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Spatial analysis of natural reserve fund of the Zakarpatska Oblast

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Abstract. The article brings light to the study of the nature reserve fund (NRF) of Zakarpatska oblast as a component of the national heritage of the country. Representativeness is considered to be one of the main principles of spatial formation of the NRF object network. Therefore, to determine the current state and ensure further effective development of the region's nature reserve fund, it is necessary to analyze its territorial and internal structural indicators. The purpose of the study is to analyze the current status of the region's nature reserve fund with the reference to the possibility of introduction of the further new management practices. The article is based on information and statistical materials, the provisions of regional programs for the formation of the ecological network and environmental legislation of Ukraine. To solve the assigned tasks, there has been done a comprehensive analysis of statistical reporting data and materials of the NRF Register in Zakarpatska oblast of the Department of Ecology of Natural Resources of Zakarpattia Regional State Administration within the period of 2019, and reporting documents of environmental institutions for the same period. The considered indicator is the territorial distribution of nature reserve areas and region areas by administrative districts (before the formation and implementation of changes to the administrative-territorial structure of the Zakarpatska oblast), which is presented in the form of the division into four groups. The spatial distribution of the territory and the NFR objects do not sufficiently meet the criteria of local representativeness, so their spatial structure needs significant improvement, be specific – the creation of nature reserves, especially in the lowlands of the region. The average density of nature protection objects in the region (36 units / 1000 km^2) is almost three times higher than the corresponding indicator in the neighboring Lviv region. The average value of the reserve factor in the region makes 14.17 %. It has been found that the reserve ratio demonstrates geographically the largest disproportion in Zakarpatska oblast. It is the highest indicator in turns of administrative entities in the districts of Mizhhiria, Velyky Bereznyi and Rakhiv. The lowest one is in Svaliava and Berehove districts, respectively. In addition, the reserve ratio compared to the national average indicator and in other European countries has been carried out. The quality of the nature reserve network is determined by the insularity coefficient, which indicates the size of the NRF objects and their stability. Further expansion of the network of nature protection objects in Zakarpatska oblast is possible due to the creation of Latorytsa, Shaian and Uzhok landscape parks. A big assumption can be made that by 2020 it will be possible to create new and expand existing areas of NRF in the region up to 100–120 thousand hectares, which will increase the protected area up to 20–22 %. The key issues of nature reserves to be developed in Zakarpatska oblast are primarily related to the imperfection of the management system. To handle this problem, there is an urgent need to develop a strategy, which will envisage the perception of the NRF as a holistic anthropogenic and natural unit in order to put into practice the environmental, scientific, educational and recreational functions.

Keywords: nature reserve fund (NRF), density of nature protection objects, reserve factor, index of insularization, Zakarpatska oblast

Просторовий аналіз природно-заповідного фонду Закарпатської області

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Анотація. Стаття присвячена дослідженню природно-заповідного фонду (ПЗФ) Закарпатської області як складової національного надбання країни. Одним із головних принципів просторового формування мережі об'єктів ПЗФ є репрезентативність. Тому для визначення сучасного стану та забезпечення подальшого ефективного розвитку природно-заповідного фонду регіону необхідно здійснити аналіз його територіальних та внутрішньо-структурних показників. Метою дослідження є проведення аналізу сучасного стану природно-заповідного фонду області щодо можливостей запровадження в подальшому нових практик управління. Здійснено оцінку його територіальних та внутрішньо-структурних показників, на основі якого можна судити про рівень сформованості сучасної природно-заповідної мережі області. Розглядається розподіл територій та об'єктів ПЗФ Закарпатської області за їх значенням, категоріями та типами. Розраховано щільність об'єктів ПЗФ, коефіцієнт заповідності та індекс інсуляризованості. На основі цих показників проведено групування адміністративних районів області ще до початку формування та впровадження змін до адміністративно-територіального устрою Закарпатської області. З'ясовано, що коефіцієнт заповідності демонструє найбільшу диспропорцію в територіальному відношенні у межах Закарпатської області. Крім того, здійснено порівняння коефіцієнта заповідності з середнім показником по країні та іншими країнами Європи. Якість природно-заповідної мережі визначено за допомогою коефіцієнта інсуляризованості, що засвідчує величину об'єктів ПЗФ та їхню стійкість. Акцентується увага на перспективі подальшого розширення мережі природно-заповідного фонду Закарпатської області за рахунок створення нових природоохоронних об'єктів, зокрема, Латорицького, Шаянського та Ужоцького ландшафтних парків, та розширення меж уже існуючих природозаповідних територій. Окреслені основні проблеми розвитку заповідної справи в області на сучасному етапі. Існує нагальна потреба щодо розробки стратегії, яка передбачатиме сприйняття ПЗФ, як цілісного антропогенно-природного організму з метою практичного втілення природоохоронної, науково-освітньої та рекреаційної функцій.

Ключові слова: природно-заповідний фонд, щільність об'єктів ПЗФ, коефіцієнт заповідності, індекс інсуляризованості, Закарпатська область

Introduction.

A prominent place in the structure of territories and objects, which have the status of special legal protection, is given to the nature reserve fund of Ukraine (hereinafter – NRF). NRF is characterized by a special mode of protection, reproduction and use. Thus, the Law Ukraine "On Environmental Protection" states that natural areas and objects that are of great ecological value as unique and typical natural complexes under special state protection (Zakon Ukrainy "Pro okhoronu navko lyshnoho pryrodnoho seredovyshcha", 1991). Well-known American scientist Eugene Odum noted that to maintain the basic functioning of ecosystems and landscapes, it is necessary to preserve two-thirds of the territory in its natural state, while in Europe the area of protected areas is about 20 %. The nature reserve fund of European countries is almost 98 % concentrated in specialized ecological networks. As a national heritage of the NRF of Ukraine is a component of the world system (formation) of protected areas and objects, so it is necessary to implement the experience of European countries in land use of nature reserves, namely in terms of ecological networks.

In 1992, European legislation significantly broadened the understanding of the environmental protection problem, as a result of which the European program "Nature 2000" was developed – a system of special protected areas for wildlife conservation in Europe (Pietrzyk-Sokulska, 2009). A study of the experience of neighboring Poland in the operation of the nature reserve fund indicates differences in the level of financial and logistical support, in particular, some funding for Polish parks is provided by the European Union, as well as the principles of land use in such facilities. Despite the differences in the functioning and structure of the NRF between the two countries, they outline common goals, that is the preservation and balanced use of nature reserves. It is also necessary to take into account the European trends in the creation of geoparks, but the prospects for the use of such facilities for geotourism purposes, as shown by the experience of European countries in general and Poland in particular, are significant.

One of the main principles of spatial formation of the network of NRF objects is representativeness. Therefore, to determine the current state and ensure further effective development of the nature reserve fund of the region, it is necessary to analyze its territorial and intra-structural indicators.

Some aspects of the formation and development of nature reserves in Ukraine are considered in the works of: V. I. Hetman (Hetman, 2002), M. P. Stetsenka, F. D. Gamora (Stetsenko, Hamor, 2017), M. D. Grodzynsky (Hrodzynskyi, Sheliah-Sosonko, 2001), B. M. Girnogo, A. A. Kovalchuk (Kovalchuk, Ivanov, Sviderko, 2004; Kovalchuk, Pavlovska, Savchuk, 2011), O. Y. Kovalenko, D. V. Krylova, S. M. Stoiko (Stoiko, Hadach, Shymon, Mykhalyk, 1991) and others.

The main functions of the nature reserve fund are nature protection, scientific-education and recreation. The biosphere-ecological concept of sustainable development of TRS in their works was studied by L. Arkhipova, N. Fomenko, I. Kinash, O. Golovina (Arkhypova, Fomenko, Kinash, Golovnia, 2019). Various aspects of the formation, functioning and development of objects of the nature reserve fund of the Zakarpatska oblast, the assessment of its representativeness are found in the scientific works of S. M Stoiko (Stoiko, Saik, Tatarynov, 1982), F. D. Gamor, J. B. Oliynyk, V. I. Hetman (Oliinyk, Hetman, 2002), S. S. Pop (Pop, 2011), V. F. Antosyaka, N. F. Gabchak, L. F. Dubis, A. V. Melnyk, N. V. Chyr (Habchak, Dubis, Melnyk, Chyr, 2018), V. P. Kichuri, A. V. Kichura (2009),

V. V. Krichfalushiy, A. V. Mygaly, V. I. Nikolaychuk and others.

The purpose of the study is to analyze the current state of the nature reserve fund of the Zakarpatska oblast on the possibility of further introduction of new management practices. After all, at the present stage there is a growing social importance of nature reserves for the development of the state in general and the region in particular, which requires scientific justification by establishing the dynamics, identifying major trends and patterns of its development, as well as identifying and solving problems to ensure further effective development.

Materials and methods of research.

This article is based on information and statistical materials, the provisions of regional programs for the formation of the ecological network and environmental legislation of Ukraine. The study was conducted on the basis of analysis of statistical reports and materials data of the Register of NRF of the Zakarpatska oblast of the Department of Ecology of Natural Resources of the Zakarpatska Oblast State Administration for 2019 and reporting documents of environmental institutions of the region. The methodological tools of the study are presented by analytical, statistical, comparative-geographical, mathematical methods, as well as methods of generalization, systematization, classification and typology.

Methods of grouping and structuring were used to estimate the quantitative indicators of the NRF objects of the Zakarpatska oblast. Using the cartographic method, the territorial distribution and density of NRF objects were revealed. Research the qualitative characteristics of the NRF of the region of was carried out based on the insularity ratio, which proves the stability of protected areas (Klymenko, Olijnyk, 2014).

Results and their analysis.

Spatial-dynamic criteria for determining the representativeness of the natural funds are based on the statement that protected areas should be combined in space and time and have sufficient space to maintain biodiversity. Estimation of spatial-dynamic criteria is rather difficult. It is mainly based on qualitative characteristics, principles of functioning of eco-corridors, one of the important functions of which is to provide migration routes for the fauna.

To achieve the purposes of research on the possibilities of introducing new management practices natural commandments of Zakarpatska oblast it is necessary to analyze the total number of protected areas and their connection. It is, first of all, about the spatial organization of territories, which would ensure the integrity and effective protection of ecosystems, help to prevent artificial fragmentation of protected areas. In case of insufficiency of these characteristics it is necessary to solve questions concerning expansion of a network of NRF (Didukh, Vakarenko, Vynokurov, 2016).

The existing network of NRF of Ukraine was created mainly for the needs of protection of rare plants and animals, however, if we proceed from the idea that in modern conditions its objects should be the nuclei of a single ecological network, it is entrusted, among other things, the function of landscape and biodiversity. Thus, the prospects for improving the organizational and legal framework for the preservation of landscape and biotic diversity are primarily related to ensuring the combination of territories and objects of the NRF and other specially protected objects as part of a single multifunctional ecological territorial system (Udovychenko, 2017).

The urgency of the topic increases due to the need to create a Pan-European eco-network in the context of the Pan-European Strategy for Biodiversity Conservation (Sofia, 1995) as a result of combining eco-networks of different levels, forming an optimal structure of protected areas.

The key to creating conditions for the effective functioning of typical natural and unique landscapes, reducing the rate of loss of biological diversity is the formation of a representative, scientifically sound and holistic in spatial and functional aspects of protected areas (Chyr, 2016).

The current structure of the nature reserve fund of the studied area consists of 469 territories and objects on the total area of 180.6 thousand hectares (as of 2019) (Fig. 1). At the same time, 34 objects are of national importance (155.5 thousand hectares) and 435 objects of local importance (25.1 thousand hectares) (Department of Environment Natural Resources Zakarpatska oblast Regional Administration, 2019). The distribution of territories and objects of Zakarpatska oblast NRF by their meaning, categories and types are given in table. 1.

It should be noted that the area of the NRF of the Zakarpatska oblast of more than 185.3 thousand hectares does not fully reflect the real area of protected territories. Quite often, nature protection objects of the highest category of reserve include the territories of lower categories of nature reserve fund. Therefore, the actual area of the NRF of the region without duplication is 180.7 thousand hectares, which is 2.5 % less than the previous figure.

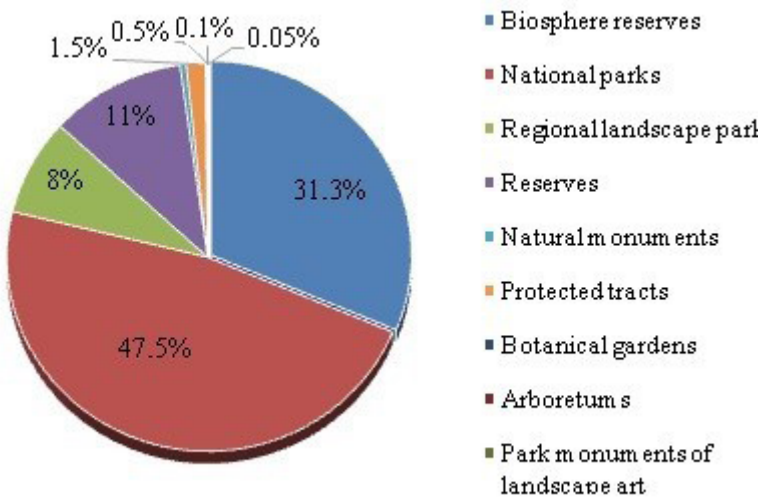

Fig. 1. The structure of the NRF of Zakarpatska oblast,% of the area of individual categories to the total area of the NRF (created by the authors on the basis of (Department of Environment Natural Resources of Zakarpatska Oblast Administration, 2019)

Table 1. The structure of the nature reserve fund of Zakarpatska oblast (as of 2019) (Department of Environment Natural Resources of Zakarpatska Oblast Regional Administration, 2019)

Categories of nature reserve fund	Objects of NRF						% of certain categories of the total area of NRF
	national importance		local significance		total		
	amount	area, hectares	amount	area, hectares	amount	area, hectares	
Biosphere reserves	1	58035.8	-	-	1	58035.8	31.31
National parks	3	87964.3	-	-	3	87964.3	47.46
Regional landscape parks	-	-	2	14961.9	2	14962.0	8.07
Reserves	19	12368.0 (9218.0*)	56	7935.5 (7098.9*)	75	20303.5 (16316.9*)	10.95
Natural monuments	9	464.0 (192.0*)	329	478.7 (384.3*)	338	942.7 (576.3*)	0.50
Protected tracts	-	-	12	2848.1 (2546.1*)	12	2848.1 (2546.1*)	1.54
Botanical gardens	1	86.4	-	-	1	86.4	0.05
Arboretums	-	-	2	34.9	2	34.9	0.02
Park monuments of landscape art	1	38.0	34	138.3	35	176.3	0.10
Total:	34	158956.5 (155534.5*)	435	26397.4 (25164.4*)	469	185353.9 (180698.9*)	100

Footnote: * – The actual area without duplication

As we can see, there is a certain disproportionate representation of different classification categories of protected areas in the NRF network of the region. At the same time, during their creation and further operation, attention is focused on the protection of individual components of nature, rather than the landscape as a whole. In addition, among all possible for the creation and defined by law a range of categories of NRF objects, the bequest of land took place mainly in the status of reserves and protected tracts of local importance, so they are quantitatively dominant in the region (Udovychenko, 2017).

Multifunctional objects of higher categories of reserves (Carpathian Biosphere Reserve, National natural park "Synevyr", National natural park Uzhansky Regional landscape park "Enchanted Land", Regional landscape park "Sinyak") make up the lion's share of the territories that have the status of protected areas (Fig. 2). Together, they occupy 87.3 % of the total area of the Zakarpatska oblast.

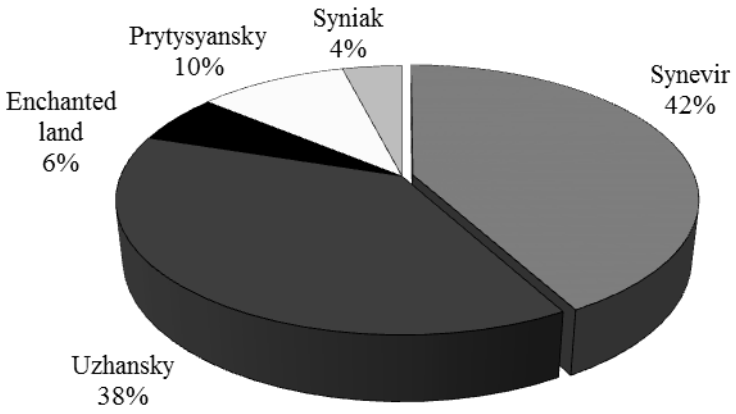

Fig. 2. Value space of the areas of the NRF objects of the Zakarpatska oblast of the highest categories of reserves (created by the authors).

Such protected areas are the destinations that attract tourists due to the availability of unique or specific tourist and recreational resources and appropriate infrastructure. However, special attention should be paid to the negative impact on the former environment due to the development of mass tourism, management of visitor flows, identification of sustainable types of tourism, the introduction of technologies to reduce the negative impact on the environment.

In recent years, Ukraine concerned mainly about improving the structure of NRF in quantitative manifestation, leaving aside its qualitative characteristics. Therefore, we consider it appropriate to investigate the qualitative characteristics of these areas.

In addition to the categorical distribution of the NRF of the region in accordance with the functions they perform, a qualitative reflection of the network of protected areas is the uniformity of their location.

The territorial structure of nature reserves and territories in the context of the administrative division of the region is quite representative. Analysis of their territorial structure shows a diverse distribution of protected areas in terms of administrative districts (studies are based on materials that preceded the reform to form a new administrative-territorial structure of the region), (Fig. 3) (Habchak, Dubis, Melnyk, Chyr, 2018).

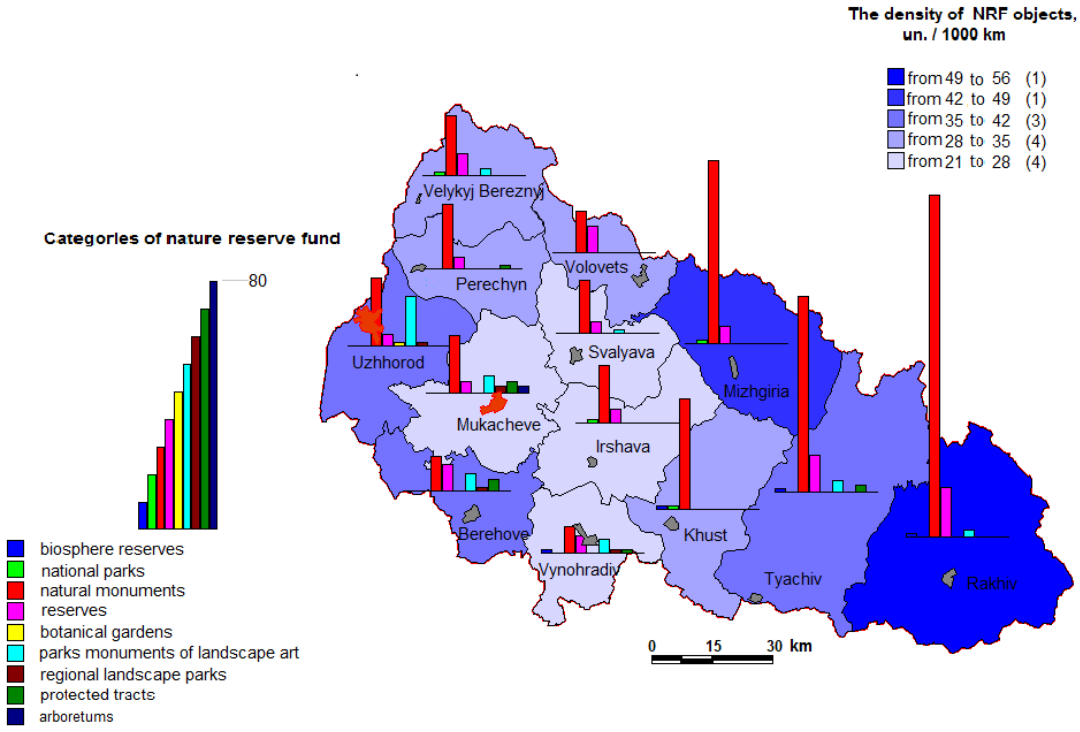

Fig. 3. Territorial structure of the nature reserve fund of Zakarpatska oblast

According to the assessment of quantitative indicators of NRF objects, the administrative units of Zakarpatska oblast are grouped as follows:

– Velykobereznyansky, Berehivsky, Vynohradivsky, Volovetsky, Irshavsky, Mukachevo, Perechynsky, Svalyava and Khust districts are territories with a small number of nature protection objects (up to 30 units);

– Uzhhorod, Mizhhirya and Tyachiv districts belong to the territories with a significant number of nature protection objects (30–60 units);

– Rakhiv district represents a group with a large number of environmental facilities (over 90 units). It accounts for 23 % of all NRF facilities in the region.

According to the indicator of spatial distribution of NRF areas, administrative units of Zakarpatska oblast can be grouped:

– Berehovo and Svalyava districts are the territories with a very small protected area (up to 1 thousand hectares);

– Volovets, Perechyn, Khust districts are the territories with a small protected area (up to 5 thousand hectares);

– Vynohradiv, Irshava, Mukachevo, Uzhhorod districts are the territories with large protected areas (5–10 thousand hectares);

– Velykobereznyansky, Mizhhirsky, Rakhiv, Tyachiv districts are the territories with a large protected area (over 10 thousand hectares).

The relative indicators, calculated in relation to the area of 1000 km², showed that the average value of the density of nature protection objects in the Zakarpatska oblast is (36 units / 1000 km²). For comparison: in the neighboring Lviv region the density of nature protection objects is fixed at the level of 10–15 units / 1000 km², which is almost three times lower than in the studied region (Kovalchuk, Ivanov, Sviderko, 2004).

Among the administrative districts, Vynohradiv and Mukachevo districts, as well as Berehiv, Tyachiv and Uzhhorod districts have the largest number of different objects and territories of the NRF, and Volovets district has the smallest number, respectively. In all administrative districts, except for Svalyava, objects and territories of both national and local significance are represented.

Uneven distribution of NRF in the region is a rather unfavorable factor for their main functions – biodiversity conservation. In general, this factor has a negative impact on the overall assessment of the NRF.

One of the important indicators of the quality of the nature reserve network of the region is the reserve ratio. Its average value in the region as of 2019 is 14.17 % (Department of Environment Natural Resources Zakarpatska Oblast Regional Administration, 2019). Despite the Program of long-term development of nature reserves and ecological network for 2006–2020, which declared an increase in the area of NRF of the region to 23 % due to the creation of objects of national importance, we note its insignificant negative dynamics (as of 2016–14.4 %) (Prohrama perspektyvnoho rozvytku pryrodno-zapovidnoi spravy ta ekolohichnoi merezhi v Zakarpatskii oblasti).

For comparison, the average rate of conservation in Ukraine is as of 2019–6.6 %.

Conservation, enhancement and sustainable use of ecosystem biodiversity has become one of the key environmental policy priorities of most EU countries. However, as for Ukraine, its current general reserve index is not only inferior to European standards (Fig. 4), but also does not meet the requirements of the Basic Principles (Strategy) of State Environmental Policy of Ukraine for the period up to 2020", adopted in 2011. According to them, in 2015 the area of the NRF was going to reach 10 % of the total territory of the country, and in 2020–15 % (Ecoinform, 2019). At the same time, the regulatory documents provide for an increase in the share of reserves in Ukraine to 15 % by 2020 (Yavorska, Hevko, Sych, Kolomiyets, 2018).

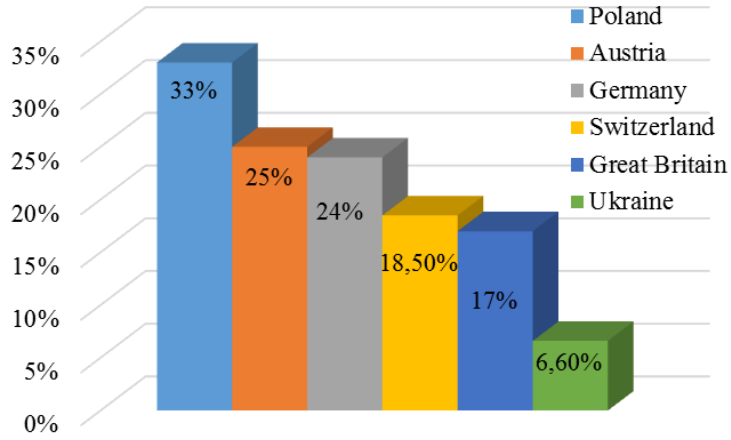

Fig. 4. Indicator of reserves of some European countries (created on the basis of (Ecoinform, 2019))

In addition to the low conservation rate, which is typical for the study area, there are a number of other important factors that hinder the growth of the reserve to European standards and standards regulations. In particular, it is about the probability of loss of the complexes which already exist and are reserved under the will of natural due to their withdrawal from the lands of the natural funds or misuse.

Meanwhile, not all sites can acquire the status of protected areas in accordance with European standards. It should be noted that the creation of protected areas in some areas of forests is a global trend and one of the key mechanisms for preserving their biological diversity. Today, almost 12 % of the world's forests already belong to such areas and are classified according to IUCN categories. The percentage of forest bequests in Ukraine (16.6 %) exceeds the corresponding figure of European countries (Ecoinform, 2019).

The reserve index shows the largest disproportion in the territorial relationship within the Zakarpatska oblast (Table 2). In particular, we fix the maximal value of this indicator in Velykobereznyansky, Rakhiv and Mizhhirya districts. Whereas, it is the smallest in Svalyava and Berehovo districts. This is explained by the specialization of these areas in health and recreational activities. At the same time, it is here that the emphasis should be on expanding existing and creating new environmental facilities.

Table 2. Quantitative indicators of the nature reserve fund in Zakarpatska oblast in terms of administrative units

Administrative district	Reserve rate,%	Density of NRF objects, un. / 1000 km	Index insularization
Berehivsky	1.2	38	0.57
Velykobereznyansky	48.7	31	0.44
Vynohradivsky	10.4	24	0.39
Volovetsky	6.3	33	0.34
Irshavsky	9.7	21	0.38
Mizhgirsky	35.9	46	0.46
Mukachevo	6.4	27	0.45
Perechynsky	5.1	33	0.44
Rakhivsky	23.2	56	0.46
Svalyava	0.5	27	0.51
Tyachivsky	8.5	36	0.45
Uzhhorod	7.1	40	0.44
Khustsky	4.8	30	0.49
Average regional indicator	14.4	36	0.44

Further expansion of the network of nature protection facilities within the Zakarpatska oblast is possible due to the creation of Latoritsky landscape park, where the sanatorium-resort complex "Kvitka Polonyny", "Sonyachne Zakarpattia", "Karpaty", Shayansky landscape park around Shayansky sanatorium is located. Uzhhorod Landscape Park (lower and middle part of the Uzh Basin), etc.

The need to expand protected areas is that currently protected areas border on intensively used agricultural land or adjacent to industrial areas. They are ecological islands surrounded by significantly changed natural conditions (Mudrak, Yelisavenko, Polishchuk, Mudr ak, 2019).

It will also be advisable to expand existing nature reserves. During 2014–2018, 10 objects of the nature reserve fund of local significance were created in the region on the total area of 2969.9 hectares. Of these, 7 reserves of local importance on an area of 1305.1 hectares and 3 protected areas on an area of 1664.8 hectares (Department of Environment Natural Resources Zakarpatska Oblast Regional Administration, 2019). In particular, in June 2015, the issues of expanding the territories of NPP "Enchanted Land" and "Synevir" were considered. The petition for the proposed changes to the boundaries of national nature parks was prepared by the Ukrainian Society for the Protection of Birds and approved by the Ministry of Nature of Ukraine.

In addition, in the future, the NRF of Vynohradiv district may increase due to the atonic reserve of local significance "Dombosh" (4.0 hectares); Tyachiv district – a forest reserve of local importance near the village. Ruske Pole (118 hectares) and a botanical reserve of local significance near the village of Neresnitsa (42 hectares). In the Uzhhorod district, it is planned to create a general zoological reserve of local significance along the Uzh River, as well as the botanical reserve "Ostrosh" (398.7 ha) and "Chernecha Hora" (40.0 ha) within the Mukachevo district. Hydrological reserves of local importance "Berezhskoe Reservoir" (46.0 ha), "Moshnev" (15.0 ha), "Dyidovskoe Reservoir" (75.0 ha); Gola Obuch and Solyansky forest reserves with a total area of 37 hectares, as well as the Borsuchy botanical reserve (up to 1.0 hectares) will replenish the protected areas of the Berehovo district in the future. Prepare Leno

scientific substantiation for creating a series of protected sites of local importance within Vinogradov District: botanical reserve "Dibrova Zatysyanschyny" "Fornoska Dubrava", "Travel" (Department of Environment Natural Resources Zakarpatska Oblast Regional Administration, 2019).

It is safe to assume that during the 2020s-2030s it will be possible to create new and expand the existing areas of NRF in the region up to 100–120 thousand hectares, which will increase the reserve area to 20–22 %. In general, it is planned to increase the nature reserve fund of Zakarpatska oblast to 23 % of its area.

The quality of the nature reserve network of the region is determined by the index of insularization, which indicates the size of the NRF objects and their stability. The high coefficient indicates a significant share in the territorial structure of the NRF of small, ecologically unstable, and therefore unstable protected areas. To this kind of environmentally unstable include protected areas with an area of up to 50 hectares (Klymenko, Olijnyk, 2014).

369 objects are located in the NRF of Zakarpatska oblast on the area of 614.4 hectares. Their area ranges from 0.01 to 51 hectares, and the average area is about 1.7 hectares. Such a large number of small objects with insufficient ecological capacity cannot fully ensure the preservation of the gene pool and living conditions of biota (Mudrak, Yelisavenko, Polishchuk, Mudrak, 2019).

Typically, such objects are represented in the structure of the NRF by botanical monuments of local character (which includes mainly age-old and old-fashioned root and introduced trees) or hydrological monuments of local character, including sources.

As a result of the research, it was established that the average value of the quality index of the NRF of the Zakarpatska oblast – the index of insularization is 0.44. This indicates the low quality of placement of the nature protection network (see Table 2). It should be noted that its significant fluctuations in administrative districts are not observed, the maximum value of the index is fixed at 0.56 for Berehovo district, its smallest value is 0.34 is typical for Volovets district (Fig. 5).

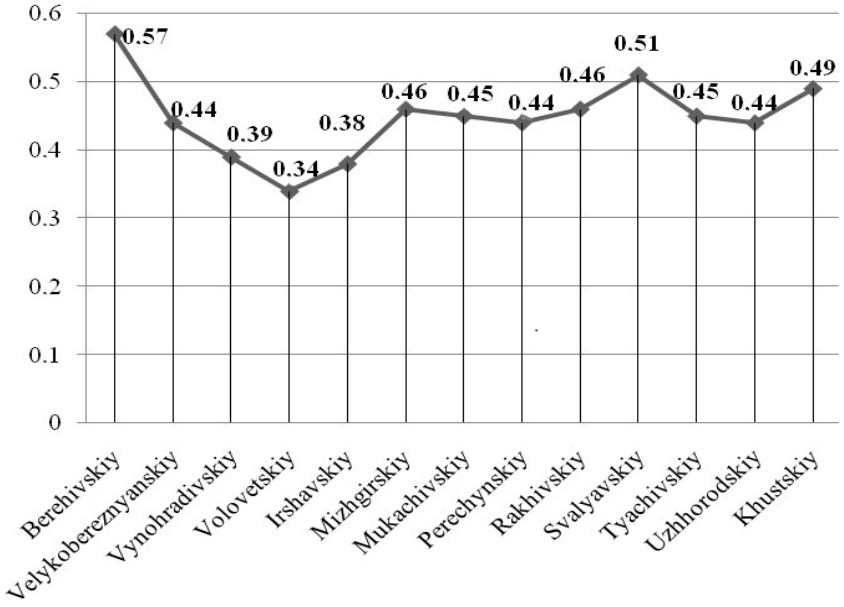

Fig. 5. Index of insularization of administrative districts of Zakarpatska oblast

Numerous small isolated protected objects and territories, which cannot always be combined due to the lack of conformity of the environment of isolates and connecting elements, are the result of a botanical approach to the reserve, which provides a well-conserved function to preserve species diversity of flora and fauna, only partially takes into account the need for systematic action of objects and territories of the nature reserve fund and almost does not provide a balance of environmental, economic and social requirements (Ivanov, Kovalchuk, 2007; Klymenko, Olijnyk, 2014; Kovalchuk, Ivanov, Sviderko, 2004). In accordance with the requirements of sustainable development, the region needs a comprehensive approach to nature conservation.

Despite the uneven spatial distribution, the nature reserve fund is represented in all existing landscapes and plant communities in the region of high-altitude zones. However, it should be noted that the majority of the areas account for the forest groups. About one-fifth of the forest land area is part of the region's NRF. Meadow, alpine and wetland plant groups make up 6.2–8.4 % in different parts of the region. As a result, protected areas have the opportunity to play the role of

a kind of key areas for maintaining ecological balance and reproduction of biological diversity.

The main problems of the development of protected areas in the region at the present stage, as in Ukraine in general, we associate, first of all, with the imperfection of the management system in this area, low budget funding, logistics, insufficient development of special research, weak legal liability for violation of the regime of nature reserves and facilities.

Conclusions.

The basis of the NRF of Zakarpatska oblast are multifunctional objects of the highest category of reserves. A large number of nature protection facilities is combined with their significant fragmentation, which affects the qualitative characteristics of nature reserves. According to the spatial distribution of the territory and objects of the NPF do not sufficiently meet the criteria of local representativeness, so their spatial structure needs significant improvement, namely – the creation of nature reserves, especially within the lower districts of the region.

At the present stage of development there is a clear tendency to increase the number and area of nature reserves and territories within the region. When planning new nature reserves in order to preserve landscape diversity, first of all, it is necessary to pay special attention to those areas where the most difficult situation has developed due to the small share of reserves.

The main problems of the development of nature reserves in Zakarpatska oblast are primarily related to the imperfection of the management system. To solve this problem, there is an urgent need to develop a strategy that will provide for the perception of NPF as a holistic anthropogenic-natural organism in order to put into practice the environmental, scientific, educational and recreational functions.

Qualitative functioning of the geoinformation system of monitoring of nature reserves of Zakarpatska oblast is designed to ensure effective management of environmental activities and rational use of nature in the region. It is due to the automation of processing, streamlining, generalization and integration of primary data, comprehensive analysis and evaluation of the representativeness of the nature reserve fund of Zakarpatska oblast and information-analytical decision support that it is possible to ensure further effective development of the nature reserve fund of the region, its representative taking into account the best European practices.

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