

NATURE AND BIODIVERSITY





Definition

This indicator shows the number of species present in the Republic of Macedonia and assessed as globally threatened and/or protected by European instruments (such as EU Directives and the Bern Convention) protected at national level.

At present, the indicator shows the status of the number of endemic and threatened species at national level, identified in accordance with the relevant international documents and the national legislation:

- Number of endemic and threatened wild species of plants
- Number of endemic and threatened wild species of fungi
- Number of endemic and threatened wild species of animals

Units

- Number of species

Policy relevance of the indicator

List of relevant policy documents:

The Second National Environmental Action Plan, in its Chapter on Nature, emphasizes the goal of the establishment of integrated system for nature and biological

diversity protection, in line with the EU standards and multilateral agreements, through the measure for application of mechanisms for further implementation of the National Strategy for Biological Diversity Protection with Action Plan and the National Capacity Self-Assessment (NCSA), the Law on Nature Protection and creation of appropriate conditions for Natura 2000 network establishment. It envisages action towards development of National Red Lists and Red Book of the Republic of Macedonia.

The National Strategy for Biological Diversity Protection with Action Plan defines integrated approach to the protection and sustainable use of components of biological diversity. The Action Plan outlines the specific actions to be taken to achieve the goals. One of the measures in this document is the Protection of Species, through several actions concerning elaboration of National Red Lists and Red Book of the Republic of Macedonia, vultures protection, and protection of endemic and relict species *Thymus oehmianus*.

Legal grounds

The Law on Nature Protection provides for elaboration of Red Lists and Red Book of the Republic of Macedonia,

as well as proclamation of strictly protected wild species and protected wild species, by which they shall acquire the status of natural heritage.

Targets

Identification of the extent of threat for certain species of plants, fungi and animals found in the Republic of Macedonia, which are of European or global significance and definition of measures for their protection and management.

Key policy issue

How many species of European/global significance are protected by national instruments?

Key message

Abundance and variety of species and ecosystems are the main features of biological diversity in the Republic of Macedonia. According to the available information, this wealth comprises the imposing number of around 17.604 species, out of which 976 species are endemic species.

Considering the fact that national Red Lists of animals, plants and fungi are under establishment, the analysis

of threatened and protected wild species has been made in accordance with international criteria contained in a number of multilateral documents (conventions, agreements, Global Red List, European Red List, EU Directives).

Thus, the IUCN World Red List contains 72 taxa of higher plants from the Republic of Macedonia, 19 of which are local endemic taxa.

The Annexes of the Bern Convention include 12 species of higher plants.

The European List of vertebrate animals includes 113 species, of which: 30 fish species, 66 bird species, 16 mammals and 1 reptile species. Out of the total of 20 endemic fish species from the Republic of Macedonia, 17 have been enrolled in the category of globally threatened species. The total number of identified “Emerald” species (under Resolution No.6 to the Bern Convention) on the territory of the Republic of Macedonia is 165 species.

Figure 1. Number of endemic and threatened wild plant species

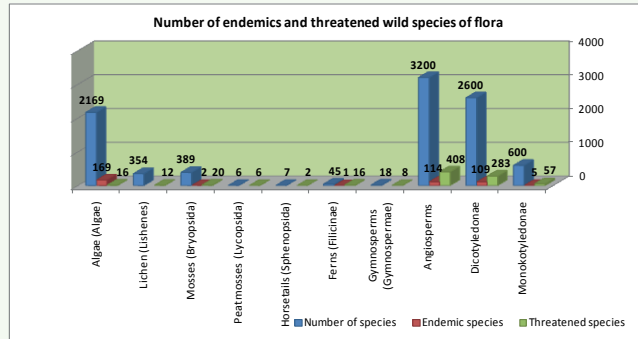


Figure 3. Number of endemic and threatened animal species

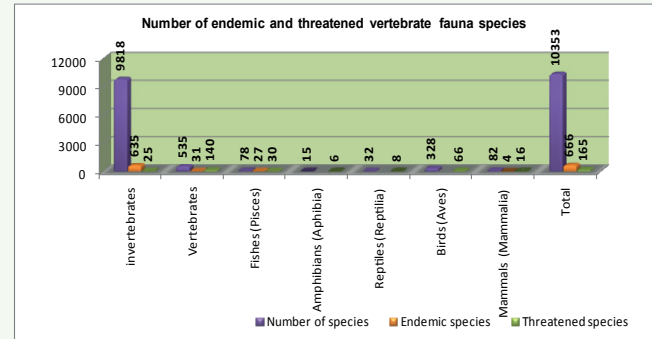


Figure 2. Number of threatened species of fungi

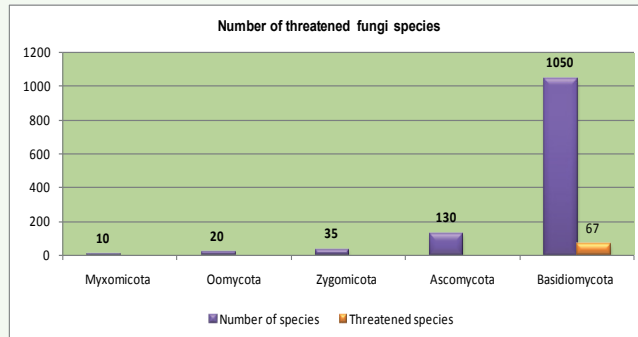
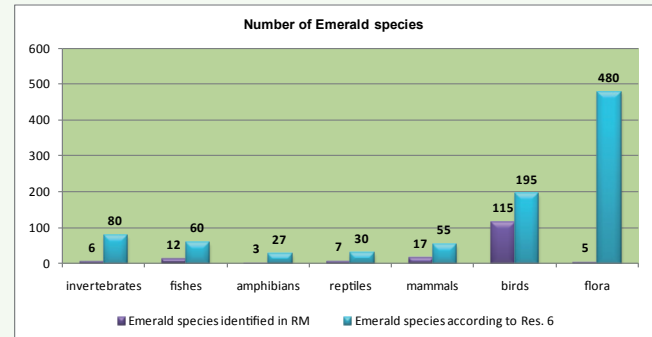


Figure 4. Number of Emerald species



Assessment

The flora of the Republic of Macedonia is very rich and diverse and represented by 4.028 species, of which 2.169 algae, 354 lichen species and 3.674 species of plants. Recent flora of higher plants is represented by a mosaic of various floral elements (Tertiary relicts, Mediterranean, Greek-Asia Minor, Illyric, Caucasian, Middle European, Skardo-Pindian, Eurasian, Arctic-Alpine, cosmopolitan), among which 228 species are endemic (Balkan, South Balkan, Macedonian, etc.). The highest number of endemic plant species (114) has been recorded with Angiosperms.

The National Red List of threatened wild plant species is under establishment. The number of threatened wild plant species is shown in Table 1. The assessment of threat of species by taxonomic groups has been carried out in accordance with international criteria contained in several international documents (conventions, agreements, Global Red List, European Red List, EU Directives).

The IUCN Global Red List contains 72 taxa from the Republic of Macedonia, 19 of which are local endemic species. The Annexes of the Bern Convention list 12 plant species having their area of spreading on the

territory of the Republic of Macedonia.

Fungi compose exceptionally heterogeneous group of organisms; however, studies so far have focused on the types of Ascomycota and Basidiomycota, while others are poorly studied. The total number of studied and recorded growing wild fungi on the territory of the Republic of Macedonia is 1245 species. Most of those belong to the types Myxomicota (10), Oomycota (20), Zygomycota (35), Ascomycota (130) and Basidiomycota (1050).

The Preliminary National Red List of threatened fungi species includes 67 species belonging to the type of Basidiomycota.

The main feature of the fauna diversity is its high extent of taxonomic diversity, represented by as many as 10.354 species and 228 subspecies or 10.582 taxa in total.

The group of invertebrate animals is represented by 9.819 species, 635 of which are endemic. Nevertheless, detailed analyses of threat to species by taxonomic groups have not been completed yet, and therefore the number of preliminary listed species is only 25 invertebrate animal species.

The group of vertebrate wild animals is represented by 535 species, 31 of which are endemic species. The class of fish includes 78 species, 27 (34.5%) of which are endemic species. No endemic species have been recorded among the classes of amphibians, reptiles and birds, while four endemic species have been recorded with the class of mammals. With regard to the extent of threat to populations of vertebrate animals, the class of fish has 17 species included in the category of globally threatened species.

It is of particular importance to point out that the fauna of vertebrate animals includes 113 species that have been enrolled on the European Red List, namely: 30 species of fish, 66 birds, 16 mammals and 1 reptile species. The National Red List of threatened fauna species is under development.

Within the species diversity, particular significance is attributed to the identified “Emerald” species. Namely, total of 165 species have been identified, as follows: 6 species of invertebrate animals, 154 vertebrate animals (12 species of fish, 3 species of amphibians, 7 species of reptiles, 115 species of birds, 17 species of mammals and 5 species of plants).

Data specification

Title of the indicator	Source	Reporting obligation
Threatened and protected species	<ul style="list-style-type: none"> – Study on the Status of Biological Diversity in the Republic of Macedonia – Strategy and Action Plan for Biological Diversity Protection in the Republic of Macedonia – Analysis and valorization of species diversity in the Republic of Macedonia 	<ul style="list-style-type: none"> – Secretariat of CBD – Secretariat of BC/CE

Data coverage:

Table 1: Number of endemic and threatened wild species of flora

	Number of species	Endemic species	Threatened species
Algae	2.169	169	16
Lichenes (Lichenes)	354	-	12
Mosses (Bryopsida)	389	2	20
Peat mosses (Lycopsida)	6	-	6
Horsetails (Sphenopsida)	7	-	2

Ferns (Filicinae)	45	1	16
Gymnosperms (Gymnospermae)	18	-	8
Total Angiosperms	3.200	114	408
Dicotyledonae	2.600	109	283
Monokotyledonae	600	5	57
Total.	4.028	286	468

Table 2: Number of threatened fungi species

Orders of Fungi	Total number of species	Threatened species
Myxomicota	10	
Oomycota	20	
Zygomycota	35	
Ascomycota	130	
Basidiomycota	1.050	67
Total	1.245	67

Table 3: Number of endemic and threatened vertebrate fauna species

	Number of populations	Endemic species	Threatened species
Invertebrate animals	9.818	635	25
Vertebrate animals	535	31	140
Fish (Pisces)	78	27	30
Amphibians (Amphibia)	15	-	6
Reptiles (Reptilia)	32	-	8
Birds (Aves)	328	-	66
Mammals (Mammalia)	82	4	16
Total	10.354	666	165

Table 4: Number of Emerald species identified in the Republic of Macedonia

	invertebrates	fish	amphibians	reptiles	mammals	birds	flora
Emerald species identified in the Republic of Macedonia	6	12	3	7	17	115	5
Emerald species according to Res. 6	80	60	27	30	55	195	480

General metadata

Code	Title of the indicator	Compliance with CSI/EEA or other indicators		Classification by DPSIR	Type	Linkage with area	Frequency of publication
MK NI 007	Threatened and protected species	CSI 007	Threatened and protected species	S/I		Biological diversity	5 - annually



Definition

The indicator shows the proportion of a country designated total area that is protected under national instruments, or under the EU Birds and/or Habitats Directives (Natura 2000 sites), or under the Bern Convention (Emerald sites) and other multilateral agreements.

- Total (cumulative) designated area of sites protected under national instruments, or under the EU Birds and/or Habitats Directives and under multilateral agreements over the time.
- The indicator is also broken down to show the different trends of surface area in km² designated under international conventions and initiatives, under EU Directives and under national legislation:
 - Number of protected areas under the national categorization
 - Percentile representation of individual national categories of protected areas out of the total protected area
 - Changes over time in cumulative surface area of Emerald sites (designated under the Bern Convention).
 - International instruments

Units

- Number of sites, ha, km² and %.

Policy relevance of the indicator

List of relevant policy documents

Spatial Plan of the Republic of Macedonia

The Second National Environmental Action Plan, in its Chapter on Nature, emphasizes the goal of the establishment of integrated system for nature and biological diversity protection, in line with the EU standards and multilateral agreements, through the measure for application of mechanisms for further implementation of the National Strategy for Biological Diversity Protection with Action Plan and the National Capacity Self-Assessment (NCSA), the Law on Nature Protection and creation of appropriate conditions for Natura 2000 network establishment.

The National Strategy for Biological Diversity Protection with Action Plan, adopted by the Government in 2004, defines integrated approach to the protection and sustainable use of components of biological diversity. One of the envisaged measures in the Second Action Plan is the expansion of the system of designated areas,

through several activities for nomination of different categories of new designated sites, as well as proposals for nomination of new areas for the Global Ramsar List and the List of the World Heritage under the UNESCO.

Legal grounds

The Law on Nature Protection (adopted in 2004) with the amendments in 2006, 2007, 2010, 2011, provides for introduction of a system of designated areas aimed at protecting biological diversity in natural environments, natural processes, as well as abiotic characteristics and biological diversity of the area. The Law adopts new categorization of the designated areas which is in accordance with the International Union for Conservation of Nature (IUCN) model, establishing 6 categories of protected natural heritage. The law stipulates a responsibility that, within 6 years, all designated areas (nominated before 2004) to be re-evaluated and designated according with the new categorization. These areas are foreseen with the Spatial Plan of the Republic of Macedonia for the period until 2020.

Targets

Expansion of the network of national designated areas

up to around 12% in relation to the territory of the Republic of Macedonia is foreseen under the Spatial Plan of the Republic of Macedonia, the Spatial Plans of the Regions and the National Strategy for Biological Diversity Protection

The 35 areas identified by the National Emerald network will be used to form the Natura 2000 network; therefore it is necessary to strengthen the capacities at national and local level to start the process of identification of all areas in accordance with Natura 2000 and the EU Birds and Habitats Directive

Key policy issue

What is the progress in designation of areas (km², %) under the national legislation, EU Directives and multilateral agreements?

Key message

As of 1948, when the First National Park “Pelister” was designated in the Republic of Macedonia, the number and the total surface area of different categories of protected areas have noted permanent growth on national level.

At this moment, due to the new categorization of

designated areas established under the new Law on Nature Protection, in accordance with the IUCN categorization, the designated area system is in transition and includes designated areas under the old and under the new categorization. The analysis (in relation to the number and the area) includes all designated areas in the Republic of Macedonia designated under the old and also under the new categorization.

The National Emerald network of areas of special conservation interest, initiated in 2002, comprises 16 areas which cover a total area of 198.145 ha, or around 7.7% of the total national territory. Activities towards identification of new Emerald areas will continue until its full establishment. Emerald areas will be included in the Natura 2000 network when the Republic of Macedonia becomes an EU Member State.

In doing so, the areas designated in accordance with the old categorization have been processed according to the appropriate/corresponding IUCN category. The analysis of the area of the designated areas has been made by rendering the borders of the areas in GIS.

At the moment the network of designated areas comprises 81 areas which cover a total area of 231.385,6 ha, or around 9% of the total national territory. Most

of it falls into the category national parks and natural monuments.

The National Emerald network of areas of special conservation interest in the Republic of Macedonia identifies 35 locations with an area of 752.223 ha or 29 % of its territory.

Figure 1. Number and area of designated areas in accordance with the national categorization

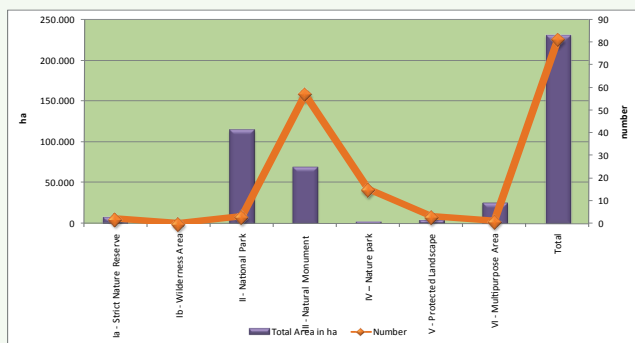


Figure 2. Share of individual national categories of designated areas on the overall territory of the Republic of Macedonia

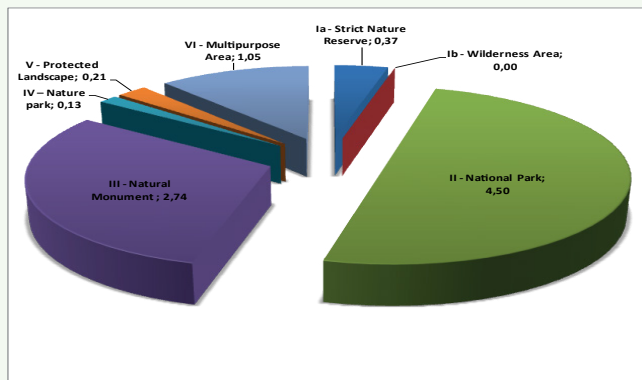
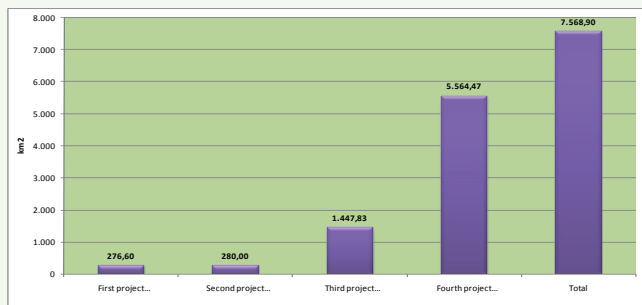


Figure 3. Area of identified Emerald areas



Assessment

1. Designated areas at national level

11 areas and objects, in the period 1948 to 1960, have been designated as natural rarities based on existing Law for protection of cultural monuments and natural rarities, with a total area of 131.599 ha (5,11 % of the territory of the country). With the Law for protection of natural rarities, adopted in 1960 and the amendments in 1965 and 1973, additional 58 items have been designated, therefore the total number of designated items is 69 taking area of around 7,16 % of the national territory.

Under the 2004 Law on Nature Protection, new categorization of designated area is introduced, aligned with the International Union for Conservation of Nature (IUCN), enabling inclusion of the national designated areas in the world network of designated areas. The law stipulates a responsibility that, within 6 years, all designated areas (nominated before 2004) to be re-evaluated and designated accordance with the new categorization. Because of the current transitional period, the network of designated areas (areas designated according to the new categorization

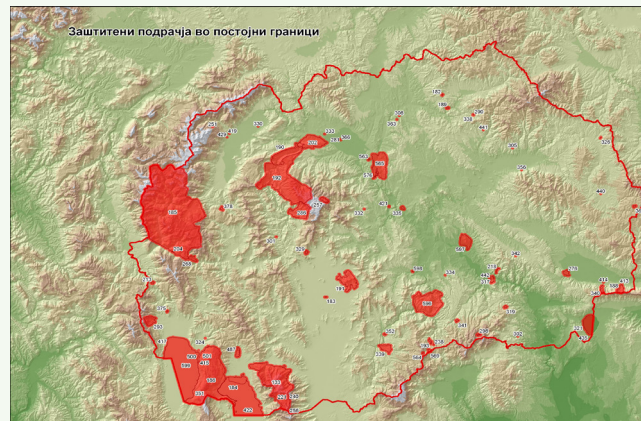
redesignated areas) the analysis (regarding the number and area they occupy) includes all designated areas in the Republic of Macedonia, designated under the old and also the new categorization. In doing so, the areas designated in accordance with the old categorization have been processed according to the appropriate/ corresponding IUCN category. The analysis of the area of the designated areas has been made by rendering the borders of the areas in GIS (according to the data from the acts of designation or redesignation of areas, the Spatial Plan of the Republic of Macedonia, and where precise data in the Spatial Plan were missing, the area of the designated areas was rendered in accordance with the experts opinion). ¹

Therefore, currently the designated area network comprises 81 areas, with total area of 231385.6 ha or around 9% of the territory of Macedonia.

Most of it falls into the category national parks with around 4,5 %, natural monuments with 2,74 % and the multipurpose area Jasen with 1,05 % of the national territory.

¹ The analysis of the number and area of designated areas, i.e. the rendering of the borders in GIS has been done during 2010-2011, within the UNDP and GEF project „Strengthening the environmental, institutional and financial sustainability of the system of designated areas in the Republic of Macedonia “.

Map 1. National designated areas



2. Designated areas with internationally recognized status

- Monument of Nature “Ohrid Lake” – World Natural Heritage (UNESCO);
- Monument of Nature “Prespa Lake” – Ramsar Site (1995);
- Monument of Nature “Dojran Lake” – Ramsar Site (2008);
- Monument of Nature “Markovi Kuli” (King Marko’s

Towers) - World Natural Heritage (UNESCO's Tentative List); and

- Monument of Nature “Slatinski izvor” (The Springs of Slatino) - World Natural Heritage (UNESCO’s Tentative List).

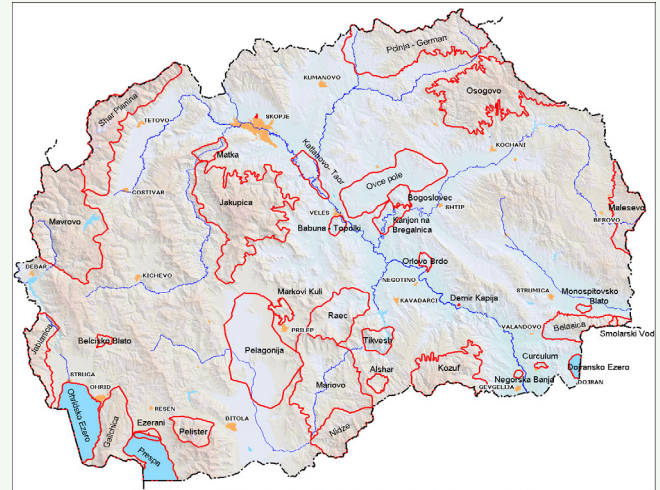
3. Emerald network

4 phase process was implemented in the Republic of Macedonia from 2002 to 2008 to identify the areas of special conservation interest (ASCI) and establish the Emerald Network. This network is established on the territory of the countries Parties to the Bern Convention and important part in the preparation of candidate countries for EU membership for the implementation of the EU Birds and/or Habitats Directives, or an additional tool in the process of establishing the coherent European Environmental Network Natura 2000.

35 locations have been identified in the National Emerald network. Under the first project, implemented in 2002-2003, 3 areas have been identified: SNR Ezerani, NP Galicica and SR Dojran Lake, with a total area of 27.660 ha (3,6%). In 2004 a second project was implemented, identifying another 3 areas: SNR Tikves, NP Pelister,

SR Demir Kapija, with a total area of 28.000 ha (3,8%). Under the third project implemented in 2005-2006, ten areas with a total area of 144.783 ha (19,1%) were identified, while with the fourth project (implemented in 2008), another 19 areas were identified with a total area of 556.447 ha (73,5%). The National Emerald Network of the Republic of Macedonia identifies 35 areas covering an area of 752.223 ha or around 29 % of its territory.

Map 2. National Emerald network of the Republic of Macedonia



Methodology

■ Methodology for the indicator calculation

The procedure for identification and designation of different categories of protected areas derives from the Law on Nature Protection, EU Directives and provisions of multilateral agreements.

Data specification

Title of the indicator	Source	Reporting obligation
Designated Areas	<ul style="list-style-type: none">– CDDA– Emerald database	<ul style="list-style-type: none">– Annually, to the European Environmental Agency– Annually, to the Secretariat of the Bern Convention with the Council of Europe

Data coverage:

Table 1: Number, area and representation of designated areas (according to national categorization)

Category	Number	Total Area in ha	% of territory of RM
Ia - Strict Nature Reserve	2	10,673.20	0,42
Ib - Wilderness Area	0	0	0
II - National Park	3	115.713,2	4,50
III - Natural Monument	57	70.424	2,74
IV - Nature park	15	3,375,53	0,13
V - Protected Landscape	3	5.387,12	0,21
VI - Multipurpose Area	1	26.923,03	1,05
Total	81	232,496.08	9,04

Table 2: Changes, over time, in the number and area of Emerald sites

	2002-2003	2004	2005-2006	2008	Total
Number	3	3	10	19	35
Area (km ²)	276,60	280	1 447,83	5 564,47	7 568,9
% of total area of Emerald sites	3,6	3,8	19,1	73,5	100

General metadata

Code	Title of the indicator	Compliance with CSI/ EEA or other indicators		Classification by DPSIR	Type	Linkage with area	Frequency of publication
MK NI 008	Designated areas	CSI 008	Designated areas	P	A	<ul style="list-style-type: none"> – Biological diversity – nature – policies 	Annually



Definition

The indicator will show the trend in the number and distribution of selected species or species groups at national level, as relative assessment compared other baseline year of the monitoring commencement.

At the moment, species groups considered are the birds.

The indicator will show the trend of common birds species (developing) and the trend of certain selected species of birds of prey.

Units

- Number of species, estimated number of individuals for certain species.

Policy relevance of the indicator

List of relevant policy documents

The Second National Environmental Action Plan, in its Chapter on Nature, emphasizes the goal of the establishment of integrated system for nature and biological diversity protection, in line with the EU standards and multilateral agreements. One of the actions envisaged for the goal achievement is

development of national monitoring programme for biological diversity components and elaboration of national biodiversity indicators.

The National Strategy for Biological Diversity Protection with Action Plan defines integrated approach to the protection and sustainable use of components of biological diversity. The Action Plan outlines the specific actions to be taken to achieve the goals. The strategic commitment “Research and monitoring” includes action for national biodiversity indicators development.(D.1.11).

Legal grounds

The Law on Nature Protection provides for organization of monitoring of nature state. The monitoring methodology needs to be specified in a regulation. The monitoring over the state of nature is carried out through: measurement, observation, assessment and control of the state of species, their habitats, habitat types, environmentally important areas, ecosystems, landscape types, monitoring and assessment of geological values and monitoring of the state of natural heritage.

Targets

Identification of the trend in populations for selected bird species and establishment of the reason leading to reduction in their number and development and implementation of measures for the negative trend halting (contribution to the achievement of the Target 2020 for biodiversity loss prevention/reduction by 2020).

Key policy issue

What is the trend in the populations of selected bird species and what are the reasons leading to their number reduction?

Key message

According to available data, there is a trend of populations number reduction.

Figure1. Trend in the number of Griffon Vulture in Macedonia (by colonies)

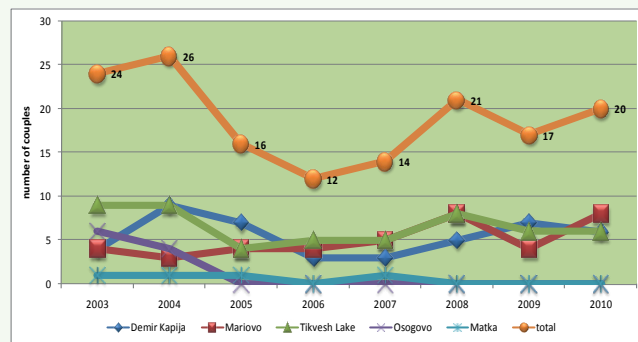
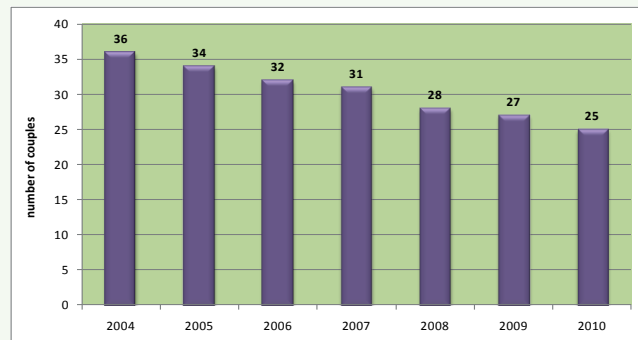


Figure2. Trend in the number of Griffon Vulture in Macedonia (by couples)



Assessment

Abundance and variety of species and ecosystems are the main features of biological diversity in the Republic of Macedonia. According to the available information, this wealth comprises the imposing number of 17.604 species, out of which 976 are endemic species. According to the analysis of the richness of biodiversity in the countries of the European continent, the Republic of Macedonia is positioned at the very top of the list of states known as “European Hotspot».

Ornithofauna of the Republic of Macedonia is represented by 338 taxa (309 species and 19 subspecies) of birds.

66 bird species found in the Republic of Macedonia have been included in the European Red List. From among “Emerald” species identified in the Republic of Macedonia (under the Resolution No. 6 of the Bern Convention), 115 species are birds.

In the period from January 2003 until October 2010, within the Project for vultures conservation, monitoring of the populations of two species of birds of prey, namely Griffon Vulture and Egyptian Vulture has been carried out, accompanied also by monitoring of

the Imperial Eagle (there is also older data on the said species, as well as on the Golden Eagle, Mediterranean Falcon and long-legged buzzard; however, this data should be updated and analyzed again).

The implementation of the Project for common bird species monitoring was initiated in 2007 and data on the trend in certain indicative bird species has been obtained in the course of the past four years.

Methodology

■ Methodology for indicator calculation

Sampling quadrants (10 – 15) with an area of 1 km² are taken by random and common bird species were counted there by the method of linear transect. Counting took place in the period of nesting (from 15 April to 15 June) with the intensity of two searches per year. Data was statistically processed resulting in the established trend in the populations of species at national level.

With reference to birds of prey, full census of couples in nest and determination of their success in nest have been envisaged.

■ Source of used methodology

We applied methodology used by the organization British Trust for Ornithology in carrying out the census of birds in nests on the territory of the United Kingdom.

Indicator: Number of vulture couples

The indicator shows the estimate of the size of populations (in couples) of Griffon Vulture and Egyptian Vulture in Macedonia, based on detailed monitoring of nesting sites of the two species on the whole territory of Macedonia.

Data specification

Title of the indicator	Source	Reporting obligation
Species diversity	<ul style="list-style-type: none">– Grubac, B. & VELEVSKI, M. (2004-2010): Survey and monitoring of the status, breeding success and threats to the Egyptian Vulture in Macedonia- Report to BVCF/FZS.– Grubac B., Veleviski M., Lisicanec T., Lisicanec E., Roleviski, D.&Andevski, J. (2007): Decrease of population size of the Griffon vulture <i>Gypsfulvus</i> in Macedonia and assessment of conservation measures. III Congress of Ecologists of Republic of Macedonia, 06-09.10.2007, Struga. Abstract Book, 101-102. Macedonian Ecological Society.– Macedonian Ecological Society and Wild Flora and Fauna Fund.	

Data coverage:

Table1.Trend in the number of Griffon Vulture in Macedonia (by colonies)

Griffon Vulture - couples						
	Demir Kapija	Mariovo	Tikvesh Lake	Osogovo	Matka	total
2003	4	4	9	6	1	24
2004	9	3	9	4	1	26
2005	7	4	4	0	1	16
2006	3	4	5	0	0	12
2007	3	5	5	0	1	14
2008	5	8	8	0	0	21
2009	7	4	6	0	0	17
2010	6	8	6	0	0	20

Table 2.Trend in the number of Egyptian Vulture in Macedonia (in couples)

Egyptian Vulture	
year	couples
2004	36
2005	34
2006	32
2007	31
2008	28
2009	27
2010	25

General metadata

Code	Title of the indicator	Compliance with CSI/EEA or other indicators		Classification by DPSIR	Type	Linkage with area	Frequency of publication
MKNI 009	Species diversity	CSI 009	Species diversity	C		Biological diversity	