

## NATURAL PROTECTED AREAS FROM THE PANONIC BIOGEOGRAPHIC REGION, ROMANIA

### ARIILE NATURALE PROTEJATE DIN REGIUNEA BIOGEOGRAFICĂ PANONICĂ, ROMÂNIA

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**Abstract.** Although it only covers 3% of the territory of the European Union, the Pannonian bioregion is home to a high biodiversity with some endemic species. In Romania, the Pannonian bioregion covers 6% of the national territory, and lies on a strip in the Western part of the country. The main purpose of our study is to evaluate the number, surface and distribution of protected natural areas at the level of Pannonian bioregulation in Romania. According to the data processed by specific GIS methods, before the designation of Natura 2000 sites, the area covered by protected areas was 1.59% (22371.86 ha) in the Pannonian bioregion, and now the area covered by protected areas has increased up to 13, 92% (217409.01 ha). Of the 79 protected bioregions, 2 have management structures, 26 are managed by the custodians and 51 do not have management or custody facilities, and 25 are under an approved management plan.

**Key words:** protected areas, Natura 2000, the Pannonian bioregion

**Rezumat.** Deși acoperă doar 3% din teritoriul Uniunii Europene, bioregiunea Panonică adăpostește o biodiversitate ridicată, cu unele specii endemice. În România, bioregiunea Panonică acoperă 6% din teritoriul național, și se întinde pe o fâșie din partea de vest a țării. Scopul principal al studiului nostru este de a evalua numărul, suprafața și distribuția ariilor naturale protejate la nivelul bioregiunii panonice din România. În urma datelor prelucrate prin metode specifice de GIS, rezultă că până la desemnarea siturilor Natura 2000, în bioregiunea panonică suprafața acoperită de zone protejate era de 1,59% (22371.86 ha), iar în prezent suprafața acoperită de zone protejate a crescut la 15,52% (217409.01 ha). Din totalul de 79 de arii protejate la nivelul bioregiunii, 2 dețin structuri de administrare, 26 sunt administrate de către cunoști și 51 nu dețin nici structuri de administrare nici custode, iar 25 funcționează în baza unui plan de management aprobat.

**Cuvinte cheie:** arii protejate, Natura 2000, bioregiunea Panonică

## INTRODUCTION

Developments, particularly in the 20th century, have led to the widespread destruction of nature in Europe (Report of the Commission to the Council and European Parliament, Nature in the European Union, 2015), the local footprint of

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human consumption with an environmental impact on the environment is often higher in the EU than in any other area (Imhoff *et al.*, 2004).

The Aichi Targets, adopted in 2010 commits CBD to improve connectivity within existing networks of protected areas and to expand the global coverage of terrestrial protected areas up to 17% by 2020 (Venter *et al.*, 2014).

The EU has taken on a global commitment and has made extensive efforts to preserve biodiversity by creating Natura 2000 network of protected areas. The national protected areas and Natura 2000 network currently cover more than one third of the European Union (Maiorano *et al.*, 2015) and globally these protected areas represent one of the most important responses to the global biodiversity crisis (Watson *et al.*, 2014).

World Database on Protected Areas - updated every five years by the World Conservation Monitoring Center, shows that if in 1962 the number of protected areas was 9214, with an area of 2,400,000 km<sup>2</sup>, in 2014 worldwide there were 209,429 protected areas (32,868,673 km<sup>2</sup>), covering about 14.6% of the world's terrestrial areas and 2.8% of its oceans (Deguignet *et al.*, 2014).

Out of the total of these protected areas, about 65% are located in Europe. However, they represent only over 12% of the total area covered by globally protected areas (Deguignet *et al.*, 2014).

Of the nine biogeographical regions of the European Union, Romania has five, with our country having the largest number of such regions. The invaluable natural treasure of Romania is reflected in this great biogeographical diversity (Natura 2000 in Romania, 2012).

The Pannonian Region referred to in this paper includes the entire territory of Hungary as well as peripheral regions of Slovakia, the Czech Republic and Romania (among the countries of the European Union), and outside the territory of the Union, regions of Serbia, Croatia and Ukraine (Natura 2000 in the Pannonian region, 2010).

Due to varied and contrasting habitats, the Pannonian region has a wide variety of species, some of which endemic. Although it covers only 3% of the territory of the European Union, the Pannonian region houses more than 100 species of animals and over 40 species of plants included in the Habitats Directive but also over 50 types of habitats (Natura 2000 in Romania (2012), Natura 2000 in the region Pannonic, 2010).

In Romania, the Pannonian bioregion covers 6% of the national territory (Natura 2000 in Romania, 2012).

**The main purpose** of our study is to quantify and compare the number, surface area and distribution of protected natural areas in the panonian bio-region in Romania, before and after EU accession.

Studies on the number and distribution of protected areas for the Western region of Romania were also carried out by Pascu M. (2018), Cojocariu L. (2017).

## MATERIAL AND METHOD

In the analysis of the protected natural areas, geospatial data were published on the website of the Ministry of Environment (<http://www.mmediu.ro/articol/date->

gis/434),, respectively the limits of the protected natural areas and the boundaries of the biogeographical regions.

Protected natural areas have been analyzed based on Overlay procedures (multilayer analysis), Union, Intersect and Erase functions respectively, considering their overlay. Thus, the areas of each category (SCI, SPA, RONPA, RORMS, etc.) were obtained and, implicitly, the calculation on the total surface.

ArcGIS 10.1 software was used to process and generate cartographic materials.

Data on the number of protected areas with specially constituted or custodial management structures and those operating under an approved management plan have been taken over and processed from the Ministry of Environment database (<http://www.mmediu.ro/category/natural-protected-areas/208>) and the National Agency for Protected Natural Areas (<http://anapn.gov.ro/anapn/arii-naturale-protejate/vest/>).

## RESULTS AND DISCUSSIONS

According to the Romanian legislation, different categories of protected areas are distinguished at national level (the purpose and management of which are defined in Annex 1 to GEO 57/2007), depending on the different protection, conservation and use regime as follows: natural protected areas of national interest, of international interest, of community interest (Natura 2000 sites) and of county or local interest.

The largest number of protected natural areas of national interest was declared by Law 5/2000, the surface of which amounts to approx. 5% of Romania's surface. By Government Decision 2151/2004 the protected area increased to 7% and in the period 2006-2016 the surface of the protected natural areas increased to 8% of the country's surface by establishing new protected natural areas.

At the end of 2007, with the implementation of the Natura 2000 network, Romania proposed 273 sites of Community importance representing 13.81% of the country's area and 108 special avifauna special areas representing 12.54% of the country's surface. At the end of 2011, after the new sites were declared, the area of the country included in the Natura 2000 network increased, the number of SCIs reaching 407 and SPAs at 149, and in 2016 the number of SCIs was 435; SPAs of 149, totaling 6,057,700 ha, representing 22.74% of the national territory (Pacu *et al.*, 2018, O.U.G. 57/2007).

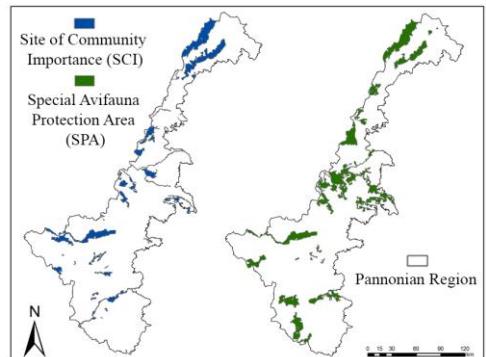
Thus, Natura 2000 network represents, at continental level, an important network of protected areas that act as a good complement to the existing national protected areas (Maiorano *et al.*, 2015). Natura 2000, together with nationally designated protected areas, covers approximately 1 222 725 km<sup>2</sup> (or 21% of land and inland waters) and around 338 000 km<sup>2</sup> (or 5.9% of EU marine areas), (<https://www.eea.europa.eu/soer-2015/countries-comparison/biodiversity#tab-based-on-indicators>).

The Pannonian bioregion spreads in Romania on a strip in the Western part of the country, on the border with Hungary (Natura 2000 in Romania, 2012), and the processed data show that it has a total area of 1400132.21 ha.

The number and the area of natural areas currently protected at the bioregion level are as follows (fig. 1 and fig. 2): 24 natural reserves (RONPA):

5314.87 ha; 2 natural parks: 22375.57 ha; 1 wetland of international importance (RORMS): 17397.57 ha; 35 SCIs: 116077.13 ha and 17 SPAs: 179469.54 ha.

It results in a total area covered by protected areas of 340634.70 ha, which represents 24.32% of the Pannonian bioregion. However, due to partial or total overlapping of different categories of protected areas, the actual area is 217409.01 ha (15.52%).



Until the designation of Natura 2000 sites in the Pannonian region of Romania, the area covered by protected areas was 1.59% (22371.86 ha), and after 2007 the area covered by protected areas has progressively increased thanks to Natura 2000 sites, and of the Cefa Natural Park designated in 2010, amounting to 13.92% (195037.15 ha) of the total area covered by the Pannonian region.

**Table 1**  
**Spatial correlations between different categories of protected areas**

RONPA	SPA	PN2	PN1	RORMS	SCI	AREA (ha)
RONPA	0	0	0	0	0	2866.90
0	SPA	0	0	0	0	96165.49
0	0	0	0	0	SCI	34714.23
RONPA	SPA	0	0	0	0	670.47
RONPA	0	0	0	0	SCI	358.34
0	SPA	PN2	0	0	0	1629.01
0	SPA	0	0	0	SCI	59191.87
RONPA	SPA	0	0	0	SCI	1066.14
0	SPA	PN2	0	0	SCI	3336.55
RONPA	SPA	PN2	0	0	SCI	12.44
0	SPA	0	PN1	RORMS	SCI	17057.00
RONPA	SPA	0	PN1	RORMS	SCI	340.58

Legend: PN1 - Lunca Mureș Natural Park; PN2 - Cefa Natural Park

By overlay operations, the surface area overlapping different types of protected areas was determined (tab. 1). It can be seen that the space protected by different categories of protected areas is smaller than the surface obtained by summing the values for each type of protected area, as they overlap in the "vertical plane". The data summarized in table 1 shows that on the 340.58 ha five types of protected areas were identified, and over 17057 ha overlapped 4 entities.

The association between different categories of protected areas in a given territory may suggest a differentiated "degree of protection" from one sub-area to another, so that specific restrictions are imposed on the respective territories.

Establishing and declaring natural protected areas by law is not sufficient, they should be managed through active and sustainable management, for this reason another objective of our study was to present the situation regarding the administration of the protected areas of the Pannonian bioregion (fig. 3).

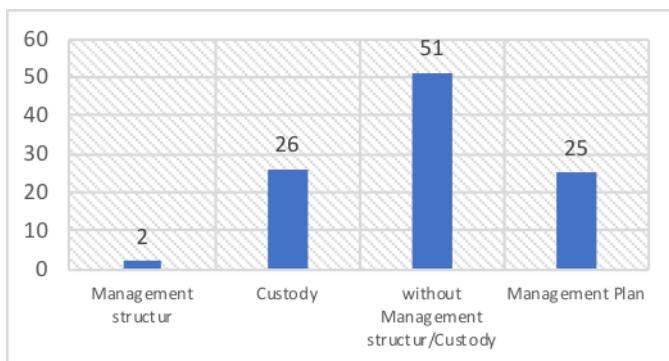


Fig.3 The management situation of the protected natural areas

Of the 79 protected bioregional areas, 2 are managed by management structures (the Lunca Mureș Natural Park and the Lower Mureș Floodplain), 26 are managed by the custodians and 51 have neither management nor custody facilities, and 25 operate in custody based on an approved management plan. Those without administration or custody, under Romanian law, are coordinated by the National Agency for Natural Protected Areas (ANANP).

## CONCLUSIONS

In Romania, the Pannonian region occupies an area of 1400132.21 ha, 6% of the national territory, and the protected areas amount to 217409.01 ha (15.52%) from the region. The management of the 79 protected areas is partly provided through administration or custody facilities (2 and 26 respectively) and 51 do not have management or custody facilities. Of the total protected areas, 25 have an approved management plan.

Protected Areas are the most effective way of preserving in-situ biodiversity, with the widest possible diversity in the long term.

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