

NEGATIVE ANTHROPOGENIC ACTIVITIES AND THREATS TO THE BIODIVERSITY IN THE AREA OF CAPE EMINE

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ABSTRACT

Negative influences and threats to the biodiversity in the area of Cape Emine and locality Irakli were studied. Impacts and problems relating to the conservation significance of the two protected zones in the region, “Emine – Irakli” and “Emine”, were discussed. Main objects of protection within the meaning of the protected areas (species and habitat types), which most heavily suffered the negative effects of anthropogenic activities were pointed out. Some activities for recovery of the injured habitats were proposed.

Key words: *anthropogenic threats, biodiversity, Cape Emine, Irakli site*

Introduction

In the recent years, biological, ecosystem and landscape diversity of the Bulgarian Black Sea coast suffered numerous overwhelming hits by a various investment intentions. Innumerable are the vigorous violation attempts and destroyed forever natural habitats. One of the particular palatable territories is the area of Cape Emine, where the multilateral reputation site Irakli is located. Cape Emine marks the end of the Stara planina mountain chain and it is the most Eastern geographical point of Bulgaria. Climatic and environmental conditions, characteristic of the coastal zone, contribute to the development of specific ecosystems typical for the sea coast. Along with its wealth of southern taxa, this area is significant also as a place where the basic migration path *Via pontica* passes through. Object of this study were the negative influences and threats to the biodiversity from the implementation of various types of anthropogenic activity.

Conservation status of the area

1976 – Natural Landmark “Cape Emine”

1994 – Protected Site “Irakli”

1996 – CORINE Biotopes place (code F0008100)

1997 – BirdLife International Important Bird Area “Cape Emine” [9]

2004 – Natura 2000 sites with the codes BG0000114 and BG0000111

2008 – Protection Zone “Emine – Irakli” with the code BG0001004 [6]

2009 – Protection Zone “Emine” with the code BG 0002043 [5]

2010 – Application for a declaration of Managed Nature Reserve in the Irakli site

Within the boundaries of the protected by Natura 2000 zones are included three Protected Sites with code BG 06 – “Smrikite”, “Ortoto” and “Irakli” and the Protected maritime aquatory “Koketrays”, announced in 2001 for protection of the sand bank in the Bourgas Bay.

Main groups of anthropogenic impacts and their expansions

Threats to the biological diversity in Bulgarian as a whole are [2, 3]:

1. Loss and destruction of habitats. Affects all ecosystems.

2. Pollution of the environment. In many countries, including Bulgaria it increases and represents a considerable threat to the biodiversity and human health.

3. Over-exploitation. It affects many ecosystems, habitats and separate taxa. Manifestations are: over-exploitation of the resource species (affects *fungi, herbs, reptiles, birds, mammals*); poisoning and killing of animals (*reptiles, birds, mammals*).

4. Invasion of invasive and introduced species. Generally less dangerous threat.

5. Intensification of agriculture.

6. Change of ownership on the ground.

7. Global environmental changes. Climate change directly affects groups of *fungi, algae, plants* and *habitats; animals* follow changes in habitats. If global warming leads to sea-level rise, adverse effects on the Black Sea coast will be significant.

8. Lack of knowledge and effective managerial policy. There are gaps and weaknesses in the scientific information on biological diversity with respect to the species richness, population dynamics and trends, dispersal and distribution in respect of the in many taxonomic groups. In the area of Cape Emine real biological and ecological studies to the present date have not been carried out. Scarce is the data in respect of the various anthropogenic effects, methods for their mitigation and control, and methods for recovery of the biodiversity. There is inadequate understanding and knowledge of the public about the importance of biodiversity and the threats to it. There are gaps in the availability and reliability of information, and in the adjustment and consciousness of the public. Implementation of nature conservation legislation is poor. There is ineffective management and administration of the protected areas, there are no management plans for the most of them.

Affected groups of organisms by the loss of habitats

Problems are associated with: reclamation of wetlands and operation of drainage systems (*all taxonomic groups*); impoundage of springs (*algae, invertebrates*); water catches (*algae, plants, communities, amphibians, reptiles, fishes, invertebrates, birds*); regulations of watercourses (*algae, invertebrates, fishes, amphibians, reptiles, birds*); elimination of riverine vegetation (*plants, invertebrates, birds, mammals*); conversion of meadows and pastures into arable lands (*fungi, plants, invertebrates, birds, mammals*); abandonment of meadows and pastures (*fungi, plants, invertebrates, birds, mammals*); burning down of pastures and stubble-fields (*plants, invertebrates, reptiles, birds, mammals*); creating of large blocks of monoculture (*plants, invertebrates, reptiles, birds, mammals*); clear felling and burning down the forests (*fungi, all taxa of flora and fauna*); construction of buildings, resorts, facilities, etc. (*all taxa*); development of infrastructure (*amphibians, reptiles, birds, mammals*); change of land use (*all taxonomic groups*).

Affected groups of organisms by deterioration of habitats (including fragmentation and isolation)

Problems with the deterioration of habitats are associated with: use of artificial fertilizers and chemicals (*plants, invertebrates, reptiles, birds, mammals*); water pollution by fertilizers and chemicals (*algae, plants, invertebrates, fishes, amphibians, birds*); unsustainable management of meadows and pastures (*fungi, plants, invertebrates, birds, mammals*); unsustainable management of the forests (*fungi, plants, invertebrates, birds, mammals*); unsustainable management of cultivated agricultural lands (*plants, invertebrates, birds, mammals*); development of road infrastructure (*plants, invertebrates, birds, mammals*); harassment (*nesting birds, large mammals*).

Affected groups of organisms due to a lack of information

For the *fungi, algae, plants and invertebrates* the whole diversity of species is not still known, and therefore all the problems and solutions for reducing the loss of biodiversity cannot be adequately determined. The region of Cape Emine is with a **high** degree of importance in respect of the areas that need a further study. [2]

Direct threats to the biodiversity in the area of Cape Emine

Coastal territories of the whole Bulgarian Black sea coast are directly threatened by construction activities and by the increase of the tourists press. The main threat to the area of Cape Emine and Irakli site is the plan for development of a new seaside resort, situated on the territory of

the sole estuary and adjacent sand dune habitats. Intended overbuilding of the abandoned extensive agricultural lands along the river terrace and in the near-by heights is connected with infringement of the neighbouring thermophilic forests and dunes. Destruction of these habitats could lead to serious fragmentation of the area and it will damage its conservation importance and function. Moreover, the only estuary in this place and the whole riverine forest vegetation will be destroyed, as long as the related habitats of the pond tortoise and Otter. Territories represent an important habitat for the Bulgarian ratsnake and tortoises, which are becoming increasingly rare.

Of great significance is the proximity of one of the most mass and “megalith” summer resorts – Sunny beach. Its rapid development and intensive construction in the vicinity already have led to the destruction of existing coastal dunes, grasslands, meadows and forest remainders. There is an intensification of the overbuilding in the northern part of the area too.

Tourist pressure each year is increasing not only along the coast, but also into mountainous parts. Primary issues are unauthorised camping and related pollution by waste and interference of animal populations, as well as the “off-road” tours in the mountain forest and grass habitats. Illegal cuttings and hunting concern many species, especially birds. Very serious problem is the abandonment of agricultural lands and attempts for their overbuilding. On the other hand, some of them are subject of intensive use with application of a significant quantity of chemicals.

International road is passing through the area, which has a considerable negative impact on the surrounding territories, mainly due to the pollution and constructions along the road. There are plans for improvement of this road as a high-way one, which can lead to fragmentation of the territory. Especially topical are plans for building of wind energy parks, but they restrict free movement of birds, constitute a barrier to the wandering and nocturnal migrants and cause significant mortality among them and corresponding reducing of their populations. Marine aquatory is subject of too intensive fishing with fixed and floating nets. Trolling, illegal but actively practised in the area, leads to destruction of marine ecosystems and impairs habitats of marine birds. [10]

Non negligible are problems with the adequate implementation of **Natura 2000**: late entry into force of the legal declaration of zones; destruction and degradation of habitats due to inappropriate practices of land use and construction; overexploitation of resources and destruction of the subject and purpose of conservation; failure to be ensured an effective operation of the net due to the exclusion of the local people from the process of its construction; need for trainings and meetings for acquaintance of the people with the principles of Natura 2000 “for people and nature”.

Potentially endangered natural habitats and species [8, 11]

- Estuaries 1130 and Riparian habitats 91F0, 91E0 and 92A0 and related species – European pond turtle (*Emys orbicularis*) and Otter (*Lutra lutra*);
- White dunes 2120 and their ecotone with oak forests – habitat for the Spur-thighed tortoise (*Testudo graeca*), Hermann's tortoise (*Testudo hermanni*), Bulgarian ratsnake (*Elaphe sauromates*);
- Forest habitats 91M0 *Balkan-Pannonian cerris-durmast forests* and 91AA *Eastern forests of pubescens oak* and Steep sea cliffs with endemic species of *Limonium* 1240;
- Semi-natural dry grass and bush communities on limestone 6210, as well as grasslands, meadows, cultivated and abandoned agricultural areas and related species – Spur-thighed tortoise (*Testudo graeca*), Hermann's tortoise (*Testudo hermanni*), Bulgarian ratsnake (*Elaphe sauromates*) and Spotted polecat (*Vormela peregusna*);
- Riparian birds: Levant Sparrowhawk (*Accipiter brevipes*), Common Kingfisher (*Alcedo atthis*);
- Related to dry meadows with a fragmented vegetation: Montagu's Harrier (*Circus pygargus*), Stone Curlew (*Burhinus oedicnemus*), Calandra Lark (*Melanocorypha calandra*), Greater Short-toed Lark (*Calandrella brachydactyla*), Tawny Pipit (*Anthus campestris*), Barred Warbler (*Sylvia nisoria*), Ortolan Bunting (*Emberiza hortulana*), European roller (*Coracias garrulus*), as well as the species, propagating in both trees and bushes belts between the fields and

those between the field and the forest: Red-backed Shrike (*Lanius collurio*), Lesser Grey Shrike (*Lanius minor*), Masked Shrike (*Lanius nubicus*), Short-toed Snake Eagle (*Circaetus gallicus*), Booted Eagle (*Hieraaetus pennatus*), European Nightjar (*Caprimulgus europaeus*), Honey Buzzard (*Pernis apivorus*);

- Species whose habitats are likely to be significantly negatively affected: Otter (*Lutra lutra*), European Fire-bellied Toad (*Bombina bombina*), European pond turtle (*Emys orbicularis*), Southern Crested Newt (*Triturus karelinii*) Agone (*Alosa agone*), Pontic Shad (*Alosa immaculata*), Black Sea Shad (*Alosa maeotica*) Azov Shad (*Alosa tanaica*), Thick shelled river mussel (*Unio crassus*).

Theoretical opportunities for direct and indirect impacts of anthropogenic intervention with construction activities

With overbuilding and construction of facilities the ability for restoration of natural habitats is permanently lost [1, 11]: damage of landscape; violations of integrity of the zone, fragmentation and damage of habitats, reduction of habitats of species subject to conservation in the protected zone, lasting damage to adjacent habitats due to increased human presence; overbuilding of areas which may be of importance for the survival of species subject to conservation in the protected zone since their importance as places for propagation, hibernation, resting during migration or for hiding during the moult; substitution of vegetation, which is food source for species subject to protection; chasing away the sensitive species and individuals due to increased human presence, noise load and other stressful stimuli (i. e. artificial light); intense and concentrated presence of domestic and sinanthropic predators as dogs, cats, rats; unsuitable conditions for all types of amphibians and reptiles because of the management of green areas; interruption of important ecotones and limited access to key habitats; creation of partitions and interruption of biocorridors for migration and spreading of the species; waste disposal and possibility of contamination of water and soil; increased risk of fires, incidents and accidents; mortality from motor vehicles and other equipment; invasion of foreign species in natural habitats; reduction of the possibilities of the zone for sustainable environmentally sound development; direct destruction because of carelessness, vandal acts, intolerance of people to snakes and amphibians, collection of turtles.

Main ecological problems of the rural areas

Most important are: loss of habitats and biodiversity due to change in land use, drainage and repartition of land, removal of elements of the landscape; abandonment of land; deterioration of habitats from use of artificial fertilisers and chemical preparations; unsustainable management of grasslands, arable areas and forests; development of infrastructure; overexploitation; disturbing, poisoning and killing of animals; soil erosion – main ecological problem; acidification of the soil and humus reducing because of long-standing incorrect high dose fertilisation; pollution of soil, surface water and groundwater and air; use of chemical fertilizers and chemo-synthetic plant protection products; use of water with high content of nitrates. [7]

Threats to the biodiversity in the forests

The most serious threat is ecologically and environmentally improper forest management, associated with destruction of indigenous forest habitats – illegal logging and ploughing up, fires caused by human negligence, and poaching of game and protected by law species.

Threats of irrational management of river basins

There is a strong cumulative effect of carried out negative influences. The main of them are correction and cleansing of the bed of the river Vaya, which took place in the 2007, and building of a resort village at the mouth of the river. As a result were heavily damaged or destroyed habitats of species that are subject to protection, mainly related to the river valley. Any further interference in the structure and functions of the river and riverine ecosystems may irreversibly impair natural

habitats and species and will involve a loss of purpose of the protected zone. The territory belongs with the zones and water bodies with a **significant** negative effects caused by water catches, withdrawal of water levels, changes in hydrological regime of the rivers – power stations, adjustments of river currents, construction of ponds, shoots, and many others. [8]

Threats from the realisation of the energy strategy

Direct effects: barriers to the proper functioning of habitats and fragmentation; mortality of individuals; chasing away animals due to increased human presence and raised noise background; seizure of areas; reduction of populations and changes in the species composition in protected zones. **Indirect effects:** changing for the worse the quality of habitats (by pollution); occurrence of invasive or foreign species (accidentally, unintentionally or in connection with the establishment of protective belts, etc.); formation of communities with disrupted structure. [4]

Conclusions

Although introduced prohibitions for certain activities (removal of features of the landscape; afforestation of meadows, pastures and commons; use of pesticides and fertilisers in pastures and meadows; construction of wind energy equipment; cutting and firing reed massives and coastal vegetation; drainage, drying up or change of the water regime of the wetlands and natural water bodies; residential, resort and summer-house construction; change of the natural character of the river beds outside the inhabited areas; conducting of “off-road” races), additional actions are necessary in the region in order to restore and protect the biodiversity.

Mainly these activities must be directed towards the recovery of the destroyed part of the bed of the River Vaya and recuperation of the affected riverine forests, as well as regulation of the negative impact on the dunes. Recovery and maintenance of extensive agricultural practices in abandoned agricultural lands (grazing, extensive vineyards and gardens) is of paramount importance for the preservation of essential habitats (especially for some reptiles).

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