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Research paper

The Structuring of the Lands Nature Reserve Fund Central Forest-Steppe of Ukraine

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Abstract

In the work for the territory of the Central Forest-steppe (Vinnitsa, Cherkasy and Poltava regions), the structure of the lands of the nature reserve fund (NRF) was carried out. The current analysis of the state of lands of the NRF and the definition of priority tasks for its development is important for the ecological stability of the territory of the regions. The given structuring of lands of the NRF consists in the quantitative distribution of administrative regions. The grouping of object categories by area and number and the establishment of a reserve level for the regions is done. The results show that a number of disproportions and problems of nature use are distinguished on the lands of the NRF of the region. In particular, the strictly uneven is the protection of administrative districts, the differences between which reaches dozens of times.

Keywords: *lands of the nature reserve fund, nature reserve level, nature reserve territories.*

1. Introduction

In the process of sustainable development principles introduction the problem of coordination of the resource and environmental values of the region acquires especial topicality and aims at balances nature management. In addition, the sustainable use of natural resources is impossible without studying its permanent standards – protected sites and territories. Taking into account that state protection of valuable natural objects and territories is one of the most effective forms of their preservation, development of nature reserve network provides proper protection of valuable species of flora and fauna, unique landscapes, geological, hydrological objects etc. [1-3].

The development of natural reserves is determined to be one of the priorities of environmental policy of Ukraine for the coming years. It will be carried out on the basis of systematic consideration of environmental, economic, social and other public interests, as well as compliance with international obligations.

For territory of Vinnytsia region such papers as O.V. Mudrak, H.V. Mudrak, Ye.I. Vorona, L.M. Kyryliuk [4-5], B.P. Fishchuk, K.V. Avramchuk [6], M.M. Prykhodko [7], N.O. Syplyva [8], Yu.V. Yatsentiuk [9-10], V.A. Ishchenko, M.S. Korinenko [11] et al.

For territory of Cherkasy region the papers of such scientists as V.L. Shevchyk [12], S.M. Koniakin, I.A. Chemerys [13-14], V.A. Konohrai [15-16], P.I. Moroz, H.A. Chorna, T.F. Haiova, T.P. Novilova [17] et al.

For territory of Poltava region such papers as O.M. Bairak [18], N.P. Halchenko [19], O.M. Bairak, N.O. Stetsiuk, M.V. Sliusar, Yu.S. Holik, N.P. Halchenko, M.I. Proskurnia [20], V.V. Nykyforov [21] et al.

Analysis of the lands of the nature reserve fund of the Central Forest-Steppe, namely, in Vinnytsia, Cherkasy and Poltava regions, to determine: the nature reserve level on the boundaries of the regions districts, the number of sites and areas of the NRF, the area of different categories and an analysis comparing the regions.

2. Material and results of the research

The modern structure of the nature reserve fund of Ukraine includes 11 categories of territories and sites of the state and local significance. About 90 % of the number of existing sites are the natural monuments, nature reserves and protected woodlands, while about 80 % of the nature reserve fund are reserves, national natural and regional landscape parks. Half of the area of the nature reserve fund of Ukraine is occupied by the territory and objects of national importance.

In Ukraine it was planned to raise it up to 7% by 2015, but this aim was not achieved. In different regions the index of the nature reserve level fluctuates from 1 % to 15 %, and, in 12 regions of Ukraine it makes only 1-3%, in 10 regions it is of medium value – 4-9%, and only in three regions (Transcarpathian, Ivano-Frankivsk and Khmelnitsky regions) and the cities of Kyiv and Sevastopol it exceeds 10%.

According to the physical-geographical zoning of Ukraine [22], we included Vinnytsia, Cherkasy and Poltava regions to the Central Forest-Steppe; they are situated in the central forest-steppe part and have similar natural and climatic conditions.

A quantitative distribution of the NRF by administrative districts is the key indicator of the available reserve network analysis.

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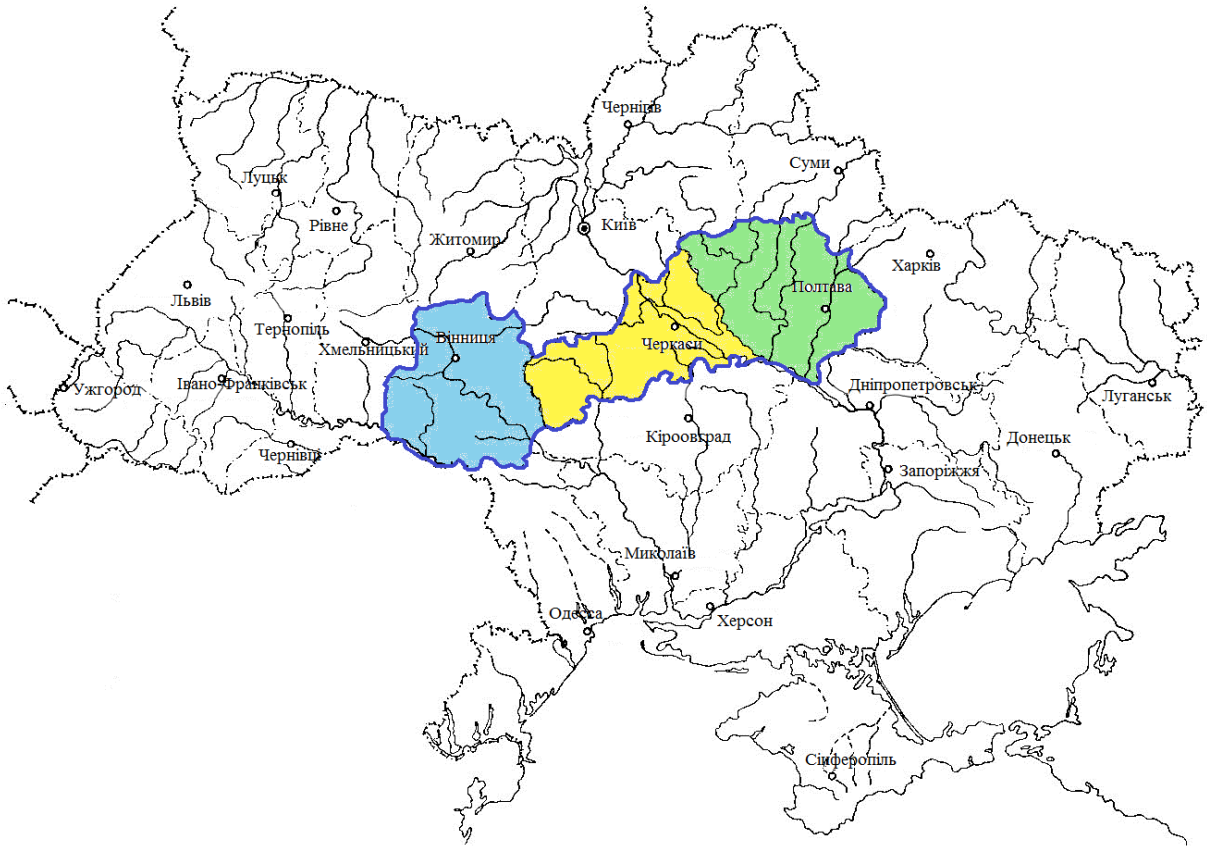


Fig. 1: The scheme of the location of the Central Forest-steppe

In the territory of Vinnytsia region NRF includes 405 reserve sites of the area of 65638.3 ha, including 43 objects of national importance in the territory of 34490.1 ha (10.68%) [23], and 362 objects of local importance in the territory of 31137.89 ha. According to the law of Ukraine "About the nature reserve fund of Ukraine" [24] there are 11 categories of objects, and in the territory of Vinnytsia region there are 6 categories: national nature park – 1, regional landscape park – 4, natural monuments – 196, wild life preserves – 138, park a monument of landscape art – 36 and protected woodlands – 28.

On the whole, the nature reserve level in the region is 2.8%, which is much lower than in Ukraine 4.6 % and in Europe on average 15%. To compare the nature reserve level in Vinnytsia region we present the data for Chechelnik district 32.91% (max) and Lypovets district 0.02% (min), shown in tables 1-2.

Table 1: NRF distribution by the categories of territories and objects of Chechelnik district

Territories and objects	Objects number	Of national importance		Of local importance	
		Area, ha	%	Area, ha	%
National nature park	1	20203.4	80.77	-	-
Botanical wild preserve	3	3259.0	13.03	1538.0	6.15
Botanical natural monument	2	12.5	0.05	-	
Hydrological natural monument	2	-	-	0.07	0.01
Nature reserve territories area 25012.97 ha					
Area of the district 760 km^2					
Nature reserve level of the territory 32.91%					

Table 2: NRF distribution by the categories of territories and objects of Lypovets district

Territories and objects	Objects number	Of national importance		Of local importance	
		Area, ha	%	Area, ha	%
Hydrological wild preserve	1	-	-	15.4	76.50
Hydrological natural monument	3	-		0.03	0.15
Complex natural monument	1	-		4.7	23.35
Nature reserve territories area, 20.13 ha					
Area of the district 970 km^2					
Nature reserve level of the territory, 0.02%					

In the territory of Chechelnik district the objects of national importance prevail, there are 93.84% of them; the biggest area is occupied by national nature park "Karmeliukove Podillia". Among the objects of national importance the least area is occupied by the botanical natural monument – 0.05%, and among the objects of local importance – the hydrological natural monument – 0.01%. In the territory of Lypovets district there no objects of national importance and among the objects of local importance the hydrological wild preserve prevails – 76.5%. Hydrological natural monuments include most objects (3), but the least area – 0.15%.

The index of Vinnytsia region NRF insularization has been calculated; it is 0.5, which proves its suboptimal formation. The higher the insularization index is (max=1.0), the more important role in the general protected territory is played by small sections that do not have ecological stability; their role in preserving the gene pool is small. Moreover, for the territories of Kalynivka, Kryzhopil, Lypovets and Tomashpil districts this index is 1, which certifies that the general protected territory consists of the smallest sections and is not stable or stationary.

In the territory of Cherkasy region NRF includes 538 reserve objects of the area of 70317.0653 ha, including 22 objects of national importance in the area of 35296.5566 ha (4.08%) [23], and

516 objects of local importance in the territory of 40003.0999 ha. Nine categories of NRF objects include: a nature reserve – 1, national nature park – 2, regional landscape park – 4, natural monument – 192, wildlife preserve – 222, park monument of landscape art and protected woodlands – 52 each, arboretum and zoo – 1 each.

On the whole the nature reserve level in the region is 2.66%. Tables 3-4 contain distribution of the objects for Kaniv district 15.6% (max), Kamiansk and Uman districts 0.15% (min).

Table 3: NRF distribution by the categories of territories and objects of Kaniv district

Territories and objects	Objects number	Of national importance		Of local importance	
		Area, ha	%	Area, ha	%
Natural reserve	1	8634.88	43.2	-	-
National nature park	1	3356.22	16.78	-	-
Regional landscape park	1	5562.5	27.83	-	-
Botanical wild life preserve	8	-	-	32.55	0.16
Landscape wild life preserve	3	405.0	2.03	54.5	0.27
Hydrological wild life preserve	5	-	-	184.3	0.92
General zoological wild life preserve	1	-	-	0.5	0.01
Ichthyological wild life preserve	1	-	-	120.0	0.60
Botanical natural monument	10	-	-	6.55	0.06
Zoological natural monument	1	5.0	0.02	-	-
Complex natural monument	2	-	-	23.5	0.12
Hydrological natural monument	7	-		10.14	0.05
Geological natural monument	10	-		25.3	1.27
Protected woodland	19	-	-	1540.37	7.71
Park monument of landscape art	1	-	-	20.0	0.1
Nature reserve territories area 19981.33 ha					
Area of the district 1281 km^2					
Nature reserve level of the territory 15.6%					

In the territory of Kaniv district the objects of national importance prevail – 89.86%, and among them – the natural reserve. The general zoological wild life preserve – 0.01% and geological natural monuments – 0.05% occupy the least area among the objects of local importance.

The objects of local importance prevail in the territory of Kamiansk district – 94.81%, and among them – botanical wild life preserves. Geological natural monuments occupy the least area among the objects of local importance – 0.98%.

The index of Cherkasy region NRF insularization has been calculated; it is 0.5, which proves its suboptimal formation. Moreover, for the territories of Kamiansk and Katerynopil districts this index is 1, which certifies that the general protected territory consists of the smallest sections and is not stable or stationary.

NRF in Poltava region includes 387 objects in the area of 164860.2415 ha, including 29 objects of national importance in the area of 64600.22 ha [23], and 358 objects of local importance in the area of 100260.0215 ha (7.49%). There are 8 categories of NRT: national nature park – 2, regional landscape park – 5, natural monuments – 135, wild life preserves – 176, park monument of landscape art – 18, protected woodlands – 48, botanical garden – 1, arboretum – 2.

Table 4: NRF distribution by the categories of territories and objects of Kamiansk district

Territories and objects	Objects number	Of national importance		Of local importance	
		Area, ha	%	Area, ha	%
Botanical wild life preserve	2	-	-	22.6	20.17
Hydrological wild life preserve	1	-	-	11.0	9.82
Entomological wild life preserve	1	-	-	5.0	4.46
Botanical natural monument	3	-	-	10.6	9.46
Complex natural monument	2	-	-	24.297	21.69
Hydrological natural monument	4	-	-	16.41	14.65
Geological natural monument	2	-	-	1.1	0.98
Protected woodland	1	-	-	15.2	13.58
Park monument of landscape art	1	5.82	5.19	-	-
Nature reserve territories area 112.027 ha					
Area of the district 725.4 km^2					
Nature reserve level of the territory 0.15%					

The area of the nature reserve fund of Poltava region is distributed rather irregularly. The lowest nature reserve level is in Hrebinka (0.8%), Myrhorod (0.88%), Shyshaky (1.08%) districts, and the highest – in Pyriatyn (18.79%), Dykanka (17.92%), and Kobeliaky (14.68%) districts. Tables 5-6 include distribution of the nature reserve level in Pyriatyn and Hrebinka districts.

Table 5: NRF distribution by the categories of territories and objects of Pyriatyn district

Territories and objects	Objects number	Of national importance		Of local importance	
		Area, ha	%	Area, ha	%
National nature park	1	12028.42	74.14		
Botanical wild life preserve	1	-	-	12.00	0.07
Landscape wild life preserve	1	622.7	3.83	-	-
Hydrological wild life preserve	6	300.0	1.85	1450.20	8.94
Entomological wild life preserve	1	-	-	79.2	0.49
General zoological wild life preserve	1	-	-	746.00	4.59
Protected woodland	2	-	-	887.20	5.48
Botanical natural monument	4	-	-	48.04	0.30
Complex natural monument	2			4.8	0.03
Park monument of landscape art	1	45	0.28		
Nature reserve territories area 16223.56 ha					
Area of the district 863.5 km^2					
Nature reserve level of the territory 18.79%					

Table 6: NRF distribution by the categories of territories and objects of Hrebinka district

Territories and objects	Objects number	Of national importance		Of local importance	
		Area, ha	%	Area, ha	%
Botanical wild life preserve	1	-	-	10.0	2.08
Landscape wild life preserve	2	-	-	246.9	52.64
Hydrological wild life preserve	1	-	-	100.0	20.82
Entomological wild	1	-	-	73.2	15.24

life preserve					
Botanical natural monument	8	-	-	5.58	0.81
Zoological natural monument	2	-	-	7.42	1.54
Complex natural monument	1	-	-	5.5	1.45
Park monument of landscape art	1	-	-	27.40	5.70
Nature reserve territories area 476.0 ha					
Area of the district 595 km^2					
Nature reserve level of the territory 0.8%					

The objects of national importance prevail in the territory of Pyriatyn district – 80.1%, and among the objects of local importance – hydrological wild life preserves – 8.94%. Botanical wild life preserve occupies the least area among the objects of local importance – 0.07%.

In the territory of Hrebinka district there are no objects of national importance, and among the objects of local importance landscape wild life preserves prevail – 52.64%. Botanical natural monuments occupy the least area among the objects of local importance – 0.81%.

The index of Poltava region NRF insularization has been calculated; it is 0.25, which proves its medium formation. Moreover, for the territory of Kobeliaky district the insularization index is 0, which certifies that in the territory of the district there are no the objects of the area less than 50 ha.

The most number of objects up to 50 ha are in Vinnytsia region – 339, in Cherkasy region – 298 and in Poltava region – 202 objects. The objects with the area of up to 50 ha that are especially vulnerable and unstable.

As to the level of dissection (insularization) the most stable objects are situated in the territory of Poltava region – 0.25, the index is twice as high for the territories of Cherkasy – 0.5 and Vinnytsia regions – 0.55.

With the aim of assessment of the territory nature reserve level the authors [25] propose to generate a data bank using MapInfo GIS-package and to create theme maps according to the space distribution of the objects of the nature reserve fund.

For a visual image of the distribution of the nature reserve level for the Central Forest-Steppe we built thematic maps of the spatial distribution of data (Fig. 2-4).

As to the nature reserve level, Poltava region occupies the first place – 5.48% with the total area of the objects 164860.2415 ha, number of the objects 387, average area of 1 object is 425.99 ha. The second place is occupied by Vinnytsia region; its nature reserve level is 2.8% with the total area of the objects 65638.3 ha, number of the objects 405, average area of 1 object is 162.07 ha. The third place is occupied by Cherkasy region; it has the lowest nature reserve level – 2.66%, but the biggest number of objects – 538, of the total area 70317.0653 ha, average area of 1 object is 130.70 ha.

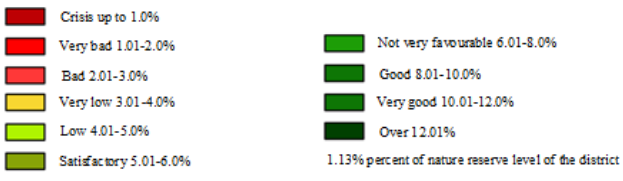




Fig. 2: Distribution of the nature reserve level of Vinnitsa region



Fig. 3: Distribution of the nature reserve level of Poltava region



Fig. 4: Distribution of the nature reserve level of Cherkasy region

3. Conclusions

Thus, characterizing the regions of the Central Forest-Steppe (Vinnytsia, Cherkasy and Poltava) we come to the conclusion that they are located in the central part of the Forest-Steppe, have similar natural-climatic indices, the number of districts, but different nature reserve level. In the future Vinnytsia and Cherkasy regions will have urgent need for the development of natural reserve fund and bringing the nature reserve level of the regions to the best standards from the scientific point of view and European-style of natural reserve areas.

The region NRF contains a number of disproportions and problems of nature management. In particular, the nature reserve levels are extremely irregular; the difference between them comes to scores of times.

So, it is necessary, if there is a possibility, to combine these areas and create territories more significant for protection (nature reserves, national parks and regional landscape parks).

References

[1] Andriienko TL, Malysheva NR, Parchuk SV et al., *Reserve business in Ukraine*, Teografika, (2003), 306 p.

[2] Didukh YaP, Sheliah-Sosonko YuR (2001), Ecosystems classification – imperative of the national econetwork (ECONET) of Ukraine. *Ukrainian botanical journal*. Vol. 58, No 14, 450-458.

[3] Hrodzynskyi MD, *Fundamentals of landscape ecology*, Lybid, (1993). 224 p.

[4] Mudrak OV, Mudrak GV, Polishchuk VM and other, *Standards nature Vinnichiny*, Console, (2015), 540 p.

[5] Mudrak OV, Vorona YeI & Kyryliuk LM (2005), Protected objects in Vinnytsia region, the character and features of their distribution in physical-geographical districts. *Scientific papers of Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University. Series: Geography*. Is.10, 90-96.

[6] Fishchuk BP & Avramchuk KV (2012), Ecological typological aspects of creation of the regional ecological network in Vinnytsia region. *Collected papers. Agriculture*. No. 1 (57), 142-146.

[7] Prykhodko MM (2011), Ecological network as a factor of ecological safety of natural and anthropogenic geosystems in the region of Ukrainian Carpathians and adjacent territories. *Ukrainian geographical journal*. No. 2, 41-48.

[8] Syplyva NO, *Autphytosozological assessment of the reserve Vinnytsia region* [Electronic resource]. – Access mode: http://boOk.net.

[9] Yatsentiuk YuV, *Adjacent territories of the econetwork of Vinnytsia region* [Electronic resource]. – Access mode: http://eco.com.ua.

[10] Yatsentiuk YuV *Econetwork of Vinnytsia region*, Edelveis and K, (2011), 128 p.

[11] Ishchenko VA & Korinenko MS *Express-assessment of the state of the nature-reserve fund of Nemyrivskyi district in Vinnytsia region* [Electronic resource]. – Access mode: http://eco.com.ua.

[12] Shevchyk VL, Bakalyna LV, Polishko OD (2009), About extension of some rare plant species in Cherkasy region. *Herald of Cherkasy University. Series. Biology*. Is. 156, 135-148.

[13] Koniakin SM (2012), Assessment of representation of the nature-reserve fund of Cherkasy region as the basis of functioning the regional econetwork. *Herald of Chernivtsi National University. Series Geopgraphy*. Is. 614-615, 58-65.

[14] Koniakin SM & Chemerys IA (2013), Landscape-phytocenotic representation of the regional econetwork of Cherkasy region in the territory of the Left-bank Dnipro territory. *Man and environment. Problems of neoecology*. No. 1-2, 33-41.

[15] Konohrai VA (2014), Modern state of vegetation protection in the territory of Kremenchuk reservoir. *Nature of Western Polissia and adjacent territories*. 220-225.

[16] Konohrai VA (2013) *Vegetation of Kremenchuk reservoir: structure, dynamics, protection* / Candidate's thesis (Biology), 23.

[17] Novikova TP (2013), Nature reserve fund of Cherkasy region and its role in preservation of biodiversity. *Herald of NLTU of Ukraine*. Is. 23.6, 304-308.

[18] Bairak OM (2000) *Phytodiversity of the Left-bank Dnipro territory* / Doctor's thesis (Biology), 36.

[19] Halchenko NP (2006), Vegetation of RLP "Kremenchutski plavni", *Natural reserve territories of Ukraine. Vegetation*, Phytosociocenter, 175.

[20] Bairak OM, Stetsiuk NO, Sliusar MV, Holik YuC, Halchenko NP & Proskurnia MI, *Regional econetwork of Poltava region*, Verstka, (2010), 204.

[21] Nykyforov VV, (2003), Ecological network of Medium Dnipro territory: modern state and ways of ortimization. *Publishing house of Dnipropetrovsk University*, (2003), 188.

[22] Physical-geographical division into districts of the Ukrainian SSR, *Publishing house of Kiev University*, 1968. 684.

[23] Nature reserve fund of Ukraine of national importance: Reference book, (1999), 240.

[24] About nature reserve fund: Law of Ukraine of 25.07.1992 [Electronic resource]. – Access mode: http://zakon4.rada.gov.ua.

[25] Volkov A (2014) Conservation areas assessment in the context of sustainable development of Ukraine (Utilizing geoinformational technologies), *Sustainable development*, No. 19, 89-93.

[26] Onyshchenko, V. O., Bryzhan, I. A., & Chevhanova, V. Y. (2014). Ecologically oriented development of ukraine's economy: Problems and perspectives. Actual Problems of Economics, 155(5), 261-270.