ASSESSING THE EFFICIENCY OF THE ROMANIAN NATURAL PROTECTED AREAS IN CONSERVING PRIORITY HABITATS

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Abstract. In an attempt to safeguard its biodiversity, the European Union carried out more programs, including an inventory of its priority habitats (CORINE Biotopes) and the establishment of natural protected areas, including the Natura 2000 network. The Romanian national system of protected areas was developed in accordance with the guidelines of the International Union for the Conservation of Nature, although there are some variations concerning the definition of categories and stronger or weaker management guidelines. However, the process of establishing new areas was a true challenge, resulting into overlapping categories and even a lawsuit from the European Union. This study was aimed to use spatial metrics to examine the efficiency of the Romanian protected areas in the conservation of priority habitats. The results indicate that 81% of the habitats are included in the protected areas; the most efficient areas in preserving the key habitats are Ramsar sites and the Reserves of Biosphere, with 72, respectively 70% of their territory covering key habitats. Nevertheless, the efficiency of protection is debatable due to the land cover and changes affecting these areas.

Keywords: Natura 2000, Biosphere Reserves, Ramsar, IUCN, CORINE.

Rezumat. Evaluarea eficienţei ariilor protejate din România în conservarea habitatelor prioritare. Încercând să îşi conserve biodiversitatea, Uniunea Europeană a derulat mai multe programe, incluzând un inventar al habitatelor prioritare (Biotopuri CORINE) şi stabilirea ariilor naturale protejate, inclusiv reţeaua Natura 2000. Sistemul naţional românesc de arii naturale protejate a fost dezvoltat conform recomandărilor Uniunii Internaţionale pentru Conservarea Naturii, deşi există diferenţe în definirea unor categorii şi constrângeri de management mai puternice sau mai slabe. Cu toate acestea, declararea noilor arii naturale protejate s-a dovedit a fi o adevărată provocare, având ca rezultate categorii suprapuse şi chiar un proces din partea Uniunii Europene. Acest studiu şi-a propus să examineze eficienţa ariilor protejate din România în conservarea habitatelor prioritare folosind măsurători spaţiale. Rezultatele arată că 81% din aceste habitate se află în arii naturale protejate. Cele mai eficiente tipuri sunt siturile Ramsar şi rezervaţiile biosferei, al căror teritoriu este format în proporţie de 72, respectiv 70% din habitate prioritare. Cu toate acestea, eficienţa protecţiei este discutabilă datorită modificărilor acoperirii şi utilizării terenului din interiorul acestor arii.

Cuvinte cheie: Natura 2000, rezervaţii ale biosferei, Ramsar, IUCN, CORINE.

INTRODUCTION

Natural protected areas are crucial to sustainability by safeguarding a part of today's biodiversity (MÜCHER et al., 2009; KATI et al., 2015). In an attempt to safeguard its biodiversity, the European Union used two directives, Birds and Habitats, as a start point for assessing its biodiversity, and carried out more programs, including an inventory of the priority natural habitats, produced within the frame of CORINE Biotopes program, started in the mid 1980's (EVANS, 2012b), with a special focus on the priority ones (MOSS & WYATT, 1994; EVANS, 2006; MÜCHER et al., 2009; EVANS, 2012a). Based on the results, the Natura 2000 network was not designated for the strict preservation of biodiversity, but aimed at sustainability in partnership with local communities (STĂNCIOIU et al., 2010; SINGH et al., 2014), and consists of sites conserving priority habitats in the Habitat Directive (SCIs), areas for the protection of birds under the Birds Directive (SPAs) and sites connecting the first two categories (SACs) (MÜCHER et al., 2009; EVANS, 2012a; STRINGER & PAAVOLA, 2013).

The Romanian national system of protected areas was developed in accordance with the guidelines of the International Union for the Conservation of Nature, although there are some variations concerning the definition of categories and stronger or weaker management guidelines; for example, national parks have a more restrictive management, protected landscapes are more permissive, and natural monuments include species and individuals in addition to sites (MUNTEANU & SEVIANU, 2014). However, the process of establishing new areas was a true challenge (VANONCKELEN & VAN ROMPAEY, 2015), resulting into overlapping categories (IOJĂ et al., 2010) and even a lawsuit from the European Union (COJOCARIU et al., 2010). Currently, the national system of protected areas covers 18% of the national territory (STĂNCIOIU et al., 2010), a percentage similar to the European one (KATI et al., 2015). In particular, the Natura 2000 network was designated to cover the 90 types of natural habitats of a communitarian importance (PĂTROESCU et al., 2007).

Previous studies carried out in Romania aimed at assessing the efficiency of the national system of natural protected areas by looking at the overlap of categories (IOJĂ et al., 2010), coverage of biogeographical regions (PETRIŞOR, 2008, landform diversity PETRIŞOR, 2009) or coverage of wetlands (PETRIŞOR, 2010a). Most studies used Geographical Information Systems (GIS) in conjunction with spatial metrics or indicators, since the use of GIS alone is insufficient (PĂTROESCU et al., 2007).

This study was aimed to use GIS in conjunction with spatial metrics to examine the efficiency of the Romanian protected areas in the conservation of priority habitats.

DATA AND METHODS

The study used several datasets, freely available from the European Environment Agency and the Romanian Ministry of the Environment, Waters and Forests, presented in Table 1. Data were processed by re-projecting and sub-sampling subsets for Romania, clipping and dissolving contours based on sub-categories, and ultimately computing areas using the X-Tools extension of ArcView GIS 3.X. The analyses were aimed at assessing the coverage of habitats by the natural protected areas, comparing their share within and outside the natural protected areas, and the share of their area from the total area of each type of protected area.

Table 1. Specifications on the data used in the study: dataset, provider, URL, remarks and transformations.

Dataset	Provider	URL	Remarks	Transformation
CORINE biotopes in PHARE countries	Romanian Ministry of the Environment, Waters and Forests	http://www.eea.europa.eu/data-and-maps/data/corine-biotopes-in-phare-countries#tab-gis-data	2005 data	Project into Stereo 1970, sub-sample for Romania
Natural protected areas	Romanian Ministry of the Environment, Waters and Forests	http://mmediu.ro/new/?page_id=5178	Not all types of protected areas legally defined are available	None needed

RESULTS AND DISCUSSION

Table 2 and Figure 1 show the coverage of the priority habitats by the Romanian natural protected areas. The results indicate that 81% of the habitats are included in the protected areas; the most efficient areas in preserving the key habitats are Ramsar sites and the Reserves of Biosphere, with 72, respectively 70% of their territory covering key habitats.

Table 2. Coverage of the priority habitats by the Romanian natural protected areas.

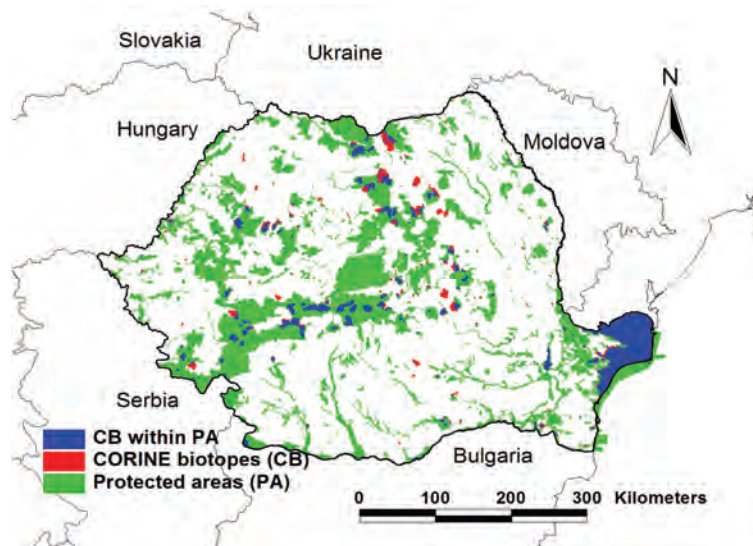|	CORINE habitats within the protected surface	CORINE habitats		Protected surface	
	Area (km²)	Area (km²)	% CORINE Habitats	Area (km²)	% protected surface
All categories	78.06		80.69	569.02	13.72
Natural parks, protected landscapes	53.36		55.16	166.39	32.07
Ramsar sites	45.25		46.77	62.72	72.15
Scientific and natural reserves, natural monuments	7.35	96.74	7.59	25.11	29.25
Biosphere reserves	46.30		47.86	66.17	69.97
Natura 2000 SCIs	73.10		75.57	415.22	17.61
Natura 2000 SPAs	63.77		65.92	369.36	17.26
Natura 2000 SACs	4.45		4.60	19.35	23.01

Figure 1. Coverage of the priority habitats by the Romanian natural protected areas (original).

Romanian protected areas face different threats despite the protection status; the main issues include land cover and use changes (PETRIŞOR, 2015), climate changes (PETRIŞOR, 2010b, 2011; SÂRBU et al., 2014), economic (STĂNCIOIU et al., 2010; KATI et al., 2015; WILFRED & MACCOLL, 2015) and social issues (STAN et al., 2013; ADETOLA & ADETORO, 2014). In addition to the efficiency of spatial coverage, an in-depth study should also look at the efficiency of enforcing the protection status (PETRIŞOR, 2010a; SINGH & BORTHAKUR, 2015) and of the management plans (POP et al., 2010).

The limitations of the study refer to the unavailability of data for some categories. Scientific and natural reserves and natural monuments are included only if their area exceeds 5 hectares; however, the missing categories account for a very limited portion of the national system of protected areas.

CONCLUSION

The results suggest a very good coverage of the priority habitats by the Romanian natural protected areas, especially by the Ramsar sites and Reserves of Biosphere. Nevertheless, the efficiency of protection is debatable due to the land cover and changes affecting these areas.

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