

Evaluation of the efficiency of functioning of the nature reserve fund in the Pripet river basin in the Volyn region

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ABSTRACT

Introduction. Considerable attention of scientists at the current stage of development of society is given to the theory of formation and assessment of the state of the nature reserve network and its ability to ensure biodiversity. The upper part of the Pripet River basin in the Volyn region is marked by various nature-reserved objects that belong to the pan-European, national and regional eco-networks.

The objective of the work is the assessment and territorial distribution of NRF within the Pripet River basin in Volyn.

Methods. The research used a complex and systematic approach, as well as mathematical, cartographic and comparative descriptive methods.

Results. The river basin contains 314 objects of the nature reserve fund (NRF) with a total area of 164,735.7 hectares. The actual area is 149,186.4 hectares as a number of objects that are included in the total area of the nature reserve fund are actually located within the boundaries of other NRF objects, much larger in area. There are more than 40 such objects in the Pripet river basin. Such objects located within several river basins are also found within the basins of the main tributaries of the Pripet – the Vyzhivka, the Turia, the Tsy, the Stokhid, the Sty rivers. In the upper Pripet River basin, there is an uneven distribution of protected areas across the territory, which indicates the need to increase their size in the Sty, Turia, Vyzhivka, and Korostyanka river basins to achieve an optimal ratio of areas and conserve species biodiversity based on a basin approach. The results of the calculation of the insularity index of the NRF of the Volyn region and of the degree of protection within the river basins are presented. The effectiveness of the nature reserve fund of the Pripet River basin was assessed, where the actual area of the protected area is 149,186.4 ha, the density of objects is 2.14 per 100 km², the degree of protection (S_{pro}) is 10.17%, and the insularity index (I) is 0.32. Twelve species of flora included in the International Red Lists were identified (*Daphne cneorum* L., *Cypripedium calceolus* L., *Aldrovanda vesiculosa* L., *Salvinia natans* (L.) All., *Jurinea cyanoides* (L.) Rchb., *Tragopogon ukrainicus* Artemczuk., *Silene lithuanica* Zapal., *Liparis loeselii* (L.) Rich., *Pulsatilla patens* (L.) Mill., *Saxifraga hirculus* L., *Galanthus nivalis* L., *Crataegus ucrainica* Pojark.), the areas of distribution of which are protected areas located in the Pripet River basin.

Conclusions. Prospectively, a successful expansion of the NRF area of the basin will make it possible to develop a national and pan-European eco-network, as well as to expand the area of wetlands of international importance.

Keywords: river basin, natural reserve fund, ecological network, degree of protection, insularity index.

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Introduction. Considerable attention of scientists at the current stage of development of society is given to the theory of formation and assessment of the state of the nature reserve network and its ability

to ensure biodiversity. The state of the nature reserve fund (NRF) of Ukraine was studied for a long time by such researchers as V. Klymenko, A. Romaniv, V. Hrynevetskyi, A. Zlobin, P. Tsaryk, Yu. Shelyag-Sosonko, V. Petlin, V. Fesyuka, N. Maksymenko, etc. [6; 7; 10; 14; 16; 22; 24], and optimization measures for its improvement were developed. The issue of nature protection activities in Volyn is highlighted in the scientific works of Yu. Hryshchenko, Z. Karpyuk, V. Fesyuk, T. Pavlovska, I. Kovalchuk, etc. [11; 15; 19].

However, the organization of the NRF network and methods of its optimization were usually studied within the boundaries of administrative territorial units (districts, regions, the country in general). Today, the basin approach is becoming more and more relevant when assessing the nature reserve network. In this regard, Yu. Shelyag-Sosonko [22] developed a layout of the eco-network of the Dnieper basin. The eco-network of the Volyn region was also marked out [10], characterizing the current state of the territorial distribution of the NRF objects of the Stokhid River, the Vyzhivka, and the Western Bug, as presented in the studies of I. Kovalchuk, T. Pavlovska, Z. Karpyuk, V. Fesyuka, M. Boyarin, I. Netrobchuk etc. [2; 11; 15; 19]. A further study of the NRF within the boundaries of individual river basins of the Volyn region is necessary, in particular the rivers of the Pripet basin, since the majority of the water management complex in Volyn is its basin which has a significant degree of development.

The objective of the work is the assessment and territorial distribution of NRF within the Pripet River basin in Volyn.

Research methods and raw data. Data of the Volyn State Administration and of the State Department of Environmental Protection in the Volyn Region were used for the scientific research of the territorial distribution of NRF objects within the Pripet River basin [21]. The research used a complex and systematic approach, as well as mathematical, cartographic and comparative descriptive methods.

The assessment of the effectiveness of the nature reserve fund of the Pripet river basin in the Volyn region, of the need to optimize the ecological network of each sub-basin and to expand existing nature conservation areas used the following indicators:

Determination of the insularity index utilized the methodology [8; 14; 16]

NRF insularity index I is the mean arithmetic value of the two indicators I_m and I_n and is determined by the formula

$$I = (S_{ns}/S_{NRF} + N_{ns}/N_{total})/2$$

Insularity index ranges from 0 to 1, according to which the higher the value of the index, the greater the share of *unstable* objects in the NRF

structure of the investigated object. According to the research of Yu.A. Zlobin etc. [7; 8], *unstable* or *insular* objects are territories up to 50 ha; the boundary area of *ecologically stable* nature reserve objects in Ukraine is 50 ha.

The indicator I_m is determined by the formula

$$I_m = S_{ns}/S_{NRF}$$

where S_{ns} is the area of relatively unstable nature reserve objects (NRO) (with an area of up to 50 ha); S_{NRF} is the total NRF area of a certain territory.

The indicator I_n is determined by the formula

$$I_n = N_{ns}/N_{total}$$

where N_{ns} is the number of unstable NROs (area up to 50 ha); N_{total} is the total number of NROs of the basin.

The degree of protection of the territory (S_{pro}) is also an important indicator to develop recommendations on the arrangement and territorial optimization of the structure of the NRF within the Pripet River basin. This is determined by the formula

$$S_{pro} = (S_O/S_R) * 100\%$$

where S_O is the total area of all protected objects of a certain district, S_R is the total area of that district [8].

Research results. One of the priority tasks of socio-economic development is the formation of a regional ecological network to restore the integrity of the structural and functional organization of river basin landscapes. The SWOT analysis method used in [11; 23] revealed the strengths and weaknesses of the territorial structure of the NRF, as well as opportunities for development and optimization of the state of the NRF of the Volyn region, as the Pripet River basin occupies more than 80% of its total area. Thus, the northern part of the basin (the Pripet source, northern parts of the basins of the Vyzhivka, the Turia, the Tsyra, the Stokhid, the Styra rivers) is characterized by a low level of development of the territory, a high degree of afforestation, a dense hydrographic network and by infertile soils, which form good conditions for the preservation of natural landscapes and ecosystem development. The southern part of the Pripet basin (sources of the Turia, the Stokhid, and the middle stream of the Styra) has low degree of afforestation, a small number of hydrographic objects and fertile soils which are actively used in agriculture, so the conditions for the preservation of natural landscapes and development of eco-networks are unfavorable. The common problems for the northern and southern parts of the basin are: a low share of the territories of the nature reserve fund set aside, with clearly delineated boundaries; lack of eco-network projects at the local level, as well as the poor state of conservation of existing NRF objects in forest areas, which also includes violations of the conditions of forest use, the for-

mation of spontaneous landfills, non-compliance with environmental protection requirements, etc. Solving these problems, at least partially, requires significant capital investments, as well as time.

However, a relatively high degree of protection was found in the basin of the Pripet River, 10.17%, compared to other regions [11; 21], which inspires hope for achieving the indicators set in the State Environmental Policy Strategy for the period until 2030 approved by the parliament (No. 2697-VIII, 28.02.2019) with provisions of 15% of the total territory occupied by NRF.

An important factor in calculating the NRF land area is that a number of objects that are included in the total NRF area are actually located within the boundaries of other, much larger in area, NRO. There are over 40 such objects in the Pripet river basin [11; 21]. Also, when determining the area of the NRF lands within the basins of the main tributaries (the Vyzhivka, the Turia, the Tsyр, the Stokhid, the Styr rivers), objects located within several river basins were identified: Shatsk national reserve park (partially), Pripet-Stokhid national reserve park, Kivertsi national reserve park "Tsumanska Pushcha", local general zoological reserve "Starovyzhivskiy", local landscape reserve "Sviatobuzakivskiy", local general zoological reserve "Dubechnivskiy". The Pripet river basin totals 314 NRF objects (Fig. 1).

The actual NRF area of the catchment area 1 of the Pripet River is 14,301.42 ha, since the forest reserve "Smolyari-1" (33.0 ha; 31.10.1991) is part of the general zoological reserve "Smolyarivskiy" (1422.0 ha; 31.10.1991), and the forest reserve "Smolyari-2" (11.0 ha; 10/31/1991) is part of the general zoological reserve "Dubechnivskiy" (1792.0 ha; 09/04/1985) (*1592.0 ha of the area of the reserve is within the Pripet basin*) [11; 21].

The actual NRF area of the catchment area 2 of the Pripet River is 17,755.8 ha, as the hydrological reserves "Vetlivskiy" (600.0 ha; 23.11.1979), "Hirkivskiy" (400.0 ha; 23.11.1979), "Prypyatskiy-3" (320.0 ha; 09/04/1985), "Rogiznenskiy" (610.2 ha; 09/12/1998), parts of forest reserves "Dolskiy" (\approx 40.0 ha of 73.6 ha; 07/25/2003), "Biloozerskiy" (\approx 80.0 ha out of 276.5 ha; 25.07.2003), botanical nature monuments "Group of oaks-1" (0.2 ha; 11.07.1972), "Group of oaks-2" (0.3 ha; 11.07.1972), "Plot of forest-1" (5.0 ha; 11.07.1972), "Plot of forest-2" (1.5 ha; 11.07.1972) are all parts of the Pripet-Stokhid national reserve park (16,915.5 ha in the catchment basin 2 of the Pripet River).

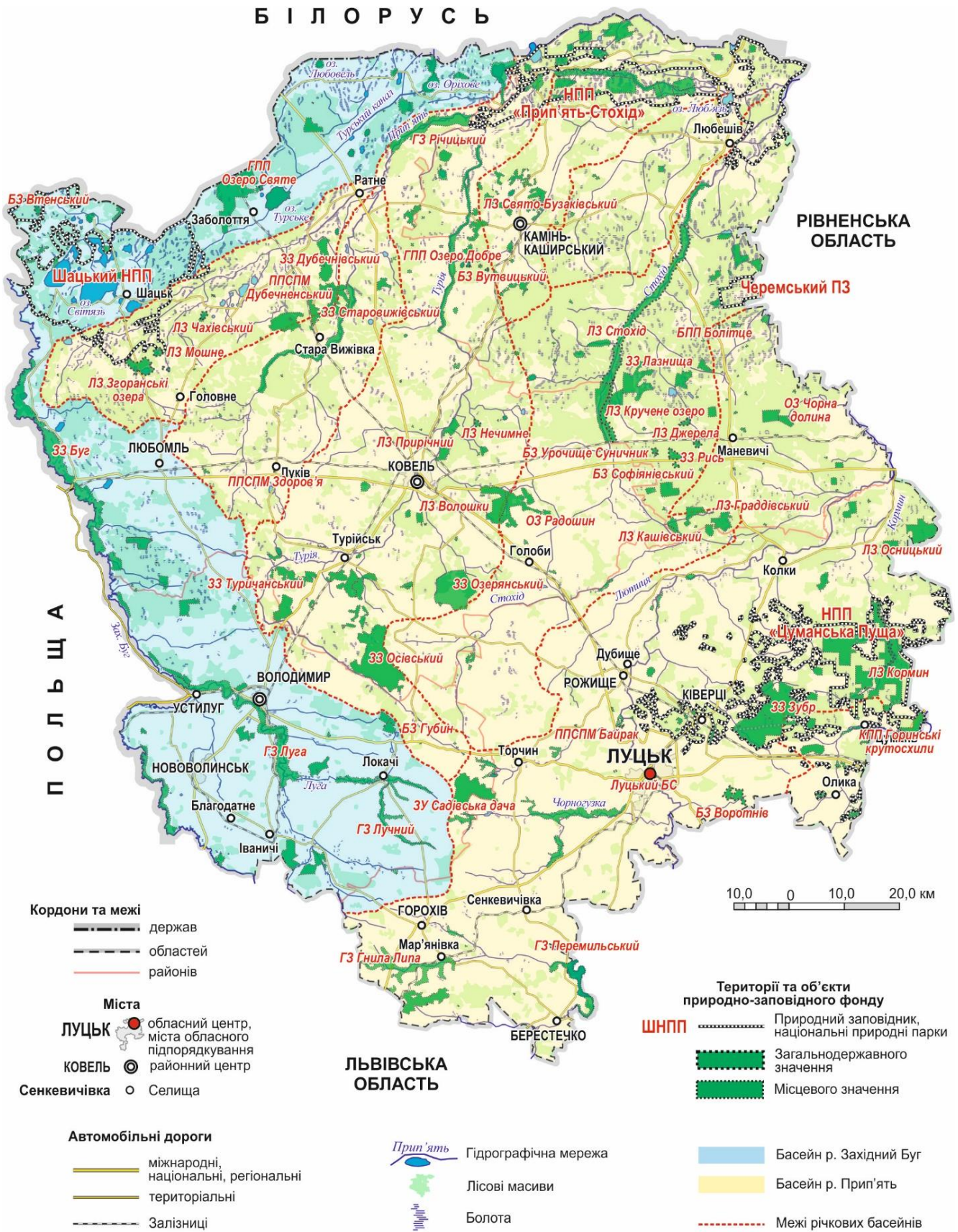
The NRF area of the Turia River basin is 26,246.38 ha, since the "Velikoglushanskiy" hydrological reserve (360.0 ha; 23.11.1979) is included in the "Prypyat-Stokhid" national reserve park (3600.0 ha of the Turia river basin of 39,315.5 ha; 08/13/2007).

The actual NRF area of the Tsyр river basin is 11,957.1 ha, since the hydrological reserves "Yamno" (218.3 ha; 07.25.2003), "Tsyрskiy" (210.0 ha; 11.23.1979), "Prypyatskiy-1" (340.0 ha; 09/04/1985), "Prypyatskiy-2" (220.0 ha; 09/04/1985), "Birkivskiy" (850.0 ha; 09/04 1985) are parts of the Pripet-Stokhid national reserve park (10,000 ha in the Tsyр river basin) [11; 21].

The actual NRF area of the Styr river basin is 53,214.7 ha, since the national landscape reserve "Kormyn" (549.0 ha; 10.12.1994) is part of the protected tract "Tsumanska Pushcha" (8930.6 ha; 29.03.2005), which in turn is a component of the "Tsumanska Pushcha" national reserve park (28,275.0 ha within the river basin with 33 475.34 Ha; 22.02.2010). Parts of ornithological sanctuaries "Muravishche-1" (\approx 26.0 ha out of 40.0 ha; 10/31/1991), "Muravishche-2" (\approx 8.0 ha out of 15.4 ha; 10/31/1991), botanical natural attractions "Sokyrychi" (6.6 ha; 31.10.1991), "Giant Oaks" (0.5 ha; 31.10.1991), "Giant Oak" (0.01 ha ; 31.10.1991), "Muravyschenska dibrova" (15.0 ha; 31.10.1991) are part of the general zoological reserve "Zubr", which partly (\approx 1800.0 ha out of 5530.0 ha; formed on 18.08. 2000) belongs to "Tsumanska Pushcha" national reserve park. The Tsumanska Pushcha National Park also includes natural attractions: zoological "The Revni Tract" (7.0 ha; 12.12.1995), botanical "Forest Plot-1" (4.3 ha; 11.07.1972), "Patriarch Oak" (0.01 ha; 10/31/1991), "Lisodub" (8.3 ha; 10/31/1991), "Dubovyk" (3.3 ha; 10/31/1991), "Dubososnina" (7.2 ha; 31.10.1991), protected tracts "Kivertsivska dacha-1" (6.3 ha; 11/23/1979), "Kivertsivska dacha-6" (7.1 ha; 23.11.1979), "Kivertsivske" (75.3 ha; 04.11.1997), "Cuckoo's Shoes" (65.0 ha; 16.12.2003), "Dibrova" (24.8 ha ; 04.11.1997), "Dibrova-1" (65.0 ha; 16.12.2003), "Oak-pine forest-1" (29.6 ha; 12.12.1995), "Oak-pine forest-2" (45.5 ha; 12.12.1995), "Oak-pine forest-3" (100.9 ha; 12.12.1995), "Oak-pine forest-4" (50, 6 ha; 12.12.1995), "Oak-pine forest-5" (23.5 ha; 12.12.1995). Botanical monument of nature "Western sycamore" (0.01 ha; 09/26/1977) is part of the Lutsk Botanical Garden (10.0 ha; 10/14/1975) [11; 21].

Quantitative and qualitative indicators which make it possible to analyze the current state and the possibilities of optimization of NRF objects are also important for the formation of a basin ecological network [20; 24]. The indicators shown in Table 1 were used for quantitative and qualitative assessment of the state of the nature reserve fund within the Pripet River basin in the Volyn region.

The calculated degree of protection S_{pro} presented in Table 1 and Fig. 2 varies significantly by river basins (catchment 1 of the Pripet River, 3.07, catchment 2 of the Pripet River, 48.25, basins of the



Скорочення на карті: ПЗ – природний заповідник, НПП – національний природний парк, ЛЗ – ландшафтний заказник, БЗ – ботанічний заказник, ЗЗ – загальнозоологічний заказник, ОЗ – орнітологічний заказник, ГЗ – гідрологічний заказник, КПП – комплексна пам'ятка природи, БПП – ботанічна пам'ятка природи, ГПП – гідрологічна пам'ятка природи, БС – ботанічний сад, ППСІМ – парк-пам'ятка садово-паркового мистецтва, ЗУ – заповідне урочище

Fig. 1. Ecological network of the Pripyet River basin in the Volyn region [11; 18]

Indicators of the state of the network of territories and objects of NRF by river basins in the upper reaches of the Pripet River in the Volyn region [11;21]

River basin	Total number of objects, N_{total}	Total NRF area (S_{NRF}), ha	Actual NRF area ($S_{NRF\ fact.}$), ha	Degree of protection S , %	Density of objects, per 100 km ²
Catchment area 1, the Pripet	30	14,345.42	14,301.4	14.65	3.07
Catchment area 2, the Pripet	11	19,202.8	17,755.8	48.25	2.98
The Stokhid River basin	55	19,890.4	19,890.4	6.36	1.76
The Styr river basin	115	65,074.162	53214.7	10.56	2.28
The Turia river basin	78	26,606.38	26,246.4	9.05	2.69
The Vyzhivka river basin	13	3294.81	3294.8	2.59	1.02
The Tsyrriver basin	11	13,795.4	11,957.1	23.58	2.17
The Korostyanka river basin	8	2525.8	2525.8	5.30	1.68
Upper reaches of the Pripet River (total)	314	164,735.17	149 186.4	10,17	2.14

Note. The total number of NRF objects is 314, as some of them are located within several river basins (Shatsk national reserve park (partially), Pripet-Stokhid national reserve park, Kivertsi national reserve park "Tsumanska Pushcha", local general zoological reserve "Starovyzhivskiyi", local landscape reserve "Sviatobuzakivskiyi", local general zoological reserve "Dubechnivskiyi").

Stokhid River, 1.76, the Styr, 2.28, the Turia, 2.69, the Vyzhivka, 1.02, the Tsyrriver, 23.58, the Korostianka, 1.68). The overall degree of protection S_{pro} of the Pripet river basin in the Volyn region is 10.17%. The highest value of the degree of protection is for catchment area 2 of the Pripet, because there are only 4 relatively unstable NRF objects; the lowest values of the degree of protection are recorded for the Vyzhivka River with 8 objects of less than 50 ha, the Korostianka River with 7 objects, the Stokhid River with 23 such objects.

The density of NRF objects per 100 km² are: catchment area 1 of the Pripet river, 14.65; catchment area 2 of the Pripet river, 2.98; basins of the Stokhid, 6.36; the Styr, 10.56; the Turia, 9.05; the Vyzhivka, 2.59; the Tsyrriver, 2.17; the Korostianka, 5.30. The overall value for the Pripet River basin in the Volyn region is 2.14, which is higher than the average value for Ukraine (1.08).

The effectiveness of the NRF and determine its role in the formation of the ecosystem was evaluated by determining the insularity index of the basin territory. The insularity indices of the basin are (Table 2): catchment area 1 of the Pripet river, 0.37, catchment area 2 of the Pripet river, 0.18, basins of the Stokhid, 0.22, the Styr, 0.34, the Turia, 0.33, the Vyzhivka, 0.32. the Tsyrriver, 0.14, the Korostianka, 0.45. The overall value for the Pripet River basin in the Volyn region is 0.32.

Comparing these indicators for the state of the NRF of the Volyn region for 2021, the degree of protection of the territories and NRF objects of the

region overall is 10.92% vs 10.17% for the Pripet river basin; the insularity index in the region overall is 0.3 vs 0.32 for the Pripet river basin; the density of NRF objects in the region is 1.9 objects per 100 km² vs 2.14 for the Pripet River basin [10;11].

A significant role in the optimization and restoration of species biodiversity is played by the extent of the NRF area. Their uneven distribution in the Pripet river basin is observed, which indicates the need to increase the protected areas in the basins of the Styr, the Turia, the Vyzhivka, the Korostianka rivers, to achieve an optimal territorial ratio and preserve species biodiversity, based on the basin approach outlined above. Since this is exactly the approach that was used during the creation of the «Pripyat-Stokhid» National Nature Park in the Pripet river basin.

The nature reserve fund largely covers areas preserved in their natural state, with rare species of flora and fauna listed in the Red Book of Ukraine and in international nature conservation lists. The region territory lacks only some categories of protected areas, in particular regional landscape and dendrological parks, some types of reserves such as entomological, paleontological, karst and speleological [1; 10; 11].

One of the expected results of increasing the territory of protected areas is the preservation of plant species included in the Red Lists. However, their location on the territory of the Volyn region is quite uneven due to its geographical position and the location within two nature zones [1;4], pine and mi-

Table 2

The insularity index of the NRF by basins of the Pripet River tributaries in the Volyn region

River basin	I_T index		I_N index		Insularity index, I
	Area of relatively unstable NRO (S_n), ha	Total NRF area (S_{NRF}), ha	Number of relatively unstable NROs, N_n	Total NROs, N_{total}	
Catchment area 1, the Pripet	102.62	14,345.42	22	30	0.37
Catchment area 2, the Pripet	7.0	19,202.8	4	11	0.18
The Stokhid River basin	379.3	19,890.4	23	55	0.22
The Styr river basin	729,192	65,074,162	77	115	0.34
The Turia river basin	658.21	26,606.38	50	78	0.33
The Vyzhivka river basin	77,81	3294.81	8	13	0.32
The Tsyry river basin	92.4	13,795.4	3	11	0.14
The Korostyanka river basin	69.8	2525.8	7	8	0.45
Upper reaches of the Pripet River (total)	2116,332	164,735.17	194	314	0.32

xed forests in the north (Volyn Polissia region) and broad-leaved forests in the south (Volyn Highlands region), a line Ustylug–Volodymyr–Khorokhorin–Kulchyn–Kivertsі–Olyka being the border. Different soil and climatic condition, which change from north to south, the different degree of development of the territory determines the diversity of plant groups and their spatial arrangement. The south of the Volyn region is characterized by a low degree of forest cover (10-11%), forest groupings of secondary origin being small, highly fragmented and transformed by human activity [1;4]. Therefore, the share of nature reserves here is minor. The vegetation of the northern part of the region was formed in the post-glacial period and is characterized by the predominance of boreal, arctic boreal, and meadow

types of plants with a small share of nemoral plants. Forest cover averages 40% of the territory. The natural vegetation cover is characterized by the dominance of forest, swamp, meadow, coastal and water biotopes. The majority of the NRF objects of the region are concentrated in this zone, and specifically the studied object, the basin of the Pripet River which is characterized by a variety of biotopes which include plant species that are included in the IUCN Red List, European Red List, CITES and Resolution No. 6 (Annex I) of the Bern Convention (Table 3).

Among the species of plants that are protected and found in various biotopes of the Pripet River basin, most are representatives included in Resolution No. 6 (Appendix I) of the Bern Convention [9].

Table 3

Species of flora included in the International Red Lists [25]

Species	IUCN Red List	Euro Red List	Addendum 1 Bern conv	Resol. 6 Bern conv.	CITES
<i>Daphne cneorum</i> L.	–	–	+		
<i>Cypripedium calceolus</i> L.	+		+	+	+
<i>Aldrovanda vesiculosa</i> L.	–	–	+	+	
<i>Salvinia natans</i> (L.) All.	–	–	+		
<i>Jurinea cyanoides</i> (L.) Rchb.	–	–	+	+	
<i>Tragopogon ucrainicus</i> Artemczuk		+			
<i>Silene lithuanica</i> Zapal.		+			
<i>Liparis loeselii</i> (L.) Rich.			+	+	
<i>Pulsatilla patens</i> (L.) Mill.			+	+	
<i>Saxifraga hirculus</i> L.			+	+	
<i>Galanthus nivalis</i> L.					+
<i>Crataegus ucrainica</i> Pojark		+			

A species *Cypripedium calceolus* is among the plants of broad-leaved and mixed forests (found in the protected tract "Cuckoo's shoes", "Guta", forest reserves "Dolskyi", "Pnivenskyi", "Moshchanskyi", "Sankiv meadow", botanical reserves "Lyuboml'skyi", "Zadibskyi", general zoological reserve "Turychanskyi", national nature parks "Prypyat-Stokhid" and "Tsumanska Pushcha", Cheremsky Nature Reserve), which is also included in the IUCN Red List and CITES. The species *Pulsatilla patens* is included in the list of plants of the resolution 6 of the Bern Convention, confined to pine and mixed forests and forest edges (protected in the botanical reserves "Sofianivskyi", "Dubovy zakit", "Lisova dacha", landscape reserve "Kashivskyi", forest reserves "Zarichya", "Smolne", general zoological reserves "Chortoriyskyi", "Buzhanivska dacha", Cheremsky Nature Reserve). The species *Jurinea cyanoides* which is protected in the Pripet-Stokhid National Nature Park is confined to pine forests.

Two species included in the Bern Convention are found among swamp vegetation, *Liparis loeselii* (landscape reserve "Zgorany Lakes", botanical reserve "Ozeryshche", botanical natural monument "Bolitze", Cheremsky Nature Reserve) and *Saxifraga hirculus* L. (hydrological reserve "Girnytske swamp", landscape reserve "Mishech").

The aquatic communities of the Pripet River basin include *Aldrovanda vesiculosa* listed in Resolution 6 of the Bern Convention (protected in the landscape reserves "Zgorany Lakes", "Moshne", botanical reserve "Lyubche", Cheremsky Nature Reserve, Kivertsi National Nature Park "Tsumanska Pushcha") [1;25].

Four species of the European Red List grow in the studied area. Two are confined to psammophytic growth conditions, *Tragopogon ucrainicus* (protected in Cheremsky Nature Reserve, National Nature Parks "Pripet-Stokhid") and *Silene lithuanica* (Cheremsky Nature Reserve, National Nature Parks "Pripet-Stokhid" and "Tsumanska Pushcha"), and a forest species *Crataegus ucrainica* (Cheremsky Nature Reserve).

The Checklist of CITES Species, in addition to *Cypripedium calceolus*, also includes the forest species *Galanthus nivalis* (found in the protected tracts "Sadivska dacha", "Tsumanska Pushcha", landscape reserves "Chernyavske", "Radovichivskyi", forest

reserves "Mokretskyi", "Tsumanskyi", "Novosilky", general zoological reserves "Aurochs", "Pavlivskyi", "Buzhanivska dacha", Kivertsi National Nature Park "Tsumanska Pushcha") [1;25].

Conclusions and prospects for further research. The basin of the Pripet River includes 314 protected areas with a total area of 164,735.7 ha, but the actual area is 149,186.4 ha as a number of objects are included in the total NRF area are actually located within other, much larger in area, NRF objects. There are more than 40 such objects in the Pripet river basin. Also, when determining the area of NRF lands within the basins of the main tributaries of the Vyzhivka, the Turia, the Tsyр, the Stokhid, the Styр rivers, objects located within several river basins were identified. These are part of Shatsk national reserve park, Pripet-Stokhid national reserve park, Kivertsi national reserve park "Tsumanska Pushcha", local general zoological reserve "Starovyzhivskyi", local landscape reserve "Sviatobuzakivskyi", local general zoological reserve "Dubechnivskyi". Metrics of the nature reserve network of the Pripet River basin were listed, e.g. the actual protected area is 149,186.4 ha, the density of objects is 2.14 per 100 km², the protection index is 10.17%, the insularity index is 0.32. The assessment of the current state of the NRF of the Pripet River basin within the Volyn region provided an opportunity to substantiate the continuation of research with the aim of identifying rare biota species and expanding the network of NRF objects.

The analysis of the floristic composition of the plant groupings within the basin found 12 species included in the International Red Lists, the area of distribution of which are protected areas located in the Pripet River basin. In the future, the successful expansion of the area of the NRF of the basin will enable the spread of biodiversity, the protection of various types of flora included in the International Red Lists, the expansion of their habitats, the development of the national and Pan-European ecnetwork, as well as the expansion of the area of wetlands of international importance. This will accordingly stimulate the development of recreation and tourism, contribute to the improvement of the ecological situation of the basin, the preservation and restoration of its biodiversity.

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Оцінка ефективності функціонування природно-заповідного фонду у басейні річки Прип'ять на Волині

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Верхів'я басейну річки Прип'ять у Волинській області відзначається розрізненими природно-заповідними об'єктами, які належать до загальноєвропейської, національної та регіональної екомереж. У басейні річки знаходиться 314 об'єктів природно-заповідного фонду (ПЗФ) загальною площею 164735,7 га, проте фактична площа становить 149186,4 га, оскільки існує ряд об'єктів, які враховуються у загальну площу природно-заповідного фонду, але фактично розташовані у межах інших, значно більших за площею, об'єктів ПЗФ. У басейні річки Прип'ять таких об'єктів нараховується більше 40. Також при визначенні площі земель ПЗФ у межах басейнів основних притоків Прип'яті - річок Вижівка, Турія, Цир, Стохід, Стир виявлено об'єкти, що знаходяться у межах кількох річкових басейнів. У верхів'ї басейну річки Прип'ять спостерігається нерівномірний розподіл площ ПЗФ по території, що вказує на необхідність їх збільшення у басейнах річок Стир, Турія, Вижівка, Коростянка, для досягнення оптимального співвідношення території та збереження видового біорізноманіття на основі басейнового підходу. Представлено результати розрахунку індексу інсуляризованості природно-заповідного фонду Волинської області, ступінь заповідності у межах річкових басейнів. Здійснено оцінку ефективності природно-заповідного фонду басейну річки Прип'ять, де фактична площа ПЗФ становить 149186,4 га, щільність об'єктів – 2,14 об./100 км², показник ступеня заповідності (S_3) – 10,17 %, індекс інсуляризованості (I) – 0,32. Визначено 12 видів флори (*Daphne cneorum* L., *Cypripedium calceolus* L., *Aldrovanda vesiculosa* L., *Salvinia natans* (L.) All., *Jurinea cyanoides* (L.) Rchb., *Tragopogon ucrainicus* Artemczuk., *Silene lithuanica* Zapal., *Liparis loeselii* (L.) Rich., *Pulsatilla patens* (L.) Mill., *Saxifraga hirculus* L., *Galanthus nivalis* L., *Crataegus ucrainica* Rojark.), занесених до Міжнародних Червоних списків, ареалом поширення яких є ПЗО, що розташовані у басейні річки Прип'ять. У перспективі успішне розширення площі ПЗФ басейну дасть змогу розбудувати національну та Пан'європейську екомережу, а також розширити площі водно-болотних угідь міжнародного значення.

Ключові слова: басейн річки, природно-заповідний фонд, екологічна мережа, ступінь заповідності, індекс інсуляризованості.

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