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ORIGINAL PAPER

Determination of recreation potential in three urban forests

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ABSTRACT

This paper presents the results of an assessment of the recreational potential of urban forests in three Eastern European cities carried out by a field survey method. The main criteria for assessing recreational potential were their suitability for recreational use by local inhabitants, the viability of ecological characteristics and the level of management. Fifteen social and ecological characteristics of urban forests were selected as indicators, which were scored and integrated to estimate the recreational potential of the forest. Field data were processed and assessed using ArcGIS software. It was found that large parts of these forests have medium to high recreational potential depending upon their area, age, density of trees and management status. This assessment method proved to be useful for rapid and objective assessment of recreational potential of urban forests and parks because of its simplicity and comprehensiveness and its suitability for use in widely diverse geographical locations. The results of this assessment demonstrate that the method can be used by urban authorities to assess the current ecological status of their urban forests, to determine forest recreational potential and to identify measures needed to improve these forests to meet the ever-increasing demand for recreational opportunities by inhabitants of cities.

KEY WORDS

Park, Indicator, ArcGIS, Green infrastructure, Road network

Introduction

Cities evolve by intermittent development in relation to different stimuli, producing myriad functional urban spaces (Wang *et al.*, 2012). Urban green infrastructure is an important functional part of cities that plays an important role in urban development. The urban forest is an integral part of urban green infrastructure as it offers a wide range of benefits, including many ecosystem services that improve the quality of the anthropological landscape (Lafortezza *et al.*, 2013). Urban greenery offers various benefits and services, including flood risk mitigation, microclimate regulation, carbon sequestration, improved health, psychological wellbeing, and leisure and recreation.

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The importance of the urban forest is increasing with ongoing global climate change (Bellard *et al.*, 2012; Lane, 2018; Wang *et al.*, 2018; Mngumi, 2020) because high temperatures are exacerbated by the urban heat island effect (Rajagopalan *et al.*, 2008; Yang *et al.*, 2016; Yao *et al.*, 2019). Urban forests not only have a positive impact on the local climate (Wang *et al.*, 2018; Moss *et al.*, 2019) but they also improve air quality in cities (Fantozzi *et al.*, 2015; Bottalico *et al.*, 2016; Jayasooriya *et al.*, 2017; Zhao *et al.*, 2020).

Recently, the pandemic caused by COVID 19 has restricted travel in many countries (Zhang *et al.*, 2020), although walking by individuals in the immediate vicinity of their residence has often still been permissible. Under this circumstance, urban forests provide an avenue to access nature for many city residents, their children and family pets. As documented in many studies (e.g., Jackson *et al.*, 2013; Lafortezza *et al.*, 2013; Dzhambov *et al.*, 2014; Jennings *et al.*, 2017; Nowak *et al.*, 2018; Siljeg *et al.*, 2018), urban green spaces, such as urban forests help maintain both the physical and psychological well-being of city residents.

Monitoring and assessment of urban forests are important and useful tools to ensure the quality and suitable management of urban forests and green spaces are being maintained. In this regard, the accurate estimation of urban forest recreational areas is an essential objective in planning and maintaining urban greenery (Lafortezza *et al.*, 2013). The assessment of sustainable recreational use is more likely to be accurately determined when both ecological parameters of the green space as well as human needs or expectations for recreational forest area use are considered jointly in the assessment (Ishii *et al.*, 2010; Robertson and Mason, 2016; Zhao *et al.*, 2020). For this reason, it is important to take into account not only ecological values of urban forests, but also human-related values, such as the presence of physical amenities (benches, toilets, summerhouses), accessibility due to road network density, and noise, among other factors. (Levandovska *et al.*, 2020).

The methodology for evaluating the recreational potential of urban forests provided by Levandovska *et al.* (2020) is relatively simple and rapid. The aim of the present study was to demonstrate the potential of this method for evaluating a wide range of types of urban forests. The information generated from this approach has the potential to be used for developing and managing sustainable cities and climate resilient urban ecosystems at regional and national scales.

Materials and methods

General approach. A simple, field-based method was developed to assess the recreational potential of urban forests mainly based on ecological characteristics and the availability of physical amenities for visitors (Levandovska *et al.*, 2020). This study evaluates the ability of the methodology to characterize the recreational potential of urban areas with different characteristics of urban green infrastructure, urban corridors and green spaces using a systematic approach.

Study areas. The urban forests examined (located in the cities of Bratislava, Brno, and Sochi) varied in historical origin, area, accessibility to residents, and other characteristics. As a result, urban forests in Bratislava, Brno and Sochi possess a diversity of social and ecological features:

– Horský Park in Bratislava, Slovakia (Fig. 1A) was established by Heinrich von Justi on the then western border of the city in 1868 and contains a largely natural environment resembling that which was present at the time of its establishment (Rešovská and Klučárová, 1989; Deáková, 1998). The park is now popular for relaxation and as a meeting place within the original cultural center of Bratislava. In the late 19th century this park was planted

Fig. 1.
Locations of study areas
A – Horský Park, Bratislava, Slovakia, B – Myslivna Forest, Brno, Czech Republic, C – Matcestian Forest Park, Sochi, Russian Federation

with many exotic species of trees. However, due to climatic and habitat conditions, these exotic plantings were mostly unsuccessful and, as a result, the vegetation in Horský Park is mainly composed of native trees and plants.

– Myslivna Forest in Brno, Czech Republic (Fig. 1B). Hundreds of years ago, the Kohoutovický forests were established as a protected area by sixteen forest owners. That ownership structure endured until after World War II, when these forests were nationalized. During that period, the Kohoutovický forests were used for timber extraction, causing substantial damage. In 1989 the forests were returned to their previous owners or their surviving heirs, but the forests by that time were in degraded condition. Since restoring the ownership, measures have been taken to improve the condition of the forests. Today 33 forest areas comprise the Kohoutovický forests, one of which is the Myslivna Forest that serves as a recreational suburban forest area.
– Matcestian Forest Park (Sochi, Russian Federation) was established in 1935 (Fig. 1C). At that time there was large-scale construction taking place on the sea-side of the Sochi resort (Anonymous, 1936). A plan to establish and manage parks was a condition for building a number of sanatoriums (resort and recreational facilities combined with services for temporary respite and medical care). Roads were built for cars and pedestrian traffic. The natural landscape was not affected, so the diversity of plant species in the area was preserved. At first, the Matcestian Forest Park was intended for use by visitors to the resort. However, as Sochi grew, the forest park also began being used as a recreational green space by local citizens. This forest area has never been used for commercial purposes.

Brief descriptions of each urban forest are given in Table 1.

Calculation of recreational potential. The determination of forest recreational potential was based on an assessment of its degree of suitability for recreational activities, as per Levandovska *et al.* (2020).

The assessment method uses a set of 15 indicators grouped into two domains (Table 2). The first domain, forest ecology characteristics (Forest), includes five indicators and assesses forests in view of their physical and ecological condition and stability. The Forest domain consists of natural and environmental factors that are more stable in time and space compared to the second domain, which describes recreational characteristics (Recreation). The Recreational domain comprises indicators reflecting the appeal to and comfort for visitors in the urban forest.

This version of the recreational potential method uses fewer indicators compared to the previous study by Levandovska *et al.* (2020). The factors excluded were *Water sources* in the Recreation domain and *Sanitary conditions of forests* in the Forest domain. *Water sources* was

Table 1.
General characteristics of three studied urban forests

Parameters	Horský Park, Bratislava, Slovakia	Myslivna Forest, Brno, Czech Republic	Matcestian Forest Park, Sochi, Russian Federeation
Geographic coordinates	48°09˘25.5"N 17°05˘31.2"E	49°11˘30.3"N 16°33˘14.5"E	43°33˘20.8"N 39°47˘59.2"E
Area	21.29 ha	75.57 ha	167.78 ha
Location of study forest	In the historical centre of the city	Out of the city center, near a public transport stop, in the suburban areas	Out of the city center, near by bus stop
Existence as a recreation forest	From the late 19th century	After the restitution, 1989	From 1935, reconstruction after World War II (1950)
Climate	Temperate climatic strip of continental character, with a large temperature difference between winter and summer	Temperate climatic strip of continental character, with a large temperature difference between winter and summer	Humid subtropical climate by classification of Köppen climate classification Cfb (McKnight and Hess 2000)
Altitude	185 – 260 m	220 – 366 m	25 – 127 m
Terrain	Complex relief	Average complexity relief	Average complexity relief
Type of the forest	Oak-Hornbeam Carpathian forest dominates. Fundamental species of trees in the Park were enriched with introduced species e.g.: *Aesculus hippocastanum* L., *Quercus rubra* L., *Q. palustris* Münchh. and coniferous species of the genus *Chamaecyparis* Spach, *Abies grandis* (Douglas ex D. Don) Lindl., *Picea omorika* (Pančić) Purkyně, *Metasequoia glyptostroboides* Hu et W. C. Cheng	Fundamental species of trees in the Park are natural local species such as *Fagus sylvatica* L., *Quercus petraea* (Matt.) Liebl., *Carpinus betulus* L., *Acer pseudoplatanus* L., *Tilia cordata* Mill.	Natural Oak-Hornbeam forest with autochthonous species of the colchid type. Forest includes species such as *Carpinus betulus* L., *Quercus petraea* (Matt.) Liebl., *Q. iberica* Steven ex M. Bieb., *Fagus orientalis* Lipsky, *Acer campestre* L., *Fraxinus excelsior* L., *Tilia caucasica* Rupr., *Abies nordmanniana* (Steven) Spach, *Picea orientalis* (L.) Peterm.
Agglomeration	437 726 residents. Capital of the Slovak Republic (www.datacube.statistics.sk. Cited 21 April 2020)	379 527 residents, the second industrial city in Czech Republic (www.czso.cz. Cited 21 April 2020)	411 512 residents, spa town on the Black Sea coast of the Russian Federation (www.statdata.ru. Cited 21 April 2020)
Type of activity	Short-term recreation, walking distance for seniors,sport activities, walking with dogs	Sport activities, scientific excursions, walking with dogs, mushroom, fishing, cycling. The protected area Kohoutovický Potok is used as a place of educational excursions	Short-term recreation, tourism, hiking, mushroom, fishing, cycling, picnics

Table 2.

System of indicators for assessment of recreational potential of urban forests

Indicator	Description	Parameter	Grade
		Forest domain	
Recreational digression	Changes in the forest due to recreation impact	Over 50 %	0
		Between 11–50 %	1
		Between 0–10 %	2
New regrowth	Regrowth – young generation of forest that is able in the future to form an over layer and replace the old growing stock	Lacking or scarce	0
		Average regrowth	1
		Rich regrowth	2
Lower layers of vegetation	Shrub and herbal layer as a part of the biotope	Without herb and shrub layers	0
		Only shrub layer or herb layer	1
		Both layers are presented	2
Road network density	Calculation of area occupied by roads or trails in the total area of the forest	Over 10 %	0
		Between 6–10 %	1
		Between 0–5 %	2
Soil texture	Soil texture classification	Mainly clays	0
		Mainly silt loam	1
		Mainly sand	2
		Recreation domain	
Relief	Slope and irregularity of land surface	Slope 21–30°, high irregularity	0
		Slope 11–20°, medium irregularity	1
		Slope 0–10°, low irregularity	2
Quality	A forestry term for forest quality in a certain area. Includes average height and age of trees	Class IV.–V.–Va.	0
		Class II.–III.	1
		Class I–Ia.	2
Accessibility	Distance from public transport and residential buildings	Over 3 km	0
		1–3 km	1
		Below 1 km	2
Soil moisture	Degree of soil moisture	Swamps	0
		Wet forests	1
		Fresh and dry forests	2
Diversity of tree species	Species variability of trees in the forest	1 species	0
		2 species	1
		More than 2 species	2
Vertical structure	Vertical differentiation of the trees depending on the height	1-story forest	0
		2-story forest with new staddle-shrubs	1
		multistory forest with the staddle-shrubs	2
Stand density	Density of trees	Dense forest (0.8–1.0) or scarce (0.1–0.2)	0
		Average density (0.3–0.7) and even individual distribution	1
		Average density (0.3–0.7) and cluster tree distribution	2
Waste	Both man-made (industrial and domestic waste), and natural, biological waste (tree stems, branches	Large amount, 2 or more cases in each area	0
		Medium amount, 1 case in each area	1
		Almost lacking	2
Noise	Man-caused noises from roads, industrial facilities, etc.	Significant loud	0
		Low	1
		Lacking	2
Development level	Benches, summerhouses, dustbins, washrooms, playgrounds and sports grounds	Zero	0
		1 object in the study area	1
		2 or more objects in the study area	2

excluded as an indicator because they often do not exist in the urban forest. The indicator *Sanitary conditions of forests* was not included because it duplicates in part another indicator, *Recreational digression*. A third indicator, *Objects of interest*, was combined with the indicator *Development level* as they represent similar aspects of park amenities to visitors (Table 2). Each site was evaluated using all 15 of the remaining indicators. The data obtained was manually entered into an Excel table in the field.

Recreational potential of each park was expressed using Class Recreational Volume (CRV). CRV defines forest biotope suitability for recreational use. A separate calculation of indicators was conducted for each domain for particular areas within each park. The values of the relevant coefficient (C) are calculated according to the formula:

$$C = SP / SM$$

where SP is the sum of points of the forest assessed for all indicators of both domains and SM is the maximum possible sum of points for all indicators.

CRV values are expressed in classes (I, II or III) of forest biotope suitability for recreational use. If the value of both domains is =0.67, the forest belongs to CRV class I and is highly suitable for recreational use; if the value of one of the domains is from 0.34 to 0.66 and that of the other factor is >0.33, the forest belongs to CRV class II, which enables limited recreational use of the forest; and if the value of either of the domains is =0.33, the forest belongs to CRV III, and its recreational use is not recommended without implementing measures to improve its quality by addressing indicators with low values. Additional details of the method are described in Levandovska *et al*. (2020).

Tabular data from Excel were transferred to Arcmap to visually represent and analyse the condition of each park. Maps presented in this paper were created using ArcGIS® (Esri 2011).

Data collection. Fieldwork and acquisition of analytical data in Horský Park were carried out in the autumn of 2017. Horský Park was divided into 63 sections, each section delimited by existing trails.

Myslivna Forest was surveyed in the spring of 2018. Baseline data about the vegetation, soils, and recreational facilities in the park were obtained from the Department of Water, Forestry, and Agriculture, Municipality of Brno (state institution of the Czech Republic) for analysis. In total, 61 sampling sites were identified based on variations in forest inventory.

Matcestian Forest Park in Sochi has the largest area among the three parks. In it, 74 sampling sites were identified based on forest inventory in 2013. Some data provided by the administration of Sochi National Park (state institution of the Russian Federation) was also used in the study.

Results

Indicators. Results for Forest indicators and Recreation indicators for the three urban forest areas are presented in Figures 2 and 3, respectively.

Class Recreational Volume. Horský Park, Bratislava, Slovakia. Most sites within the park are classified as having average recreational potential (Fig. 4A). Fifteen of the sites, covering 4.04 ha and representing 19% of park, have CRV III. These sites can be suitable for recreation after implementing measures to improve the quality of low scoring indicators. The remaining 48 sites covering 17.25 ha (81% of the park) fall in CRV II, indicating limited recreational potential. No sites within Horský Park received the highest rating – CRV I.

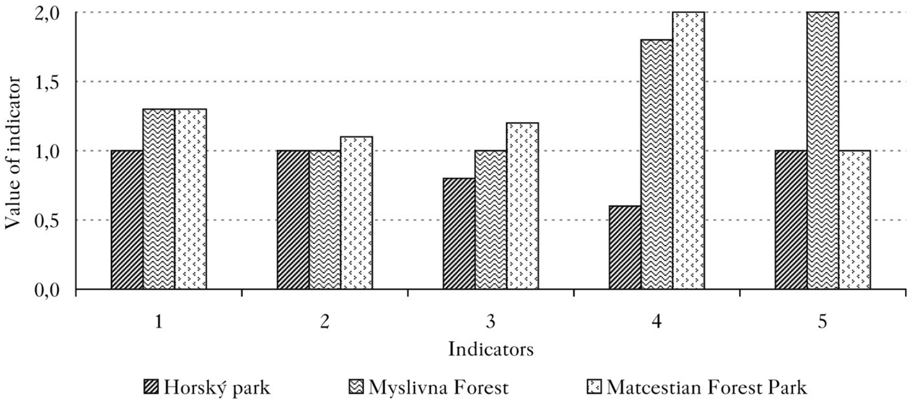

Fig. 2.

Forest indicators for three contrasting urban forests

Indicators: 1 – Recreational digression, 2 – New regrowth, 3 – Lower layers of vegetation, 4 – Road network density, 5 – Soil texture

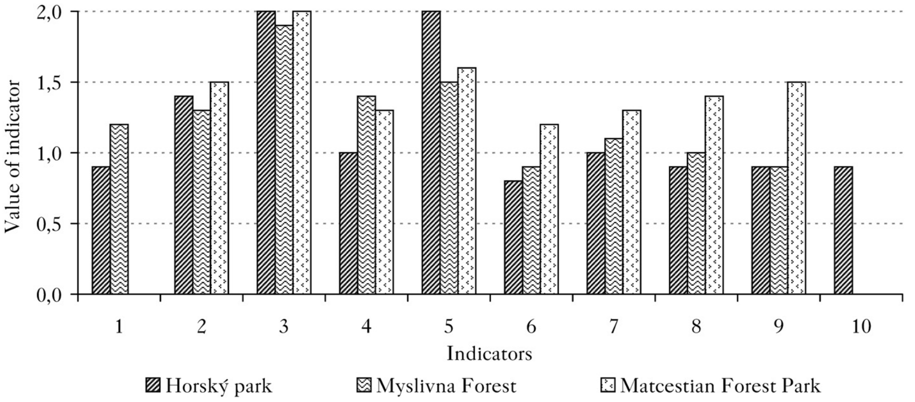

Fig. 3.

Recreation indicators for three contrasting urban forests

Indicators: 1 – Relief, 2 – Quality, 3 – Accessibility, 4 – Soil moisture, 5 – Diversity of tree species, 6 – Vertical structure, 7 – Stand density, 8 – Waste, 9 – Noise, 10 – Development level

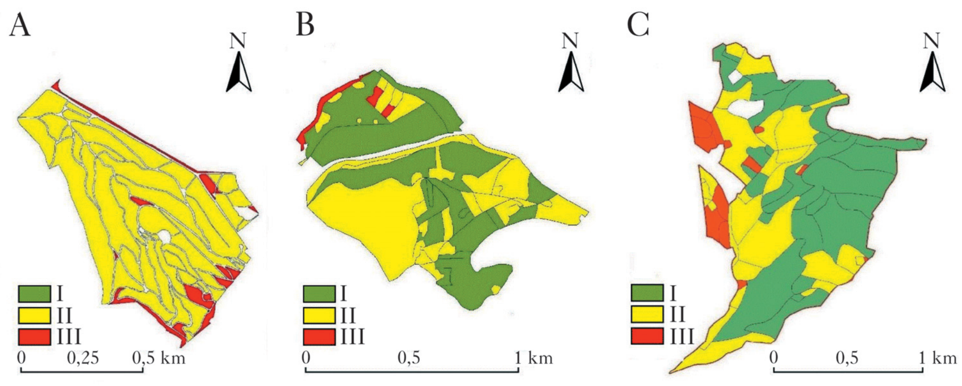

Fig. 4.

Class Recreational Volume of areas within three contrasting urban forests

A – Horský Park, Bratislava, Slovakia, B – Myslivna Forest, Brno, Czech Republic, C – Matcestian Forest Park, Sochi, Russian Federation

Myslivna Forest, Brno, Czech Republic. 90% of the area covered by Myslivna Forest fell into CRV classes I and II. Only 1.63 ha (2%) of total area was in CRV III, whereas CRV I and II accounted for 39.71 ha (53%) and 34.23 ha (45%) of the park, respectively. Overall, CRV I accounted for more than half the total area (Fig. 4B).

Matcestian Forest Park, Sochi, Russian Federation. The majority of sites at Matcestian Forest Park were identified as having high recreational potential (CRV I), covering 57% of the total park on 94.23 ha (Fig. 4C). In comparison, CRV II covered 59.38 ha (36%) and CRV III accounted for only 11.17 ha (7%).

Discussion

The comparative assessment of recreational potential of three unique parks in this study identified a range of results for different cities: Matcestian Forest Park had the largest proportion of high and medium CRV scores, followed by Myslivna Forest and Horský Park. Large portions of each park fell within the second category (CRV II). It is encouraging that the proportion of sites with low recreational potential (CRV III) was low in all parks. The results indicate that these parks have medium to high levels of recreational potential, with further improvement possible by better management and inclusive development interventions. This can be achieved by addressing certain ecological concerns, such as increasing the diversity of tree species, supporting the regeneration of tree saplings and managing herbaceous vegetation. In addition, better scores could be achieved by addressing issues related to cleanliness (waste disposal and improved drainage) and providing physical amenities, such as benches, lights, roads and drinking water, etc.

Green spaces improve the quality of urban life in different ways, with the provision of public recreation opportunities being one of their prime benefits (Zhao *et al.*, 2020). The role of green spaces in providing multiple benefits to society and improving the environmental conditions in cities is increasingly being recognized. To meet demands for such spaces and to increase the benefits provided by urban parks, objective methods for measuring and assessing the potential roles of parks (e.g., recreation, ecosystem services, cultural, economic) are vital.

The three parks assessed in this study have different historical development and also differ in a number of important features (e.g., size, distance from the city center, access by roads, etc.). However, all three parks provide functions, services and benefits, which are needed for the sustainable development of urban areas and improved quality of life (Jennings *et al.*, 2017; Solomou *et al.*, 2019). The different characteristics of these urban parks was also reflected in the results of the assessment of their recreational potential, calculated in this study using the methods of Levandovska *et al.* (2020).

Horský Park is the oldest forest of the three areas studied. It is not surprising that it is currently in poor condition. This is attributed to its high recreational use, resulting in areas that have been degraded and trampled by park visitors, which is related to the indicator *Road network density* in the Forest domain. Achieving a sustainable road (trail) network in forest parks is an important aspect affecting park recreational potential (Wang *et al.*, 2018). Building an optimal trail network is important for directed visiting, which needs to provide an appropriate level of anthropogenic pressure on an area to manage the level of ecological damage from trampling (Zhang *et al.*, 2019). The size and location of trails, as well as the type of trail surface should reflect the range of preferences expressed by visitors of different ages (Zhai and Baran, 2017). The Road network density indicator was given a higher ranking in the other forest parks in this study (Fig. 2), reflecting their larger total area of the park, as well as the lower ranking of the *Development level* indicator (in the Recreation domain).

The *Recreational digression* indicator relates to the reduction of the ecological condition of a park due to use. Despite the high road network density in Horský Park, this forest has a somewhat lower *Recreational digression* value compared to the other two parks. Similar results were evident for the *New regrowth* and *Lower layers of vegetation* indicators of forest condition (Fig. 2).

The *Waste* indicator also is directly influenced by the effects of park visitors on the condition of the forest. The most favorable *Waste* indicator value was obtained in the case of Matcestian Forest Park (Fig. 2) due to the relatively small amount of waste observed there. This result could be attributable to the park's location on the periphery of the city, in contrast to the other parks in this study. It is also likely related to greater care exercised by visitors, as well as a high functioning waste collection program within the park.

Compared to Myslivna Forest and Horský Park, Matcestian Forest Park is the least affected by noise due to the absence of highways. On the other hand, the indicator *Development level* has a score of zero in the case of the Myslivna Forest and Matcestian Forest Park, and a non-zero value in Horský Park. Development of Horský Park increases its attractiveness for visitors, which, due to its location near built-up areas and thus its easy accessibility, increases anthropogenic pressure on the forest. The availability of an urban forest is one of the main factors determining pressure on its use (Arnberger, 2006) and the frequency of visits to forest areas (Burrows *et al.*, 2018). The availability of urban parks has a greater impact on traffic levels than, for example, does greater vegetation cover (Shanahan *et al.*, 2015).

The indicators *Relief*, *Soil moisture* and *Soil texture* are natural features that change only slowly over time and are almost constant. In comparison, the indicators *Diversity of tree species*, *Vertical structure* and *Stand density* reflect both natural conditions and forest management. Study areas differed only slightly in these indicators (Fig. 3). *Diversity of tree species* and *Vertical structure* indicators are affected negligibly by visitors. Despite visitors usually having only limited knowledge of biodiversity (Paul and Harini, 2017), they perceive those indicators as important. Preferences for a particular vegetation density in urban parks is determined by a person's age, education, type of accommodation, as well as their interest in wildlife and whether they hold pro-ecological values (Bjerke *et al.*, 2006).

As mentioned earlier, the proposed methodology is based on two broad groups of indicators (forest ecology and recreation). The approach has limitations as it relies on the collection and analysis of data regarding perceptions of the general public and of visitors about the recreational role of urban green spaces. The inclusion of documentation and analysis of public perceptions in this method will further augment its reliability and effectiveness. Visitors to urban forests can have different preferences in relation to tree abundance, playground qualities, safety, cleanliness, forest trails, etc. (Ayala-Azcárraga *et al.*, 2019; Zhang *et al.*, 2019). The needs and requirements of the public should be taken into account in designing and implementing urban forest management (Tomićević-Dubljević *et al.*, 2017; Paul and Harini, 2017).

Management measures should be taken to stabilize and improve the sustainability of urban forest parks (Ohwaki *et al.*, 2013; Vasiljevic *et al.*, 2018). Different types of forest parks have different sensitivity to recreational utilization and could be negatively affected, altered and permanently damaged by anthropogenic pressure (Repshas, 1994; Drobyshev and Korotkov, 2005; Lehvävirta *et al.*, 2004; Rysin *et al.*, 2006). Appropriate management of urban forests can increase their recreational potential and therefore their functions, services and benefits (Solomou *et al.*, 2019). It is therefore important to improve the quality of urban life through parks by taking into consideration both objective measures of ecological condition and perceptions by residents and urban forest users (Kothenz and Blaschke, 2017).

Conclusion

The aim of this research was to investigate the applicability of an innovative field method to assess recreational potential of urban forests in geographically and historically different areas. As demonstrated in a previous study, the recreational potential of an urban forest or park mainly depends upon two sets of factors – the ecological characteristics of the forest area and the availability of physical amenities for visitors. The assessment method described in this research for evaluating recreational potential is based on two principles of green space research, phytoecological characteristics and state of physical infrastructure for visitors. The use of the method in parks in three geographically distant cities suggests that it has wide applicability and provides an objective assessment of recreational potential in urban forests with varying habitat conditions. In addition, the use of fifteen indicators in its evaluation provides robustness to the results it yields. Due to its simplicity, the inclusion of wide-ranging indicators and a simple grading system, it can be used as a standard method to rank the recreational potential of different green spaces and can facilitate the comparison and improvement of parks for their provision of improved and sustainable recreation facilities to urban dwellers.

Authors' contributions

N.L. – research concept, fieldwork, sample collection, data analyses, manuscript preparation; B.Š. – research concept, manuscript preparation; H.Ź. – data analyses, manuscript preparation; K.F.A. – manuscript preparation and corrections.

Conflicts of interest

The Authors declare no conflicts of interests.

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STRESZCZENIE

Określenie potencjału rekreacyjnego w trzech różnych lasach miejskich

Celem pracy była ocena użyteczności innowacyjnej metody terenowej służącej do określenia potencjału rekreacyjnego lasów miejskich znajdujących się w miastach zróżnicowanych pod względem zarówno geograficznym, jak i historycznym (fig. 1). Jak pokazują wcześniejsze badania, potencjał rekreacyjny lasów miejskich i parków zależy w głównej mierze od dwóch grup czynników, tj. cech ekologicznych oraz dostępności obiektów rekreacyjnych dla odwiedzających. Opisana metoda opiera się na dwóch zasadach badania terenów zieleni: charakterystyce fitoekologicznej oraz stanie infrastruktury rekreacyjnej dla odwiedzających. Stwierdzono, że główna część tych lasów ma średnie lub wysokie walory rekreacyjne w zależności od ich lokalizacji, wieku, zadrzewienia i stanu zagospodarowania (fig. 2-4). Ze względu na swoją prostotę i wszechstronność, a także na możliwość wykorzystania w innych lokalizacjach geograficznych metoda ta okazała się skuteczna do szybkiej i obiektywnej oceny walorów rekreacyjnych lasów i parków miejskich. Uzyskane wyniki mogą zostać wykorzystane przez władze miejskie do określenia bieżącego stanu ekologicznego lasów miejskich, określenia ich użyteczności z punktu widzenia rekreacyjnego oraz niezbędnych środków, jakie należy zastosować, aby poprawić stan lasów miejskich w celu zaspokojenia stale rosnących potrzeb mieszkańców miast.