Article

Sustainable Tourism in Cities—Nature Reserves as a ‘New’ City Space for Nature-Based Tourism

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Abstract: Visible trends in city tourism related to the development of sustainable tourism clearly imply an increase in the significance of green areas and the development of nature-based tourism. Natural areas in cities that ideally fit the assumptions of sustainable tourism are nature reserves—areas where protection of the valuable environment is a priority. This paper aims to highlight that nature reserves are green spots in cities that can be excellent sites for sustainable tourism. The choice of big cities was dictated by the fact that they have the highest requirement for recreational green spaces due to a high concentration of tourist traffic in historic city centres and a clearer need for sustainable forms of tourism. Sixteen nature reserves in five big Polish cities with a population of more than 100,000: Gdańsk, Łódź, Poznań, Toruń, and Warsaw were selected for the study. Field surveys were carried out in nature reserves to see whether basic tourism facilities providing information about nature, supporting education, and conservation of the natural environment existed in the publicly available areas of such reserves. The attractiveness of nature reserves to tourists and their suitability for developing sustainable tourism was evaluated through score-based valuation of the reserves. The valorisation index was used for a synthetic rating and classification of the reserves in terms of attractiveness. The results of surveys imply a possibility of using selected nature reserves in cities for developing sustainable forms of active tourism—in particular hiking and cycling, educational tourism and daily recreational activities of city residents. The sites in question can be regarded as attractive ecotourism products, and as such hold the potential to become a popular destination among tourists and eco-tourists in particular.

Keywords: sustainable tourism in cities; protected areas; nature reserves; tourist facilities in reserves; tourism and recreation in nature reserves; Poland

1. Introduction

Sustainable tourism is an essential element of harmonious regional development, minimises adverse impacts on the natural environment and promotes local culture and traditions [1]. Sustainable tourism gains special importance in cities in which protected areas such as landscape parks or nature reserves are situated. Next to monuments of architecture, intact natural environment can give rise to the development of tourism [2]. Trends visible in urban tourism related to the development of sustainable tourism clearly imply an increase in the significance of green spaces and protected areas in cities. Spaces that are becoming increasingly attractive both to tourists and city dwellers include city parks, squares, and boulevards [3]. Urban Greenway [4], Green Grid [5], Eco-City [6] are created.

Urban spaces that ideally match the assumptions of sustainable tourism—environment-friendly tourism—are nature reserves, valuable natural areas, the main aim of which is environmental protection but also learning and education. The reserves are a space where tourism, including nature-based tourism, can develop and an increasingly significant recreational space for city dwellers. Some of them are equipped with basic recreational
facilities and tourism infrastructure, which implies their potential social function. This is also corroborated by formal legal provisions regarding access to specified nature reserves for recreation and tourism purposes [7,8]. It is anticipated that the growing need for contact with nature due to the development of civilisation and transformation of the natural environment in people’s dwelling places will increase the popularity of nature reserves and enhance their social function.

Properly managed and planned tourism in protected areas can be a positive form of economic activity that contributes to increasing the activity and attractiveness of cities. Moreover, it has been noted that cities are the most important and most popular destinations for tourists [9–11], and urban tourism is one of the main global trends in tourism [12]. In 2017, urban tourism in Europe grew by 7.7%, especially boosted by international markets [13]. According to [14] “not only is urban tourism the most diverse form of tourism but also allows fulfilling all the needs and expectations of tourists”. Urban tourism is a global trend giving rise to disputes on account of an excess of tourists and its negative consequences for local communities [15,16]. In many cities, particularly those attractive to tourists, overtourism (too many visitors to a destination) can be observed [17–19]. Not only does overtourism cause damage to the historic part of a city and reduce the level of consumption of tourist experiences [20], but it also contributes to deteriorating the quality of life of the city inhabitants—for instance, by increasing the noise level, overcrowding and pollution, impeding access to certain public spaces and raising the cost of living [21]—and gives rise to tourism-phobia and tourism gentrification [20,22,23]. Increased tourist traffic and its negative impact on the oldest historic part of the city was noted by researchers in Polish cities such as Krakow [20] and Poznan [19], and in the world—in Berlin [17], Venice [22], Barcelona [24], Lisbon [25], and Porto [26]. Excessive tourist traffic can be prevented by sustainable urban tourism [12] the development of which is underlain by improving the functionality of the city transport infrastructure, beautifying public space and diversifying tourist traffic through expanding the cultural and gastronomic offer and creating all sorts of attractions in other parts of the city, redirecting tourist traffic to those parts, and creating new spaces attractive to tourists [27,28].

New forms of tourism activity are sought in cities as a result of the continuously changing needs and expectations of tourists. Ideas for tourism products falling within the scope of sustainable tourism are created. There is an urgent need to design new sustainable tourism solutions and concepts based on urban space such as nature reserves. Previous studies concerning urban tourism focused mainly on issues of tourism infrastructure, economics [29], culture [30,31], architecture [32–34] and ecology [35]. However, there were no comprehensive studies dealing directly with the development of sustainable forms of tourism in protected areas in cities. The interest in making nature reserves available for tourism (and recreation) was driven by the outbreak of the SARS-CoV-2 pandemic in 2019/2020 and 2021, which completely redefined leisure activities and forms of tourism. A long-lasting economic lockdown and restrictions on movement and social relations increased the need for making use of green spaces in cities.

Considering the aforementioned information, the main purpose of this paper was to demonstrate that despite having a leading role in nature conservation, nature reserves can be a space for the development of sustainable forms of recreation and tourism, nature-based tourism and ecotourism in cities.

2. Theoretical Background

2.1. Sustainable Tourism in Protected Areas

Nature conservation is often said to keep tourists out of nature reserves and even forbidding anyone from spending spare time and undertaking any leisure activities in nature reserves. This assumption is a misinterpretation. In most nature reserves, visitors are welcome since people who are attracted by nature and who understand how it relates to ecology can become involved in its conservation in the future [36,37]. Personal experiences
with nature are now far more important than the transfer of knowledge for information purposes and are deemed a part of basic environmental education.

From the point of view of society and economics, nature is a significant factor in tourism supply as a “basic resource for the tourism industry” [38] and a basic factor attracting tourists to a destination [39]. Nature conservation was supposed to exist “for the benefit and joy of people” as declared in 1972 by the founders of the first national park in Yellowstone in the United States [40]. In Europe, in 1836 the Prussian State established protection of the Drachenfels (Dragon’s Rock) on the Rhein, and in 1898 the Prussian Parliament resolved to support natural history heritage also “for the benefit and joy of people”.

The European Commission takes special notice of the development of sustainable tourism [41]. The tourism policy of the European Union supports regional activities reducing economic variations of regions, for instance through promoting sustainable development of urban tourism [42,43]. The fundamental principles of sustainable tourism include: minimising negative impacts on the natural environment [44] and local culture and customs [45] and maximising economic benefits for local communities and the satisfaction of tourists [36,46–48]. Proper tourism management is a positive form of economic activity that contributes to increasing the activity and attractiveness of cities [49,50].

The use of valuable natural areas, and particularly those covered by strict legal protection, for tourism can give rise to conflicts on account of ecology, tourism, and education. In fact, nature and tourism are closely interdependent but the need for nature conservation is a priority since nature allows the maintaining of biodiversity in a landscape [51]. To this end, integrated management in valuable natural areas makes use of their potential in line with the principles of sustainable development [52,53]. Well-organised tourism in protected areas testifies to the reasonableness of protection, is an instrument for implementing the principles of sustainable development, offers new possibilities of effective nature conservation, and provides money for environmental protection.

2.2. Reserve as a Nature Conservation Area

In Poland there are 10 nature conservation forms with different protection regimes, concepts, and objectives: national parks, landscapes parks, protected landscape areas, Natura 2000 sites, nature monuments, documentation sites, ecological sites, natural and landscape complexes, species protection of plants, animals, and fungi [54] (Act of 16 April 2004 on the Nature Conservation, 2004). This reflects the great diversity of Polish landscapes, habitats, ecosystems, and species [40]. The most important natural area conservation forms in Poland, protecting the most valuable parts of the natural environment, are national parks and nature reserves [55]. Nature reserves are the oldest form of nature protection in Poland with a long tradition. In contrast to national parks, only a part of the reserves is formally accessible for tourism and recreation. This is determined by the provisions of regulations establishing respective nature reserves or orders of the Regional Directorates for Environmental Protection issued specifically to indicate how the area of the reserve should be used for tourism and recreation which places will be accessible for tourism and outdoor activities.

According to the Nature Conservation Act (2004) [54] in force, reserves are “areas preserved in a natural state or with little intervention, ecosystems, sanctuaries, and natural habitats, as well as plant, animal, and mushroom habitats and the creations and constituents of inanimate nature displaying special natural, scientific, cultural, or landscape values”. In nature reserves the development of tourism is very limited as a result of nature conservation and preservation of the natural and cultural heritage for future generations. It is forbidden there to devastate vegetation, pick mushrooms and groundcover plants, catch and kill animals living in the wild, make noise and collect rocks, stones, minerals and amber, as well as organise mass events (public runs), do very noisy sports and practise the basic forms of tourism allowed elsewhere, such as: hiking, cycling, horse-riding, camping, campfires, mountaineering, and exploration of caves and water reservoirs, except on trails and at sites allowed by a regional director for environmental protection [40,56]. Nature reserves should
be made available for tourism accompanied by adequate organisational and technical measures to create the conditions in which cognitive and educational objectives can be accomplished and protecting the natural environment against damage (Figure 1).

![Figure 1. Opportunities for tourism development in legally protected areas in cities (source: own study based on [8,57,58]).](image)

2.3. Nature Reserves in Cities as a Tourism Space

Nature in cities is an element of urban tourism supply and a component of the urban tourism product [56]. Nature-based tourism in the city according to [57] includes avenues and streets with a tree stand, wetlands, municipal forests, ruderal habitats and species, synanthropic animals and protected areas and objects, including trees and erratic boulders deemed monuments of nature. It should be emphasised that not all objects are equally attractive, and some are valuable to a select group of tourists only. Reserves are a special category of green areas whose predominant function is nature conservation, and other functions should not disturb the balance in nature. A need to combine the conservation function with the leisure function is suggested [8,58].

The definition of reserves does not provide for the possibility of using them for tourism and recreation. However, the nature conservation objectives in reserves, and in particular scientific and cultural objectives, predispose it towards social functions, including tourism and cultural functions [7,59]. The many social benefits of tourism and recreation in nature reserves include learning about native wildlife, shaping patriotic attitudes, disseminating knowledge about nature, and developing awareness and responsibility for nature, health, and leisure. Health was a reason for creating landscape reserves in the industrial regions of Poland during the 1960s [7].

Ref. [58] reports that the social function of valuable natural areas within the limits of cities is increasingly being taken note of. Meeting the expectations and needs of city inhabitants halfway, nature reserves can be an excellent place for developing sustainable forms of tourism. Access and ways of access to reserves for urban tourism are regulated by Regional Directorates for Environmental Protection. To this end, elements of tourism infrastructure are introduced in urban reserves. It can be observed that nature reserves in cities—due to their location—are used similarly to other green spaces [60] and treated as a recreational hinterland [8]. City inhabitants use them for daily recreation, education, science, and culture (cult and memorial sites, plein air painting, film sets etc.). First of all, they allow city dwellers to easily and quickly come into contact with nature and participate in leisure activities such as walking, jogging, cycling and fitness trails. They are a place where people can meet, pursue teaching objectives—particularly related to environmental education—and where they can practise various forms of tourism and recreation [7,8].
Developing environment-friendly tourism based on nature reserves in cities is necessary and has become increasingly reasonable as tourists more and more often desire having contact with nature [61,62]. This can be essential in terms of education—thanks to disseminating knowledge on the natural values of the area and principles of environmental protection—and the social aspect—by improving the quality of human life.

3. Materials and Methods

3.1. Research Objective

The paper addresses the following research questions:

- Do nature reserves in cities combine nature conservation and tourism functions and can they be a place for developing sustainable forms of recreation and tourism, nature-based tourism, and ecotourism?
- What is the potential for developing tourism in nature reserves in big cities?
- Which roles do nature reserves fulfil in cities?

The objective of the research is using the outcomes of the survey for the needs of representatives of the management of protected areas, local administrative units and tourism organisations for planning and management of sustainable forms of tourism based on nature reserves. The resulting model can help solve problems in other parts of Europe and the world. The research procedure used in the paper is presented in Figure 2.

![Figure 2. Research procedure (source: own elaboration).](image)

3.2. Source Data

Nature reserves were identified according to the Central Register of Nature Conservation Forms kept by the General Directorate for Environmental Protection [63]. The register contains records relating to the establishment of the reserve and conservation plans or conservation tasks for respective reserves. Information regarding access to the reserves was also found in the internet resources. The location of reserves was verified using digital maps: resources of the General Directorate for Environmental Protection [64] and the Head Office of Geodesy and Cartography [65]. For a full description of the reserves the Forest Data Bank [66] and immovable monuments maps of the National Institute of Cultural Heritage [67], were also used.

3.3. Study Area

Poland is a country with rich natural resources, featuring varied landscapes and large biodiversity. In Poland, 32.6% of the surface area of the country is subject to different forms of protection. Nature reserves, amounting to 1503 [63], account for slightly more than 0.5% of the country’s surface area. Ultimately, they were supposed to account for 2–3% of the...
surface area of Poland [68], as indicated more than 40 years ago. This would still be a small percentage in comparison to other European countries, e.g., Germany, where nature reserves cover 8% of the country’s surface area [69].

An area of interest is reserves situated within administrative boundaries of Poland. Nature reserves also protect the most valuable parts of nature in urbanised areas. In Polish cities there are a total of 167 nature reserves, which corresponds to 11.1% of all nature reserves in Poland. They are situated in 111 cities accounting for 7.4% of all cities in Poland. Nearly half of the reserves are situated in small towns with a population of up to 25,000 (76 reserves, i.e., 45.5% of reserves formed in cities) and in big cities having more than 100,000 inhabitants (59 reserves accounting for 35.3% of all reserves).

The survey was carried out in reserves located in big cities with more than 100,000 inhabitants [8]. Out of 24 big cities in Poland in which nature reserves exist (59 reserves in total), the city with the highest number of nature reserves is Warsaw. It has 12 nature reserves, including 10 situated fully within the limits of the city. Other cities with a high number of reserves include: Krakow (5 reserves), Kielce (5), Gdansk (4) and Gdynia (4) (Figure 3). Other big cities have one or two nature reserves.

Figure 3. Nature reserves located in cities with a population of more than 100,000 (source: own elaboration).

The attractiveness to tourists in terms of the development of sustainable forms of tourism was evaluated based on 16 reserves in five big cities in Poland (Gdańsk, Poznań, Toruń, Łódź, Warszawa) that are popular centres for tourism and sightseeing in northern and central Poland. The criterion for choosing reserves was their location being fully within the administrative limits of cities. Reserves only partially falling within the range of the examined cities were excluded from analyses. Reserves that are not permanently accessible to visitors and those offering guided tours only were also not included.
3.4. Research Scenario

Stage 1. Categorisation of urban reserves according to types, conservation objectives and methods of access.

This allowed for the determination the amount and type of supply of a tourism product, that is, nature reserves in big cities in Poland. The first stage of works involved a review of various types of studies on the specific features of nature conserved in the reserves and changes in the nature of reserves due to the impact of the city, presence of humans, adaptation of reserves to social functions, formal issues regarding access to reserves and objectives assigned to the reserves. The next stage was a field survey of the reserves in terms of landscape attractiveness (scenic beauty), degree of conservation and anthropogenic damage, presence of basic elements of recreational and tourism infrastructure and the number of users and activities undertaken in the reserves (Table 1).

Table 1. Reserve inventory card including the rules of classification for a scoring—based evaluation of the attractiveness of nature reserves to tourists.

| Evaluation Criteria | Scoring Scale |
|---------------------|---------------|
| I. Criterion—Access and purposes of establishment (max. 4 pt) | Formal access: yes—1 pt; no—0 pt |
|                     | Permitted uses: within 3 or more forms—2 pt, 1–2 forms—1 pt, none—0 pt |
|                     | Purposes of establishment mentioned in reserve founding documents: social objectives—1 pt, none—0 pt |
| II. Criterion—Attractiveness of landscape and culture (max. 8 pt) | Variations in land relief: more than 20 m—2 pt, from 10 to 20 m—1 pt, less than 10 m—0 pt |
|                     | Variations in landscape according to Corine: more than 1 landscape type—1 pt, 1 landscape type—0 pt, two or more forms—2 pt, one form—1 pt, none—0 pt |
|                     | Water reservoirs, natural and artificial watercourses, springs, wetlands: two or more forms—2 pt, one form—1 pt, none—0 pt |
|                     | Location in protected areas: yes—1 pt, no—0 pt |
|                     | Nature monuments: yes—1 pt, no—0 pt |
|                     | Objects of culture in the reserve and other noteworthy objects in or visible from the reserve: yes—1 pt, no—0 pt |
| III. Criterion—Presence of trails and paths in the reserve (max. 3 pt) | Tourist trails: yes—1 pt, no—0 pt |
|                     | Educational paths: inside the reserve—2 pt, only at the boundary—1 pt, none—0 pt |
| IV. Criterion—Tourism infrastructure and recreational facilities in the reserve (max. 11 pt) | Tourist view towers: yes—1 pt, no—0 pt |
|                     | Footbridges: yes—1 pt, no—0 pt |
|                     | Umbrella roofs: yes—1 pt, no—0 pt |
|                     | Benches: yes—1 pt, no—0 pt |
|                     | Signboard with reserve name at the entrance: yes—1 pt, no—0 pt |
|                     | Signboard with information on reserve: yes—1 pt, no—0 pt |
|                     | Footpaths with information boards or QR codes: yes—1 pt, no—0 pt |
|                     | Trespassing barriers, keep out signs for other paths: yes—1 pt, no—0 pt |
|                     | Litter Bins: yes—1 pt, no—0 pt |
|                     | Running paths, health trails, playgrounds: yes—1 pt, no—0 pt |
|                     | Nature reserve parking lot: yes—1 pt, no—0 pt |
Table 1. Cont.

| Evaluation Criteria                                                                 | Scoring Scale               |
|-------------------------------------------------------------------------------------|-----------------------------|
| **V. Criterion—Forms of anthropopressure** (max. 6 pt)                              |                             |
| Damage of vegetation                                                                | no—1 pt; yes—1 pt           |
| Damage of sculpture                                                                 | no—1 pt; yes—1 pt           |
| litter                                                                              | no—1 pt; yes—1 pt           |
| Traces of bonfires                                                                  | no—1 pt; yes—1 pt           |
| Illegal paths                                                                       | no—1 pt; yes—1 pt           |
| Other forms of anthropopressure: noise, unpleasant smell                            | no—1 pt; yes—1 pt           |
| **VI. Criterion—Types of activity and number of visitors** (max. 4 pt)              |                             |
| Observed types of activity                                                          | many—2 pt; average—1 pt     |
| Number of visitors                                                                  | little—0 pt; many—2 pt; average—1 pt; little—0 pt |
| Source: own study based on [40,70–72].                                              |                             |

Photographic documentation was compiled for each reserve. The surveys also covered the number of users and forms of activity undertaken in the reserves. For each reserve an inventory card was prepared containing basic data about the reserve and information obtained during the field survey that provided a basis for scoring. Studies of [40] concerning adaptation of nature reserves for sightseeing were used as a model.

Stage 2. Valuation of the attractiveness of reserves to tourists in terms of possibilities of developing sustainable forms of tourism.

In the valuation of reserves for Nature-Based Tourism purposes a scoring method was used as it proves effective for such studies [59,70–74]. This method is widely used for evaluating the tourism attractiveness of various areas, in particular administrative units [75], physico-geographical units [74,76] and protected areas, landscape parks [70], and nature reserves [71,72,77]. The examined elements were evaluated for each reserve according to a two- or three-stage scoring scale. The maximum possible score was 36 per reserve—most points were assigned for recreational and tourism infrastructure in the reserves.

Stage 3. Evaluation of the tourism attractiveness of reserves according to the calculated valorisation index—synthetic treatment of attractiveness of reserves to tourists.

At the next stage of scoring valuation, the scores testifying to the attractiveness of respective evaluated categories were added up for each category analysed as a component of attractiveness of reserves to tourists. Finally, a ranking of tourism attractiveness of reserves was prepared based on the valorisation index calculated as the total score per reserve to theoretical maximum score ratio [78].

\[
I_{AT} = \frac{s}{S_{max}}
\]

\(I_{AT}\)—tourism attractiveness index  
\(s\)—score per area  
\(S_{max}\)—maximum score

The tourism attractiveness index was analysed from 0 to 1 with the attractiveness value ranges being: 0.0–0.19 (very low), 0.2–0.39 (low), 0.4–0.59 (medium), 0.6–0.79 (high), 0.8 and more (very high).

4. Results

The observation and survey and analysis of records concerning nature reserves revealed big differences in uses of urban reserves for recreation and tourism, which was associated with their location in the city, permitted uses, type, surface area, present development status, type of footpaths and trails and tourist traffic in the reserves.
The examined reserves were mostly established in the 1950s and 1980s or 1990s. The predominant types of reserves are forest reserves (13). The surface of the reserves is strongly diverse—from ca. 2 ha to ca. 900 ha. Formally, 12 out of 16 reserves (nearly 3/4) are accessible to visitors (Table 2).

**Table 2.** Nature reserves situated in their entirety within the limits of Gdańsk, Poznań, Łódź, Toruń, Warszawa.

| Cities | Name of the Reserve | Formal Access | Type of Reserve | Establishment Period | Area in Ha |
|--------|---------------------|---------------|-----------------|----------------------|-----------|
| Gdańsk | Strzyże Valley (Dolina Strzyży) | yes | forest | the 1st decade of the 21st century | 38.52 |
| | Hussar Gorge (Wawóz Huzarów) | no | forest | the 1st decade of the 21st century | 2.87 |
| | Eva Valley Headwaters (Żródliska w Dolinie Ewy) | yes | forest | the 80’s. | 12.04 |
| | Bird Paradise (Ptasi Raj) | yes | not specified | the 50’s. | 198.07 |
| Poznań | Morasko | yes | landscape | the 70’s. | 54.28 |
| | Zurawiniec | no | inanimate nature | the 50’s. | 1.67 |
| Łódź | Łagiewniki Forest (Las Łagiewnicki) | yes | forest | the 90’s. | 69.86 |
| | Polesie Konstantynowskie | no—fenced, visitors not allowed | forest | the 50’s. | 9.8 |
| Toruń | Marketplace Ait (Kęp Bazarowa) | yes | forest | the 80’s. | 32.4 |
| | Kabacki Forest (Las Kabacki) | yes | forest | the 80’s. | 903.5993 |
| | Nataliński Forest (Las Natolinski) | yes—closed, guided tours only | forest | the 90’s. | 104.2204 |
| | Ursynów Escarpment (Skarpa Ursynowska) | yes—guided tours against payment only as a part of the offer of the Wilanów Museum | landscape | the 90’s. | 20.8037 |
| | Morysin | yes | forest | the 90’s. | 53.4565 |
| Warszawa | Lake Czerniakowski (Jezioro Czerniakowskie) | yes | aquatic | the 80’s. | 47.6767 |
| | Olsynka Grochowska | yes | forest | the 80’s. | 59.449 |
| | Kawęczyn | yes | forest | the 90’s. | 69.7101 |
| | King John Sobieski Reserve (Rez. Króla im. Jana Sobieskiego) | no | forest | the 50’s. | 114.4071 |
| | Jack’s Swamp (Bagno Jacka) | no | peatland | the 80’s. | 19.45 |
| | Bielany Forest (Las Bielarski) | yes | forest | the 70’s. | 132.5915 |

Source: own study based on the data from General Directorate for Environmental Protection and internet resources.

There reserves have different locations in cities:

- reserves in the city centre, e.g., Zurawiniec, Lake Czerniakowskie, Ursynów Escarpment, Bielany Forest, Marketplace Ait;
- reserves outside the urbanised area in the natural area adjoining the city and additionally covered by other forms of protection: Strzyże Valley, Hussar Gorge, Eva Valley Headwaters, as parts of Tri-City Landscape Park and Bird Paradise reserve in Gdańsk being a Ramsar Wetland Site, Łagiewniki Forest reserve in Łódź within Łódź Hills Landscape Park and King John Sobieski Reserve in Warsaw within Masovian Landscape Park.
4.1. Results of the Scoring Valuation of Reserves—Assessment of Criteria Influencing Tourism Attractiveness of Reserves

4.1.1. Criterion—Access and Purposes of Establishment

According to this criterion, the most attractive reserves were those that: were formally accessible (12 out of 16, except: Hussar Gorge, Żurawiniec, Jack’s Swamp, King John Sobieski Reserve), their establishment purposes included social objectives (Bird Paradise, Kabacki Forest, Lake Czerniakowskie, Bielany Forest), and for which more than 3 uses were permitted. The highest number of permitted uses was recorded for Lake Czerniakowskie, i.e., beach and bathing area, swimming, fishing at appointed sites, walking at appointed sites and along a designated trail, dog-walking at appointed sites, horse-riding, and Kabacki Forest: walking and cycling and campfire sites. In other reserves walking and cycling along designated trails is most often permitted and sometimes walking is the only permitted use (Marketplace Ait, Łagiewniki Forest, Olszynka Grochowska). The most walker-and tourist-friendly reserves were: Kabacki Forest, Lake Czerniakowskie and Bielany Forest.

4.1.2. Criterion—Attractiveness of Landscape and Culture

Considering all the components, the most attractive were: forest reserves—Strzyże Valley and Kabacki Forest, landscape reserve—Ursynów Escarpment and a reserve by the Gdansk Bay—Bird Paradise. This was affected by diverse factors in connection with which elements of the natural environment were protected in the reserves. A reserve with the most varied landscape according to Corine (four types) was Bird Paradise, which also contains 2 The Natura 2000 habitats and forms part of an international nature conservation form. The biggest differences in height occur in reserves situated in Gdansk on the moraine upland of the Kashubian Lakeland (Strzyże Valley, Hussar Gorge, Eva Valley Headwaters) and in the Morasko Reserve in Poznań that is a meteorite site. The most varied water environment is characteristic of Strzyże Valley, Eva Valley Headwaters and Ursynów Escarpment. Elements of cultural and historical heritage are found in two reserves only: Olszynka Grochowska, an old battle site and Ursynów Escarpment. Most reserves coincide with other nature conservation forms: Tri-City Landscape Park (Strzyże Valley, Hussar Gorge, Eva Valley Headwaters), Masovian Landscape Park (King John Sobieski Reserve) and Łódź Hills Landscape Park (Lagiewniki Forest), Natura 2000 areas (Bird Paradise, Marketplace Ait, Jack’s Swamp and Bielany Forest), protected landscape areas (most of the reserves in Warsaw are situated in the Warsaw Protected Area). The examples of natural assets are presented in Figure 4.

![Figure 4. Natural assets of selected nature reserves: (A): Bird Paradise in Gdańsk, (B): Olszynka Grochowska in Warsaw, (C): Hussar Gorge in Gdańsk, (D): Lake Czerniakowskie in Warsaw (by authors).](image-url)
4.1.3. Criterion—Presence of Trails and Paths in the Reserves

The following large reserves—used by city dwellers for years—feature the best access: Kabacki Forest (35 km of different kinds of trails) and Bielany Forest in Warsaw (Figure 5), Łagiewniki Forest in Łódź in the Łagiewniki Forest used by the inhabitants of Łódź and Morasko Reserve in Poznań. There are tourist trails passing through the reserve, nature trails and trails along the border of the reserve (Figure 6). The inanimate nature reserve Zurawiniec in Poznań and peatland reserve Jack’s Swamp in Warsaw have no trails at all.

Figure 5. Schematic plans of nature reserves with indicated tourist trails. (A): Kabacki Forest in Warsaw, (B): Bielany Forest in Warsaw (source: own study based on field survey and Head Office of Geodesy and Cartography [65]).

Figure 6. Examples of marked educational paths and tourist trails in reserves: (A) Morasko in Poznań, (B) Olszynka Grochowska in Warsaw, (C) Kabacki Forest in Warsaw, (D) Kawęczyn in Warsaw (by authors).

4.1.4. Criterion—Tourism Infrastructure and Recreational Facilities in the Reserve

Elements of recreation and tourism infrastructure in the reserves mainly include signboards with the name of the reserve at the entrance (in all of the reserves except Jack’s Swamp and Hussar Gorge) and boards displaying information about the reserve and reserve rules. Elements that are rare in the examined reserves are observation towers (present in Bird Paradise), footbridges (in Morasko, Lake Czerniakowskie and Bielany Forest), umbrella roofs (Bird Paradise, Kabacki Forest, Bielany Forest, King John Sobieski Reserve), and even benches and waste bins (Bird Paradise, Kabacki Forest, Lake Czerniakowskie,
Olszynka Grochowska, Bielany Forest, King John Sobieski Reserve). Trespassing barriers keeping tourists on the right path were found in the Morasko Reserve and in the forest reserves: King John Sobieski Reserve and Bielany Forest. In Kabacki Forest ‘keep off this path’ signs are common. Educational facilities that are still scarce in the reserves are QR codes on wooden posts found in the Bird Paradise Reserve in Gdańsk and in most of the reserves in Warsaw: Kabacki Forest, Lake Czerniakowskie, Olszynka Grochowska, and Kawęczyn. An education room is available in Kabacki Forest only (currently under preparation—October 2021). Elements of recreational infrastructure such as running tracks, fitness trails and playgrounds were recorded in a few reserves only (Łagiewniki Forest, Kabacki Forest, Bielany Forest and King John Sobieski Reserve). Ultimately, none of the reserves scored the possible maximum, and large forest reserves such as Kabacki Forest and Bielany Forest and Bird Paradise in Gdańsk, used for city dwellers’ recreation, proved to have the best infrastructure. The examples of tourist and recreational infrastructure of selected nature reserves are presented in Figure 7.

4.1.5. Criterion—Forms of Anthropopressure

The survey of the conservation status of reserves showed no clear damage to vegetation and relief. Waste does not pile up along the trails. Illegal paths were identified in Morasko, Strzyże Valley and Bielany Forest. However, when analysing the location of reserves numerous negative factors influencing the reserves were noted, including noise made by frequent airflights in Strzyże Valley, malodour from sewerage in Eva Valley Headwaters, noise made by cars in Morasko, Kawęczyn, and Bielany Forest (the reserves are either intersected or surrounded by roads), and noise made by trains in Olszynka Grochowska (Figure 8).

4.1.6. Criterion—Types of Activity and Number of Visitors

Analysing the actual, observed use of the reserves, the biggest number of users and the greatest variety of uses refer to large-area forest reserves: Kabacki Forest, Bielany Forest, Łagiewniki Forest and the aquatic reserve Lake Czerniakowskie—all of them used by city dwellers for recreation.

4.2. Classification of Reserves According to the Tourism Attractiveness Index

Based on a synthetic valorisation index the reserves were classified, according to their usefulness for the development of sustainable forms of tourism, into groups from ‘very useful’ to ‘not very useful’ (Table 3).
4.1.6. Criterion—Types of Activity and Number of Visitors

Analysing the actual, observed use of the reserves, the biggest number of users and the greatest variety of uses refer to large-area forest reserves: Kabacki Forest, Bielany Forest, Łagiewniki Forest and the aquatic reserve Lake Czerniakowskie—all of them used by city dwellers for recreation.

4.2.1. Index above 0.8—Very High

The only reserve with the highest index value was Kabacki Forest (0.86). This is due to the fact that the inhabitants of Warsaw have long perceived it as a recreational site; it is the biggest forest complex in Warsaw and the largest of the examined reserves, with an area of about 903 ha. It has many visitors and is a place of many outdoor activities. It features good tourism infrastructure such as numerous tourist trails and paths of different kinds (two running tracks and nature trails and a fitness trail). All of the trails are well marked. Nature trails in the reserve are fitted with educational boards and QR codes. Umbrella roofs and benches for tourists are provided at the crossroads (Figure 9). A common practice in the reserve is signs to keep off other paths. For a long time, this area formed part of the Wilanów estate, and in 1938 was purchased by the city and placed at the disposal of the inhabitants of Warsaw for leisure [79].
4.2.2. Index with a Value of 0.6 to 0.79—High

This group consisted of three reserves, each of a different type: Bielany Forest (forest reserve), Lake Czerniakowskie (aquatic reserve) and Bird Paradise (unspecified type). The type and infrastructure of Bielany Forest reserve is reminiscent of that of Kabacki Forest. This is also a place associated by the inhabitants of Warsaw with leisure. The groups of users are numerous. The Lake Czerniakowskie is a completely different type of reserve. Similar to Kabacki Forest, it owes its high rank to the highest score regarding the categories of use, due to social objectives indicated for the reserve and the highest number of permitted uses. The lake is a former oxbow lake of the Vistula River, and because it is situated almost in the centre of Warsaw, it is a very popular place used by city dwellers for outdoor recreation. The reserve has one nature trail around the lake fitted with original educational boards. The landscape around the reserve is intriguing—high-rise buildings and chimney stacks of the Siekierki Power Plant. The Bird Paradise reserve is located near the Gdańsk Bay at the outlet of the Śmiała Wisła. The reserve owes its high tourism attractiveness index to diverse tourism infrastructure (observation towers, educational boards, car park with a restaurant next to the reserve), and the fact that it features many forms of nature conservation, including international ones. This reserve, featuring valuable natural amenities and located away from the city of Gdańsk, is used for tourism more than for recreation.

4.2.3. Index with a Value of 0.4 to 0.59—Medium

The biggest group of reserves (7 out of the examined 16) are averagely attractive to tourists and show a strong internal diversity. Generally, these reserves do not rank highly for accessibility and tourism infrastructure. The intensity of their use and types of activities undertaken there are average. In the King John Sobieski Reserve, reserve tourist trails, the running track, and the fitness trail are at the border of the reserve only. In the Strzyże Valley reserve there are no nature trails, benches, or waste bins, but it is used intensively due to the proximity of housing estates located on two opposite sides of the reserve. Similarly, Ursynów Escarpment has no nature trail, but it does have a tourist trail. Despite its small surface area and terrain relief—high escarpment and at the same time flat wetlands—this area is often visited by city dwellers who have protested against the attempted closure of the reserve [80]. The Eva Valley Headwaters reserve is less used since it is not directly adjacent to housing estates. It is equipped with basic infrastructure, including signboards. The Morasko reserve has a well-developed tourism infrastructure—for instance signboards on the trail, and a car park with a toilet (as the only reserve), but despite its original amenities, its uneven terrain (differences in height) and narrow paths discourage many
visitors. The Olszynka Grochowska reserve is accessible for social use—it has a designated walking path with QR codes.

4.2.4. Index with a Value of 0.2 to 0.39—Low

The group of reserves not very attractive in terms of tourism and recreation included reserves that are not formally accessible (Hussar Gorge, Jack’s Swamp, Żurawiniec), have few tourist trails and a poor tourism infrastructure. Next to forest reserves, the group also included a peatland reserve (Jack’s Swamp) and an inanimate nature reserve (conservation of geological deposits—Żurawiniec).

5. Discussion and Conclusions

The first issue for discussion is the inconsistencies in formal access to reserves. The results of surveys show that a part of the reserves, although not formally accessible, are in fact used for tourism and recreation (Hussar Gorge in Gdańsk, and Żurawiniec in Poznań). A review of literature and available references concerning nature reserves has corroborated that this is a focus of attention for many researchers investigating tourism in nature reserves [8,40,58,72]. It was also observed that, for many sites, the documents concerning reserves (regulations establishing the reserves, conservation plans and decisions on accessibility to tourism) do not take into account the actual development status of the reserves, the existing network of tourist trails and paths and the infrastructure. Online maps should be analysed in detail in combination with site visits to obtain reliable information about the development status of a reserve. Another difficulty is that in Poland it is not easy to find information and reliable statistics on nature reserves. Gathering information about reserves is a demanding task since not all documents related to reserves are archived in Central Register of Nature Conservation Forms maintained by the General Directorate for Environmental Protection.

The surveys have corroborated that the popularity of a reserve is largely determined by its location within a city space, as indicated by [8]. The examined reserves represent two different types of urban reserves. Some are located in the very centre of the city, surrounded by city buildings, and others are situated in natural areas adjoining the city far from its centre. This not only generates other needs related to nature conservation but also affects the use of reserves for recreation and tourism and differences in target groups. A lower number of users is observed in reserves situated far from the city centre, such as Bird Paradise in Gdańsk and the reserves of the Tri-City Landscape Park, especially Hussar Gorge which is distant from housing estates and can be reached via a tourist trail only. The Jack’s Swamp peatland reserve is also not very popular. A low popularity of peatland reserves is also mentioned by other authors, including [71] who—using the example of the Brodnica region in Poland—found that peatland reserves are not accessible to visitors and, as a rule, have no tourism infrastructure. An important factor influencing the number of tourists in nature reserves and types of activities they undertake is the leisure value of reserves. This is noticeable in the intensely used Lake Czerniakowskie aquatic reserve and Ursynów Escarpment landscape reserve. Many reserves also perform a “communication” function. They are situated on the inhabitants’ daily movement routes (Strzyżew Valley and Żurawiniec), so the number of their ‘users’ is considerable. The surveys show that the most intensely used are large-area forest reserves in city centres featuring good transport accessibility and good infrastructure (Kabacki Forest, Bielany Forest), which is also corroborated by [71]. Ref. [40] proposes that larger forest and landscape reserves should be used as a basis for creating reserves accessible to visitors for educational purposes, and in particular for the purposes of natural sciences. In turn, [60] propose that the concept of an urban reserve be implemented, and separate provisions be created for reserves situated in cities that are naturally used as recreational grounds. It can be observed that reserves associated by city dwellers with recreation sites (Kabacki Forest, Bielany Forest) have many visitors. According to [40], reserves located in and near cities were intentionally created in order to stop the degradation of valuable natural areas and have been used by
city dwellers for years. The author provides an example of “park reserves”: Kabacki Forest, Ursynów Escarpment and King John Sobieski Reserve in Warsaw and Fox Hill (Lisia Góra) Reserve in Rzeszów. Local communities have objected to attempts to close such reserves or impose limitations on and forbid their use. This is the case of Bielany Forest in Warsaw [81], and Natolin Forest that—together with the Palace—was handed over to the foundation Natolin European Centre. Only guided tours are possible there [82,83].

Another specific feature of reserves located in cities is that a considerable number of them are unfavourably situated—near busy roads and rail tracks. They are often completely surrounded by single- or multi-family buildings. The city often deteriorates the natural environment of a reserve. For instance, Zurawiniec in Poznań is a reserve situated in the centre of the city in a forest surrounded by housing estates, which leads to deterioration of the water regime and drying out of protected valuable geological resources in the reserve [84].

Despite their often specific, unfavourable location, urban reserves are examples of real, little transformed nature that is often surprisingly rich. However, not all reserves are adapted to tourist traffic. Generally, they are also not promoted as tourist amenities of the cities, which leads to the conclusion that, apart from those commonly used for recreation (Kabacki Forest, Bielany Forest, Lake Czerniakowskie), nature reserves in cities are not targeted at mass users but at individual users with specific interest in tourism (nature-based tourist and ecotourist) who will get there intentionally, seeking information about them on their own. This is one of the factors somehow predisposing such reserves for natural-based tourism and ecotourism.

Referring to the 4 types of nature-based tourists according to Lindberg (1991) [85] (Type 1 Hard-Core Nature Tourists, Type 2 Dedicated Nature Tourists, Type 3 Mainstream Nature Tourists, Type 4 Casual Nature Tourists), it seems that the examined reserves are dedicated, in particular, to Hard-Core Nature Tourists, that is, scientists or participants of educational excursions or forest cleaning activities, and to Dedicated Nature Tourists, that is, people who go on a tour to see the protected areas and learn about the history of local nature and culture. In the examined reserves intensely used by city dwellers, casual nature tourists interact with nature by chance, usually on a trip with a broader purpose. According to [72], the presence of casual tourists, for whom sustainable tourism is not a target, can pose a hazard to the environment of the reserves.

Other features of nature reserves that predispose them to sustainable tourism include the founding objectives of reserves, permitted forms of activity and tourism infrastructure. The surveys show that half of the examined reserves have elements used for education. Refs. [40,72] report that nature reserves most often have no elements of tourism infrastructure fostering tourist education and leisure. Given the incontestable presence of tourist traffic in reserves, tourism infrastructure is desirable as, when properly incorporated in the reserve space, it can indirectly contribute to nature conservation and shape society’s ecological awareness accordingly [77]. A need to expand tourist trails and building nature trails with well-maintained educational boards is highlighted by [72] in a study on the options for developing ecotourism in the nature reserves of Silesian Beskids.

Based on the results of studies and a review of reference literature, different roles of nature reserves in cities can be listed:

- leisure and recreation sites for city dwellers due to recreational values of reserves; Similarly, ref. [86]—using the example of nature reserves in Kielce—also identifies reserves as sites to pursue culture-related objectives;
- sports and qualified tourism sites—similarly, ref. [40] mentions that it is possible to pursue these objectives in reserves within big conurbations;
- sites attractive to nature-based tourists and ecotourists (new ecotourism products in cities);
- education site (learning about nature, growing respect for the natural and cultural heritage of cities);
• new tourism products of cities, city landmarks (reserves as the last wildlife sites in cities protecting their natural and cultural heritage, unique sites improving the quality of life in cities and making attractive public spaces).

Nature reserves can also provide an interesting alternative to sightseeing of historic monuments. Tourists can focus on different aspects and see another face of the city—traditional nature that used to exist there in the past. They become acquainted with the natural foundations of the city and its true natural heritage. The location of reserves in the city centre, surrounded by buildings and road traffic, engenders awareness of the fact that humans do have a huge impact on the environment and that civilisation has greatly transformed the city space, which articulates the need for nature conservation and teaches how to sightsee with respect for nature. The impact of the expansion of Warsaw on the natural environment in Natolin Forest and Kabacki Forest reserves is described in detail by [87].

The tourism potential of the examined reserves should be used for developing sustainable tourism to match the assumptions of sustainable development of both the reserves and cities for which such reserves can be an additional amenity and advantage as sustainable tourism products.

It seems that cities should promote nature reserves as valuable natural sites where one can see the true natural environment of the city, dedicated to specific target groups. This would allow reducing losses in the natural environment due to overtourism or tourism and outdoor activities having an adverse effect on the natural environment in the reserve. As indicated by [72], the conservation of species, and particularly species of plants, in the reserves can provide the basis for using the reserves for developing ecotourism and wild-flower tourism that is little known in Poland.

Studies by the present authors imply that nature reserves in the examined cities to varying degrees combine the nature conservation function with tourism (the highest valorisation index was noted for: Kabacki Forest and Bielany Forest, and for Bird Paradise and Lake Czerniakowskie) and feature necessary conditions for tourism, including nature-based tourism and ecotourism that are based on natural and cultural values in line with the concept of sustainable development [72]. Tourism in reserves also allows for the pursuit of these objectives in cities that additionally offer tourism products with varied natural features such as forest, aquatic, and peatland reserves. Their significance as recreation and leisure sites in cities has been growing during the COVID-19 pandemic.

An exploration of the level of differences in the tourism attractiveness of reserves, with its results and conclusions, should contribute to enhancing the development of tourism and recreation in urban reserves. Ref. [86], using the example of studies evaluating the regional attractiveness of urban reserves in Kielce, points to a great need for promoting and using nature reserves as a tourism product to increase the attractiveness of the area.

6. Recommendations

It is anticipated that growing human needs with simultaneously declining areas with tourism and recreational values will contribute to increased human interest in protected areas as rare destinations offering an attractive landscape and almost untainted natural environment. They can provide a basis for creating competitive tourism products falling within the scope of sustainable tourism, and in particular ecotourism. The most important are believed to be:

1. Increased awareness of society regarding the use of nature reserves for tourism respecting nature conserved in the reserves (familiarity with prohibitions, compliance with reserve rules);
2. Increased popularity of nature reserves as valuable tourism and recreation sites particularly dedicated to tourists interested in nature-based tourism and ecotourism;
3. To pursue these objectives, nature conservation needs many employees, clear legislation, spatial planning, monitoring of the natural environment and tourist traffic, and support from politicians and the local community;
4. This is a very serious problem. Nature reserves in cities are areas offering many natural values and valuable biodiversity that are often used for tourism and recreation in spite of formal prohibitions. The results of studies presented and described in this paper should encourage further works on changes in city legislation and planning to incorporate nature reserves as ‘new’ city spaces for developing nature-based tourism.

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