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Research Article

Environmental and Economic Zoning of Specially Protected Natural Areas in the Framework of Natural Resources Rational Use

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ABSTRACT.
Organization of rational use of land and its protection are among the most important land management activities and are implemented in the process of conducting various kinds of territory zoning. The article highlights the issues of ecological and economic zoning of the specially protected natural areas of the Irbitsky Reserve in order to ensure rational land use and realization of goals and objectives of its operation. Six functional zones were identified as a result of the land use analysis and the ecological and economic zoning of the reserve, taking into account the existing use of the territory, economic feasibility and environmental priorities for the land and natural resources use. The results of the study allowed developing a number of proposals for planning and rational use of lands of the reserve in order to ensure both economic activities and environmental protection.

Keywords: Rational land use, Specially protected natural areas, Reserve, Ecological and economic zoning, Protection of natural resources.

INTRODUCTION

Specially Protected Natural Areas (SPNAs) are plots of land where natural complexes and objects are located that have special environmental, scientific, cultural, aesthetic, recreational and health value, which are partially or completely removed from economic use and for which special protection is established [1]. These territories are designed to ensure environmental stability. The growing demand for eco-tourism leads to the creation and development of protected areas [2], requiring a special approach to the arrangement of their rational use. Rational use should be understood as effective, targeted use of land executed in compliance with the interests of society, in consideration of environmental relations in the natural environment and in combination with the protection of land as the basis of human life and activity [3]. The main land management activity for organizing the rational use and effective management of territories is the execution of various types of zoning. The rationality of land use at the zoning stage makes it possible to cluster the plots, identify and study the features of the organized territories and make the right decisions on their use based on the common features of the territory and a set of overall phenomena [4]. For these purposes, landscape, landscape-ecological, ecological, physical-geographical, economic-geographical, natural-economic, natural-agricultural and other types of zoning are used. The result of zoning is a specific network of isolated and delimited zones or territories, characterized by the presence of common features [5]. One of the types of comprehensive zoning of the territory is ecological-economic zoning, which is intended to determine the regulations for the economic development of the territory with the formation of activities for the protection and rational use of

natural resources based on its resource and ecological possibilities [6].

MATERIALS AND METHODS

The study object is the territory of the Irbitsky Reserve located in the northwestern part of the Irbitsky municipal district of the Sverdlovsk Region. This is a reserve of local significance, with an area of 66.0 thousand hectares within the borders of Irbit forestry. It was created to protect the diversity of local upland fowl (wood grouse, black grouse, hazel grouse) and elk, roe deer, squirrel, marten, lynx.

Cartographic materials for the territory of the study object and reports on the activities of the reserve were used as study materials. Abstract-logical, forecasting, cartographic, computational-constructive, analytical, statistical research methods and the method of analysis and synthesis were applied.

The methodology of work on the implementation of ecological and economic zoning of the Irbitsky Reserve SPNA is represented in stages according to the diagram in Fig. 1.

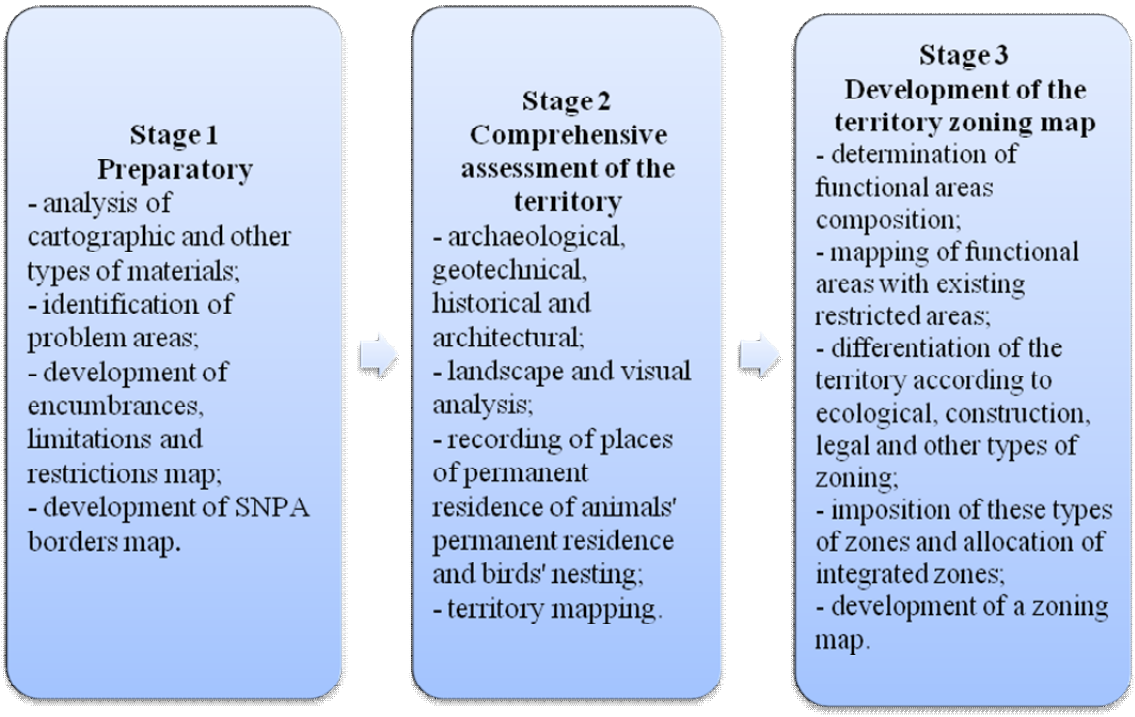

Fig. 1 Stages of ecological and economic zoning of the Irbitsky Reserve.

As a result of the land use analysis of the Irbitsky Reserve, it was established that the major part of the territory is occupied by forests (70%), hayfields and pastures (15%) and other acreages including wetlands, accounting for 15% of the total area.

The analyzed results of the current use of natural resources and ecosystem services of the reserve are presented in Table 1.

Table 1: Use of natural resources of the reserve

Item No.	Natural resources and ecosystem services	Main recipients of services
1 1.1	Forest resources Timber resources (firewood)	Irbit forestry, local residents
1.2	Non-timber resources (berries, mushrooms, medicinal plants, nuts)	Local residents
2	Hay and pasture acreages (mowing)	Local residents
3	Rare plants	Local residents
4	Recreational resources	Visiting tourists, local residents, business structures

5	Hunting resources	Visiting hunters, business structures, local residents
6	Land resources	Local residents, business structures
7	Mineral resources	Local residents, business structures

RESULTS

Ecological and economic zoning of the Irbitsky Reserve territory was carried out based on the analysis of its existing use: ecological and economic zones were allocated and their areas and percentage ratio in the reserve's land use structure were calculated. The results are presented in Table 2.

Table 2: Results of ecological and economic zoning of the reserve

No. of the zone	Functional zone name	Area	
		[ha]	[%]
I	Hunting zone	26,400	40
II	Wildlife residency zone	12,540	19
III	Protected bird species breeding zone	13,332	20
IV	Agricultural zone (forage conservation)	4,488	7
V	Agricultural zone (crop production)	6,930	11
VI	Administrative zone	2,310	3
TOTAL		66,000	100.0

A map representing the ecological and economic zones of the Irbitsky Reserve is shown in Fig. 2.

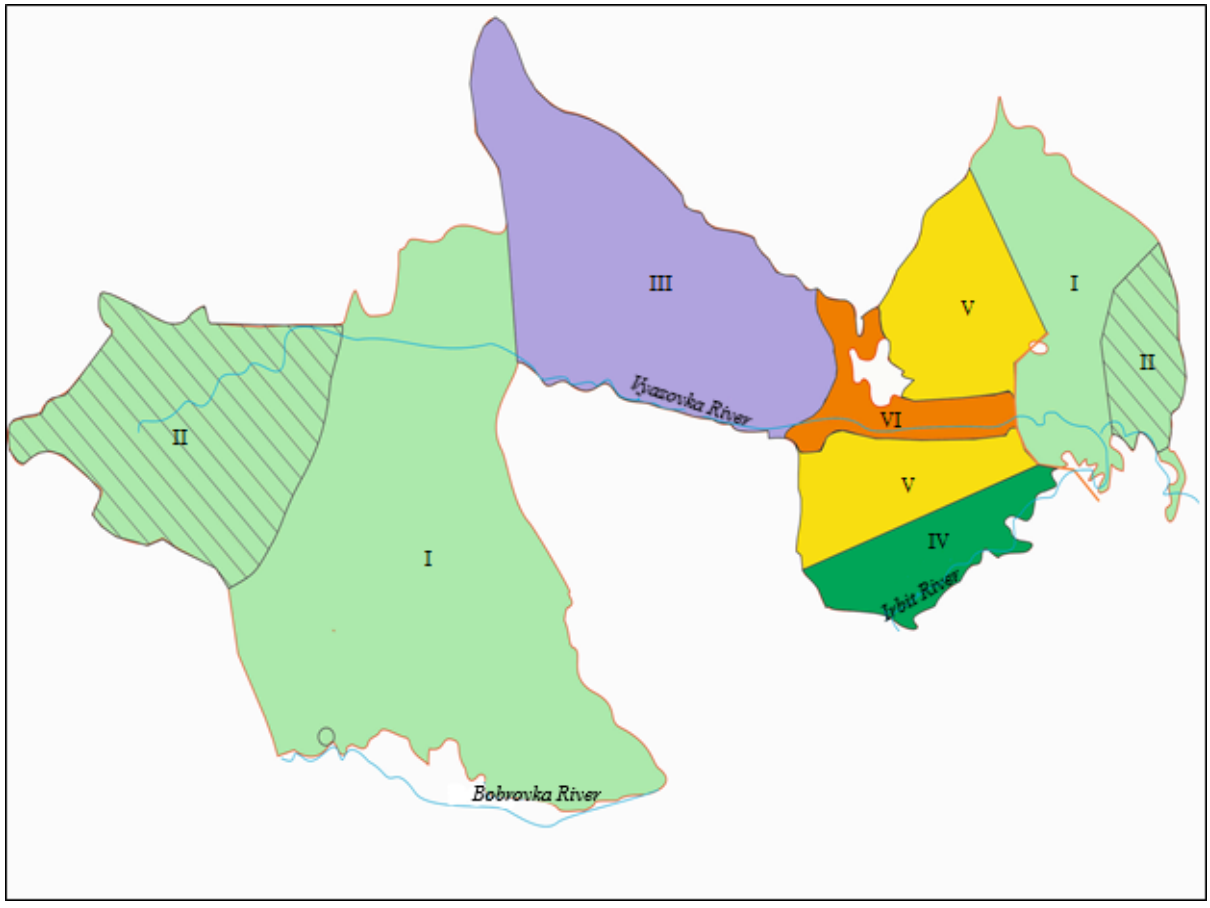

Fig. 2 Map of ecological and economic zoning of the Irbitsky Reserve territory.

When ranking selected zones by area, it should be noted that the largest one is occupied by the hunting zone (40%), since one of the tasks of the reserve is to issue permits for hunting according

to one-time individually issued licenses, while the smallest one is the staff accommodation zone (administrative zone).

Discussion and Conclusions

Results of ecological and economic zoning are used as the foundation of the project proposals for the development of measures for the organization of reserve lands rational use:

- carrying out detailed research work on the impact of economic activities on flora and fauna, in order to prevent a reduction of and to help grow the number of animals therefore preserving biodiversity;
- conducting an inventory of lands in the reserve in order to identify unused or non-designated lands;
- performing cadastral evaluation of the reserve territory based on the capitalization of the estimated rental income or taking the costs required for the reproduction and preservation of the natural potential (income or cost method) into account;
- organizing ecological tourism and travel routes in order to immerse a person in an untouched natural environment.

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