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# BIODIVERSITY ASSESSMENT FOR THE BULGARIAN TERRITORY

**Responsible beneficiary:**
**MUNICIPALITY OF KRESNA**

Subcontractor:
P United Ltd.

Project website:
https://mobilebiodiversity.com/

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*The contents of this srudy are sole responsibility the Municipality of Kresna and can in no way be taken to reflect the views of the European Union, the participating countries, the Managing Authority and the Joint Secretariat.*

# FINAL REPORT

for the implementation of **Activity 2:** "Preparation of a Final Report, including an analysis of the results"

according to Contract № D-270/30.12.2019 for a public invitation with subject: "Biodiversity assessment in the area of Kresna Municipality"

within project „Virtual and Mobile Museum of Biodiversity" with an acronym „Mobile Biodiversity", financed under The Cooperation Programme INTERREG V-A "Greece-Bulgaria 2014-2020"

**Contracting Authority:** Kresna Municipality

**Contractor:** P-United Ltd.

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# I. General information

The current Final Report has been prepared in connection with the implementation of a public invitation with subject “Biodiversity assessment in the area of Kresna Municipality”, within project “Virtual and Mobile Museum of Biodiversity“, financed under The Cooperation Programme INTERREG V-A "Greece-Bulgaria 2014-2020".

The main goal of the project is to analyze and maintain / improve the state of biological diversity in the cross-border territory of the municipalities of Kresna and Paggaio. As biodiversity and ecosystems cannot be limited to the borders of municipalities, the project activities are reduced to a project area covering part of the cross-border region.

The main purpose of the project is based on the achievement of the following specific objectives:

1. Biodiversity assessment (research) in the cross-border area of the municipalities of Kresna and Paggaio and development of a joint database for monitoring.
2. Development and pilot implementation of a joint strategy for biodiversity conservation.
3. Development of educational tools and pilot implementation of an educational campaign for the conservation of biological diversity to bring about a change in public consciousness.

The activities, subject of this research, are directly related to the achievement of the first specific goal of the project: *Biodiversity assessment (research) in the cross-border area of the municipalities of Kresna and Paggaio and development of a joint database for monitoring*.

The biodiversity assessment will serve as a basis for making informed decisions and taking effective actions for biodiversity conservation (as there is currently insufficient data on significant species, their behavior, risks, etc.).

## II. Summary of implemented activities

In accordance with the technical specifications of the Contracting Authority, the current public procurement: "*Biodiversity assessment in the area of Kresna Municipality"* includes the implementation of the following activities:

- **Activity 1:** "Collection of available information and data on biodiversity in the Bulgarian part of the project territory and assessment of selected species and / or habitats".
- **Activity 2:** "Preparation of a Final Report, including an analysis of the results".

## 1. *Activity 1*

**The purpose of Activity 1:** *„Collection of available information and data on biodiversity in the Bulgarian part of the project territory and assessment of selected species and / or habitats"* is collected and systematized available information and data (for example: information about the protected areas under national law and protected sites of the NATURA 2000 ecological network, information from management plans for the protected areas and sites, available data from conducted studies in the area, etc.) for the biological diversity in the area of Kresna Municipality and created database with the available information.

In addition to the above, the implementation of Activity 1 also includes:

**A.** Study of the following groups:

- Plants and habitats;
- Mammals (except bats);
- Bats;
- Fish;
- Amphibians and reptiles;
- Birds.

**B.** Biodiversity assessment in the Bulgarian part of the project territory

Based on the collected and systematized initial information and in accordance with the Contracting Authority requirements, species and habitats have been selected for which to be made assessment of the threats and vulnerability for the territory of the municipality. Such Assessment of the threat and vulnerability has been performed for 10 species / habitats.

**C.** From the groups in point A are defined 60 interesting for the region or with high conservation status species for which additional information has been obtained.

The products prepared under **Activity 1** are:

❖ Database with obtained and systematized available data on biological diversity in the area of Kresna Municipality;

❖ Assessment of threats and vulnerability for 10 species/habitats;

❖ Additional information obtained (distribution, description/ biological and ecological features, status, condition, photographic images of the species or its habitats) for 60 interesting for the region or with high conservation status species.

***1.1.*** *Implemented actions for preparation of the Database with obtained and systematized available data on biological diversity in the area of Kresna Municipality*

For the purposes of preparation of database for biological diversity in the area of Kresna Municipality, available information and data were collected and systematized (incl. preparation of bibliographic references, submission of requests for access to institutional information, field / theoretical research, etc.), for example: information about the protected areas under national law and protected sites of the NATURA 2000 ecological network, information from management plans for the protected areas and sites, available data from conducted studies in the area, etc.

Based on the information gathered and the conducted research on the available data from studies conducted in the area of Kresna Municipality, typical species and habitats for the territory were identified, systematized by groups, as follows:

- Plants and habitats;
- Mammals (except bats);
- Bats;
- Fish;
- Amphibians and reptiles;
- Birds.

The database with obtained and systematized available data on biological diversity in the area of Kresna Municipality is attached to this Final Report (**Annex 1**).

***1.2.*** *Implemented actions for preparation of the Assessment of the threats and vulnerability for 10 species / habitats*

Based on the collected and systematized initial information and after discussion with the partners from the Greek side, a total of 10 species / habitats for the territory of Kresna and Paggaio municipalities were jointly selected for which and Assessment of threats and vulnerability is performed. The biodiversity assessment will serve as a basis for making informed decisions and taking effective actions for conservation of species and their habitats.

The following 9 species and 1 habitat have been selected for the assessment of threats and vulnerability:

1. Wolf (*Canis lupus*);
2. Rock partridge (*Alectoris graeca graeca*);

3. Golden eagle (*Aquila chrysaetos*);
4. Short-toed snake-eagle (*Circaetus gallicus*);
5. Black woodpecker (*Dryocopus martius*);
6. European honey-buzzard (*Pernis apivorus*);
7. Yellow-bellied toad (*Bombina variegata*);
8. Spur-thighed tortoise (*Testudo graeca*);
9. Hermann's tortoise (*Testudo hermanni*);
10. 8210 Calcareous rocky slopes with chasmophytic vegetation.

For each species / habitat has been made an assessment of the existing threats in the area of Kresna municipality, an assessment of the degree of vulnerability, as well as measures have been proposed that would contribute to reducing the vulnerability of the species / habitats.

The Assessment of the threats and vulnerability for each species / habitat is attached to this Final Report (**Annex 2**).

***1.3.*** *Implemented actions for the Additional information obtained (distribution, description/ biological and ecological features, status, condition, photographic images of the species or its habitats) for 60 interesting for the region or with high conservation status species*

Additional information was obtained for 4 vertebrates, 9 bats, 16 amphibians and reptiles, 28 birds and 3 plants.

The information for each species contains:

- ✓ Distribution;
- ✓ Description of the species (biological and ecological features);
- ✓ Conservation condition;
- ✓ Conservation status;
- ✓ Photographic images of the species or its habitats.

The information for 60 interesting for the region or with high conservation status species is attached to this Final Report (**Annex 3**).

## 2. *Activity 2*

**The purpose of Activity 2:** *"Preparation of a Final Report, including an analysis of the results"* is the preparation of this Final Report, including an analysis of the results of Activity 1 for biodiversity conservation in the municipality of Kresna.

In accordance with the requirements of the Contracting Authority, the Final Report includes the information under Activity 1, incl. the descriptions of the biology and ecology of the species, as well as photographic material, meeting the requirements of the Contracting Authority (**Annex 1**, **Annex 2**, **Annex 3**).

The analysis of the results is presented in **point IV.** of the current report.

# III. Applied methodology in the implementation of activities

For the implementation of the activities within the scope of this contract, the Contractor applied a **System Approach** based on the consideration of the tasks as a comprehensive set of interconnected elements.

The main principles used in the System Approach are:

- Integrity – allowing the consideration of the task as independent and at the same time interconnected with the other activities;
- Hierarchical structure – observance of the hierarchy and subordination between the representatives of the Contracting Authority and the Contractor, observance of the hierarchy according to the reliability of the sources of initial information;
- Structurality – the structure of the activity is determined by the requirements of the Contracting Authority;
- Consistency – subordination of the activity to the general goal and characteristics of the system.

**The methodology** for the performance of the contract is based on the applied approach. The methodology is the sequence of application of the following set of methods:

- **Planning** – Planning is a function of management, a process of coordination and achieving set goals. It connects intentions with resources and opportunities.
- **Communication –** Expressed in active dialogue with all stakeholders (if necessary) and achieving good communication.
- **Quality management –** Ensuring high quality of performance and efficiency.

# IV. Analysis of the results

From the analysis of the results obtained from Activity 1 it can be concluded that the territory of the municipality of Kresna is characterized by significant biological diversity. The area of the municipality includes 9 protected areas under the Protected Areas Act, 4 protected sites of the ecological network Natura 2000, and the species found in the municipality of Kresna are subject to protection in a number of national and international legislative documents:

- Biodiversity Act;
- Red Data Book of the Republic of Bulgaria;
- Annex I to Directive/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (Birds Directive);
- Annex II and Annex IV of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive);
- Annex II and Annex III of the Bern Convention;
- Annex II of the Convention in International Trade in Endangered Species of Wild Fauna and Flora (CITES);
- Part of the IUCN (International Union for Conservation of Nature) Red List of Threatened Species.

Based on the information gathered and the conducted research, a number of scientific studies on biodiversity in the area of Kresna municipality were discovered. A solid basis of scientific information about the biological diversity of Bulgaria is one of the most significant advantages for the country in the implementation and application of new measures for its conservation. Nevertheless, there are a number of weaknesses and gaps in this scientific basis. These imperfections and gaps range from the usual for many areas of biodiversity research and conservation, to very specific areas, taxa, habitats and threats:

- Insufficient information about the species richness, distribution, density and dynamics of the populations of representatives of many taxonomic groups;
- Insufficient information on the impact and consequences of the various anthropogenic threats to biodiversity, methods for mitigating this impact and recovery procedures. For example, little research has been conducted on the impact on the biological diversity of the construction of railway facilities, factories, highways, dams, etc.;
- Lack of long-term biological monitoring and ecological research, especially with regard to the species listed in the Red Data Book of the Republic of Bulgaria;

- Lack of long-term research on changes in the state of the environment, especially in the protected areas.

# V. Annexes

- **Annex 1:** Database with obtained and systematized available data on biological diversity in the area of Kresna Municipality;
- **Annex 2:** Assessment of threats and vulnerability for 10 species/habitats in the area of Kresna Municipality;
- **Annex 3:** Description of 60 interesting for the region of Kresna Municipality and with high conservation status species.

# Database with obtained and systematized available data on biological diversity in the area of Kresna Municipality

in connection with the implementation of **Activity 1:** "Collection of available information and data on biodiversity in the Bulgarian part of the project territory and assessment of selected species and / or habitats"

according to Contract № D-270/30.12.2019 for a public invitation with subject: "Biodiversity assessment in the area of Kresna Municipality"

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## Introduction

Kresna Municipality is located in the southwestern part of the country. Administratively, the municipality is included within the Blagoevgrad region, with a total area of 344,5 km$^2$. The valley of the Struma River divides its territory into two parts – Pirin and Maleshevska. A significant area of the municipality is covered by protected areas and reserves – Pirin National Park, Tisata Reserve, Moravska protected area and others.

The territory of Kresna Municipality has an extremely diverse relief. The highest point is Vihren Peak (2914 m), on the border with Bansko Municipality. The lowest point (140 m) is located at the exit of the river Struma, south of the village of Dolna Gradeshnitsa, on the border with the municipality of Strumyani. So, the elevation gain of the terrain is over 2770 m.

The territory of the municipality falls into four different climatic regions:

- ✓ Climatic region of the Struma valley – covers the territory of the Sandanski-Petrich valley up to 600 m above sea level and Kresna Gorge;
- ✓ Low mountain climatic region – covers the slopes of Pirin and Maleshevska mountain from 600 to 1000 m above sea level;
- ✓ Middle mountain climatic region – covers the highest parts of Maleshevska mountain and the middle high parts of Pirin with altitude between 1000 and 1800 m (part of this climatic region is included in the boundaries of Pirin National Park);
- ✓ Alpine climatic region – covers the highest parts of Pirin (over 1800 m above sea level), which is fully included in the boundaries of Pirin National Park.

The main drainage system on the territory of the municipality is the Struma River. Its valley, together with the Mesta valley, are included in the West Aegean region for basin water management, covering about 12% of the country's territory. The formation of groundwater and their quantitative and qualitative characteristics are closely related to the peculiarities of the geological structure of the territory.

The predominant mountain relief on the territory of the municipality has determined the height zoning of the vegetation cover. It is generally dominated by tree species, but the area of natural meadows and pastures and shrubs is significant. A characteristic feature is that due to the warmer and drier climate there is a higher location of the upper limits of the habitats of almost all tree species, compared to those from the interior of the country. Up to 600 m above sea level

typical representatives of the sub-Mediterranean and Mediterranean forest vegetation, such as Downy Oak (*Quercus pubescens*), oriental hornbeam (*Carpinus orientalis*), Greek juniper (*Juniperus excelsa*), as well as artificial plantations, mainly of coniferous species. Along the Struma River and its tributaries, the tree vegetation is represented by moisture-loving species such as willows (*Salix spp.*), poplars (*Populus spp.*), black alder (*Alnus glutinosa*), plane trees (*Platanus spp.*) and others.

Natural oak and mixed deciduous forests are widespread in the low mountain belt (from 600 to 1000 m). In these areas the species diversity is largely related to the changes in altitude, the different exposure of the slopes and the local hydroclimatic and soils-ecological conditions. In well-drained and drier places grow Hungarian oak (*Quercus frainetto*), Sessile oak (*Quercus petraea*), European hop-hornbeam (*Ostrya carpinifolia*) and artificial plantations of Scots pine and Black pine (*Pinus sylvestris* and *Pinus nigra*). In wetter habitats, woody vegetation is represented by common beech (*Fagus sylvatica*), field maple (*Acer campestre*), hornbeam (*Carpinus betulus*), alder, acacia (*Robinia pseudoacacia*), rowan (*Sorbus aucuparia*), wild service tree (*Sorbus torminalis*) and others.

In the middle mountain belt (from 1000 to 1600 m altitude) beech formations and mixed deciduous-coniferous forests predominate. In the Maleshevska part of the territory of the municipality in the beech forests there are also winter oak, hornbeam and European hop-hornbeam. The most compact beech forests are in the areas of Moravsko, Ivishtnik, Leshta, Zastava, Lisicharnika. In the Pirin part of the territory of the municipality coniferous forests predominate, but there are both entirely beech forests and mixed deciduous-coniferous forests from beech, silver fir (*Abies alba*), Norway spruce (*Picea abies*), Scots pine, black pie, manna ash (*Fraxinus ornus*) etc. Scots pine communities occupy mostly solar exposures and poorer habitats. Black pine grows well on calcareous terrains and often forms communities involving Scots pine and White-barked pine (*Pinus heldreichii*), and less commonly with the silver fir.

In the lower part of the high mountain belt (up to 1900 m above sea level) there are pure and mixed forests of Scots pine, Macedonian pine and spruce. In the highest part of the forest belt, communities of Macedonian pine with undergrowth of Bog pine (*Pinus mugo*) and Alpine juniper (*Juniperus sibirica*), and typical bog pines communities above them. Extensive pastures stretch over the bog pine area. Edelweiss (*Leontopodium alpinum*) is found on the rocky Pirin peaks, and

on forest meadows - avens (*Geum spp.*), peony (*Paeonia spp.*), primrose (*Primula spp.*), thyme (*Thymus spp.*), oregano (*Organum vulgare*), alpine squill (*Scilla bifolia*), blueberries (*Vaccinium*) and others.

Forests are mainly used for the extraction of construction timber and firewood, but they also have important water-regulating, anti-erosion and ecological significance as habitats for numerous animal species. The animal world is extremely diverse – common representatives of wildlife are the rabbit (*Lepus europaeus*), squirrel (*Sciurus vulgaris*), stone marten (*Martes foina*), pine marten (*Martes martes*), fox (*Vulpes vulpes*), wild boar (*Sus scrofa*), roe deer (*Capreolus capreolus*). The wolf (*Canis lupus*) and brown bear (*Ursus arctos*) can be seen in higher parts of Pirin in the zone of bog pine. The fish wealth in the mountainous parts of the municipality is great – brown trout (*Salmo trutta fario*), the rainbow trout (*Oncorhynchus mykiss*) and brook trout (*Salvelinus fontinalis*), and in Struma – the common nase (*Chondrostoma nasus*), common chub (*Leuciscus cephalus*), Romanian barbel (*Barbus petenyi*) and many others.

The territory of the municipality of Kresna is characterized by a rich and diverse flora with a significant participation of Mediterranean species. The mountainous part attracts tourists with a variety of wild berries – blackberries (*Rubus spp.*), raspberries (*Rubus idaeus*), blueberries, wild strawberries (*Fragaria vesca*) and others, as well as many beautiful flowers, some of which are valuable medicinal plants – thyme, oregano (*Origanum vulgare*), mint (*Mentha longifolia*), wall germander (*Teucrium chamaedrys*), sweet violet (*Viola odorata*), common juniper (*Juniperus communis*), false hellebores (*Veratrum lobelianum*), alpine dock (*Rumex alpinus*), лечебна common lungwort (*Pulmonaria officinalis*) and many others.

# 1. Protected sites and protected areas

The territory of Kresna Municipality is characterized by significant landscape and biological diversity, due to both the specific natural and geographical conditions of this part of the country and the relatively limited anthropogenic impacts on the environment.

After consulting the Ministry of Environment and Water (MoEW), it was established that the following protected areas and territories fall in whole or in part within the municipality:

1. Protected site BG0000366 Kresna – Ilindentsi under the Habitats Directive;
2. Protected site BG0000209 Pirin under Habitats Directive and Birds Directive;
3. Protected site BG0002003 Kresna under the Birds Directive;
4. Protected site BG0002126 Pirin bufer under the Birds Directive;
5. National park "Pirin";
6. Reserve „Bayuvi Dupki – Dzhindzhiritsa"
7. Reserve „Tisata";
8. Protected area „Kresnensko Defile";
9. Protected area „Moravska";
10. Protected area „Estestveno Nahodishte na Chinar";
11. Protected area „Estestveno Nahodishte na Chinar – Buyna";
12. Protected area „Estestveno Nahodishte na Chinar – Kuchkarnika";
13. Natural Monument „Sharaliiska peshtera".

- **Protected sites**

***Protected site BG0000366 Kresna – Ilindentsi under the Habitats Directive***

The site has several separate cores connected by river valleys in a single site. The site is like a "buffer" zone to the west of Pirin National Park, it also includes the highest parts of Maleshevska and Vlahina Mountains towards the border with Macedonia, and between them the deep Kresna Gorge of the Struma River.

In protected site BG0000366 „Kresna – Ilindentsi" unique biodiversity is concentrated in the site. Here the Rhodope Mountains has the best ecological connection with the mountains on the border between Bulgaria and Macedonia. The Struma River is biocorridor for the migration of species in south and north direction.

The area includes the northern distribution limits of many species and Mediterranean plant communities, including those of the Oriental plane (*Platanus orientalis*), the kermes oak (*Quercus coccifera*), phillyrea (*Phillyrea media*), Greek juniper (*Juniperus excelsa*). Between the villages of Ploski and Ilindentsi is located "Zandana" – complex of 3 caves in which breeding colonies of horseshoe bats (*Rhinolophus spp.*) and migratory groups/ colonies of other species of bats have been observed. There are other species of bats that have been registered in rock crevices and abandoned buildings in the protected site.

***Protected site BG0000209 Pirin under the Habitats Directive and the Birds Directive***

Pirin is a mountain in southwestern Bulgaria, located between the valleys of the rivers Struma and Mesta, part of the Rila-Rhodope Mountains.

The mountain is characterized by pointed peaks and steep slopes. The oldest rock complexes in it are metamorphic granite gneisses, crystalline shales and marbles. About 62% of its area is occupied by Paleozoic and Mesozoic granites and granite-like rocks. The limestone part, including marbled limestone, is the richest part of endemic plant species. There are 185 lakes on the territory of Pirin, most of which are of glacial origin. The soils are dominated by Cambisols and Mollic cambisols, smaller areas are occupied by Umbrosols and Rendzic Leptosols.

Pirin Mountain is covered mainly with forests (71%) and alpine meadows and open spaces (10%). Grassland habitats in the alpine zone are represented by communities of *Sesleria coerulans*, mountain avens (*Dryias octopelata*) snow willow (*Salix reticulata*) on a marble base and communities of *Agrostis rupestris, Festuca airoides*, etc. on silicate terrains, and both types of communities include a wide variety of plant species. The subalpine belt is also fully developed with widespread formations of bog pine (*Pinus mugo*), alpine juniper (*Juniperus sibirica nana*), *Chamaecitisus absinthoides*, blueberry (*Vaccinium uliginosum*), (*Festuca penzesii*), (*Festuca valida*), matgrass (*Nardus stricta*) and others.

The vegetation in the mountain lakes is represented by Merilin's grass (*Isoetes lacustris*), floating bur-reed (*Sparagnum angustifolium*) and others.

The coniferous belt is represented by communities of spruce (*Picea abies*), Macedonian pine (*Pinus peuce*) and Scots pine (*Pinus sylvestris*) on silicate terrains and by fomrations of White-barked pine (*Pinus heldreichii*) and black pine (*Pinus nigra*) on marble terrains. The shrubs in the coniferous belt are represented by alpine juniper (*Juniperus siberica nana*), *Chamaecytisus*

*absinthoides* and blueberry (*Vaccinium myrtillus*), and the grass habitats are represented by communities of Alpine chewing's fescue (*Festuca nigrescens*), common bent (*Agrostis capillaris*) and others. At an altitude of 900 – 1 600 m common beech forests (*Fagus sylvatica*) predominate. At lower altitudes, deciduous forests of Dalechamps oak (*Quercus dalechampii*), Common hornbeam (*Carpinus betulus*) and Balkan beech (*Fagus moesiaca*) predominate.

The flora of Pirin includes about 2000 species of plants, which is nearly 50 % of all species described in Bulgaria.

***Protected site BG0002003 Kresna under the Birds Directive***

Ornithologically important place Kresna is located in southwestern Bulgaria along the valley of the river Struma in the area of the Kresna Gorge. The climate is transitional Mediterranean. The Kresna Gorge is a rock complex on a silicate base, including strongly rocky and steep slopes, a large rock massif with vertical walls and smaller rock habitats. South of the gorge there are hills with Mediterranean vegetation at an altitude of up to 500 m. Up to this altitude, the mixed forests of Downy Oak (*Quercus pubescens*), oriental hornbeam (*Carpinus orientalis*) and manna ash (*Fraxinus ornus*) and those of Greek juniper (*Juniperus excelsa*) and downy oak with undergrowth of evergreen Mediterranean shrubs are widespread.

In the southern regions there are also some typical Mediterranean evergreen species – the kermes oak (*Quercus coccifera*) and phillyrea (*Phillyrea media*). Communities of kermes oak and hornbeam are typical. Juniper forests and mixed forests of juniper and kermes oak with undergrowth of Mediterranean shrubs are habitats that determine the high percentage of Mediterranean species in the avifauna of the region (over 30%). Along the valley of the river Struma, south of Blagoevgrad and at the foot of Pirin are represented communities of the Oriental plane (*Platanus orientalis*).

Kresna is of global importance as a representative example of the Mediterranean biome. There are 8 biologically limited species – Rock partridge (*Alectoris graeca*), Olive-tree warbler (*Hippolais olivetorum*), Masked shrike (*Lanius nubicus*), Black-headed bunting (*Emberiza melanocephala*), Western black-eared wheatear (*Oenanthe hispanica*), Western subalpine warbler (*Sylvia cantillans*), Sardinian warbler (*Sylvia melanocephala*) and the Western rock nuthatch (*Sitta neumayer*). For the Levant sparrowhawk (*Accipiter brevipes*) the region of Kresna is one of the most important nesting places in Bulgaria.

The migration route Via Aristotelis, which is of regional importance for migratory birds – mainly birds of prey and songbirds, but is also important for the migration of Waterfowl.

***Protected site BG0002126 Pirin bufer under the Birds Directive***

Protected site "Pirin bufer" is situated in the lower parts of Pirin Mountain, covering mainly areas south and west of Pirin National Park. The area has medium and low mountainous character. Main habitat in the area are coniferous forests, most of them are dominated by Scots pine and mixed conifer forests.

In protected site "Pirin buffer" nest 17 bird species from Annex 1 of the Birds Directive and 20 species of migratory birds, also included in Annex 1 of the Directive, are passing through its territory. The area supports nationally significant populations of the European honey buzzard /*Pernis apivorus*/, Peregrine falcon /*Falco peregrinus*/, Boreal owl /*Aegolius funereus*/, Black woodpecker /*Dryocopus martius*/, and contributes greatly to the conservation of the populations of the Short-toed snake eagle /*Circaetus gallicus*/, Golden eagle /*Aquila chrysaetos*/, Long-legged buzzard /*Buteo rufinus*/, Hazel grouse /*Bonasa bonasia*/, Nightjars /*Caprimulgus europaeus*/, Woodlark /*Lullula arborea*/ and Red-backed shrike /*Lanius collurio*/.

- **Protected areas**

***National park "Pirin"***

The total area of the park amounts to more than 40 thousand ha, of which nearly 15% or over 6 thousand ha, fall within the administrative boundaries of the municipality of Kresna.

The forests in the Pirin National Park include 16 tree species, some of which are local and Balkan endemics, others are of particular conservation importance or represent some of the largest stocks of the tree species in Europe or in Bulgaria. The average age of the forests in the park is 85 years, with the largest share of forests over 140 years old.

The purpose of declaring a protected area is to preserve the natural character of natural ecosystems and landscapes, together with their plant and animal communities and habitats.

The following species are protected in the Pirin National Park: spruce, scots pine, silver fir, common beech, bilberry (*Vaccinium myrtilus*), *Aquilegia aurea*, great yellow gentian (*Gentiala lutea*), bog pine (*Pinus mugo*), spotted gentian (*Gentiana punctata*), alpine snowbell (*Soldanella pusilla*), rose root (*Rhodiola rosae*), nardus (*Nardus stricta*), alpine juniper (*juniperus sibirica*), lingonberry (*Vaccinium vitis-idaea*), brown bear (*Ursus arctos*), wolf (*Canis lupus*), roe deer

(*Capreolus capreolus*), fox (*Vulpes vulpes*), wild boar (*Sus scrofa*), squirrel (*Sciurus vulgaris*), black woodpecker (*Dryocopos martius*), western capercaillie (*Tetrao urogalus*), hazel grouse (*Bonasa bonasia*), golden eagle (*Aquila chrysaetos*), common european viper (*Vipera berus*), viviparous lizard (*Lacerta vivipara*), fire salamander (*Salamandra salamandra*), slowworm (*Angius fragilis*), brown trout (*Salmo trutta fario*).

Pirin National Park has developed and approved a management plan for the period 2004-2013, which sets the following long-term goals for sustainable management of the park:

- ✓ Preservation, protection and maintenance of the naturalness and inviolability of the ecosystems and the landscape;
- ✓ Providing opportunities for environmental education and interpretation;
- ✓ Promoting researches;
- ✓ Providing revenues for local communities as a result of the opportunities and advantages of the National Park;
- ✓ Improving the management policy and specialized protection of the park;
- ✓ Compliance and observance of the legal institutional base.

The definition of the objectives is made in accordance with the requirements of the Protected Areas Act and the adopted categorization system of the International Union for Conservation of Nature (IUCN).

***Reserve "Bayuvi Dupki – Dzhindzhiritsa"*** is part of the territory of Pirin National Park. The reserve was declared by Decree of the Council of Ministers № 1388 from 29.01.1934 in order to preserve the natural relict forests of Macedonian pine and White-barked pine and the great variety of plant and animal species. In 1997 "Bayuvi Dupki – Dzhindzhiritsa" was included in the list of biosphere reserves to the UNESCO program – Man and the Biosphere.

***Reserve "Tisata"***

The reserve is located on both sides of the Struma River in the Kresna Gorge with a total area of 574.5 ha. It was declared by Decree of the Council of Ministers № 6663 from 05.12.1949 and by Order № 130 from 22.02.1985 in order to preserve the only in Bulgaria compact locality of Greek juniper and Mediterranean biocenoses. The reserve falls within the State Forestry "Kresna" and its scope has increased and decreased several times over the years.

The unique biodiversity of the reserve is due to the fact that the Kresna crosses a sharp border between Central and Mediterranean climate, which is why more species of plants and animals are concentrated in this small area than anywhere else in Bulgaria. The place is a biological corridor for migration of large mammals between the mountains of the Balkan Peninsula, as well as a migration route of birds (Via Aristotelis). A number of plant and animal species here are included in the Red Data Book of the Republic of Bulgaria and the world, in European laws and conventions for the protection of natural heritage.

Reserve "Tisata" has prepared and approved a management plan for the period 2014-2023, the main goals and sub-goals of which are to achieve sustainable management and protection of the reserve:

✓ **Main objective I: Preserved natural character of the reserve and protected habitats, populations of species and landscape.**

- Sub-objective I.1: Preserved natural character of forest ecosystems;
- Sub-objective I.2: Favourable conservation status of indicator habitats and species;
- Sub-objective I.3: Preserved typical elements of the landscape.

✓ **Main objective II: Improved reserved management model, contributing to the achievement of conservation goals and local sustainable development.**

- Sub-objective II.1: Formed broad public support for the reserve, by involving stakeholders in various aspects of management;
- Sub-objective II.2: Up-to-date information base for reserve management;
- Sub-objective II.3: Improved institutional capacity for reserve management.

***Protected area "Kresnensko Defile"***

The Kresna Gorge was formed by the incision of the Struma River between Pirin and the Maleshevska Mountain, where the river has carved a beautiful canyon. The gorge is located in an area that is characterized by a typical transitional-Mediterranean climate.

The Kresna Gorge is one of the richest in wild plants and animals in Bulgaria (some of which are included in the Red Data Book); part of the ecological network Natura 2000; CORINE-place and important ornithological area according to the criteria of Birdlife International.

In the immediate vicinity of the gorge is the "Tisata" Reserve. The reserve and the adjacent territories in the Kresna Gorge include habitats of many mammals, including brown bear, wolf,

otter, beech marten, red deer, wildcat etc.; of 17 species of bats (more than in the whole Central Europe); of 232 bird species, 135 of which are nesting.

***Protected area "Moravska" is*** located in the Maleshevska Mountain, 2 km west of Kresna. This is the second largest locality of the protected species of Greek juniper in Bulgaria after the "Tisata" Reserve. It includes sections of the localities "Nikolov Chukar", "Gradishte" and "Breyanitsa", where are many representatives of the Mediterranean flora and fauna.

***Protected area "Estestveno Nahodishte na Chinar", "Estestveno Nahodishte na Chinar – Buyna"*** **and** ***protected area "Estestveno Nahodishte na Chinar – Kuchkarnika"*** are natural habitats of Oriental plane trees over 300 years old, located in the vicinity of the village of Gorna Breznitsa in the Maleshevska Mountain. They stand out with beautiful untouched nature, many trees with hollows in their trunks, braided branches, plane trees and more.

***Natural monument "Sharaliiska peshtera"*** was announced by Order № RD-873 from 22.11.2013 of the Minister of Environment and Water, in order to protect a cave, a habitat of rare animal species (bats, invertebrates, etc.).

## 2. Study by groups

Based on the information gathered from the previous points and a conducted study on the available data from studies conducted in the area of Kresna Municipality, typical species and habitats for the area were identified.

Data for biodiversity studies in the area of the municipality are found in the following sources and scientific publications:

- Amphibians (Amphibia) and Reptiles (Reptilia) in Kresna Gorge
- Analysis and data collection (flora and fauna) of the cross-border Maleshevska Mountain;
- Bats (Mammalia Chiroptera) in Kresna Gorge
- Contribution to the faunistic research and conservation of the herpetofauna of northern Kresna Gorge and some adjacent areas;
- Distribution of European Cat Snake Telescopus fallax (Fleischmann, 1831) (Reptilia: Colubridae) in South-Western Bulgaria;
- Estimation of the faunistic diversity of the Kresna Gorge;
- New data for the presence and numbers of some conservation dependent birds in Kresna Gorge with proposal of original method for individual identification of vultures;
- Rare birds of prey observations in Kresna Gorge in Bulgaria;
- Red Data Book of the Republic of Bulgaria (2015);
- The Standard Data Forms of the protected sites falling within the territory of the municipality.

The obtained data on biodiversity in the area of the municipality is systematized by groups as follows:

- Plants and habitats;
- Mammals (except bats);
- Bats;
- Fish;
- Amphibians and reptiles;
- Birds.

Bellow in tables the species composition for each group, including the source of information, is described in detail.

## *Plants and habitats*

| Code by EUNIS | Code by Habitats Directive | Code in Volume 3 of the Red Data Book of the Republic of Bulgaria | Specific name | Target species in Protected site BG0000366 „Kresna – Ilindentsi“ | Target specie in Protected site BG0000209 „Pirin“ | Red Data Book of the Republic of Bulgaria, Volume I. Plants and fungi | Red Data Book of the Republic of Bulgaria, Volume III. Natural habitats | Analysis and data collection (flora and fauna) of the cross-border Maleshevska Mountain | Conservation status |
|---|---|---|---|---|---|---|---|---|---|
| **Plants** | | | | | | | | | |
| | **4080** | | *Centaurea immanuelis-loewii* | ✓ | | ✓ | | | Favourable |
| | **1386** | | *Buxbaumia viridis* | | ✓ | | | | Unknown |
| | | | *Frullania fragilifolia* (perennial leafy liverwort) | | | ✓ | | | - |
| | | | *Syntrichia pagorum* (perennial acrocarpous moss) | | | ✓ | | | - |
| | | | *Syntrichia papillosa* (perennial acrocarpous moss) | | | ✓ | | | - |
| | | | *Tortula canescens* (perennial acrocarpous moss) | | | ✓ | | | - |
| | | | *Scleropodium touretii* (perennial robust pleurocarpous moss) | | | ✓ | | | - |
| | | | *Anchusa stylosa* M. Bieb. | | | ✓ | | | - |
| | | | *Anthemis auriculata* Boiss. | | | ✓ | | | - |
| | | | *Colchicum bivonae* Guss. | | | ✓ | | | - |
| | | | *Crucianella latifolia* L. | | | ✓ | | | - |

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|---|---|---|---|---|---|---|---|---|---|
| | | | Kermes oak (*Quercus coccifera* L.) | | | ✓ | | ✓ | - |
| | | | *Sideritis lanata* L. | | | ✓ | | | - |
| | | | Italian Valerian (*Valeriana dioscoridis* Sibth. & Sm.) | | | ✓ | | | - |
| | | | *Anchusa macedonica* | | | ✓ | | | - |
| | | | Greek juniper (*Juniperus excelsa*) | | | | | ✓ | - |
| | | | Oriental plane (*Platanus orientalis*) | | | | | ✓ | - |
| | | | Turpentine tree (*Pistacia terebinthus*) | | | | | ✓ | - |
| | | | Cade juniper (*Juniperus oxycedrus*) | | | | | ✓ | - |
| | | | Green olive tree (*Phillyrea latifolia*) | | | | | ✓ | - |
| | | | Wild asparagus (*Asparagus acutifolius*) | | | | | ✓ | - |
| | | | European nettle tree (*Celtis australis*) | | | | | ✓ | - |
| | | | *Crocus olivieri* | | | | | ✓ | - |
| | | | Fritillaria (*Fritillaria orientalis*) | | | | | ✓ | - |
| | | | Yellow jasmine (*Jasminum fruticans*) | | | | | ✓ | - |
| | | | Greek oregano (*Origanum vulgare subsp. hirtum*) | | | | | ✓ | - |

| Code by EUNIS | Code by Habitats Directive | Code in Volume 3 of the Red Data Book of the Republic of Bulgaria | Specific name | Target species in Protected site BG0000366 „Kresna – Ilindentsi“ | Target specie in Protected site BG0000209 „Pirin“ | Red Data Book of the Republic of Bulgaria, Volume I. Plants and fungi | Red Data Book of the Republic of Bulgaria, Volume III. Natural habitats | Analysis and data collection (flora and fauna) of the cross-border Maleshevska Mountain | Conservation status |
|---|---|---|---|---|---|---|---|---|---|
| **Habitats** | | | | | | | | | |
| | **3130** | | Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* | | ✓ | | | | Favourable |
| | **3160** | | Natural dystrophic lakes and ponds | | ✓ | | | | Unfavourable-inadequate– |
| **F2.2** | **4060** | | Alpine and Boreal heaths | ✓ | ✓ | | | ✓ | Unfavourable-inadequate |
| | **4070*** | | Bushes with *Pinus mugo* | | ✓ | | | | Unfavourable-inadequate |
| **F5.13** | **5210** | | Arborescent matorral with *Juniperus spp.* | ✓ | | | | ✓ | Unfavourable-inadequate |
| **E4.32** | **6150** | | Siliceous alpine and boreal grasslands | | ✓ | | | | Unfavourable-inadequate |
| | **6170** | | Alpine and subalpine calcareous grasslands | | ✓ | | | | Unknown |

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|---|---|---|---|---|---|---|---|---|---|
| | **6210** | | Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-brometalia*) (*important orchid sites) | ✓ | | | | ✓ | Unfavourable-inadequate |
| | **6220*** | | Pseudo-steppe with grasses and annuals of the *Thero-Brachypodietea* | ✓ | | | | ✓ | Unfavourable-inadequate |
| | **6230*** | | Species-rich Nardus grasslands, on siliceous substrates in mountain areas | | ✓ | | | ✓ | Unfavourable-inadequate |
| | **6430** | | Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels | | ✓ | | | ✓ | Unknown |
| **E2.31** | **6520** | | Mountain hay meadows | ✓ | | | | ✓ | Favourable |
| | **7140** | | Transition mires and quaking bogs | | ✓ | | | ✓ | Unfavourable-inadequate |
| **H2.3** | **8110** | | Siliceous scree of the montane to snow levels | | ✓ | | | | Unfavourable-inadequate |
| | **8120** | | Calcareous and calcshist screes of the montane to alpine levels | | ✓ | | | | Unfavourable-inadequate |

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|---|---|---|---|---|---|---|---|---|---|
| | **8210** | **08H3** | Calcareous rocky slopes with chasmophytic vegetation | | ✓ | | | | Unfavourable-inadequate |
| | **8220** | | Siliceous rocky slopes with chasmophytic vegetation | | ✓ | | | ✓ | Unfavourable-inadequate |
| | **8230** | | Siliceous rock with pioneer vegetation of the *Sedo-Scleranthion* or *Sedo Albi-Veronicion Dillenii* | ✓ | | | | ✓ | Unfavourable-inadequate |
| | **8310** | | Caves not open to the public | ✓ | ✓ | | | | Unfavourable-inadequate |
| **G1.61** | **9110** | | Beech forests from *Luzulo-Fagetum* | ✓ | ✓ | | | ✓ | Unfavourable-inadequate |
| **G1.63** | **9130** | | Beech forests from *Asperulo-Fagetum* | ✓ | ✓ | | | ✓ | Unfavourable-inadequate |
| **G1.66** | **9150** | | Medio-European limestone beech forests of the (*Cephalanthero-Fagion*) | ✓ | | | | | Unfavourable-inadequate |
| | **9170** | | *Galio-Carpinetum* oak-hornbeam forests | ✓ | | | | ✓ | Unfavourable-inadequate |
| **G1.7371** | **91AA*** | **13G1** | Eastern white oak woods | ✓ | | | ✓ | ✓ | Unfavourable-inadequate |

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|---|---|---|---|---|---|---|---|---|---|
| | **91BA** | | Moesian silver fir forests | ✓ | ✓ | | | | Unfavourable-inadequate |
| | **91CA** | | Rhodopide and Balkan Range Scots pine forests | | ✓ | | | ✓ | Unfavourable-inadequate |
| **G1.761, G1.762, G1.76A1, G1.76A2, G1.769** | **91M0** | **16G1** | Pannonian-Balkanic turkey oak- sessile oak forests | ✓ | | | ✓ | ✓ | Favourable |
| | **91E0*** | | Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Pandion, Alnion incanae, Salicion albae*) | ✓ | | | | ✓ | Unfavourable-inadequate |
| | **92A0** | | Riverside forests of *Salix alba* and *Populus alba* | ✓ | | | | ✓ | Unfavourable-inadequate |
| **G1.381** | **92C0** | **07G1** | Forests of *Platanus orientalis* | ✓ | | | ✓ | ✓ | Unfavourable-inadequate |
| | **9410** | | Acidophilous Picea forests of the montane to alpine levels (*Vaccinio-Piceetea*) | | ✓ | | | | Unfavourable-inadequate |

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|---|---|---|---|---|---|---|---|---|---|
| | **9530*** | | (Sub-)Mediterranean pine forests with endemic black pines | | ✓ | | | | Unfavourable-inadequate |
| **G3.932** | **9560*** | **39G3** | Endemic forests with *Juniperus spp.* | ✓ | | | ✓ | ✓ | Unfavourable-inadequate |
| **G3.6** | **95A0** | | Macedonian pine and White-barked pine forests | ✓ | ✓ | | | | Unfavourable-inadequate |
| **C3.31** | **6420** | **18C3** | Mediterranean tall-grass communities along rivers and in dune depressions | | | | ✓ | | - |
| **F5.1162** | | **23F5** | Shrubs and low woods of of Kermes Oak (*Quercus coccifera*) | | | | ✓ | | - |
| **F5.51A4** | | **26F5** | Thickets of Green olive tree (*Phillyrea latifolia*) | | | | ✓ | | - |
| **G1.7C12, G1.7C13** | | **21G1** | Hop-hornbeam (*Ostrya carpinifolia*) forests | | | | ✓ | | - |
| **H3.1B2** | | **14H3** | Pyramids in sand-clay rocks | | | | ✓ | | - |

***Mammals (except bats)***

| Code | Specific name | Target species in Protected site BG0000366 „Kresna - Ilindentsi“ | Target specie in Protected site BG0000209 „Pirin“ | Red Data Book of the Republic of Bulgaria, Volume II. Animals | Analysis and data collection (flora and fauna) of the cross-border Maleshevska Mountain | Conservation Status |
|---|---|---|---|---|---|---|
| **1355** | Eurasian otter (*Lutra lutra*) | ✓ | ✓ | ✓ | ✓ | Favourable |
| **1352** | Wolf (*Canis lupus*) | ✓ | ✓ | ✓ | ✓ | Favourable |
| **1371** | Balkan Chamois (*Rupicapra rupicapra balcanica*) | | ✓ | ✓ | | Unfavourable-inadequate |
| **1354** | Brown bear (*Ursus arctos*) | ✓ | ✓ | ✓ | | Unfavourable-inadequate |
| **2635** | Marbled polecat *Vormela peregusna*) | ✓ | | ✓ | | Unfavourable-inadequate |
| | Southern white-breasted hedgehog (*Erinaceus concolor*) | | | | ✓ | - |
| | Hazel dormouse (*Muscardinus avellanarius*) | | | | ✓ | - |
| | European mole (*Talpa europaea*) | | | | ✓ | - |
| | Eurasian water shrew (*Neomys fodiens*) | | | | ✓ | - |
| | Mediterranean water shrew (*Neomys anomalus*) | | | | ✓ | - |
| | Bicolored shrew (*Crocidura leucodon*) | | | | ✓ | - |
| | Lesser white-toothed shrew (*Crocidura suaveolens*) | | | | ✓ | - |
| | Beech marten (*Martes foina*) | | | | ✓ | - |
| | European polecat (*Mustela putorisus*) | | | | ✓ | - |
| | European wildcat (*Felis silvestris*) | | | ✓ | ✓ | - |
| | European badger (*Meles meles*) | | | | ✓ | - |
| | Fox (*Vulpes vulpes*) | | | | ✓ | - |

| Code | Specific name | Target species in Protected site BG0000366 „Kresna - Ilindentsi“ | Target specie in Protected site BG0000209 „Pirin“ | Red Data Book of the Republic of Bulgaria, Volume II. Animals | Analysis and data collection (flora and fauna) of the cross-border Maleshevska Mountain | Conservation Status |
|---|---|---|---|---|---|---|
| | Least weasel (*Mustela nivalis*) | | | | ✓ | - |
| | Wild boar (*Sus scrofa*) | | | | ✓ | - |
| | Roe deer (*Capreolus capreouls*) | | | | ✓ | - |

***Bats***

| Code | Specific name | Target species in Protected site BG0000366 „Kresna-Ilindentsi“ | Target specie in Protected site BG0000209 „Pirin“ | Red Data Book of the Republic of Bulgaria, Volume II. Animals | Bats (Mammalia: Chiroptera) in Kresna Gorge | Conservation Status |
|---|---|---|---|---|---|---|
| **1324** | Greater mouse-eared bat (*Myotis myotis*) | ✓ | ✓ | | | Unfavourable-inadequate |
| **1304** | Greater horseshoe bat (*Rhinolophus ferrumequinum*) | ✓ | ✓ | | ✓ | Unfavourable-inadequate |
| **1310** | Common bent-wing bat (*Miniopterus schreibersii*) | ✓ | ✓ | ✓ | | Unfavourable-inadequate |
| **1316** | The long-fingered bat (*Myotis capaccinii*) | ✓ | | ✓ | | Unfavourable-inadequate |
| **1323** | Bechstein's bat *Myotis bechsteinii*) | | ✓ | ✓ | ✓ | Unfavourable-inadequate |
| **1303** | Lesser horseshoe bat (*Rhinolophus hipposideros*) | ✓ | ✓ | | ✓ | Favourable |
| **1307** | Lesser mouse-eared bat (*Myotis blythii*) | | ✓ | | | Unfavourable-inadequate |
| **1321** | Geoffroy's bat (*Myotis emarginatus*) | ✓ | ✓ | ✓ | ✓ | Unfavourable-inadequate |
| **1308** | Western barbastelle (*Barbastella barbastellus*) | ✓ | ✓ | ✓ | ✓ | Unknown |

| Code | Specific name | Target species in Protected site BG0000366 „Kresna-Ilindentsi“ | Target specie in Protected site BG0000209 „Pirin“ | Red Data Book of the Republic of Bulgaria, Volume II. Animals | Bats (Mammalia: Chiroptera) in Kresna Gorge | Conservation Status |
|---|---|---|---|---|---|---|
| **1305** | Mediterranean horseshoe bat (*Rhinolophus euryale*) | ✓ | | ✓ | ✓ | Favourable |
| | Natterer's bat (*Myotis nattereri*) | | | | ✓ | - |
| | Serotine bat (*Eptesicus serotinus*) | | | | ✓ | - |
| | Savi's pipistrelle (*Hypsugo savii*) | | | | ✓ | - |
| | Common pipistrelle (*Pipistrellus pipistrellus*) | | | | ✓ | - |
| | Nathusius' pipistrelle (*Pipistrellus nathusii*) | | | | ✓ | - |
| | Grey long-eared bat (*Plecotus austriacus*) | | | | ✓ | - |
| | Parti-coloured bat (*Vespertilio murinus*) | | | | ✓ | - |

***Fish***

| Code | Specific name | Target specie in Protected site BG0000366 „Kresna-Ilindentsi“ | Red Data Book of the Republic of Bulgaria, Volume II. Animals | Conservation Status |
|---|---|---|---|---|
| **1134** | European bitterling (*Rhodeus sericeus amarus*) | ✓ | | Favourable |
| **1137** | Round-scaled barbel (*Barbus cyclolepis*) | ✓ | | Favourable |
| **1149** | The spined loach (*Cobitis taenia*) | ✓ | | Favourable |
| **1130** | Eurasian cyprinid fish (*Aspius aspius*) | ✓ | ✓ | Unknown |
| | Macedonian vimba (*Vimba melanops*) | | ✓ | - |

***Amphibians and reptiles***

| Code | Specific name | Target specie in Protected site BG0000366 " Kresna-Ilindentsi" | Target specie in Protected site BG0000209 „Pirin" | Red Data Book of the Republic of Bulgaria, Volume II. Animals | Contribution to the faunistic research and conservation of the herpetofauna of northern Kresna Gorge and some adjacent areas | Analysis and data collection (flora and fauna) of the cross-border Maleshevska Mountain | Distribution of European Cat Snake *Telescopus fallax* (Fleischmann, 1831) (Reptilia: Colubridae) in South-Western Bulgaria | Amphibia (Amphibia) and reptiles (Reptilia) in Kresna Gorge | Conservation Status |
|---|---|---|---|---|---|---|---|---|---|
| | **Amphibians** | | | | | | | | |
| **1193** | Yellow-bellied toad (*Bombina variegata*) | ✓ | ✓ | | ✓ | ✓ | | ✓ | Favourable |
| **1171** | Southern crested newt (*Triturus karelinii*) | ✓ | ✓ | | | ✓ | | | Unknown |
| | Smooth newt (*Triturus vulgaris*) | | | | | | | ✓ | - |
| | Fire salamander (*Salamandra salamandra*) | | | | ✓ | | | ✓ | - |
| | Common toad (*Bufo bufo*) | | | | ✓ | | | ✓ | - |
| | European green toad (*Bufo viridis*) | | | | | | | ✓ | - |
| | European tree frog (*Hyla arborea*) | | | | ✓ | | | ✓ | - |
| | Agile frog (*Rana dalmatina*) | | | | ✓ | | | ✓ | - |
| | Greek stream frog (*Rana graeca*) | | | | ✓ | | | ✓ | - |
| | Marsh frog (*Pelophylax ridibundus*) | | | | ✓ | | | ✓ | - |

| Code | Specific name | Target specie in Protected site BG0000366 “ Kresna-Ilindentsi” | Target specie in Protected site BG0000209 „Pirin“ | Red Data Book of the Republic of Bulgaria, Volume II. Animals | Contribution to the faunistic research and conservation of the herpetofauna of northern Kresna Gorge and some adjacent areas | Analysis and data collection (flora and fauna) of the cross-border Maleshevska Mountain | Distribution of European Cat Snake *Telescopus fallax* (Fleischmann, 1831) (Reptilia: Colubridae) in South-Western Bulgaria | Amphibia (Amphibia) and reptiles (Reptilia) in Kresna Gorge | Conservation Status |
|---|---|---|---|---|---|---|---|---|---|
| | Syrian spadefoot (*Pelobates syriacus* Boettger) | | | | | ✓ | | ✓ | - |
| | **Reptiles** | | | | | | | | |
| **1293** | Leopard snake (*Zamenis situla*) | ✓ | | | | ✓ | | | Unknown |
| **1279** | Four-lined snake (*Elaphe quatuorlineata*) | ✓ | | | | ✓ | | ✓ | Unfavourable-inadequate |
| **1219** | Greek tortoise (*Testudo graeca*) | ✓ | ✓ | | ✓ | ✓ | | ✓ | Unfavourable-inadequate |
| **1217** | Hermann's tortoise (*Testudo hermanni*) | ✓ | ✓ | | ✓ | ✓ | | ✓ | Unfavourable-inadequate |
| | European cat snake (*Telescopus fallax*) | | | ✓ | | ✓ | ✓ | ✓ | - |
| | European pond turtle (*Emys orbicularis*) | | | | ✓ | | | ✓ | - |
| | European green lizard (*Lacerta viridis*) | | | | ✓ | | | ✓ | - |
| | Balkan green lizard (*Lacerta trilineata*) | | | | | | | ✓ | - |

| Code | Specific name | Target specie in Protected site BG0000366 “ Kresna-Ilindentsi” | Target specie in Protected site BG0000209 „Pirin“ | Red Data Book of the Republic of Bulgaria, Volume II. Animals | Contribution to the faunistic research and conservation of the herpetofauna of northern Kresna Gorge and some adjacent areas | Analysis and data collection (flora and fauna) of the cross-border Maleshevska Mountain | Distribution of European Cat Snake *Telescopus fallax* (Fleischmann, 1831) (Reptilia: Colubridae) in South-Western Bulgaria | Amphibia (Amphibia) and reptiles (Reptilia) in Kresna Gorge | Conservation Status |
|---|---|---|---|---|---|---|---|---|---|
| | Kotschy's gecko (*Cyrtodactylus kotschyi bibroni*) | | | | | | | ✓ | - |
| | Slow worm (*Angius fragilis*) | | | | | | | ✓ | - |
| | Erhard's wall lizard (*Podarcis erhardii*) | | | | ✓ | | | ✓ | - |
| | Common wall lizard (*Podarcis muralis*) | | | | | | | ✓ | - |
| | Smooth snake (*Coronella austriaca*) | | | | | | | ✓ | - |
| | Caspian whipsnake (*Dolichophis caspius*) | | | | ✓ | | | ✓ | - |
| | Dahl's whip snake (*Platyceps najadum*) | | | | ✓ | ✓ | | ✓ | - |
| | Aesculapian snake (*Zamenis longissimus*) | | | | ✓ | | | ✓ | - |
| | Dice snake (*Natrix tessellata*) | | | | ✓ | | | ✓ | - |
| | Grass snake (*Natrix natrix*) | | | | ✓ | | | ✓ | - |
| | European blind snake (*Typhlops vermicularis*) | | | | | ✓ | | ✓ | - |

| Code | Specific name | Target specie in Protected site BG0000366 “ Kresna-Ilindentsi” | Target specie in Protected site BG0000209 „Pirin“ | Red Data Book of the Republic of Bulgaria, Volume II. Animals | Contribution to the faunistic research and conservation of the herpetofauna of northern Kresna Gorge and some adjacent areas | Analysis and data collection (flora and fauna) of the cross-border Maleshevska Mountain | Distribution of European Cat Snake *Telescopus fallax* (Fleischmann, 1831) (Reptilia: Colubridae) in South-Western Bulgaria | Amphibia (Amphibia) and reptiles (Reptilia) in Kresna Gorge | Conservation Status |
|---|---|---|---|---|---|---|---|---|---|
| | Eastern montpellier snake (*Malpolon insignitus*) | | | | | ✓ | | ✓ | - |
| | Nose-horned viper (*Vipera ammodytes*) | | | | | | | ✓ | - |

***Birds***

| № | Specific name | Target specie in Protected site BG0002003 „Kresna“ | Target specie in Protected site BG0000209 „Pirin“ | Target specie in Protected siteBG0002126 „Pirin bufer“ | Red Data Book of the Republic of Bularia, Volume II. Animals | Analysis and data collection (flora and fauna) of the cross-border Maleshevska Mountain | Rare birds of prey observations in Kresna Gorge in Bulgaria | New data for the presence and numbers of some conservation dependent birds in Kresna Gorge with proposal of original method for individual identification of vultures |
|---|---|---|---|---|---|---|---|---|
| **1.** | Levant sparrowhawk (*Accipiter brevipes)* | ✓ | ✓ | ✓ | | | | |
| **2.** | Eurasian sparrowhawk (*Accipiter nisus*) | ✓ | ✓ | ✓ | | | | |
| **3.** | Common sandpiper (*Actitis hypoleucos*) | ✓ | ✓ | | | | | |
| **4.** | Boreal owl (*Aegolius funereus*) | | ✓ | ✓ | | | | |
| **5.** | Cinereous vulture (*Aegypius monachus*) | ✓ | | | | | ✓ | ✓ |
| **6.** | Common kingfisher (*Alcedo atthis*) | ✓ | | | | | | |
| **7.** | Rock partridge (*Alectoris graeca graeca*) | ✓ | ✓ | | | | | |
| **8.** | Eurasian teal (*Anas crecca*) | | ✓ | ✓ | | | | |
| **9.** | Mallard *(Anas platyrhynchos*) | ✓ | ✓ | ✓ | | | | |
| **10.** | Tawny pipit (*Anthus campestris*) | ✓ | ✓ | | | | | |
| **11.** | Golden eagle (*Aquila chrysaetos*) | ✓ | ✓ | ✓ | | ✓ | | |
| **12.** | Greater spotted eagle (*Aquila clanga*) | ✓ | | | | | ✓ | ✓ |
| **13.** | Eastern imperial eagle (*Aquila heliaca*) | ✓ | | | | | ✓ | ✓ |
| **14.** | Lesser spotted eagle (*Aquila pomarina*) | ✓ | ✓ | ✓ | | | | |
| **15.** | Grey heron (*Ardea cinerea*) | ✓ | | | | | | |
| **16.** | Hazel grouse (*Bonasa bonasia*) | | ✓ | ✓ | | | | |
| **17.** | Eurasian eagle-owl (*Bubo bubo*) | ✓ | ✓ | ✓ | | ✓ | | |

| № | Specific name | Target specie in Protected site BG0002003 „Kresna“ | Target specie in Protected site BG0000209 „Pirin“ | Target specie in Protected siteBG0002126 „Pirin bufer“ | Red Data Book of the Republic of Bularia, Volume II. Animals | Analysis and data collection (flora and fauna) of the cross-border Maleshevska Mountain | Rare birds of prey observations in Kresna Gorge in Bulgaria | New data for the presence and numbers of some conservation dependent birds in Kresna Gorge with proposal of original method for individual identification of vultures |
|---|---|---|---|---|---|---|---|---|
| **18.** | Eurasian stone-curlew (*Burhinus oedicnemus*) | ✓ | | | | | | |
| **19.** | Common buzzard (*Buteo buteo*) | ✓ | ✓ | ✓ | | | | |
| **20.** | Long-legged buzzard (*Buteo rufinus*) | ✓ | ✓ | ✓ | | | | |
| **21.** | Greater short-toed lark, (*Calandrella brachydactyla*) | ✓ | | | | | | |
| **22.** | European nightjar (*Caprimulgus europaeus*) | ✓ | ✓ | ✓ | | | | |
| **23.** | Little ringed plover (*Charadrius dubius*) | ✓ | ✓ | ✓ | | | | |
| **24.** | White stork (*Ciconia ciconia*) | ✓ | ✓ | ✓ | | | | |
| **25.** | Black stork (*Ciconia nigra*) | ✓ | ✓ | ✓ | | | | |
| **26.** | Short-toed snake-eagle (*Circaetus gallicus*) | ✓ | ✓ | ✓ | | | | |
| **27.** | Western marsh harrier (*Circus aeruginosus*) | ✓ | | | | | | |
| **28.** | Hen harrier (*Circus cyaneus*) | | ✓ | ✓ | | | | |
| **29.** | European roller (*Coracias garrulus*) | ✓ | | | | | | |
| **30.** | Corn crake (*Crex crex*) | ✓ | ✓ | ✓ | | | | |
| **31.** | White-backed woodpecker (*Dendrocopos leucotos*) | | ✓ | ✓ | | | | |
| **32.** | Middle spotted woodpecker (*Dendrocopos medius*) | ✓ | | | | | | |
| **33.** | Syrian woodpecker (*Dendrocopos syriacus*) | ✓ | | | | | | |

| № | Specific name | Target specie in Protected site BG0002003 „Kresna“ | Target specie in Protected site BG0000209 „Pirin“ | Target specie in Protected siteBG0002126 „Pirin bufer“ | Red Data Book of the Republic of Bularia, Volume II. Animals | Analysis and data collection (flora and fauna) of the cross-border Maleshevska Mountain | Rare birds of prey observations in Kresna Gorge in Bulgaria | New data for the presence and numbers of some conservation dependent birds in Kresna Gorge with proposal of original method for individual identification of vultures |
|---|---|---|---|---|---|---|---|---|
| **34.** | Black woodpecker (*Dryocopus martius*) | ✓ | ✓ | ✓ | | | | |
| **35.** | Great egret (*Egretta alba*) | | ✓ | ✓ | | | | |
| **36.** | Ortolan bunting (*Emberiza hortulana*) | ✓ | ✓ | ✓ | | | | |
| **37.** | Lanner falcon (*Falco biarmicus*) | ✓ | | | | | ✓ | ✓ |
| **38.** | Saker falcon (*Falco cherrug*) | ✓ | ✓ | ✓ | | | | |
| **39.** | Eleonora's falcon (*Falco eleonorae*) | ✓ | | | | | ✓ | ✓ |
| **40.** | Peregrine falcon (*Falco peregrinus*) | ✓ | ✓ | ✓ | | | | |
| **41.** | Eurasian hobby (*Falco subbuteo*) | ✓ | ✓ | ✓ | | | | |
| **42.** | Lesser kestrel (*Falco naumanni*) | | | | | | | ✓ |
| **43.** | Common kestrel (*Falco tinnunculus*) | ✓ | ✓ | ✓ | | | | ✓ |
| **44.** | Red-footed falcon (*Falco vespertinus*) | ✓ | ✓ | ✓ | | | | |
| **45.** | Semi-collared flycatcher (*Ficedula semitorquata*) | ✓ | ✓ | ✓ | | | | |
| **46.** | Common moorhen (*Gallinula chloropus*) | ✓ | ✓ | ✓ | | | | |
| **47.** | Eurasian pygmy owl (*Glaucidium passerinum*) | | ✓ | ✓ | | | | |
| **48.** | Griffon vulture (*Gyps fulvus*) | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| **49.** | Booted eagle (*Hieraaetus pennatus*) | ✓ | ✓ | ✓ | | | | |
| **50.** | Olive-tree warbler (*Hippolais olivetorum*) | ✓ | | | | | | |
| **51.** | Red-backed shrike (*Lanius collurio*) | ✓ | ✓ | ✓ | | | | |

| № | Specific name | Target specie in Protected site BG0002003 „Kresna“ | Target specie in Protected site BG0000209 „Pirin“ | Target specie in Protected siteBG0002126 „Pirin bufer“ | Red Data Book of the Republic of Bularia, Volume II. Animals | Analysis and data collection (flora and fauna) of the cross-border Maleshevska Mountain | Rare birds of prey observations in Kresna Gorge in Bulgaria | New data for the presence and numbers of some conservation dependent birds in Kresna Gorge with proposal of original method for individual identification of vultures |
|---|---|---|---|---|---|---|---|---|
| **52.** | Lesser grey shrike (*Lanius minor*) | ✓ | ✓ | ✓ | | | | |
| **53.** | Masked shrike (*Lanius nubicus)* | ✓ | | | | | | |
| **54.** | Caspian gull (*Larus cachinnans*) | | ✓ | | | | | |
| **55.** | Woodlark (*Lullula arborea*) | ✓ | ✓ | ✓ | | | | |
| **56.** | Calandra lark (*Melanocorypha calandra*) | ✓ | | | | | | |
| **57.** | European bee-eater (*Merops apiaster*) | ✓ | ✓ | ✓ | | | | |
| **58.** | Black kite (*Milvus migrans*) | | ✓ | ✓ | | | | |
| **59.** | Red kite (*Milvus milvus*) | ✓ | | | | | ✓ | ✓ |
| **60.** | Egyptian vulture (*Neophron percnopterus*) | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| **61.** | Black-crowned night heron (*Nycticorax nycticorax*) | | ✓ | ✓ | | | | |
| **62.** | Osprey (*Pandion haliaetus)* | | ✓ | ✓ | | | | |
| **63.** | Dalmatian pelican (*Pelecanus crispus*) | ✓ | | | | | | ✓ |
| **64.** | European honey buzzard (*Pernis apivorus*) | ✓ | ✓ | ✓ | | | | |
| **65.** | Eurasian three-toed woodpecker (*Picoides tridactylus*) | | ✓ | ✓ | | | | |
| **66.** | Grey-headed woodpecker (*Picus canus*) | ✓ | ✓ | ✓ | | | | |
| **67.** | Sand martin (*Riparia riparia*) | ✓ | | | | | | |
| **68.** | Barred warbler (*Sylvia nisoria*) | ✓ | ✓ | ✓ | | | | |

| № | Specific name | Target specie in Protected site BG0002003 „Kresna“ | Target specie in Protected site BG0000209 „Pirin“ | Target specie in Protected siteBG0002126 „Pirin bufer“ | Red Data Book of the Republic of Bularia, Volume II. Animals | Analysis and data collection (flora and fauna) of the cross-border Maleshevska Mountain | Rare birds of prey observations in Kresna Gorge in Bulgaria | New data for the presence and numbers of some conservation dependent birds in Kresna Gorge with proposal of original method for individual identification of vultures |
|---|---|---|---|---|---|---|---|---|
| **69.** | Western capercaillie (*Tetrao urogallus*) | | ✓ | ✓ | | | | |
| **70.** | Blue rock thrush (*Monticola solitarius* L.) | | | | ✓ | | | |
| **71.** | Western orphean warbler (*Sylvia hortensis*) | | | | ✓ | | | |
| **72.** | Western rock nuthatch (*Sitta neumayer*) | | | | ✓ | ✓ | | |
| **73.** | Wallcreeper (*Tichodroma muraria*) | | | | ✓ | | | |
| **74.** | Western subalpine warbler (*Sylvia cantillans*) | | | | | ✓ | | |
| **75.** | Eastern olivaceous warbler (*Hippolais pallida*) | | | | | ✓ | | |
| **76.** | Tawny owl (*Strix aluco*) | | | | | ✓ | | |
| **77.** | Western black-eared wheatear (*Oenanthe hispanica*) | | | | | ✓ | | |
| **78.** | Sardinian warbler (*Sylvia melanocephala*) | | | | | ✓ | | |
| **79.** | Rock bunting (*Emberiza cia*) | | | | | ✓ | | |
| **80.** | Black-headed bunting (*Emberiza melanocephala*) | | | | | ✓ | | |

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# Assessment of threats and vulnerability for 10 species/habitats in the area of Kresna Municipality

in connection with the implementation of **Activity 1:** "Collection of available information and data on biodiversity in the Bulgarian part of the project territory and assessment of selected species and / or habitats"

according to Contract № D-270/30.12.2019 for a public invitation with subject: "Biodiversity assessment in the area of Kresna Municipality"

within project „Virtual and Mobile Museum of Biodiversity" with an acronym „Mobile Biodiversity", financed under The Cooperation Programme INTERREG V-A "Greece-Bulgaria 2014-2020"

2020

## Table of Contents

# 1. Assessment of threats and vulnerability for the Habitat 8210 Calcareous rocky slopes with chasmophytic vegetation distributed in the area of Kresna Municipality

## Description

Habitat 8210 Calcareous rocky slopes with hasmophytic vegetation is part of Natura 2000 ecological network, included in Annex I of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive). Also corresponds to habitat 08H3: Calcareous rocks with hasmophytic vegetation, included in Vol. 3 Natural habitats of the Red Data Book of the Republic of Bulgaria.

Habitat 8210 is extremely important for the distribution of many higher plants of conservation importance – endemic and legally protected species and syntaxa.

(Photograph: Sonya Tsoneva, Red Data Book of the Republic of Bulgaria)

## Assessment of threats

The threats identified in the area of Kresna Municipality concerning Habitat 8210 Calcareous rocky slopes with hasmophytic vegetation are:

- construction of roads and highways;
- construction of tunnels;
- exploitation of limestone;
- construction of power lines and telephone lines;
- pollution of water from point sources;
- intensive grazing;
- erosion;
- collapse of terrains and landslides.

## Assessment of the vulnerability

The overall assessment of the vulnerability of Habitat 8210 Calcareous rocky slopes with hasmophytic vegetation in the area of Kresna municipality is medium degree of vulnerability.

Regarding the negative factors such as erosion, landslides, collapse of terrains, grazing, the degree of vulnerability of the habitat is assessed as low. The habitat has a high degree of vulnerability to the investment intentions in the adjacent territories (construction of roads, highways, tunnels; exploitation of limestone, etc.).

## Measures for reducing the vulnerability of the habitat

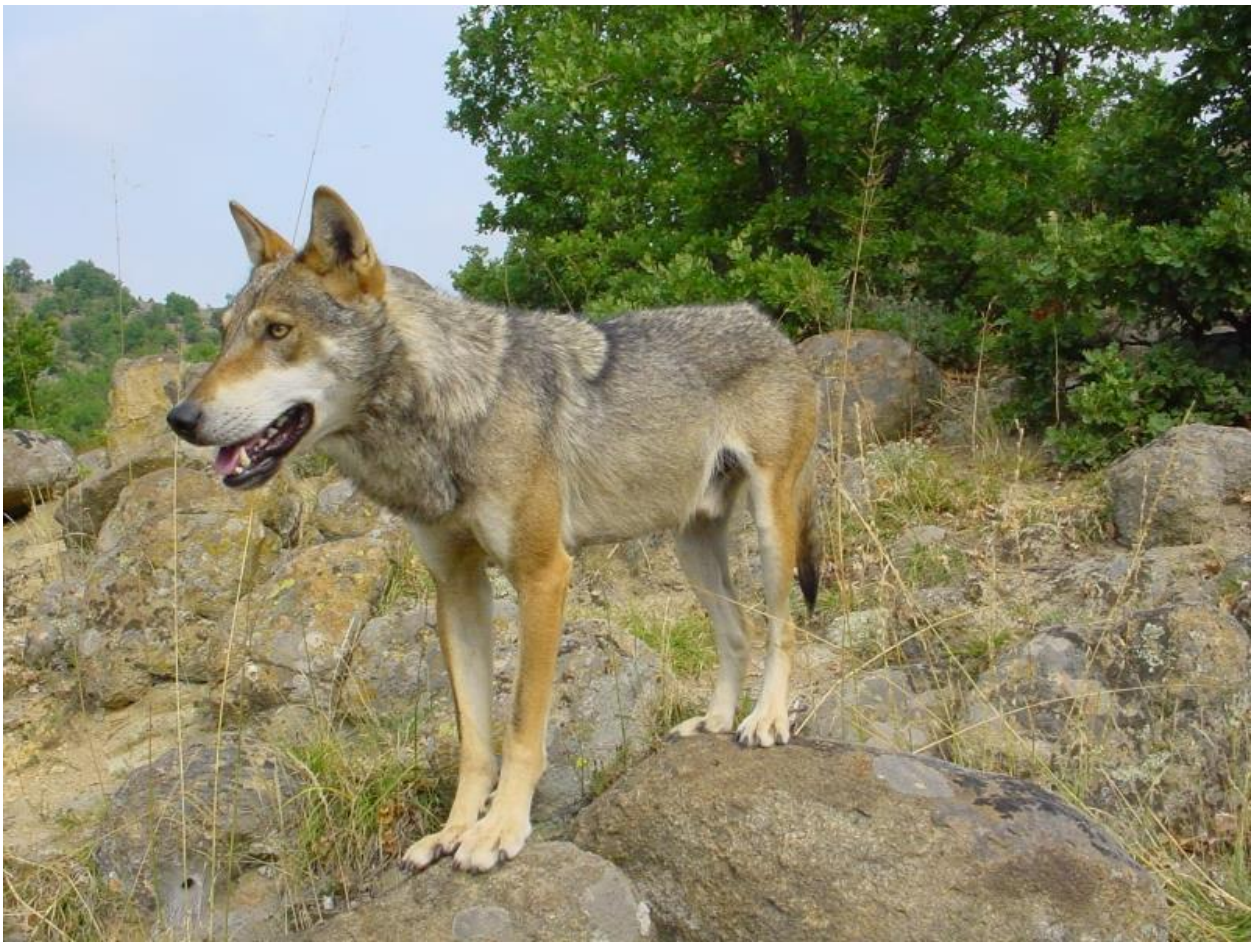
- To establish new protected areas in order to protect the habitat.
- Effective control over the collection of flowers by tourists, leading to disruption of the structure of the coenoses and to reducing the number of coenopopulations.
- Elaboration of an interpretative program for the tourists aiming at the protection of the habitat.
- Organizing research to accumulate data on the reproductive capacity of plant species with small populations and single individuals, or those with impaired age structure.
- Limiting the spread of invasive species in the surrounding areas.
- Minimizing the impact of implementing infrastructure projects.

## 2. Assessment of threats and vulnerability for the wolf (*Canis lupus*) in the area of Kresna Municipality

### Description

The wolf (*Canis lupus*) is a protected species included in Annexes 2 and 4 of the Biodiversity Act (BDA) and Annex II of the Bern Convention. The species is also included in Annex II of the Convention in International Trade in Endangered Species of Wild Fauna and Flora (CITES) and in Annex II and Annex IV of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive).

The wolf is part of the Red Data Book of Bulgaria (2015) with category "Vulnerable" (VU) and also included in the IUCN (International Union for Conservation of Nature) Red List of Threatened Species with category Least Concern (LC).



(Photo: Elena Tsingarska, Red Data Book of Bulgaria)

## Assessment of threats

The species is constantly persecuted in the area, there are registered cases of shooting during the hunting season. During the winter months it goes to the lower parts of the mountain, following the wild ungulates and domestic animals. Wolf attacks on flocks are frequent and in many cases – successful. The reason for this is lack of reliable methods of protection of the animals. This situation stimulates the local people to use forbidden methods against the wolf. There have been cases of the use of poisons and traps. Poisoning and direct killing of specimens are a threat to the existence of the species. Although the area of Kresna Municipality has a high degree of protection, the quality habitats for the species in the areas are decreasing due to intensive tourist activity. Another significant threat to the species is hybridization with domestic dogs. The movement of vehicles in forest areas is also a threat, as it is associated with the concern of sensitive animal species, including the wolf.

## Assessment of the vulnerability

In general, the vulnerability of the wolf in the area of Kresna Municipality is assessed between medium and high. One of the reasons for this is the poaching and the setting of poison baits. In recent years, increased educational and advocacy activities among the local population have reduced illegal hunting to some extent, but covert poaching is still an important factor.

There isn`t a unified strategy and organization of the tourist flow so as to minimize the concern for the species, especially in the places with concentration of conservationally important species.

Another important factor concerning the vulnerability of the wolf is the change or destruction of its habitats or refuges. It is highly vulnerable in the first place to area reductions and habitat degradation, caused by human activities.

Another factor directly relevant to the vulnerability of the wolf is the reduction or insufficiency of the nutrient base, also caused by human activity. This factor is especially important for large predators, whose food base is around the minimum thresholds.

## Measures for reducing the vulnerability of the species

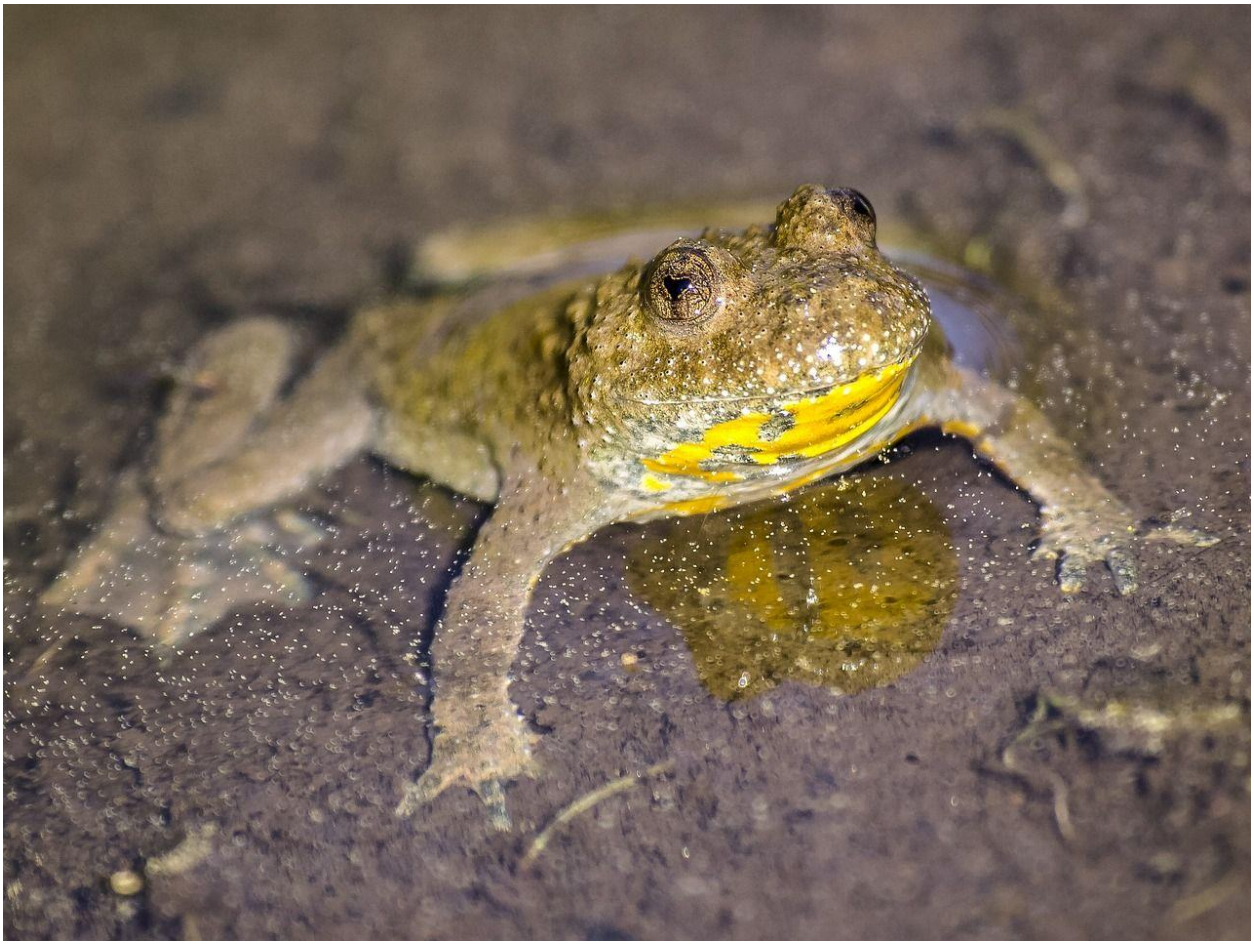
- Increasing the level of control over the implementation of the legislation;
- Restriction on the hunting of wolves in the spring and in the summer;
- Ensuring passages through the motorways for the species;
- Monitoring.;
- Popularization of the role of the wolf in the ecosystems;
- Compensation for damages in animal breeding, etc.

## 3. Assessment of threats and vulnerability for the Yellow-bellied toad (*Bombina variegata*) in the area of Kresna Municipality

### Description

The Yellow-bellied toad *(Bombina variegata)* is a protected species included in Annexes 2 and 3 of the Biodiversity Act (BDA) and Annex II of the Bern Convention. The species is also included in Annex II and Annex IV of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive).

The Yellow-bellied toad is included in the IUCN (International Union for Conservation of Nature) Red List of Threatened Species with category Least Concern (LC).



(Photo: https://pixabay.com/)

## Assessment of threats

The Yellow-bellied toad belongs to the species that are widespread and with numerous populations in the country, but in the area of Kresna Municipality (Pirin National Park) are of limited distribution (for most of them this is the upper limit) and / or have shown trends for reduction.

The Yellow-bellied toad is not a seriously endangered species. However, habitat destruction has a negative impact on its populations, which is one of the main threats to the species' existence.

Other threats to the Yellow-bellied toad may be:

- Loss of suitable habitats – due to urbanisation, road and other infrastructure development, drainage of wetlands, filling in of ponds, human activities such as intensive forestry and agriculture;
- Loss of connectivity between populations caused by the fragmentation of suitable habitat. This makes the remaining isolated populations vulnerable;
- Drainage or water abstraction which lowers the water table, causing the temporary breeding ponds to disappear or to dry out too quickly in summer to allow successful breeding;
- Eutrophication or pollution of habitat caused by leaching of nutrients from surroundings, pesticides and other agrochemicals.

## Assessment of the vulnerability

Amphibians, incl. Yellow-bellied toad, are generally vulnerable due to their small size, direct dependence on their reproduction on certain conditions. A subjective reason for their vulnerability is the negative attitude towards a large part of the representatives of this group.

In general, the Yellow-bellied toad is vulnerable to a number of anthropogenic and natural factors. In less visited areas, its vulnerability can be considered relatively low. In areas with higher anthropogenic impact, however - e.g. those with a developed road network, as well as areas with intensive grazing, the vulnerability of the species increases. Therefore, it can be assumed that in the area of Kresna Municipality the Yellow-bellied toad is characterized by a medium degree of vulnerability.

## Measures for reducing the vulnerability of the species

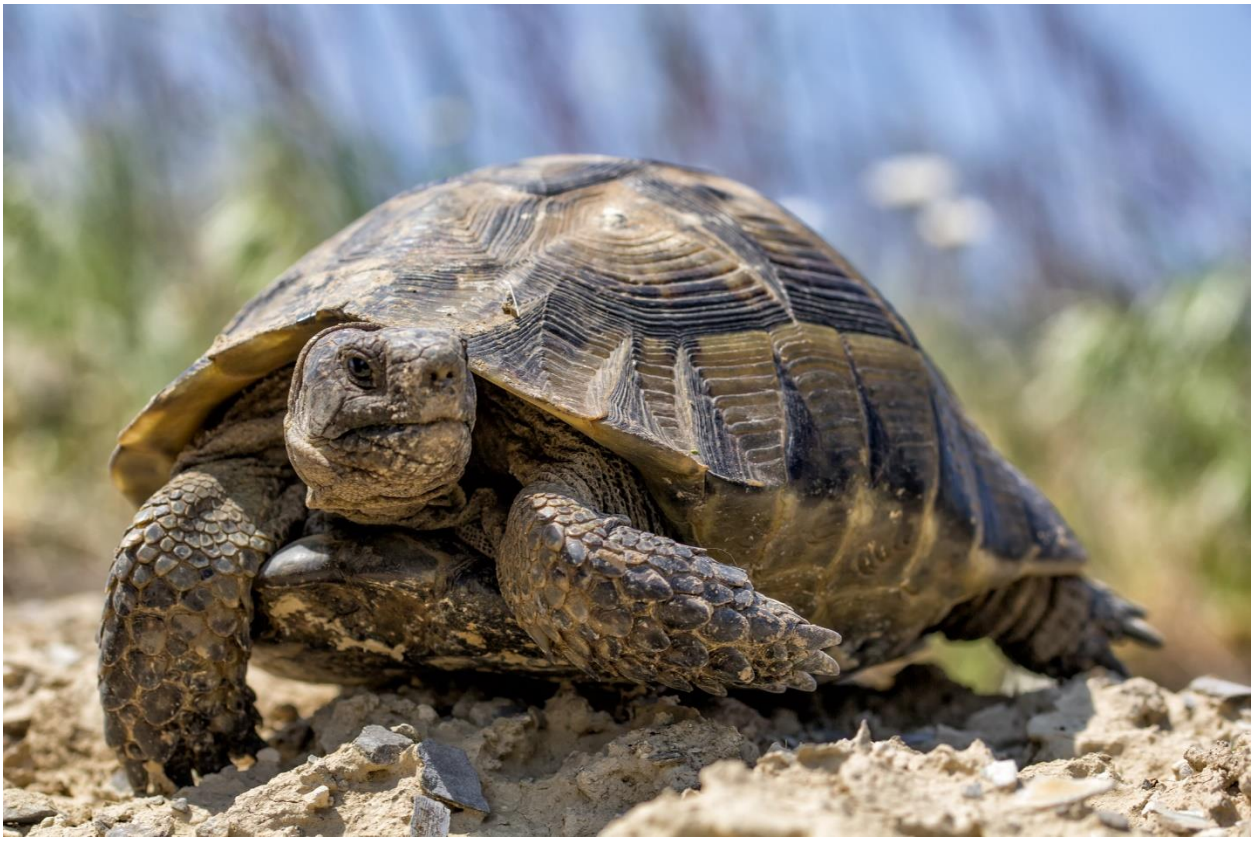
- Increasing the level of control over the implementation of the legislation;
- Monitoring;
- Restoration and maintenance of breeding ponds;
- Raising awareness of people, etc.

# 4. Assessment of threats and vulnerability for the Spur-thighed tortoise (*Testudo graeca*) in the area of Kresna Municipality

## Description

The Spur-thighed tortoise is a protected species included in Annexes 2 and 3 of the Biodiversity Act (BDA) and Annex II of the Bern Convention. The species is also included in Annex II and Annex IV of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive).

The Spur-thighed is part of the Red Data Book of Bulgaria (2015) with category "Endangered" (EN) and also included in the IUCN (International Union for Conservation of Nature) Red List of Threatened Species with category Vulnerable (VU).



(Photo: https://www.dreamstime.com/)

## Assessment of threats

In terms of herpetology, the municipality of Kresna is one of the richest regions in the country and in Europe. Here are found both for the territory of the country conservation significant species of tortoises.

Due to the lack of large predators in some of the important habitats for the Spur-thighed tortoise in the municipality, it is possible in the near future to increase the density of the Wild boar population to dangerous values, especially for the tortoises, which is one of the main threats to the species.

Other factors that negatively affect the population of the species are: gathering of individuals for the purpose of treating diseases; forest fires, unregulated grazing of both farm animals and horses, etc.

## Assessment of the vulnerability

The vulnerability of the Spur-thighed tortoise in the area of Kresna Municipality is assessed as high. The main reasons for the high degree of vulnerability are the small size, slow mobility, increased poaching. Another reason is the disturbance of the species around huts, shelters, camping sites, etc.

## Measures for reducing the vulnerability of the species

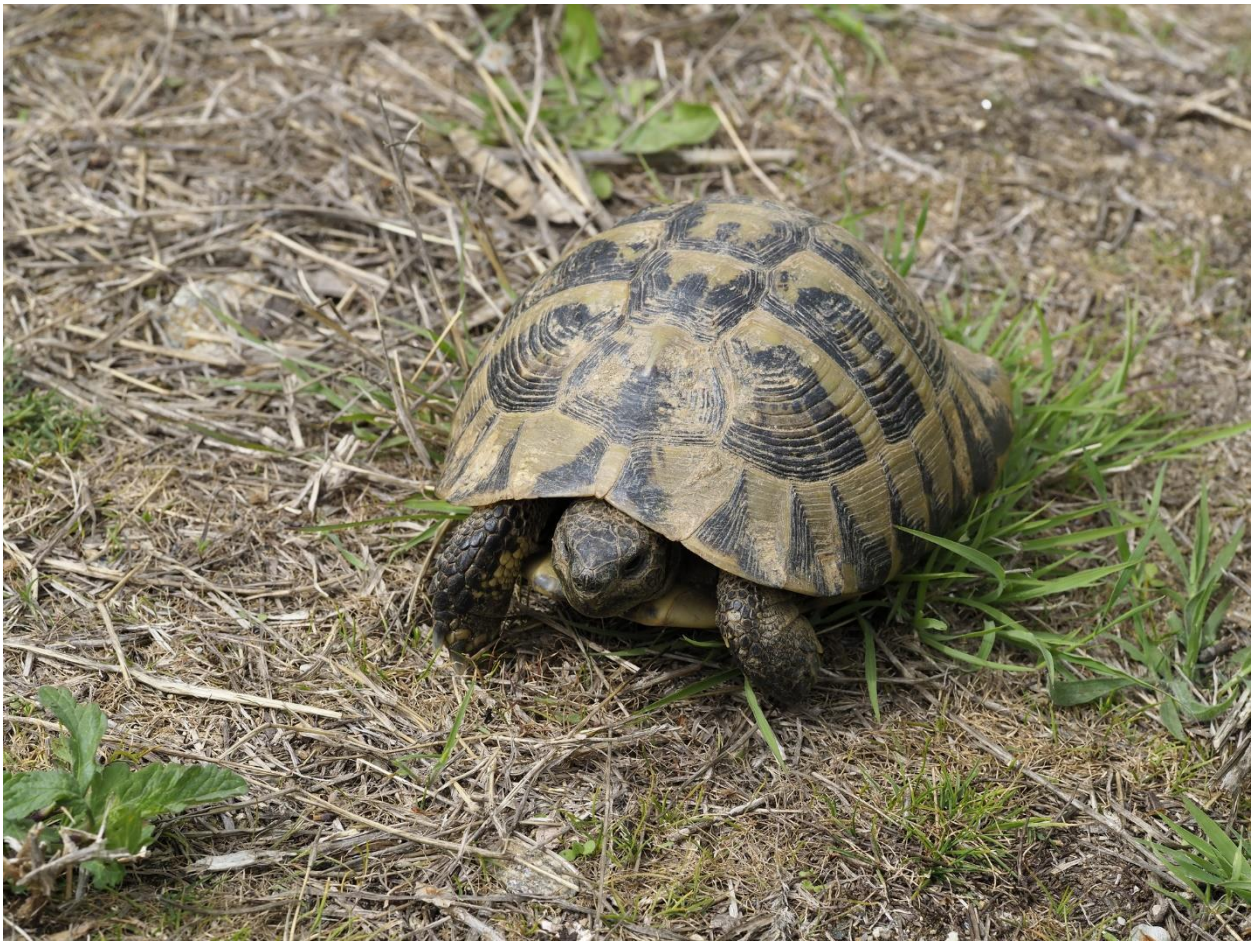
- Large popularization of the nature conservation status of the Spur-thighed tortoise and raising the awareness of tourists.
- Development of management plans for protected areas and protected sites important for the Spur-thighed tortoise.
- Territorial protection of the places with the densest populations of the species.
- Territorial protection of separate endangered populations.
- Strict control and sanctioning of the activity of poachers.
- Explanation of the uselessness of "turtle cure".

## 5. Assessment of threats and vulnerability for the Hermann's tortoise (*Testudo hermanni*) in the area of Kresna Municipality

### Description

The Hermann's tortoise is a protected species included in Annexes 2 and 3 of the Biodiversity Act (BDA) and Annex II of the Bern Convention. The species is also included in Annex II and Annex IV of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive).

The Hermann's tortoise is part of the Red Data Book of Bulgaria (2015) with category "Endangered" (EN) and also included in the IUCN (International Union for Conservation of Nature) Red List of Threatened Species with category Near Threatened (NT).



(Photo: https://www.dreamstime.com/)

## Assessment of threats

In terms of herpetology, the municipality of Kresna is one of the richest regions in the country and in Europe. Here are found both for the territory of the country conservation significant species of tortoises.

Due to the lack of large predators in some of the important habitats for the Hermann's tortoise in the municipality, it is possible in the near future to increase the density of the Wild boar population to dangerous values, especially for the tortoises, which is one of the main threats to the species.

Other factors that negatively affect the population of the species are: gathering of individuals for the purpose of treating diseases; forest fires, unregulated grazing of both farm animals and horses, etc.

## Assessment of the vulnerability

The vulnerability of the Hermann's tortoise in the area of Kresna Municipality is assessed as high. The main reasons for the high degree of vulnerability are the small size, slow mobility, increased poaching. Another reason is the disturbance of the species around huts, shelters, camping sites, etc.

## Measures for reducing the vulnerability of the species

- Large popularization of the nature conservation status of the Hermann's tortoise and raising the awareness of tourists.
- Development of management plans for protected areas and protected sites important for the Hermann's tortoise.
- Territorial protection of the places with the densest populations of the species.
- Territorial protection of separate endangered populations.
- Strict control and sanctioning of the activity of poachers.
- Explanation of the uselessness of "turtle cure".

## 6. Assessment of threats and vulnerability for the Golden eagle (*Aquila chrysaetos*) in the area of Kresna Municipality

### Description

The Golden eagle (*Aquila chrysaetos*) is included in the Red Data Book of Bulgaria (2015) with category "Vulnerable" (VU), as well as in Annexes 2 and 3 of the Biodiversity Act (BDA). The Golden eagle is listed in Annex I to Directive/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds.

It is also in the Red List of the International Union for Conservation of Nature (IUCN) – with the category “Least Concern” (LC).

(Photo: Dimitar Ragyov, Red Data Book of the Republic of Bulgaria)

## Assessment of threats

The species is in critical condition. It is rarely seen in small numbers in the breeding period. There is a clear tendency of decreasing of the nesting pairs.

One of the main threats to the species is illegal hunting / poaching. No less important is the illegal setting of poisonous baits as a means of combating large predators. The presence of extensive livestock farming in the area implies the existence of this threat, whose impact on the Golden eagle can be extremely negative and in a very short time to cause a sharp reduction of its populations in the area.

Noise pollution caused by heavy traffic can also be a threat to birds in the area, including Golden eagle, but at this stage there is no data on the impact of this factor on bird populations due to the lack of specific studies (this type of research has not been conducted so far and throughout the country). However, it is known that regular high levels of noise caused by human activity (industry, transport, etc.) have a multifaceted negative impact on wildlife populations.

## Assessment of the vulnerability

The vulnerability of the Golden eagle in the area of Kresna Municipality is assessed between medium and high. In general, the most vulnerable of birds to anthropogenic presence and disturbance are diurnal and nocturnal birds of prey, including the Golden eagle.

The species is vulnerable to the following forms of human activity: poaching, setting of poison baits in the adjacent territories, investment intentions in the adjacent territories and others. These actions can cause direct destruction of the Golden eagle or its disturbance.

Closeness to settlements and infrastructure, as well as the traditional use of areas for grazing and / or the passage of domestic animals, can also be factors that affect the vulnerability of the Golden eagle.

## Measures for reducing the vulnerability of the species

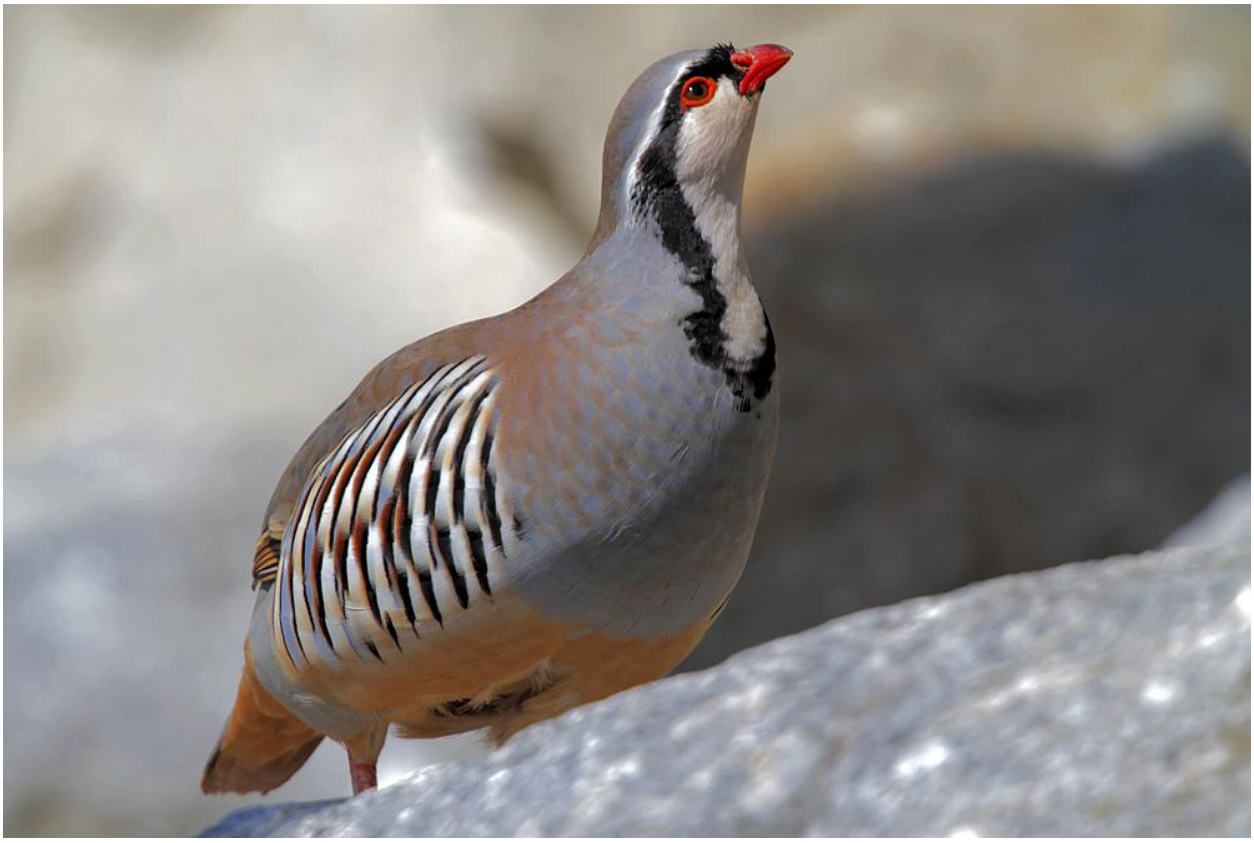
- Increasing the level of control over the implementation of the legislation;
- Poachig and bird stuffing control;
- Monitoring;
- Focused studies of its breeding distribution in the region of Kresna Municipality;
- Clarifying the reasons for the decreasing of the species;
- Strict protection of the teritories, occupied by nesting pairs in the region of Kresna Municipality;
- Inclusion of a text on birds of prey in the textbooks for primary education, etc.

## 7. Assessment of threats and vulnerability for the Rock partridge (*Alectoris graeca graeca*) in the area of Kresna Municipality

### Description

The Rock patridge (*Alectoris graeca graeca*) is a protected species included in Annexes 2 and 4 of the Biodiversity Act (BDA) and Annex III of the Bern Convention. The species is also included in Annex I to Directive/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (Birds Directive).

The Rock patridge is part of the Red Data Book of Bulgaria (2015) with category "Endangered" (EN) and also included in the IUCN (International Union for Conservation of Nature) Red List of Threatened Species with category Near Threatened (NT).



(Photo: FokusNatur)

## Assessment of threats

There are several threats related to the Rock partridge population in the area of Kresna Municipality - for example changes / fragmentation in the habitats, hybridization with Chukar and transmission of diseases from displaced ones, disturbance, hunting press, direct killing and persecution, etc. Given the nature of habitats, the main threats are related to fragmentation, construction, changes in grassland composition and food supply.

## Assessment of the vulnerability

In general, the vulnerability of the Rock partridge in the area of Kresna Municipality is assessed as medium. One of the reasons for this is that the species is sensitive to disturbance as a result of human activity, which can lead to a reduction in parts of the size of the territory inhabited by it. The hunting press is also a factor influencing the vulnerability of partridges, although the illegal hunting of the Rock partridge is practically unprovable, given the nature of their habitats. Grazing of domestic animals also has an impact, although to some extent it favors the development of partridges, and to another extent it has a negative effect on them.

Another important factor concerning the vulnerability of the Rock partridge is the hybridization between the two species of partridges, which can be a serious problem and is one of the real reasons for the reduction of both species in their natural range.

## Measures for reducing the vulnerability of the species

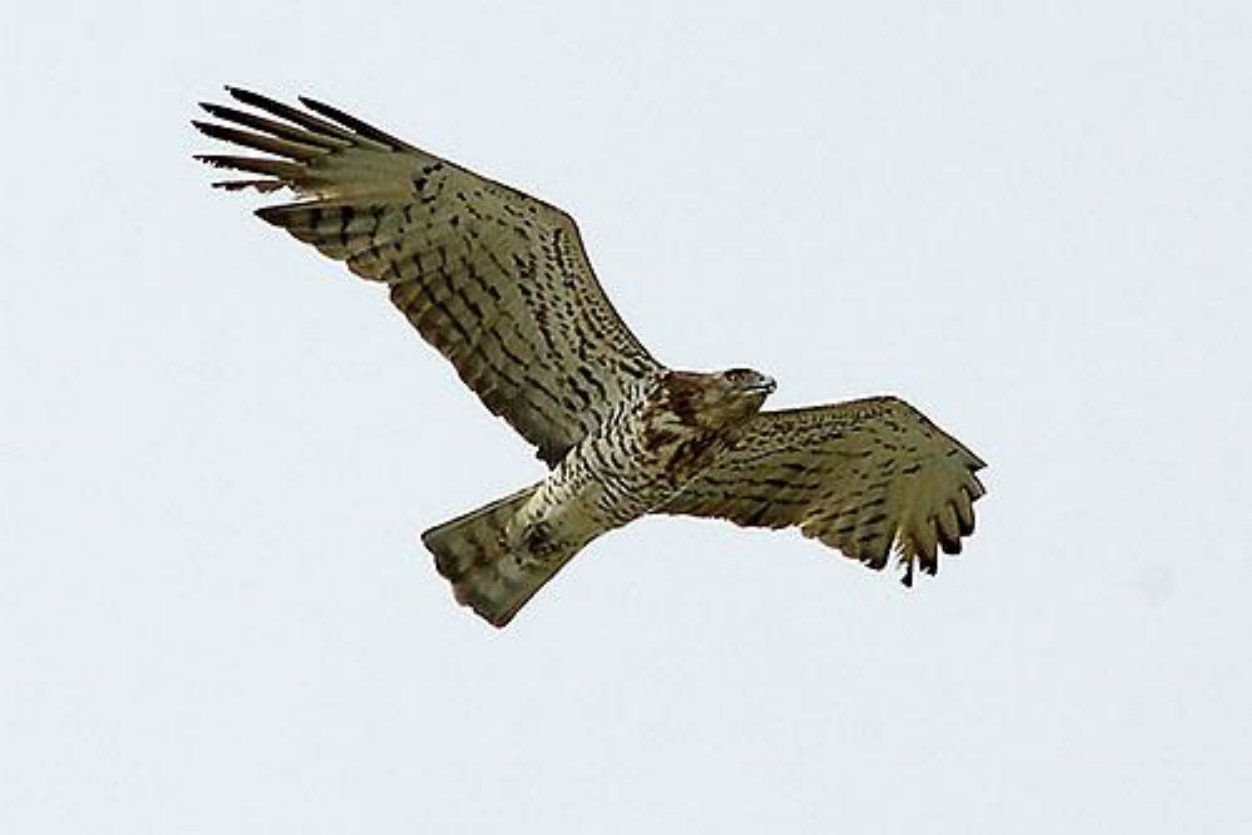
- Increasing the level of control over the implementation of the legislation;
- Monitoring;
- Control over the resettlement of animals from farms in habitats where there is a possibility of crossbreeding with animals from wild populations;
- Artificial breeding and introduction in areas with former habitats of the species;
- A ban on hunting and a discontinuation of settling the Chukar in the areas of Kresna Municipality where the Rock partridge is an autochtonous inhabitant, etc.

# 8. Assessment of threats and vulnerability for the Short-toed snake eagle (*Circaetus gallicus*) in the area of Kresna Municipality

## Description

The Short-toed snake eagle (*Circaetus gallicus*) is included in the Red Data Book of Bulgaria (2015) with category "Vulnerable" (VU), as well as in Annexes 2 and 3 of the Biodiversity Act (BDA). The species is listed in Annex I to Directive/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds.

It is also in the Red List of the International Union for Conservation of Nature (IUCN) – with the category “Least Concern” (LC).



(Photo: Teo Todorov)

## Assessment of threats

The species is a very rare in the territory of Kresna Municipality and in Pirin National Park as a whole.

The main threats to the species are: large-scale forestation; clearcutting and fires; catching birds for stuffing; lethality caused by clashes with electric posts and high-voltage lines; direct persecution; disturbance, etc.

Noise pollution caused by heavy traffic can also be a threat to birds in the area, including Short-toed snake eagle, but at this stage there is no data on the impact of this factor on bird populations due to the lack of specific studies (this type of research has not been conducted so far and throughout the country). However, it is known that regular high levels of noise caused by human activity (industry, transport, etc.) have a multifaceted negative impact on wildlife populations.

## Assessment of the vulnerability

The vulnerability of the Short-toed snake eagle in the area of Kresna Municipality is assessed between medium and high. In general, the most vulnerable of birds to anthropogenic presence and disturbance are diurnal and nocturnal birds of prey, including the Short-toed snake eagle.

The species is vulnerable to human activities, which can cause direct destruction of the Short-toed snake eagle or its disturbance.

Closeness to settlements and infrastructure, as well as the traditional use of areas for grazing and / or the passage of domestic animals, can also be factors that affect the vulnerability of the Short-toed snake eagle.

## Measures for reducing the vulnerability of the species

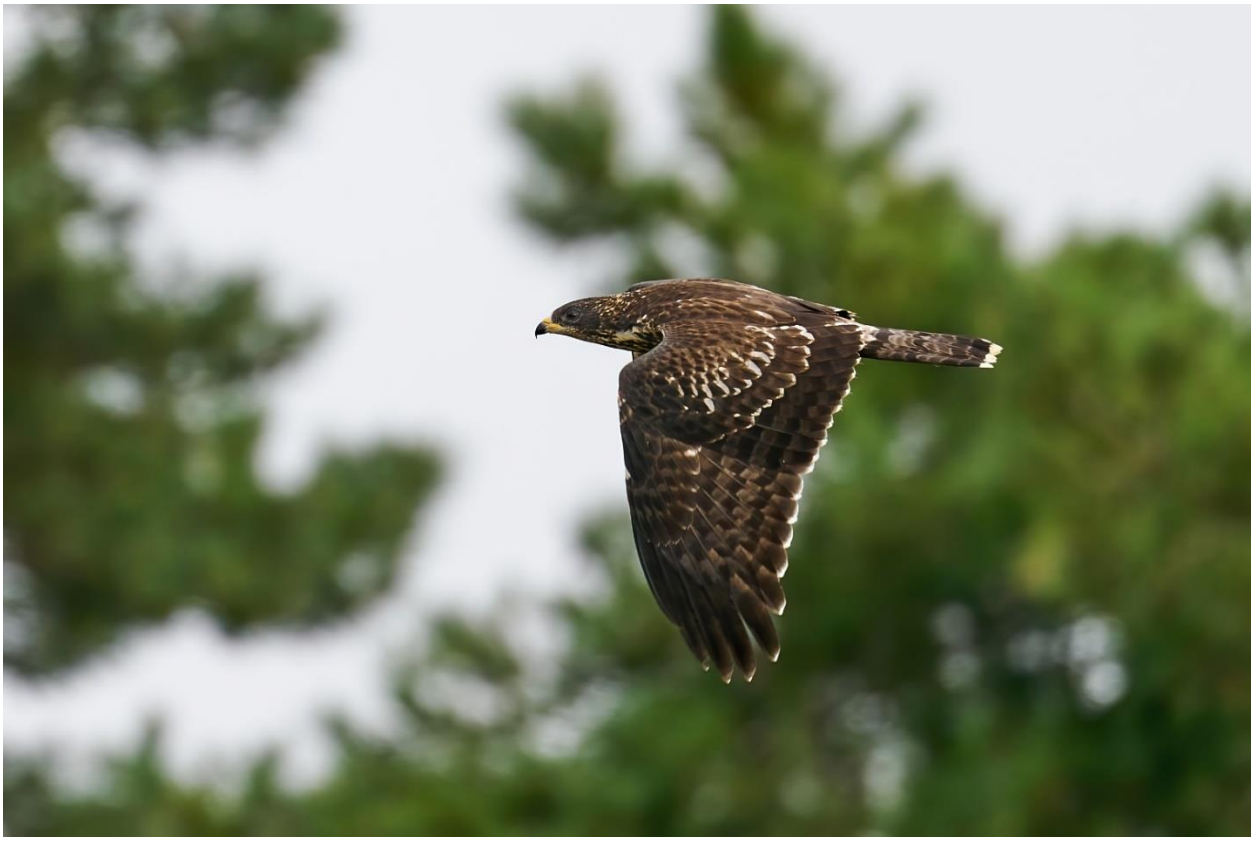
- Increasing the level of control over the implementation of the legislation;
- Poachig and bird stuffing control;
- Targeted studies on the numbers, the biology, the ecology and the threats for the species on the territory of Kresna Municipality;
- Increase of the nature conservation culture of hunters and foresters;
- Inclusion of a text on birds of prey in the textbooks for primary education, etc.

## 9. Assessment of threats and vulnerability for the European honey buzzard (*Pernis apivorus*) in the area of Kresna Municipality

### Description

The European honey buzzard is included in the Red Data Book of Bulgaria (2015) with category "Vulnerable" (VU), as well as in Annexes 2 and 3 of the Biodiversity Act (BDA). The species is listed in Annex I to Directive/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds.

It is also in the Red List of the International Union for Conservation of Nature (IUCN) – with the category “Least Concern” (LC).



(Photo: https://www.dreamstime.com/)

## Assessment of threats

One of the main threats to the European honey buzzard are: poaching; disturbance during the breeding season; destruction of nests in forestry activities; degradation of forest habitats; use of pesticides in agriculture, etc.

Noise pollution caused by heavy traffic can also be a threat to birds in the area, including European honey buzzard, but at this stage there is no data on the impact of this factor on bird populations due to the lack of specific studies (this type of research has not been conducted so far and throughout the country). However, it is known that regular high levels of noise caused by human activity (industry, transport, etc.) have a multifaceted negative impact on wildlife populations.

## Assessment of the vulnerability

The vulnerability of the European honey buzzard in the area of Kresna Municipality is assessed between medium and high. In general, the most vulnerable of birds to anthropogenic presence and disturbance are diurnal and nocturnal birds of prey, including the European honey buzzard.

The species is vulnerable to human activity, which can cause direct destruction of the European honey buzzard or its disturbance.

Closeness to settlements and infrastructure, as well as the traditional use of areas for grazing and / or the passage of domestic animals, can also be factors that affect the vulnerability of the European honey buzzard.

## Measures for reducing the vulnerability of the species

- In the forest departments where the species is registered, to be kept old and strongly branched trees, as well as trees with nests (including nests of other species, as the European honey buzzard often uses old nests of other birds, such as crows).
- Within a radius of 200 m around the nests of the species, no economic activities shall be performed during the nesting period.
- Strict control and sanctioning of the activity of poachers.

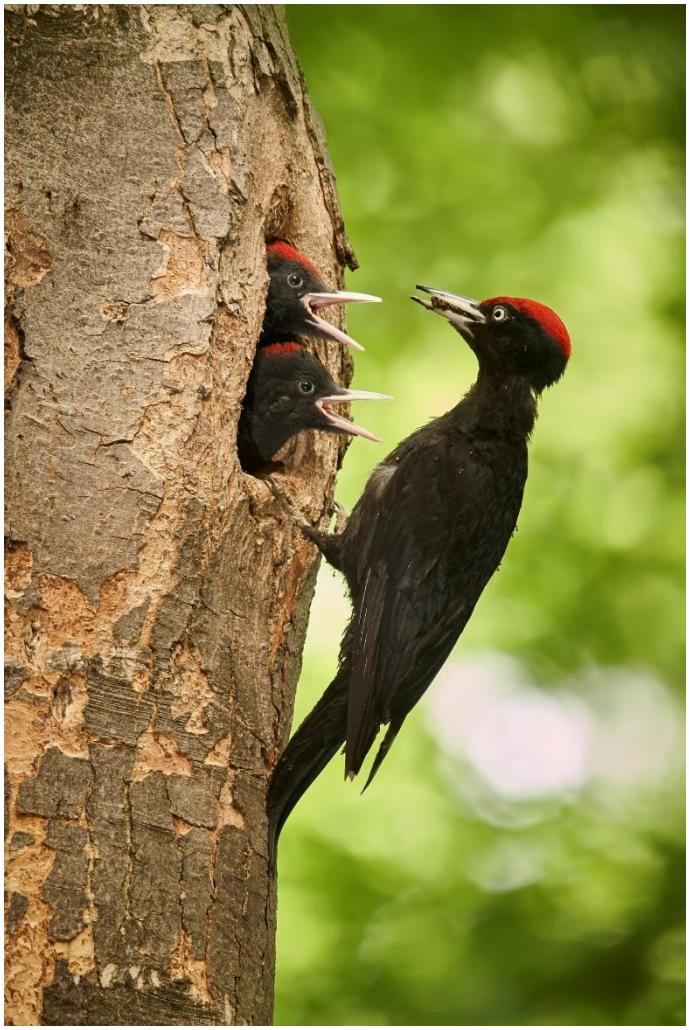
## 10. Assessment of threats and vulnerability for the Black woodpecker (*Dryocopus martius*) in the area of Kresna Municipality

### Description

The Black woodpecker is protected species, included in Annexes 2 and 3 of the Biodiversity Act (BDA).

It is also in the Red Data Book of Bulgaria (2015) with category "Vulnerable" (VU), as well as in the Red List of the International Union for Conservation of Nature (IUCN) – with the category "Least Concern" (LC).

The species is listed in Annex I to Directive/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds.



(Photo: https://www.dreamstime.com/)

## Assessment of threats

The Black woodpecker is a palearctic species inhabiting the taiga and the zone of the deciduous forests in Eurasia. The species is comparatively rare in the Balkan Peninsula glacial relict.

One of the main threats to the species are: intensive logging in the forests and destruction of forest habitats; decrease of the nutrition base, in particular of the red an; the narrow specialization to feeding and habitat.

Other threats for the population of the Black woodpecker are the forest fires, as well as the competition by the Grey-headed woodpecker, the White-backed woodpecker and the Green woodpecker.

## Assessment of the vulnerability

The vulnerability of the Black woodpecker in the area of Kresna Municipality is assessed as medium. The species is vulnerable to human activity, which can cause its direct destruction or its disturbance.

Closeness to settlements and infrastructure, increasing the risk of fires, as well as the lack of adequate technological measures to combat fires, are main factors that affect the vulnerability of the Black woodpecker.

## Measures for reducing the vulnerability of the species

- During the nesting periods (01.02-01.07), in the forest subdivisions with established presence of the species not to be performed economic activities.
- When carrying out forestry activities in the subdivisions with established presence of the species and the neighboring subdivisions, all standing and fallen dead trees, trees with hollows, as well as trees with visible signs of disease and rot must be preserved.
- It is recommended the habitats of the species to be identified as old-growth forests.
- Mapping of nesting sites and annual monitoring of their condition.

# Description of 60 interesting for the region of Kresna Municipality and with high conservation status species

in connection with the implementation of **Activity 1:** "Collection of available information and data on biodiversity in the Bulgarian part of the project territory and assessment of selected species and / or habitats"

according to Contract № D-270/30.12.2019 for a public invitation with subject: "Biodiversity assessment in the area of Kresna Municipality"

within project „Virtual and Mobile Museum of Biodiversity" with an acronym „Mobile Biodiversity", financed under The Cooperation Programme INTERREG V-A "Greece-Bulgaria 2014-2020"

2020

**Species list:**

*Mammals (except bats)*

1. Eurasian otter (*Lutra lutra*)
2. Grey wolf (*Canis lupus*)
3. Balkan chamois (*Rupicapra rupicapra balcanica*)
4. Brown bear (*Ursus arctos*)

*Bats*

5. Greater mouse-eared bat (*Myotis myotis*)
6. Greater horseshoe bat (*Rhinolophus ferrumequinum*)
7. Schreiber's bent-winged bat (*Miniopterus schreibersii*)
8. Lesser horseshoe bat (*Rhinolophus hipposideros*)
9. Lesser mouse-eared bat (*Myotis blythii*)
10. Geoffroy's bat (*Myotis emarginatus*)
11. Western barbastelle (*Barbastella barbastellus*)
12. Mediterranean horseshoe bat (*Rhinolophus euryale*)
13. Nathusius' pipistrelle (*Pipistrellus nathusii*)

*Amphibians and reptiles*

14. Fire salamander (*Salamandra salamandra*)
15. Common toad (*Bufo bufo*)
16. Yellow-bellied toad (*Bombina variegata*)
17. European tree frog (*Hyla arborea*)
18. Agile frog (*Rana dalmatina*)
19. Leopard snake (*Elaphe situla*)
20. Four-lined snake (*Elaphe quatuorlineata*)
21. Cat snake (*Telescopus fallax*)
22. Spur-thighed tortoise (*Testudo graeca*)
23. Hermann’s tortoise (*Testudo hermanni*)
24. European pond turtle (*Emys orbicularis*)
25. Dahl's whip snake (*Platyceps najadum*)
26. Dice snake (*Natrix tessellata*)

27. Grass snake (*Natrix natrix*)
28. Eastern montpellier snake (*Malpolon insignitus*)
29. Nose-horned viper (*Vipera ammodytes*)

*Birds*

30. Grey heron (*Ardea cinerea*)
31. Levant sparrowhawk (*Accipiter brevipes*)
32. Eurasian sparrowhawk (*Accipiter nisus*)
33. Booted eagle (*Hieraaetus pennatus*)
34. Mallard *(Anas platyrhynchos*)
35. Golden eagle (*Aquila chrysaetos*)
36. Greater spotted eagle (*Aquila clanga*)
37. Eastern imperial eagle (*Aquila heliaca*)
38. Lesser spotted eagle (*Aquila pomarina*)
39. Eurasian eagle-owl (*Bubo bubo*)
40. Common buzzard (*Buteo buteo*)
41. Long-legged buzzard (*Buteo rufinus*)
42. White stork (*Ciconia ciconia*)
43. Black stork (*Ciconia nigra*)
44. Lanner falcon (*Falco biarmicus*)
45. Eleonora's falcon (*Falco eleonorae*)
46. Common kestrel (*Falco tinnunculus*)
47. Common moorhen (*Gallinula chloropus*)
48. Griffon vulture (*Gyps fulvus*)
49. Osprey (*Pandion haliaetus*)
50. Barred warbler (*Sylvia nisoria*)
51. Blue rock-thrush (*Monticola solitarius*)
52. Western orphean warbler (*Sylvia hortensis*)
53. Western rock nuthatch (*Sitta neumayer*)
54. Wallcreeper (*Tichodroma muraria*)
55. European nightjar (*Caprimulgus europaeus*)

56. Little ringed plover (*Charadrius dubius*)

57. Corncrake (*Crex crex*)

*Plants*

58. Kermes oak (*Quercus coccifera* L.)

59. Greek juniper (*Juniperus excelsa*)

60. Oriental plane-tree (*Platanus orientalis*)

TO REVIEW THE MATERIALS FOR EACH SPECIES PLEASE VISIT

https://mobilebiodiversity.eu/

The materials are too voluminous to be uploaded within this document.