STUDIA UBB BIOLOGIA, LVIII, 2, 2013 (p. 91-95)

PARTICIPATORY MONITORING OF BIODIVERSITY IN THE RODNA MOUNTAINS NATIONAL PARK (BIOSPHERE RESERVE)

CLAUDIU IUȘAN[1,✉]

SUMMARY. The Rodna Mountains National Park started an innovative model of biodiversity conservation by involving volunteers as pioneers in Romanian system of protected areas. The participatory monitoring of biodiversity in the Rodna Mountains National Park (the Eastern Carpathians) is a system developed during 9 years and based on involvement of a network formed from 1,000 volunteers, rangers, researchers, experts in flora and fauna, biologists, ecologists which are monitoring 26 flagship species of animals and plants, combining the participatory monitoring with environmental education.

Keywords: biodiversity, flagship, monitoring, participatory.

Case study

The Rodna Mountains National Park is one of the hotspots of biodiversity at the Carpathian level and one of the three Romanian Biosphere Reserves (Iușan, 2011). The Park Administration tried during 9 years (2004-2013) various approaches to develop a combination of environmental, social and economic interventions that conserve biodiversity. The encouraging outcomes of these interventions have led us to pursue the successful approaches over the past 9 years.

The participatory system of monitoring biodiversity created in the Rodna Mountains is offering practical guidance on the key methods and tools that were developed, tested and refined over the years by working with local communities, partners and governmental agencies (Szabo *et. al*, 2008).

The starting point of the system focusing on biodiversity monitoring was set up in 2004 in the framework of an international partnership between the Park Administration of the Rodna Mountains National Park and Environmental Change Institute from Oxford University (UK). Building on these insights, we have been producing a number of field guides, manuals, toolkits and guidelines.

[1] *The Rodna Mountains National Park Administration, 1445 Principală Str., Rodna, Bistrița-Năsăud, www.parcrodna.ro*

✉ ***Corresponding author: Claudiu Iușan**, The Rodna Mountains National Park Administration, 1445 Principală Str., Rodna, Bistrița-Năsăud , www.parcrodna.ro,*
E-mail: iusan2000@yahoo.com

At the beginning of the Park Administration establishment (2004), a group of experts from Oxford University and Park Administration was involved in working groups for assessment the biodiversity status in the protected area and setting up the steps for developing a participatory monitoring system (Table 1).

Table 1.

Steps for developing a participatory monitoring system for biodiversity in the Rodna Mountains National Park (Biosphere Reserve)

No.	Steps for developing the monitoring system of biodiversity
1	Working groups for assessing the biodiversity conservation status
2	Identifying the needs for nature conservation
3	Identifying the key stakeholders for biodiversity conservation (SWOT analysis)
4	Selecting the set of flagship species for participatory monitoring (25 species of flora and fauna)
5	Selecting the volunteers for participatory monitoring
6	Establishing the monitoring forms and protocols for each flagship species of flora and fauna for standardizing the collecting process of biological data
7	Training the volunteers in methods and techniques for monitoring the flagship species
8	Setting up the electronic database for biodiversity monitoring
9	Collecting biological data from field
10	Supervising the monitoring process of flagship species
11	Analyzing the collected data
12	Validating the biological data
13	Establishing the conservative management measures for flagship species
14	Including the management measures in the Management Plan of the National Park
15	Effectiveness assessment of the monitoring system
16	Improving the effectiveness of participatory monitoring of biodiversity
17	Disseminating and applying the system in other protected areas
18	Financial sustaining the monitoring system

The Park Administration organized a few working groups for assessing the conservation status of biodiversity from the Rodna Mountains. As a result of the working groups focused on biodiversity assessment, more than 1,000 scientific articles, dissertations, books and doctoral thesis were analyzed and a database for biodiversity was created with 6,516 species of flora and fauna, which places the Rodna Mountains on the second place in Romania as the number of inventoried species of flora and fauna (Iușan, 2011).

Identifying the needs for nature conservation was the second step for developing a system of monitoring. Using SWOT analysis, the following entities were identified as key stakeholders: research institutes, faculties of biology and ecology, schools, NGOs, science museums, landowners, land administrators etc.

Volunteers were selected from these different groups which can help the Park Administration in monitoring target species. Having in mind the importance of flagship species and habitats, target species were identified, taking into account their rarity, endemic status, vulnerability and protection status (Table 2).

Table 2.

Set of flagship species taken into account for monitoring in the Rodna Mountains

No.	Flagship species identified for participatory monitoring in the Rodna Mountains	
	Scientific name	**Vernacular name**
1	*Rupicapra rupicapra carpathica*	Chamois
2	*Marmota marmota*	Alpine marmot
3	*Narcissus stellaris*	Daffodils
4	*Pholidoptera transsylvanica*	Transylvanian bush-cricket
5	*Rosalia alpina*	Rosalia longicorn
6	*Microtus nivalis*	Snow vole
7	*Tetrao tetrix*	Black grouse
8	*Erebia sudetica radnaensis*	Sudeten ringlet
9	*Tetrao urogallus*	Capercaillie
10	*Papaver alpinum corona-sancti-stephani*	Glacier poppy
11	*Silene nivalis*	Rodna Mountains rush-light
12	*Gentiana punctata*	Spotted gentian
13	*Dianthus tenuifolius*	Dianthus
14	*Dianthus superbus*	Dianthus
15	*Eriophorum scheuczeri*	Scheuczer´s cotongrass
16	*Lynx lynx*	Eurasian lynx
17	*Leontopodium alpinum*	Edelweiss
18	*Miramella ebneri caprathica*	*Miramella* locust
19	*Muscardinus avellanarius*	Common dormouse
20	*Triturus montandoni*	Carpathian newt
21	*Drosera rotundifolia*	Sundew
22	*Ranunculus crenatus*	Crenate buttercup
23	*Soldanella hungarica*	Snowbell
24	*Inachis io*	Peacock
25	*Pinus cembra*	Swiss pine
26	*Barbastella barbastellus*	Western Barbastelle bat

The monitoring protocols were developed for each species (26) by involving experts in each group of plants and animals, these documents being an important tool for teaching the responsible persons for monitoring (rangers, teachers, students, volunteers) about the biology of flagship species, methods and techniques used for monitoring, period of monitoring, type of biological data collected, abiotic parameters, geographic coordinates.

According to the monitoring protocols, the monitoring forms were elaborated in order to collect the data. During the field monitoring, the persons responsible for monitoring have filled the monitoring forms and after that transposed them in the electronic database of the Rodna Mountains National Park and the information used in management decision process for conserving the target species and habitats.

The field monitoring is involving diverse techniques and methods which are proper for each flagship species: entomological nets for butterflies and grasshoppers, lighting traps with black, white, UV light for moths, Shermann life-traps for small mammals, Barber traps for bugs, binoculars for birds and large mammals, aquatic nets for amphibians, bat detector for bats and locusts, sound recording with the field microphone and analysis of frequency and amplitude (sonograms, oscilograms) for locusts and bats, field guides for all species, sound recorder for birds and call back method, field microscopes for plant seeds, night vision monocular for large mammals and birds, pneumatic boat for glacial lakes and peat bogs, GPS and radio collars for chamois and lynx, video cameras with infrared sensors for large carnivores etc. All the equipment is assured by the Park Administration.

The data collected from field is analyzed, selected and validated by the Scientific Council of the Rodna Mountains National Park, which is composed of 23 members (researchers, university teachers, experts in flora and fauna). The valid biological data are introduced by the supervisors of monitoring system (rangers and IT experts) in the electronic biodiversity database.

Using the new data collected by the network of volunteers regarding the flagship species, the Scientific Council and the Park Administration are deciding and establishing the conservative management measures for preserving the target species. For example, certain vulnerable habitats with flagship species are included in more restricted management zones such as strict protected areas or integral protected areas inside the national park and biosphere reserve. Based on other results, the Park Administration established new scientific reserves such as Corongis, Bila-Lala, Piatra Rea and Pietrosu Mare or banned the access of tourists in hibernation period of bats in different caves, redirected the tourists in the breeding season of large mammals. The daffodil (*Narcissus stellaris*) meadow from the Saca Massif was monitored in last 9 years by volunteers and taking into account the effect of overgrazing identified a few years ago, this activity was established by the management measures of the Park Administration and now the meadow is enlarging. Valuable distribution maps were created using the GIS and remote sensing, finding more information about the flagship species monitored.

The participatory system of monitoring biodiversity is assessed every year for improving its effectiveness by the Park Administration, using questionnaires, interviews, requests from members of the network. For the past 9 years, 10 international exchange programs were organized between volunteers from the Rodna Mountains and Eischfeld-Hanich-Werratal Nature Park from Germany, Pyrenees National Park from France, Gran Paradiso and Abruzzo National Parks from Italy, Hohe Tauer

National Park from Austria, Bayerischer Wald National Park from Germany, Sumava National Park from Czech Republic, High Tatra National Park from Slovakia, Borjomi Karagauli National Park from Georgia, Sooma National Park from Estonia. All these exchanges were focused on transferring the experience regarding the participatory monitoring of flagship species and improving the model developed in the Rodna Mountains.

The participatory monitoring system is sustained from financial point of view by different grants from Darwin Initiative (UK), Netherland Embassy, Rufford Foundation (UK), Alfred Toepfer Academy for Nature Conservation (Germany), Life Natura, Grundtvig, Youth in Action Program, Structural Funds for Environment, GEF Small Grants (USA), EEA – Financial Programs of Iceland, Liechtenstein and Norway in Romania, Erasmus, Partnership Foundation for Environment, Rompetrol Funds.

REFERENCES

Iuşan, C. (2011) *Monografia Parcului Naţional Munţii Rodnei (Rezervaţie a Biosferei)*, Ed. Todesco, Cluj Napoca, pp 335

Szabo, A., Lawrence, A., Iușan, C., Canney, S. (2008) Participatory protected area management - A case study from Rodna Mountains National Park, Romania, *International Journal of Biodiversity Science and Management* 4, 197-199, DOI 10.3843/Biodiv 443