ЗАПОВІДНА СПРАВА

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ASSESSMENT OF COMPLIANCE WITH THE NORMATIVE ZONING RATIO OF NATIONAL NATURE PARKS IN UKRAINE

Purposes. To assess the compliance of the actual functional zoning of the territories of national nature parks of Ukraine with the current regulatory requirements.

Methods. System analysis, statistics, cartographic modeling.

Results. The world experience of zoning was analyzed, and a comparative analysis of the actual zoning of all 26 national natural parks of Ukraine was carried out with the state building standards DBN B.2.2-12:2019 "Planning and development of territories", according to which each park must have a clearly defined share of the area of the zones: reserve, regulated recreation, stationary recreation and economic zone.. Six groups of parks were identified according to the degree of compliance of zoning with the standards: "Satisfactory" - 6, "Close to satisfactory" - 2, "Less close to satisfactory" - 5, "Far from satisfactory" - 5, "Completely unsatisfactory" - 4. It was not possible to assess zoning in 4 NNPs due to differences in official sources. It was found that the functional zoning of 70% of the national nature parks of Ukraine does not meet the established regulatory requirements, An interactive map of zoning of Ukrainian NNPs was created; recommendations for improving zoning were proposed.

Conclusions. The non-compliance of functional zoning with established regulatory requirements negatively affects the effectiveness of the protection of natural areas. The situation in each park depends on natural conditions, the level of recreational pressure, and the socioeconomic context, but having clear and reasonable zoning is essential to achieving the main goal of preserving ecosystems, ensuring sustainable use of natural resources, and developing ecotourism.

KEYWORDS: *National Nature Park, functional zoning, regulations, strict protection zone, regulated recreation zone, stationary recreation zone, economic zone, interactive map*

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Introduction

Effective zoning of the territories of environmental institutions is an important component of sustainable management of natural resources and ensuring long-term conservation of biodiversity. International practice shows that a clear delineation of functional zones allows not only to protect valuable natural complexes, but also to organize sustainable recreational activities and integrate local communities into the management of territories. This section analyzes the international experience of zoning protected areas, including the recommendations of the International Union for Conservation of Nature (IUCN) and examples of the application

of a multi-level zoning system in certain countries, which can serve as a guide for improving approaches in Ukraine.

The system introduced in Canada, in particular within the Aulavik National Park, is interesting and illustrative. [1] The management plan for this park provides for a clearly defined multi-level zoning system that includes five functional zones, each of which performs its own environmental, social or management function.

The most protected zone is Zone I, which is intended for the absolute preservation of the most sensitive and valuable natural or cultural sites. Visiting, transportation and any form of interference are completely prohibited in this part of the park. It serves as a kind of ecological core, providing a basic level of preservation of unique natural processes. In this aspect, it is analogous to the protected zone in Ukrainian national parks, according to DBN B.2.2-12:2019, although the Canadian model is often even stricter in terms of access.

Zone II covers the majority of the park's area and plays the role of a buffer zone, where natural processes are preserved without significant anthropogenic interference. This area is intended for wild natural landscapes, where minimal intervention is allowed only in case of emergency. Recreational use is possible here, but in a limited format - only in compliance with the regime of visits without infrastructure. This zone can be compared to the regulated recreation zone in Ukraine, although the Canadian interpretation is more conservative.

The third zone, the natural environment zone, is a transitional zone between wild natural areas and areas with a higher level of anthropogenic impact. It is possible to use basic infrastructure, install navigation signs, build trails and campsites here. The main goal of this zone is to provide an opportunity to get acquainted with natural values without the threat of their degradation.

The fourth zone is defined as the active recreation zone, which includes places with a more developed infrastructure for receiving visitors. It is designed for short-term visits, organized tours, excursions, and services. Campsites, information centers, and service facilities can be built here. This zone can be compared to the Ukrainian zone of stationary recreation.

The fifth zone, Park Services, is reserved for administrative and service facilities necessary for the park's operation. The construction of technical facilities, warehouses, staff quarters, and transportation infrastructure is allowed here. This zone is analogous to the economic zone in the Ukrainian approach to zoning. Its area is small, but it is critical for ensuring the viability of the management system.

The zoning system in Aulavik Park not only demonstrates a multi-level approach to nature conservation, but also provides flexible management of the territory depending on the level of ecological value, recreational load, and logistical needs. [1] It is important to emphasize that the Canadian experience clearly reflects the desire to preserve the integrity of natural landscapes at the level of the entire ecosystem, with minimizing human impact in most of the park. For Ukrainian national nature parks, this can serve as an example of an effective spatial structure where priority is given to biodiversity conservation rather than the exploitation of recreational potential. Particularly valuable is the principle of strict protection of the most sensitive areas, and it is implemented not declaratively, but through real management mechanisms, including access restrictions, a clear division of functions and responsibilities, and constant monitoring of the natural environment.

The global practice of zoning protected areas is gradually shifting from formal division to assessing the effectiveness of this zoning in terms of achieving environmental, social and management goals.

The functional zoning of national parks varies significantly from country to country or region to region, due to differences in natural conditions, geographical location, socio-economic development, and management approaches. For example, the United States uses a classical zoning model with a clear distinction between natural and anthropogenic zones, as well as a detailed approach to managing each of them. In Italy, the zoning structure is more differentiated - it covers from three to six types of functional zones, which indicates the flexibility and complexity of the system. In New Zealand, functional zoning involves the use of the concepts of "special zones" and "management zoning," which allows for adaptation of approaches to specific environmental goals. [2]

A thorough study conducted by an international group of authors in 2024 is dedicated to a global analysis of the effectiveness of zoning in biosphere reserves, one of the highest formats of protected areas in the international system (UNESCO MAB). [3] The paper systematizes

more than 100 publications on the implementation of the zoning concept on five continents. Biosphere reserves, unlike classical national parks, have a more comprehensive model of functioning based on the principle of coexistence of nature conservation and sustainable development. Traditionally, they are divided into three main zones: core zone, buffer zone, and transition zone. The core zone is intended exclusively for the preservation of natural ecosystems, the buffer zone is for scientific research, environmental education and ecotourism, while the transition zone provides for sustainable economic activities of the local population. The authors emphasize that the mere existence of zoning does not guarantee the achievement of environmental goals. The effectiveness depends on the clarity of the boundaries, the legal status of the zones, interaction with local communities, and the resources involved in management. In many countries, there are cases where the formal designation of a core or buffer is not accompanied by real restrictions, which leads to the loss of the values of these areas. This is especially true in countries with insufficient control or an unstable political situation. Considerable attention is paid to examples of adaptive zoning, which changes depending on the results of monitoring, environmental conditions, or socioeconomic conditions. This allows for a more flexible and dynamic management system that meets real threats and needs. The publication also discusses the impact of local community participation on the effectiveness of zoning implementation. Active cooperation with communities, involving them in decision-making and sharing the benefits of ecotourism significantly increases the level of conservation in buffer and transition zones. [3]

Clear and functionally sound zoning can significantly enhance the effectiveness of biodiversity protection within protected areas. One of the most widely used models in the world is the zoning concept adopted by the Man and the Biosphere (MAB) program. [3] This concept is actively used in many countries, such as Australia, Canada, China, Germany, Mexico, Spain, and the United States. Although the names and specific management regimes may vary, the basic principle remains the same: differentiating the territory by function, from the strictest environmental protection regime to the zone of permissible human intervention. The purpose of this approach is to reduce pressure on the most valuable areas of the territory from the point of view of conservation, while ensuring the possibility of sustainable use of resources in less vulnerable areas. However, global analysis shows that the effectiveness of this approach is not unambiguous. In some cases, functional zoning has indeed demonstrated positive results, for example, by limiting infrastructure development to the transition zone or by striking a balance between conservation and socioeconomic development. However, there are also a significant number of studies that have revealed serious shortcomings: even in strictly protected core areas, significant human interventions are often recorded, and the level of this impact is only increasing over time. These cases demonstrate the risk of formalizing zoning when it exists only "on paper" without actually enforcing the restrictions. This situation leads to the fact that the principles of zoning are not implemented in reality, and the protection regime remains declarative. It is also important to note that the effectiveness of zoning depends not only on the cartographic division of the territory, but also on the level of management: stronger management structures are better able to control deforestation and other threats. One of the main problems is the lack of information park managers have about the actual state of protected areas. In most cases, managers do not have clear data that would allow them to determine whether functional zones are appropriately delineated. There is also a lack of integrated regional data on the state of ecosystems, which makes it impossible to make informed management decisions. In this regard, modern approaches require regular analysis of the effectiveness of zoning in terms of achieving conservation goals, conservation of target species and habitats, and social acceptability of measures. [4]

Thus, mere compliance with formal zoning regulations (e.g., core or buffer areas) does not guarantee effective protection. More important is the mechanism for implementing zoning: clear boundaries, monitoring compliance, community involvement, and flexibility of the system to take into account changes in the environment and social environment. These conclusions are extremely relevant for the analysis of zoning in Ukrainian NNPs, where there is currently a similar tendency to declarativeness and a lack of systematic monitoring of functional zones. The processed information on the world experience of zoning is grouped in Table 1.

Table 1

World experience in zoning National Parks

Country / Region	Functional areas	Principle of zoning and features	Notes.
Canada (Aulavik National Park)	1. Zone of absolute safety 2. Buffer zone of wildlife 3. Natural environment zone 4. Zone of active recreation 5. Park Services	The zones are divided according to the level of anthropogenic pressure and ecological value. Zone 1 – complete prohibition of access. Zone 2 – minimal intervention. Zone 3 – light infrastructure. Zone 4 – tourist infrastructure. Zone 5 – maintenance.	High level of control. Real access restrictions, functional management, and adaptive management are provided.
Biosphere reserves (UNESCO, global practice: Germany, Spain, Mexico, China, etc.)	1. Core 2. Buffer 3. Transition	Differentiation by function: core – nature protection, buffer – research and ecotourism, transition – sustainable development.	It is widely used in the Man and the Biosphere program. There are often problems with the formality of zoning without a real regime.
Ukraine (according to DBN B.2.2-12:2019)	1. Protected area (≥20%) 2. Regulated recreation area (≥35%) 3. Zone of stationary recreation (≥10%) 4. Economic zone (15-35%)	Allocation according to regulatory requirements and type of use. Protected – scientific observations, no interventions. Regulated – recreation with restrictions. Stationary – campsites, etc. Economic – support of the park's vital activity.	There is often declarative nature and lack of monitoring. The actual zoning does not always comply with the norms. Management approaches need to be modernized.

Problem Statement

In today's environment of deepening environmental crisis, increasing anthropogenic pressure on natural resources and active development of recreational tourism, the issue of effective management of protected areas is becoming particularly relevant.

One of the key tools of such management is functional zoning, which allows optimizing the spatial structure of national nature parks (NNPs), ensuring the preservation of valuable ecosystems and at the same time meeting the needs of society in recreation, education, research and sustainable use of natural resources. Given that there are more than fifty NNPs in Ukraine, it is important not only to formally define their functional zones, but also to ensure that zoning complies with established standards, control their compliance, and monitor the effectiveness of the spatial organization of territories.

Objective: to assess the compliance of the actual functional zoning of the territories of national nature parks of Ukraine with the current regulatory requirements.

Methodology of Study

The ratio of zones of the National Nature Parks in Ukraine is regulated by the DBN B.2.2-12:2019 Planning and Development of Territories. [5] When designing the territories of NNPs, the following functional zones should be distinguished:

- protected, which should cover an area of 20% of the park's territory;
- regulated recreation - should be 35% or more of the park's territory;
- stationary recreation should cover 10% or more of the park's territory;
- economic zone – may consist of settlements, industrial, municipal, infrastructure facilities, land plots to meet the needs of the park (5-10%). In total, the zone may comprise 15-35% of the park's territory.

The following sources were used to collect primary information on the state of zoning of national nature parks: official websites of the NNPs of Ukraine; open scientific sources and publications; geospatial data available in the public domain; materials from planning and organizational documents approved by the admin-

istrations of the NNPs. Special attention was paid to officially confirmed or published data only.
To perform calculations and create tables, we chose the Google Sheets program, which allows us to process the required amount of data and structure the information.

Stages of the study:

1. Selection of national parks for analysis.
2. Collection of data on functional zoning.
3. Calculation of the normative areas of functional zones based on the total area of the NNP.
4. Comparison of actual and standard areas.
5. Analysis of zoning compliance with the established standards.
6. Systematization and visualization of the results.

Research Results

The zoning of national parks performs a very important function - ensuring the preservation of particularly valuable landscapes and, at the same time, the realization of other functions - scientific, educational, enlightening, recreational, social, etc. That is why the percentage norms of the area of each zone approved by the regulatory authorities correspond to their main tasks:

1. Protected area (20%): This percentage is necessary to provide a large enough space to preserve natural ecosystems, rare species of flora and fauna, and to conduct scientific research. It should be isolated from human activity, allowing ecosystems to develop without human intervention.
2. Regulated recreation (35%): This zone allows maximum use of the territory for tourism and recreation, but subject to the requirements for minimizing the negative impact on nature. It is taken into account that for sustainable tourism development, a significant part of the territory should be allocated for recreational activities with restrictions.
3. Stationary recreation (10%): A dedicated part of the park is needed to provide the necessary infrastructure for vacationers (campsites, recreation centers, hotels). It should be sufficient to accommodate people, but also maintain a balance without harming the environment.
4. Economic zone (15-35%): The economic use zone is necessary to ensure the proper operation of the park, maintain infrastructure and provide basic needs such as power, water, administrative buildings, etc. This ensures the vital activity of the national park without violating environmental requirements.

Legal aspects of functional zoning. The legal aspects of functional zoning of national nature parks are regulated by a number of legislative and regulatory acts:

- The Law of Ukraine "On the Nature Reserve Fund of Ukraine" establishes the basis for the protection of natural areas, regulates the issues of protected areas and their protection [6].
- DBN B.2.2-12:2019 "Planning and Development of Territories" - provides specific guidelines for the design of NNP territories, including the allocation of functional zones, which allows for nature protection while integrating human activities [5].
- Resolutions of the Cabinet of Ministers of Ukraine and other bylaws - regulates issues related to the use of land within protected areas, organization of environmentally friendly recreational activities and sustainable development [6].

Using a search on the official websites of the NNPs and open sources posted on the Internet, we managed to obtain data on functional zoning for 26 out of 56 NNPs. Among these parks, most published information on zoning on their official websites(21). The other 5 parks (Velykyi Luh, Verkhovynskyi, Ichnianskyi, Kamianska Sich, Shatskyi) did not have the necessary information on their official websites, but we managed to find this information in third-party sources.

By tabulating the data and making calculations according to the methodology, 26 parks were conditionally divided into 6 groups, depending on the correspondence of the actual areas of functional zones to the calculated (normative) ones.

Group 1 ("Azov-Sivash", "Azov", "Syniogora", "Carpathian", "Verkhovyna", "Ichnianskyi") [7, 8, 9, 10, 11, 12] includes 6 NNPs with satisfactory protected areas. Among them, Azov-Sivash is the leader in terms of the protected area (75.2% of the total park area), Ichnianskyi is the leader in terms of the area of the regulated recreation zone (75.8% of the total park area), and Syniogora NNP has the closest to the normative functional zones (Fig. 1). Their location is somewhat unusual - the protected area is located on the border of the NNP, but given that it is the area adjacent to the top of the mountain range, the distribution of functional zones is logical.

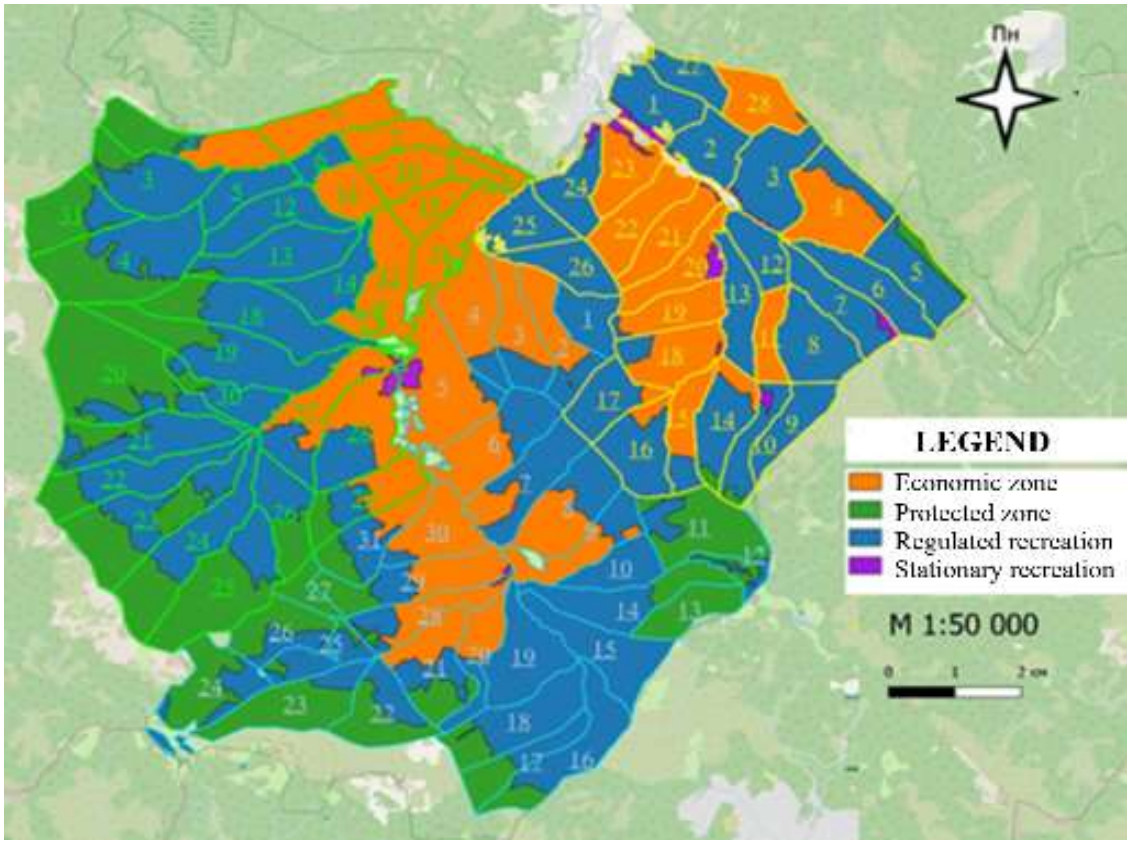

Fig. 1 – Example of group 1. Functional zoning of the Syniogora National Park [10]

The next group 2 includes 2 NNPs "Galytskyi" and "Skole Beskydy" [13, 14], which have close to satisfactory areas of functional zones. The zoning of the Galytskyi Park cannot be called completely satisfactory due to the smaller than the normative area of the regulated recreation zone (30% instead of 35+% of the total park area) and slightly larger than the normative area of the economic zone (35.1% instead of 15-35% of the total park area). The areas of the protected zone and the regulated recreation zone correspond to the normative ones, but the area of the stationary recreation zone is overestimated (40.9% instead of 15-35% of the total area of the park (Fig. 2).

Group 3 is characterized by less satisfactory zoning, which is less close to the normative areas of functional zones and includes 5 parks ("Vyzhnytskyi", "Hetmanskyi", "Tuzly Estuaries", "Korolivski Beskydy", "Velykyi Luh"). [Two of them exceed the area of the economic zone ("Tuzly Estuaries" - 46.3%, "Velykyi Luh" - 44.6%). The Hetmansky NNP is characterized by a large area of the regulated recreation zone - 80.7% of the total area and an insufficient area of the protected zone - 16.2% (Fig. 3.). The NNP "Vyzhnytskyi" also has an insufficient protected area - 18.7%, but the zones of regulated recreation and economic use meet the normative values (44.4% and 30.3%, respectively). The Korolivski Beskydy NNP is characterized by a significant excess of the area of the stationary recreation zone (42.5% instead of 10% of the total park area).

Group 4 includes 5 NNPs ("Hutsulshchyna", "Dvorichanskyi", "Desniansko-Starohutskyi", "Sviati Hory", "Tsumanska Pushcha"), [20, 21, 22, 23, 24] whose zoning is classified as "far from satisfactory". In the case of four parks, the area of the economic zone exceeds the normative values ("Hutsulshchyna" - 50.7%, "Dvorichanskyi" - 57.2%, "Desniansko-Starohutskyi" - 36.0%, "Tsumanska Pushcha" - 69.7%) (Fig. 4). The areas of regulated recreation in the Desniansko-Starohutskyi and Hutsulshchyna NNPs are satisfactory (48.2% and 41.2% respectively), in the Sviati Hory Park this area is 79.4%, and in the Tsumanska Pushcha NNP this area is completely absent. Other areas of the functional zones of the three NNPs are smaller than the normative ones (Protected zones: "Dvorichanskyi - 17.5%, Desniansko-Starohut

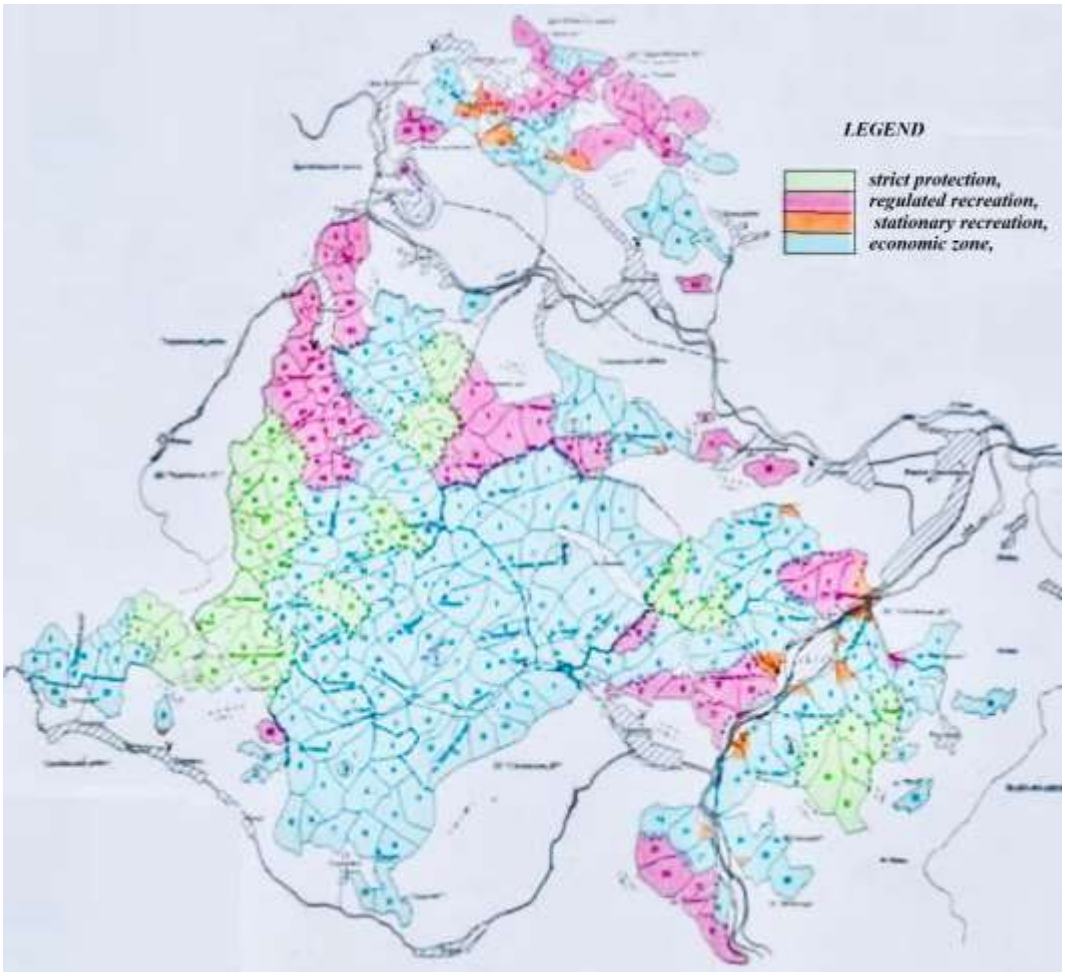

Fig. 2 – Example of group 2. Functional zoning of Skole Beskydy National Park [14]

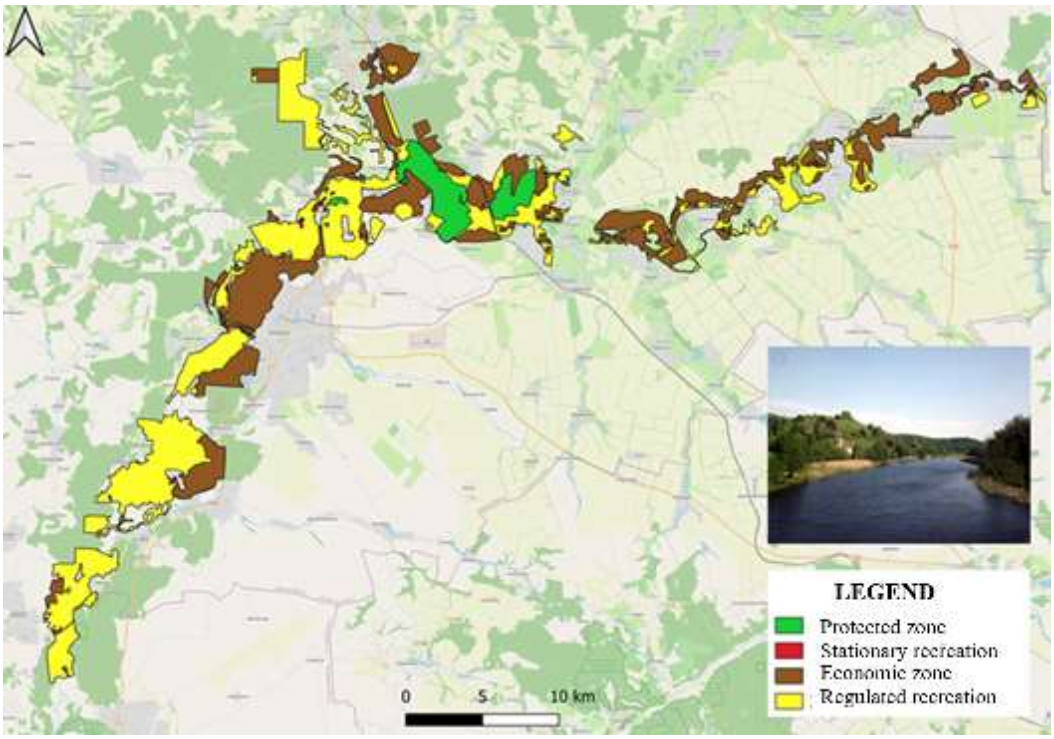

Fig. 3 – Example of Group 3: Functional zoning of the Hetmanskyi National Park. [16]

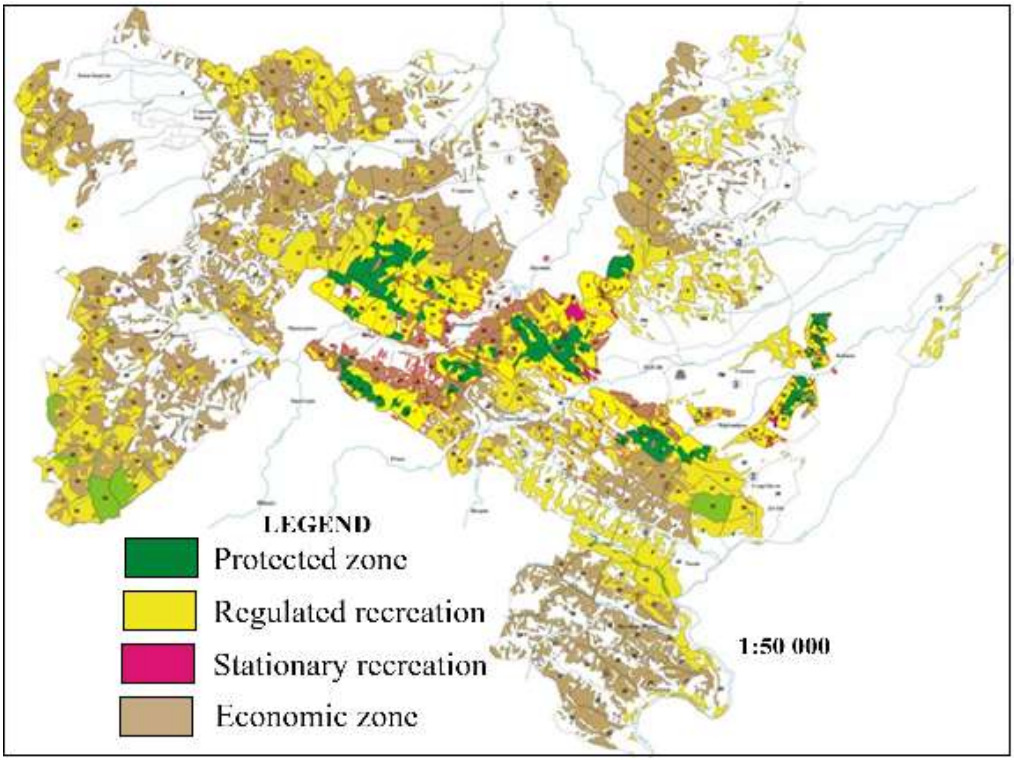

Fig. 4 – Example of group 4. Functional zoning of the Hutsulshchyna NNP [20].

skyi - 15.7%, Sviati Hory - 6.5%, Hutsulshchyna - 7.7%, instead of 20% of the total park area. And the area of regulated recreation "Dvorichansky" - 23.0% instead of 35+%).

The following 4 parks ("Gomilshanski forests", "Zalissia", "Podilski Tovtry", "Uzhanskyi") [25, 26, 27, 28] are grouped into the 5th group and are characterized by a complete discrepancy between the actual zoning areas and the normative ones (Fig. 5). All three parks have a significant excess of the area of the economic zone ("Gomilshanski forests" - 75.5%, "Zalissia" - 71.1%, "Podilski Tovtry" - 94.1%, "Uzhanskyi" - 70.7%) at the expense of other functional zones.

The last group of 4 parks (Synevyr, Yavorivskyi, Kamianska Sich, Shatskyi) [29, 30, 31, 32] cannot be analyzed due to the difference in the total area provided in open sources and on official websites and the calculated area obtained by summing all functional zones.

All the information described in this section is summarized in Tables 2 and 3.

Most of the National Nature Parks of Ukraine have not published numerical information on the areas of functional zones, and normative values were calculated for them based on the published information on the total area of the parks' territories. The resulting calculations are presented in Table 4.

Data visualization is a key tool for a deeper understanding of spatial processes, especially in the field of ecology and nature protection. In the context of analyzing the zoning of Ukraine's national nature parks, graphical representation of information allows not only to summarize significant amounts of spatial data but also to make them accessible for interpretation by both specialists and a wide audience. Visualization helps to identify imbalances in the distribution of functional areas. As part of the thesis, an interactive map was created on the ArcGIS platform, which demonstrates the current state of zoning of all Ukrainian national parks. The first map created using the ArcGIS platform with points is the NNPs that provided information on zoning, depending on their geographical location (Fig. 6). The colors of the points provide information on the compliance of the areas of functional zones with the normative ones.

Map created using the ArcGIS platform with red triangles indicating the NNPs that did not provide information on zoning, depending on their geographical location (Fig. 7).

The analysis has shown that most of Ukraine's NNPs have problems with the quality of functional zoning. Satisfactory or close to satisfactory zoning prevails mainly in the Carpathian region and in the south of the country. Instead, the

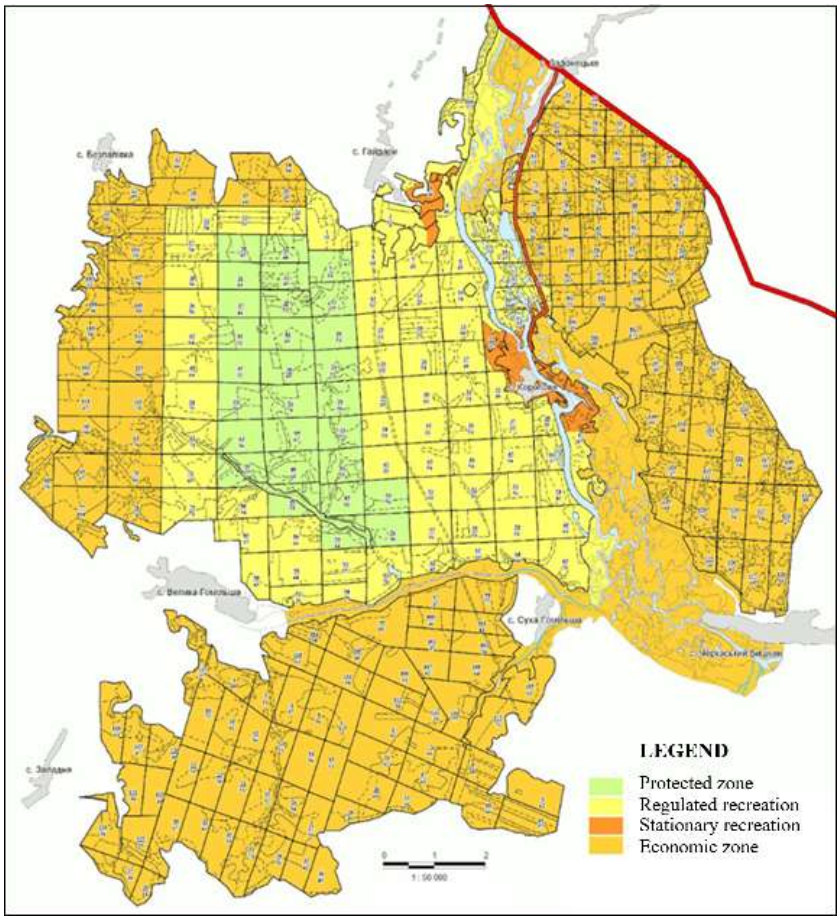

Fig. 5 – Example of group 5. Functional zoning of the NNP Gomilshanski forests [25].

Table 2

Symbols for Table 3

	Mismatch of the total area
	Not satisfactory at all
	Far from satisfactory
	Less close to satisfactory
	Close to satisfactory
	Satisfactory

Table 3

Comparison of the calculated (normative) and actual areas of the functional zones of the Ukrainian NNPs

№ №	Name of NPP	Park area, Total km²|ha	Protected zone 20%			Regulated recreation, >35%			Stationary recreation. 10%			Economic zone, 15-35%			
			real	%	norm	real	%	norm	real	%	norm	real	%	norm from	norm to
1	Azov-Sivash	52154	39231	**75,2**	10430	618	**1,2**	18254	49	**0,1**	5215	12256	**23,5**	7823	18254
2	Priazovsky	78126	16388	**21,0**	15625	33669	**43,1**	27344	40	**0,1**	7813	28029	**35,9**	11719	27344
3	Syniogora	10866	2187	**20,1**	2173	5452	**50,2**	3803	90	**0,8**	1087	3135	**28,9**	1630	3803
4	Carpathian	50495	11401	**22,6**	10099	25964	**51,4**	17673	96	**0,2**	5050	13033	**25,8**	7574	17673
5	**Verkhovinskyi**	12022	5917	**49,2**	2404	3609	**30,0**	4208	26	**0,2**	1202	2470	**20,5**	1803	4208
6	**Ichnyanskyi**	9666	2140	**22,1**	1933	7324	**75,8**	3383	35	**0,4**	967	166	**1,7**	1450	3383
7	Galytskyi	14684	5105	**34,8**	2937	4405	**30,0**	5139	14	**0,1**	1468	5160	**35,1**	2203	5139
8	Skole Beskids	35684	8350	**23,4**	7137	12596	**35,3**	12489	1427	**4,0**	3568	14594	**40,9**	5353	12489
9	Vyzhnytskyi	11238	2107	**18,7**	2248	4992	**44,4**	3933	745	**6,6**	1124	3394	**30,2**	1686	3933
10	Hetmanskyi	11673	1895	**16,2**	2335	9425	**80,7**	4086	115	**1,0**	1167	236	**2,0**	1751	4086
11	Tuzly estuaries	27865	10404	**37,3**	5573	4561	**16,4**	9753	55	**0,2**	2787	12893	**46,3**	4180	9753
12	Korolivski Beskydy	8997	2416	**26,9**	1799	2574	**28,6**	3149	3828	**42,5**	900	179	**2,0**	1350	3149
13	**Velykyi Luh**	16756	8104	**48,4**	3352	1172	**7,0**	5866	0	**0,0**	1676	7479	**44,6**	2514	5866
14	Hutsulshchyna	32248	2480	**7,7**	6450	13295	**41,2**	11287	130	**0,4**	3225	16343	**50,7**	4837	11287
15	Dvorichanskyi	3131	548	**17,5**	626	721	**23,0**	1096	70	**2,2**	313	1791	**57,2**	470	1096
16	Desnyansko-Starogutskyi	16214	2547	**15,7**	3243	7820	**48,2**	5675	2	**0,0**	1621	5844	**36,0**	2432	5675
17	Sviati Hory	40448	2648	**6,5**	8090	32098	**79,4**	14157	1894	**4,7**	4045	3808	**9,4**	6067	14157
18	Tsumanska Pushcha	33 475	9 854	**29,4**	6695	0	**0,0**	11716	300	**0,9**	3348	23320	**69,7**	5021	11716
19	Gomilshanski forests	14314	1022	**7,1**	2827	1380	**9,6**	4947	1100	**7,7**	1413	10811	**75,5**	2120	4947
20	Zalissia	14836	2511	**16,9**	2967	1521	**10,3**	5193	250	**1,7**	1484	10552	**71,1**	2225	5193
21	Podilski Tovtry	261315	2282	**0,9**	52263	12961	**5,0**	91460	208	**0,1**	26132	245843	**94,1**	39197	91460
22	Uzhanskyi	46146	5224	**11,3**	9229	8203	**17,8**	16151	99	**0,2**	4615	32620	**70,7**	6922	16151
23	Sinevyr	40777	5840	**14,3**	8155	21377	**52,4**	14272	8	**0,0**	4078	390	**1,0**	6117	14272
24	Yavorivskyi	7108	1030	**14,5**	1421	1428	**20,1**	2487	40	**0,6**	710	415	**5,8**	1066	2487
25	**Kamianska Sich**	12261	2942	**24,0**	2452	3407	**27,8**	4291	56	**0,5**	1226	2319	**18,9**	1839	4291
26	**Shatskyi**	32 515	5446	**16,7**	6503	12836	**39,5**	11380	1028	**3,2**	3252	29667	**91,2**	4877	11380

Table 4

Estimated normative zoning areas for NNPs without published information

№№	Name of NPP	Park area, Total km²|ha	Protected zone 20%	Regulated recreation, >35%	Stationary recreation. 10%	Economic zone, From 15% to35%	
1	Svyatoslav's Beloberezhye	35223	7045	12328	3522	5283	12328
2	Beloozerskyi	7014	1403	2455	701	1052	2455
3	Boykivshchyna	12240	2448	4284	1224	1836	4284
4	Buzky Gard	6138	1228	2148	614	921	2148
5	Golosiivskyi	10988	2198	3846	1099	1648	3846
6	Dermansko-Ostrozkyi	5448	1090	1907	545	817	1907
7	Dzharylgatskyi	10000	2000	3500	1000	1500	3500
8	Dniester Canyon	10829	2166	3790	1083	1624	3790
9	Enchanted Land	6101	1220	2135	610	915	2135
10	Karmelukove Podillia	16518	3304	5781	1652	2478	5781
11	Kremenets Mountains	6951	1390	2433	695	1043	2433
12	Kreminna forests	7269	1454	2544	727	1090	2544
13	Small Polissya	8762	1752	3067	876	1314	3067
14	Mezinskyi	31035	6207	10862	3104	4655	10862
15	Meotis	20 720	4144	7252	2072	3108	7252
16	Nyzhniodniprovskyi	80177	16035	28062	8018	12027	28062
17	Nyzhniodnistrovskyi	21511	4302	7529	2151	3227	7529
18	Nyzhniosulskyi	18635	3727	6522	1864	2795	6522
19	Nobel	25318	5064	8861	2532	3798	8861
20	Oleshky sands	11 671	2 334	4 085	1 167	1 751	4 085
21	Northern Podillia	15587	3117	5455	1559	2338	5455
22	Pripyat-Stokhid	39315	7863	13760	3932	5897	13760
23	Pyriatynskyi	12028	2406	4210	1203	1804	4210
24	Slobozhanskyi	5244	1049	1835	524	787	1835
25	Khotynskyi	9446	1889	3306	945	1417	3306
26	Cheremoskyi	7117	1423	2491	712	1068	2491

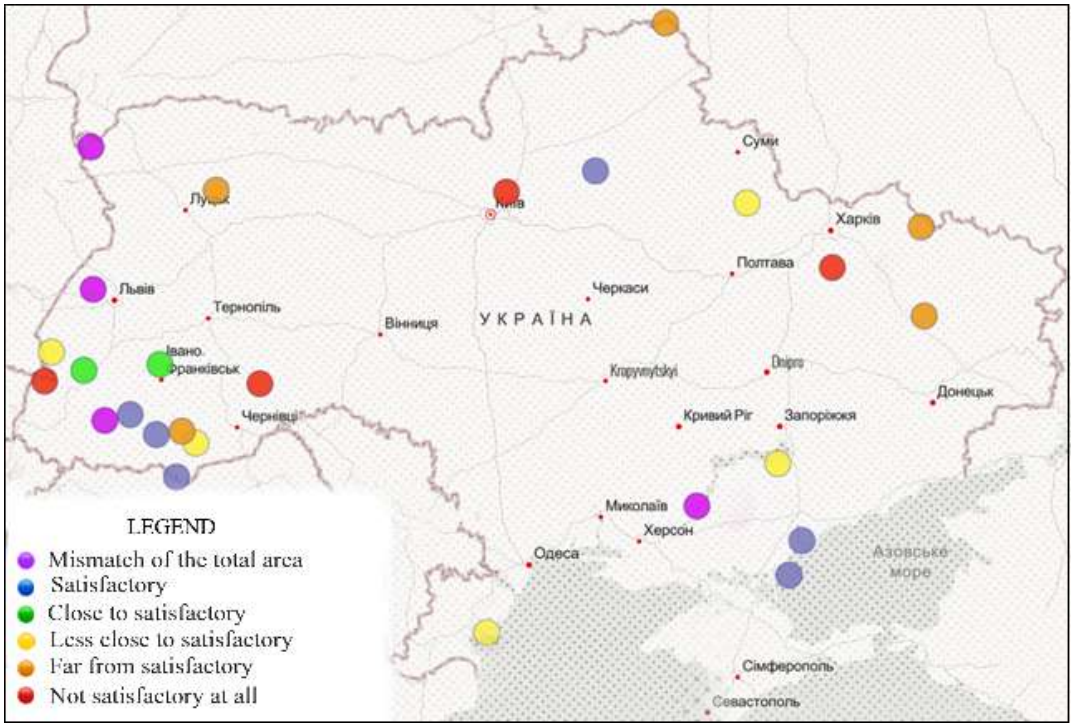

Fig. 6 – Map of the spatial location of NPPs with different levels of compliance with zoning requirements according to DBN B.2.2-12:2019

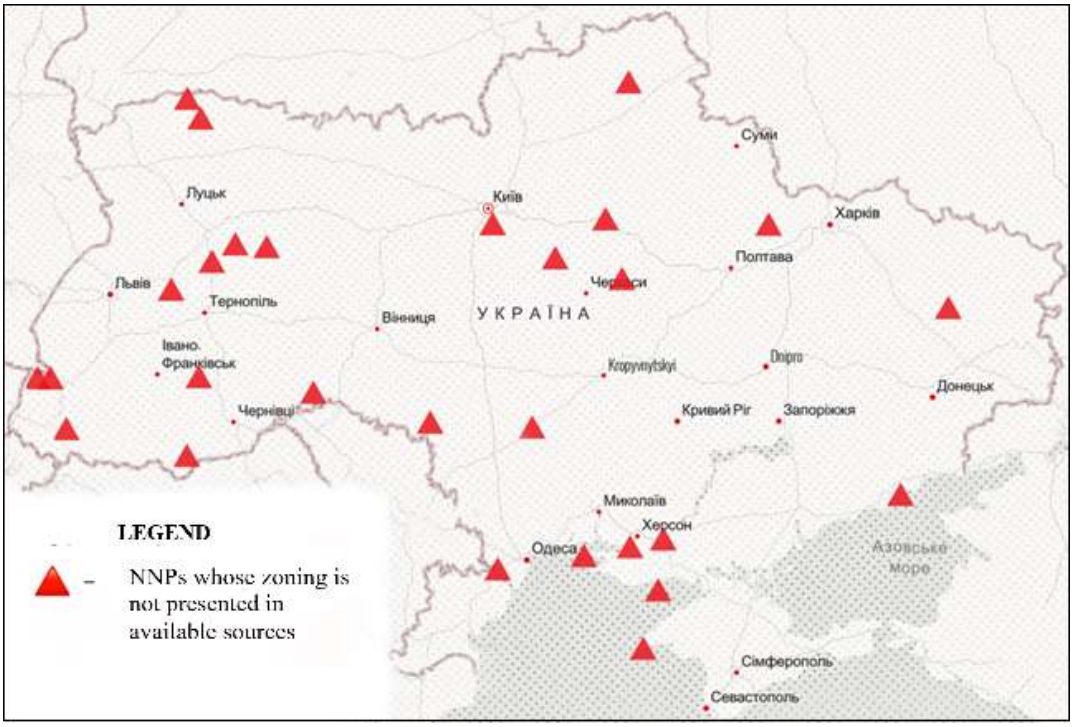

Fig. 7 – Map of the spatial location of NNPs whose zoning is not presented in available sources

central and eastern regions have a significant number of parks with unsatisfactory or very unsatisfactory zoning.

In addition to visual information, the created interactive map allows you to find out about the real (if any) and estimated (regulatory) zoning by clicking on any of the symbols responsible for each national park. Clicking on the mark opens a window with the name of the NNP and a fragment from Tables 1, 2 or 3, respectively, for each object. An example of a window with information can be seen in Fig. 8.

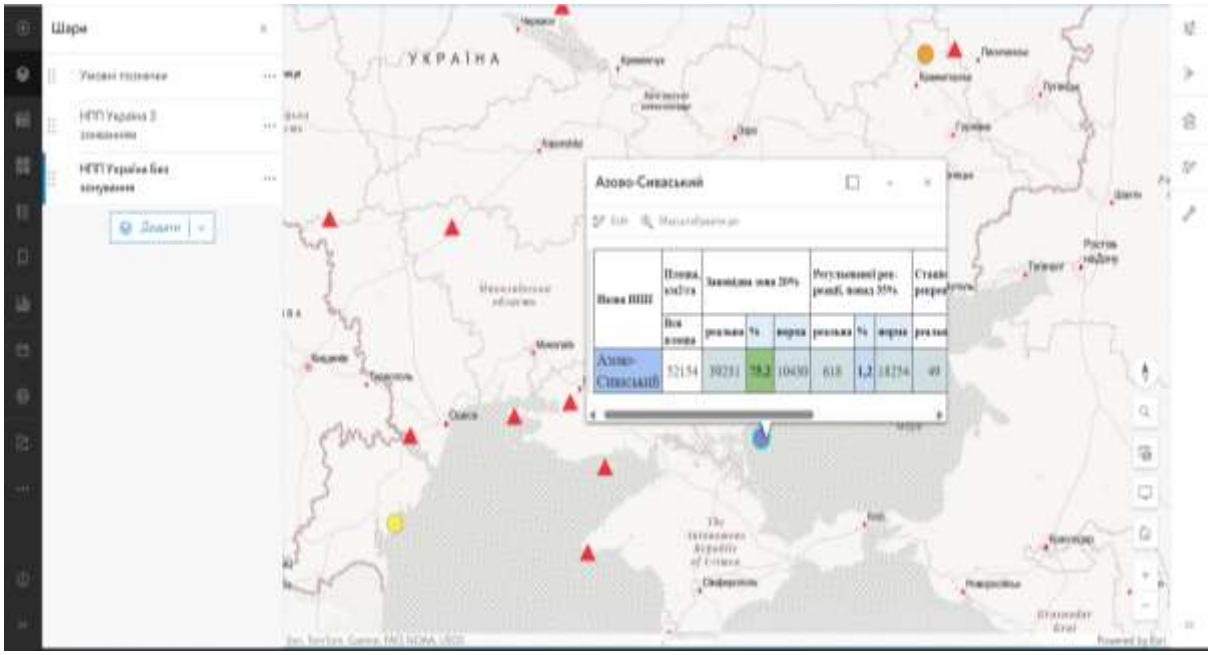

Fig. 8 – Example of a "window" with information on the real and standard areas of functional zones of each park

Conclusions

The study found that the functional zoning of Ukraine's national nature parks often does not meet the established regulatory requirements, which negatively affects the effectiveness of natural area protection. International experience, in particular the practice of Canada and UNESCO biosphere reserves, demonstrates the importance of not only formal zoning, but also real compliance with the regimes of use of the territories, systematic monitoring and adaptive management.

Based on a comparative analysis of the existing zoning in all the National Nature Parks of Ukraine and the normative areas of functional zones according to DBN B.2.2-12:2019, 26 parks were conditionally divided into 6 groups according to the level of compliance of zoning with the standards, except for four parks where discrepancies were found. Six parks were rated as "Satisfactory", 2 as "Close to Satisfactory", 5 as "Less Close to Satisfactory", 5 as "Far from Satisfactory", and 4 as "Completely Unsatisfactory".

An interactive map was developed to visualize the results.

The situation in each park depends on the natural conditions, the level of recreational pressure, and the socio-economic context, but having clear and reasonable zoning is essential to achieve the main goal of preserving ecosystems, ensuring sustainable use of natural resources, and developing ecotourism.

Conflict of Interest

The authors declare no conflict of interest regarding the publication of this manuscript. Furthermore, the authors have fully adhered to ethical norms, including avoiding plagiarism, data falsification, and duplicate publication.

***Authors Contribution*:** all authors have contributed equally to this work.

In this study, generative artificial intelligence was not used.

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ОЦІНКА ДОТРИМАННЯ НОРМАТИВНОГО СПІВВІДНОШЕННЯ ЗОНУВАННЯ НАЦІОНАЛЬНИХ ПРИРОДНИХ ПАРКІВ В УКРАЇНІ

Мета. Оцінити відповідність фактичного функціонального зонування територій національних природних парків України чинним нормативним вимогам.

Методи. Системний аналіз, статистичні, картографічне моделювання.

Результати. Проаналізовано світовий досвід зонування, здійснено порівняльний аналіз фактичного зонування всіх 26 НПП України з державними будівельними нормами ДБН Б.2.2-12:2019 «Планування та забудова територій», згідно з якими кожен парк повинен мати чітко визначену частку площа зон: заповідної, регульованої рекреації, стаціонарної рекреації та господарської зони. Визначено 6 груп парків за ступенем відповідності зонування нормативам,: «Задовільно» - 6, «Наближене до задовільного» - 2, «Менш наближене до задовільного»- 5, «Далеке від задовільного» - 5, «Зовсім незадовільне» - 4. Оцінка зонування у 4 НПП виявилась неможливою із-за різниці даних у офіційних джерелах. Встановлено, що функціональне зонування 70 % національних природних парків України не відповідає встановленим нормативним вимогам. Створено інтерактивну карту зонування НПП України; Запропоновано рекомендації щодо удосконалення зонування.

Висновки. Невідповідність функціонального зонування встановленим нормативним вимогам негативно впливає на ефективність охорони природних територій. Ситуація в кожному парку залежить від природних умов, рівня рекреаційного тиску, соціально-економічного контексту, проте мати чітке й обґрунтоване зонування вкрай важливо для досягнення головної мети – збереження екосистем, забезпечення сталого використання природних ресурсів та розвитку екологічного туризму.

КЛЮЧОВІ СЛОВА: *Національний природний парк, функціональне зонування, норматив, зона суворої охорони, зона регульованої рекреації, зона стаціонарної рекреації, господарська зона, інтерактивна карта*

Конфлікт інтересів

Автори заявляють про відсутність конфлікту інтересів щодо публікації цього рукопису. Крім того, автори повністю дотримувалися етичних норм, включаючи уникнення плагіату, фальсифікації даних та дублювання публікацій.

Внесок авторів: всі автори зробили рівний внесок у цю роботу.

В роботі не використано ресурс штучного інтелекту.

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