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Importance and effectiveness of cultural ecosystem services of parks in Kyiv during the war in Ukraine

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Abstract. In Ukraine, during the full-scale Russian-Ukrainian war, rapid economic and social changes took place, the war caused a massive reduction and destruction of cities, and the environmental situation worsened due to which the cultural services of the ecosystem decreased. Such changes provide an opportunity for the remaining cities to improve the quality of the environment through urban green spaces and solve the problem of meeting the aspirations of the community. The purpose of the study was to identify the importance and effectiveness of eight cultural ecosystem services during the war for park visitors in Kyiv. The following methods were used in the study: field survey (route), analytical, systematisation, sociological, socio-psychological, statistical. The Likert psychometric scale was used to survey visitors of two parks in Kyiv to identify the importance and effectiveness of eight cultural ecosystem services provided by parks. The data were analysed using descriptive statistics. It was established that during the war, the visitors of the parks “Yunist” and “Sovky” noted the importance and effectiveness of such cultural ecosystem services as recreation, aesthetics, and nature awareness. It is determined that young people aged 16-30 and 51-60 are most in need of such services, and social relations in both Yunist and Sovky parks for all age categories are located in the reserve zone of service supply. The proven that effectiveness and

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importance of such services as cultural heritage and spiritual enrichment are the lowest for all age categories. Almost half of the visitors in the two parks provided suggestions for improving the quality of the environment, the greatest need was to increase the number of plantings and improve the improvement of territory, in the park “Sovky” respondents stated the need cultural heritage. It was established that the quality of plantings and the location of parks affected the overall satisfaction of visitors. Respondents’ satisfaction with the cultural ecosystem services of Sovky park is higher than that of Yunist park. The results of the studies can be used to improve the quality of cultural ecosystem services in the Sovky and Yunist parks

Keywords: green spaces; satisfaction; recreation; aesthetics; social relations; spirituality

Introduction

Internationally, the most common markets for ecosystem services are carbon, swamp, water quality, water supply (quantity), and biodiversity markets (Soloviy, 2018). R. Pace *et al.* (2018) established that trees at the Englischer Garten in Munich in 2012 potentially removed 4 tonnes of pollutants, especially ozone and nitrogen dioxide, and 200 tonnes of carbon dioxide. According to N. Chenmin & Q. Zhengming (2020), a valuable focus is also the Xiamen Park Expo Garden (Jimei Zhongzhou island, Xinglin bay), the plantings of which contribute to the removal of carbon dioxide, oxygen release, air purification, and water resources conservation. Z. Li *et al.* (2022) argued that differentiating the impact of urbanisation levels on ecosystem service supply and demand budgets in terms of core functional-oriented areas is of great importance for formulating sustainable development strategies at the regional level. Forests and the human connection to nature have a big impact on human health. M. Hochmalová *et al.* (2021) established that through exercise and recreation in the forest, people get many benefits from forest ecosystem services that have a positive impact on their physical and mental health. Therewith, they note that the Czech Republic lacks legislative recommendations on cultural ecosystem services at the national level

(M. Hochmalová *et al.*, 2021). M. Dallimer *et al.* (2014) note that green spaces have a positive impact on the mental health of park visitors. Ecosystem services are all useful resources and benefits that a person can get from nature (O. Vasyliuk & L. Ilminska, 2020). The cultural services of the ecosystem are aimed at meeting the cultural and intellectual needs of the individual, ensuring creative and spiritual development, and have a certain value.

A number of studies on ecosystem services have been conducted in Ukraine. N. Vysotska *et al.* (2021) reviewed the main benefits and challenges of ecosystem services provided by buffer forest strips. Their economic assessment was conducted for two groups of services: provision and regulation, maintenance. The content of the economic category of public welfare through the prism of ecosystem services, and approaches to their classification, assessment, and payments; the relationship between the intensity of environmental management and the vulnerability of ecosystems and their stability are examined. L.O. Shashula *et al.* (2019) conducted an economic assessment of ecosystem services for various types of land use (agricultural, forest, and swamp land) by region. It is noted that services provided by ecosystems can fall into one of four broad categories, namely, they can be providing, regulating, cultural, or

supporting. N. Havadzyn & I. Melnychuk (2020) reviewed and supplemented the classification criteria for which it is advisable to conduct an inventory of ecosystem services to further determine their economic value. O.I. Furdychko *et al.* (2019) conducted an assessment of forest ecosystem services (carbon deposition, biodiversity conservation, and climate regulation) in the test area of the Drevliansky nature reserve, using remote sensing data. The cost of ecosystem services of the regional landscape park “Znesinnia” as an object of the nature reserve area and the green zone of the urban environx

Thus, in Ukraine, studies have been conducted on the economic categorisation and evaluation of ecosystem services. Ecosystem services of green spaces in urbanised areas (providing, regulating, fragmentary cultural) were considered, however, there have been no studies on the importance and effectiveness of cultural ecosystem services, including in times of war. According to the authors, during the war, most people are stressed and need more cultural ecosystem services such as recreation, aesthetics, and social relations. D. Saadi *et al.* (2020) established that the green environment has a strong restorative effect on the psychological and physiological parameters of a person, which depends on the function, aesthetics, and quality of park plantings.

The purpose of the study is to identify what cultural ecosystem services (aesthetics, recreation, nature awareness, social relations, cultural heritage, inspiration, sense of place, spiritual or religious enrichment) park visitors need during the war and which ones are most effective.

Task: conduct a survey of visitors of different age groups of two parks in Kyiv on the importance and effectiveness of eight cultural ecosystem services (aesthetics, recreation, nature awareness, social relations, cultural heritage, inspiration, sense of place, spiritual or religious enrichment) and establish which of

them are important and effective in restoring the respondents' condition during the war.

Materials and Methods

The study was conducted in Yunist and Sovky parks on weekends. The first survey was conducted in November 2022, and the second – in December 2022. During the survey, ethical standards were observed when working with people: the study was conducted in accordance with the WMA Declaration of Helsinki – ethical principles for medical research involving human subjects (2013). The first anonymous survey determined which cultural ecosystem services visitors prefer (a total of 30 respondents were interviewed in Yunist park and Sovky park). The following anonymous survey was based on previous results, considering the importance and effectiveness of cultural ecosystem services among casual park visitors. 32 respondents were interviewed again in Yunist park and 29 – in Sovky park. Respondents of different age categories took part in the survey: 16-30 years, 31-40 years, 41-50 years, 51-64 years, and 64+ years.

The questionnaire consisted of four parts. The first part was the persons' personal information. As shown in Table 1, the ratio of male and female respondents was not the same: women predominated in Yunist park and men – in Sovky park. Among the respondents, the share of elderly people over 64 years of age at 13.8% is recorded only in the park “Sovky”. The main respondents to parks were middle-aged people and young people. 65.6% of respondents had a higher level of education. Classes of respondents were the largest in the field of state, corporate professions and technical personnel in Yunist park (46.9%) and in the service sector (34.5%) in Sovky park, and a certain number of pensioners and students. In two parks, visitors were local residents and only one migrant was surveyed in Sovky park, which to a certain extent indicates the diversity of people.

Table 1. Characteristics of respondents

Categories	Yunist park	Sovky park
	%	%
Gender		
Male	43.7	58.6
Female	56.3	41.4
Age, years		
16-30	50.0	41.4
31-40	18.7	31.0
41-50	12.5	6.9
51-64	18.8	6.9
64+	-	13.8
Education		
School	21.9	17.2
College	12.5	17.2
University	65.6	65.6
Monthly profit		
up to 10000	15.6	24.2
From 10000 to 20000	31.3	17.2
From 20000 to 30000	15.6	17.2
>30000	12.5	17.2
absent	25.0	24.2
Profession		
Service-oriented/ Factory workers	21.9	34.5
Government and corporate organisations professions and technical staff	46.9	27.6
Pensioners	3.1	17.2
Pupils/students	25.0	17.2
Unemployed	3.1	3.5
Place of residence		
A local resident of Kyiv	93.8	97.1
Displaced person		2.9
Passerby	6.2	

Source: compiled by the authors

The second part was the importance scale for cultural ecosystem services, using the five-point Likert scale to measure eight types of importance; 1 point – completely unimportant, 2 points – unimportant, 3 – satisfactory, 4 – important, and 5 points – very important. The third part was the satisfaction (efficiency) scale, which also used the Likert method. 1-5,

respectively, extremely dissatisfied, dissatisfied, neutral, satisfied, and extremely satisfied, respectively. Visitors evaluated the importance and effectiveness (satisfaction) of eight cultural ecosystem services (aesthetics, recreation, nature awareness, social relations, cultural heritage, inspiration, sense of place, spiritual or religious enrichment) by a questionnaire on

a five-point Likert scale. The fourth part is an open question about what aspects of the park should be improved.

The importance analysis method was used. Statistical analysis was performed using IBM SPSS Statistics 29.0. Likert scale – used to assign values and get points for eight types of importance and eight performance efficiency (satisfaction) using a questionnaire. The Cronbach’s alpha coefficient was used to test the reliability of the questionnaire.

Results and Discussion

Urban green spaces are the main providers of ecosystem services in cities, as the diversity of urban flora and fauna is very limited. The quality and variety of ecosystem services provided

by natural plant communities and urban green spaces vary substantially and depend on human activity (Radomska, 2022).

Sovky park was established in 1976 in Sviatoshynsky district of Kyiv on the territory of the tract “Treasure forest” on an area of 30 hectares (Fig. 1) based on natural plantings of *Pinus sylvestris* L. In 2018-2019, the park was reconstructed. Alleys have been arranged and dendroflora of *Quercus robur* L., *Prunus padus* L., *Picea abies* Karst., *Prunus serrulata* Lindl., *Prunus cerasifera* subsp. *pissartii* (Carrišre) Dost 1 has been replenished. The infrastructure was updated. There are 3 playgrounds and a 400 m² workout area. A 2 km long eco-route and a chess pavilion have been created (Recreation park “Sovky”, 2022).

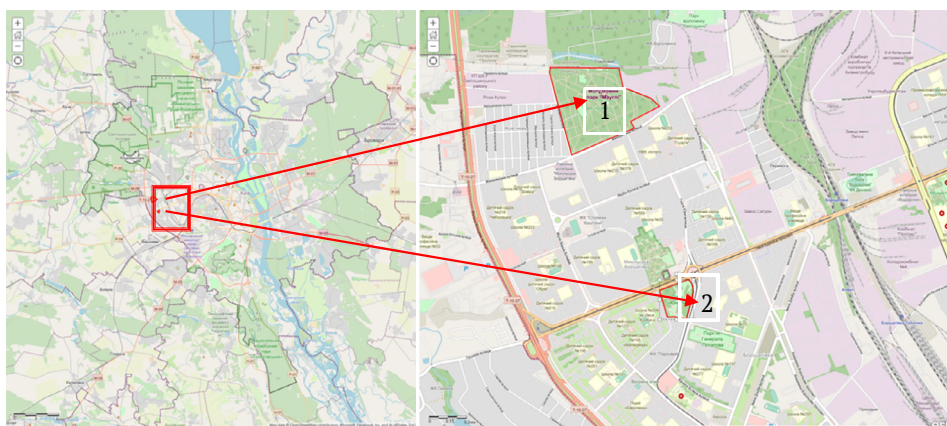


Figure 1. Recreation park “Sovky” (1), park-monument of landscape art “Yunist” (2), Kyiv
Source: OpenStreetMap (n.d.)

Yunist park (a park-monument of landscape art of local importance), created in 1979 by school students, is located on the territory of the Sviatoshynsky district of Kyiv (Fig. 1). In 2015, the park was reconstructed: alleys, kiosks were arranged, two mazes and flower beds were created. A church has been built on the territory of the park. The area of the park is 5.94 ha (park Yunist, 2022). Ecosystem services are linked to

human activities, forming a kind of edge where people must have these services to survive and simultaneously be able to influence their provision (Radomska, 2022). The study of the parks began by assessing cultural ecosystem services of eight categories (aesthetics, recreation, nature awareness, social relations, cultural heritage, inspiration, sense of place, spiritual or religious enrichment) to test the relevant

categories of cultural ecosystem services for urban parks (since the values belonging to cultural ecosystem services vary according to individual preferences). After conducting the first survey of 60 respondents in two parks, it was established

that visitors in Yunist and Sovky parks prefer ecosystem services such as recreation and social relations and get inspiration from communication with nature, while in Sovky park there are twice as many such respondents (Fig. 2).

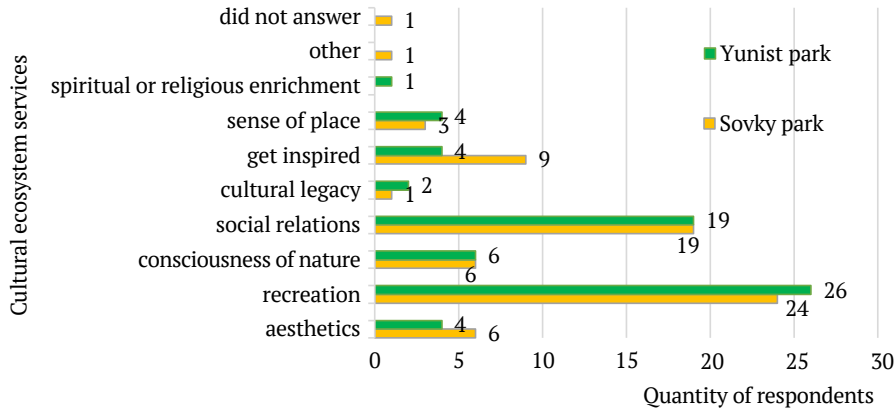


Figure 2. Results of the survey of respondents of the parks “Sovky” and “Yunist”, on the provision of benefits to types of cultural ecosystem services

Source: compiled by the authors

Tables 2 and 3 show respondents’ assessments of the importance and effectiveness of cultural ecosystem services in Yunist and Sovky parks. The results of the analysis confirmed differences in the importance and effectiveness of different cultural categories of ecosystem

services. During the war, in Kyiv, the average value of importance (3.69) in Yunist park and (3.92) in Sovky park of cultural ecosystem services, which was perceived by all respondents, was lower than the level of their effectiveness (satisfaction) (4.08 and 4.38, respectively) (Table 2, 3).

Table 2. Cultural ecosystem services of the park-monuments of landscape art “Yunist”

Cultural ecosystem services		Importance			Satisfaction		
		Average	Mean square	Cronbach’s alpha	Average	Mean square	Cronbach’s alpha
A	Aesthetics	4.13	0.871	0.977	4.53	0.803	0.976
B	Recreation	4.34	0.653	0.980	4.47	0.842	0.973
C	Nature awareness	4.16	0.987	0.977	4.28	1.085	0.972
D	Social relations	3.36	1.157	0.974	4.28	1.170	0.971
E	Cultural heritage	3.36	1.100	0.972	4.59	1.292	0.976
F	Inspiration	3.36	1.100	0.972	4.22	0.975	0.970

Table 2, Continued

Cultural ecosystem services		Importance			Satisfaction		
		Average	Mean square	Cronbach's alpha	Average	Mean square	Cronbach's alpha
G	Sense of place	3.56	1.143	0.974	4.22	0.975	0.970
H	Spiritual or religious enrichment	2.47	1.218	0.978	3.06	1.268	0.979
Total		3.69	1.029	0.976	4.08	1.051	0.973

Source: compiled by the authors

Table 3. Cultural ecosystem services of the Sovky recreation park

Cultural ecosystem services		Importance			Satisfaction		
		Average	Mean square	Cronbach's alpha	Average	Mean square	Cronbach's alpha
A	Aesthetics	4.34	0.614	0.971	4.76	0.511	0.941
B	Recreation	4.38	0.622	0.971	4.83	0.468	0.944
C	Nature awareness	4.38	1.015	0.969	4.79	0.559	0.942
D	Social relations	3.83	1.071	0.963	4.45	0.985	0.929
E	Cultural heritage	3.59	1.181	0.965	3.79	1.177	0.939
F	Inspiration	4.00	1.102	0.963	4.52	0.738	0.932
G	Sense of place	3.93	1.132	0.963	4.45	0.870	0.935
H	Spiritual or religious enrichment	2.90	1.345	0.969	3.48	1.243	0.942
Total		3.92	1.010	0.967	4.38	0.819	0.938

Source: compiled by the authors

S. Gai *et al.* (2022) obtained opposite results when examining peacetime parks in China, meaning respondents' satisfaction with cultural ecosystem services was generally lower than their importance. Figures 3 and 4 show the distribution of importance and effectiveness (satisfaction) analysis by the score for all respondents in eight categories of cultural ecosystem services. In Yunist park, there are three categories of "supply-demand compliance zone" in the first quadrant: aesthetics (A),

recreation (B), nature awareness (C), and the importance and effectiveness of all these categories are relatively high (Fig. 3). This shows that these three categories are the main ones that have a substantial impact on overall user satisfaction and that respondents are generally satisfied with these indicators. Among them, aesthetics (A) has a higher complex score than others. The aesthetics of the park during the war allows for distracting at least temporarily from the problems that arise.

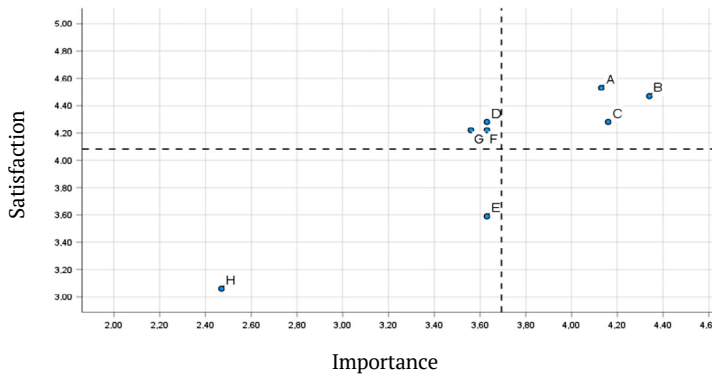


Figure 3. Scatter plot analysis of the importance and effectiveness of eight types of cultural ecosystem services for Yunist park respondents

Note: A – Aesthetics, B – Recreation, C – Consciousness of nature, D – Social Relations, E – Cultural legacy, F – Inspiration, G – Sense of place, H – Spiritual or religious enrichment
Source: compiled by the authors

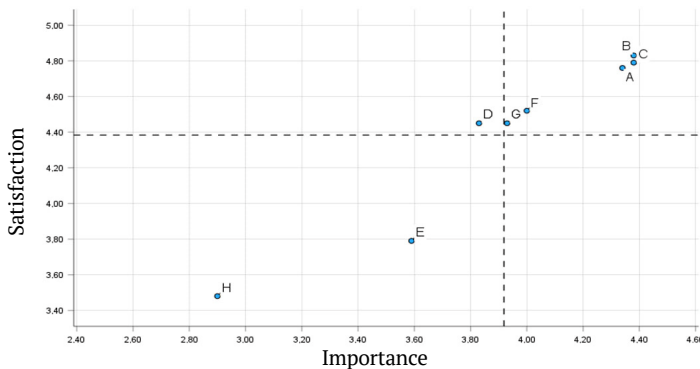


Figure 4. Scatter plot analysis of the importance and effectiveness of eight types of cultural ecosystem services for Sovky park respondents

Note: A – Aesthetics, B – Recreation, C – Consciousness of nature, D – Social Relations, E – Cultural legacy, F – Inspiration, G – Sense of place, H – Spiritual or religious enrichment
Source: compiled by the authors

The second quadrant also focuses on three categories – social relationships (D), inspiration (F), and sense of place (G) – the supply reservation zone. Their performance indicators are close to those of importance. Respondents rated the overall importance of the three categories as low, and their relative performance (satisfaction) was high. This result is partially similar to that of S. Gai *et al.* (2022), where urban parks only had inspiration in the second quadrant.

This difference may be related to the purpose of most visitors and the environment of Yunist park. Many respondents wanted to relax in the park, and not continue to think and draw inspiration. The park is located between two roads with quite heavy traffic, there is a certain level of noise. In the park, all the plantings are visible and most of the territory is open and there are not enough quiet places where it is possible to stop to get inspired. Therefore, to a certain

extent, the environment and landscape caused respondents to have a relatively low need for inspiration. People pay a little less attention to social activities in the park and the sense of place. Due to the impact of the epidemic in 2020 and the war in 2022 in Ukraine, respondents began to communicate more on social networks, and their demand for personal social interaction decreased. Due to its relatively small scale and open landscape elements, Yunist park is difficult to transform into a place with a strong sense of place. Cultural heritage (E) and spiritual or religious enrichment (H) are located in the third quadrant – a zone of weak supply and demand. Yunist park was created in the 80s of the 20th century, on its territory there is a summer cinema, which has a satisfactory condition, other objects were created after Reconstruction at the beginning of the 21st century (Recreation park “Sovky”, 2022). Although a church was built on the territory of the park, this also did not contribute to the importance and effectiveness of the above-mentioned cultural services of the ecosystem (Fig. 3).

In the park “Sovky” there is a slightly different trend, in the first quadrant there are five categories – “zone of conformity of supply and demand”: aesthetics (A), recreation (B), nature

awareness (C), the importance and effectiveness of these categories are relatively high and inspiration (F), sense of place (G) the importance and effectiveness of which are somewhat lower (Fig. 4). Sovky park is created based on natural plantings, and its area is more than 5 times the area of Yunist park, respectively, the majority of respondents visit the park for inspiration, which is facilitated by clean pine stands, and remote quiet places. Social relations (D), like in Yunist park, are located in the second quadrant and are a reserve area... for the supply of services. After the war ends, their importance and effectiveness may increase. Cultural heritage (E) and spiritual or religious enrichment (H) are located in the third quadrant – a zone of weak supply and demand, similar to Yunist park. This is due to the fact that, assumably, during the war, people still need more rest, sensations, connection with nature, and aesthetics, which to a certain extent allow for restoring mental health. Respondents were divided into five groups by age, and differences in perception among these age groups of performance (satisfaction) in eight categories were compared. Among the respondents, young people and older people both in Yunist park and Sovky park had different feelings (Fig. 5, 6).

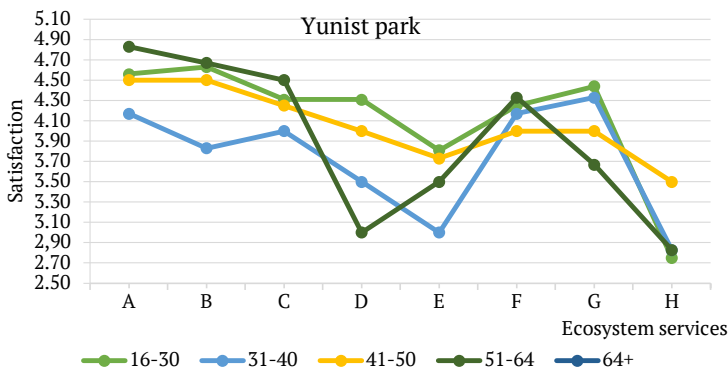


Figure 5. Satisfaction with cultural ecosystem services by age group in Yunist park

Note: A – Aesthetics, B – Recreation, C – Consciousness of nature, D – Social Relations, E – Cultural legacy, F – Inspiration, G – Sense of place, H – Spiritual or religious enrichment

Source: compiled by the author

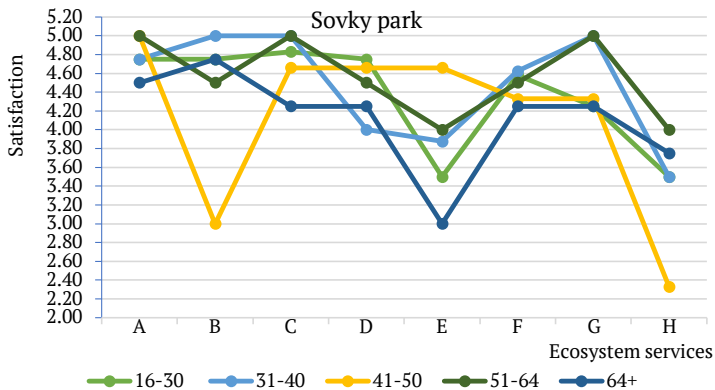


Figure 6. Satisfaction with cultural ecosystem services by age group in the park "Sovky"

Note: A – Aesthetics, B – Recreation, C – Consciousness of nature, D – Social Relations, E – Cultural legacy, F – Inspiration, G – Sense of place, H – Spiritual or religious enrichment

Source: compiled by the author

Respondents aged 16-30 and 41-50 in Yunist park and young people aged 16-30 and 31-40 in Sovky park had the highest degree of satisfaction – this indicates that they are more grateful for the provision of cultural ecosystem services from the park. Visitors aged 31-40 are less satisfied in Yunist park, while people aged 64+ are less satisfied in Sovky park. This result may be related to the park's landscape style, which tends to be natural rather than artificial. Most of the older people who live in the scoops park area come from rural areas, they are used to the natural environment and may be relatively less satisfied with this park. S. Gai *et al.* (2022), examining the parks in China, noted that the rates for people over 64 were much higher than in the 55-64 age group. They attribute these results to the fact that most older people over the age of 64 have retired from nearby colleges and universities, with a relatively high level of education, and are better able to perceive this style of park. In addition, S. Gai *et al.* (2022), having examined peoples' perception of the importance and effectiveness of nine types of cultural services in the urban park ecosystem Udaokou in Beijing, China, established that the

importance score was substantially higher than the performance score.

M.M.Radomska (2022) noted that the importance of regulatory ecosystem services in parks created based on natural areas is more substantial than cultural ecosystem services. Therewith, in man-made urban parks of culture and recreation, ecosystem regulatory services have a somewhat limited potential, and cultural ecosystem services are becoming more important. A study of the Sovky and Yunist parks showed that the Sovky park, which is formed based on natural plantings, provides better cultural services, which indicates the satisfaction of visitors in three age groups of 16-30 years, 31-40, and 51-64 years (Fig. 6). Therewith, the results obtained in this study support the study by M.M. Radomska (2022), that the greatest ability to provide ecosystem services is characteristic of larger parks and parks with holistic green spaces. H. Ko & Y. Son (2018), after examining respondents' perceptions of cultural ecosystem services in the urban environment of Gwacheon, Republic of Korea, noted that green spaces are particularly valuable to urban residents and provide them with a variety

of cultural ecosystem services. V. Jennings *et al.* (2016) demonstrated that urban green areas also provide a range of ecosystem services that support the physical, psychological, and social health of residents. However, in many cases, these benefits are unevenly distributed among diverse urban populations. M. Dallimer *et al.* (2014) note that there is a positive association between how often people use green spaces and the well-being they rate. The researchers noted that availability (in the form of the time it takes to reach a green zone) is an important factor in determining how often users visit them. However, they did not find a clear link between the frequency of visits and the ecological state of green spaces (measured by the number of bird species and plantings). According to this study, in the park “Sovky”, where pine stands grow, visitors of all age categories prefer aesthetics more compared to the park “Yunist” (Fig. 5, 6), although the parks are 2 km apart, residents prefer to visit Sovky park. This is confirmed by the data of study C.Y. Jim & V.Y. Chen (2006), arguing that the quantity and quality of ecosystem services depend on the composition of plantings, size, location, purpose of the park, etc. The authors after examining 25 ecosystem services, established that the citizens of the city of Guangzhou in southern China have a positive attitude to the ecosystem services of urban green spaces. They highly rate the importance of recreation as one of the categories of ecosystem services, attach less importance to ecosystem benefits associated with biotic-abiotic relationships, and evaluate the landscape as an aesthetic resource for recreation.

After investigating 18 ecosystem services and five challenges of local parks in Addis Ababa (Ethiopia), N.V. Vernihorova (2020) established that respondents prefer environmental, socio-cultural, and economic ecosystem services, but socio-cultural and environmental

benefits are considered more important than economic ones. Socio-demographic characteristics of age, gender, and education level did not substantially affect the perception and attitude of parks to ecosystem services, in contrast to the parks examined, where the age of respondents affected the perception of services. Thus, in Yunist park, visitors aged 16-30 and 41-50 and respondents aged 16-30 and 31-40 in Sovky park were more satisfied with such cultural ecosystem services as aesthetics, recreation, and nature awareness. This study agrees with the opinion of N.V. Vernihorova (2020) that such studies point to the importance of conducting them to assess the benefits that attract people to use urban parks and the problems that hinder the use of parks.

K. Yeshitela (2020) believes that planning and management of urban parks should consider people’s perceptions and attitudes about the benefits, challenges, and quality of parks. N. Kabisch *et al.* (2015) emphasise that green spaces have numerous environmental and social benefits for city residents, so it is important to preserve and develop them. Gardens and parks are a place of recreation, educational and scientific research and affect the value of real estate. Thus, ecologically sustainable natural plantings with ecosystem services can bring numerous benefits to various stakeholders.

Conclusions

The parks of Kyiv are a valuable centre for providing cultural ecosystem services. During the war, most people are stressed and need more communication with nature for physical and emotional recovery. The preference for certain types of cultural ecosystem services was influenced by such socio-demographic characteristics as age. In the Yunist and Sovky parks, a large proportion, 50.0% and 41.4%, respectively, were visitors aged 16 to 30 years. Respondents of the Yunist and Sovky parks noted

the relatively high importance and efficiency of cultural ecosystem services, such as recreation, aesthetics, and nature awareness. Young people between the ages of 16 and 30 and people between the ages of 51 and 60 are most in need of such services. 50% of visitors to Yunist park and 43% of visitors to Sovky park provided suggestions for improving the park environment and the quality of cultural services. Respondents of Sovky and Yunist parks need more cultural heritage and better territory improvement: installation of more benches, landfills, lanterns (Yunist park), premises for sending natural human needs, creating an additional entrance to the park and recreation areas (Sovky park), entertainment areas (Yunist park), increasing tree stands and flower beds to improve aesthetics. It was established that the size of the park, the origin of plantings and their number affect the satisfaction of city res-

idents and the quality of cultural services in the park ecosystem.

Further research can be conducted to identify the importance and effectiveness of cultural ecosystem services in both urban and rural parks in other regions of Ukraine, including to identify the respondents' wishes to further consider the needs of different users when creating or reconstructing urban and rural parks, improve the quality of cultural ecosystem services. Research can also be aimed at investigating the effectiveness of other types of ecosystem services provided by park plantings, and the impact of plantings on the emotional state of people.

Conflict of Interest

None.

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None.

References

- [1] Chenmin, N., & Zhengming, Q. (2020). Value assessment of ecosystem service functions of xiamen park expo garden. *International Journal of Environmental Monitoring and Analysis*, 8(1), 1-10. doi: 10.11648/j.ijema.20200801.11.
- [2] Dallimer, M., Davies, Z.G., Irvine, K.N., Maltby, L., Warren, P.H., Gaston, K.J., & Armsworth, P.R. (2014). What personal and environmental factors determine frequency of urban greenspace use? *International Journal of Environmental Research and Public Health*, 11(8), 7977-7992. doi: 10.3390/ijerph110807977.
- [3] Ecosystem services of the regional landscape park "Znesinnia". (2019). Retrieved from <http://epl.org.ua/wp-content/uploads/2019/10/Ekosystemni-poslugy-RLP-Znesinnya.pdf>.
- [4] Furdychko, O.I., Drebot, O.I., Kuchma, T.L., & Iliencko, T.V. (2019). Assessment of forest ecosystem services based on remote sensing data. *Agroecological Journal*, 4, 6-16. doi: 10.33730/2077-4893.4.2019.189436.
- [5] Gai, S., Fu, J., Rong, X., & Dai, L. (2022). Users' views on cultural ecosystem services of urban parks: An importance-performance analysis of a case in Beijing, China. *Anthropocene*, 37, article number 100323. doi: 10.1016/j.ancene.2022.100323.
- [6] Havadzyn, N., & Melnychuk, I. (2020). Improvement of tools for implementation of ecosystem service functions. *Economics of Nature Use and Environmental Protection*, 41, 251-219. doi: 10.32843/infrastruct41-35.
- [7] Hochmalová, M., Červená, T., Purwestri, R., Hájek, M., & Sloup, R. (2021). Anchor of cultural forest services in the national forest policies of Central European countries. *Central European Forestry Journal*, 67(4), 212-229. doi: 0.2478/forj-2021-0013.

- [8] Jennings, V., Larson, L., & Yun, J. (2016). Advancing sustainability through urban green space: cultural ecosystem services, equity, and social determinants of health. *International Journal of Environmental Research and Public Health*, 13(2), article number 196. doi: [10.3390/ijerph13020196](https://doi.org/10.3390/ijerph13020196).
- [9] Jim, C.Y., & Chen, W.Y. (2006). Perception and attitude of residents toward urban green spaces in Guangzhou (China). *Environmental Management*, 38, 338-349. doi: [10.1007/s00267-005-0166-6](https://doi.org/10.1007/s00267-005-0166-6).
- [10] Kabisch, N., Qureshi, S., & Haase, D. (2015). Human-environment interactions in urban green spaces – A systematic review of contemporary issues and prospects for future research, *Environmental Impact Assessment Review*, 50, 25-34. doi: [10.1016/j.eiar.2014.08.007](https://doi.org/10.1016/j.eiar.2014.08.007).
- [11] Ko, H., & Son, Y. (2018). Perceptions of cultural ecosystem services in urban green spaces: A case study in Gwacheon, Republic of Korea. *Ecological Indicators*, 91, 299-306. doi: [10.1016/j.ecolind.2018.04.006](https://doi.org/10.1016/j.ecolind.2018.04.006).
- [12] Li, Z., Hu, B., & Ren, Y. (2022). the supply–demand budgets of ecosystem service response to urbanization: Insights from urban-rural gradient and major function-oriented areas. *Remote Sensing*, 14(22), article number 5670. doi: [10.3390/rs14225670](https://doi.org/10.3390/rs14225670).
- [13] OpenStreetMap. (n.d.). Retrieved from <https://www.arcgis.com/home/webmap/viewer.html>.
- [14] Pace, R., Biber, P., Pretzsch, H., & Grote, R. (2018). Modeling ecosystem services for park trees: Sensitivity of i-Tree eco simulations to light exposure and tree species classification. *Forests*, 9(2), article number 89. doi: [10.3390/f9020089](https://doi.org/10.3390/f9020089).
- [15] Park “Yunost” (Svyatoshinsky district). (2022). Retrieved from <https://mesta.com.ua/park/park-junost-v-kieve>.
- [16] Pryshchepa, A.M. (2019). Ecosystem services of urbosystems green plantations. *Scientific Report of NULES of Ukraine*, 1(77), 1-12. doi: [10.31548/dopovidi2019.01.004](https://doi.org/10.31548/dopovidi2019.01.004).
- [17] Radomska, M.M. (2022). Biodiversity based solutions for the support of ecosystem services, provided by urban green infrastructure. *Scientific Bulletin of UNFU*, 32(5), 50-58. doi: [10.36930/40320507](https://doi.org/10.36930/40320507).
- [18] Recreation Park “Sovki”. (2022). Retrieved from <https://kyivmaps.com/ua/places/park-vidpochynku-sovki>.
- [19] Saadi, D., Schnell, I., & Tirosh, E. (2021). Ethnic differences in environmental restoration: Arab and Jewish women in Israel. *International Journal of Environmental Research and Public Health*, 18(23), article number 12628. doi: [10.3390/ijerph182312628](https://doi.org/10.3390/ijerph182312628).
- [20] Shashula, L.O., Sakal, O.V., & Tretiak, N.A. (2019). Payment for ecosystem services in Ukraine: Priority direction of revitalization. *Mechanism of Economic Regulation*, 2, 6-16. doi: [10.21272/mer.2019.84.01](https://doi.org/10.21272/mer.2019.84.01).
- [21] Soloviy, I. (2018). Concept of payments for ecosystem services: Global experiences and prospects of its implementation in forest sector. *Proceedings of the Forestry Academy of Sciences of Ukraine*, 14, 252-258. doi: [10.15421/411634](https://doi.org/10.15421/411634).
- [22] Vasyliuk, O., & Ilminska, L. (2020). *Ecosystem services*. Rzhyschiv: Fund of Protection Biodiversity of the Ukraine.
- [23] Vernihorova, N.V. (2022). Park ecosystem services and their evaluation. *Economic Innovations*, 24(2(83)), 53-65. doi: [10.31520/ei.2022.24.2\(83\).53-65](https://doi.org/10.31520/ei.2022.24.2(83).53-65).

- [24] Vysotska, N., Kalashnikov, A., Sydorenko, S., Sydorenko, S., & Yurchenko, V. (2021). [Ecosystem services of shelterbelts as the basis of compensatory mechanisms of their creation and maintenance](#). *Proceedings of the Forestry Academy of Sciences of Ukraine*, 22, 199-208.
- [25] WMA Declaration of Helsinki – ethical principles for medical research involving human subjects (2013). Retrieved from <https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/>.
- [26] Yeshitela, K. (2020). Attitude and perception of residents towards the benefits, challenges and quality of neighborhood parks in a Sub-Saharan Africa City. *Land*, 9(11), article number 450. doi: 10.3390/Land9110450.

Важливість та ефективність культурних екосистемних послуг парків міста Києва під час війни в Україні

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Анотація. В Україні під час повномасштабної російсько-української війни відбулись швидкі економічні та соціальні зміни, війна спричинила масове зменшення та знищення міст, погіршилась екологічна ситуація за рахунок чого зменшились культурні послуги екосистеми. Такі зміни надають можливість містам, що залишились, покращити якість навколишнього середовища за допомогою міських зелених насаджень і вирішити проблему задоволення прагнень громади. Метою дослідження було виявлення важливості та ефективності восьми культурних екосистемних послуг під час війни для відвідувачів парків м. Києва. В дослідженні було використано наступні наукові методи: натурні обстеження (маршрутний), аналітичний, систематизації, соціологічний, соціально-психологічний, статистичний. Використано психометричну шкалу Лайкерта для опитування відвідувачів двох парків м. Києва, щоб виявити важливість і ефективність восьми культурних екосистемних послуг, що надають парки. Дані було проаналізовано за допомогою описової статистики. Було встановлено, що під час війни відвідувачі парків «Юність» та «Совки» відмітили важливість і ефективність, таких культурних екосистемних послуг, як відпочинок, естетичність та свідомість природи. Виявлено, що найбільше потребують таких послуг молоді люди 16-30 років та люди віком 51-60 років, соціальні відносини як у парку «Юність» так і парку «Совки» для всіх вікових категорій знаходяться у резервній зоні постачання послуг. Підтверджена

ефективність та важливість таких послуг як культурна спадщина та духовне збагачення найнижча для всіх вікових категорій. Майже половина відвідувачів у двох парках надала пропозиції щодо покращення якості середовища, найбільша потреба була у збільшенні кількості насаджень та покращенні благоустрою території, у парку «Совки» респонденти потребують культурної спадщини. З'ясовано, що якість насаджень та розташування парків вплинула на загальну задоволеність відвідувачів. Задоволеність респондентів культурними екосистемними послугами парку «Совки» вища ніж парку «Юність». Результати досліджень можуть бути використані для підвищення якості культурних послуг екосистеми в парках «Совки» та «Юність»

Ключові слова: зелені насадження; задоволеність; відпочинок; естетичність; соціальні відносини; духовність