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NATIONAL NATURE PARK "KARMELIUKOVE PODILLIA" AS A STRUCTURAL ELEMENT OF THE NATIONAL ECOLOGICAL NETWORK

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On the basis of complex ecological monitoring, geobotanical, zoogeographical, landscape-ecological, hydroecological, forest typological, agroecological principles and approaches, and own field research, the general ecological-geographical characteristics of the National Nature Park "Karmeliukove Podillia" as a structural element of the national ecological network from the standpoint of physical-geographical and geobotanical zoning. It is shown which objects of the nature reserve fund are part of the characterized park. The following key territories (natural cores) in the structure of the ecological network have been identified: 1 — Britavske; 2 — Chervonogreblyanske; 3 — Verbske; 4 — Bondurivske; 5 — Kurenivske; 6 — New Ukrainian; 7 — Lyubomyrkivskei; as well as restoration territories: 1 — Novoukrainskaya; 2 — Verbska; 3 — Stratiivska; 4 — Bondurivska; 5 — Luzka; 6 — Chervonogreblyanska. Flora and fauna are described, rare and endangered species are highlighted, which are included in the Red Book of Ukraine, as well as phytocenoses of the Green Book of Ukraine. The need to include the "Vyshenka" tract, with an area of 47.7 hectares, as a complete natural complex, represented by unique landscapes of various types of ecosystems, including forest, meadow-steppe and wetlands. The specified territory is characterized by 8 biotopes with valuable associations of plant groups, which include 15 regionally rare species and 9 species that are included in the Red Book of Ukraine, where more than 50 species of animals with international and national zoological status live. In general, it is expedient to transfer other territories to the NPP for permanent use: ornithological reserve of local importance "Stavky" — 6.9 hectares; land of historical and cultural purpose — 17.3 hectares; reserve land for forestry purposes — 7.7 hectares; agricultural reserve land — 25.5 hectares; shrubs, reserve land — 7.3 ha. The total area of these plots is 64.7 hectares, which,

together with the Vyshenka tract, will make up an area of 112.4 hectares. The inclusion of these territories in the park will make it possible to preserve representative landscapes with diverse flora and fauna, rationally use the recreational potential, promote the development of ecological tourism, sport hunting and fishing, introduce permanent ecological and educational, nature conservation and ecological educational work, create new jobs for local population that will support the established regime of park protection and engage in organic farming.

Keywords: *biotic and landscape diversity, ecosystems, nature reserve fund, nature management.*

INTRODUCTION

Conservation of biotic diversity, unique and representative natural and anthropogenic landscapes, historical and cultural heritage, development of ecotourism, optimisation of land use of nature reserves of multifunctional significance in the structure of the national ecological network, and development of scientific foundations for sustainable nature management should be one of the priority areas for sustainable development of Eastern Podillia [11].

National nature parks (NNPs) are nature protection, recreational, cultural, educational, scientific and research institutions of national importance, which are created for the purpose of conservation, reproduction and efficient use of natural complexes and objects of special environmental, health, historical, cultural, scientific, educational and aesthetic value. The territories of the NNP may include land and water areas of other landowners and land users. The main tasks of the NNPs are as follows: preservation of valuable natural, historical and cultural complexes and objects; creation of conditions for organised tourism, recreation and other types of recreational activities in natural conditions in compliance with the regime of protection of protected natural complexes and objects; conducting scientific research of natural complexes and their changes in conditions of recreational use, development of scientific recommendations on environmental protection and efficient use of natural resources; carrying out ecological educational work [6].

The centre of conservation, reproduction and rational use of biotic and landscape diversity of Eastern Podillia (Vinnytsia region) is the National Nature Park "Karmeliukove Podillia", with an area of 20203.4 hectares. The theoretical substantiation, scientific and methodological development and solution of problems of protection of the representative landscape and cenotic diversity of the park in the structure of the national ecological network remain relevant and important for establishing the current ecological state of its functional zones, forming tourist routes, developing ecological trails, identifying threats and factors of influence, conservation and restoration measures [5].

The purpose of the article is to study the ecological and geographical characteristics of the National Nature Park "Karmeliukove Podillia" as a structural element of the national ecological network of Ukraine.

ANALYSIS OF RECENT RESEARCH AND PUBLICATIONS

Many works have been devoted to the scientific substantiation, creation, expansion of the boundaries of the territory of the National Nature Park "Karmeliukove Podillia", functional zoning, conservation of its biotic and landscape diversity, formation of an ecological network, efficient use of tourist and recreational potential, and balanced nature management [2; 4–5; 7; 9; 12–14].

MATERIALS AND METHODS OF RESEARCH

Based on cartographic materials, local lore, stock and literary sources, catalogues, practical field surveys, and methodological recommendations, the general characteristics of the National Nature Park "Karmeliukove Podillia" in the structure of the national ecological network are presented.

Methods of research — analytical, descriptive, comparative, expeditionary, statistical, field, cartographic, key sites, landscape-ecological, biotic monitoring.

Object of research — existing natural, natural-anthropogenic, anthropogenic ecosystems and landscapes of structural elements of the ecological network of the National Nature Park "Karmeliukove Podillia" within the Eastern Podillia.

The subject of the study is the impact of environmental factors on the existing natural, natural-anthropogenic, anthropogenic ecosystems and landscapes of the National Nature Park "Karmeliukove Podillia" in the structure of the national ecological network.

RESEARCH RESULTS AND DISCUSSION

According to the physical and geographical zoning of Ukraine (2005), the National Nature Park "Karmeliukove Podillia" belongs to the South Podilskyi forest-steppe of the Dniester-Dniprovskyi forest-steppe region of the forest-steppe

zone of the Eastern European plain landscape country [10].

According to the geobotanical zoning of the territory of Ukraine (2003), the National Nature Park "Karmeliukove Podillia" belongs to the South Podillia district of oak forests and meadow steppes of the Ukrainian forest-steppe subprovince of the Eastern European forest-steppe province of oak forests, steppe meadows and meadow steppes of the forest-steppe subregion of the Eurasian steppe region [3].

Administrative location. Administratively, the only one in Eastern Podillia, National Nature Park "Karmeliukove Podillia" is located within the Haisyn district — Olhopilska rural, Chechelnytska and Trostianetska settlement territorial communities.

The park was established in accordance with the Decree of the President of Ukraine № 1057/2009 dated 16.12.2009. 20203.4 hectares of state-owned land were agreed upon in accordance with the established procedure, including 16518 hectares of land withdrawn from the state enterprise Chechelnytskyi Forestry and provided to the park for permanent use, and 3685.4 hectares of land included in its territory without withdrawal in accordance with the Annex. The park started its operation on 19.12.2011 in accordance with the Order of the Ministry of Ecology and Natural Resources of Ukraine No. 519 dated 12.12.2011 [4–5]. It is located relatively equidistant from the main industrial, economic and commercial centres of the region (*Fig. 1*) [14].

The area is 20203.4 hectares, the actual area is 15393.9 hectares. The NNP "Karmeliukove Podillia" comprises 5 PAs with an area of 4809.5 hectares (*Table 1*). The majority of the NNP's land belongs to the forest fund — 17422 hectares. Hayfields and pastures (usually areas of natural meadow-steppe and steppe vegetation of varying degrees of preservation) cover 899 hectares, and another 378 hectares are occupied by lands with tree and shrub vegetation. The lands of the park also include (without withdrawal from land users) 875 hectares of arable land and 87 hectares of other lands [5; 14].

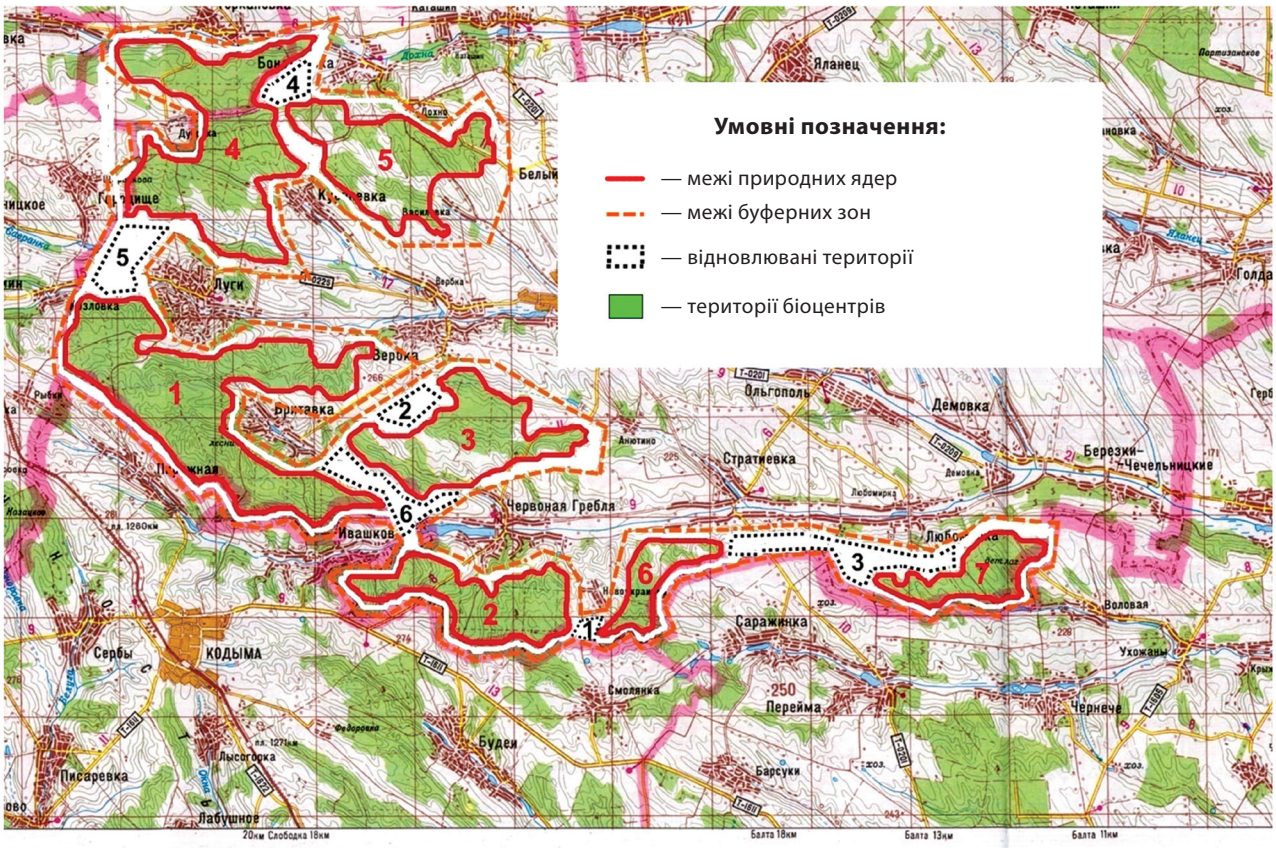

Fig. 1. Structural elements of the ecological network National Nature Park "Karmeliukove Podillia"

Source: [14].

Note: **Natural cores:** *1* — Britavske; *2* — Chervonohreblyanske; *3* — Verbske; *4* — Bondurivske; *5* — Kurenivka; *6* — Novoukrayinske; *7* — Liubomyrkivske. **Restoration areas:** *1* — Novoukrayinska; *2* — Verbska; *3* — Stratiyivska; *4* — Bondurivska; *5* — Luzka; *6* — Chervonohreblyanska.

Table 1

Objects of the nature reserve fund that are part of NNP "Karmeliukove Podillia"

	List of NRF objects, the territories of which are part of the territory of the NNP "Karmeliukove Podillia"		Area, ha
National Nature Park "Karmeliukove Podillia"	1	Botanical reserve of national importance "Brytavskyi"	3259,0
	2	Botanical natural monument of national importance "Tereshchukiv Yar"	3,8
	3	Botanical natural monument of national importance "Romashkovo"	8,7
	4	Botanical reserve of local importance "Verbska Dacha"	46,0
	5	Local botanical reserve "Chervonohreblyansky"	1492,0
	Number of objects, pcs: 5		4809,5

Source: [5].

Criteria for designation. The territory of the NNP "Karmeliukove Podillia" is designated according to the following criteria: 1) the object has a unique (representative) value for the conservation of biotic and landscape diversity of the Eastern Podillia region, the gene pool of rare, endangered and vulnerable plants, including endemics and relics; 2) the territory is located at the intersection of the Bug natural longitudinal and the Southern Ukrainian (Steppe) natural latitudinal corridors in the structure of the national ecological network (biome-zonal level); 3) maximum inclusion of natural areas (biocentres) in the determination of natural boundaries (such boundaries are the valley of the Savranka River and its small Savranka River valley and its small tributary in the north-east, the boundaries of large forest areas in the west, the southern border is the border with Odesa Oblast — from Rybky village in the west to Berizky-Chechelnytsky village in the east); 4) presence of phytocoenoses listed in the Green Book of Ukraine (GBU); 5) presence of historical and cultural heritage sites [5].

General description. The relief of the park is divided, ravine and gully systems are highly developed. The interfluves stretch from the west and north-west to the east and southeast in the form of strips several kilometres wide. Their slopes are steep (often reaching a grade of 200). The absolute height is 280 m, the minimum (Savranka River valley) is 130 m. The valleys and river floodplains are well developed, wide (the width of the Savranka River floodplain reaches 1 km), and there are floodplain-terrace areas with alluvial deposits. Grey forest and dark grey forest soils, podzolised chernozems, leached chernozems, and typical chernozems are found on the plakoras. Grey forest and dark grey forest soils are occupied mainly by forest vegetation, under which they were formed. In the gullies, there are meadow chernozem soils. On the floodplain terraces, chernozems and sod soils on sandy loam rocks are sometimes found [14].

The main landscape areas of the park are interannual wavy forest plains with medium-humus soils. The meadow landscapes have been preserved in fragments, mainly within the steep slopes of beams and river valleys, along the edges of forest areas. The valley landscapes are characterised by a combination of terraced areas with chernozem-meadow and meadow-chernozem soils and floodplain areas with meadow, meadow-bog soils and floodplain forests. The park is almost exclusively dominated by deciduous forest landscapes, represented by forests of common and rock oak [4].

The climate is temperate continental with an average annual temperature of +7°C. The absolute maximum temperature in summer is +37°C, the absolute minimum in winter is –32°C. Two rivers flow through the park — Savranka and Dokhna, the right tributaries of the Southern Bug. The northern boundary of the park runs along the Dokhna River, and the western boundary runs along the border of Pishchanskyi and Chechelnytskyi districts from the river to the south, along the Torkanivska Dacha forest area to the road between the villages of Dubivka and Bondurivka. Further along the edge of the Kurenivska Dacha forest tract to the railway. The eastern boundary of the park runs from the border with Odesa oblast and further upstream along the Savranka riverbed to the confluence of the unnamed left tributary (mouth) into the Savranka river (the boundary is the bridge in Olhopil village) [5].

Vegetation. The vegetation cover is dominated by forest vegetation, which occupies 1/3 of the core area (17987.5 ha). The most important are the forests of Chervonohreblyansky, Stratievsky, Dokhnyansky, and Britavsky forestries, which are preserved in their natural state. The complex stands have two or more tiers with a pronounced undergrowth. The forests are dominated by oaks —

common oak and rock oak; the participation of hornbeam in the forests is relatively small. Large areas of forests dominated by rock oak are a characteristic feature of this area. The forests are characterised by an exceptional richness of dendroflora. In addition to oaks, common species include tall ash, sharp-leaved maple, field maple, and heart-leaved linden. Sycamore and sweet cherry, which are found in this area on the eastern border of the range, as well as mountain elm, leafy elm, cork elm, forest apple, early apple, and common pear, are much less common. Of considerable scientific and practical value are rocky oak plantations, where the second tier of the stand contains a Mediterranean species, birch, which is listed in the Red Book of Ukraine (RBU) and in some cases provides up to 3–4 units of the composition of this tier. Such plantations are almost absent on the territory of other nature reserves in Ukraine. The undergrowth consists of Tatar maple, blood-red hawthorn, hazel, dog rose, crooked hawthorn, and whole-leaved viburnum (gordovina). Of particular value are the close-to-native plantations with a predominance of dogwood in the undergrowth (the closeness of the undergrowth layer varies from 0.3 to 1), which occupy large areas. The main forest formation is oak-hornbeam forests. They cover the slopes of the gullies, forming a typical ecological series. On the levelled areas, green herb, sparse herb, and stellate communities prevail, while on the slopes, hair-sedge communities dominate. In the wide flattened bottoms, there are cenoses dominated by gill nettle and bear onion. The latter communities can be found along the bottoms of all forest areas. They stretch in wide strips and sometimes cover large areas. These communities with bear onion (levurda) in the herbage are listed in the Red Book of Ukraine. In total, the following rare phytocoenoses listed in the Red Data Book are found in the park: 1) community of common oak forests (*Querceta roboris*) with dominance of bear onion (*Allium ursinum*) in the herbage; 2) community of common oak forests (*Querceta roboris*) with dominance of common ivy (*Hedera helix*); 3) community of common oak forests with sod (*Querceta* (*roboris*) *cornosa* (*maris*)); 4) *Querceta* (*roboris*) *swidosa* (*sanguineae*) common oak forests with dominance of Parva sedge (*Carex brevicollis*) in the herbage; 5) *Querceto* (*petraeae*)-*Querceta* (*roboris*) rocky oak-common oak forests; 6) rocky-oak forests with turf (*Querceta* (*petraeae*) *cornosa* (*maris*)); 7) *Stipeta capillatae*; 8) *Stipeta pulcherrimae*. The forests included in these massifs are characterised by a rich floristic composition. The first tier is represented mainly by oak with the participation of ash, sycamore, sharp-leaved maple, sweet cherry, and often rock oak; the second tier is represented by hornbeam (with the participation of field maple, linden, and birch). Due to the high shade, the undergrowth is fragmentary, dominated by hazel, bird cherry, black elder, and European elder. On the slopes of the southern exposure, in the communities of rock oak and common oak, there is an undergrowth of dogwood with the participation of viburnum. Particularly noteworthy are the areas where ivy forms the above-ground layer. Ivy communities, typical of Western and Southern Europe, are found here in an isolated locality to the east of the range boundary. Rare associations also include forest areas with a predominance of periwinkle in the ground layer — especially many of them in Chervonohreblyansky forestry (quadrats 36, 51, 52, 60, 61, 69) — and May lily of the valley, which in some places dominates the herbage in levelled areas. In general, the Chervonohreblyansky Botanical Reserve of local importance (1492 ha) has reference plantations on an area of 160 ha, with 11 plus trees (out of 112 in Vinnytsia region). A characteristic feature of the massifs that determine their high scientific value is the presence of a well-defined core of non-moral sub-Mediterranean, in particular, Balkan species in the forest communities. This makes the park a unique natural core in the national ecological network of Ukraine. The following species occurring in this area on the eastern and northeastern edge of the continuous range or in localities east of the continuous range boundary include: in the stand — rock oak, birch; in the understory — dogwood, whole-leaved viburnum, bloodroot, common ivy; in the herbage — white violet, Besser's arum, cereal grass, single-flowered pearlwort, bear's onion, carnation scopolia, tall helmet, thin-leaved hare's chill, purple-blue sparrow (egonichon), almond milkweed, Parva sedge. The latter is common in levelled areas, mostly along the edges of forests. These relict phytocoenoses are locally distributed in Ukraine, mainly in the Podnistrian region. Sub-Mediterranean and Central European species are found in the spring flora of the massifs — significant areas are occupied by synusia of white snowdrop, rutvice-shaped snowdrop, and clumps of large dormouse. Of particular note is the fact that Britavska Dacha has significant populations of one of the rarest plants in the flora, the dwarf spindle tree, which is a tertiary relic located at the northern border of the range and is therefore under special protection of the RBU [1; 4–5; 8; 15].

Flora of the park is rich and diverse. The species composition of herbaceous plants is diverse: cane calamus, oak anemone, small periwinkle, annual immortelle, field bindweed, bindweed, three-leaved bindweed, thistle, herbaceous elderberry, medicinal sweet clover, valerian, medicinal ve-

ronica, common oatmeal, Tatar-leaved duckweed, water pepper, blue cornflower, multicoloured elm, viper's tasseled onion, galinsoga, field carnation, peppercorn (water pepper), white nettle, spring mountaineer, creeping throat, mouse pea, common rake, common shepherd's purse, collective broom, yarrow, bells, skipper's weed, dope, common toadflax, common buttercup, creeping buttercup, yellow thistle, St. John's wort, stars, yellow zelenchuk, hedgehog's head, marsh puddleflower, hairy feather grass, large goatsfoot, lake reed, May lily of the valley, creeping clover, meadow clover, European hoof, common cornflower, cat's feet, dioecious nettle, medicinal dandelion, fragrant bush, bushy bush, white water lily, wild lettuce, forest lily, white quinoa, burdock, common flaxseed, lupine multifolia, horned lambsquarters, wild poppy, maruna, common oregano, lungwort, lemon balm, medicinal soapwort, mugwort, milkweed, mint (several species), medicinal marigold, hairy nematanthus, elecampane (divosil), mistletoe, thistle, sedge (several species), reed, caustic stonecrop, purple stonecrop, common witch hazel, sweet-bitter nightshade, spring primrose, goose cinquefoil, scaly cinquefoil, tansy, creeping wheatgrass, marsh cocksfoot, common cinquefoil, common snowdrop, field dodder, wormwood, bitter wormwood, spring wheat, rush, narrow-leaved cattail, broad-leaved cattail, club-leaved plaunus, chamomile, tuberous cinquefoil, duckweed, motherwort, field axes, black sleep, knotweed, sytnik, common arrowroot, wild strawberries, rape, umbellifera, tartar, timothy, tippac, meadow bluegrass, scented violet, tricoloured violet, physalis, field horsetail, marsh horsetail, hops, chilly horsetail, bear onion, chicory, poison chicory, sand cumin, plantain mock, Podolsk thyme, three-parted succession, chersak, spring chin, celandine, field chernushka, meadow sage, horse sorrel, etc. Taking into account the specifics of the vegetation cover, which is dominated by forest vegetation, the floristic core is formed by typical and rare, as well as listed in the Red Book of Ukraine, forest and meadow-steppe plant species: birch (*Sorbus torminalis* (L.) Crantz.); dwarf euonymus (*Euonymus nana* M. Bieb.); large-flowered bull's-eye (*Cephalanthera damasonium* (Mill.) Druce); slender elm (*Securigera elegans* (Pančić) Lassen); tartar-leaved broom (*Carlina onopordifolia* Besser); tiled gladiolus (*Gladiolus imbricatus*); common nesting plant (*Neottia nidus-avis* (L.) Rich.); spring adonis (*Adonis vernalis* L.); Podolsk zinnia (*Chamaecytisus podolicus* (Blocki) Klaskova); cuckoo's tears ovoid (*Listera ovata*); pinnate broom (*Staphylea pinnata* L.); hairy feather grass (*Stipa capillata* L.); beautiful feather grass (*Stipa pulcherrima* K. Koch); purple broom (*Epipactis purpurata* Smith); helleborine broom (*Epipactis helleborine* (L.) Crantz); tiled mullein (*Gladiolus imbricatus* L.); forest lily (*Lilium martagon* L.); two-leaved lily (*Platanthera bifolia* (L.) Rich.); green-flowered lily (*Platanthera chlorantha*); snowball (*Galantus nivalis* L.); carniolian scopolia (*Scopolia carniolica* Jacq.); big sleep (*Pulsatilla grandis* Wender.); meadow sleep (blackening sleep) (*Pulsatilla pratensis* (L.) Mill.); open sleep (*Pulsatilla patens* (L.) Mill.); oak tulip (*Tulipa quercetorum* Klokov et Zoz); white violet (*Viola alba* Besser); bear onion (*Allium ursinum* L.); mottled chin (*Lathyrus venetus* (Mill.) Wohlf.); reticulated saffron (*Crocus reticulatus*) [4–5; 15].

The flora contains many regionally rare and medicinal plants. The geographical analysis of the core flora showed that it is dominated by species belonging to the non-moral and meadow-steppe geoelements — 64.5% and 20.3%. The non-moral geo-element is represented here by six types of habitats: circumpolar, eurasian, european, european-siberian, central european, and sub-mediterranean. The most abundant species are those with the european-siberian type of range: dark lungwort, common fescue, onion bells, two-leaved lupine, etc. Species with circumnomeral habitats include male shield, knotweed, broad-leaved bush and lily of the valley, which are generally less numerous than the previous group. On the north-eastern border of its range, there are ruebush, rowan hawthorn (bereka), rock oak, dogwood, common ivy, sycamore maple, and viburnum (gordovina). The park's forests are home to populations of many species from the CERCLA, including dwarf spindle, white violet, carnation scopola, bear onion, tatar-leaved broom, purple broom, broad-leaved broom, big dormouse, meadow dormouse, oak tulip, slender elm, hairy feather grass, tiled mullein, forest lily, snow-white snowdrop, common nesting plant, double-leaved buttercup, ovoid cuckoo's tears, hairy feather grass, feather grass, pinnate broom, shade sedge. The relic species are spring adonis, periwinkle, steppe cherry, green strawberry, and common ivy. The flora of the core contains a number of regionally rare species that are protected here at the local level, such as Marshall's cordgrass, whole-leaved saxifrage, five-lobed denticle, Hungarian cockscomb, three-lobed lazuli, common physalis, black hellebore, Pannonian chyna, and grove starflower. A number of valuable medicinal plants have been discovered in the forests and on their edges (ecotones). In addition to the aforementioned May lily of the valley, spring adonis, periwinkle, and Parva sedge, which grow in large numbers here, there is St. John's wort, spring primrose, oregano, sandy caraway, linden, and several species of thyme and yarrow. Thus, the natural core of the park contains a valuable

gene pool of medicinal plants. Forests are only part of the natural core. The following types of mushrooms grow here: porcini mushroom, boletus, butter mushroom, champignon, cep, real pearl mushroom, chanterelle, caustic boletus, autumn mushroom, porchavka, etc. [4–5; 15].

Another important component of the natural cores (biocentres) of the NNP "Karmeliukove Podillia" are natural areas with meadow-steppe and steppe vegetation, where species listed in the Red Book of Ukraine occur: steppe cherry, feather grass, and Tatar-leaved broom (nine-leafed) [15].

In general, the syntaxonomic structure of the steppe vegetation of the park includes 7 associations belonging to 2 unions, 1 order and 1 class. Cl. Festuco-Brometea Br.-Bl. et R.Tx. 1943. Ord. Festucetalia valesiacae Br.-BI. et R.Tx. 1943. All. Fragario viridis-Trifolion montani Korotchenko, Didukh, 1997. Ass. Thymo marschalliani-Caricetum praecocis Korotchenko, Didukh, 1997. Ass. Betonico officinalis-Trifolietum montani Popova in Popova et al. 1986. Ass. Salvio pratensis-Poetum angustifoliae Korotchenko, Didukh 1997. Ass. Medicago-Festucetum valesiacae Wagner 1940. All. Festucion valesiacae Klika 1931. Ass. Botriochloetum ischaemii (Krist. 1937) I. Pop 1977. Ass. Stipetum capillatae Dziubaltowski 1925. Ass. Festuco valesiacae-Stipetum capillatae Sillinger 1931 [2].

A feature of the park's flora is the presence in its forests of a number of non-moral sub-Mediterranean species: common turf, periwinkle, common ivy, Parva sedge, variegated pearlwort, Besser's arum, etc. The most numerous species are those with the European-Siberian type of habitat: dark lungwort, common fescue, onion bells, double-leaved lover's broom, etc. The species with circumnomeral habitats in the park include male shield, knotted knapsack, broad-leaved bush and lily of the valley. Of particular interest are the species with the Central European type of range, which are on the verge of distribution here and form numerous populations in the park's forests — sycamore, birch, bear onion, carnation scopopia, snowdrop, rue and some others. On the edges of the forests, there are steppe areas with rare steppe species: hairy feather grass, umbellifera, cereal grass, big dormouse, steppe cherry. The park's flora, according to the Chronicle of Nature, includes a total of 638 species of vascular plants [4–5].

The park has a number of rare species listed in the Red Book of Ukraine: stipa capillata, stipa pulcherrima, stipa pennata, pulsatilla nigricans. The richest in rare species are the communities of the Salvio pratensis-Poetum angustifoliae association (3 out of 4 species). At the same time, no rare species were found in the communities of the Botriochloetum ischaemii association [15]. The practice of terracing steppe slopes and planting them with woody species, in particular pine, is unacceptable for the conservation of steppes, as it was observed near Chechelnyk village in the Tereshchukiv Yar ravine, as such works disrupt the structure of steppe communities, rare species disappear, while forest phytocoenoses do not form from these plantations, the trees look depressed and gradually dry up. On the territory of the NNP "Karmeliukove Podillia", the largest areas of steppe communities are on the slopes of the Sukhoi Balka, which is located between Chechelnyk and Dokhno villages. To preserve the steppe areas in the park, it is necessary to introduce a regime of regulated conservation, which provides for periodic haying in the second half of summer, which will restrain the development of the shrub layer and help maintain the species diversity of phytocoenoses [4]. The inclusion of steppe areas in the park's natural core will ensure the preservation of the integrity of the region's biotic diversity and increase its representativeness.

Fauna. On the territory of the park, 58 species of mammals, 161 species and subspecies of birds, 10 species of reptiles, 11 species of amphibians, as well as 303 species of invertebrates — 4 types, 19 orders, 73 families and 197 genera — were found. Among invertebrates, the highest species richness was recorded for the class of insects — 260 species. In total, the species composition of the fauna is represented by 5 taxonomic types, which include 456 species. The core of the fauna is made up of representatives of forest and shrub complexes with a significant participation of open space species (inhabitants of agrocenoses, open slopes of ravines and hills), as well as synanthropic species. The dominant mammalian species (excluding mouse-like rodents) are grey hare, European roe deer, wild pig; mole, common hedgehog and common fox are present in significant numbers; forest ferret, forest marten, squirrel, gopher, marmot, elk, ermine, badger are also found. The core's avifauna is quite rich and diverse, especially in the forest areas, where 64 species of breeding birds have been found (total density of 608.9 individuals per 1 km2, according to M.F. Koval). The dominant species in the park's forests are the great tit (6.7%), the shepherd's purse (4.5%), the black-headed warbler (3.4%), as well as the chaffinch, the yellow-breasted shepherd, the eastern nightingale, the field sparrow; typical species are the robin, the song thrush, the nuthatch, the nuthatch, the common oatmeal, the wood chaffinch, the greenfinch, the great and little pied woodpeckers, etc. Among birds of prey, buzzard and great hawk are relatively common; black bullfrog and pygmy eagle, which are listed in the

Red Data Book, are also found. Zoogeographical analysis of the structure of the forest bird community shows the dominance of transpalearctic (40.6%) and western Palearctic (40.5%) elements with a significant participation of transgolarctic (7.9%) and semi-cosmotic (3%) elements. Western European and European species account for 2% and 1% of the total number, respectively. The fauna of reptiles and amphibians has been studied superficially. It is known that the park territory is home to the common boa constrictor, nimble lizard, green lizard, and the copperhead, which is listed in the Red Data Book. Amphibians are represented by lake frogs, pond frogs, sharp-finned frogs, grass frogs, yellow-bellied toads, and green toads. About 20 species of fish are found in rivers and ponds. The following species of animals are rare, namely: badger, ermine, dwarf eagle, balaban, copperhead, deer beetle, rhinoceros beetle, etc. The following species of valuable animals belonging to different taxonomic groups are listed in the Red Data Book of Ukraine: insects: virgin beauty (*Calopteryx virgo*); emperor sentinel (*Anax imperator*); purple xylocopa (*Xylocopa violacea*); common xylocopa (*Salvia ofcinalis* L.); reddish sphex (*Sphex funerarius*); giant scolia (*Scolia maculata*); deer beetle (*Lucanus cervus*); podalirius (*Iphiclides podalirius*); machaon (*Papilio machaon*); green lizard (*Lacerta viridis*); birds: Dwarf Eagle (*Aquila pennata*); Lesser Spotted Eagle (*Aquila pomarina*); Pond Spoonbill (*Tringa stagnatilis*); Northern Pintail (*Anas strepera*); Black Crane (*Milvus migrans*); Mammals: Red-crowned Vesper (*Nyctalus noctula*); Ermine (*Mustela erminea* L.); forest polecat (*Mustela putorius*); forest cat (*Felis silvestris silvestris*) [4–5; 14–16].

CONCLUSIONS

Taking into account the latest amendments to the Law of Ukraine "On the Nature Reserve Fund of Ukraine", IUCN (International Union for Conservation of Nature) recommendations, and EU directives on biodiversity conservation, it is necessary to include the Vyshenka tract, located within the Chechelnytsia settlement territorial community, in the NNP "Karmeliukove Podillia" with the right of permanent use. It is a holistic landscape complex with relatively clear natural boundaries and is represented by different types of ecosystems: forest, meadow-steppe and wetland. The area is located in the centre of intensively used agro-cenoses. Within the studied landscape complex, there are areas that are proposed to be included in the NNP: the Stavky Ornithological Reserve of local importance — 6.9 hectares; lands of historical and cultural purpose — 17.3 hectares; reserve lands of forestry purpose — 7.7 hectares; reserve lands of agricultural purpose — 25.5 hectares; shrubs, reserve lands — 7.3 hectares. The total area of these plots is 64.7 hectares. It is proposed to transfer these land plots to the park for permanent use in combination with a plot of reserve land in the Vyshenka tract of 47.7 hectares, which is currently part of the NNP "Karmeliukove Podillia" without being withdrawn from use. The specified territory is characterized by 8 biotopes with valuable associations of plant groups, which include 15 regionally rare species and 9 species that are included in the Red Book of Ukraine, where more than 50 species of animals with international and national zoological status live. The total area to be transferred to the permanent use of the NNP is 112.4 hectares. The identification of natural objects for changing the boundaries of the park's functional zones (expansion of its territory), which are subject to special protection, should be carried out with appropriate justification, as they are representative.

At present, it is necessary to carry out scientific activities in the park, develop various types of ecological tourism: hiking, cycling, horseback riding, water, nature trails, historical and cultural tourism, and others, develop ecological and educational trails (Vyshenka and others), and raise the environmental awareness of the local population. Currently, this work should be aimed at reviving folk traditions in the field of nature protection and fostering a caring attitude towards the nature of the native land. After all, the park is the natural core and the "connecting" key territory (ecological node) of the regional ecological networks of Vinnytsia and Odesa regions.

REFERENCES

1. Hryhora, I.M., Solomakha, V.A. (2005). *Roslynnist Ukrainy (ekoloho-tsenotychnyi, florystychnyi ta heohrafichnyi narys) [Vegetation of Ukraine (ecological-cenotic, floristic and geographical outline)].* K.: Fitosociotsentr [in Ukrainian].
2. Didukh, Ya.P., Korotchenko, I.A. (2008). Zberezhennia stepiv na terytorii natsionalnoho pryrodnoho parku "Karmeliukove Podillia" (Vinnytska oblast) [Preservation of steppes on the territory of the national natural park "Karmeliukove Podillia" (Vinnytsia region)]. *Priorytety zbalansovanoho (staloho) rozvytku Ukrainy. M-ly II Ukrainskoho ekolohichnoho Konhresu — Proceedings of the II Ukrainian Ecological Congress.* K.: Center for Environmental Education and Information [in Ukrainian].
3. Didukh, Ya.P., & Sheliah-Sosonko, Yu.R. (2003). Heobotanichne raionuvannia Ukrainy ta sumizhnykh terytorii [Geobotanical zoning of Ukraine and adjoining territories]. *Ukrainskyi botanichnyi zhurnal — Ukrainskii botanichnii zhurnal, 60, 1,* 6–17 [in Ukrainian].

4. Dudnyk, H., Ishchenko, H., Markivska, L., & Yaroslavska, M. (2019). *Natsionalnyi pryrodnyi park "Karmeliukove Podillia" [Karmeliukove Podillia National Nature Park].* Vinnytsia: TOV "TVORY" [in Ukrainian].
5. Mudrak, O.V. (Ed.), Mudrak, H.V., & Polishchuk, V.M., et al. (2015). *Etalony pryrodi Vinnychyny: monohrafiia [Standards of nature of Vinnytsya: monograph].* Vinnytsia: TOV "Konsol" [in Ukrainian].
6. Pro pryrodno-zapovidnyi fond Ukrainy: Zakon Ukrainy № 2456-XII vid 16.06.1992 [On the Nature reserve fund of Ukraine: Law of Ukraine No. 2456-XII of 16.06.1992]. (1992). URL: http://zakon3.rada.gov.ua/laws/show/2456-12 [in Ukrainian].
7. Yavorska, O.H. (Ed.). (2005). *Zapovidni obiekty Vinnychchyny [Reserved objects of Vinnytsia region].* Vinnytsia: Veles [in Ukrainian].
8. Didukh, Ya.P. (2009). *Zelena knyha Ukrainy [Green book of Ukraine].* Kyiv: Alterpres [in Ukrainian].
9. Hordiienko, M.I. (Ed.), Bondar, A.O., Krynytskyi, H.T., et al. (2006). *Lisovi nasadzhennia Vinnychchyny [Forest plantations of Vinnytsia].* K.: Urozhai [in Ukrainian].
10. Marynych, O.M., & Shyshchenko, P.H. (2005). *Fizychna heohrafiia Ukrainy: pidruchnyk [Physical geography of Ukraine: textbook].* Kyiv: Znannia [in Ukrainian].
11. Mudrak, O.V., & Mudrak, H.V. (2020). *Zapovidna sprava: navch. posib. dlia studentiv haluzi znan 10 "Pryrodnychi nauky" [Reserve business: textbook for students of the field of knowledge 10 "Natural Sciences"].* Kherson: OLDI-PLUS [in Ukrainian].
12. Mudrak, O.V. (2012). *Zbalansovanyi rozvytok ekomerezhi Podillia: stan, problemy, perspektyvy: monohrafiia [Balanced development of the Podillia eco-network: state, problems, prospects: monograph].* Vinnytsia: SPD Hlavatka R.V. [in Ukrainian].
13. Mudrak, O.V. (Ed.), Matviichuk, O.A., Mudrak, H.V., Matvieiev, M.D., Drebet, M.V., Osadchuk, I.S., Hanchuk, M.M. (2018). *Rarytety tvarynnoho svitu Podillia: stan, zahrozy, zberezhennia. Monohrafiia. Byd. 2-e, vypr. i dopov. [Rarities of the animal world of Podillya: condition, threats, preservation. Monograph. Edition 2, revised and supplemented].* Vinnytsia: Consol LLC [in Ukrainian].
14. Mudrak, O.V., Mudrak, H.V., Serebriakov, V.V., Shcherbliuk, A.L., Romanchuk, O.P. (2021). Obgruntuvannia rozshyrennia terytorii natsionalnoho pryrodnoho parku "Karmeliukove Podillia" [Justification of the expansion of the territory of the Karmeliukovo Podillia National Nature Park]. *Ahroekolohichnyi zhurnal — Agroecological journal, 1*, 14–30 [in Ukrainian].
15. Didukh, Ya.P. (Ed.). (2009). *Chervona knyha Ukrainy. Roslynnyi svit [Red book of Ukraine. Plant world].* Kyiv: Hlobalkonsaltynh [in Ukrainian].
16. Akimov, I.A. (Ed.). (2009). *Chervona knyha Ukrainy. Tvarynnyi svit [Red Book of Ukraine. Animal world].* Kyiv: Hlobalkonsaltynh [in Ukrainian].

НАЦІОНАЛЬНИЙ ПРИРОДНИЙ ПАРК "КАРМЕЛЮКОВЕ ПОДІЛЛЯ" ЯК СТРУКТУРНИЙ ЕЛЕМЕНТ НАЦІОНАЛЬНОЇ ЕКОЛОГІЧНОЇ МЕРЕЖІ

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На основі комплексного екологічного моніторингу, геоботанічних, зоогеографічних, ландшафтно-екологічних, гідроекологічних, лісотипологічних, агроекологічних принципів і підходів та власних польових досліджень подано загальну еколого-географічну характеристику національного природного парку "Кармелюкове Поділля" як структурного елемента національної екологічної мережі з позицій фізико-географічного й геоботанічного районування. Показано, які об'єкти природно-заповідного фонду входять до складу охарактеризованого парку. Виділено такі ключові території (природні ядра) в структурі екологічної мережі, як: 1 — Британське; 2 — Червоногреблянське; 3 — Вербське; 4 — Бондурівське; 5 — Куренівське; 6 — Новоукраїнське; 7 — Любомирківське; а також відновлювальні території: 1 — Новоукраїнська; 2 — Вербська; 3 — Стратіївська; 4 — Бондурівська; 5 — Лузька; 6 — Червоногреблянська. Описано рослинний і тваринний світ, виділено рідкісні та зникаючі види, які занесено до Червоної книги України, а також фітоценози Зеленої книги України. Обґрунтовано необхідність включення до складу парку з правом постійного користування урочища "Вишенька", площею 47,7 га, що розташоване в межах Чечельницької селищної територіальної громади, як цілісного природного комплексу, що представлений унікальними ландшафтами різних типів екосистем, які включають лісові, лучно-степові та водно-болотні ділянки. Вказана територія характеризується 8 біотопами із цінними асоціаціями рослинних угруповань, які налічують 15 регіонально рідкісних видів і 9 видів, які внесено до Червоної книги України, де мешкає понад 50 видів тварин, що мають міжнародний і національний созологічний статус. Загалом до складу НПП у постійне користування доцільно передати інші території: орнітологічний заказник місцевого значення "Ставки" — 6,9 га; землі історико-культурного призначення — 17,3 га; землі запасу лісогосподарського призначення — 7,7 га; землі запасу сільськогосподарського призначення — 25,5 га; чагарники, землі запасу — 7,3 га. Загальна площа цих ділянок складає 64,7 га, які разом з урочищем "Вишенька" будуть становити площу 112,4 га. Внесення до складу парку цих територій дозволить зберегти репрезентативні ландшафти з різноманітною флорою і фауною, раціонально використовувати рекреаційний потенціал, сприяти розвитку екологічного туризму, спортивного мисливства й рибальства, запровадити постійну еколого-освітню, природоохоронну й еколого-виховну роботу, створити нові робочі місця для місцевого населення, яке буде підтримувати встановлений режим охорони парку та займатися органічним землеробством.

Ключові слова: *біотичне і ландшафтне різноманіття, екосистеми, природно-заповідний фонд, природокористування.*

ЛІТЕРАТУРА

1. Григора І.М., Соломаха В.А. Рослинність України (еколого-ценотичний, флористичний та географічний нарис). К.: Фітосоціоцентр, 2005. 452 с.
2. Дідух Я.П., Коротченко І.А. Збереження степів на території національного природного парку "Кармелюкове Поділля" (Вінницька область). Пріоритети збалансованого (сталого) розвитку України. М-ли ІІ Українського екологічного Конгресу. К.: Центр екологічної освіти та інформації, 2008. С. 271–276.
3. Дідух Я.П., Шеляг-Сосонко Ю.Р. Геоботанічне районування України та суміжних територій. *Український ботанічний журнал.* 2003. Т. 60. №1. С. 6–17.
4. Дудник Г., Іщенко Г., Марківська Л., Ярославська М. Національний природний парк "Кармелюкове Поділля". Вінниця: ТОВ "ТВОРИ", 2019. 64 с.
5. Еталони природи Вінниччини: монографія / О.В. Мудрак, Г.В. Мудрак, В.М. Поліщук та ін.; за заг. ред. О.В. Мудрака. Вінниця: ТОВ "Консоль", 2015. 540 с.
6. Про природно-заповідний фонд України: Закон України № 2456-XII від 16.06.1992. URL: http://zakon3.rada.gov.ua/laws/show/2456-12 (дата звернення: 25.05.2024).
7. Заповідні об'єкти Вінниччини / під заг. ред. О.Г. Яворської. Вінниця: Велес, 2005. 104 с.
8. Зелена книга України / під заг. ред. чл.-кор. НАН України Я.П. Дідуха. К.: Альтерпрес, 2009. 448 с.
9. Лісові насадження Вінниччини / М.І Гордієнко, А.О. Бондар, Г.Т. Криницький та ін. За ред. М.І. Гордієнка. К.: Урожай, 2006. 2006. 248 с.
10. Маринич О.М., Шищенко П.Г. Фізична географія України: підручник. К.: Знання, 2005. 511 с.
11. Мудрак О. В., Мудрак Г.В. Заповідна справа: навч. посіб. для студентів галузі знань 10 "Природничі науки". Херсон: ОЛДІ-ПЛЮС, 2020. 640 с.
12. Мудрак О.В. Збалансований розвиток екомережі Поділля: стан, проблеми, перспективи: монографія. Вінниця: СПД Главацька Р.В., 2012. 914 с.
13. Мудрак О.В., Матвійчук О.А., Мудрак Г.В., Матвєєв М.Д., Дребет М.В., Осадчук І.С., Ганчук М.М. Раритети тваринного світу Поділля: стан, загрози, збереження. Монографія / За заг. ред. О.В. Мудрака. Вид. 2-е, випр. і допов. Вінниця: ТОВ "Консоль", 2018. 594 с.
14. Мудрак О.В., Мудрак Г.В., Серебряков В.В., Щербльок А.Л., Романчук О.П. Обґрунтування розширення території національного природного парку "Кармелюкове Поділля". *Агроекологічний журнал.* 2021. № 1. С. 14–30.
15. Червона книга України. Рослинний світ / за ред. Я.П. Дідуха К.: Глобалконсалтинг, 2009. 900 с.
16. Червона книга України. Тваринний світ / за ред.: І.А. Акімова. К. : Глобалконсалтинг, 2009. 600 с.

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Новини

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Результати найбільшого в історії опитування громадської думки щодо проблем зміни клімату. 86% опитуваних хотіли б, щоб їхні країни відкинули геополітичні розбіжності й працювали над проблемою зміни клімату спільно. За посилення кліматичних заходів виступає більшість жителів 20 найбільших країн світу, на частку яких припадає левова частка парникових газів: 66 % — у США, 67 — у Німеччині, 73 — у Китаї, 77 — у Південній Африці та Індії, 85 — у Бразилії та 93 — в Італії. Крім того, в Австралії, Канаді, Франції, Німеччині та США жінок набагато більше хвилюють проблеми зміни клімату, ніж чоловіків. 72% опитуваних виступають за якнайшвидшу відмову від викопного палива. Лише 7% заявили, що їхня країна взагалі не повинна переходити на нові технології у сфері енергетики. 56% респондентів констатують, що регулярно задумуються про проблему зміни клімату. 69% опитаних заявили, що зміна клімату значною мірою впливає на прийняття людьми важливих рішень, наприклад, де жити або працювати. Опитування проводилося ПРООН спільно з Оксфордським університетом і компанією GeoPol. У ньому взяли участь 73 тисячі людей з 77 країн.