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The Value of Protected Man-Made Parks of the Ukrainian Polissya of the Second Half of the 18th and Early 20th Centuries

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Abstract. For thousands of years, human activity has shaped the environment, changing it in accordance with utilitarian and functional requirements. As these requirements changed over time, so did the value that people associated with certain landscape features. Man-made parks created in the Ukrainian Polissya in the second half of the 17th – early 20th century are landscapes, the historical park environment, and modern adaptation of which to the modern functional purpose are valued by modern society and can be considered as ecosystem services of the park. The purpose of the study was to develop and test a methodology for assessing the values of man-made protected parks in the Ukrainian Polissya. The following research methods were used: field surveys (route), analytical, comparative and historic and systematic. To assess the level of ecosystem services provided by 32 parks located on the territory of the Ukrainian Polissya, a methodology was developed and tested that included 19 assessment categories, each of which contained several attributes (1-20). Assessment categories included utilitarian, environmental, educational, etc. Attributes were presented, but were not limited to the presence of a source and/or the presence of medicinal plants (within the utilitarian category), the presence of plantings that perform the functions of river protection and/or soil stabilisation (within the ecological category), and the presence of an educational path (in the educational category). Each attribute was assigned a score of 1 with a sum of values (up to a potential sum of 97), reflecting the level of ecosystem services provided by each individual park. By estimating the sum of values, parks were classified as high-value (sum of values from 70 to 97), medium-value (sum of values from 40 to 69), and low-value (sum of values below 40). Among the 32 parks surveyed, 31 (96.9%) parks were classified as medium-value (most with a sum of values in the range from 50 to 60), and one (3.1%) park was classified as low-value, while no park was classified as high-value. By identifying which of the 19 assessment categories (and attributes) are missing, it is possible to plan and implement improvements to increase the ecosystem services provided by individual parks. This methodology can be used to evaluate ecosystem services provided by man-made parks in Ukraine and around the world. Such an assessment would help preserving existing parks, saving them from destruction and development, thus preventing their transition to other types of land use. It would also increase the value of these unique multi-purpose landscape features in the future by transforming and expanding their cultural and social ecosystem services

Keywords: park-monuments of landscape art, protected areas, ecosystem services, history, transformation

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Introduction

Historical sites that reflect national identity are the key to sustainable development. The historical heritage reflects the cultural code and identity of a particular region, city, or locality. Historical architecture and park environment form an idea of harmony and aesthetic tastes of many generations [1]. The park and garden are interconnected with the natural and architectural environment and with society. Different philosophical views have enriched the semantics of the landscape gardening styles over the centuries [2]. A historical garden according to the Florence Charter [3] is an architectural and park composition (the components are mainly plants that are in constant dynamics), which is of interest to the public from a historical or artistic standpoint. Parks can be considered not only as an object of biodiversity, but also as man-made architectural objects that use woody plants in the composition [4]. Countries that have well-established park and gardening traditions, such as the United Kingdom, the United States, France, etc., pay considerable attention to the preservation, restoration, and management of historical gardens. On the other hand, the lack of gardening culture and education leads to the degradation and loss of historical parks and gardens [5]. Researchers also conduct various studies in historical parks around the world. In Estonia, based on the inventory and analysis of the species composition of plantings of historical parks, the model for the composition of stands of trees in a historic park was developed [4]. Greece has developed methodological plans for the recognition and preservation of historical gardens and parks based on a comparative analysis of similar sites abroad and in Greece [5].

Protected parks of Ukrainian Polissya of the 18th-20th century attracted the attention of many researchers who studied them in various aspects. O.Yu. Klymenko [6] investigated the condition of the plantings of park-monument of landscape art (PMLA) Ivnytskyi. F.F. Markov conducted ecological, geographical, phytosociological, and taxonomic analysis of woody plants such PMLAs as Yulino, Park imeni Miklukho-Maklaia, Korostyshivskyi, and Vilkhivskyi [7]. In the work [8], the historical, cultural, and architectural significance of the Park imeni Miklukho-Maklaia is analysed. The study [9] highlights the history of the creation of the Tereshchenko family palace and park complexes (PMLA Yulino), and examines the current state of parks and their structure in landscape, taxonomic, and aesthetic aspects. In [10], the history of the creation of the Korostyshivskyi PMLA and the state of the park zone and its structure were investigated, and a taxonomic, landscape and aesthetic assessment was carried out. The study by A.M. Savoskina considers the historical aspect of the establishment of plantings and their condition in the Vozdvyzhenskyi and Kochubeivskyi PMLAs [11]. The study [12] examines the historical features and modern categorical structure of the network of man-made protected parks of the Ukrainian Polissya.

The authors of the above studies analysed the history of park establishment, their current state, taxonomic composition, and species composition of dendrosozoexotic species, and aesthetic evaluation, mostly in fragments in the regions of Ukrainian Polissya. However, in the Ukrainian Polissya there had been no comprehensive assessment of the value of parks-monuments of landscape art of the second half of the 17th century – early 20th century, which is currently relevant.

The purpose of the study is to develop and test a methodology for assessing the values of parks based on the generalisation of key features of 32 protected man-made historical parks of the Ukrainian Polissya.

Tasks: to conduct an inventory of 32 objects, of which 31 are man-made protected parks and complex natural monuments of the Ukrainian Polissya, to identify and explore preserved objects, structural elements of parks-monuments of landscape art, to develop a methodology and determine the value of the objects under study.

Materials and Methods

During 2014-2021, an inventory survey and comprehensive analysis of 31 park-monuments of landscape art (PMLA) and complex natural monument (CNM) (hereinafter – parks) of the Ukrainian Polissya of the second half of the 17th – early 20th centuries was carried out. PMLAs and CNM are located in the Polissya part (mixed forest zone) of seven regions. The largest number of PMLAs is concentrated in Zhytomyr (34.4%) and Chernihiv (21.9%) regions, 15.6% each in Rivne and Volyn regions, and one or two PMLAs each in Kyiv (3.1%), Sumy (6.3%) and Khmelnytskyi (3.1%) regions. Park and garden complexes differ in regional characteristics: park and garden complexes of Volyn and Kyiv regions, Northern Left Bank, which is associated with certain differences in the historical and social development of these lands and the features of natural landscapes of the localities based on which they were formed [13]. Analytical and systematic methods, and general scientific principles of historicism and chronological sequence have been applied.

The analysis of literary sources and iconographic material was carried out, with the involvement of museum materials of images of park-monuments of landscape art and complex natural monuments, which provided an idea of the development of parks in different periods and allowed tracing the nature of transformation over a long period of time. A visual full-scale survey (route method) of the territory of 32 parks was carried out, when structural elements of parks (types of woody plants, types of plantings, reservoirs, buildings, small architectural forms), composite axes, and planning structure were recorded in the field. The plant species were identified [14], and the species names were specified in accordance with the international classification [15]. The age structure of plantings was determined by mensurational descriptions and archival materials.

In order to develop the value assessment (value implies certain phenomena or objects that have material (economic), social, or cultural significance [16]) of man-made protected parks, the following methods were applied: classification of protected nature values [17], methodology for determining the dendrological value and level of preservation of landscape objects [18], assessment of unique trees [19], in accordance with the Florentine Charter, components of the architectural composition of historical parks: plan and relief; types of plantings, plant species, structural and decorative features; water elements [4], approaches to applying the design of landscape groups of plants and their medicinal properties [20], classification of ecosystem services [21], assessment of ecosystem services [21-23]. The study evaluated each value in points depending on the number of features found in parks (PMLA and CNM), and then, according to the classification of ecosystem services and classified them into four groups.

Results and Discussion

According to the chronology and stylistic features, L. Prybieha attributes the PMLAs created before the middle of the 18th century to the early period; in the last third of the 19th century – to the era of early classicism; in the first third of the 19th century – to the Empire style; from the middle of the 19th century to the beginning of the 20th century – to the period of romantic and eclectic trends in architecture and landscape gardening (in the organisation of the park environment, preference is given to refined plasticity and the creation of lyrical architectural and artistic images, monumentality is reduced) [14]. By size, the parks were grouped of authors into categories: small (up to 3 ha) – 6.2%, medium (from 3 to 10 ha) – 34.4%, large (from 10 to 25 ha) – 43.8%, and very large (from 25 ha) – 15.6 % (Table 1).

Table 1. Characteristics protected man-made parks of the Ukrainian Polissya

No.	Region	PMLA, CNM	Purpose	Area, ha	Creation period	Number of species	Types of plantings
17th century							
1	Rivne	CNM Volodymyretskyi park	castle*** palace*	3	17th, 1827	16	a; gr; s; st
2	Chernihiv	Lyzohubivskyi	estate*	22	end of 17th	21	a; gr; s; r; or
18th century							
3	Zhytomyr	Park imeni Kutuzova	fortress, palace***	5	2nd half of 18th	35	a; g; s; or
4	Zhytomyr	Ivnytskyi	estate***	14	2nd half of 18th	32	gr; s; r; st; rp
5	Zhytomyr	Kmytivskyi	estate*	9	2nd half of 18th	40	a; gr; s; rp; st, b
6	Sumy	Kochubeivskyi	estate*	22	2nd half of 18th	27	a; gr; s; rp; st
7	Volyn	Zdorovia	castle palace*	13.6	2nd half of 18th	44	a; gr; s; rp; h; or
8	Rivne	Tuchynskyi	residence***	10	end of 18th	35	a; gr; s; rp; g
9	Chernihiv	Stolnenskyi	estate***	12	end of 18th	39	a; gr; s; rp; h
10	Volyn	Liubeshivskyi	**	12	end of 18th	25	a; g; gr; s
19th century							
11	Rivne	Horodotskyi	***	8	1820	44	a; gr; s; r
12	Volyn	Makarevychivskyi	estate*	0.9	1839	14	a; gr; s; r
13	Zhytomyr	Dvoryshchanskyi	estate*	1.5	1840	20	gr; s; g; a

Table 1, Continued

No.	Region	PMLA, CNM	Purpose	Area, ha	Creation period	Number of species	Types of plantings
14	Zhytomyr	Korostyshivskyi	castle palace	12.9	1840	41	a; gr; s; r; st; r*
15	Zhytomyr	Ushomyrskyi	estate**	12.91	first half of 19th	55	a; gr; g, s; r; st; or
16	Zhytomyr	Park imeni Yu.Haharina	estate	36	end of the first half of 19th century	90	a; gr; s; r; st; h
17	Chernihiv	Miskyi sad	-	11.2	1850-1900	53	gr; s; r; st
18	Rivne	Oleksandriyskyi	estate***	5	1840-1870	22	a; gr; s; rp; r
19	Zhytomyr	Vilkhivskyi	palace**	11.2	mid-19th century, 1860	35	gr; s; rp; st
20	Volyn	Sadyba Lypynskoho	estate*	3	1882	26	gr; s; rp; b
21	Zhytomyr	Horodnytskyi	estate***	21	1880-1890	52	a; gr; s; rp; h
22	Zhytomyr	Park imeni Miklukho-Maklaia	-***	29.6348	1873-1886	66	a; g; gr; s; rp; st, h; or
23	Zhytomyr	Yulino	estate*	25	2nd half of 19th	36	a; g; s; rp; gr, or, st
24	Kyiv	Kopylivskyi	summer residence*	8	1888-1890	45	a; gr; s; rp; g; h
25	Chernihiv	Vahanytskyi	estate	6	1880-1900	42	a; gr; s; rp
26	Sumy	Vozdvyzhenskyi	estate**	45.9	1889	47	a; gr; s; rp; st
27	Chernihiv	Park imeni T.H. Shevchenka	-	10	end of 19th century	27	gr; s; rp
28	Khmelnytskyi	Polonskyi	estate**	37	2nd half of 19th	51	a; gr; g; s; rp; r
29	Volyn	Litynskyi	family estate***	8.4	end of 19th	37	a; gr; s; rp; or; r
30	Rivne	Zirnenskyi	summer residence***	17.2	late 19th 1896	50	a; gr; s; rp
early 20th century							
31	Chernihiv	Tupychivskyi	estate	3	1900-1905	22	a; gr; r
32	Chernihiv	Boldyna Hora	Saint Anthony cave comlpex*	6	1911	42	a; gr; s; rp; h

Note: * – estate building has been preserved; ** – partially preserved buildings for various purposes; *** – estate building is not preserved; a – alley; rp – row planting; s – solitary, gr – group; st – stands on an area >0.5 ha; g – grove; or – orchard; h – hedges; b – border; r – ring, *r – ring is not preserved
Source: compiled by the authors

It was found that 62.4% of PMLAs were established during the 19th century, 25 % – in the second half of the 18th century, and 6.3% – at the end of the 17th century and early 20th century. Natural factors influenced the creation of the architectural and artistic composition of palace and park ensembles. Until the middle of the 17th century, the protective properties of the area were an outstanding factor in choosing a site for a residence, the transformation of castle complexes into palace and park ensembles took place over time and gradually (Volodymyretskyi park). O.L. Mykhailyshyn noted that in Volhyn, the function of protection at a certain stage was performed by natural reservoirs, which were gradually included in the structure of palace and park ensembles as elements of a new aesthetic, water surfaces also had an economic and applied purpose [24].

During the 17th – 19th century, functional and compositional relationships of natural (woodlands) and anthropogenic (park part of residences) landscapes have become widespread, which is found in the Volodymyretskyi, Horodnytskyi, Kmytivskyi, Kochubeivskyi, Vozdvyzhenskyi, and Park imeni Kutuzova. In the 18th century, manor construction had its own characteristics. L. Prybieha notes that in the planning and spatial structure of parks, the palace was located on elevated terraces of the area and had a dominant position, the symmetrical composition of the park with the cour d'honneur open towards the entrance was emphasised by the main alley located on the

same axis as the palace, which ensured regular planning of the pre-palace space and garden plantings. At the same time, the second part of the park, located behind the palace, opposite to the main entrance, was laid out freely, had a landscape character [13].

A similar planning and spatial structure of the park can be observed in the PMLA Ivnytskyi, founded in the second half of the 18th century in Ivnytsia village on the gentle left slope of the river, the owner of the town, Jozef Czarnecki, built a two-story stone palace, established a landscape park with a system of ponds with gateways. Nowadays, the entrance gate and *Fraxinus excelsior* L. on the left, the utility building, dilapidated defensive towers, and steps leading to the south-eastern tower remain. Behind the entrance gate, a little further on, there is a clearing, probably a cour d'honneur that was in front of the palace, it has the shape of a circle with a diameter of 100 m, around which century-old trees grow in an row planting with three specimens of *Tilia cordata* Mill., two specimens of *Carpinus betulus* L. At the end of the 19th century, a greenhouse parterre was built behind the palace with *Citrus limon* L. Osbeck and *Citrus×aurantium* L. in containers, *Picea abies* Karst. were planted as single plantings (1914), some have survived to this day.

In the second half of the 18th century, the type of rural estate with the corresponding establishment of parks (Kmytivsky, Kochubeivskyi) also spread. Baroque parks were not widespread – among the studied sites is the well-known Liubeshivskyi PMLA. The Baroque residence was built by the Great Lithuanian Hetman M. Vyshnevetskyi on the site of a wooden palace that burned down during the Great Northern War; a park was established around the palace. J. Mniszech, having inherited the residence after the Vyshnevetskyi family, sold it in 1754 to J. Czarnecki, who built a brick wall and created a moat, on the western side of the palace – an entrance gate, the entrance to which was closed by a suspension bridge. In the first half of the 19th century, the palace had an Italian-style garden with stalls, alleys, and lawns. O.L. Mykhailyshyn notes that the imitation of the traditions of Western European landscape art in Volyn was embodied in the arrangement of baroque gardens of the Italian type, baroque gardens of the French type in their traditional form did not become widespread, only the front parterre was used. In the second half of the 18th century, the English theory of landscape-style parks began to be applied, where the structural elements were a garden for walking, a menagerie, and an orchard.

In Volyn, there were ceremonial, melancholic parks, and parks in which water was the main element. Other types: rustic, pastoral, and intimidating were represented by separate semantic sections (P. Giżycki distinguishes six types of landscape parks) [24]. In the Ukrainian Polissya, 84.4% of the studied objects have reservoirs or water bodies, where six principles of arrangement of garden compositions with water elements were revealed: single-faced (PMLAs Liubeshivskyi, Tuchynskyi, Park imeni Kutuzova, Dvoryshchanskyi, Lyzohubivskyi, Stolnenskyi, Kochubeivskyi, Kmytivskyi, Oleksandriyskyi), double-faced (Horodnytskyi), island (Horodnytskyi, Zdorovia), combined (river and lake PMLAs Horodnytskyi, Korostyshivskyi, river and fountain PMLA Park imeni Yu. Haharina, river and pond system of PMLAs Ushomyrskyi, Ivnytskyi, Park imeni Miklukho-Maklaia), man-made reservoirs (PMLAs Zdorovia, Yulino, Vahanytskyi, Miskyi sad, Zirnenskyi, CNM Volodymyretskyi park, in PMLAs Kopylivskyi and Sadyba Lypynskoho, reservoirs have not been preserved). Of the 27 protected historical parks, 62.3% were created along the river banks [25].

During the 19th century, intensive construction of new park complexes began in the Ukrainian Polissya, with 62.5% of the studied parks being established. This period is characterised by landscape parks, some of them included fruit orchards, which were located either in the entrance part (PMLA Litynskyi), or in remote parts, next to the walking part of the park and delimited by alleys with *Carpinus betulus* L. (PMLA Ushomyrskyi), *Tilia cordata* Mill. (PMLA Vozdvyzhenskyi), *Ulmus laevis* Pall. and *Aesculus hippocastanum* L. (PMLA Lyzohubivskyi). In Park imeni Kutuzova, an orchard was created in the 1950s on an area of 3 hectares, now there are: *Prunus cerasus* L., *Prunus avium* L., *Prunus cerasifera* Ehrh., *Pyrus pyraster* (L.) Burgsd., *Juglans regia* L., *Malus domestica* Borkh.

At the end of the 19th – beginning of the 20th century, summer residences were created and parks were arranged around them (PMLAs Kopylivskyi, Zirnenskyi, Kmytivskyi). In 1888, the Kopylivsky family built a summer wooden residence (cottage) in Nordic or National Romantic architectural style around the manor house, and a rose garden was arranged. Alleys of large-sized plants with *Picea abies* Karst. (in 2018, the trees died) and with *Tilia cordata* Mill. were arranged (the paths of the alleys were sprinkled with sea sand); a pond was dug. Evelina Sumovska (Bohdanovych), the owner of the Kmytivskyi estate, inherited the house (built at the turn of the 19th and 20th centuries) as a summer residence after

her marriage. Over time, Anna-Maria and Evelina Sumovsky build the villa for winter living, where they stayed until 1917 [26].

During the first half of the twentieth century, some of the historical park complexes underwent a devastating transformation (Park imeni Kutuzova, Park imeni Miklukho-Maklaia, Dvoryshchanskyi, Sadyba Lypynskoho). Since the 1950s, certain measures have been taken to restore the plantings of PMLAs Kmytivskyi, Park imeni Kutuzova, Ivnytskyi, Dvoryshchanskyi, Korostyshevskyi, Park imeni Yu. Haharina, Boldyna Hora, but the preservation of characteristic vegetation and historical landscape structure was rather neglected.

L. Pribega [13] divided PMLAs into two groups: the first group includes historical parks or gardens (aesthetic features are determined primarily by the unique biological properties of the presented plant species), such a group can include Park imeni Yu. Haharina, Park imeni Miklukho-Maklaia, Ushomyrskyi, Vozdvyzhenskyi, Litynskyi. The second group – estate and park complexes (ensemble) – any set of separate or interconnected structures, their architecture and consistency with the landscape is of particular historical, artistic, scientific, social, or ethnological value [3]). The planning and spatial organisation of palace and park complexes has a special creative idea, where park buildings and the palace are placed as a compositional dominant of the entire ensemble. These include – CNM Volodymyretskyi park, PMLAs Sadyba Lypynskoho, Polonskyi, Lyzohubivskyi, Kochubeivskyi, Zdorovia, Horodotskyi, Korostyshivskyi, Kopylivskyi, Dvorishchanskyi, and Yulino. According to the authors, it is necessary to single out another group of parks that have preserved compositional dominants, but park buildings and the palace have not been preserved. This group is proposed to include: PMLAs Horodnytskyi, Ivnytskyi, Stolnenskyi, Liubeshivskyi, Oleksandriyskyi, Tupychivskyi.

According to the authors' methodology for assessing parks, it is proposed to introduce 19 values, with a total maximum score of 97 points, which can provide such ecosystem services (ES) as security, regulating, cultural and social, and supportive (Table 2). The distribution of parks by value is as follows: low-value – up to 40 points, medium-value – 40-70 points, high-value – from 70 to 97 points. Based on the results of a scoring of the values of parks, their features and ways to optimise these objects will become clear. Since most of the values for which the assessment was conducted relate to cultural and social services of the ecosystem, accordingly, it will be possible to identify in which parks they are presented more fully and ways to increase them for parks where such values are poorly developed. Evaluating the utilitarian value that supply services provide will help identify the parks with the highest representation. The ecological and maintenance value of regulating and supporting ecosystem services, respectively, is typical for all parks.

Table 2. Assessment of the values of man-made protected parks

ES*	Value	Maximum number of points	Signs
1	Utilitarian	4	availability: water sources (1 point), resources for further use (fruits and seeds of rare species (1 point)), medicinal raw materials (1 point), genetic resources (1 point)
2	Ecological	4	plantings of the park perform a water-regulating (1 point), soil-protective (1 point) function, create a comfortable microclimate (1 point), plantings are habitats for entomophages, insectivorous species, pollinating insects (1 point)
3	Museum	3	presence of a museum on the territory of the park (3 points), it is possible to create a museum on the territory of the park (2 points), it is not possible to create a museum on the territory of the park (0 points)
3	Historical and cultural	9	preservation of cultural monuments together with their environment (1 point), preservation of cultural landscapes (1 point), remains of ancient settlements (1 point), remains of ramparts (1 point), religious graves (1 point), entrance gate (1 point), defence tower (1 point), bridge (1 point), shooting gallery (1 point)
3	Spiritual (religious)	5	presence of a church or cathedral on the territory of the park (3 points), near but outside the park (2 points), absence, but the park is a place of spirituality (2 points)
3	Scientific	3	the park is subordinate to an institution where research can be conducted (1 point); the park has objects (rare plants, animals, birds, etc.) for conducting research (1 point); the ability to study natural processes (1 point).
3	Educational	4	organised ecological trail (3 points), developed and potentially possible organisation of an ecological trail (2 points), there is no possibility of organising an ecological trail (0 points); the park is a place of visual knowledge (1 point).

Table 2, Continued

ES*	Value	Maximum number of points	Signs
3	Ethical (moral)	3	park plantings as a valuable example of a human-made environment by previous generations, which has the right to exist. Where the morality of kindness and beauty is laid down, as a result, a humane attitude to nature and people (3 points).
3	Educational (patriotic)	3	the park located within cities and towns is an example of a human-made environment and processes that occur in it, there is a possibility to raise children in contact with nature (3 points), the park is located outside of settlements, is an example of a human-made environment and processes that occur in it, there is a possibility to raise children in contact with nature (2 points), the park is located in the depths of the forest there is no opportunity to raise children in contact with nature (1 point)
3	Aesthetic	3	elements: plantings, reservoirs, buildings (3 points), a combination of two elements including the remains of buildings (2 points), one element (1 point)
3	Health and recreation	7	availability of a recreation environment (plantings (1 point), reservoirs (1 point)), stadium (1 point), playgrounds (1 point), recreation areas (1 point), theater (1 point), lawn (1 point)
3	Unperceived	1	a value that is not yet realised by a person, but potentially exists (1 point)
3	Reference	20	availability of reference plantings (alley; row planting; solitary, group; array; grove; orchard; hedge; borders; ring) (1 point is given for each reference type of plantings), preservation of the planning structure (1 point), composite axes (1 point); available main elements of the estate: complex of buildings (1 point), building (1 point), natural reservoirs (river, lake, pond) (1 point), man-made water systems (pond, cascade or pond system, fountain or cascade of fountains) (1 point), island (1 point), gazebo (1 point), lawn (1 point)
3-4	Collectable (taxonomic)	3	availability of 100 taxa (3 points), 50 to 100 taxa (2 points), and up to 50 taxa (1 point) in the park's plantings collection
3-4	Dendrorarity	3	availability of rare woody plants in the collection in % of the total number: 90 to 100% (3 points), from 50 to 90% (2 points), less than 50% of rare plants (1 point)
3-4	Planting types	9	old (100-200 years) and centuries-old (200- 800 years) plantings: alleys (1 point), groups (1 point), solitary (1 point), row plantings (1 point), mixed and pure stands on an area > 0.5 ha (1 point); unique plantings (ring) (1 point), moulded plants (1 point), orchard (1 point), typical plantings: mixed and pure stands on an area > 0.5 ha, groves, groups, alleys, row plantings, solitary, hedges, borders (1 point).
3-4	Unique trees	5	ancient trees (trunk circumference is significant) (1 point), veteran trees that have experienced various harsh living conditions, as a result of accelerating ageing and the appearance of signs of old age, regardless of their age (1 point); notable (significant) trees (very large mature trees, stand out locally, larger than other trees around them (1 point); champion trees – the tallest or those that have the largest trunk circumference among trees of a certain species in a particular region (1 point); heritage trees (outstanding) correspond to any of the above descriptions, are of particular cultural or historical interest (1 point).
3-4	Therapeutic plant communities	5	place for restoring human health (5 points in total) (stimulating the five senses of visitors: vision (1 point), hearing (1 point), touch (1 point), smell (1 point), taste (1 point)
4	Support	3	air quality (1 point), noise reduction (1 point), environmental impact on the development of living organisms (1 point)
	Total	97	

Note: if there are several characteristics of the same value criterion, their number is summed up. *Ecosystem services (ES): 1 – security (supply), 2 – regulating, 3 – cultural and social, 4 – supporting
Source: compiled by the authors

Next, the study considers the significance of some key values. Each epoch influences people's worldview and forms their new historical consciousness due to changing economic, political and socio-cultural changes. In turn, each epoch, the political structure of states, and their economic development are created not by their own efforts, but in accordance with certain laws. Understanding of the processes that are taking place depends on awareness of the epochs of human development in the relationship of times. The

establishment of historical parks is the impact of man on the environment, the impact of nature on man, the perception of nature by man and his actions in connection with this perception. The study and preservation of park-monuments of landscape art is possible in the absence of ideological approaches that harm their development. Under Soviet rule, due to ideology, some of the estates (buildings) were destroyed (PMLA Zirnenskyi, Ivnytskyi, Stolnenskyi, Korostyshivskyi, Vilkhivskyi). This deprived humanity of important components of universal culture, which is no longer possible to study, because it is completely destroyed.

A positive result in the knowledge of culture can be achieved only in a combination of the study of material and non-material (spiritual) culture. Museums play a significant role in studying historical, cultural and natural heritage in their totality. Therefore, their value is obvious. Museums are found on the territory or nearby in seven PMLAs (Lyzohubivskyi, Zirnenskyi, Sadyba Lypynskoho, Kochubeivskyi, Horodotskyi, Korostyshivskyi, and Kmytivskyi (outside the park) (Table 3). The museum's mission is to study, preserve, and broadcast historical, cultural, and natural heritage to future generations. Heritage is the social experience of generations that the museum preserves and transmits from the past through the present to the future. Therefore, the assessment of museum value is important, and the creation of new museums on the territory of the PMLA or outside of them will contribute to social memory.

Table 3. Assessment of the value of man-made protected parks in Ukrainian Polissya

CNM, PMLA	Value																			
	Utilitarian	Ecological	Museum	Historical and cultural	Spiritual (religious)	Scientific	Educational	Ethical (moral)	Educational (patriotic)	Aesthetic	Health and recreation	Unperceived	Reference	Collectable (taxonomic)	Dendrorarity	Planting types	Unique trees	Therapeutic plant communities	Support	Total
ES	1	2	3	3	3	3	3	3	3	3	3	3	3	3-4	3-4	3-4	3-4	3-4	4	
CNM Volodymyretskyi park	1	4	2	3	4	2	3	3	3	3	5	1	5	1	2	4	3	4	3	56
Lyzohubivskyi	2	4	3	2	4	2	3	3	3	3	3	1	6	1	2	5	3	5	3	58
Park imeni Kutuzova	2	4	0	2	2	2	1	3	3	2	3	1	2	1	2	4	2	5	3	44
Ivnytskyi	2	4	2	3	2	3	3	3	3	2	3	1	7	1	3	5	2	5	3	57
Kmytivskyi	1	4	3	1	2	2	1	3	3	3	4	1	3	1	2	6	1	4	3	48
Kochubeivskyi	2	4	3	1	2	2	3	3	3	3	6	1	6	1	3	5	2	4	3	57
Zdorovia	2	4	2	4	4	2	3	3	3	3	3	1	8	1	2	6	2	5	3	61
Tuchynskyi	2	4	0	1	2	2	3	3	3	2	5	1	7	1	2	5	3	4	3	53
Stolnenskyi	2	4	2	1	2	2	3	3	3	2	6	1	4	1	2	5	2	4	3	52
Liubeshivskyi	2	4	2	2	4	2	3	3	3	3	6	1	4	1	3	4	3	4	3	57
Horodotskyi	2	4	3	3	5	2	1	3	3	3	3	1	5	2	2	4	3	5	3	57
Makarevychivskyi	1	4	2	1	2	2	1	3	3	2	2	1	4	1	2	4	2	5	3	45
Dvoryshchanskyi	1	4	2	1	2	2	3	3	3	3	2	1	4	1	2	4	2	4	3	47
Korostyshivskyi	1	4	3	3	5	2	3	3	3	2	5	1	4	1	2	7	2	4	3	58
Ushomyrskyi	2	4	2	1	2	2	3	3	3	3	7	1	8	2	2	6	3	5	3	62
Park imeni Yu. Haharina	2	4	2	1	2	3	3	3	3	2	7	1	4	2	2	6	2	5	3	57
Miskyi sad	1	4	0	1	2	2	3	3	3	2	6	1	1	2	2	4	1	5	3	46
Oleksandriyskyi	2	4	0	1	4	2	3	3	3	1	5	1	6	1	3	5	4	4	3	55
Vilkhivskyi	2	4	2	2	2	2	3	3	3	3	4	1	3	1	2	4	1	5	3	50

Table 2, Continued

CNM, PMLA	Value																			
	Utilitarian	Ecological	Museum	Historical and cultural	Spiritual (religious)	Scientific	Educational	Ethical (moral)	Educational (patriotic)	Aesthetic	Health and recreation	Unperceived	Reference	Collectable (taxonomic)	Dendrorarity	Planting types	Unique trees	Therapeutic plant communities	Support	Total
Horodnytskyi	2	4	2	1	2	3	3	3	3	2	5	1	5	1	2	5	1	5	3	53
Park imeni Miklukho-Maklaia	3	4	2	1	2	2	3	3	3	2	7	1	10	2	2	8	2	5	3	65
Yulino	2	4	2	1	2	2	3	3	3	3	4	1	7	1	2	7	2	5	3	57
Kopylivskyi	1	4	2	2	2	2	3	3	3	3	5	1	5	1	2	6	3	5	3	56
Vahanytskyi	2	4	2	1	4	2	3	3	3	3	3	1	7	1	2	4	3	5	3	56
Vozdvyzhenskyi	2	4	2	1	5	2	3	3	3	3	4	1	8	1	2	5	3	5	3	60
Park imeni T.H. Shevchenka	1	4	0	1	4	1	1	3	3	2	2	1	1	1	2	3	2	4	3	39
Polonskyi	2	4	2	1	4	3	3	3	3	3	4	1	8	2	2	6	2	5	3	61
Litynskyi	2	4	0	1	2	2	3	3	3	1	3	1	8	1	2	6	3	5	3	53
Zirnenskyi	2	4	3	1	2	3	3	3	3	2	3	1	8	2	2	4	3	5	3	57
Tupychivskyi	1	4	2	1	2	2	3	3	3	3	1	1	2	1	3	3	1	4	3	43
Boldyna Hora	1	4	3	1	5	1	3	3	3	3	2	1	1	1	2	5	1	5	3	48

Source: compiled by the authors

L. Prybieha noted that the historical and cultural value of an ensemble or complex is determined by the compositional integrity and artistic level of the entire territorial and spatial objects and an integrated system of layers reflecting historical stages of development [13]. The planning structure of ensembles, complexes, and estates was influenced by the characteristic features of the corresponding landscapes and such components as reservoirs, hills, and slopes. According to the assessment proposed by the authors, the historical and cultural value was attributed to: the preservation of cultural monuments together with their environment, the preservation of cultural landscapes, the remains of ancient settlements, the remains of ramparts, religious burials, entrance gates, defensive rowers, bridges in the studied parks and their components, the authors partially agree with the researcher. Reservoirs, according to the authors' method, are classified as signs of health and recreational value.

Study [27] showed that spending time in nature restores and heals psychological, physical, and emotional aspects of a person, promotes the development of social relationships, and has the greatest impact on the human spirit, giving a sense of connection, vibration and awe. Time in nature can be transformative, turning negative emotions into positive ones that lead to joy, gratitude, and compassion. In addition, it is a free and affordable way to foster spiritual well-being [27]. Thus, spiritual value is obvious, because PMLA is the place where a person can heal and receive spiritual well-being. The presence of a church or cathedral on the territory of a park or nearby can enhance the spiritual value. In the 18th-19th centuries, the construction of the church and the palace took place almost simultaneously, and then the park was built, so the church was an integral part of some palace and park complexes (CNMs Volodymyretskyi park, Zdorovia, Liubeshivskyi, Oleksandriyskyi).

According to the authors, the reference value is very important, which is represented by: various types of reference plantings (alley; row planting; solitary, group; array; grove; orchard; hedges; borders; ring), preservation of the planning structure, compositional axes, the main elements of the estate are: a complex of buildings, a building, natural reservoirs (river, lake, pond), man-made water bodies (man-made pond, cascade or pond system, fountain or cascade of

fountains), an island, gazebo, lawn (Table 2). That is, all the structural components that can be used as an example for the reconstruction of parks of a certain period. Antique reference alleys are most represented in the PMLAs Ushomyrskyi, Litynskyi, Lyzohubivskyi, Liubeshivskyi, and Yulino they are created from *Pinus sylvestris* L., *Carpinus betulus* L., *Tilia cordata* Mill., *Acer platanoides* L., *Aesculus hippocastanum* L., *Picea abies* Karst. No less interesting is the ring plantation type, which occurs only in PMLAs Litynskyi (with *Picea abies* Karst., *Tilia cordata* Mill.), Polonskyi (double ring with *Carpinus betulus* L. and a low hedge with *Ligustrum vulgare* L.), Oleksandriyskyi (with *Fraxinus excelsior* L. and *Fraxinus angustifolia* Vahl.), grew in the middle of the 20th century in PMLA Korostyshivskyi (with *Populus nigra* var. *italica* Münchh.), however, it has not been preserved. As reference stands with *Pinus sylvestris* L., *Quercus robur* L. on an area of >0.5 ha and an orchard are available at the PMLA Vozdvizhenskyi.

The park environment is able to provide a pleasant, healthy, and comfortable atmosphere for people of all ages and has a positive impact on human health [28]. A person perceives external information through the five senses (sight, hearing, touch, smell, and taste). The theory of the five senses provides an opportunity to understand the therapeutic effect of plant communities [20]. Therapeutic plant groups have the following signs of value: leaf colour, crown architectonics, creating light and shadow from plants (stimulate vision), phytoncidal and aromatic plants (stimulate the sense of smell), deciduous plants that add the sound of rustling leaves, edible plants (affect the taste buds), long-lasting plants with different textures (diversify the sense of touch). All of the above signs have a positive effect on strengthening a person's physical and mental health. Assessment of the value of therapeutic plant communities in PMLA will help identify shortcomings in plantings, and will help in selecting plants to improve the design and complement certain groups of sensory plants. Species diversity and stable plant communities are a reliable basis for PMLA, which will influence the ecological state of the park's plantings and ensure the diversity of therapeutic plant landscapes. The design of therapeutic plant communities is extremely important. They can improve the park environment, provide a comfortable and pleasant stay, and also increase its value in terms of aesthetics. The authors also agree with the opinion of researchers [23] that with the increase in urbanised areas and the decrease in human contact with nature around the world, the question of preserving and expanding access to the natural environment arises. In addition, the compaction of the urban environment, which causes air pollution and noise pollution, can be buffered by parks where citizens can spend leisure time [20]. Plantings in parks reduce the temperature in summer, mitigate the effects of heat islands, increase the comfort of recreation conditions, and indirectly affect human health. Staying in the PMLA can affect a person's cognitive functioning, emotional well-being, and other aspects of mental health, which increases the value of parks and expands eco-friendly services. Mental health benefits are usually accompanied by benefits from other ecosystem services and can be considered as "concomitant benefits" for other services [28].

Based on the analysis of values, it was revealed that 30 PMLAs and CNMs have an average value ranging from 40 to 70 points: 22.6% of parks have a value of 40-50 points, 61.3% – 50-60 points, 12.9% – 60-65 points (PMLAs Vozdvyzhenski, Polonskyi, Zdorovia, Ushomyrskyi, Park imeni Miklukho-Maklaia) (Table 3). The last five PMLAs that received the most points are to some extent reference ones, which retain plantings, planning structure, and most of the components of parks. The remaining 24 PMLAs and CNMs require careful analysis to diversify the components of parks, increase their attractiveness, and understand their area of development. When supplementing plantings (to create therapeutic plant communities) in PMLAs, it is important to consider the basic needs of communities, adopt a holistic view, and use natural types of woody and herbaceous plants to achieve sustainable development of parks and local ecosystems.

Park imeni T.H. Shevchenka has a low score, which indicates that the cultural and social services of the ecosystem are not high in the PMLA, which is conditioned by the history of its creation. In the 18th century, the Holy Trinity and St. George churches were built on the site of the park, around which a system of burials was established. In the 19th century, the park had the Trinity cemetery with the city garden and the St. George cemetery [29]. A mass grave of several hundred people who died in the Second World War has been built near the city stadium. In a separate part, a place for burials was left in the direction of ravines, which began to be developed as a Soviet burial site in the 1930s.

Currently, considerable attention is paid by researchers around the world to assessing different values at both the regional, local, and global levels, with different approaches being used. A special place is occupied by assessing the value of nature and eco-forest services, which are key to human mental health. G.N. Bratman et al. developed a conceptual model to

preserve and expand the assessment of ecosystem services to include mental health. The model can be used to assess where green spaces or better access to nature can improve a person's mental health, and where certain infrastructure, building placement, and other land use decisions can negatively affect it [28]. R.P. Remme et al. proposed a spatial model that can be used in decision-making to guide and inform numerous groups of stakeholders, considering individual approaches to a particular territory. The researchers suggest that integrating a natural-oriented physical activity model as a tool for evaluating ecosystem services can help take into account the many values of preserving and improving the natural environment [30]. Z. Ouyang et al. developed an indicator of the gross product of the ecosystem, which summarises the importance of the contribution of nature to the economic activity of the country. This indicator can be used in making decisions about investing in the conservation of ecosystem assets to ensure the provision of ecosystem services through transregional compensation payments [31]. A.S.M.G. Kibria et al. evaluated Cambodia's Veun Sai-Siem Pang National Park, which is significant in terms of biodiversity value and little known to the international community, and found that the area under study is a base of valuable knowledge about natural resources, has cultural significance for indigenous peoples, and is part of one of the most important eco-regions in the world. At the same time, it has numerous threats (illegal logging, poaching, public pressure, and corruption). Assessment of ecosystem services will provide an opportunity to promote sustainable park management [32]. G. Moradi et al. studied the recreational value of Baharan Park in Maybod, and a logit model was used to determine the effective factors of visitors' willingness to pay for park protection and improvement The willingness to pay for ecosystem services indicates the high importance of the park [33]. Assessment of recreational ecosystem services in protected areas, namely, in botanical gardens, as noted by C. Funsten et al., can promote the development and optimisation of potential ecosystem services that botanical gardens are designed to provide, such as demonstration and training, and planning various activities can increase social well-being and improve inclusivity. C. Funsten et al. examined respondents' satisfaction with a questionnaire at the Zagara Plant Festival in the Botanical Garden of the University of Palermo in Sicily (Italy) and found that the festival met the relevant needs of visitors to outdoor social events. Therefore, one of the management decisions, according to the researchers, can be the creation of special events in protected areas to improve the well-being of people [34]. Raising awareness of the value of natural resources [32] will encourage policy-makers to adopt a sustainable development approach rather than a popular short-term economic benefit.

Conclusions

Based on the generalised features, an assessment of 19 values was developed and tested in 32 parks that were created over three centuries. Man-made parks of the Ukrainian Polissya are an integral element of estates of the second half of the 17th – early 20th centuries, which had local characteristics and aesthetic individuality. Their spatial frame is represented by a characteristic relief, reservoirs, historically formed layout, buildings and structures with more than 100-year-old plantings (mixed and pure stands on an area >0.5 ha, groves, alleys, groups, rings, solitary, row plantings, fruit orchards). It was revealed that 6.3% of parks were established in the late 17th century and early 20th century, in the second half of the 18th century – 25%, and in the 19th century – 62.4%. They differ in area: up to 3 hectares – 6.2 %, from 3 to 10 hectares – 34.4 %, from 10 to 25 hectares – 43.8%, and over 25 hectares – 15.6 %.

Based on the assessment of 19 values (total number of points 97), it was found that 31 parks have an average value score ranging from 40 to 70 points. The average value with the number of points from 60 to 65 is given to the park-monuments of landscape art Vozdvyzhenskyi, Polonskyi, Zdorovia, Ushomyrskyi, and Park imeni Miklukho-Maklaia, which are the best preserved and have different structural components, in turn, they provide the most diverse cultural and social ecosystem services. Therefore, it is necessary to continue to ensure the further preservation of the considered parks as a valuable historically inherited environment that can provide ecosystem services such as cultural and social, security, regulating, and maintenance.

The findings can be used to preserve the existing components, and maintain the historical and artistic image of the park environment by restoring plantings during reconstruction. The proposed method of value assessment can be applied to determine the values of man-made protected parks, including those that do not have a protected status both in Ukraine and in other countries of the world. The results obtained can be used to guide research on expanding the provision of cultural and social ecosystem services.

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Цінність заповідних штучно-створених парків Українського Полісся другої половини XVII початку XX століть

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Анотація. Протягом тисячоліть діяльність людини формувала навколишнє середовище, змінюючи його відповідно до утилітарних і функціональних вимог. Оскільки ці вимоги змінювалися з часом, змінювалася й цінність, яку люди пов'язували з певними особливостями ландшафту. Рукотворні парки, створені на українському Поліссі у другій половині XVII – на початку XX століття, являють собою ландшафти, історичне паркове середовище та сучасна адаптація яких до сучасного функціонального призначення цінуються сучасним суспільством і можуть розглядатися як екосистемні послуги парку. Метою дослідження було розробити та апробувати методику оцінки цінностей заповідних штучно-створених парків Українського Полісся. Застосовано методи дослідження: натурних обстежень (маршрутний), аналітичний, порівняльно-історичний, систематизації. Для оцінки рівня екосистемних послуг, які надають 32 парки, що розташовані на території Українського Полісся, було розроблено та апробовано методику, яка використовувала 19 категорій оцінки, кожна з яких містить кілька атрибутів (1-20). Категорії оцінювання включали утилітарну, екологічну, освітню та інші. Атрибути були представлені, але не обмежувались наявністю джерела та/або наявністю лікарських рослин (в межах утилітарної категорії), наявністю насаджень, що виконують функції захисту річок та/або стабілізації ґрунтів (в межах екологічної категорії), та наявністю навчальної стежки (в освітній категорії). Кожному атрибуту було присвоєно значення 1 із сумою значень (до потенційної суми 97), що відображає рівень екосистемних послуг, що надаються кожним окремим парком. Оцінюючи суму цінностей, парки були класифіковані як високоцінні (сума цінностей від 70 до 97), середньоцінні (сума цінностей від 40 до 69) і низькоцінні (сума цінностей нижче 40). Серед 32 досліджених парків 31 (96,9 %) парк був віднесений до середньоцінних (більшість із сумою значень у межах від 50 до 60), а один (3,1 %) парк – до низькоцінних, тоді як жоден парк не був віднесений до високоцінних. Визначивши, яких із 19 категорій оцінки (та атрибутів) бракує, можна планувати та впроваджувати вдосконалення для збільшення екосистемних послуг, що надаються окремими парками. Ця методика може бути використана для оцінки екосистемних послуг, які надають штучно-створені парки, в Україні та світі. Така оцінка допомогла б зберегти існуючі парки, врятувавши їх від знищення, а їх територію – від забудови, таким чином запобігаючи їх перехід в інші види землекористування. Це також дозволить підвищити цінність цих унікальних багатоцільових ландшафтних особливостей у майбутньому шляхом урізноманитнення та розширення їх культурних і соціальних екосистемних послуг

Ключові слова: парки-пам'ятки садово-паркового мистецтва, охоронні території, екосистемні послуги, історія, трансформація