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Ministry for Spatial Planning and Environment

National Biodiversity Strategy with the Action Plan for the period 2010 – 2015

DRAFT

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The National Biodiversity Strategy with the Action Plan represents the result of 14 month work invested within the joint project of the Ministry of Tourism and Environment and UNDP financed by the Global Environment Facility - GEF.

Project implementation was supervised by the Project Management Commission composed of: Siniša Stanković, Deputy minister, Ministry for Spatial Planning and Environment, Chairman, Milica Begović Radojevic PhD, Leader of Environment Cluster in UNDP, Co-chairman, Milosav Anđelić PhD, assistant to the Minister, Ministry of Agriculture, Forestry and Water Management, member, Rade Gregović, Director, Public Company National Parks of Montenegro, member, Zlatko Bulić PhD, Director, Republican Nature Protection Agency, member, representative of NGO Green Home" Nataša Duraković, observer, representative of NGO "Zeleni Crne Gore" Saša Drljević, observer, representative of NGO "Centar za zaštitu i proučavanje ptica" Darko Saveljić, observer and Jelena Rabrenović, senior advisor in the Ministry of Tourism and Environmental Protection, Project coordinator.

The Strategy was formulated based on previous projects results: (i) "*Biodiversity Study of Montenegro*" from March 2008 (process led by Vasilije Bušković MSc, Leader of the Team for Development of the Study), (ii) its *Summary* (prepared by Vasilije Bušković MSc) which was presented at the 9th Conference of the Contracting Parties to CBD in Bonn, Germany, in May 2008 and (iii) "*Country Study*" –Biodiversity Study of Montenegro from October 2008 (process led by Nigel Varty PhD, UNDP consultant, with the assistance of Marija Vugdelić Phd), as well as other official documents relevant for issues covered by the Strategy.

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1. Introduction

1.1. Bases for adoption of the National Biodiversity Strategy with the Action Plan

Articles 100, 101 and 102 of the Nature Protection Law (Official Gazette of Montenegro 51/08 of August 22 2008) provide the legal base for adoption of Biodiversity Strategy of Montenegro with the Action Plan (hereinafter referred to as the Strategy) as a document adopted by the Government, on the proposal of the Ministry competent for the affairs of environmental protection, for a period of five years with the aim to determine long term objectives and guidelines for preservation of biological and landscape diversity. In compliance with the provisions of Article 101, the Strategy includes in particular:

- guidelines for preservation of protected natural assets;
- guidelines for protection of ecosystems, habitat types and wild animal, plant and fungi species;
- guidelines for investigating and monitoring the state of nature;
- action plans for Strategy implementation, with determined priorities and possible sources of financing;
- guidelines for including nature proteciton in other sectors;
- guidelines for informing the public and involving it in decision making process on nature protection;
- manner of fulfilling international obligations in the area of nature protection;
- cartographic annex that presents in spatial terms the measures for biological and landscape diversity protection and for protection of natural assets.

Amendments to the Strategy can also be introduced prior to the expiry of the period it covers. Reporting on implementation is the annual obligation of the Ministry competent for the affairs of environmental protection, which shall submit the mentioned document to the Government of Montenegro for adoption (Article 102 of the Law). The annual report of the ministry is produced based on the annual reports of local government bodies and data on implementation of the Strategy and other planning documents on nature protection. The concerned report includes:

- data on the state of biological and landscape diversity, protected habitat types and wild species of plants, animals and fungi with the analysis of their vulnerability, as well as reasons of vulnerability and problems related to protection;
- data on effects of natural resources utilization on biological and landscape diversity;
- data on the effects of particular actions and activities on nature;
- assessment of implementated measures for protection of biological and landscape diversity and protected natural assets;
- data on the use of funds for nature protection;
- assessment of the need to amend the Strategy;
- other data important for nature protection and conservation.

The name of the strategy as defined by the Law (Biodiversity Strategy with the Action Plan) is harmonized with the translation of its name in the documents of the Convention on Biological Diversity (National Biodiversity Strategy with the Action Plan), with this document ensuring double use of the attribute denoting the state the Strategy belongs to as „national“ or „of Montenegro“.

1. 2. Requirements of the Convention on Biological Diversity (CBD)

Convention on Biological Diversity – (hereinafter referred to as CBD) was adopted in Rio De Janeiro in 1992, and 191 countries – contracting parties have adhered to it to date (168 of which have signed it). Protocol on Biological Safety, in force since 2003, was signed by 147 countries, 103 of which have signed it.

CBD targets (Article 1) are: (i) **protection of biological diversity**, (ii) **sustainable use of its components** and (iii) **equitable distribution of benefits arising from utilisation of genetic resources**.

Through promotion of **ecosystem approach**, this Convention puts special emphasis on mutual relations between preservation and sustainable use of natural resources and sustainable development of human communities.
The State Union Serbia and Montenegro ratified CBD[1] in 2003. Montenegro became a member of CBD by succession, after proclaming independence on **3 June 2006.**
Development of the National Biodiversity Strategy with the Action Plan (NBSAP, Strategy) is one of the first obligations of all contracting parties to CBD (Article 6.). The documents point out the objectives of governments for preservation of biodiversity, setting out clear activities for their achievement. The Strategy formulates mechanisms for governments to show the manner of implementation of obligations arising from CBD, just like the manner of monitoring their fulfilment. The Strategy is developed based on information provided in the "*Country Study*".

1.3. Conditions for development of Biodiversity Study of Montenegro and of the National Biodiversity Strategy with the Action Plan (Strategy)

Biodiversity Study of Montenegro was developed in two phases. During the first phase a team of specialists for particular segments of biodiversity, coordinated by the Team Leader collected information on biodiversity in the period from November 2007 to February 2008. On that occasion the basic information was collected and analyzed (there were no primary investigations carried out) on species and ecosystems diversity, values and utilization of biodiversity, threats and their causes, and current measures for protection of biodiversity and cross-cutting issues. The result of that work was the interim " Biodiversity Study of Montenegro " whose Summary was presented at 9th Conference of Contracting Parties to CBD in Bonn, Germany, in May 2008. Local and international experts and UNDP reviewed the study and identified information[2] lacking for development of the final "Country Study" - Biodiversity Study of Montenegro, which was developed in October 2008. The mentioned Study gave an overview and analysis of the current state of biodiversity in the country, of antropogenous and other threats to biodiversity and their causes, degree of current protection and in that context the related factors such as policy, legal, economic, institutional, scientific, educational and information framework, and interaction of biodiversity with the local and national stakeholders.
UNDP and the Ministry of Spatial Planning and Environment provided funds for development of the Study and the National Biodiversity Strategy with the Action Plan from GEF through a project[3] coordinated by the Ministry of Spatial Planning and Environment and UNDP Office in Montenegro.
The Biodiversity Study of Montenegro describes the key characteristics of biological resources (biodiversity) in Montenegro, establishing thus an important source of information and a base for identifying options for preservation and sustainable management of biodiversity and planning of adequate actions. This document will be a part of the First National Report of Montenegro, which will be submitted to CBD Secretariat in compliance with the obligations under Article 26 of the Convention on Biological Diversity.
The general – long term and specific – operative objectives related to protection and preservation of biodiversity and its sustainable use were formulated based on the analyses done in the previously quoted studies and in the very Strategy, followed by an activity plan and measures for their achievement, including their bearers, the needed budget and timeframe.
The underpinning general principles/ rationale of the Strategy create conditions for integration of previously stated objectives of CBD, all 7 thematic programmes of work and recommendations from the Strategic plan of CBD for significant reductions of biodiversity loss by 2010, all in compliance with the national framework of the Strategy as provided for by

[1] Including also the Protocol on Biological Safety
[2] In particular: information on the status of ecosystems, threats and basic causes of loss of biodiversity, influence of political framework and regulatory mechanisms on biodiversity, assessment of trends for negative effects, priority areas in which there is need to build capacities, and the currently available instruments for mitigating pressures on biodiversity
[3] Biodiversity Strategy, Action plan and First National report (BSAP)

the Nature Protection Law which set out the basic obligations of the most important actors responsible for implementation of the Strategy and its Action Plan in particular.
Having in mind the advantage of the legal obligation to review, amend or adopt a new Strategy every 5 years on one side, and on the other side the fact that its development was started immediately (little more than two years) after Montenegro became a party to CBD, the *National Biodiversity Strategy with the Action Plan for the period 2010 – 2015* is mostly **oriented towards implementation of the first two objectives of CBD**: (i) **protection of biological diversity** and (ii) **sustainable use of its components**.

2. Basic principles and objectives of the Strategy

2.1. Basic principles of the Strategy

Having in mind the requirements of CBD and the provisions of the Nature Protection Law[4], based on which this document was adopted, the following basic principles have been defined as the starting points of the Strategy:

- protection of biodiversity is the key segment of nature protection in Montenegro for which the ecosystem approach is used[5];
- biological diversity is one of the basic values and one of the main resources for furhter development of Montenegro
- further development of Montenegro depends on the capacities and productivity of the ecosystem[6];
- other, in particular economic development sectors in Montenegro are responsible for inclusion of biodiversity and nature protection in their policies, strategies, programmes and development plans;
- biological diversity of Montenegro is a part of the global – world biodiversity which is why efforts for its protection are being harmonized with adequate international conventions and regional and global initiatives;
- nature and biological diversity protection rely on the engagement of all parts of Montenegrin society;
- the process of extraordinary or regular adoption of the Strategy (after five years) shall ensure its previous consideration by those target groups and actors that are important for its implementation.

Strategy implementation will contribute to fulfilment of the principles from the Declaration on Environment and Development from Rio de Janeiro (UNCED 1992)[7].

2. 2. Strategy objectives

In compliance with the previously determined principles, and in line with the requirements of CBD, Biodiversity Strategy with the Action Plans has the following objectives:

a) Long-term objectives (LO):

LO 1 - *(i) protection and improvement of all components of biological diversity, (ii)their sustainable use and* (iii) equitable distribution of benefits arising from utilisation of genetic resources[8] represent long term objectives of the Strategy that must be intergrated into other sectoral policies, strategies, plans and programmes. The first (i) and the second (ii) objective have priority for the five year validity period.

LO 2. – Thematic areas of work of CBD: (i) Agrobiodiversity[9], (ii) Biodiversity of dry lands[10], (iii) Forest biodiversity[11], (iv) Freshwater biodiversity, (v) Islands biodiversity[12], (vi) Marine and coastal biodiversity[13] and (vii) Mountain biodiversity[14] represent long term objectives of the Strategy and areas it covers, with the following having priority: *I. Forest biodiversity, II. Freshwater biodiversity III. Marine and coastal biodiversity and IV. Mountain biodiversity*.

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[4] Nature Protection Law (Official Gazette of Montenegro 51/08)
[5] http://www.cbd.int/ecosystem/
[6] CBD, Decision no. V/6, annex, section C, paragraph 12, Description, Principles and Operative instruction for ecosystem approach
[7] Especially with regard to implementation of principles. 7, 8, 11, 15 and 17 (see text of the Declaration at http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm)
[8] Articles 6 and 8 of CBD, Decision no. III/9, paragraph 2
[9] CBD, Decision no. III/11, paragraph 15, Decision no. VIII/23, paragraph 5
[10] CBD, Decision no. VI/4, paragraph 2, Decision no. VI/2, paragraph 5 (c)
[11] CBD, Decision no. VI/22, paragraph 28
[12] CBD, Decision no. VIII/1, paragraph 3
[13] CBD, Decision no. VII/5, paragraph 44
[14] CBD, Decision no. VII/27, paragraph 3.

LO 3. – Of particular importance are the cross-cutting issues of protection and sustainable use of biodiversity: (i) *Protected areas of nature*[15]*, (ii) Sustainable use of biodiversity*[16]*, (iii) Protection of ecosystems*[17]*, (iv) Tourism and protection of biological diversity*[18]*, (v) Spatial planning and biodiveristy and (vi) Assessment of actions impact on biodiversity /nature/ environment* represent long term objectives of the Strategy for which special measures and activities are implemented in the five year period of its validity

b) Operative objectives (OO):

OO 1. – develop adequate activities and measures for identification, protection and improvement of all components of biological diversity, both *in situ*, and *ex situ*;

OO 2. – develop adequate activities and measures for eliminating and/or mitigating negative effects on biological diversity;

OO 3. – apply adequate indicators[19] for monitoring progress in application of objectives and implementation of measures and activities determined by the Strategy;

OO 4. – ensure regular allocation of adequate funds[20] for implementation of measures and activities determined by the Strategy;

OC 5. – ensure transposition and implementation of EU directives and regulations pertaining to natural habitats and species living in the wild;

OC 6. – ensure organizational adjustment and capacity building of institutions responsible for protection of biodiversity/nature, in compliance with the needs stemming from: (i) enforcement of adequate laws, (ii) the EU accession process, (iii) obligations determined by this Strategy;

OC 7. – stimulate improvement of formal and informal forms of education on biological diversity and public participation in decision making processes.

Activities and measures determined in the Action Plan based on previously determined principles and objectives of the Strategy should contribute to enforcement of provisions from the CBD Strategic Plan (from 2002) at the national level for significant reducion of biodiversity loss by the year 2010.[21]

The validity of the above determined Strategy principles and objectives is checked in every new process of extraordinary or regular adoption.

2. 3. Period of Strategy validity

In accordance with the provisions from Article 101 of the Nature Protection Law, the validity period of the Biodiversity Strategy with the Action Plan is 5 (five) years, from 2010 to 2015. The date of 29 July 2010, when the Government of Montenegro adopted it, is considered the beginning of its validity, while the 29 July 2015 is considered the date of expiry of its validity. In the event a new or amended Strategy is not adopted by the Government after expiry of the 5 year validity period, provisions of the last version of the Strategy adopted by the Government shall be in force and apply. Implementation of all measures and activities that were envisaged in the last version of the Strategy shall continue after expiry of the Strategy validity period.

2. 4. General conditions for implementation of the Strategy and the Action Plan

Process of preparation, adoption, implementation and reporting on implementation of the Strategy is related to the greatest extent to the central authority bodies in Montenegro, thus

[15] CBD, Decisions from CoP 7
[16] CBD, Decisions related to principles and Instructions adopted at the Conference in Adis Abeba
[17] CBD, Decision no V/6, annex, section C, paragraph 12, Instructions prepared by WRI (2008) on the functioning of benefits provided by ecosystems
[18] CBD, Decision no. VII/14, paragraph 10, Instructions on biodiversity and tourism development
[19] Using the preliminarily defined indicators in CBD, Decision VII/30, Annex I
[20] Using available possibilities, as recommended by CBD, in Decision VII/24, paragraph 18.
[21] See recommendations within: "Achieving the 2010 Biodiversity target. Decisions from Eighth meeting of the Conference of the Parties to the Convention on Biological diversity and The Report of High Level Segment. Curitiba, Brasil 20 – 31 March 2006"

the largest part of measures and activities determined by the Strategy is delegated as a task to Government institutions. Due to complexity of obligations for protection of biological diversity determined in the Law and CBD, and in compliance with the positive practice of the Government of Montenegro to ensure as wide participation as possible of responsible actors in the society in the processes related to official strategic documents, the measures and activities determined by the Strategy are defined in the largest number of cases as joint obligation of competent government institutions, local self-government bodies, professional organizations, associations and civil society bodies.

Adequate funds[22] will be provided in the Budget of Montenegro by the Government for implementation of measures and activities determined in the Strategy and its Action Plan, as well as by municipalities in their budgets, and from other sources of financing (donations, international projects), at annual dynamics to be determined by the ministry competent for the affairs of environmental protection and local self-government units. In compliance with the conditions for allocation of funds for implemention of activities and measures determined by the Strategy, the Ministry can adopt a *Plan of Funds Mobilization* from local, state, regional and international financial sources that will ensure implementation of priority activities and measures as determined by the Strategy.

Institutions and social actors to which this document delegated certain activities or measures as tasks, are obliged to cooperate on their implementation. For the needs of adjustment and capacity building of institutions responsible for biodiversity protection/nature protection for implementation of measures and activities determined by the Strategy, the ministry competent for the affairs of environmental protection can adopt adequate *Programme*, which will ensure, among other, engagement of existing staff and its higher efficiency.

In order to monitor successfulness of Strategy implementation, apart from the mechanism of preparation, consideration and adoption of annual reports on Strategy implementation, the ministry competent for the affairs of environment can delegate to the *Council for Sustainable Development* the obligation to prepare, consider and assess certain issues important for efficiency of their joint action.

[22] CBD, Decision no. VIII/13, paragraph 2

3. State and review of biological diversity

3. 1. General assessment of biological diversity in Montenegro

According to the wealth of flora and fauna and ecosystem diversity Montenegro belongs to the leading countries of Europe.

The state of biological diversity in Montenegro has been monitored, even though to a very limited scope, since 2000[23] within the national Environmental Monitoring Programme. Due to greatly reduced scope of financing of this Programme component, information collected to date does not yet allow for a more serious analysis of trends regarding the state of indicator species populations, changes at selected types of habitats and thus in the environment in general. Still, summary results of previous work on the Monitoring Programme of biologal diversity in Montenegro (given in Information on the state of the environment in Montenegro adopted by the Government)[24], confirmed assessments expressed earlier in professional and scientific literature on threats for numerous components of biological diversity. By generalizing the results obtained through the Programme, it was stated that negative consequences were mostly present in **water ecosystems and forests**[25], and then also in urban and agrarian areas. Degree of vulnerability of particular ecosystems is not the same and depends on the intensity of antropogenous factors. Coastal ecosystems have also been endangered due to turning of those natural habitats into developed spaces and structures. Water ecosystems are under the pressures of various forms of pollutions, which reduce their productivity. It was concluded that the causes of threats to biodiversity in the forthcoming period must be carefully analyzed in order to be able to propose measures for improving the state of biodiversity, through their integration into sectoral plans and strategies, while the existing Biodiversity Monitoring Programme should be extended. A more complex and multidisciplinary programme/ project of systematic monitoring of the state and determining of distribution of particular plant and animal species and their habitats should be initiated and realized, in the light of obligations stemming from the process of establishment of a network of protected areas and NATURA 2000 network. In 2005, additional threats for dry grassland ecosystems (the Zeta and Bjelopavlićka Plain) and ecosystems of salt pans was stated (hinterland of Velika Plaza in Ulcinj).

More detailed presentation of threats and factors endangering biological diversity in Montenegro is given in Chapter 7, as well as in Chapters 5 and 6 of the Strategy.

The results of research within the Biological Diversity Monitoring Programme made possible review of old and adoption of a new List of Protected Biodiversity Species which includes 415 plant and 430 animal species, as well as the entire order of bats (Decision on putting under protection particular plant and animal species (Official Gazette of Montenegro 76/06).

Review of biological diversity in Montenegro

Diversity of geological base, landscapes, climate and soil, and the very position of Montenegro on the Balkan Peninsula and in the Adriatic, created conditions for appearance of biological diversity with very high values, which places Montenegro among biological „hot-spots“– of European and world biodiversity.

Figure 1. *„Hot-spots“– of biological diversity (red colour) in the world*, Source ECNC

There are two main bio-geographic regions in Montenegro: Mediterranean and Alpine, with very diverse types of ecosystems and habitats, on a very small surface. The change of uniformity of flora and fauna zoning, from the cold mountain areas in the north to warm

[23] Republican Nature Protection Agency

[24] Information on the state of the environment in Montenegro for 2005, 2006, 2007, Ministry of Tourism and Environment http://www.mturizma.vlada.cg.yu/vijesti.php?akcija=rubrika&rubrika=258 and Information on the state of the environment in Montenegro for the years 2002, 2003 and 2004, Ministry of Spatial Planning and the Environment http://www.mepp.cg.yu/vijesti.php?akcija=rubrika&rubrika=28

[25] This conclusion was reached also when ecosystems were prioritized for protection, as can be seen from the summary table given at the end of this chapter

Mediterranean coast in the south is influenced by the presence of Alpine flora and fauna elements on the tops of seaside mountains and penetration of warm air and elements of Mediterranean flora and fauna through river valleys and canyons up to mountain areas of inland Montenegro. The northern mountain region is bio-geographically connected with other mountain areas in the corridor of South-eastern Dinarides[26].

During the last Ice Age, the flora and fauna in Montenegro evaded the main effects of glaciation that affected countries more to the north. Therefore, we encounter the relicts of glacial flora and fauna (glacial relicts) in Montenegro today, and the relicts of older tertiary flora and fauna can be found in its sheltered, warm river valleys and canyons. Due to the refugional character of those „sheltered" habitats, endemism[27] with dominant mid-European, Alpine and Mediterranean elements in flora and fauna is notable in Montenegro.

3. 2. Ecosystems diversity

There is no formal, widely accepted classification of ecosystems, which is why a review of characteristic ecosystems, habitats and geological formations was done for the needs of this document in order to present the essence of biodiversity and landscapes of Montenegro to the possible extent.

The following ecosystems were singled out: Alpine, forest, dry grasslands, freshwater and marine, and among habitats: coastal, caves, canyons, and karst as a specific geologicial formation. The restrictions of classical biological divisions and classifications of vegetation/ecosystems[28] or of systems similar to them adopted by particular international organisations (UNESCO[29], FAO[30]) were overcome by including characteristic habitats and geological formations.

Alpine ecosystem

This includes high mountain area of the continental part of Montenegro, with dominant mountain peaks of Durmitor (2 523m), Komovi (2 461m), Prokletije (2 536m), Sinjavina (2 277m) and Bjelasica (2 037m), and of the coastal mountains of Orjen (1 893m), Lovćen (1 749m) and Rumija (1 586m). Areas in which these ecosystems are present are characterized by short cool summers and long and severe winters with abundant snow. As regards vertical distribution, these ecosystems are situated above the upper forest line and include the following habitat types: alpine pastures, cliffs, screes and rocky areas with sparse vegetation and heaps of sandy and rocky materials „sipari" („točila"). Characteristic plant species can be found in these habitats: the Alpine flower Edelweiss *Leontopodium alpinum*, the endemic Montenegrin blue-bell *Edraianthus montenegrinus, E. glisichi, E. pulevici*, *Wulfenia blecicii*, Durmitor mullein *Verbascum durmitoreum*, *Potentilla montenegrina, Draba betriscea* and numerous glacial relict species. Characteristic fauna includes chamois *Rupicapra rupicapra*, among birds Alpine Chough *Pyrhocorax graculus,* Meadow Pipit *Antus pratensis*, Alpine Accentor *Prunella collaris*, Black Redstart *Phoenicurus ochruros*, Golden Eagle *Aquila chrysaetos*, more rarely Griffon Vulture *Gyps fulvus*, Wall Creeper *Tichodroma muraria* and other. Bird fauna also includes glacial relicts such as: White-winged Snowfinch *Montifringilla nivalis*, Horned Lark *Eremophila alpestris* and Alpine Accentor *Prunella collaris*.

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[26] South-eastern Dinarides of wider, regional Dinaric biocorridor that streches from the Alps in the north-west to Šar-Pind in south-east, in paralel with the Adriatic coast.

[27] Only in the flora of Montenegro 223 endemic species and sub-species are registered

[28] The most important are given in the following works: (i) *Walter, H*. (1985): Vegetation of the Earth, and ecological systems of the geobiosphere, Third Edition. Springer-Verlag, New York, (ii) *Ellenberg, H. and D. Mueller-Dombois.* (1967): A tentative physiognomic-ecological classification of the formations of the earth. pgs. 466 488, (iii) *D. Mueller-Dombois and H. Ellenberg.* (1974): Aims and methods of vegetation ecology. John Wiley and Sons. New York, New York. 547 pp, (iv) *Сукачёв В.Н.* (1945): Биогеоценология и фитоценология // Докл. АН СССР. Т. 47, № 6. С. (v) *Horvat I.* (1949): Nauka o biljnim zajednicama (Science on plant communities). Nakladni Zavod Hrvatske, Zagreb, 434 pp, (vi) *Horvat I.* (1950): Šumske zajednice Jugoslavije (Forest communities of Yugoslavia). Institut za šumarska istraživanja, Zagreb, 65 pp, (vii) *Horvat I, Glavac V & Ellenberg* (1974): Vegetation Sudosteuropas . Gustav Fishler Verlag. Stuttgart 768 pp

[29] See in United Nations Educational, Scientific and Cultural Organization (UNESCO) 1973: International Classification and Mapping of Vegetation, Series 6, Ecology and Conservation. Paris, France: United Nations Educational, Scientific, and Cultural Organization. 93 pp

[30] The base of FAO's system for classification of ecological zones is made up of climate and (potential) vegetation. According to this system 5 dominant climate zones were singled out at the first level (Tropical, Subtropical, Moderate, Boreal and Polar) and 20 ecological zones at the second level which are singled out based on the quantity of precipitations as an additional criterion. See in FAO (2001): Global Ecological Zoning for the global forest resources assessment, Rome 2001

Forest ecosystem

Statistically, in terms of the surface they cover, forests are the most extensive ecosystem in Montenegro. Forests and forest land cover 54% of the state territory. Natural forests cover approximately 45% of territory of Montenegro which makes it one of the most forested countries in Europe. Coniferous species, largely Fir *Abies alba*, Spruce *Picea excelsa* and Mugho Pine *Pinus mugo*, dominate the forests of higher altitude.

Forests of fir and spruce *Abieto-Picetum* occupy a wide area of the mountains in northern Montenegro in the zones of Kovač, Ljubišnja, Durmitor, Sinjajevina, Krstac, Smiljevica and Hajla mountains, as well as in enclave forms in Prokletije, Bjelasica, Maglić and other mountains. There is important forest of *Picetum abieti montenegrinum,* a Spruce community in Mount Ljubisnja. There are also forests with Balkan endemic pines Macedonian pine and Whitebark pine. Macedonian pine *Pinus peuce* is present in Prokletije and to a smaller degree on other Montenegrin mountains (Bjelasica and other). Whitebark pine *Pinus heldreichii* appears in the zone of Prokletije and on the mountains in the central part of Montenegro (Štitovo, Komovi...). Endemic species Mountain maple *Acer heldreichii* appears in the forests of high mountains of the northern and central part of Montenegro. Mainly beech trees are widespread in higher areas, at altitudes of 700 to 1 800m. Even though rarer, oak, mainly mixed forests can also be found. Chestnut forests – of chestnut *Castanea sativa* are specific for sub-Mediterranean part of Montenegro but with discontinuous distribution (several localities in the Bay of Kotor, northern slopes of Rumija - Ostros, Livari). Characteristic fauna of forests in Montenegro includes the Wolf *Canis lupus*, Brown Bear *Ursus arctos*, and Wild Boar *Sus scrofa*, along with many species of birds such as Owls (*Strigiformes*), Woodpeckers (*Picidae*) and species of Warbler (*Sylviidae*), with most of the forest avifauna of the Western Palaearctic represented. Despite extensive logging in the past[31], some forest areas, such as Durmitor, Bjelasica and Prokletije, still retain relatively pristine forests and are under protection.

Figure 2. *Map of forest ecosystems*

(Dry) grasslands ecosystem

Dry grasslands are found on alluvial land but are now very rare. Small remnant areas still exist at Ćemovsko polje, including Karabuško, Tuško and Dinoško polje and the lower part of the canyon of the River Cijevna.

Concerning typical birds, in these areas are present Stone Curlew *Burchinus oedicnemus* and Tawny Pipit *Anthis campestris.*

Freshwater ecosystem

These comprise lakes, rivers, streams, marshes/wetland habitats and man-made reservoirs, flooded meadows and riverine forests. Wetland habitats occur in the lowlands and along the coast. Skadar Lake that is shared with Albania is the largest[32] and the richest in terms of biodiversity. According to new research, Skadar Lake is estimated as a refuge for many species that survived the glaciations. Consequently Skadar Lake and its vicinity are rich in relict and endemic animal and plant species. The lake is relatively shallow[33]) with dominant Reedbed *Phragmites communis*, Water Lilies *Nymphea alba* and Yellow Water-lily *Nuphar luteum*, Water Calltrop *Trapa natans*, but also includes flooded meadows, and flooded forests. Forest fragments of Skadar oak *Quercus robur scutariensis* are still present in some areas near to northern Lake shore*.* There are numerous islets along the southern coast which is steep, rocky, with sparse sub-Mediterranean pseudo-macquis (Oriental Hornbeam *Carpinus orientals,* Pomegranate *Punica granatum,* Jerusalem Thorn *Paliurus spina-christi,* Fig *Ficus carica,* Holly *Phillyrea sp.*). The community of algae of the Lake is very diverse which characterizes only tropical and sub-tropical freshwater aquatic systems. 1092 species,

[31] Sustainable forestry, Ministry of Agriculture, Forestry and Water Management

[32] The Lake surface varies between 354 and 505 km^2, depending on the water level

[33] The average depth is 6m

varieties and forms have been determined at the territory of the lake, with dominant silicate algae. The richness of algae community is the consequence of lake eutrophication (according to bioproduction it belongs to oligotrophic lakes). This is manifested by the whole bottom being covered by benthos algea and by increase of planctone communities in shallow zones of the northern bank of the Lake at low water level. The Lake supports over 40 species of fish (economically the most valuable ones are Carp *Cyprinus carpio* and Bleak *Alburnus alburnus).* The presence of 281 species of birds have been recorded, and the lake supports large populations of breeding and wintering waterbirds, including the largest population of Pygmy cormorant *Phalacrocorax pygmeus* in Montenegro as well as the globally threatened Dalmatian Pelican *Pelecanus crispus*. It is also an important 'stop-over' for migrating birds traveling along the Adriatic Flyway from breeding areas in Central Europe to their wintering station further south and east in the Mediterranean and Africa. The biodiversity of Lake Skadar is among the most investigated in Montenegro. Other important lowland wetlands include Šasko Lake, which is another relatively shallow lake with well-developed macrophyte vegetation in south-east and north-west bank. There are also a number of important cold, high-mountain glacial lakes, particularly in Durmitor, Biogradska gora and Prokletije mountains national parks[34]. These lakes are poor in nutrients[35]) and have specific flora and fauna, including neotenic form of the crested newt *Triturus alpestris.* Barno Lake at Durmitor is specific because of its mountain mire (peat) vegetation.

Marine ecosystem

Montenegro's maritime zone extends out to 12 nautical miles (22.26 km) from the shore, covers 2 504.8 km^2, and reaches a maximum depth of 1.233m[36]. The average sea depth in the coastal area is 27. 3 m, and the maximum is 60 m. Depths of around 20 m follow the line of coast at a distance from 200 to 300 m. Algae (plankton) and sea weed are characteristic vegatation of the coastal zone, which support extensive Seagrass *Posidonia oceanica* and *Cymodocea nodosa* with life cycle of numerous animal species related to them. The fauna of the Adriatic Sea has not been fully investigated yet, however, according to recent data[37] there are over 300 species of algae, 40 species of sponges, 150 species of crustaceans, 340 species of mollusks, over 400 species of fish, with 3 species of marine turtles and 4 species of dolphins in Montenegrin part of the Adriatic. Most of the known economically important species are distributed along the littoral zone (up to 200 meters deep), but some of them can be found in the transition zone to the bathyal zone (200-300 meters deep) such as Norway lobster *Nephrops norvegicus* and petrified sponge *Thenea muricata*. According to their importance for preservation of biodiversity, the Bay of Kotor and Bojana estuary can be singled out as areas important for nutrition and spawning of economically important species. Rare species including mollusks *Tijsira orahoviciana* and *Mitra zonata* can be found in the Bay of Kotor. Bojana estuary is an important station for nutrition of migratory bird species.

Figure 3. *Map of marine and freshwater ecosystems*

Coastal (littoral) habitats

Montenegrin coast is 313 km long and characterized by rocky shores (cliffs), numerous natural sandy beaches and 8 smaller islands. The longest beach is in Ulcinj (over 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. Culitivated areas with olive groves and fruit orchards are also found here. Characteristic vegetation includes typical Mediterranean species such as Evergreen Oak *Quercus ilex*, Kermes Oak *Quercus coccifera*, Viburnum *Viburnum tinus*, Holly *Phillyrea media*, Coastal Juniper *Juniperus*

[34] The most important mountain lakes (a) of Durmitor: Crno jezero, Vražje, Riblje, Barno, Zminjičko and other; (b) of Bjelasica: Biogradsko, Šiško, Pešića jezero and other; (c) of Komovi – Rikavačko, Bukumirsko and other, (d) of Prokletije – Ridsko, Plavsko, Visitorsko and other; (e) on Lukavica: Kapetanovo jezero; (f) on Volujak/Bioč: Stabanjska, Trnovačko and other.

[35] Especially with nitrogen and phosphorous

[36] Registered to the south-east from Budva

[37] In Regner, S.,Vukanic, D., Vuksanovic, N., Jerkovic, L., Kljajic, Z., Mandic., V., Milojevic, S., Radovic, I. & Regner, D., 2003: Geneticki resursi morskih organizama. Jugoslovenska inzenjerska akademija, Bilten br. 1., Belgrade

oxycedrus, Big Heath *Erica arborea*, Evergreen Pistachio *Pistacia lentiscus*, Strawberry tree *Arbutus unedo*, Rockrose *Cistus villosus* and White Rockrose *Cistus salviaefolius*, Spanish Broom *Spartium junceum*, Myrtle *Myrtus communis*, Olive *Olea europea*, Smilace *Smilax aspera*, Blackberry *Rubus ulmifolius*, Flowering Ash *Fraxinus ornus*, Fig *Ficus* spp, and Hornbeam *Carpinus* orientalis., and a range of medicinal plants such as Sage *Salvia officinalis* and Laurel *Laurus nobilis*. Some rare and endemic species with limited range of distribution are also present here, including Skadar Oak *Quercus robur* spp. *scutariensis* in Stoj near Ulcinj, as well as the rare community of laurel and oleander *Andropogoni – Nerietum* above the well Sopot near Risan. The Salt Pans in Tivat and the commercial salt works at Ulcinj together with the neighboring salinas and lagoons comprise an important over-wintering area for waterbirds.

Caves

Due to its geology, Montenegro has numerous caves and sinkholes. The caves are frequently particulary beautiful (e.g. Lipska cave, Đalovica cave), while sinkholes are among the deepest in the Balkans (e.g. sink holes at Vjetrena brda in Durmitor, Duboki do in Lovćen). In many cases, they have an exceptionally complex and rich fauna, with many endemic and relict (particularly Tertiary) forms, especially among invertebrate groups.

Canyons

Canyons give an impressive image to Montenegro. While some of them are under the influence of Mediterranean climate (the canyons of Morača and Cijevna) cold continental climate dominates in others, such as the canyon of the Tara river, the remains of the canyons of Piva and Komarnica, and in the gorges such as Ibarska, Tifranska and Đalovića. They have preserved assemblages of very different, frequently endemic species, which separates them from the neighbouring mountain areas. The Tara river canyon with the maximum depth of 1 300 m is the deepest in Europe and the second deepest in the world (after the Colorado river Grand Canyon in the USA).

Karst

Montenegro's karst region lies generally at elevations of 1000 meters above sea level, although some areas rise to 1 900m such as Mount Orjen (1 894m), the highest massif among the coastal limestone ranges. The vegetation is characterized by thicket of White Hornbeam *Carpinus betulus*, Black Hornbeam *Ostrya carpinifolia*, Macedonian Oak tree *Quercus trojana*, Downy Oak Quercus pubescens, and herbaceous vegetation dominated by Sage *Salvia Officinalis*, and there are numerous endemic forms. Typical bird fauna includes Rock Partridge *Alectoris graeca*, Rock Thrush *Monticola saxatilis,* Blue Rock Thrush *Monticola solitarius,* Rock Nuthatch *Sitta neumayer,* Mediterranean Wheatear *Oenanthe hispanica*, Whitethroat *Sylvia communis* and Orphean Warbler *Sylvia hortensis.* There is high degree of endemism in the herapatofauna of the Mediterranean karst area.

Figure 4. *Karst panorama (Žijovo)*

Prioritety habitats and ecosystems for protection

Having in mind the fact that the results (conclusions) obtained through Biodiversity Monitoring Programme (see chapter 3.1.) stated that the negative consequences were mostly expressed in **water and forest ecosystems**, a survey for additional checking and comparison of those conclusions was carried out during drafting of the Strategy. The survey included 15 specialists in the area of biology and related natural sciences, from various institutions, who gave their assessment of degree of vulnerability and importance for protection of ecosystems and specific types of habitats in Montengro applying previously selected biological[38] and social -economic[39] criteria.

The survey results (see Annex no. 5.) confirmed previously stated results/conclusions from Biodiveristy Monitoring Programme in Montenegro.

[38] Biological criteria: Diversity of species or habitats of a particular ecosystem (total number of species or habitats supported by an ecosystem) and their relation with other ecosystem/s; The presence of rare or endangered species and their number (representation in the List of Protected Biodiveristy Species in the Annexes of EU Habitats Directive, or on the Red List of IUCN, the number of endemic species and their number (local or regional endemic species); Naturalness / authenticity (timeframe in which the ecosystem has not physically changed under antropogenous effect) Sensitivity and vulnerability of ecosystem (how much are the species, habitats or the ecosystem sensitive to distrubances; Vitality and resistance of the ecosystem (how easily species, habitats or ecosystem return to the previous state after disturbance; what is the threshold to which the ecosystem can bear distrubances without consequences)

[39] Social – economic criteria: Economic value of ecosystem (direct and indirect where it is known); Social, recreational and/or cultural values of ecosystem; General ecosystem values (production of economically valuable resources, provision of services for the needs of development); Level of scientific knowledge on ecosystem (fully investigated ecosystems have higher value); Level of threats by antropogenous factors (such as the pressure of urban development, tourism and the like); The possibility to conduct activities for protection of the ecosystem (complex assessment based on a large number of factors).

3. 3. Diversity of species

Montenegro has a high biological diversity for such a small European country, due to its geographic position, distribution and heterogenousness of habitats, topographic variations, geological history and climate conditions. Information on the most important groups on which there are data is presented below. However, it can be observed that basic knowledge about biological diversity and many taxa is very limited, including disagreements about taxonomic status of some taxa – whether they are species or subspecies.

Algae

Freshwater algae

Freshwater algae of Montenegro exhibit high diversity – 1 200 species and varieties have been described so far with silicate algae (*Bacillariophyta*) and green algae being the predominant groups. The freshwater systems they inhabit differ in conditions, with the northern lakes and rivers being oligotrophic and supporting relatively few species (silicate algae dominate, particularly *Asterionella formosa* and species of the families *Cyclotella*, *Fragillaria* and *Synedra*), while those in the south are generally mesotrophic to eutrophic and are richer in species of algae.

The most significant site for algae in Montenegro is Skadar Lake, the largest freshwater basin in the Balkans, whose meso- to eutrophic waters support a very high biomass of planctonic, benthic and epiphytic algae. Some 1 092 taxa are known from the Lake, of which more than 700 have not been recorded elsewhere in Montenegro. One algal species - *Cyclotella skadariensis* – is believed to be endemic to Skadar Lake. Other lakes in Montenegro are known to support significant diversity of algae, including Crno (195 species), Bukumirsko (190), Ridsko (183), Plavsko (182), Zminje (180), Šasko (138), and Veliko i Malo Stabanjsko (138). The man-made reservoir Krupačko also supports a good diversity of algae (130 species). The algae flora of rivers in Montenegro is less well studied and taxonomic lists exist only for the Tara River (221 taxa) and the Morača River (214 taxa) systems.

Marine algae

Over 300 species of macro algae have been recorded in Montenegrin waters (although there are likely to be many more), the majority of which are red algae (*Rhodophyta),* comprising 202 (66.5%) of recorded species in spring and summer surveys, followed by *Phaeophyceae* (60 taxa, 19.7%) and *Chlorophyceae* (42 taxa, 13.8%). Most of these species are widespread in the Adriatic and Mediterranean seas (Adriatic-Mediterranean 57.5%, Mediterranean endemic 26.1%), and only 4.3% are endemic to the Adriatic Sea

Mosses and liverworts (bryophyte) and lichens

Currently, 589 species of Bryophytes are recorded for Montenegro, comprising 483 species of Mosses and 106 of Liverworts. 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 from Montenegro. The largest numbers of species are associated with forests of Beech *Fagus* spp., Hornbeam *Carpinus* spp., Oak *Quercus* spp. and Plane Tree *Acer monspessulanum.* With an increase in altitude and change of forest type the diversity of mosses decreases. Mosses are also associated with watercourses and are particularly diverse in peat bogs in Montenegro (e.g. at Barno lake, Prokletije mts) where 13 species of *Sphagnum* mosses have been recorded. In Montenegro 693 species of lichens are recorded[40].

Vascular plants (higher plants)

[40] According to: Knežević & Mayrhofer (2009): Catalogue of the Lichenized and Lichenicolous fungi of Montenegro. Phyton, Wienn

The Balkan Peninsula, which includes Montenegro, is the most diverse part of Europe in terms of vascular plants, with 7 000 - 8 000 species recorded. Within Balkans which is one of 158 potential centres of biodiversity in the world, important is the share of subcentres[41] of high mountain flora from Montenegro. There are 3 250 species in the vascular flora of Montenegro. The number of endemics is also high – there are as many as 392 Balkan (regional) Endemic species, which accounts for over 7% of Montenegrin flora. Apart from these, even local Endemic species have significant importance - there are 46 of these in Montenegro, mostly Tertiary Relicts. Families of vascular plants with the largest number of species in Montenegro are the *Asteraceae* (307 taxa)*, Poaceae* (263), *Fabaceae* (233), and *Caryophyllaceae* (151).

Fungi

Around 2 000 species of fungi (over 1 000 Micromycete species and approximately 920 Macromycete species) have been recorded for Montenegro, although it has been estimated that between 15 000 and 21 000 species could occur, of which around 4 500 would be Macromycetes[42]. The key macromycete groups are: *Agaricales* (321 known species), *Aphyllophorales* (221), *Ascomycota* (141), *Boletales* (69), *Gasteromycetes* (47), and *Russulales* (91)

Invertebrates

Terrestrial and freshwater invertebrates

Terrestrial invertebrates are a very large group of animals with many types, most of which have been poorly studied in Montenegro. As a result, comprehensive species check-lists and even widely accepted approximations of species numbers are lacking (although species lists exist for some sites, principally Skadar Lake). This holds even for those phyla whose members are important from the point of view of human health (e.g. Protozoans, Nematodes, Flukes, Flatworms, Leeches). To date, the best-studied phyla include Mollusks *Mollusca* with 323 recorded species and 136 Land Snail species considered of international importance, mostly Endemic species), Segmented Worms (*Oligochaeta* - with 27 recorded species) and Arthropods (*Arthropoda* – with an estimated 16 000-20 000 estimated species, although some estimations put the number of >25,000 Insects only). Reseraches of these groups suggest that they are of high levels of endemism as well as high species diversity.

Many are relict species, particularly from the Tertiary period, and include the 'living fossil' *Congeria kusceri* - the only known subterranean Bivalve Mollusk - from a genus thought to be extinct since the Miocene (23 to 5.3 million years before the present). Particularly significant cave sites for endemic invertebrates include: Lipska cave (endemic genera of Amphipod *Typhlogammarus*, endemic species of Snails and Copepod), Bobotuša cave near Trnovo (endemic species of Copepod, Harvestman (*Opiliones*), and Beetle), Obodska cave (endemic species of Beetle, Amphipod and Snails) and Megara cave near to Podgorica (endemic species of Beetle and Harvestman).

Marine invertebrates

The existing data suggest a relatively high diversity, although low endemism (in common with the rest of Adriatic Sea). For instance, some 50% (50/101 species) of all the Echinoderms (*Echinodermata*) occurring in the Adriatic Sea are recorded for Montenegro, 127 species of bivalves have been reported from the inner part of Boka Bay (Kotor-Risan Bay) with an estimated 250-300 species in Montenegrin waters, and 17 species of cephalopod (*Sepia officinalis, Sepia elegans, Sepia orbignyana, Sepietta oweniana*, *Sepiola rondeleti, Illex coindetii, Loligo vulgaris, Octopus vulgaris, Octopus salutii, Eledone moschata, Eledone cirros, Alloteuthis media, Rossia macrosoma, Scaeurgus uncirrhus, Pteroctopus tetracirrhus* and *Todarodes sagitatus)* have been recorded on the open part of the Montenegrin coast.

[41] Subcentre I – Coastal Dinarides: Orjen, Njeguške planine, Lovćen Rumija, Subcentre II – Durmitor mountain group: Bioč, Durmitor, Sinjavina, Vojnik, Ljubišnja and Subcentre III – Prokletije mountain group: Bjelasica, Komovi, Prokletije

[42] The estimated number of micromicetes (according to G. Kasom, Prilog o gljivama and Studija o bioloskom diverzitetu (2008) of around 4 500 species represent only half of the number of known macromicete species of Europe

Commercially exploited species include Squid (*Loligo vulgaris*) and Cuttlefish (*Sepia officinalis*), which comprise the majority of the Cephalopod catch in Montenegrin waters, as well as species of crab and shrimp (*Crustacea*), e.g. the Shrimp *Parapenaeus longirostris*, and several Bivalve species (*Mollusca*). However, despite their commercial importance, the ecology of these groups is still rather poorly known.

Fish

Freshwater fish

Freshwater ecosystems of the Adriatic basin are inhabited by around 60, and those of the Black Sea by around 30 fish species. Disparities in the distribution of species between these two basins are the consequence of geological past of the Adriatic basin which served as a Refugium to numerous fish species during the last several glaciations. The Adriatic basin and the southern/Mediterranean part of Montenegro abound in a large number of endemic species and a high level of genetic diversity, not only of fish but of other organisms as well. Typical species of fast mountain rivers waters include salmonids (*Salmo trutta / faroides*, *Salmo dentex, Thymallus thymallus)*, as well as cyprinids (*Gobio gobio*, *Barbus meridionalis*, and *Barbus barbus)*. In moderately fast courses (lower river stretches) dominate cyprinids (*Rutilus*, *Leuciscus*, *Phoxinus*, *Chondrostoma*, *etc*) but some salmonid species (including rare endemic trout *Salmothymus obtusirostris zetensis)* are present as well. Still water (lake, ponds) fishes are also cyprinids from the orders *Cyprinus, Carpio, Leuciscus, Alburnus etc*. Characteristic estuarine and brackish water species include species from orders *Mugil*, *Dicentrarchus*, *Blennius*, *Platichthis, Anguilla, Alossa* etc.

Among the country's most important sites for freshwater fishes is Skadar Lake, which supports more than 40 fish species, including species that migrate between marine and freshwater systems, such as the Eel (*Anguilla anguilla),* Twaite Shad *(Alossa falax nilotica)* etc.

Marine fish

The marine fish fauna of the Adriatic Sea is considered diverse with 117 recorded families, but has a low level of endemism. To date, 407[43] species have been recorded for Montenegro, which represents around 70% of those recorded for the Mediterranean. However, this is not likely to be a full list, as some species have been recorded only once and their status in Montenegrin waters is unknown (e.g. whether they are migratory or resident), and not all of the marine territory of Montenegro has been explored (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 the drop offs and reefs of the near-shore coastal zones, which provide high structural diversity and different microhabitats for fish. Sandy bottoms, such as that at the mouth of the River Bojana, are relatively poor in fish species, although shallow-water *Posidonia* Seagrass provide important nursery areas for young fish. Close to the coast e.g. Boka-Kotor Bay, *Spicara flexuosa*, *Serranus hepatus*, *Mullus barbatus*, *Pagellus erythrinus* and other, mostly bento-pelagic species, can be found, while *Merluccius merluccius*, *Trisopterus minutus capelanus*, *Trachurus trachurus* are characteristic of the benthic area of open sea areas in the middle and southern Adriatic.

Reptiles and amphibians (herpetofauna and batrahofauna)

Montenegro supports a relatively high diversity of both terrestrial and aquatic Amphibians and Reptiles, including Lizards, Snakes, Turtles, Frogs, Toads, Salamanders, and Sea Turtles. There are currently 56 species (18 species of Amphibian and 38 species of Reptiles), and 69 subspecies recorded 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 Crested Newt (*Triturus cristatus)* species complex, for which the region is the centre of speciation, and records of more species and sub-species are likely.

The Lovćen and Prokletije mountain regions stand out as particular hotspots of Amphibian and Reptile diversity and endemism in Montenegro. Aquatic habitats in the Lovćen region are especially interesting as they host Amphibian and Reptile communities with many relict and endemic species e.g. Italian Crested Newt *(Triturus carnifex),* Cetinje Yellow-Bellied Toad *(Bombina variegata scabra), Podarcis melisellensis fiumana, Dinarolacerta mosorensis (=Lacerta mosorensis),* Blue Lizard *Dalmatolacerta oxycephala (=Lacerta oxycephala),* and *Vipera ammodytes meridionalis*. The lakes of Mount Prokletije region (Bukumirsko and Ridsko lakes) are notable for their populations of Neotenic [44] Alpine Newt *Triturus alpestris*, and also support a significant number of Balkan endemic species e.g. *Bombina (variegata) scabra, Pelophylax shqipericus,* Greek Stream Frog *Rana graeca, Dinarolacerta montenegrina* (new species), *Dalmatolacerta oxycephala, Podarcis melisellensis, Hierophis gemonensis=Coluber gemonensis*. Also of note are the islands of Skadar Lake, which each support a different lizard community, the Durmitor National Park area where *Triturus alpestris, Triturus vulgaris, Rana temporaria, Vipera berus* and the two endemic reptiles Mosor Rock Lizard *Dinarolacerta mosorensis* and Sharp snouted Rock Lizard *Dalmatolacerta oxycephala* occur.

Other important sites for rare amphibians and reptiles include the Pošćenska lakes, the canyon of the Komarnica river from Skakavica to village Duži, Zminičko Lake (important for the survival of the endemic Zminicki Newt *Triturus alpestris serdarus*, part of the River Tara canyon – locality Ćelije-Borovi is important for *Rana graeca*, Kotor-Risan Bay (for *Caretta caretta, Chelonia mydas, Elaphe quatuorlineata, Zamenis situla = Elaphe situla, Bombina variegata*), Platamuni (*Caretta caretta, Chelonia mydas*), Katic island (*Caretta caretta, Chelonia mydas*), Cijevna River canyon (*Elaphe quatuorlineata, Zamenis situla, Testudo*

[43] The number of 407 species in the Adriatic Sea is quoted by Jardas, I. (1999): Jadranska ihtiofauna. Skolska knjiga. Zagreb. Pg. 538. However, the work of Dulcic, J & Lipej, L (2004): The current status of Adriatic fish biodiversity. Balkan Biodiversity. Kluwer Academic Publishers – Dordrecht – Boston – London, pgs 291 – 306 quotes 28 more new fish species so that the total number of recorded fishes in the Adriatic is 435.

[44] In neotenic forms, sexual maturity is achieved while a unit is still in the state of a larva.

hermanni, Triturus carnifex), Ćemovsko field (*Testudo hermanni*), Buljarica (*Testudo hermanni*), Mrtvica canyon (*Elaphe quatuorlineata, Zamenis situla, Testudo hermanni, Bombina variegata*), Ada Bojana (*Caretta caretta, Chelonia mydas, Emys orbicularis*, *Testudo hermanni, Triturus carnifex*), Mala Rijeka canyon (*Testudo hermanni*), Rumija mt (*Elaphe quatuorlineata, Zamenis situla, Testudo hermanni, Vipera ursinii*), Tivat Salina (*Caretta caretta, Emys orbicularis*, *Mauremys caspica, Testudo hermanni, Elaphe quatuorlineata, Zamenis situla*).

Birds

Montenegro's location along a major migratory route (the Adriatic flyway) and diversity of natural habitats result in high avian diversity. Of a total of 526 European bird species, 333[45] species are assumed to be regularly present in Montenegro. Of these, 204 species nest in the country. Montenegro has a wide variety of bird types, including many raptors, forest and wetland species, and provides an important refuge for a number of rare and threatened bird species, including Dalmatian pelican *Pelecanus crispus* and pygmy cormorant *Phalacrocorax pygmeus*.

Important bird sites include Buljarica, Velika Plaža, Ada Bojana, Tivat and Ulcinj Salt Pans, Šasko Lake in the Mediterranean region, the pastures and flooded woodlands adjacent to the Bojana River, and, further inland, Durmitor, Bjelasica, Komovi and the canyons of Piva, Tara, Morača and Cijevna Maglic, and Prokletije. Over 281 species of birds have been recorded at Skadar Lake, approximately 250 in the surroundings of Ulcinj, and 172 in Durmitor.

Mammals

Montenegro also has rich[46] mammal fauna. The largest number of species appear in the forest mountain part in the North. The mammals fauna includes: (i) Carnivores e.g. Wolf (*Canis lupus)*, Brown Bear (*Ursus arctos)* , Red Fox (*Vulpes vulpes)*, Lynx (*Lynx lynx)*, Otter (*Lutra lutra*), (ii) Ungulates e.g. Wild Boar (*Sus scrofa)*, Red Deer (*Cervus elaphus)*, Roe Deer (*Capreolus capreolus)*, Chamois (*Rupicapra rupicapra*), (iii) Rodents including the endemic *Pitymus thomasi*, found only around Podgorica (Beri, Vranici) and in Vilusi Lesser Mole Rat *(Spalax leucodon*) as well as several species of bats; (iv) Marine Mammals common Dolphin (*Delphinus delphis)*, Striped Dolphin (*Stenella coeruleoalba),* Bottlenose Dolphin (*Tursiops truncates)*, and (v) Common Rabbit *(Lepus concolor)*. Apart from some research on individual species, e.g. Brown Bear (*Ursus arctos)*, and Bats in the Ulcinj and Arsenal areas, and hunting population estimates[47] by hunting societies, there are no systematized data on the size of mammal populations in Montenegro.

[45] There are no adequate data in literature on the total number of birds in Montenegro, except for data for regular appearance of 333 bird species at the territory of Serbia and Montenegro together. (Vasić, V, I. (1997): Biodiverzitet Jugoslavije – Pregled vrsta od međunarodnog značaja. Ecolibri, Beograd)

[46] 65 mammal species have been registered

[47] Disputable reliability of data about number of hunting game presented by the hunting organizations since their professional verification is missing

3. 4 Centres of biodiversity in Montenegro

Mapping[48] of plant and animal species distribution on the Balkan peninsula indicates that almost entire territory of Montengro can be treated as the centre of biological diversity.
Also, almost all the mountainous regions of Montenegro can be treated as centers of vascular flora diversity, including Durmitor, Prokletije massif, and coastal mountains Orjen, Lovćen and Rumija. Regions with 1 200-1 400 taxa (species and subspecies) include: Durmitor with Bioč including the canyons of the rivers Tara, Piva and Sušica; Bjelasica, Komovi and Prokletije with Visitor, Žijovo, Hum Orahovski, Canyon of Cijevna river; Mrtvica Canyon[49]; Skadar Lake with northern slopes of the Rumija mountain. The areas of the Prokletije massif [50], Moračke mountains, Bjelasica and Komovi are recognized as centers of endemic vascular flora.

The most important biodiversity centers of birds are the region of Skadar Lake and Ulcinj, as well as mountain areas of Durmitor and Prokletije. Centers of mammal diversity are the mountainous regions of Durmitor, Sinjavina, western side of Prokletije, Komovi and Bjelasica, with smaller concentration of species in eastern side of Prokletije, central parts of Montenegro, northern parts of Boka-Kotor bay and Orjen and coastal Dinarides (Lovćen, Rumija with Skadar Lake).
The coastal region of Montenegro and its hinterland, Skadar Lake, Lovćen and Prokletije, are considered the most important centres of Reptiles and Amphibians diversity on the Balkan peninsula and in Europe.

Figure no. 5 *Overlapping of centers of diversity of vascular flora (VF), amphibian and reptiles (AR), birds (B) and mammals (M) in Montenegro*
Circles in red represent overlapping centers of diversity for three groups of organisms, while the circles in light-brown colour represent overlapping areas of diversity for two groups of organisms.

Regional and global importance of Montenegro biodiversity

Montenegro, with more than 3 250 plant species, is floristically one of the most diverse areas in the region, comparable only to Greece and Bulgaria. The "S/A" index [51] of Montenegro for vascular plants is 0.837, which represents the highest recorded of all European countries (Figure no.4).
Similarly, an index of the density of nesting birds in Montenegro has a value of 0.557, which is higher than the figure for the Balkans as a whole (0.435).
At the global level, Montenegro is included within the Mediterranean biodiversity hotspot[52]; and the following Global Eco-regions[53]: European-Mediterranean Mixed Forests (no. 77), Mediterranean Forests, Woodlands and Scrub (no.123), and Mediterranean/Adriatic Sea (no. 199) and the Balkan Rivers & Streams (no. 180); and, together with the mountainous area of Bulgaria, represents one of the 153 centers of globally significant floral diversity.

Areas that are important for rare, endemic and endangered species

Within particular specialist areas, criteria have been established for identification of areas important for preservation of rare, endemic and endangered species, as is the case with birds (Important Bird Areas – IBA) and plants (Important Plant Areas – IPA).

[48] Stevanovic, V. & Vasic, V. (1995): Biodiverzitet Jugoslavije sa pregledom vrsta od medjunarodnog znacaja, Bioloski Fakultet i Ecolibri, Beograd
[49] According to Z. Bulić (2008): Vaskularna flora kanjona i klisura rijeke Morače u Crnoj Gori. Univerzitet u Beogradu. Biološki fakultet. (doctoral dissertation)
[50] In central and eastern Prokletije there are over 110 endemic taxa
[51] It is expressed as the algorithm of the number of registered species (log S) divided with the logarithm of that area surface (log A). See Stevanovic, V., Vasic, V., and Regner, S. (eds) (2000). Biodiverzitet SR Jugoslavije. Ecolibri, Beograd.
[52] Conservation International - Mediterranean biodiversity hotspot. See at http://www.biodiversityhotspots.org/xp/hotspots/mediterranean/Pages/default.aspx
[53] Global Ecoregions are scientifically defined, most notable land, freshwater and marine habitats on the Earth. See at http://www.panda.org/about_wwf/where_we_work/ecoregions/ecoregion_list/index.cfm

The following IBA[54] areas have been identified in Montenegro: Skadar lake, Ulcinj Saltworks, Šasko lake, Durmitor and Biogradska gora [55]. In the integral list of identified and potential (*) IBA are: Bojana estuary, Rumija, Buljarica bay, Skadar lake, Plavsko lake with flooded meadows, Tivat Salina, Ćemovsko polje, Prokletije mt, Nikšić water accumulations, Hajla mt, Biogradska gora, Durmitor mt, Cijevna river canyon, Zeta river valley*, Kučke mts*, Visitor mt*, Komovi mts*, Golija mt*, Pivska highland*, Ljubišnja mt*.
Concerning Important Plant Araes (IPA), 22 sites have been identified in Montenegro:[56]: Jerinja glava mt, Lukavica mt, Trebjesa mt, Starac mt, Bogićevica mt, Visitor mt, Hajla mt, Skadar lake, Orjen mt, Lovćen mt, Rumija mt, Velika Ulcinjska beach, Babji zub mt, Piva River canyon, Tara River canyon, Komarnica River Canyon, Mrtvica Canyon, Cijevna River canyon, Lim River canyon, Komovi mt, Durmitor mt and Biogradska gora.
If identification of Important Fungi Areas (IFA) is provided, it will provide additional reasons for protection of existing and new / potential Protected Areas.

3. 5. Agrobiodiversity

Agrobiodiversity encompasses the variety and variability of animals, plants and micro-organisms that are necessary to sustain agricultural production and nutrition of humans and livestock.

Plant agrobiodiversity

Although a small country, Montenegro has significant diversity of agroecological conditions, and a number of distinctive local varieties and breeds. On the basis of common features (climate, agricultural production structure, cultivated and plowed area, income level, and livestock concentrations) Montenegro is traditionally divided into five characteristic but at the same time also very heterogenous regions which are: the coastal region; Zeta and Bjelopavlici Plain; karst region; northern mountains; and the Polimsko-ibarski region.
The coastal region (area from Debeli Brijeg up to the river Bojana) covers 11.5% of the country, i.e. about 20 000ha of cultivable land, and is suitable for fruit (citrus fruit and olives), and vegetable production, and is rich in honey-yielding, aromatic and medicinal herbs, and wild fruit species (pomegranate, fig, etc.).
The Zeta and Bjelopavlici Plain (Zetsko-bjelopavlicki region, covering area of Podgorica and Danilovgrad) accounts for 14% of the territory of Montenegro, and vegetables, agricultural crops and fruit (including grapes, figs, orange and kiwi) are characteristic for it.
The Karst region (covering area of Cetinje and Niksic) covers 21% of Montenegro, but because of the very limited availability of land and water, agricultural production focuses on livestock breeding, pasture land and agricultural crops.
The northern mountains comprise the largest territory (32.5%) and include all the municipalities of the central and northern part of Montenegro and are suitable for growing grains, potatoes and cabbages, and for natural and artificial meadows. The largest territory of this region is covered by pastures.
The Polimsko-ibarski Region (valleys of the rivers Lim and Ibar) covers about 20.5% of Montenegro, and 32.9% of the most fertile cultivable land, where there is intensive production of vegetables and fruits.
There are important native varieties of cereals, beans, onions, potatoes, tomatoes, fruits, grape vines and other fruit and vegetables that are still cultivated and consumed locally. However, intensification of agriculture has negatively affected this diversity and some genotypes have already been lost from the wild (e.g. some wheat varieties no longer occur in their original collection areas). Still, the most important genetic resources relevant for food

[54] Important bird zones are sites of particular importance for birds preservation because they regularly receive important populations of one or more globally or regionally endangered, endemic or determined groups of birds assembly or highly representative groups of birds. Important zones for birds were selected based on internationally specified criteria and standards. See: http://www.birdlife.org/action/science/sites/european_ibas/index.html.
[55] See http://www.birdlife.org/datazone/sites/index.html and select the link for Montenegro. Biogradska gora (YU037) – meets the criteria B2, B3; Durmitor (YU036) meets the criteria B2, B3; Šasko jezero (YU039)meets the criteria B1i, B2, B3; Skadar lake (YU038) meets the criteria A1, A3, A4i, A4iii, B1i, B2; Ulcinjska Saltworks (YU040) meets the criteria A1, A4i, B1i, B2
[56] See - http://www.ipa-montenegro.cg.yu/

and agriculture are mostly conserved and represent a good source of the new germplasm for development of selection and seed-growing.

Animal agrobiodiversity

Montenegro, on its relatively small territory, has almost all of the domesticated species that are bred across the Balkans. The populations are genetically and phenotypically specific and small in population sizes. Some of them exists in such small numbers that they are in danger of becoming extinct. Among these is the '*busha'*, a small, sturdy and low-maintenance breed of cow, adapted to the harsh, remote, low-nutrient regions of the north and north-east of the country (e.g. municipalities Plav and Rozaje), which very often have poor communications and unfavorable feeding conditions. Individual breeds or small groups can be found in the hinterland of the Skadar Lake and around delta of the river Bojana. The most common sheep breed is the '*pramenka'* of which there are several varieties across the country, each with adaptations to the local environmental conditions, and include the *Zetska zuja* which was originally bred around Podgorica (Zeta, Ljeskopolje, Cemovsko polje, up to the Bjelopavlici area) and is able to cope with its hot summers, the *Bardoka* which is reared in the border area between Kosovo and Albania (Plav, Gusinje, and part of the Podgorica municipality)*, the Pivska ovca* reared in the wider area of the Durmitor and Sinjajevina mountains, the *Ljaba* which was originally reared in the area of Ulcinj, Krajina, Bar and Malesija and the *Sjenicka ovca* (*the Sjenica sheep*) and *Vasojevicka ruda* both reared in the north-east of Montenegro. However, the *Zetska zuja* is near extinction, and only small numbers exist for many of the other varieties. In addition, domestic *Balkan goats* are predominantly kept in the south of the country in areas unsuitable for sheep, and especially for cattle breeding. Such areas include the karst areas in the municipalities of Niksic, Cetinje, Podgorica, and coastal municipalities covered in bushes and low deciduous trees. The red color variety is considered representative for this species in Montenegro. *The* small *mountain horse* is also still used in Montenegro, notably in the more remote and inaccessible mountain areas, while donkeys, though in small numbers, can be found in parts of the south (the municipalities of Ulcinj, Bar, partially Cetinje and Podgorica). A local domestic variety of pig – the "*šiška'* – is already extinct in Montenegro.

3. 6. Information and sources of data on biological diversity

Even though it was started earlier, the major part of scientific research on the flora and fauna in Montenegro was conducted in the period after World War II. Unfortunately, events related to disintegration of Yugoslavia resulted in reduction of funds allocated for these purposes, and thus also in reduction of the scope of biological research.

Previous research of biological diverisity of Montenegro was not conducted in a systematic manner. It mainly focussed on narrow scientific topics in the area of researchers' interest (eg. master and doctoral theses) or was practically limited by organisational issues related to accessibility of the terrain, possibility to engage equipment and the like. In such conditions systematic-taxonomic research prevailed in relation to research in other areas, such as population ecology, genetic diversity and other.

In spite of this, the existing flora and fauna inventories are incomplete in most cases, and the largest part of Montenegro and its biological diversity remained uninvestigated. Still, if we were to single out the best researched areas in Montenegro, it would be the Bay of Kotor, Skadar Lake and the mountains of Durmitor and Lovćen.

The situation with research and the state of inventories of vascular flora is indicative. Previous research focussed on taxonomy/systematization of species and plant communities ecology. Ecological, molecular and physiological research is still in its infancy. Scanty genetic studies focussed mainly on cultivated species. Unfortunately, systematic – taxonomic research of flora has not yet covered the entire territory of Montenegro, so that besides gaps in research of particular regions, species distribution maps and vegetation maps are still missing. The central part of Montenegro, i.e. mountains in the vicinity of Nikšić such as:

Vojnik, Golija, Njegoš as well as Ljubišnja in the vicinity of Pljevlja are almost uninvestigated in floristic terms. Data that were once collected for the project "Vegetation map of Montenegro " have not yet been published. However, the first intergral list[57] of vascular flora of Montenegro was produced during preparation of study base for development of this Study.
In general, knowledge on biodiversity of Montenegro is quite scarce, with significant gaps, lack of inventories for a number of groups, as well as data on population dynamics, ecology and degree of genetic variations for most species. This made impossible designing and development of adequate protection measures, primarily for rare and endangered species in Montenegro, and the general lack of data on biodiversity restricts the monitoring of ecological changes.

[57] Developed based on Rohlen, J. (1942) Conspectus flore Montenegrine and Pulević, V (2006): Građa za vaskularnu floru Crne Gore

4. Protection of biological diversity in priority areas of action

4. 1. Protectioni of biological diversity *in-situ*

Protected natural resources – protected areas of nature

Nationally protected natural resources

Based on national legislation, a large number of natural assets[58] are put under protection in Montenegro, many of which make possible protection of the most important components of biological diversity in situ.

Establishment of the National Protected Areas Network made up of the existing and planned areas for protection, makes an integral part of the Government of Montenegro policy aimed at ensuring protection of all representative types of habitats, ecosystems and plant and animal species. For a long period of time the projection of the National Protected Areas Network was associated with the spatial planning system and its supreme planning document – Spatial Plan of Montenegro (SP MN). The current projection of the national protected areas network in the SP MN from 2008 is given in Annex 3 of the Strategy.

In the past several years, this issue has become the subject of interest of other official strategies and policies as well. Apart from the projection of protected areas of nature in the zone of Public Maritime Domain, which is determined in the Special Purpose Spatial Plan for Public Maritime Domain (SPSP MD MN)[59], the national system of protected areas of nature was considered also through drafting of the National Sustainable Development Strategy (hereinafter NSDS)[60] which for the first time set out the target of increasing the territory under protected areas of nature to 10% of the state territory and protecting 10% of the coastal area in the 3-year planning period. To this view the NSDS pointed out the priority areas for protection. Similarly to NSDS and SPSP MD MN, the issue of the protected areas network at Montenegrin seaside is being considered and priorities are determined in the National Strategy for Integrated Coastal Zone Management of Montenegro which has been prepared for adoption by the Government of Montenegro.

The National protected areas network is currently covering 124 964.24ha, or **9.047 %** of the territory of Montenegro, of which five national parks: Durmitor, Skadarsko jezero, Lovćen, Biogradska gora and the recently proclaimed NP Prokletije account for the biggest share (101 733ha or 7.77 % of Montenegrin territory. The remainder are over 48 protected areas within categories: monument of nature; special natural features area and (general and special) reserves[61]. Even though (SP MN) proposals have been determined for putting under protection more areas in the category *Regional park*, or Park of nature, to date not a single[62] protected area has been determined in this category.

During several recent decades there was stagnation in putting under ptoection the planned protected areas of nature, especially those covering larger areas. Namely, all the newly established protected areas of nature from this period cover relatively modest surfaces and did not contribute significantly to the share of nationally protected areas in Montenegro. Practically, since the NP Skadarsko jezero was established in 1986, no protected area of nature of more extensive territory has been established. Significant progress was made by the end of 2009 when the NP Prokletije[63] was established.

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[58] Apart from the name protected natural assets the names protected areas of nature and protected objects of nature are equally used in everyday practice

[59] SPSP MD MN from 2008

[60] NSDS from 2007

[61] Except for Tivat Salt Pans (150ha) all reserves are located within the boundaries of two national parks – Skadar Lake and Durmitor and they make their integral part

[62] The only attempt for establishment of Regional parks was for 4 regional parks at the territory of municipality Plav as follows: Plav Lake; Alipašini izvori - Grebaja and Ropojana with the canyon Grlje; Hridsko Lake and Vistorsko Lake, for which an adequate regulation has been adopted (Decision on proclamation of regional parks at the territory of municipality Plav (Official Gazette of Montenegro 24/03 – municipal regulations)), but they have not been established.

[63] In the final version, the surface of NP Prokletije of 16 038 ha (in the draft of the new Law on National Parks) was reduced in relation to the proposed one (21 647ha) *Feasibility Study for the Establishment of the Protected Area at the territory of the part*

On the other side, the Nature Protection Law ensured putting under protection of endemic, rare and endangered plant and animal species. At the beginning of 1968, only 6 plant species were put under protection[64], to have 52 plant and 314 animal species put under protection[65] in 1982. In paralel with new information[66] on threats for particular plant and animal species grew the number of protected species so that 415 plant and 430 animal species have been put under protection regime[67] today.
Protection of rare, significant monumental trees has traditionally been an integral part of the activities for protection of biological diversity, so a number of trees of olive, oak, and other have been put under protection over time.

Internationally protected natural resources
Based on implementation of international treates (conventions, protocols) in the area of biodiversity protection[68] that Montenegro ratified or took over by succession from previous federations/joint states[69], the following areas are under protection:

- National park Skadarsko jezero (40.000 ha) has been under protection as a Ramsar area since December 1995, when it was entered on the list of wetland areas of international importance especially as a waterfowl habitat (Ramsar list), with Ramsar Convention (Convention on preservation of wetland areas of international importance especially as waterfowl habitat). The reason for entering the NP Skadarsko jezero on the Ramsar list is the richness and diversity of its ornitofauna (criterium 3c[70]). This area has been recognized since 1989 also as an Important Bird Area - IBA) because it meets criteria 1(iii), 2 and 3. Albanian part of Skadar Lake has also been protected as Ramsar area since February 2 2006.
- The National Park Durmitor with the Tara canyon (33 895 ha) has been under protection since 1980 as the World Natural Heritage (UNESCO List of World Natural and Cultural Heritage), following the fulfilment of criteria N (ii), (iii) and (iv) of the Convetion on the Protection of World Natural and Cultural Heritage (UNESCO). A special value of this protected area are the zones[71] with a special management regime, two of which are with a strict protection regime (the river Tara canyon and the forest reserve "Crna Poda".
- The river basin of Tara (182.899 ha) has been protected as the World Biosphere Reserve (Programme “Man and Biosphere” - M&B, UNESCO, since 17 January 1977), based on the Convention on the Protection of World Natural and Cultural Heritage (UNESCO).
- Kotor – Risan Bay (15.000 ha) has been under protection as a natural and cultural resource of world importance (UNESCO List of World Natural and Cultural Heritage) since October 26 1979, based on the provisions of the Convention on the Protection of World Natural and Cultural Heritage (UNESCO). Before it was put under international protection, this area was protected based on national legislation[72]. A Management Plan has recently been developed for this area which is currently in the final phases of approval by UNESCO.

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of Prokletije belonging to municipality Plav – National Park- Prokletije (Montenegro) produced by the Nature Protection Agency of MN, 2007.
[64] *Daphne malyana* Blecic, *Dioscorea balcanica* Kosanin, *Ilex aquifolium* L., *Leontopodium alpinum* Kass, *Ramondia serbica* Panc and *Taxus baccata* L.
[65] Decision on putting under protection rare, thinned out and endangered plant and animal species (Official Gazette of the Republic of Montenegro 36/82)
[66] See parts of chapters 3.1., considering findings on threats for biological diversity in Montenegro, based on the results from the Biological Diversity Monitoring Programme in Montenegro, beginning with 2000.
[67] Decision on putting under protection particular plant and animal species (Official Gazette of Montenegro 76/06))
[68] In particular: Convention on the Protection of World Natural and Cultural Heritage (UNESCO) and Convention on Protection of Wetland Areas of International Importance especially as waterfowl habitats (Ramsar Convention)
[69] Socialist Federative Republic of Yugoslavia (SFRY),Federal Republic of Yugoslavia, State Union Serbia and Montenegro
[70] Even though these were not formal resons for entering it on the Ramsar List, Skadar Lake meets the critera 1a, 2b, 3b, 4b and 5b.
[71] (i) Crno jezero with the forset in the immediate vicinity, (ii) water basin of Škrčka Lakes and the narrower canyon valley of Sušica, (iii) rainforest of firs and spruce in the catchment area of Mlinski potok, (iv) Barno Lake with its most immediate vicinity, (v) forest of European Black Pine in the reserve Crna poda, (vi) Zabojsko lake with its immediate vicinity and (vii) the canyon valley of the Tara river
[72] Decision on declaring Kotor and its area a natural and historical resource of particular importance (Official Gazette of Montenegro 17/79, Municipal regulations)

Apart from the previously mentioned areas, there are many other areas of nature of significant and valuable biological diversity in Montenegro that meet the criteria of previously mentioned and of other international treaties (an integral list is given in Appendix 4) to which Montenegro is a Contracting Party (member). Such is, for example, the Convention for the Protection of Mediterranean Sea (Barcelona Convention) and its Protocol for specially protected areas in the Mediterranean, which enable putting under protection of marine protected areas, but to date no protected marine areas were proclaimed in Montenegrin waters.

When, notwithstanding the existance and form of management, the nationally(124 964,24ha) and internationally (143 594 ha) protected natural assets (protected areas of nature) are assembled, excluding doubling/overlapping, the total area put under protection amounts to 268 558.24 ha which accounts for **19.44**% of the state territory. Review of the nationally and internationally protected natural resources is given in Annex 1.

Among the existing and the planned protected areas, there are also those of cross-border character. At the moment only Skadar Lake, which Montenegro shares whith Albania[73], is recognized as a cross-border protected area and its wider surroundings also as cross-border development zone (SP MN from 2008).
SP MN put forward a proposal for establishment of new cross-border protected areas of nature, primarily through extension of borders of the National Park Durmitor and its connection with the national park Sutjeska in Bosnia and Herzegovina and the planned Regional park Bioč – Maglić – Volujak in Montenegro. Possibilities for new protected cross-border areas have been recognized also in the establishment of new national parks: (i) NP Orjen in Montenegro that could be connected with the areas of Orjen and Sniježnice in B&H and Croatia and (ii) NP Prokletije which could be connected with the neighbouring areas in Albania (Theti, Bjeshkët e Nemuna), Kosovo and Serbia.

Weaknesses in the systems of protected natural resources management
The system of protected areas of nature in Montenegro is facing numerous weaknesses and problems. The largest part of protected areas cover small territory which accounts for their fragmetary distribution. The remaining unprotected ecologically valuable spaces, especially at the seaside, suffer great pressures of intensive urban and touristic development. Sufficiently expert information based on which the boundaries, category and protection regime of new protected areas of nature could be determined are still missing. The status, protection regime and management category of the existing protected areas of nature is not harmonized with the current state and those values of biodiveristy that were the main reasons for putting those areas under protection in the first place. The remaining weaknesses in the system of protected natural resources refer to: lacking or incomplete biodiversity inventories; lacking or indadequate staff who frequently do not possess sufficient expert, operative and/or managerial capacities necessary for protected areas; unfavourable position of boundaries of protected areas of nature in relation to the vicinity and directions in which settlements, infrastructure and other constructions spread. The European habitats typologizations – EMERALD, Natura 2000 were not used in identification of the existing protected areas of nature as a base for their identification, but the entire process was based on knowledge obtained within traditional nature protection doctrine which still ensured representation for the most important representative ecosystems in Montenegro. Review of the status of existing protected ares of nature, establishment of managers for all categories of protected areas of nature, and defining of optimum management models (based on participatory approach) represent the basic measures for protection of biodiversity and nature protection in general.
As regards management, a manager was designated only for the category of national parks (PE NP MN). For the categories monument of nature and special natural features area where

[73] In Albania, the wider area of the Skadar Lake and the river Bojana with the surrounding area (a total of 900km^2) was put under national protection in November 2005 as a „nature managed reserve“ and soon after that as a Ramsar area (February 2006).

local self-government is competent for establishing a manager, developing management plans and implementing management, the managers have been established only in rare cases (Trebjesa, Arboretum in Grahovo, Gradski park in Tivat and the like.). On the other side, the practice of involving local population in management structures responsible for direct management of protected resources has not been developed, which frequently causes problems to managers themselves in everyday management.
Furthermore, protected areas face a whole range of direct threats, including: unplanned forest management and illegal logging; illegal game hunting, illegal trade and uncontrolled collection of medicinal plant species; pressures arising from intensive development (tourism, urbanisation) in those areas or their vicinity especially at the seaside.
The conflict between biodiversity/nature protection and development was recognized long ago. There is no easy or simple solution for this challenge. Just as it is not realistic to stop further development, it is also not possible to persevere in total – absolute protection of nature. In Montenegro solution for this problem was found in sustainable development which is why a special strategy – National Sustainable Development Strategy (NSDS) was adopted. Unfortunately, in terms of their position and scope previous development directions were frequently in conflict with the key natural and cultural values – network of protected areas of nature (national parks, eg. Skadar lake, and other). This is true in particular for transport – road infrastructure.

Protection of species, ecosystems and habitats
At the moment there are no comprehensive targeted programmes, plans and projects conducted by Montenegrin institutions in the area of protection of biodiversity for direct protection of particular plant and animal species, special habitat group or ecosystems. Measures and activities undertaken in Montenegro for the purpose of protection of biological diversity (protected plant and animal species, protected natural resources and other) have traditionally been related to the nature protection activities.
For this reason, and also due to insufficient funds allocated from national sources, there is a large number of projects implemented in Montenegro by international organizations with the aim to protect ecosystems and habitats in particular. Such are the projects:

- Project of the Global Environment Facility „Lake Skadar Integrated Ecosystem Management“ implemented by the World Bank in Montenegro and Albania.
- Project „Establishment of EMERALD network in Montenegero“, financed and carried out in cooperation with the Council of Europe, with the aim of implementing Bern Convention and its Resolutions 4 and 6.;
- Project „Dinaric Arch“ implemented by the World Wildlife Fund Office for the Mediterranean and sub-project “ Conserving the Biological Diversity of South-Western Balkans: Transboundary Nature Conservation in the Landscape of the Durmitor Massif/Tara River/Prokletije Mountains (Montenegro and Albania)”;
- Project of the Global Environmental Facility - GEF „Improvement of protected areas of nature in the eco-region of South-eastern Dinarides“ which UNDP is implementing in Montenegro with the aim to manage more efficiently and assess representation and adequate selection of habitats and ecosystems in the sub-system of protected areas of nature in the region of South-eastern Dinarides.

There are individual projects for species protection which depend on the motivation and degree of engagement of specialists from particular biological disciplines. Thus, NGO Centre for Protection and Research of Birds conducted the campaign for protection of bird species, which, for example, made artificial nests for sea swallow from the genus *Sterna* in the saltworks of Ulcinj and conducted a research into ornitologically significant areas in the south of Montenegro.

4. 2. Protection of biological diversity *ex-situ*
As regards biological diversity protection ex-situ, a limited number of activities have been conducted in Montenegro. Firstly, three botanical gardens have been established that provide conditions for breeding a significant number of plants: (i) Botanical garden of

mountain flora in Dulovine in Kolašin (ii) Botanical garden of mountain flora in Brezojevice near Plav and (iii) Arboretum of General Vojo Kovačević in Grahovo with a large number of trees and shrub from various parts of the world. There are no zoos or programmes for breeding rare or endangered species in isolation or captivity.

On the other side, a whole range of collections with commercially important species of fruit and crops have been created, for the purpose of preserving their genetic diversity, therefore we consider them significant potential for development and preservation of agro-biodiversity. These collections are mainly financed by the Ministry of Agriculture, Forestry and Water Management through the Programme for Preservation and Use of Genetic Resources in Agriculture". The most important among them are[74]:

- Collection of grapevines from the genus *Vitis,* at Lješkopolje near Podgorica, where almost 500 types, including 303 old subtypes, 13 important genotypes, 165 newly obtained subtypes and 10 clones are preserved. This collection is included in the international bank of genes of the genus *Vitis* (reg. no YU 03 – Podgorica);
- The collection of wheat (*Triticum*) at the Biotechnical Faculty/Institute, containing 200 cultivated and wild subtypes, of which 113 samples come from the domestic Montenegrin population, 47 samples are from the other parts of former Yugoslavia (Herzegovina, Krajina and the like), while 40 samples come from Italy;
- The collections of continental and subtropical fruits at the agencies of the Biotechnical Institute in Bar and Bijelo Polje. The collection of continental fruits (Agency in Bijelo Polje) encompasses 6 types of fruits (apple *Malus domestica*, pear *Pyrus communis*, plum *Prunus domestica*, cherry *Prunus avium*, plum *Prunus cerasifera* and walnut *Juglans regia*) with total of 36 subtypes. The collection of subtropical fruits (Agency in Bar) encompasses 3 types of fruits (olive *Olea europaea*, fig tree *Ficus caric*a, and pomegranate *Punica granatum*), with 44 subtypes;

The Biotechnical Institute also keeps 8 genotypes of potato, 7 alfalfas, and 7 fodder species from the genus *Medicago. The collection of* holotypes of Montenegrin endemic taxons is preserved at the Faculty of Mathematics and Natural Sciences, Study Group Biology.

There have been attempts to create a collection of local subtypes of other important plant species, but these have failed due to poor capacities, lack of equipment and very limited funds. Some previous collections have also been lost, and there is inadequate knowledge on the values and importance of local types/subtypes, which are considered less fertile than new foreign hybrid types. In recent years, Montenegro has participated in a series of important projects in the area of agro-biodiversity that have sought to resolve these issues, including:

- ''Project SEEDNet' led by the Swedish Government which is aimed at establishing a network for studying and preserving the agro-biodiversity in Southeast Europe; and
- A project of Norwegian Government "Recognizing and preserving animal genetic resources in Southeast Europe".

The Government of Montenegro, over its Ministry of Agriculture, Forestry and Water Management is implementing the Programme for Preservation of livestock genetic diveristy in Montenegro, which has so far aimed at stimulating the breeding of the domestic sort of cattle (*busha*) in Ulcinj, of sheep *pramenka* in Piva on the farm in Pišče, and of the sheep (*žuja*) from Zeta, and at securing funds for purchase of breeding livestock of domestic sorts. For the purpose of preserving the genetic resources of agrobiodiversity, in June 2008 the Government of Montenegro adopted an Action Plan for preservation of agricultural genetic resources for the period 2009-2013

[74] Data taken over from the document „Montenegrin Agriculture and the European Union – Development Strategy for Agriculture and Rural Areas" (2006). The Ministry of Agriculture, Forestry and Water Management of Montenegro and the European Agency for Reconstruction.

5. Forms of sustainable use of biological diversity/natural resources

5. 1. Sustainable use of natural resources and „ecosystem services“

A large number of natural resources to which ecological processes with biological diversity as the key component are associated ensure to human civilizaton a wide range of benefits, goods, processes and services that have recently been called „*ecosystem services*“. They range from relatively simple ones, such as provision of wood for heating, timber, grazing for cattle to highly complex ones, such as sustaining of aquifers stability, fertility of soil or climate regulation[75]. It can be said that everyday life of people depends on ecosystem services, especially for basic needs such as provision of clean air, clean water and food production.

To date, there has not been any significant research of ecosystem services in Montenegro, of the relation between biodiversity and ecosystem services (which is important for natural resources management), or any kind of integrated approach for determining their values (monetary/economic or non-economic), except for preliminary or incomplete assessments of possibility for securing revenues from nature based tourism at selected locations (NP Durmitor).

Due to potentially great economic value of ecosystem services[76], many international organizations (IUCN, UNEP…) advocate application of market mechanisms and introduction of payment for ecosystem services by their users. This possibility has not been applied in Montenegro either (e.g. Collection of fees for maintenance of forest areas that ensure protection of aquifers/water areas and drinking water provided by that water area). On the other side, awarenss of the values and importance of ecosystem services for welfare and well-being of mankind is at a low level in Montenegro, both with the general public and those who make important decisions related to development and use of ecosystem services.

This is why the real costs of ecosystem services use by private and public sector are underestimated or not considered at all. This is in particular true for Montenegrin coast where urbanization and tourism development have led to destruction of natural habitats and loss of one part of ecosystem services these natural areas used to provide, eg. protection from erosion, landslides and floods, which coastal vegatation provided. Apart from that, loss of natural habitats and particular species reduces potential, at the moment unknown, values of ecosystem services such as plant species with pharmaceutical or medical value.

With regard to the size of forest areas which are, among other, considered also a resource for mitiagation of climate change (absorption of CO_2) the National Forest and Forest Land Administration Policy[77] has recognized the possibility of ensuring funds through “carbon” credits and global initiatives such as the Scheme for Reducing Emissions from Deforestation and Forest Degradation and other mechanisms within Kyoto Protocol and post Kyoto mechanisms.

5.2. Economic sectors using biological diversity/natural resources/ecosystem services

Contribution of biodiversity to the national economy has never been researched, and the basic information is either lacking or not publicly available. This is why only general assessment can be given on the forms of use of biodiversity/natural resources/ecosystem services.

[75] Millennium Ecosystem Assessment (2005) grouped ecosystem services into four general categories: 1. support services such as nutrient cycling, oxigen production, establishment of soil, crop breeding, pest and disease control, which support all other categories of “services”; 2. supply services, such as food, fiber, fuel, water, predecessors of pharmaceutical products; 3. regulation services, such as climate regulation, carbon capture, treatment of water and food protection; and 4. cultural services, including education, recreation, spiritual and aesthetic value.

[76] For example, recent study of EU Commission on social and economic aspects of biodiversity in the Republic of Irelnd has set out the value of biodiversity for the economy at a minimum of 2.6 billion Euros per year – see at http://www.npws.ie/en/media/Media,6432,en.pdf.

[77] Forests for the future of Montenegro – National Forest and Forest Land Administration Policy. Ministry of Agriculture, Forestry and Water Management, March 2008.

Agriculture

The agricultural sector accounts for a relatively high share in Montenegrin GDP (11.3%), and relies directly on biological diversity, through direct provision of food (meat, vegetables etc.) and materials (leather, wool, etc.), while diversity of used species (agrobiodiversity) contributes to production and food safety.

In accordance with the economic conditions for its development, agriculture has remained a low production sector based on a large number of private farms. Around 96.3% of cultivable land and the same percentage of livestock is owned by 60.043 farms. Companies and cooperatives possess only 7 040 ha of cultivable land, 828 ha of which is arable land, 376 ha orchards, 1 891 ha vineyards and 3 945 ha meadows.

Production has been differentiated per regions according to natural conditions. Production of citrus fruits, early vegetables, olives, medicinal herbs and nursery plants of sub-tropical cultures, as well as greenhouse production dominates in the coastal region; in the central region dominates production of continental fruit and vegetables, nursery plants, flowers, greenhosue production and collection of medicinal herbs and forest fruit, while the production of milk, meat, potatoes, wool, fish breeding and collection of forest fruit dominates in the northern regions. In the recent years, organic agriculture has been stimulated, especially in the northern region, and in the coastal region production and processing of Mediterranean cultures.

Even though arable land remained at the level of around 189 000 ha during time, its structure and manner of use have deteriorated. According to data from 2003, the surface of arable land and gardens decreased from 52 725 ha (1989) to 44 818 ha, and the share of abandoned and uncultuvated land increased. Arable land has been turned into meadows, and meadows into grasslands. The trend of changing purpose of agricultural land use continued, eg. for residential contruction, especially after restritution of land to previous owners. The past 5 – 6 years have seen intensive sale of land, including agricultural land, to foreign citizens, followed by intensive construction of new (residential, tourist) objects. Change of purpose of use and permanent loss of agricultural land causes damage both to biodiversity and ecosystem serivces (erosion, pollution...) and to the nature itself.

The Food Production and Rural Areas Development Strategy of Montenegro[78] proposes a concept of sustainable agriculture development. Its primary objective is appreciation of multifunctional role of agriculture in the development of the country.

Forestry

Forests, as ecosystems important in many ways, have huge social and economic importance for development of Montenegro. Forest ecosystems are very important in all segments of life and economy: significant biomass producers, sources of healthy and high quality forest fruit, medicinal herbs and mushrooms, important habitat of wild animals, the main factor for preservation and regulation of water systems, they provide protection from landslides and erosion, absorb significant quantities of carbon and play the main role in air purification. Besides, forest ecosystems are very important for development of local economy.

Out of the total territory, 743 609 ha or 54% of the state territory account for forests and forest land, of which around 621 000 ha or 45% is under forest, while 123 000 ha or 9% is barren forest land. Along with Scandinavian countries, Montenegro with its 0.9 ha of forest per inhabitant is one of the most forested countries in Europe[79] according to the degree of forest cover, with huge potential for recreation and tourism. State owned forests and forest land cover 500.000 ha or 67%, while privately owned forests and forest land make 244 000 ha or 33% of entire territory. Total growing stock in the forests of Montenegro is estimated at around 72 million m^3, of which 29 5 million m^3 or 41% are coniferous trees, and 42 5 million m^3 or 59% are deciduous trees[80]. Forests intended for timber production cover 348 000 ha or

[78] Montenegro and the European Union. Development Strategy for Agriculture and Rural Areas“ (2006). The Ministry of Agriculture, Forstry and Water Management of Montenegro and the European Agency for Reconstruction.

[79] For example: 37% of Croatia is covered by forests (0.47 ha per inhabitant), Serbia has forest coverage of 25% (0.3 ha per inhabitant), B&H 41%, Austria 38% and Spain 30%

[80] All the numbers are from the draft National Forestry Policy (Forests for the Future of Montenegro: National Forests and Forest Land Administration Policy, March 11 2008).

81% of all forests, while protective forests make 66 000 ha or 16%. Forests in the national parks cover 12 975 ha or 3% of the total quantity. Total increment in all forests is estimated at 1.5 million m^3 . The scope of cutting went below the envisaged scope of forest use in Montenegro in relation to increment and had a growing trend until 2006 of 514 708 m^3 in 2002 to 631 273 m^3 in 2006, while in 2007 a decrease in the scope of logging was registered which amounted to 548 162 m^3 in 2007, 595 195 m^3 in 2008 and 364.815 m^3 in 2009.

High and comercially most valuable forests cover 212 000 ha. They are mainly located in the northern and north-eastern part of the country, and they represent the main source of raw materials for wood industry. Wood for heating and sale is mainly provided from private forests, which usually do not exceed several hectars. For a long time period, the role of other functions of the forest have been underestimated in forest use which is why significant financial resources have been lost. Disturbed demographic structure of the village areas rich in forest can be improved by including local population in the forestry and wood processing activities and by providing conditions for normal life.

Forest sector development in Montenegro has stagnated during several past decades. According to official data[81], 20% of territory in the state forests has never been inventorized. However, implementation of the Project „National Forest Inventories in Montenegro" is under way. By the end of 2010 all field work will be completed and the first results are expected in the second half of 2011. Also, activities for application of GIS in forestry are under way (the existing maps in foresty have been digitalized and particular electronic data bases have been established for around 200 000 ha, which represents a quality base for introduction of information system in forestry). One of the problems of forest management is also lack of valid and updated data on forest resources for particular areas.

Forest administration has concluded Contracts on Forest Use – concessions for most management units for a period of 7, 15 and 30 years (except for the area of municipality Rožaje where concessions are issued for one year). According to the Forest Law municipalities are entitled to 30% of fees for forests use on their territory. These funds are allocated for financing road construction and investments in rural development, including village infrastructure. It is assumed that additional 300 000 m^3 are logged by local communities for the needs of heating, making of contruction material and the like[82].
There are significant territories of abandoned agricultural land or land unsuitable for production of agricultural cultures, and inadequately managed forest land in Montenegro. Development of agro-forestry, protection and improvement of localities significant for medicinal herbs and fungi as well as their rational use would create an environment in which local population and land users could make long term revenues.

Forest fires

Forest Administration keeps the prescribed records on forest firest per management units.

The area units submit monthly reports to Forest Adminstration where data on forest fires are summarized on the annual level. The average surface of fire inflicted territories in the period 2003-2007 was 4 800 ha and the average number of fires was 53.

The National Strategy for Emergency Situations has determined primary hazards at the territory of the state. One of priority hazards is fire, with forest fires as its subtype. Implementation of the mentioned strategy is under the competence of the Ministry of Interior and Public Administration.

For the purpose of protection from fire 5 levels of operative units have been integrated as follows:

[81] Sustainable Forestry, Ministry of Agriculture Forestry and Water Management, 2006
[82] Information on economic value of this tree is not available

- Municipal services for protection and rescue (fire fighting units) that are organized at the local level and have been established in order to respond in the early phase of accidents;
- Civil protection units that give massive support in actions of protection and rescue from fires;
- Entrepreneurial units (units of economic companies);
- Voluntary units for protection from fires organized as voluntary fire fighting associations especially in the southern and central regions;
- Airplane-helicopter unit as an organizational unit of the Sector for emergency situations and civil security for aerial fire fighting and surveillance.

Hunting

There are few concrete data on hunting, especially sport one, or on the number of hunters[83] and economic indicators of these activities. Hunting is under the competence of the Ministry of Agriculture, Forestry and Water Management. The main types of game that are hunted in Montenegro are: wild boar *Sus scrofa*, fox, rabbit *Lepus europeaus*, Chamois *Rupicapra rupicapra*, Roe Deer *Capreolus capreolus*, Wolf *Canis lupus*, and of birds snipes, ducks and other waterfowl as well as grouse, pheasant and partridge. The killed game is directly used by hunters or is sold to hotels, restaurants etc. The Brown Bear (*Ursus arctos* L.) with a bear cub of up to two years old, a roe and its fawn, a chamois and its kid are protected by permanent ban of hunting. Even though hunting tourism generates significant revenues in other European countries, it is rather limited in Montenegro.

Waterfowl hunting was allowed earlier in the National Park Skadar Lake, but has been entirely banned since 2002 due to enforcement of provisions from the Spatial Plant for NP Skadar Lake and the registered reduction in the number of waterfowl populations numbers. Birds hunting is also banned at the territory of saltworks in Ulcinj and the Salt Pans in Tivat. However, birds hunting is still present in the wetland areas in the Coastal area and its hinterland.

Hunting is still considered a recrative activity, more than a revenue generating activity or an activity oriented to tourism. Membership fees in hunting organisations are mainly low[84], investments into hunting districts modest, and national hunters mainly do not pay any compensation for each game they kill.

Marine and freshwater fishery and sport hunting

Pelagic species such as pilchard *(Sardina pilchardus)*, anchovy (*Engraulis encrasicolus*), mackerel *(Scomber scombrus)*, bonioto, (*Sarda sarda*), yellowtail (*Seriola dumerili*), benthic (demersal) fish species, hake *(Merluccius merluccius)*, gray mullet *(Mugil cephalus)*, gilthead (*Sparus aurata*), surmullet, (*Mullus barbatus*), gurnard (*Trigla sp.),* ray *(Raja sp.)* and other have the greatest potential for exploitation of marine fish. Apart from fish, the cephalopod are commercially exploited as well: squid *(Loligo vulgaris* i dr*)*, Cuttlefish *(Sepia officinalis* and other*)* and octopuses *(Octopus vulgaris* and other*)*[85], as well as various species of crab and shrimp, including the Shrimp *(Parapenaeus longirostris)*[86]*,* Norway lobster *(Nephrops norvegicus)* and some species of molluscs, mussel / Mediterranean mušlje *(Mytilus galloprovincialis)*. According to statistical data[87], the catch of marine species has risen from the average 470 t/per year in the period 2002-2005, to 689 t/per year in 2007. The total

[83] According to Statitics Agency – Monstat in 2007 7 723 hunters were registered in Montenegro (see Statistical Year-book 2008).

[84] „~50 - 100 EUR annually

[85] Cuttle-fish *(Sepia officinalis)*,which accounts for 36.2% of catch is dominant in the catch of cephalopoda and represents economically the most important type of cephalopoda, followed by muscy octopus *(Eledone moschata)* with 19.9%, Squid *(Loligo vulgaris)* with 11.1% and sipica *(Sepia orbignyana)* with 10.9%, and among the remaining economically significant species are elegant cuttlefish *Sepia elegans* and Octopus *(Octopus vulgaris)*.

[86] Research along Montenegrin coast has shown that absolute biomass of shrimp is around 112 tons, while the maximum allowed level for exploitation is around 79 tons per year (data of the Institute for Marine Biology)

[87] Statistics Agency – Monstat: Statistical Year-book 2008.

annual consumption of all fish species and cephalopod was higher in 2006 than in the previous years, which can be considered as a result of an increased production in mariculture.
Even though marine fishery is important for Montenegro, the highest pecentage of annual fish catch actually comes from freshwater systems, with a yield of 786t in 2006, in comparison with 296t in 2002. The largest part of farmed fish that is placed on the market is the Rainbow trout *(Oncorhynchus mykiss)*, and from the natural ecocystems (mainly the Skadar lake) Common carp *(Cyprinus carpio)* and Bleak *(Alburnus alburnus)* that are commercially the most important species and with which the markets in Podgorica, Cetinje and Bar are supplied. Unfortunately, there are not any recent statistical data on the catch of fishes from the Skadar Lake, so that only data for the period 1947-1979 when the annual catch was over 1.000 tons can be used for the possible comparison.
As regards permits, NP Skadarsko jezero issues annual concessions for fishing of bleak from underground springs called „eyes“[88] as well as individual permits for fishing of Common carp *(Cyprinus carpio)*, eel *(Anguilla anguilla)* and Bleak *(Alburnus alburnus alborella).* For around 500 households in the vicinity of the Skadar Lake, fishing, including drying of fish, represents the main source of revenue. Carp and bleak make more than 90% of fish catch in the Skadar Lake. The annual revenue of the NP from issued permits in 2007 was 98 340 EUR and this revenue is used for the protection activities of NP.
Just like fish, freshwater shrimps have commercial importance, in particular *Astacus astacus* and *Austropotampobius italicus,* whose significant populations can be found in the river Zeta and Krupac and Slano lake.
The price of fish is relatively high in Montenegro. Thus the price of high demand sea fish species ranges from 25-30 EUR/kilogram for sardines, anchovies and of 'lower quality' fishes it is around 2-3 EUR/kilogram. The average price of a fish meal is 8 EUR, and for those heavier than 500 grams as much as 16 EUR/kilogram. The consumption of fish in Montenegro is among the lowest in Europe (around 2 to 4 kg per capita per year[89]. The annual production of freshwater and marine fishery together is estimated at around 0,5% of GDP. Of the total farmed Rainbow trout *(Oncorhynchus mykiss)* around 1.5% goes to the European market and the same amount (1.5 %) of the wild-caught Brown trout *(Salmo trutta m. fario)* as well. In development of mariculture, which is in full swing, the most important are mussel, gilthead and sea-brass. The share of Montenegrin sector of marine fishery in the Mediterranean is 0.3% (561 288 tons). 638 persons are employed in the fishery sector in Montenegro, of which 443 in freshwater[90], 59 in marine fishery[91] and 36 in mariculture.
Sport, recreative fishery on the rivers and lakes is organized over (sport) fishing associations in each municipality which makes revenues[92] from issued permits which is used for fish stock management in the waters in their municipality. There is no special evidence on the overall revenue made from issuing of those permits.

Collection of medicinal, aromatic and wild plant, foods and animals

Montenegro is rich in species of plants and fungi that have been traditionally exploited by local people for direct consumption and use as natural remedies or dietary supplements [93]. It

[88] underground, sublacustrine springs, eg: Raduš, Krauč, Bjaca and other
[89] Fisheries Development Strategy of Montenegro and Capacity Building for Implementation of EU Common Fisheries Policy EU. Ministry of Agriculture, Forestry and Water Management and the European Agency for Reconstruction (EAR). 2006.
[90] 437 contracts for indefinite time and 6 contracts for definite time period
[91] 91 contract for indefinite time period and 68 contracts for defininte time period
[92] Permit for trout fishing costs around €30

[93] Apart from **medicinal herbs,** in Montenegro there are **edible herbs** with therapeutic features as well: Golden Alpine Strawberry (*Fragaria vesca),* Bear's Garlic *(Allium ursinum)* , dandelion/lion's tooth (*Taraxacum officinale),* Wood Sorrel (*Oxalis acetosella), sheep's sorrel (Rumex acetosella), Monk's Rhubarb* (*Rumex alpinus),* wild carrot *(Daucus carota),* Stonecrop *(Sedum album),* White Dead-Nettle (*Lamium album*), Green winged orchid *(Orchis morio)*, parsnip (*Pastinaca sativa),* Stinging Nettle *(Urtica dioica*), Annual nettle (*Urtica urens),* Bilberry *(Vaccinium myrtillus),* Lingonberry *(Vaccinium vitis-idaea),* Common Grape Vine *(Vitis vinifera),* wild pear (*Pirus piraster),* Japanese crab apple (*Malus dasyphylla),* European Wild Apple *(Malus sylvestris),* Mountain ash *(Sorbus aucuparia),* Service Tree *(Sorbus domestica),* blackthorn (*Prunus spinosa),* pissad plum *(Prunus cerasifera),* Common Hazel *(Corylus avellana),* European Cornel (*Cornus mas),* sweet chestnut (*Castanea sativa),* Common Walnut *(Juglans regia),* Raspberry *(Rubus idaeus),* Rocky Mountain Raspberry *(Rubus hirtus),* Dewberry *(Rubus caesius),* Alpine cerrant berries *(Ribes alpinum),* gooseberry*(Ribes petraeum),* and many other. Many of edible species are also used as **spices**. For example spices used very often are Persian Cumin (*Carum carvi),* wild majoram *(Origanum vulgare)*, Fennel (*Foenicilum vulgare),* Peppermint flower *(Mentha piperita),* garlic (*Allium* sp.) or Thyme (*Thymus* sp.). Numerous species

is estimated that about 660 vascular plant species are used in traditional medicine (on the coast there are 174 species with recognized medicinal properties, in the central highlands around 480 species, and in the mountains of the north 540 species), and some 133 pharmocopeial species. Commercially valuable species include:

- Medicinal and aromatic plants, such as common sage *Salvia officinalis,* juniper *Juniperus communis,* curry plant *Helichrysum italicum,* bay laurel *Laurus nobilis,* bearberry *Arctostaphylos uva ursi,* white hellebore *Veratrum album,* St John's wort *Hypericum perforatum,* yarrow *Achillea milefolium,* autumn crocus *Colchicum autumnale,* linden *Tilia sp.,* dog rose *Rosa canina* and common hawthorn *Crataegus monogyna*;
- Wild fruits, such as blueberries, raspberries, blackberries, wild strawberries;
- Fungi, including porcini *Boletus edulis*, summer cep *Boletus reticulatus*, pine bolete *Boletus pinophilus*, Golden chanterelle *Cantharellus cibarius*, black chanterelle *Craterellus cornucopioides*, conic morel *Morchella conica,* red pine mushroom *Lactarius deliciosus*.

Prior to the break-up of the former Yugoslavia, Montenegro was an important trading centre for medicinal and aromatic plants, primarily wild-harvested from the inland and coastal mountains. United Nations sanctions halted an export business of bulk medicinal and aromatic plants worth approaching US$50 million/year. Due to the previously mentioned, much of commerce shifted to Albania, but as some indicators show it is gradually being rebuilt (but relevant figures are not available).

Over 1,000 tons of fungi are collected each year in Montenegro for commercial and personal use, with the largest quantities of commercial species harvested in the northern part of Montenegro in municipalities of Andrijevica, Bijelo Polje, Berane, Kolašin, Mojkovac, Plav, Plužine, Pljevalja, Rožaje, Šavnik and Žabljak (although data on quantities for specific species harvested for a given region are not collected at the moment). Guidance on which species can be commercially traded is given in the national law governing harvesting of unprotected plant species (Official Gazette 27/02 and 64/03). Fungi are picked from the wild by local people (this activity is conducted during the fungi fruiting season), and most are purchased by processing companies and retailers for foreign markets in France and Switzerland, but some are sold in locally.

Genetically modified organisms (GMOs)

At the moment there are no comprehensive or detailed information on the presence of either plant or animal GMOs in Montenegro.

Also, there are no specialized devices for testing of GMOs and for testing of suspicious samples institutions from Serbia are engaged.

The Government of Montenegro sees determining the occurrence of GMOs, control of their use and entry into the country a priority, especially having in mind protection of a developing organic production which would not fulfill international standards if contaminated with GMOs.

Nature – based tourism

National policy promotes development of nature-based tourism activities, where biodiversity plays an important role. Such nature-oriented tourist products include birdwatching, photo-safaris, biking, hiking, and rafting, and even 'film tourism'. Montenegro is an ideal venue for shooting scientific films and documentaries. Special potential for birdwatching exists at Skadar Lake, Ulcinj saltworks and Ada Bojana, as well as the Tivat saltpans, for waterbirds, and the mountain national parks of Durmitor and Biogradska gora for birds of prey and forest species.

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or almost whole genders are used not only in food industry, but also is **chemical, pharmaceutical and cosmetic industries** (*Pinus* sp., *Juniperus* sp., *Adonis* sp., *Plantago* sp., *Salvia* sp., *Galium* sp., *Linum* sp., *Gentiana* sp., *Hypericum* sp., *Ranunculus* sp., *Aconitum* sp., *Rhamnus* sp., *Satureja* sp., *Valeriana* sp., *Thymus* sp., *Digitalis* sp., *Teucrium* sp., *Angelica* sp., *Crocus* sp., *Tilia* sp., *Betula* sp. ...). Due to extraordinary beauty, numerous species can be used as **decorations.** For example many decorative species with beautiful flowers can be found among Common Columbine (*Aquilegia),* Creeping Bellflower *(Campanula),* sea thrift *(Armeria),* anemone *(Anemone),* cerastium *(Cerastium),* Sweet William (*Dianthus),* viola *(Vioalceae), Japanese gentian (Gentiana),* primrose *(Primula),* sowbread *(Cyclamen),* daphne *(Daphne),* saxifrages/stone-breakers *(Saxifraga),* stonecrop *(Sedum),* houseleeks/liveforever (*Sempervivum),* lily *(Lilium)* or orchid (*Orchis)*. Some of these species or their cultivated varieties today are successfully grown in many nurseries.

Although Montenegro is being promoted as a destination for such activities the numbers of visitors who come to Montenegro specifically for birdwatching is unknown, but it is estimated to be relatively few. It is more likely that tourists are coming to visit because of the spectacular mountain scenery and forests, but again, the numbers of those who specifically visit for hiking and other nature-based activities is unknown because such data are not recorded. However, the information on the numbers of and revenues from visitors to national parks does exist. In 2007 income from entrance tickets to the Public Enterprise "National Parks of Montenegro" (PENPM) was EUR 100,071.00 which is used for management and improvement of protection within the national parks. Montenegrins do not use much their national parks and other natural areas because there is little national culture of wilderness activities such as hiking, mountaineering, camping and the like.

Ecological tax

The Law on Environmental Protection (2008) promotes (Article 3) the principle "user pays" according to which users of protected nature goods are obliged to pay fee for their use as well as costs of rehabilitation and re-cultivation of space. Article 68 of this Law establishes the activities and actions for which fee is paid to the manager of the protected natural asset, particularly for the following: - entering into the protected natural asset; - provision of services to visitors (use of guides, visiting the natural science collection, parking, camping); - use of names and signs of the protected natural asset; - birdwatching; - shooting commercial and popular movies, spots and commercials; - rafting and renting boats and ships; - collecting, harvesting and purchasing forest fruits; - sport fishing; - hospitality, sale, accommodation and infrastructural facilities (restaurants, bungalows, temporary facilities, promotion materials, power stations, use of land for holding sports and other events); - other activities and actions in accordance with the law.

The Decree on the amount, fees, manner of calculation and payment of fees for environmental pollution (2000) establishes fees, manner of their calculation and payment for pollution of living environment (for combustion plants over 1 MW of the installed power, for the use of fossil fuels, lubricating oils, CFCs for disposal of dangerous waste, for fees for registration of motor vehicles) paid by legal and physical entities (application of the principle "*polluter pays*").

The obligation of payment of "Ecotax" imposed on all cars which are registered in or are passing through Montenegro was introduced in 2008 in accordance with the obligations arising from the implementation of multilateral agreements in the field of environmental protection, and the reforms in the context of the European Union accession process and following the recommendations made by the World Travel and Tourism Council (WTTC). Charges are based on size and type of vehicle and range from EUR10.00-150.00. Citizens of Montenegro pay for the eco-tax when registering their vehicles, whereas foreign nationals pay this tax when entering Montenegro and the tax disc –sticker (proof that the tax has been paid) provided is valid for one year. The revenue raised has been earmarked for projects aimed at improving the environment in Montenegro and will include: afforestation and greening of public areas as a contribution to combating CO2 emissions; prevention and control of industrial and municipal pollution and rehabilitation of polluted sites; protection of endangered and endemic flora and fauna; extension of the system of protected areas of nature; research into the economic value of natural assets, including national parks and protected natural assets; actions against the loss of coastal habitats due to urbanization; and raising the awareness and knowledge of the uniqueness of Montenegro's natural heritage.

5. 3. Non-economic values of biodiversity

Other non-economic (essentially cultural) services provided by biodiversity, including education, recreation, spiritual, scientific and aesthetic values, have been very poorly assessed in Montenegro. Although some Montenegrins enjoy visiting the country's national parks and other natural areas, there are no detailed data about how important that phenomenon is for the society. Some species are used for scientific research (sea hedgehogs e.g.) and others such as amphibian (notable frogs) are used for demonstrational purposes in educational institutions (schools and universities).

5. 4 Equitable sharing of benefits arising from utilization of genetic resources

The issue of sharing the benefits of the use of genetic and generally biological resources has not yet been addressed in any coherent way in Montenegro, and basic information is either lacking or scattered among publications and has not been collated and analyzed.

Traditional knowledge of the use of natural resources has been documented to some extent by researchers, e.g. some of the uses of medicinal plants have been studied, but this knowledge is not "owned" by the wider range of users. That is why it is necessary to collect and analyze available information and data related to equitable sharing of benefits arising from the utilization of genetic resources, particularly those which generate bigger direct economic profit. The extent to which foreign pharmaceutical companies have exploited knowledge on the medicinal properties of the Montenegrin flora is unknown. However, it is known that large international health and cosmetic industries are using resources of Montenegrin flora, particularly three of the top 15 best-selling herbs and these are including St.John's Wort (*Hypericum perforatum)*, valerian (*Valeriana offinalis)*, and bilberry (*Vaccinium myrtilus)*. In addition, the coastal part of Montenegro (together with the neighbouring area of Albania) provides the world's largest production of Sage (*Salvia offiinalis).* Other than the sale of plant material, Montenegro does not receive any financial remuneration from their use.

As yet, no biotechnology industry has been developed in Montenegro yet, and it is believed that genetically modified products/organisms (GMOs) do not exist are rare in the country and there is no great pressure to import GMO seeds. There is also an active programme by the MAFWM to promote the preservation of native varieties and breeds in agriculture, and promoted is also organic production in Montenegro for local use, but also for potential export to Europe where demand is high. These activities should increase food security and reduce the likelihood of the import of GMOs. However, currently there is no legal framework that deals with "intellectual property rights" over the development of products from the biodiversity and/or agro-biodiversity.

5. 5. Sustainability of the use of biological resources in Montenegro

There is very little direct information on whether biological resources are being used in a sustainable way in Montenegro, which is a reflection of the lack of research on and still insufficient level of monitoring of this area. On the other hand there are some indications that most species are being overexploited and that management is not based on any robust sustainable use models.

In the period 2001-2006 forest exploitation had an increasing trend because of the recovered wood industry and investments in this sector, while since 2007 a decreasing trend of the use of forests is recorded. The volume of timber cut in 2002 was 514,708m^3 while in 2006 it was 631.273 m^3. However, in 2007 a decrease of the volume of timber cut is registered at 548.162 m^3 while its volume in 2008 was 595.195 m^3 of the gross mass.

The annual increase in commercial forests is estimated at around 1.18 million m^3 suggesting that, considering only the documented commercial cut, the timber take is sustainable. According to the *National Forestry Policy*[94] cutting should be no more than 2/3 of the annual growth[95], while the *Spatial Plan of Montenegro until 2020* estimates that potential annual volume of logging in all forests could be about 800.000 m³. In addition, the area under forest has been expanding in recent years not only from afforestation but from natural regeneration and expansion into abandoned agricultural land. According to the official data provided by MONSTAT and Forest Management Administration, average annual illegal logging in the period 2002 – 2009 was 4.128 m^3.

[94] This document was adopted by the Government of Montenegro (no:03-3982) in the session as of 24th April 2008.
[95] It is estimated that total annual increase is 1.5 million m3 (source: MAFWM)

It is estimated that the volume of loggings in much bigger and according to some assessments (Study of the World Bank) in some border areas (e.g. municipalities of Plav and Berane) it is on the level of data referring to almost the entire territory of Montenegro.

Logging is not conducted in inaccessible areas and thus it is concentrated in the so called "open" forest areas in which the volume of logging may not be considered sustainable. The National Forestry Policy stresses the importance of sustainable harvests in the future and places increased emphasis on multiple uses of forests, including the protection of biodiversity in forest ecosystems, watershed protection, development of tourism and recreational purposes.

There is also very little reliable data on fish stocks and its productivity in Montenegro for the last 15 years. Although marine fishing vessels are required to keep logbooks with details of catch, species, and fishing effort in accordance with FAO standards, these are not kept properly and catches are often not reported. There is also likely to be a degree of illegal fishing off the coast, and it is difficult to assess whether marine fisheries are currently sustainable. However, indirect evidence suggests an increasing fishing effort. In the 1970s and the 1980s, apart from intrusions by Italian fishing boats, only one trawl ship operated in Montenegrin territorial waters. After the decline of fishing activities in the early 1990s, which were conducted only in the Boka region and area around Ulcinj, in the mid-1990s – the number of vessels registered for commercial or recreational fishing increased to 196. Since 2000 this number decreased to a level of 17 trawlers and boats (data for 2001). The focus of the catch was on quality fish, and prohibited nets and explosives were known to be used. The estimated biomass has been reduced from 300 tons in 1973 to 100 tons now. There has also been a reduction of catch rate from 60 to 20 kg of fish per hour, while the percentage share of cartilaginous fishes in the total catch has decreased from 32% to 20%. All of the research on benthic biomass and population dynamics of economically important fish species indicate that their settlements have reached the point of being over-fished.

Data on recent changes in the fish populations in Skadar Lake are also limited (detailed data and fish stock assessments have not been conducted since the 1980s). However estimations made by fisheries experts indicate that fish populations in the Lake have declined due to increased pollution from Lake catchment area, illegal / uncontrolled fishing, destruction of the migration route for marine species in the River Bojana, and a lack of fish stock protection measures in the Albanian part of the Lake.

Hunting is another area for concern with no clear picture whether natural resources of game for hunting are used in a sustainable way or not. On the basis of shoot boar (*Sus scrofa*) (over 1,000 in 2007, and nearly 25% of the estimated population in the hunting areas, particularly in the coastal region) and wolf (*Canis lupus)* (over 340 wolfs which represents over 25% of the estimated population in the hunting areas), the present level of hunting cannot be considered sustainable. Hunting organizations submit to the MAFWM data which are not independently verified, and many kills are probably not reported. Generally, hunting is not well organized with the user of the hunting area and gives cause for concern particularly because of endangering some hunted but also other species occurring in 40 Montenegrin hunting areas which cover the surface of 1,198,000 ha[96].

5. 6. Connection of gender equality and poverty with biodiversity

Notwithstanding the substantial proportion of women among the employees of institutions related to the protection of biodiversity, Montenegrin society has still not built a suffiicient number of efficient mechanisms for meaningful inclusion of women in the planning, decision making and implementation of programs not only of protection of biodiversity, but also of environmental protection and sustainable development.

General measures to be implemented in order to establish effective mechanisms is the adoption of the Law on Gender Equality and the preparation and implementation of the National Action Plan for achieving gender equality[97]. In addition, it is necessary to work on

[96] Source: Statistical Annual Book for the year 2008. Statistical Office of Montenegro.
[97] Taken from the National Strategy for Sustainable Development

developing mechanisms for the equal influence of women and men on decision-making on economic development and distribution of benefits, especially from the use of biological / natural resources. This state was also the result of changes coming from social and economic transition in Montenegro, which led to negative trends in terms of achieving equal rights, social stratification and the occurrence of categories of “losers of transition“.
There are numerous examples of cause-effect ties between the occurrence of poverty in certain social groups and depletion of natural / biological resources. For Montenegro it is a characteristic that the poor are dependent on resources that represent a "common property". The relationship between preservation of natural / biological resources and income or expenditure of households rarely reflected through direct, but instead mostly through indirect connections. There are frequent cases that poverty forces people to exploit natural resources in unsustainable ways. On the other hand, the exploitation of natural resources is viewed in the context of limiting access to exploitation, and not through the perspectives this exploitation can provide for sustainable economic development.

6. Issues of particular interest for the protection of biodiversity and its sustainable use

6. 1. Tourism and protection of biological diversity

In the context of national economy, tourism is viewed as one of major sources of income in Montenegro and being such it is particularly highlighted in the Tourism development Strategy (2008). A significant number of foreign investments has entered Montenegro in the last 10-15 years to fund the development of this industry. Montenegro is being heavily promoted as a new Mediterranean tourism destination competing with other countries in the region such as Croatia and Greece.

Consequently, planning regulations, including the requirements for environmental impact assessments are not applied consistently, which eventually leads to intensive and in some cases unplanned and uncontrolled development of tourist facilities along almost whole Montenegrin coastline, especially around Budva, Ulcinj, along the Bojana River, Port Milena and Velika plaža, Buljarica, Tivat and Cape Luštica. Apart from the complete loss of natural habitats due to construction of hotels, roads, associated restaurants and other facilities including conversion of beaches and cultivable into developed construction land, there is an increasing problem of lack of sites for waste disposal.

Although there are no direct figures for the areas of disappeared/lost natural habitats, there are many examples in professional literature of the species or habitats of rare populations that have been lost from the coastal areas. Examples for this is the plant *Ephedra major* that has been lost from the area of Toplica in Bar due to construction of recreational and tourism facilities, than the halophytes *Pancratium maritimum* and *Polygonum maritimum* that can no longer be found near Budva, and it is assumed that the species *Polygonum salicifolium* has disappeared from the area of Buljarica, which was the only known location for this species in Montenegro. Apart from this, activities of tourists also endanger biodiversity, most often by disturbing. Unfortunately the acceptance capacities (limit of maximally allowed number of tourists) in many tourist areas are not estimated in adequate manner including the areas of protected nature.

The Tourism Development Strategy in Montenegro until 2020 defined the goal of creating sustainable, high-quality and versatile tourist product that will enable income and tourist number growth. Furthermore, this will enable the creation of new jobs and a better standard of living. Emphasis is put on sustainability, which is of vital importance for the tourism sector, because the tourism offer in Montenegro should be based on the exclusiveness of the natural and cultural attractions and different tourist activities which imply natural ambience and versatility of the historical and cultural heritage that is concentrated in the small area.

The starting point for the future tourism development is the sustainable quality tourism accompanied by two main goals: 1) progress of all the citizens of Montenegro and 2) development sustainability. The sustainability factor that is dominating is not only important from the environmental and social aspect. Its principles protect all elements of the tourism industry and the slogan “Wild Beauty” becomes the key element of the tourism offer. In that manner, the sustainability priorities influence many sectors. They require more efficient infrastructure, and the Government have realized that in time and are realizing the necessary investments in that field. Sustainability is based on the general-responsible attitude towards the environmental protection and consequently “wild” landfills in nature, illegal bird hunting in the protected areas, illegal logging that is not in accordance with the national parks plan and programme have to be completely eliminated.

On the other hand, the National Strategy for Sustainable Development (NSOR) has promoted sustainable development in the tourism sector by defining the “sustainability in tourism” as the development which (i) respects economic, ecological and social principles that are mutually balanced; (ii) does not exhaust natural resources, but is using them to the extent that will make them available for future generations; (iii) protects cultural diversity and identity and simultaneously stimulates harmony in the society; (iv) in addition provides satisfaction for tourists.

6. 2. Spatial planning and protection of biodiversity

The system of spatial planning in Montenegro traditionally enables identification and proposing [98] of the new protected natural areas for the purpose of formation of the National Network of Protected Areas of Nature. That practice is continued and the valid Spatial Plan of Montenegro (PP CG – SPMN (Engl.)) from 2008 determined the proposals for protection of the following sites in the categories of protection which have the national importance: reserves of nature, national and regional parks (see the Map of the Network of Protected Areas of Nature in Appendix 2 of the Strategy and the Projection – Concept of Protection of Natural Heritage in the SP MN in Appendix 3 of the Strategy). Other categories for protection: monuments of nature and the areas with specific natural forms are to be further considered and analyzed in municipal plans since local governments are in charge of managing these categories according to the law.
However the system of spatial planning, on the other hand, did not enable more efficient control of development, particularly building of construction, infrastructural, tourism, residential and other facilities which caused the loss of natural habitats and species as it was previously mentioned in the examples relating to construction of tourism facilities.
The system of planning is also challenged and being such favors development of negative trends such as: outdated parts of planning documentation as well as insufficient coverage of space by urban plans. Other challenges refer to weaknesses in the system of implementation of plans, that is, disrespect of plans. As a result of these weaknesses, negative trends are present in the space management which first of all reflect in the change of purpose of space which leads to the loss of natural habitats, unplanned or illegal ("wild") building and uncontrolled urbanization. These phenomena endanger and devastate some of the most precious natural resources starting with agricultural land, through the area of special purpose with economic importance (coastal zone) to natural areas important for protection. Apart from that threatened or permanently devastated are natural values and landscape wholes which make heritage of Montenegro and its unique feature as an ecological state and tourism destination. On the other hand, poor quality of life (particularly in urban areas) because of over-population and inaccessible infrastructure and facilities, risk of natural disasters is additional problem (particularly earthquakes and floods).
Wide spread illegal building in the previous several decades resulted in a great number of illegally constructed facilities in Montenegro particularly in larger urban centers and at sites attractive for development of tourism.

6. 3. Major infrastructural interventions and protection of biodiversity

Development of entire infrastructure was oriented towards satisfying local needs, but its building had multiple negative effects on nature, biodiversity and integrity of natural areas.
In this sense the biggest interventions were the so called "large" road, energetic and hydro-technical infrastructures which changed the previous looks of nature and particularly stability and functioning of the network of bio-centers and bio-corridors. Due to that, the integration of environmental protection / biodiversity in the processes of planning and construction of these facilities is of special importance for their protection.
In the last five years, economic conditions have stabilized which has led to economic recovery and consequently initiation of activities aimed at the improvement of economic development of Montenegro. This is in the first place visible in construction of infrastructural and other facilities (telecommunication, media, school, social, sport and other facilities).
Former practice of insufficient inclusion of the requirements of environmental/biodiversity protection in the planning processes, particularly defining the corridors and sites for building large infrastructure, due to which in many cases these were located in natural areas significant for functioning of the centers of biodiversity and corridors significant for their

[98] Instead of these, the term "projection" is used more often

functioning and stability. Conflicts between the environmental protection/biodiversity and positioning of large infrastructure are present with protected natural areas which is the case with the corridor of the road infrastructure that passes through the NP Skadar Lake.
Building of the following large infrastructural facilities has been planned (source: SP MN until 2020) which are in conflict with environmental / biodiversity protection: 4 hydro power plants on the river Morača, highway Bar – Boljare – Belgrade and Adriatic – Ionian highway.[99]

6. 4. Assessment of impact on biodiversity / nature / environment

In order to overcome the existing problems and limitations to the efficient functioning of the system of environmental protection, and therefore protection of nature/biodiversity, the Environmental Impact Assessment was introduced in the system of national legislation (as of 1997) as a new mechanisms and an instrument for the implementation of biodiversity/nature protection policy. As of 2008, the new Law on Environmental Impact Assessment has been implemented as well as the Law on Strategic Environmental Impact Assessment, since it is very important to integrate the requirements of sustainability and environmental protection, and therefore the preservation of biodiversity in planning documents.
Adequate application of the Strategic and Environmental Impact Assessment represent a great challenge for the bodies and institutions at the central and local level who participate in the procedures related to their application. This is particularly important for the sectors related to the use of biological resources (forestry, hunting, fishery, agriculture…) and for planning large infrastructural projects, tourism, residential and business zones which can endanger natural habitats under protection or to be put under protection. Inconsistency in the application of these two mechanisms of environmental protection resulted in increased loss of natural habitats and species (see Chapters 6. 1. Paragraph 2 and 6. 3., Paragraph 3) or increased pollution of watercourses and soil. Procedures of Strategic – and Environmental Impact Assessment have still not been implemented in forestry, hunting, fishery and agriculture.
On the other hand, the Law on Environment foresees that for the planned projects, actions and activities in the protected natural asset for which (i) the law requires environmental impact assessment done and for those for which (ii) the law does not require environmental impact assessed done, which are in the protected natural area, the **Assessment of the acceptance** of these actions, activities and works on the protected natural area. The Assessment of the acceptance includes the following, particularly: conditions and measures for prevention, reduction and elimination of potential harmful impacts on nature, compensation conditions and measures. Unfortunately, this procedure has also not been implemented in practice yet.

6. 5. Legal and institutional framework for the protection of biodiversity

In several official documents it was stated that the existing legislation and institutional framework do not provide a satisfying level of efficiency in executing duties in the area of biodiversity, that is, environmental protection[100]. Apart from the unsatisfactory level of the implementation of domestic regulations, numerous are obligations coming from international treaties[101] (conventions and protocols) which are waiting for adequate solutions.
Apart from poor efficiency of the legal, there is a lack of adequate political attitude towards biodiversity protection, which significantly contributes to the creation of conditions for unsustainable development and its negative effects on biodiversity. Although the existing legal framework for environmental protection in Montenegro has been harmonized in many

[99] According to the law, all infrastructural facilities are obliged to conduct Strategic Environmental Impact Assessment as it was the case with the Detailed Spatial Plan (DSP) for the highway Bar - Boljare or as is the case at the moment with the Detailed Spatial Plan for the multi-purpose accumulations (for 4 hydro power plants) on the River Moraca.
[100] Seei NSOR, Chapter 5. 2. 1., p. 34
[101] Appendix 4 “Strategies” presents the membership status of Montenegro in key international conventions regarding biodiversity protection.

areas or is in the process of revision and harmonization with the EU requirements, these regulations are by inertia still poorly observed and implemented/applied in practice. Lack of preventive/"proactive"measures related to the implementation of laws cannot be replaced later by repressive measures, that is, "reactive" policy.

The existing institutional framework, responsible for the preservation of biodiversity and sustainable use of natural resources in Montenegro, is mainly centralized within the governmental institutions which are mainly set in Podgorica. Even though decentralization is promoted when it comes to decision making, there are still not many examples in practice showing the implementation of that policy, and NGOs, businesses and general public are poorly involved.

The inherited problems from former socialist times and numerous challenges brought by social and economic transition caused a low level of efficiency in planning and implementation of measures and activities aimed at protection of biodiversity. Many aspects of the traditional way of work are still present in the work of institutions engaged in protection of biodiversity.

There is a need for quite some time to hire new personnel, starting from managers and guards in protected natural areas ending with specialists for specific components or aspects of protection of biodiversity. Apart form the need for ongoing vocational training of personnel engaged in protection of biodiversity/nature[102], there is the need to hire new staff and specialized personnel in jobs and tasks related to accession of Montenegro to the EU.

State institutions of Montenegro hire a big but still insufficient number of professional staff in the area of protection of nature/biodiversity. For example in the Ministry of Spatial Planning and Environment out of the total of 133, the Department for Environmental Protection employs 3 people, the Environmental Protection Agency employs 80 people, while the Nature Protection Agency employs 17 people of which 15 specialists for various fields. Public Enterprise National Parks of Montenegro employs 99 people; 22 are employed in the Museum of Natural History; 24 at the Marine Biology Institute, 28 at the Faculty for Science and Mathematics at Biology Department, 14 full time, 3 part time and 14 associate members in the Division for Natural Science of CANU (Montenegrin Academy of Art and Science) and the Statistics Office of Montenegro (MONSTAT) employs only one person to deal with all the information in the area of environmental protection. In local government services that are in charge of environmental protection, a specific number of employees is dealing with issues relating to the protection of nature/biodiversity. There is a general consensus that the number of employees in these institutions is too small to implement the efficient biodiversity protection and sustainable use of biological resources. Staff to deal with the issues of biological safety is also lacking (for now only one person is engaged in the Ministry of Agriculture, Forestry and Water Management who is in charge of other issues as well).

Even though efforts were made to strengthen capacities of human resources in the Ministry of Spatial Planning and Environment, bodies of local self-government and relevant institutions in the area of preservation of nature (Nature Protection Agency, Public Enterprise National Parks of Montenegro) there is a permanent need for new personnel and vocational training of the present staff.

National Capacity Self Assessment (NCSA[103]) did not precisely enough identify the needs for strengthening HR capacities of institutions working in the area of biodiversity (necessary training, new knowledge and skills) due to which a special program will have to be developed which will identify the needs in adequate institutions.

[102] Managers of protected natural areas, professional and scientific institutions, administration at the central and local level etc

[103] NCSA = National Capacity Self Assessment, a joint project of the Ministry of Tourism and Environment and UNDP financed by GEF (Global Environmental Facility) was conducted in 2007.

7. Threats and factors of threatening to biodiversity

7.1 Threatened habitats, flora and fauna, and agro-biodiversity

While direct comprehensive data [104] on the number and distributional changes of natural populations of wild plant and animal species and their habitats are lacking, there are many examples of threatened and disappearing biodiversity in Montenegro registered in professional literature and official documents.

Threatened habitats and ecosystems

Coastal and marine areas

The flora and fauna of the coastal zone is considered the most threatened in Montenegro. This region is threatened by uncontrolled tourism and urban development which due to increased discharge of polluted and untreated waste waters into the sea endangers marine ecosystem, particularly at tourist zones such as the Boka Bay. The most threatened habitats on the coast are (i) the dunes at Velika Plaža in Ulcinj (which is one of the latest resorts of a unique and rare halophyte vegetation[105]) and (ii) and the remaining fragments of Skadar Oak (*Quercus robur scutariensis)* forest in Štoj at the rear of the Velika Plaža. Bird fauna gravitating to these habitats is endangered by hunting.

b. Forest habitats / forest eco-systems

Forest ecosystems have also suffered huge changes, particularly after World War II when in a period of 'industrialization' of forestry the highest-quality timber was logged and almost all of the most valuable forest complexes were destroyed. Unfortunately, there are no reliable data on changes in size or composition of forest habitats over the last 50 years, but some data do exist on timber volumes extracted. In the period 1947-1951 around 1,200,000 m^3/year of timber was logged in Montenegro and in 1970s this fell to around 900,000 m^3/year and by the end of the 1980s approximately 800,000 m^3/year was harvested. The amount logged in the 1990s fell, and there were some illegal logging as it was the case (1998-2000) in the border regions with Kosovo. Logging in Montenegro is currently estimated at about 700,000m^3/year.

c. Water and wetlands habitats

The greatest threat to the water and wetlands habitats is eutrophication[106] which is a consequence of pollution from human settlements. Apart form the practice of direct use of biological resources from freshwater ecosystems, plans for their drying[107] are a possible factor for endangering of flora and fauna communities particularly fish population. Threats to water and wetlands habitats, as well as hunting of water birds, have been one of basic threats to biodiversity.

d. Dry grassland habitats

Dry grasslands in Montenegro are very rare in terms of their size and thus considered the most threatened habitats in Montenegro. Therefore converting them into arable orchards/vineyards[108] leads to their reduction and disappearance.

Threatened agro-biodiversity

Development of new practices in agriculture and market pressures have led to erosion of agro-biodiversity, first of all local varieties and breeds which are declining and disappearing from our households or their genetic basis has changed due to cross-breeding with other varieties and breeds imported from other areas.

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[104] Result of insufficient level of the research conducted and lack of more complex biodiversity monitoring system

[105] Rare and endangered psamofite and halofite at this site are as follows: *Cakile maritima*, *Xantium italicu*, *Salsola kali*, *Euphorbia peplis*, *Euphorbia paralias*, *Polygonum maritimum*, *Atriplex hastate*, *Echinophora spinosa*, sea holly *Eryngium maritimum*, *Agropyrum junceum*, *Medicago marina*, *Inula crithmoides*, *Lagurus ovatus*, *Cuscuta* sp.

[106] Particularly at the Skadar Lake

[107] Plans for deepening of the bed of the river Bojana and regulating the level of the Skadar Lake

[108] Example of turning a great part of the field Ćemovsko polje into vineyards and orchards

7. 2. Major threats to biological diversity

Major threats to biodiversity in Montenegro

On the basis of the available information, the following 6 main categories of threats to biodiversity can be identified:

1. *Uncontrolled urban and tourism development,* particularly on the coast and in Podgorica with which building of road and hydro-technical infrastructure is connected which lead to the loss, degradation and fragmentation of the remaining natural habitats, particularly coastal and wetlands habitats;
2. *Changes in land use practices*, associated with urban and tourism development and introduction of new practices in agricultural production leads not only to the loss of natural and semi-natural habitats but also to the loss of agro-biodiversity, that is, local varieties and breeds;
3. *Unsustainable and illegal use of natural resources* due to: (i): logging of natural forests, (ii) harvesting edible and medicinal plants, fungi and invertebrates, (iii) game hunting and (iv) fishing;
4. *Pollution* in the first place freshwater and marine ecosystems waste waters and solid waste which apart from intoxication of organisms leads to eutrophication in those ecosystems;
5. *Introduction of alien, invasive species,* mostly for commercial reasons[109], is a threat to biodiversity which has not been well studied yet [110], but its actualization is expected in the near future;
6. *Climate change* represents a forthcoming threat to biological diversity which has a narrow variation amplitude particularly in temperature and water regime and the analysis of consequences from climate change [111] must be paid more attention[112].

However the most significant cumulative effect of the above mentioned threats to biological diversity is the loss of rare or endangered habitats and their associated rare, endemic or endangered species particularly on the coast as well as a reduction in the functionality and stability of ecosystems, particularly of forest and water ecosystems.
More detailed information on distribution and relations in terms of consequences and threats to biological diversity with relevant business sectors are given in Chapter 5. 2. Business sectors using biodiversity / natural resources.

7.3. Major reasons which lead to loss of biodiversity

There are a number of root causes of the threats to biological diversity stated above, the most significant being:

1. Low political priority that has the protection of the environment - although environmental protection and conservation of biodiversity and natural resources are formally declared as priority in numerous official documents (The Declaration of the Ecological State, Spatial Plan of Montenegro, National Strategy for Sustainable Development, etc.). In practice they are positioned low in the political agenda since the economic sectors (tourism, energy, agriculture etc) considered as profitable are priorities. Interests of "development without

109 The most frequently encountered invasive species are as follows: Black Locust (*Robinia pseudoacacia*), which is already resident, Chinese sumac (*Ailanthus altissima*), and in urban areas the Paper Mulberry (*Broussonetia papyrifera)*. Presence of sea grapes (*Caulerpe racemosa).*

110 Only the inventory of invasive insects and fungi has been completed (see http://www.europe-aliens.org/regionFactsheet.do?regionId=YUG-MN)

111 Expected climate changes in Montenegro (the IPCC AR 4, and other sources) in the period to 2050: warming - rising temperatures of 1.8 to 2.2 0C especially during summer and a pronounced temperature contrast between land and sea, (ii) decreased amount of precipitation - the range between -6% and - 14% especially during summer, while reducing relative humidity in the air and soil and increased evaporation, (iii) increasing the frequency of extreme climate phenomena and (iv) increase in sea level by about 18 - 22 cm

112 The necessity of making forecasting scenarios for climate change and other necessary measures concerning the impact of climate change on coastal and marine biodiversity of Montenegro are included in the document the Ministry of Tourism and Environment and UNEP RAC / SPA (prepared by V. Buskovic (2008)): *Vulnerability and impacts of Climate Change on Marine and Coastal Biodiversity in Montenegro*, National Overview

barriers" are generally substantiated with strong financial and investment arguments that are stronger than environmental arguments including legal procedures and administrative measures that are considered as barriers to that kind of development.
2. Promotion of policies which are not compatible with sustainable use of natural resources and protection of biodiversity - policies which are not aimed to the environmental sustainability in these sectors could be clearly distinct. Thus, for example, policy in the tourism sector is not yet enough focused on more environmentally sustainable and expensive forms of tourism with smaller number of guests.
3. Low level of limitations and incentives relating to protection of biodiversity/protection of nature - the current system of prohibitions and sanctions for the violation of regulations concerning nature protection (ranging from pollution to the direct use of biological resources) is poorly efficient and does not provide full control and / or limiting harmful activities. When applied those penalties are often considered more like "extra taxes" that complicate economic activities. In addition, there is a lack of incentives for investment in improvement of the state of natural resources for both economic sectors (agriculture, industry, tourism…) and individuals that have to change their awareness and behaviour.
4. Demographic, social and economic changes which influence biodiversity - significant demographic changes affected the region in past two decades (the dissolution of Yugoslavia, the migration of refugees and displaced persons etc) consequently changed previous resident population (in ethnic, social, economic sense and the like) of Montenegro. On the other hand, internal migrations of the population (from village to city and from the north to Podgorica and to the Coastal Area) have changed the demographic profile of rural settlements. Also, there are significant changes in the age structure of the population, which further affects the labour capacities and economic potentials of Montenegrin population. These changes affected traditional forms of the utilization of natural resources as well as traditional life style, especially in the mountain areas. Unfavourable economic conditions caused increase of the volume of direct exploitation of biological resources. Volume of direct exploitation of biological resources is depending on their accessibility while unequal distribution of the benefits arisen from their exploitation is causing local population feel dissatisfied.
5. Poor participation of stakeholders - historically, there is no continuity in organizing participation of key stakeholders in decisions making process regarding use and management of natural resources. Also, existing mechanism for the management of protected natural assets do not meet basic rights and needs of local population whose life is linked to the use of natural resources. Even not properly organized, these interest groups are changing their estimation of natural resources in public/state use which are considered as "nonentity" property that should be exploited “as much as possible”. On the other hand, general public which is declaratively supporting environmental protection and protection of biodiversity trasfers the obligation to undertake specific steps to "someone other who is in charge for taking action" and unwillingly accept participation in the actions undertaken by organized forms of civil society.

7. 4. Obstacles for efficient protection and sustainable use of biodiversity

There is a set of major obstacles (“barriers“) which do not allow or diminish the efficiency of protection and sustainable use of biodiversity and major are the following:
1. *Lack and non-available detailed data on biodiversity* - most of taxonomic groups are poorly investigated (see Chapter 3, Sub-Chapter 3.7) which influences quality and effects of the measures undertaken for biodiversity protection. A lot of information remain unpublished, or if published they are not available to the public (internal reports within the institution, the results of research projects, master and doctoral theses, specialist papers in professional publications that are not for general public distribution). There are no publicly available databases for specific taxonomic groups, and there is no "red book" of rare and endangered species. Existing Biodiversity Monitoring Program does not provide sufficient information about the state, factors of threats and threats to biodiversity. On the other hand, country

experienced a period of isolation during the 90's that also affected scientific community causing breaks in the cooperation with similar institutions abroad, exclusion from wider initiatives related to biodiversity conservation.

2. Lack of personnel and financial resources – relatively small number of personnel is engaged in the field of nature / biodiversity protection, so far. Usually, only one or two specialists or researchers possess knowledge about a particular plant or animal group, while for some taxonomic groups there are no adequate specialists. In combination with insufficient financial allocations from state budget and with no financial participation of private sector, this is causing biodiversity conservation activities (monitoring, scientific inventories and databases, management plans for protected areas of nature, etc.) are not implemented with required efficiency, or not implemented at all. Apart from the lack of capacity, very small number of education and research institutions is providing specialized training relevant for implementation biodiversity protection measures or management practices regarding certain components of biodiversity.

3. Poor harmonization of legal and inter-institutional responsibilities - fragmented distribution of responsibilities and low level of inter-institutional coordination is causing both, overlapping of the institutional responsibilities relevant for biodiversity / natural resources, and lack of efficiency in the execution of obligations regarding biodiversity protection / conservation and sustainable use. In addition to that, there is a gap between the reforms in the legislative framework for biodiversity / nature protection, on one side and socio-economic transition / reforms all required by EU. For example, foundation of the management plans for protected areas is still in traditional management models that exclude participatory process in their preparation, adoption and implementation.

4. Lack of public and political awareness of biodiversity and lack of public participation in its protection - a low level of awareness on wide broad of issues regarding biodiversity / nature protection is reflected in various aspects, such as inadequate solid waste disposal, lack of knowledge about the protected areas, etc. Public awareness campaigns on these issues are rare, usually timely limited and focused on the specific issue (for example, campaign against the construction of hydropower plants on Tara River). Generally speaking, there is low public support to the initiatives for the nature protection (for example, lack of public support for establishing National park "Prokletije"), which leads to discouragement of general public and lack of political interest and support, as well. Putting under protection new protected areas is considered as "a barrier" for local economic development of rural areas that additionally amplifying deviation of general public opinion.

5. The weaknesses in the system of management and designation of protected areas of nature - the weaknesses in the existing management system and designation of protected areas are obstacles that affect the efficiency of direct in-situ protection of biodiversity. The low level of professional, operational / managerial capacities in existing protected areas and lack of managers / management authorities for all protected areas are important impact to key natural values of these areas. Negative trends in the designation of new protected areas, particularly those of larger size require more efficient models for their designation and management that could be provided in the process of revision of the status of existing protected areas.

8. Action plan for protection of biological diversity for the period 2010 - 2015

8. 1. Main challenges that require undertaking adequate measures and activities

Taking into account the previously established long-term (LO) and operational objectives (OO) the objectives of the Strategy (Sub-Chapter 2.2.), as well as the identified threats and factors of endangering biological diversity, seven seven special issues were highlighted - challenges that require taking the appropriate measures and activities for a better protection of biological diversity and its sustainable use that have priority in the five-year period of validity of the Strategy (in accordance with LO 1).

1. **Lack of data** [113] on specific components and aspects of biodiversity in Montenegro is a special challenge for whose overcoming (in accordance with OO 1. and OO 5.) measures and activities should be provided which refer to: (i) intensifying research, (ii) monitoring / tracking situation, (iii) making inventory and mapping of species protected by the law and (iv) identification of Network Natura 2000. The major part of scientific inventory for specific groups of biological diversity has not been completed up to the required level, while they completely lack for some groups of biodiversity (see Chapter 3, Sub-Chapter 3.7).

2. **Insufficient institutional and staff capacities** [114] ,which cannot provide efficient planning and execution of measures and activities for the protection of biodiversity, are a challenge for whose overcoming (in accordance with OO 6. and OO 7.) measures and activities of professional upgrading and personnel training should be provided within the existing system of institutions engaged in the protection of biodiversity. Many aspects of traditional ways of working are still present in the work of Montenegrin institutions and thus operations related to the accession of Montenegro to the EU are conducted with difficulties. The need to provide professional upgrading of the existing staff and employment to the new staff was identified in several areas of protection of biodiversity (see Chapter 3. Sub-Chapter 3.7.; Chapter 4. Sub-Chapter 4. 1. and Sub-Chapter 4. 2. and Chapter 6., Sub-Chapter 6. 5.).

3. **Low level of efficiency of the existing legal and accompanying institutional framework** [115] for the fulfillment of obligations in the field of the protection of biodiversity, that is protection of nature is a challenge for whose overcoming (in accordance with OO 1, OO 2., and OO 6., and in relation to OO 5.) measures and activities should be provided which refer to: (i) the completion of legal framework in the area of environmental protection, in the first place regulations related to the transposition of EU directives for habitats/species and birds and (ii) strengthening public awareness of the necessity to respect the laws. Apart from the aforementioned, there are also numerous obligations arising from international treaties (conventions and protocols) for whose implementation adequate legal solutions must be found (see within Chapter 6. (6. 5. and Chapter 4.)).

4. **Vulnerability of ecosystems**[116], primarily water and forest ecosystem as well as specific habitats and species related to those habitats and ecosystems is a challenge for whose overcoming (in accordance with LO 2. (i[117], ii i iii),, LO 3. (iii), OO 1. and OO 2.) measures and activities should be provided which refer to: (i) protection of those ecosystems, primarily in the protected areas of nature, (ii) monitoring / tracking the condition of these ecosystems, (iii) integration of the protection of these ecosystems in adequate sectoral

[113] Recognized in Chapter 7, Sub-Chapter 7.4., Item a.
[114] Recognized in Chapter 7, Sub-Chapter 7.4., Item b.
[115] Recognized in Chapter 7, Sub-Chapter 7.4., Item c, Chapter 6, Sub-Chapter 6.5 and Chapter 4.
[116] Recognized in Chapter 7, Sub-Chapter 7.1.1., Items a. – d.
[117] In accordance with spatial distribution, mountain ecosystems functionally spread along forest ecosystems

plans, (iv) identification of habitats and species important for the protection in those ecosystems and (v) other necessary measures. (See Chapter 3., Sub-Chapter 3. 1 and other Sub-Chapters within Chapter 5., Sub-Chapter 5. 2. and Sub-Chapter 5. 5. within Chapter 6. Sub-Chapters 6. 1., 6. 2., 6. 3. and 6. 4. and within Chapter 7., Sub – Chapter 7.1.1.).

5. Dependence of the protection of biodiversity on economic development is a special challenge particularly in the following sectors[118]: (i) **tourism**, (ii) **spatial planning** and (iii) **development of large infrastructure** and in relation to this with the functioning of the system of the Environmental Impact Assessment and integration of the protection of biodiversity in those sectors (LO 3.). In relation to this it is necessary to provide changes and adjustments which will enable integration of the protection of biodiversity into the key mechanisms of those sectors. (See Chapter 6, Sub-Chapters 6. 1., 6. 2. and 6. 3.)

6. Placing under protection **new protected areas of nature** is delayed[119], especially those areas that have a larger surface, which is a challenge for whose overcoming (in accordance with LO 3. (i), and in relation to LO 2., and LO 3. (i), and in particular for the implementation of OO 1.) measures and activities related to the placement under protection of new and the review of the status of protected areas of nature should be provided (see Chapter 4., Sub-Chapter 4. 1. and 4. 1.1.3.).

7. Poor efficiency in **managing protected natural areas** [120] is a challenge for whose overcoming (in accordance with LO 3. (i) and OG 1.) measures and activities should be provided which will refer to appointing manager for all protected areas of nature and participation of local people in their managerial bodies. The existing practice of appointing the manager for all of protected natural assets is not sufficiently developed (there are managers for protected areas in the category “national park”, whereas the organizations/bodies for direct management of the category “natural monument” and “natural area with special features” have not been established (See Chapter 4., Sub-Chapter 4. 1. and 4.1.1.3.).

Due to its importance the activities for the implementation of OG 3 and OG 4 are given previously in Chapter 2, Sub-Chapter 2.4., and thus they are not separately covered by the Action Plan.

[118] Recognized in Chapter 7, Sub-Chapter 7.2., Item 2.
[119] Recognized in Chapter 7., Sub-Chapter 7.4., Item e.
[120] Recognized in Chapter 7., Sub-Chapter 7.4., Item e.

8. 2. Action plan – plan of measures and activities to be undertaken to protect biological diversity for the period 2010 – 2015

As a response to the previously established challenges and in accordance with available organizational (staff and financial) capacities, implementation of the following measures and activities in the following five year period will be provided in order to preserve biological diversity and its sustainable use:
Cost estimation for the proposed measures and activities is given in most cases based on the comparison with the amount of costs of similar activities undertaken. Such estimation was not given in cases for which cost price could not be identified or any other comparative parameter.

I. DEVELOPMENT AND REINFORCEMENT OF THE EXISTING DOCUMENTATION BASIS ON BIODIVERSITY

1. Intensify **research** that will enable completion of scientific inventories for those groups of plants and animals which are identified as priorities from the aspect of protection of biodiversity and its sustainable use or within the needs arising from the process of EU accession (Network Natura 2000 areas).
The following will be done in the area of floristic biodiversity due to the importance for identification of the Natura 2000 area:
(i) **Flora of Montenegro,** as a three year project run by the Expert Team should be organized under the Nature Protection Agency project. Approximate amount of funds: EUR330,000.00 total, i.e. EUR110,000.00 per year.
(ii) **Vegetation Map of Montenegro,** as a five year project managed by the Nature Protection Agency including hiring adequate local and, where necessary, international experts. Approximate amount of funds: EUR350, 000.00 i.e. EUR70, 000.00 per year.
In the area of bird diversity, due to its importance for protection as required by EU Directives on Birds and Natura 2000, the following will be done:
(i) **Bird fauna of Montenegro**, as a one-year project, run by the Expert Team that should be organized under the Nature Protection Agency. Approximate amount of funds: EUR 40,000.00.
Funds for the implementation of these activities will be allocated from the Budget of Montenegro, through the Ministry competent for environmental issues.

2. Development of the **Programme for Long Term Research on Biodiversity in Montenegro** that will enable completion of the other missing/incomplete scientific inventories for the groups of plants and animals important for protection of biodiversity and its sustainable use. Development of the Programme, to be adopted by the Government of Montenegro, will be organized by the inter-ministerial group of the ministries competent for environment, science, agriculture, forestry and water management with participation of all the institutions and individuals from the field of protection of biodiversity. In line with the dynamics and priorities of the research identified in the Programme, regular annual allocation of funds will be ensured from the budget of Montenegro or other sources of financing identified in the Programme. Review of the Programme is to be carried out by the Ministry competent for environmental protection, together with the institutions and individuals that are relevant for biodiversity monitoring.

Funds in the amount of EUR 5,000.00 will be provided for this activity from the Budget of Montenegro through the Ministry competent for environmental protection.

3. Review of the amount and increase of funds allocated for the needs of the **Biodiversity Monitoring Programme.** Adjustment of the list of indicator species and areas of biodiversity monitoring will be provided in line with the pressures on biodiversity and most vulnerable ecosystems identified so far. Increase of funding for the implementation of this Programme will be conditional upon the results of its expert review that is to be conducted in the first year

of the Strategy implementation (2011) which means that increased funding will be provided in 2011. The amount of annual funds allocated for revised Programme as of 2011 may not be determined in advance, but based on the analogy with similar programmes it may be ascertained that it will amount from EUR 80,000.00 to EUR 200,000.00 per year. Review of the Programme is to be carried out by the Ministry competent for environmental protection, together with the institutions and individuals that are relevant for biodiversity monitoring.

Funds in the amount of EUR 15,000.00 will be allocated for this activity from the Budget of Montenegro through the Ministry competent for environmental protection.

4. **Inventory and mapping** of distribution of **endemic and legally protected plant (and optionally) animal species** will ensure practical use of information about that component of biological diversity in other sectors as well. This activity is to be organized as a two year project managed by the Expert Ream appointed by the Ministry competent for environmental protection in the period 2011 – 2012. Approximate amount of total funds: EUR 120,000.00, as follows: EUR 40,000.00 for the first year (2011) and €80,000.00 for the second year (2012). Funds for this activity will be allocated from the Budget of Montenegro through the Ministry competent for environmental protection.

5. Identification and development of the **National Network of the Natura 2000 Areas** aimed at the implementation of protection of those types of habitats contained in the EU Directive on Habitats and EU Directive on Birds, as a complex project of the Ministry competent for environmental protection which should ensure engagement of institutions and individuals competent for the relevant groups of flora and fauna, typology of habitats and protection of biodiversity in general in the period from September 1st 2011. Approximate amount of total funds: EUR 600,000.00, which is EUR 150,000.00 per year.

6. Collecting and **analysis of data related to equitable distribution of benefits** from generic diversity. This activity will be organized through a 2-month project within which the appointed Expert Team will develop adequate study in 2010 (approximate amount of EUR5,000.00 – funds will be provided from the Budget of Montenegro through the Ministry authorized for environmental protection).

7. Developing planning documentation and implementation of measures for the protection of seed stands will be implemented as a joint activity of the Ministry of Agriculture, Forestry and Water Management and Forest Management Administration. Funds foreseen for this activity should be planned in a regular budget of these institutions in the total amount of EUR 100,000.00 starting from 2011.

8. Development of the **National Classification of Habitats** (catalogue), in order to emphasize variety and specificity of habitats in the territory of Montenegro which will contain a key for homologization of national types and classes of habitats for any European classification of habitats (EMERALD, Natura 2000...). This activity will be implemented as a special component of a joint project (WWF, Ministry of Spatial Planning and Environment and Nature Protection Agency) for ecological region of the Dinaric Arc during 2012 (approximate amount of funds needed is EUR15,000.00).

9. **Inventory of invasive,** in the first place **floral species** which should result with a practical application of information obtained in that way in adequate economic sectors (agriculture, forestry etc). This activity will be organized as a one year project run by the Expert Team whose members will be appointed jointly by the ministries in charge of agriculture, forestry, water management and environment during 2012. Approximate amount of funds is EUR 10,000.00. Funds for this activity will be provided from adequate EU funds or the Budget of Montenegro through the Ministry in charge of agriculture, forestry and water management.

II DEVELOPMENT AND STRENGTHENING OF INSTITUTIONAL AND STAFF CAPACITIES FOR THE PROTECTION OF BIODIVERSITY

10. To enhance staff capacity of institutions (the ministry in charge of environmental protection, spatial development, tourism, agriculture, forestry and water management, Environmental Protection Agency, Nature Protection Agency, Public Enterprise for National Parks of Montenegro, municipal secretariats for environmental protection, NGOs and private sector) for the issues of biodiversity protection, its sustainable use, equitable share of benefits from the use og its genetic resources, control of trading in GMOs, conducting activities coming from this Strategy, the process of accession of Montenegro to the EU which will give rise to the development **Education and Training Programme.** The Programme will, among other things, define the amount of necessary funds for the implementation of the Programme and other potential sources of its funding (international organizations, donor funds etc.) other than the Budget of Montenegro. The amount of annual allocation of funds from the Budget of Montenegro for the implementation of the Programme as of 2011 may not be established in advance, but based on analogy with similar programmes it may be expected to amount between EUR 20,000.00 – EUR 100,000.00 per year. The Programme will be passed/approved by the Government of Montenegro.

III INCREASE IN EFFICIENCY OF LEGAL AND INSTITUTIONAL FRAMEWORK IN THE FIELD OF PROTECTION OF BIODIVERSITY/ PROTECTION OF NATURE

11. Development of **Action Plans for biodiversity** in all (21) municipalities, in accordance with provisions of Article 102, Paragraph 2, Item 1 of the Law on Nature Protection in order to provide for the implementation of the Strategy through the activities that the local government bodies should provide in order to achieve objectives of the Strategy, the implementation of measures and activities from the Action Plan by 2015. The Biodiversity Action Plan of local governments will cover the issues related to the preparation of annual Reports on the State of Nature (Article 102 of the Law). In this regard, all local governments will provide in 2012 funds (EUR 10,000.00) to create their Biodiversity Action Plans, and as of 2012 will ensure the preparation of annual Reports and their submitting to the ministry in charge of environmental protection.

12. Develop and pass the remaining **regulations specified by the Nature Protection Law** with simultaneous **harmonization of legislation** in the field of spatial planning, agriculture, marine and freshwater fisheries, forestry, hunting, water management, mining, energy, transport, tourism and others with the legislation in the field of nature protection. Harmonization of legislation in the field of GMO use with EU directives and the Protocol on biological safety will be provided. Listed activities will be conducted by the ministry in charge of environmental protection and other relevant ministries within their regular activities, in accordance with the Work Program of the Government of Montenegro. For the purposes of the development of these regulations no special funds will be allocated, and dynamics of their adoption will be determined by the Government of Montenegro in its annual work programs.

13. Implementation of the **campaign to raise awareness for observance of laws** relevant for nature protection/protection of biodiversity, as a multi-annual program of the Government and non-government sector aimed at protecting biodiversity and its sustainable use on a proactive level. The Project will be run by the Ministry competent for environmental protection and Environmental Protection Agency which will be defined in the Campaign Program by partner organizations of governmental, private and civil sector, the manner of conducting the campaign, forms of action directed at specific target groups, monitoring of the results and efficiency of the campaign, and funds necessary for its implementation. The amount of allocated funds for the implementation of the revised Programme as of 2011 may not be determined in advance, but following the analogy with other similar campaigns it may be

expected to amount to between EUR 50,000.00 and EUR 60,000.00 per year. The Program will be passed/approved by the ministry competent for environmental protection.

14. Preparation and passing of certain regulations and strengthening of institutions in the field of environmental protection as it is envisaged in the **National Programme for Integration of Montenegro into the European Union (NPI)** for the period 2008 – 2012 as follows:

a. Short term priorities

a. 1. Legislation

- the new Law on National Parks (in 2009). Passing of the Law will include proclamation of the new National Park "Prokletije".
- The Law on Ratification of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), Law on Ratification of the Convention on the Conservation of Migratory Species of Wild Animals (Bon Convention), Law on Ratification of the Landscape Convention and Law on Ratification of the Agreement on the Protection of Whales and Dolphins Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Areas ACCOBAMS (in 2009).[121]
- Passing by-laws pursuant to the Nature Protection Law [122](see above under Item III. 7) in order to complete and fully harmonize national legal framework with the Directive on the Conservation of Natural and Semi-Natural Habitats of Flora and Fauna (31992L0043), Directive on Wild Birds (31979L0409) and Regulation on the Protection of Wild Species of Flora and Fauna by Regulating Trade therein (31997R0338) as follows:
    - Regulation of the Sorts of Habitat Types, a Habitat Map, Endangered and Rare Habitat Types and the Safeguard Measures for Conservation of Habitat Types
    - Rulebook on the Manner and Methodology for Establishment and Management of the Natura 2000 Network
    - Rulebook on Transboundary Transport and Trade in Protected Species

Passing of the National Plan and Action Programme for Combating Desertification.

a. 2. Institutions

- Establishment of the Environmental Protection Agency [123] that will assume execution of affairs from the field of environmental protection, and in order to improve its public function and personnel structure it will bring a new job systematization and a program for material and material and technical equipping of the Public Enterprise National Parks of Montenegro. The existing building of the Environmental Protection Agency will be renovated, necessary equipment will be procured and staff will receive necessary training (in 2009).

b. Mid-term priorities

b. 1. Legislation

- Activities will be undertaken aimed at collecting of data for the establishment of the network of protected areas, indicators of monitoring of implementation of these activities will be defined and the data base will be set up (see the text above, item I, 5). Collected data will be processed and digitalized, analysis will be carried out and proposals given for the NATURA 2000 areas.
- After the media campaign and public consultations, the final proposal of the network will be established and negotiated with the European Commission. Final list of the NATURA 2000 area will result in passing of a legal act on the establishment of internationally significant NATURA 2000 areas (the end of 2012).

[121] The Law on National parks was passed in 2009, while the Law on Ratification of the Convention on the Protection of European Wild Species and Natural Habitats (Bern Convention), the Law on Ratification of the Convention on Preservation of Migration Species of Wild Animals – the Bonn Convention, the Law on Ratification of the Convention on Areas and the Law on Ratification of the Agreement on the Protection of Whales and Dolphins Cetacea in the Black Sea, Mediterranean and the nearby Atlantic Areas ACCOBAMS were passed in 2008.

[122] Until the date of coming into force four rulebooks were published and others are being prepared and will be released by the end of 2010.

[123] Environmental Protection Agency was established in 2009.

- Continued expansion of the size of protected areas will continue, i.e. harmonization of the current percentage of protected areas with the projection from the Spatial Plan of Montenegro (until the end of 2012).
- Measures and activities envisaged under the Biodiversity Strategy and Action Plan for a given period 2009-2014 will continue on a regular basis. The Red List for Sea Organisms and Red List by Taxonomic Groups (bushes and trees) will be completed by 2010, as well as the Red List of Mountain Flora by the end of 2012.
- Measures and activities defined under the Action Plan for Combating Desertification will be implemented.

b. 2. Institutions

- Institutional framework for nature protection will be finalized. Further institutional building will be undertaken in the ministry competent for environmental protection and Environmental Protection Agency. Managers of all the areas from the NATURA 2000 Network will be appointed. Inspection bodies will receive capacity building for the implementation of legal framework in the field of environmental protection.

Passing of the aforesaid regulations will be integrated into the Work Program of the Government of Montenegro, while their preparation will be entrusted with the ministry competent for environmental protection with participation and cooperation of the relevant institutions from the field of environmental and biodiversity protection. In line with the dynamics and Work Program of the Government, regular allocation of funds from the Budget of Montenegro or other resources of funding (identified in the Program) will be provided. The amount of allocated funds for passing of the aforesaid regulations may not be determined in advance, but following the analogy of needs for passing of similar regulations, it may be expected to range between EUR 500,000.00 and EUR 1,500,000.00. Additionally, the exact amount of the funds needed for institutional building activities may not be specified (also to be allocated from the Budget of Montenegro), but following the analogy of the similar needs it is expected to be in the range between EUR 2,000,000.00 and EUR 4,000,000.00.

15. Institutional adjusting and creating mechanisms for **participation of public and interested groups in the decision making processes** related to the protection of biodiversity, sustainable use of its components and equitable sharing of benefits from the use of genetic sources. This activity does not require engagement of special financial sources but instead it should be implemented as a regular practice in the work of all institutions and state bodies on the central and local level which make decisions related to the previously mentioned aspects of biodiversity (Law on Ratification of Aarhus Convention is in the process of adoption by the Parliament.)

16. Development of **Communication Strategy for the Promotion of Strategy** and implementation of the **campaign for strengthening awareness of the protection of biodiversity** in accordance with CEPA[124] requirements after the adoption of the Strategy by the Government. This activity will be implemented within the overall activities of the Strategy implementation under the competence of the Ministry authorized for environmental issues. The estimated amount of funds for the development of the Strategy is EUR 25,000.00 and for its implementation and rising awareness campaign EUR 75,000.00 (annual allocation of funds is EUR 25,000.00).

17. Development of the **Action Plan for Climate Change** which, among other things should identify and establish measures for adjusting and mitigation of impact of climate change on biological diversity. Basis for the development of this document is provided in the National Strategy for Emergency Situations. Experts will be hired for the needs of the development of the Plan (Expert Team) from relevant areas and they will be gathered within 2011 by the ministry in charge of environmental protection. For this activity funds in the amount of EUR 25,000.00 will be provided from the Budget of Montenegro. Plan will be adopted by the Government of Montenegro after it is harmonized by the authorized Ministries.

[124] Article 13 of the Convention on Biodiversity, CEPA – Communication, Education and Public Awareness

IV PREVENTION AND MITIGATION OF PRESSURE ON ECOSYSTEMS

Measures and activities of prevention and mitigation of pressures on ecosystems are to the highest extent based on changes and adjustments of the relevant government departments and their subordinate institutions, which is why they are given in this part of the Action Plan without any specially processed estimate of allocation of separate funds. However, estimates of the necessary allocated funds are given for those measures and activities which require mandatory provision of funds from the Budget of Montenegro.

17. Development of **the Program for the Protection of Forest Ecosystems in the Existing and Planned Natural Areas** where exploitation of natural resources is prohibited. This activity will be conducted in 2011 in cooperation of the ministries competent for forestry and environmental protection. Technical institutions from the area of nature protection and forestry will be engaged to meet the needs of the Program which is why the funds in the amount of EUR 50,000.00 will be allocated from the Budget of Montenegro. The Program will be passed by the Government of Montenegro after reconciliation between the Ministries competent for forestry and environmental protection.

18. Fight against illegal activities in forestry is the activity that will be implemented during 2011 in cooperation with the Ministry of Agriculture, Forestry and Water Management, Ministry of Spatial Planning and Environment and Forest Management Administration in total amount of EUR 150.000,00.

19. Implementation of research in forest habitats is the activity that will be implemented as of 2011 in cooperation with the Ministry of Agriculture, Forestry and Water Management, Ministry of Spatial Planning and Environment and Forest Management Administration in the total amount of EUR 200,000.00.

20. Participation in activities of the National Inventory of Forests is the activity that will be implemented during 2011 in cooperation with the Ministry of Agriculture, Forestry and Water Management and Forest Management Administration in the total amount of EUR 200,000.00.

21. Establishment of forest information system and further development of GIS in forestry is the activity that will be implemented as of 2011 in cooperation with the Ministry of Agriculture, Forestry and Water Management, Ministry of Spatial Planning and Environment and Forest Management Administration in total amount of EUR 600,000.00.

22. Implementation of monitoring and research in water and wetland habitats in forestry is the activity that will be implemented as of 2011 in cooperation with the Ministry of Agriculture, Forestry and Water Management, Ministry of Spatial Planning and Environment and Water Management Agency in total amount of EUR 200,000.00.

23. Increase in allocation of funds for **monitoring the condition of forest ecosystems** under the Environmental Monitoring Program and intensifying of activities related to forestry ecosystems monitoring under that Program. It is estimated that total annual allocations need to be increased for the Biodiversity Monitoring component in the Environmental Monitoring Program is in the range between EUR 80,000.00 and EUR 200,000.00. (See item I, 3).

24. **Incorporate measures and conditions for biodiversity protection and nature protection into the regulations and documents in all areas of economy** oriented to the exploitation of biological/natural resources, predominantly in the following areas: (i) **forestry** (including exploitation of the *side forest products*), (ii) **hunting**, (iii) **water supply**, (iv) **sea and freshwater fishing**. Implementation dynamics for this activity is not determined based on the above mentioned areas and fur now the amount of the required funds for its

implementation cannot be estimated which should start immediately after passing of the Strategy.

25. **Identification of sea habitats significant for the protection of biodiversity.** This activity should be undertaken as the joint project of the ministries competent for fishery and environmental protection in 2011. Estimated funds needed for the implementation of this Project are EUR 30,000.00. The source of financing of this Project is the Budget of Montenegro, unless some other source of financing (international organization, donations and the like) or way of financing is provided for its implementation, while its results will make inputs for identification of network of NATURA 2000 areas, as well as national networks of protected natural areas.

26. **Develop methodology for the establishment of the number of game and establishment of the state of game population for all the hunting areas** is the activity that will be implemented as of 2011 in cooperation with Ministry of Agriculture, Forestry and Water Management, the Ministry of Physical Planning and Environment, Environmental Agency and Hunting Association of Montenegro. Results of establishing the number of game population will be integrated in regular Programs and Plans of managing hunting areas. It is estimated that for the implementation of this activities funds should be provided in total amount of EUR 700,000.00.

27. **Identification of action plans for individual game species** is the activity that will be jointly implemented by the Ministry of Agriculture, Forestry and Water Management, the Ministry of Physical Planning and Environment, Environmental Agency and Hunting Association of Montenegro. This activity will be implemented by hiring professional organizations and individuals from adequate professional areas (ornithologist, mammologist etc.). This activity will be jointly implemented by the ministries in charge of hunting operations and environmental protection in 2011 through hunting organizations which should provide funding for its implementation.

28. **Identification of wild plant and animal species which require prioritized development of action plans/protection programs.** Through a short consultative process this activity will be implemented by the ministry competent for environmental protection and relevant institutions from the area of nature protection/biodiversity protection throughout 2010. The result of the process should be the Program of Priority Action Plans for Wild Plants and Animal Species that are in need of direct protective measures. Funds for this activity estimated at EUR 10,000.00 will be provided from the Budget of Montenegro, while the very Program will be passed by the ministry competent for environmental protection, after obtaining the opinion from the ministry competent for forestry, hunting, sea and freshwater fishing. This ministry will develop and implement **the action plans for critically endangered domestic breeds and varieties** develop **programs of breeding** of domestic breeds and varieties *in situ* for the purpose of the development of rural tourism. Dynamics of implementation and the amount of allocation of funds for the implementation of action plans and programs of breeding will be determined in these documents, which is why there is no detailed estimate in this document.

29. **Implementation of Strategic- and Environmental Impact Assessment and Assessment of the acceptance of the coverage, concession and works in the following sectors: (i) forestry and (ii) water management.** This activity does not require allocation of additional funds and should be implemented a regular new practice in the work of institutions from the area of water management and forestry, including the use and protection of forests, waters and exploitation of sand and gravel. The ministry in charge of forestry and water management in cooperation with the ministry competent for environmental protection will take care of its implementation.

30. Develop the remaining **fishery studies,** predominantly **for the Skadar Lake.** These activities should be implemented by the ministry competent for fishery and specific amount of funds should be provided for them from the Budget of Montenegro. The priority will be development of the Fishery Study for the Skadar Lake due to the sensitivity of this area, as a two year project, which is why the total of EUR 80,000.00 needs to be allocated from the Budget of Montenegro, which is EUR 40,000.00 per year. Implementation will be taken care of by the ministry competent for fishery.

V. INTEGRTATION OF BIODIVERSITY PROTECTION INTO THE FOLLOWING SECTORS: (I) TOURISM, (ii) SPATIAL PLANNING AND (III) CONSTRUCTION OF LARGE INFRASTRUCTURE

Similarly to the aforesaid, measures and activities for integration of the biodiversity protection into the sectors (i) tourism, (ii) spatial planning, (iii) construction of large infrastructure are mainly based on changes and adjustment in these sectors which is why they are presented without the estimate of separately allocated funds.

31. To ensure **functioning of the System of Strategic- and Environmental Impact Assessment and Integration of Biodiversity Protection in the sectors** related to the use / protection of biological resources (forestry, fishery, hunting, agriculture, water management etc.) or are significant for joint action in the field of biodiversity protection as follows: (i) tourism sector, (ii) spatial planning sector and (iii) large infrastructure sector. This activity does not require allocation of separate funds, but instead it should be implemented as a new regular practice in the work of central and local government bodies in the said areas. Still, its implementation is monitored by the ministry competent for environmental protection and during 2011 it will submit to the Government appropriate Information with proposed measures for endorsement.

32. Prescribe the **licensing procedure/procedure of granting authorization for the development of the Strategic- and Environmental Impact Assessment** and make the list of persons and individuals authorized to conduct such assessments. Within the framework of legal possibilities provided by the laws governing functioning of the Strategic- and Environmental Impact Assessment, the regulation will be made to define the procedure /granting of authorizations for the development of Strategic- and Environmental Impact Assessment, including the list of persons and institutions authorized to develop such studies. This activity does not require allocation of separate funds, instead it should be implemented as a regular practice of the ministry competent for environmental protection, and it will be implemented during 2011.

33. Incorporation of **measures and guidelines for biodiversity protection** into the strategies, laws, regulations, programs and plans from the following sectors: (i) tourism, (ii) spatial planning and (iii) large infrastructure. This activity does not require special funds and its implementation is due to start immediately after the adoption of the Strategy. It will be implemented as a new/regular activity within the competencies for tourism, spatial planning, energy and transport.

34. **Identification of potential areas for development of eco-tourism**. Since it is implemented as a separate project of the ministry competent for tourism and environmental protection, this activity should provide relevant input for strategies, plans and programs in tourism sector. The source of financing of this project is the Budget of Montenegro, unless some other source of financing (international organizations, donations and the like) or manner of financing is provided. Implementation of the project is due to start in 2011 depending on the dynamics of development of strategies, plans and programs in tourism sector, while estimated value of funds for the project is EUR 25,000.00.

35. Prescribe **standards and criteria for the development of eco-tourism in protected natural areas.** This activity does not require separate funds. It will be implemented in 2012 as a regular activity within the tourism competence in line with available legal arrangements.

36. Incorporate **measures and guidelines for biodiversity protection** into the strategies and **tourism** master plans. This activity does not require allocation of separate funds. It will be implemented as the regular activity under the competence of tourism, immediately after the adoption of the Strategy.

37. Develop and establish **the system of monitoring of the number of visitors and impact of visitors on protected natural areas**, predominantly for national parks. Implementation of this activity requires engagement of appropriate departments at the Public Enterprise National Parks of Montenegro which should pass the appropriate Plan that is to be integrated into the management plans for these protected nature areas. PE National Parks of Montenegro is due to start implementation of this activity during 2010 and provide funds estimated at EUR 5,000.00 for it.

38. **To protect biological and regional diversity against the negative tourism impact on the coast** in planning documents and other development plans and programs. Based on the analysis of the sample of tourism development impact on the coast through spatial-planning documents and other official development plans and programs, the 2011 will see the development of the Study that will serve as a basis for initiation of amendments and changes to the spatial and planning documentation which treats this area, starting with the Spatial Plan of Special Purpose for the Coastal Zone of Montenegro. Implementation of this measure will be taken care of by the ministry competent for tourism and environmental protection which will provide funds in the amount of EUR 30,000.00 from the Budget of Montenegro for the development of the Study.

39. Develop: a) Tourist Activities Management Plans, b) Plans for the establishment of Guide Service, c) plans for interpretation of nature/biodiversity and d) plans for education of visitors in protected nature areas which will be **integral parts of management plans,** predominantly national parks. These activities will be implemented by the PE National Parks of Montenegro whose task is to prepare the aforesaid plans and to integrate them into the management plans for individual national parks. Development/formulation of the proposed input plans will start in 2010. Integration of these plans in the management plans should be provided in line with the dynamics of their development. It is estimated that the total EUR 25,000.00 should be allocated for this activity from the Budget of PE National Parks of Montenegro.

40. Development of **the Plan for the Protection of Biodiversity against Negative Tourism Impact in protected natural areas.** Based on the sample analysis of negative impacts of tourism development in protected nature areas, the Plan for the Protection of Biodiversity against Negative Tourism Impact in protected nature areas, predominantly in national parks, will be prepared in 2012. Implementation of these measures will be jointly taken care of by the ministry competent for tourism and environmental protection and PE National Parks of Montenegro which will provide funds in the amount of EUR 30,000.00 for the Plan development from the Budget of Montenegro.

41. Lay down the obligation **to develop expert survey (baseline study) related with the biodiversity protection and protection of nature** for the needs of spatial and planning documents.

42. Lay down the obligation to **value space from the aspect of biodiversity/nature protection** in the framework of the terms of reference for the development of spatial and planning documentation, as well as the implementation of this obligation through spatial and regulatory (urban) plans. This measure will be implemented as a regular practice in

development of spatial and planning documents as of 2010 and its implementation will be jointly taken care of by the ministry competent for spatial planning and the ministry competent for environmental protection. Implementation of these measures does not require separate funds.

43. Provide integration of **nature protection measures/biodiversity protection measures** in main development areas and sectors which are elaborated **in spatial and planning documents** for the following sectors: tourism, energy, transport, agriculture, fishery, forestry, hunting, and water management. Considering the capabilities of the spatial planning sector, this measure is necessary to ensure direct integration of measures for biodiversity protection and nature protection in the plans of the aforesaid sectors. Implementation of this measure, as a regular practice in development of spatial and planning documents, will begin after adoption of the Strategy and its implementation will be jointly taken care of by the ministry competent for spatial planning and ministry competent for environmental protection. Implementation of this measure does not require allocation of separate funds.

44. **Integrate requirements for the protection of biodiversity/nature protection into the plans for development of transport infrastructure,** through environmental optimization of traffic corridors and practical protective measures (provision of crossing for wild animals on the roads of their usual daily/seasonal migrations, provision of afforestation/planting in the zone of roads impact, provision of operational drainage and sewer channels and installation of noise protection on the sites of direct roads impact in areas significant for biodiversity or protected nature areas and the like). This measure will be implemented as a regular practice in development of spatial, planning and technical documents for the transport infrastructure and will start to be implemented after adoption of the Study. Its implementation will be jointly taken care of by the Ministries competent for transport, spatial planning, and environmental protection. Implementation of this measure does not require allocation of separate funds.

45. To ensure implementation of **the analysis of impact of transport infrastructure on endangered species of birds** in wetland and water habitats. Considering the scope of planned ventures in the area of transport infrastructure (Belgrade-Bar highway and Adriatic-Ionic highway) it is necessary to: a)determine the existing level of impact of transport infrastructure on birds in wetland and water habitats (priority is the Skadar Lake), b) provide projection pf impacts and consequences of the construction of the planned highways on the birds in wetland and water habitats, c) formulate elements of monitoring of impact of planned highways on birds in wetland and water habitats. This activity will be implemented in the framework of total activities for the development of spatial plans and technical documentation (as their integral part) for the planned transport infrastructure. Implementation of this activity will be jointly taken care of by the ministry competent for transport, in cooperation with the ministry competent for environmental protection. The amount of funds to be allocated for this activity may not be determined in advance and that will be done during the preparation activities and development of spatial plans and technical documentation for the planned transport infrastructure.

46. To provide **cooperation between the environmental protection sector and transport sector** in establishment of **monitoring** of biodiversity (impacts on species, habitats, areas, monitoring of mortality of wild animals etc.). This measure will be implemented during the activities related to the development of plans and technical documentation for the planned traffic infrastructure and its implementation will be jointly taken care of by the ministries competent for transport and environmental protection, starting from adoption of the Strategy. Results of this cooperation should be integrated in the Biodiversity Monitoring Program. Implementation of this measure does not require allocation of separate funds.

47. Incorporate measures **for the protection of species, habitats and regions** in planning the construction of **energy facilities**. Implementation of this measure, as a regular practice, will start after the adoption of the Strategy and its implementation will be jointly taken care of

by the ministries competent for energy, spatial planning and environmental protection. Implementation of this measure does not require allocation of separate funds.

48. Reinforcement of **the biodiversity protection principle in the procedure of development of Environmental Impact Assessments in relation with the construction of hydro power plants in the Morača River.** Practical implementation of the principle of the protection of biodiversity from the energy facilities in the studies of Strategic- Environmental Impact Assessment will start on the example of the construction of 4 hydro power plants on the river Morača. This will be a demonstration example for other constructions of hydro power plants and other energy facilities. Implementation of this measure is due to start after the adoption of the Strategy and its implementation will be jointly taken care of by the ministries competent for energy, spatial planning, and environmental protection. Implementation of this measure does not require allocation of separate funds.

VI. PLACEMENT OF NEW PROTECTED NATURAL AREAS UNDER PROTECTION

49. Placement of new protected natural areas under protection will be ensured with the aim of achieving NSOR established goal to place 10% of state territory under protection, which is restated in the Spatial Plan of Montenegro, and the following areas are proposed for protection:

Nature reserves: The existing nature reserves network should be analyzed in accordance with findings of the revision of the protected areas of nature.

National parks: Apart from existing national parks “Lovćen”, “Biogradska gora”, “Durmitor”, and “Skadar Lake”, the following additional measures are envisaged:

- it is planned to establish a new National Park “Prokletije” as a priority
- extension of the borders of NP “Durmitor” and proposed regional parks “Bioč”, “Maglić” and “Volujak” in order to connect them with the NP “Sutjeska” in Bosnia and Herzegovina.

Establishment of a new National Park “Orjen“.

Regional Parks/Nature Parks: The following parks are suggested for placing under protection as regional parks in this category for additional analyses: “Rumija”, “Komovi”, “Sinjajevina”, “Maglić – Bioč – Volujak”, “Ljubišnja” and “Turjak” with “Hajla”.

In the category **Nature Monument,** for which the proposals were obtained during the development of the Spatial Plan of Montenegro, the following areas were envisaged to be placed under protection: Platije, canyon of the Cijevna River to the village Dinoša, and the canyon of the Mala Rijeka, canyon of the Mrtvica, Morinj Bay, Plavsko Lake, Šasko Lake, Ulcinj saltpans with Knete and Ada Bojana, with a suggestion to consider possibilities for the protection of new speleological sites, glacier lakes on high mountains, hydrological phenomena (estavels – Gornje Polje spring and other, lost rivers – Vidov brook and other), geological and geomorphologic phenomena (findings of deposits of crystalline calcium carbonate (*siga, bigar*) – Podmalinsko and Zukva), exceptional canyons (canyon Nevidio), certain botanic and zoological localities (zones at Platamun, islands Old Ulcinj, islands Katići, Topljanski Bay, Kraljev zabran in Morakovo), representative/monumental trees, preserved urban parks (in Pljevlja and alike). The following areas are suggested to be protected as high priority: Ulcinj saltpans, Šasko Lake, Knete and Ada Bojana, zones at Platamuni, islands Old Ulcinj and islands Katići. In the procedure of evaluation (in the development of expert findings), the possibilities for putting the suggested areas into the second category of protection will be considered (regional parks, reserves), which will ensure better protection of natural values of these areas.

As for the category Nature Monument, for the category **Special Natural Features Area,** the following areas are identified for placing under protection during the development of the Spatial Plan of Montenegro: Visitor and Zeletin, Beech woods at Obzovica, Luštica and confluence of the river Morača or (optionally) identified canyon valleys in the confluence of the river Morača.

Possibilities for the **extension of UNESCO area of Kotor-Risan Bay** to southern slopes of Vrmac should also be considered.
All previously mentioned areas planned for protection, together with existing protected areas of nature constitute the **National Network of Protected Areas of Nature** (graphics given in Appendix 2 of the Strategy, according to the requirements referred to in Article 101 of the Law on Nature Protection) and its realization will represent a long-term goal of this Strategy the realization of which will be put in charge of the bodies and institutions of central and local authorities, according to their abilities to provide necessary funds. The suggested areas in the category National Park are prioritized for placing under protection by 2015. Regular annual allocation of funds in the amount of EUR 200,000.00 will be provided for the realization of these priorities, starting from 2011. For further distribution and allocation of these funds by priorities, the ministry competent for environmental protection adopts the appropriate annual **Plan**, starting from 2011.

50. Ensure **the revision of status, category, regime of protection and borders of the existing protected areas of nature.** The most evident example of negative changes, i.e. disappearing of natural features of protected objects of nature is observed in the Montenegrin Littoral where the tourism/urban development pressure is dominant, particularly on the protected beaches and their immediate hinterland. For these reasons, starting from 2010, the Nature Protection Agency will carry out the procedure of status revision of the existing protected areas of nature in the area of the Montenegrin Littoral. Necessary funds in the amount of EUR 50,000.00 annually will be provided for this extraordinary activity. For the distribution and spending of these funds by annual priorities, the Agency adopts the appropriate annual **Plan** for which the ministry competent for environmental protection affairs gives its consent. During the process of revision of status, category and regime of protection and borders of the existing protected areas of nature **digitalized GIS compatible maps** of their borders will be developed.

VII. IMPROVEMENT OF EFFICIENT MANAGEMENT OF PROTECETED AREAS OF NATURE

51. Ensure **appointment of managers** for all protected natural assts. This is the activity which should be carried out by the bodies of central and local authorities, according to their competences.

52. Ensure **participation of local population in managerial structures of protected areas of nature,** national parks being the priority. This activity should start during 2010 and Public Enterprise National Parks of Montenegro will be in charge of its implementation [125] which will be supervised by the ministry competent for environmental protection. The amount of funds needed for the implementation of these activities cannot be estimated.

53. Analysis of carrying capacity of National Parks of Montenegro is the activity that will be implemented during 2011 in cooperation with the Ministry of Spatial Planning and Environment and Public Company “National Parks of Montenegro“ in total amount of EUR 30,000.00.

[125] Preparation of the Decision on Establishing Public Company for National Parks of Montenegro

Action plan (2010 – 2015) – Review

No.	Measure / activity	Responsibility for implementation[1]	Needed resources (EUR)	Deadline / implementation period	Needed funds (EUR) in 2010	Needed funds (EUR) in 2011	Needed funds (EUR) in 2012	Connection with CBD 2010 Targets
I. BUILDING AND STRENGTHENING DOCUMENT BASE ON BIOLOGICAL DIVERSITY								
1.	(i) Development of the book **Flora of Montenegro**	MSPEP / MAFWM/ NPA	330 000	2011 - 2013	-	60 000	110 000	1,2
	(ii) Development of **Vegetation map of Montenegro**	MSPEP / MAFWM / NPA/ DfF	350 000	2011 - 2015	-	70 000	70 000	1, 2
	(iii) DevloNSMent of the book **Bird fauna of Montenegro**	MSPEP / NPA	40.000	2011	-	-	40.000	1, 2
2.	Development of the **Programme for longterm research of biological divesity in Montenegro**	MSPEP / MES / MAFW / NPA / FNSM-B / ISB / NSM and other	5 000	2011	-	-	5 000	1,2
3.	Review of the **Biodiversity Monitoring Programme**	MSPEP	15 000 + 400 000 (15 000 + 800 000)	2011 - 2015	-	50 000	95 000	1, 2, 5
4.	**Inventorization and mapping of endemic and by law protected plant (**optional also of **animal) species** distribution	MSPEP / expert team	120 000	2011 -2011	-	40 000	80 000	1, 2
5.	Identification and development of the **National Network Natura 2000**	MSPEP +	600 000	2011 – 1. 09. 2012	-	300 000	300 000	1, 2

[1] MSPEP = Ministry of Spatial Planning and Environmental Protection , MT = Ministry of Tourism, MES = Ministry of Education and Science, MAFW = Ministry of Agriculture, Forestry and Water Management , ME = Minisatry of Economy, MT = Ministry of Transport , EPA = Environement Protection Agency, FNSM-B = Faculty of Natural Sciences and Mathematics, Study Group Biology, ISB = Institute for Sea Biology, NSM = Natural Sciences Museum, HO = Hunting Organisations, PE NP MN= Public Enterprise National Parks of Montengro, LS = Local Self-Government, WWF = World Wildlife Fund. The names and abbreviations are given with their valid use on September 21 2009.

6.	Collection and **analysis of data related to equitable distribution of benefits** from genetic diversity	MSPEP / expert team	5 000	2012	-	-	5 000	10
7.	Seed stands – development of planning documents and implementation of measures	MAFW/DfF	100 000		-	50 000	50 000	
8.	Development of the **National Habitats Classification** (catalogue)	MSPEP / NPA/ WWF	15 000	2012	-	-	15 000	2
9.	**Inventorization of invasive, plant species** as a priority	MSPEP / MAFW	10.000	2012	-	-	10 000	2, 6
II BUILDING AND STRENGTHENING OF INSTITUTIONAL AND STAFF CAPACITIES FOR PROTECTION OF BIOLOGICAL DIVERSITY								
10.	**Programme of education and training** for issues of biodiversity protection, its sustainable use and equitable distribution of revenues from utlization of genetic resoruces	MSPEP / MES / MAFW / NPA / FNSM-B / ISB / NSM / DfF and other	100 000 (500 000)	2011 - 2015	-	50 000	50 000	9
III INCREASE OF LEGAL AND INSTITUTIONAL FRAMEWORK EFFICIENCY IN THE AREA OF BIODIVERSITY AND NATURE PROTECTION								
11.	I Development of **Action plans for biodiversity** in all municipalities	Municipality	210 000	2011	-	-	-	1, 2, 3, ... 10
12.	Adoption of **regulations envisaged by the Law on Nature Protection and Harmonization** of other sectoral laws with that law, regulations for **GMO**	MSPEP /MAFWM/ MH	-	2011 – 2015	-	-	-	1, 2, 3, 8, 10
13.	Implementation of the **campaign for raising public awareness for adherence to the laws**	MSPEP / MAFWM/ EPA	250 000 (300.000)	2011 – 2015	-	60 000	50 000	1, 9

	relevant for nature/biodiversity protection							
14.	Implementation of the **National Programme for Integration of Montenegro into European Union (NPI)** for the period 2008 – 2012, in the part related to nature/biodiveristy protection	MSPEP +	1 700 000 (5 500 000)	2011 – 2013	-	700 000	1 000 000	1, 2, 3, ...8, ...10
15.	Adjustment and construction of mechanisms for **involvement of the public and interested groups in decision making processes** related to bidiversity.	All bodies and institutions		2010 – 2015	-	-	-	9
16.	**Communication Strategy** for promotion of the Strategy and implementation of awareness raising campaign on bidoveristy protection	MSPEP +	100 000	2011 - 2015	-	25 000	50 000	1 – 10
17.	Development of the **National Action Plan for climate change**	MSPEP	25 000	2012	-	-	25 000	7
IV PREVENTION AND MITIGATION OF PRESSURES ON ECOSYSTEMS								
18.	Development of **Protection programmes for forest ecosystems in the existing and planned protected areas of nature**	MAFW / MSPEP	50 000	2012	-	-	50 000	1, 4, 5, 8
19.	**Fight against illegal activities in forestry**	MAFWM/MSPEP/DfF	150 000	-	-	50 000	100 000	1, 5, 8, 11
20.	**Conducting of research in forest habitats**	MAFWM /MSPEP/ DfF	200 000	-	-	100 000	100 000	1, 5, 8, 11
21.	**Participation in the**	**MAFW/UŠ**	**100 000**		**-**		**100 000**	

	activities of National Forest Inventory							
22.	**Establishment of Forest Information System and further development of GIS in forestry**	MAFWM /MSPEP/ DfF	600 000	-	-	200 000	400 000	1, 5, 8
23.	**Implementation of monitoring and research in water and wetland habitats**	MAFWM /MSPEP/ DfF	200 000	-	-	100 000	100 000	1, 5, 8, 11
24.	Increase of funds allocated for **monitoring the state of forest ecosystems** including also monitoring of the forests health within Environemental Monitoring Programme	MSPEP/ MAFWM /DfF	See I. 3.	2011 - 2015	-	-	-	1, 5, 8, 11
25.	**Building of measures and conditions for biodiversity and nature protection into regulations and documents in economic areas**	MAFW	-	2010 - 2015	-	-	-	1, 2, 4, 5, 8
26.	**Identification of marine habitats important for protection of biological diversity**	MSPEP / MAFW	30 000	2010	-	-	30 000	1, 8
27.	**Development of methodology for determining numbers of game and the state of game population for all hunting areas**	MAFW / MSPEP LS /	700 000	2010 - 2012	-	-[2]	-[3]	1, 2, 8
28.	**Development of Action**	MAFWM /	100 000	2011-2013	-	40 000	50 000	1,2

[2] Estimated funds that need to be provided by hunting organizations in 2011 are 250 000 EUR
[3] Estimated funds that need to be provided by hunting organizations in 2010 250 000 EUR

	Plans for particular game species	Municipalities / DfF / MSPEP / NPA						
29.	**Programme of identification of wild plant and animal species for which priority action plans/protection programmes need to be developed** **- Development and implementation of action plans for critically endangered domestic breeds and sorts, and the programme for breeding and keeping domestic breeds and sorts**	MSPEP MAFW	10 000 (Action Plans are needed for Programme of identification of wild plant and animal species	2012	-	-	10 000	1, 2
30.	**Implementation of Strategic and Environmental Impact Assessments and assessment of acceptability of actions, concessions and works in forestry and water management for nature**	MAFW	-	2011 - 2015	-	-		1, 4, 5, 8
31.	Development of the remainings **fishery bases**, as a priority for **Skadar Lake**.	MAFW	80 000	2011 - 2012	-	20 000	40 000	1, 4, 5, 8
V. INTEGRATION OF BIOLOGICAL DIVERSITY PROTECTION INTO SECTORS: (i) TOURISM, (ii) SPATIAL PLANNING (iii) CONSTRUCTION OF MAJOR INFRASTRUCTURE								
32.	Ensure **functioning of the system of Strategic and Environmental Impact**	MSPEP / ME / MAFW/ Municipalities	-	2011 -	-	-	-	1, 4, 5, 8

	Assessment and integration of biological diversity protection in sectors							
33.	Prescribe the procedure of **licensing / issuing of authorizations for development of Strategic and Environmental Impact Assessment** and develop a list of authorized persons and institutions for drafting of those studies	MSPEP	-	2011	-	-	-	1, 4
34.	Building of **measures and guidelines of biological diversity protection** into strategies, laws, regulations, plans and programmes from the following sectors: (i) tourism, (ii) spatial planning and (iii) major infrastructure	MSPEP / ME / MT / MAFWM / MAFW	-	2011 -	-	-		1, 2
35.	**Identification of potential areas for development of eco-tourism**.	MSPEP / MT / MAFWM	25 000	2011	-	-	25 000	1, 4, 5, 8
36.	Prescribing of **standards and criteria for ecotourism development in protected areas of nature**	MSPEP / MT	-	2011	-	-		1, 4, 5, 8
37.	Building in of **measures and guidelines for protection of biological diversity into** strategies and master plans for **tourism**	MSPEP / MT	-	2010	-	-		1, 4, 5, 8
38.	Development and establishment of the **system**	MSPEP / MT / PENPMN	5.000	2012		-	5.000	1, 4, 5, 8

	for monitoring the number of visitors in the protected areas of nature, as a priority for national parks							
39.	**Protection of bilogical and landscape diversity from negative effects of tourism at the Seaside** through spatial planning documents and other development plans and programmes (→Study development).	MSPEP / MT	30 000	2011-2012	-	10 000		1, 4, 5, 8
40.	Development of: a) tourist activities management plans, b) plans for establishment of guide service, c) plans for interpretation of nature/biological diversity and d) plans for education of visitors in the protected areas of nature as **integral parts of management plans**, primarily of national parks	PENPMN	25 000	2012	-	-	25 000	1, 4, 5, 8
41.	Development of **Plan for biological diversity protection from negative effects of tourism in the protected areas of nature**	MSPEP / PENPMN	30.000	2012	-	-		1, 4, 5, 8
42.	Prescribing of the obligation to develop **an expert base (basic study) related to biological diversity and nature protection** for the needs of development of	MSPEP	-	2011	-	-		1, 4, 5, 8

	spatial-planning documents							
43.	Include the obligation to **value space from the aspect of biodiversity protection/nature protection** within programme tasks for development of spatial-planning documents	MSPEP	-	2010 -	-	-		1, 4, 5, 8
44.	Ensure integration **of nature/biological diversity protection measures** into the main development areas and sectors dealt with in the **spatial-planning documents**	MSPEP	-	2010 -	-	-		1, 4, 5, 8
45.	**Integration of requirements for biological diversity protection/nature protection in the transport infrastructure development plans**	MTMT / MSPEP	?	2010 -	-	-		1, 4, 5, 8
46.	Carry out an **analysis of the effects of transport infrastructure on endangered birds species of** wetland and water habitats	MTMT / MSPEP	-	2010 -	-	-		1, 2, 5, 8
47.	**Cooperation between sectors of nature protection and transport** on the establishment of biological diversity **monitoring**	MTMT / MSPEP	-	2010 -	-	-		1, 2, 4, 5, 8
48.	Building in of **measures for**	ME / MSPEP	-	2010 -	-	-		1, 2, 4, 5, 8

	protection of species, habitats and landscapes in the planning of **energy objects construction**							
49.	Strengthening the **principle of biological diversity protection in the procedure of development of environmental impact assessment studies** for the construction **of hydropower plants on the Morača river**	ME / MSPEP	-	2010 -	-	-		1, 2, 4, (5), 8
VI. PUTTING UNDER PROTECTION NEW PROTECTED AREAS OF NATURE								
50.	**Putting under protection new protected areas of nature** with the aim of achieving the target set out in NSDS to have 10% of the state territory under protection (repeated in the Spatial Plan of Montenegro by 2020)	MSPEP / MAFWM / NPA / Municipalities	1.000.000	2011 -2015	-	150 000	200 000	1, 2, 4, (5), 8
51.	**Review of the status, categories, protection regime and boundaries of the existing protected areas of nature**	MSPEP / NPA / Municipalities	100 000 (250 000)	2011 – 2015		50 000	50 000	1, 2, 4, (5), 8
VII. INCREASE EFFICIENCY OF PROTECTED AREAS MANAGEMENT								
52.	**Establishment of managers** for all protected areas of nature	MSPEP / NPA / Municipalities	?	2010 - 2015	-	-		1, 4, 5, 8
53.	**Participation of local population in the management structrues of**	PENPMN / Municipalities	?	2010 - 2011	-	-		1, 4, 5, 8, 9

	protected areas of nature, of the National Parks as a priority.							
54.	**Analysis of *carrying capacity* of the national parks of Montenegro**	PENPMN / MSPEP	30.000	2010	-	-	30.000	1, 4, 5, 7, 8
Total estimated amount of funds: (i) min **= 8.440.000EUR**, (ii) max = **12.640.000**EUR					Subtotal - 0.00EUR	Subtotal – 2.125.000EUR	Subtotal - 3.120.000EUR	

Annexes
Annex 1.

Review of the existing nationally protected areas of nature in Montenegro

Name and national category of protected areas of nature	Surface (ha)	Percentual share of protection categories in the state territory (13.812 km^2)
National parks – total 101.733ha		*7.77%*
Skadar Lake	40.000	
Lovćen	6.400	
Durmitor	33.895	
Biogradska gora	5.400	
Prokletije	16.038	
Reserves of nature – total 650ha (outside NPs 150ha)		*0.047%*
- in NP Skadar Lake: Manastirska tapija, Pančeva oka, Crni žar, Grmožur and Omerova gorica	420	
- in NP Durmitor: Crna Poda	80	
Salt Pans in Tivat[4]	150	
Monuments of nature – total 13.638,54ha (outside NPs 7.736,54ha)		*0.987%*
Đalovića gorge	1.600	
Lipska cave	/	
Cave Magara	/	
Cave Globočica	/	
Cave Spila kod Trnova / Virpazar	/	
Cave Babatuša	/	
Novakovića cave, near Tomaševo	/	
Pit Duboki do, in Njeguši	/	
Canyon of the Piva river	1.700	
Canyon of the Komarnica river	2.300	
Communities of the Montenegrin pine *(Pinetum mughi montenegrinum)* in Ljubišnja (1.000ha), Durmitor (5.200ha) and Bjelasica (400ha)	1.000 + (5.600)	
Communities of Bosnian pine *(Pinus heldraichii)* in Orjen (300ha), Lovćen (300ha) and Rumija (100ha)	400 + (300)	
Individual dendrological facilities: Quercus robur/ scuteriensis at Ćurioc near Danilovgrad, Quercus pubescens in Orahovac near Kotor, olive trees at Mirovica, the Old Bar and Ivanovići, Budva etc		
Beaches of the Skadar Lake	(<2)	
Velika plaža in Ulcinj	600	
Mala plaža in Ulcinj	1,5	
Bech Valdanos	3	
Beach Velji pijesak	0,5	
Beach Topolica, Bar	2	

[4] Tivat salt pans have been put under protection by the Decision of the Nature Protection Agency no 01 – 12 of 26/ 12/ 2008 in the category „*special nature reserve*“, in accordance with a procedure initiated based on the previously valid Nature Protection Law („Official Gazette of FRMN“ no. 36/77and 2/89), Articles 41 and 42, and in relation with the provisions from Article 126, paragraph 3 of the new Nature Protection Law („Official Gazette of Montenegro“ no 51/08)

Beach Sutomore	4	
Beach Lučica, Petrovac	0,9	
Beach Čanj	3,5	
Beach Pećin	1,5	
Buljarica	4	
Petrovačka Beach	1,5	
Beach Drobni pijesak	1	
Beach Sveti Stefan	4	
Beach Miločer	1	
Bečićka Beach	5	
Slovenska Beach, Budva	4	
Beach Mogren	2	
Jaz	4	
Beach Pržno	2	
Savinska Dubrava, in Herceg Novi	35,46	
Botanical reserve of laurel and oleander, above the well Sopot near Risan	40	
Botanical garden of mountain flora, in Kolašin	0,64	
Botanical garden of the General Kovačević, in Grahovo	0,93	
Park "13 jul" and "Njegošev Park", in Cetinje	7,83	
Park near hotel Boka, in Herceg Novi	1,2	
Town park, in Tivat	5,897	
Park of the Castle at Topolica	2	
Special natural features areas – 354,7ha (of which 43,3ha in the category monument of nature)		*0.025%*
Hill Spas, above Budva[5]	163,2	
Semi-island Ratac with Žukotrljica	30	
Island Old Ulcinj	2,5	
Hill Trebjesa, Nikšić	159	
Areas protected by municipal decisions - 15.000ha		*1.086%*
Kotor – Risan Bay, Municipality Kotor	15.000	
TOTAL, UNDER PROTECTION	**124.964,24**	***9.047%***

Review of the existing internationally protected areas of nature in Montenegro

Name and international category of protected areas of nature	**Surface (ha)**	**Percentage share in the state territory (13.812 km^2)**
Ramsar area (List of wetland areas of international importance, especially as a waterfowel habitat)	40.000	
Skadar Lake	40.000	
UNESCO Natural and Cultural Heritage List	48.895	
Kotor – Risan Bay, Municipality Kotor	15.000	
NP Durmitor with the Tara Canyon	33.895	
M&B UNESCO Biosphere Reserves	182.889	
River system of the Tara river	182.889	

[5] In compliance with the new Nature Protection Law („Official Gazette of Montenegro 51/08), the review procedure of the category and the protection status applies to this territory. In line with the findings of the Protection Study (produced by the Nature Protection Agency) a new protection concept has been proposed for this territory so that the western slopes of the Hill Spas, including also the promontory Mogren, have been classified into the protection category „monument of nature" (category II of protected natural assets), and the eastern slopes of the Hill Spas in the protection category „*Special natural features area*" (category III of protected natural assets). The surfaces of the mentioned areas are: (i) zone A „monument of nature" – 43,3ha (22,1+21,2) i (ii) = zone B „area of exceptional features" – 119,9ha. Based on the Study, the competent body(ies) of Municipality Budva should adopt an adequate act on proclamation – categorization of this protected natural asset

TOTAL, UNDER INTERNATIONAL PROTECTION	**237.899**	***17.22%***

Total surface of protected areas of nature in Montenegro, on both grounds, excluding **dobuling** / repeating protection in the same areas:

124 964.24 ha + 143 594 ha = **268 558.24 ha** which makes **19.44**% of the state territory

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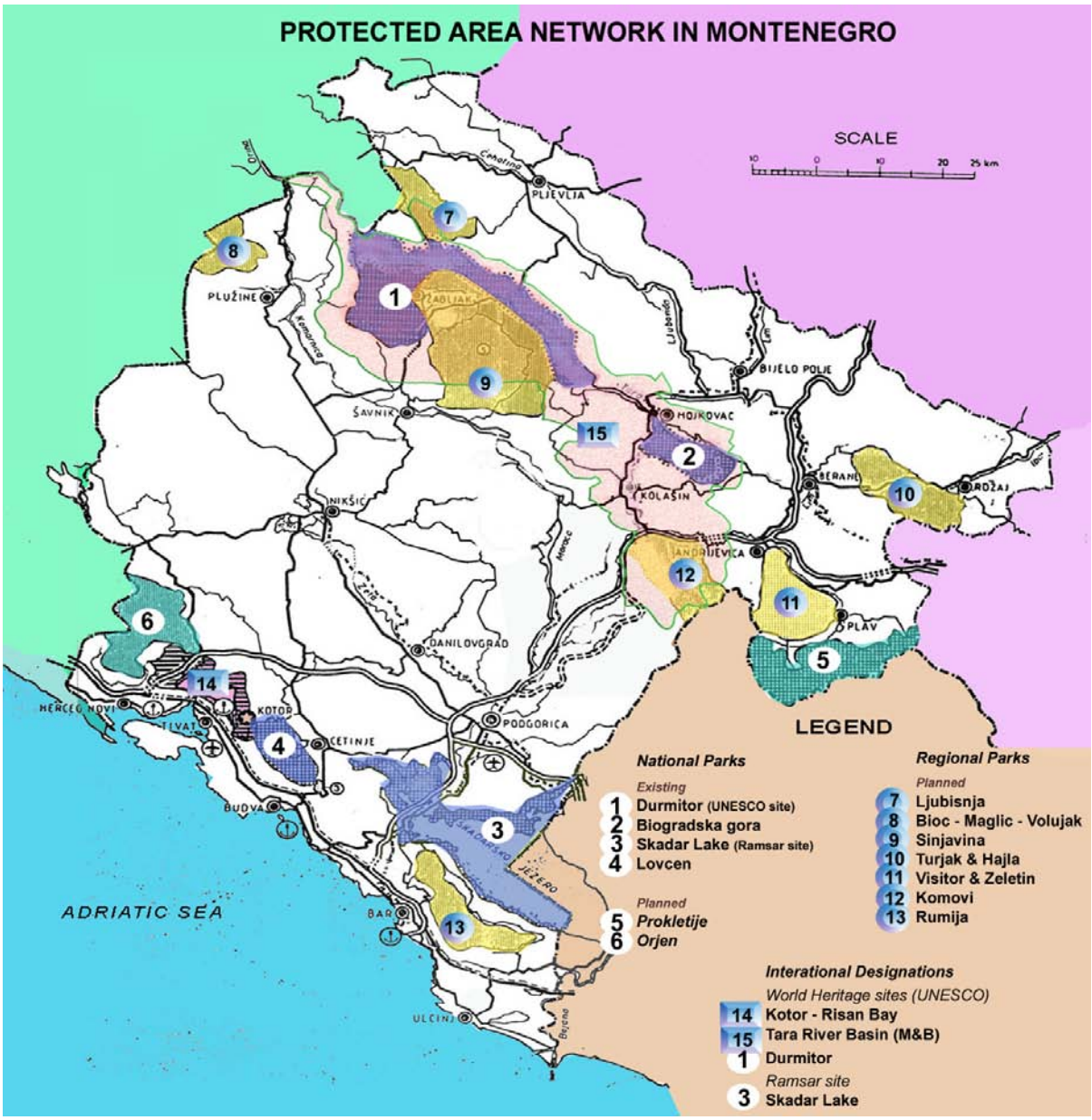
Annex 2

Protected areas network



Annex 3

Projection – Natural heritage protection concept, taken from PP of Montenegro (2008)
Even though the existing network of protected areas includes a significant number of recognized centres of biodiversity, the establishment of new protected areas of nature will be started in phases, with the aim to further strengthen their protection.
Extension of the existing network of protected areas of nature with new areas will take into account the social-economic consequences, and, in relation to this, protection of acquired rights of local population in these areas. The establishment of new protected areas of nature will not endanger development possibilities of the area, but will establish adequate limitations with the aim of achieving sustainable use in these zones. When searching for optimum options for management in the new protected areas, advantage will be given to those management models that will gather and interconnect all key actors (cooperative model with

clearly divided rights and obligations). Such management models will ensure a participative and transparent approach in the preparation, adoption and implementation of management plans for protected areas of nature.
The process of management bodies establishment and adoption of management plans for each protected area of nature will be followed by the process of review of the status, protection category and boundaries of the existing protected areas, as well as permanent review process of the list of protected biodiversity species. In reviewing the boundaries of the existing protected areas of nature, based on the existing findings and results obtained through targeted research, not only options for change of boundaries for the purpose of excluding certain parts will be considered, but also options for extending the boundaries of the protected areas, such as:

- extension of the boundaries of the National Park „Durmitor“ and the planned regional parks Maglić, Bioč and Volujak with the aim of connecting them with the National Park „Sutjeska“ in Bosnia and Herzegovina,
- extending UNESCO area in the Kotor-Risan Bay to the southern slopes of the Hill Vrmac
- including the canyon of Komarnica / canyon Nevidio into the National Park „Durmitor“,
- extending the boundaries of the National Park „Skadar Lake“ to the regional park Rumija or the area of Šasko Lake / Bojana estuary, or
- connecting the National Park „Biogradska gora“ with the mountain massif of the planned regional park Komovi and the like.

Still, the priority zone for implementation of protected areas review is Montenegrin Coast becasue of the already noticed changes in the existing protected areas in this zone.
Apart from change in the standard evaluation techniques, and the findings from traditional practice, through previously quoted reviews (protected ares of nature, list of protected biodiversity species) application of IUCN criteria and standards will be analyzed:

- for defining adequate categories of management for protected areas of nature and
- for application of criteria for red lists/protected plant and animal species at the national level:

Implementation of protected areas network extension will be supported through the system of detailed spatial-planning documents.
Proposals of long-term projection/network of new proteced areas of nature are given according to the following protection categories:

C2.9.2-1 Nature reserves

The existing network of nature reserves should be analyzed in compliance with the findings of protected areas review.

C2.9.2-2 National parks

Besides the existing national parks „Lovćen“, „Biogradska gora“, „Durmitor“ and „Skadarsko jezero“, the following additional measures are foreseen:

1. Establishment of a new National Park Prokletije[6] (16.038 ha), is planned as a priority in 2009.
2. Extension of boundaries of the National Park „Durmitor“ and the proposed regional parks Bioč, Maglić and Volujak with the aim of connecting them with the National park „Sutjeska“ in B&H**,**
3. Establishment of a new national park Orjen.

All three proposals should enable creation of cross-border protected areas with the neighbouring areas in Albania (Tethi), B&H (Sutjeska, Orjen) and Croatia (Snježnica-Orjen).

C2.9.2-3 Regional parks / parks of nature: For protection in the category regional park the following are proposed for additional analyses: Rumija, Komovi, Sinjajevina, Maglić - Bioč – Volujak, Ljubišnja and Turjak with Hajla

[6] NP Prokletije was established by the New Law on National Parks (Official Gazette of Montenegro 56/09), see Art.. 2, 11 and 39.

C2.9.2-4 Monuments of nature: Areas that are to be put under protection in the category monuments of nature are the subject of a special legal procedure and lower level spatial planning and urbanistic documents.

C2.9.2-5 Areas of water sources must be protected and ensured from risks of pollution (areas shown in the map).
Areas under special protection with the status of national or regional parks make **the basic points of ecosystem network** in Montenegro.

Montenegrin part of South-eastern Dinaric mountains is mainly situated in the Northern region and makes a part of the large biocorridor of South-eastern Dinaric mountains („Dinaric Arch"), which stretches from the Alps to the Prokletije and the Sarp- Pindor massif. In the area of Prokletije, this bio-corridor is also connected with the large regional bio-corridor called „Green Belt". This corridor marks the boundary between former socialist countries and communist countries; at the territory of Montenegro covers the entire border with Albania. Due to specific use regime of this zone in the past, it bacame a refuge and corridor important for biodiversity.
The well known corridor of coastal mountains Orjen – Lovćen – Rumija is connected with this corridor.
The larger part of node areas of ecosystems are included into two primary ecological corridors. The third corridor is determined in the direction Orijen - Pusti Lisac - Maganik – Sinjajevina – Kovren.
Secondary corridors, that divide the functional wholes, improve the natural resistance of the system to the negative effects of human activities.

Annex 4

The membership status of Montenegro in the key international treaties associated to biodiversity protection

International treaty	Date of succession, ratification or accession, by Montenegro	Competent body in Montenegro
UN Convention on Biological Divesity (CBD)	3 June 2006	MSPEP
UN CBD Cartagena Protocol on Biosafety	23 October 2006	MSPEP
Convention on conservation of wetlands of international importance especially as waterfowl habitat (Ramsar Convention)	3 June 2006	MSPEP
UN Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES– Washington Convention	26 March 2007	MSPEP
UNESCO Convention on Protection of the World Natural and Cultural Heritage (World Heritage Convention)	3 June 2006	Nacionalna komisija za UNESCO
Revised Convention on the protection of the Mediterranean Sea against pollution (Barcelona Convention)	Ratified in 2007, as well as its four Protocols	MSPEP

Appendix 5

Results of the survey[7] on vulnerability and importance of ecosystems and specific habitat types in Montenegro for protection

Ecosystem /habitat	Species diverstiy (total number of species)	Presence of rare and endangered species	Endemism	Naturalness / degree of disturbance	Sensitivity / vulnerability	Resistance	Economic value	Social, recreative and cultural value	Degree of scientific importance	Endangered by development	∑
Mountain	3	2	**2**	3	3	1	2	3	1	1	21
Forest	3	2	**1**	2	3	3	3	2	2	3	24
Karst	3	2	**3**	2	1	2	2	1	2	2	20
Freshwater	3	3	**2**	2	2	2	3	2	2	3	24
Dry grasslands	1	1	**1**	2	2	2	1	1	1	3	15
Coastal	2	1	**1**	1	2	2	2	3	2	3	19

[7] Participants of the survey: Zlatko Bulić PhD, Snežana Vuksanović MSc, Nela Dubak MSc, Jelena Dragović, Nemanja Strugar, Sunčica Bosak, Aleksandra Ivanović MSc, Vojo Dragnić, M Stana Kaluđerović MSc , Danka Petrović MSc, Darko Saveljić, Vasilije Bušković MSc, Marija Vugdelić PhD, Gojko Nikolić MSc and Jasminka Milošević MSc

Marine	2	1	**1**	3	1	3	2	2	1	2	18
Caves and canyons	1	2	**3**	3	2	1	1	1	1	1	16

Meaning of marks: 1 = Low value; 2 = Mean value; 3 = High value