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Białystok inhabitants' preferences concerning forest recreational services – the need for landscape diversity

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Abstract. This paper deals with the market segmentation of recreational forest services using the concept of 'sensation seeking' to describe expectations of town dwellers towards recreation. In this approach, the variable of landscape dissimilarity is evaluated based on the landscape preferences of town dwellers for recreational purposes. The urban agglomeration of Białystok and the Knyszyn Forest (North-Eastern Poland) were chosen as the target for this case study. The results of the research suggest that the potential market of recreational forest services of the urban agglomeration of Białystok includes and provides for about 30% of the inhabitants. The emerging true market of the recreational services of the Knyszyn Forest reaches only about 22% of the inhabitants of Białystok. These market limitations and the characteristics of the forest landscape are inacceptable for outdoor recreation for the majority of town dwellers.

Keywords: recreation, forest landscape, sensation seeking, need for variety, town dwellers

1. Introduction

In multi-function forest model, next to environmental and economical functions, there are also social functions with great meaning for society's health and rest. In both Polish and European tradition (Matau *et al.* 2001), forest space is treated like common goods with free entry for society. Effect of that is still present issue of proper access to forest for recreational purposes[1].

It is worth noting that outdoor recreational activity is by definition natural, detached from the daily routine and is meant for being pleasant. That is why, irrespective of the form of access, recreational facilities should answer for users' needs and lead to satisfaction (pleasure) from using forest recreational services (Horne *et al.* 2005). Recreation preferences are strongly varied in society (Giles-Corti & Donovan 2002). The essence of recreational access is the definition of target user, and more specifically target user's recreational preferences, which should be the basis for planning recreational facilities in forests[2] (Kotler *et al.* 2010; Matau *et al.* 2001). According to Horne and Ovaskainen (after Horne *et al.* 2005), the evaluation of recreational forest space value is determined by landscape scenery and biodiversity. Moreover, Horne and Ovaskainen (after Horne *et al.* 2005), within their research over recreational system of Helsinki forests, indicate that visitors have their own strong preferences for visited places, and are not very interested in other areas.

In such approach, forest environment and recreational facilities adjusted to user's preferences, shape so-called 'servicescape' – the environment of services (Liljander &, Strandvik 1997), in this case, forest recreation services. The term 'servicescape' includes the atmosphere during the process of service provision that is shaped under

[1] According to the definition, recreation is an activity done for enjoyment when one is not working (Oxford Dictionary). By definition, in the recreation concept included is sport, entertainment and passive recreation.

[2] Recreation facilities can be described as a consistent, spatial system of infrastructure and services used for allowing for recreational use of geographical environment of given area.

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provider's patronage. The partonate patronage concept should be understood in this case as taking care of the client (forest recreational services user), in order to guide client's consumer behaviour (user's recreational activity). Basically, every environment of service is characterised by specific emotions, which have influence on level of satisfaction obtained by service user. As an effect, the specificity of recreational facilities in forest (servicescape) have to be adapted to preferences of the target segment of forest recreational service users. Otherwise, it will not arouse positive emotions that will result in satisfaction of people visiting forest for recreational purposes (Niininen *et al.* 2004).

2. The need for variety

The emotions associated with recreation in forests result from the intensity of received external stimuli, specific for forest environment. One of the recognised character traits (of human) is sensation seeking. With this term, connected is concept of optimal level of stimulation. The idea of this concept is that each person seeks the state of optimal level of stimulation. That means that with lowered level of stimulus, the organism leads to increase of state of arousal. Inverse rule occurs when there is increased level of stimulus. Then, the organism leads to lowering of the arousal state (Zuckerman *et al.* 1964). As an effect, some people, in order to reach the optimal level of stimulation, need higher intensity of stimuli and its diversity than others (Hanna & Wagle 1988) – each one of us has our own optimal level of stimuli.

Seek for sensation can be analysed in four approaches:

1. Thrill and adventure seeking. The need for outdoor recreational activity connected with extraordinary sensations and risk (e.g. survival, cyclo-cross in difficult-to-access forest environment and so on).

2. Experience seeking. The need for outdoor recreational activity in order to make unconventional choices. In recreation, it refers mainly to discovering 'novelty' for self-improvement (e.g. seeking for knowledge about wildlife behaviour). Sometimes, recreational activity can be the expression of social nonconformity (e.g. participation in nature protection happenings).

3. Disinhibition. Temporary rejection of social norms, the need for 'out of control' recreational activity, for example, 'wild', motocross competitions, organised by group of friends in forest.

4. Boredom susceptibility. The need for new recreational activity with unpredictable effects. This need results from the lack of tolerance towards monotony of actions in 'boring' environment. For some people, forest is a dynamic landscape offering many ambiguous sensations, and for others it is static and monotonous.

The influence of stimuli during unconstrained activity, which outdoor recreation is (e.g. in forests), leads to pleasure/satisfaction, thanks to the newness, ambiguity and complexity of external stimuli. In social spectrum, the optimum level of arousal (and the optimum level of stimuli connected with it), creates continuum from seekers of minimal sensations to seekers of strong sensations. Therefore, it should be expected that given forest environment with specific sensations: (1) for some people will be unsatisfactory due to too low level of sensations ('boredom'); (2) for others will be satisfactory due to optimal level of sensations ('pleasure'); (3) for other people will be unsatisfactory due to too high level of sensations ('stress').In literature on marketing of services, developed is narrowed (in relation to 'experience seeking') trait of character called the 'need for variety'. It is used to analyse consumers' behaviour, more specifically to analyse factors influencing on satisfaction and loyalty of consumers (Chen & Paliwoda 2004). The need for variety refers to stimuli associated with purchase and/or consumption of service. Therefore, it is strongly connected with 'servicescape' concept. The variable 'need for variety' is useful in market segmentation (consumers of service) in the scope of low-variety seekers to high-variety seekers.

In outdoor recreation and in tourism, the need for variety can be considered in terms of intensity of dissimilarity of external stimuli during recreational/holiday trips (Castro *et al.* 2007). Forest landscape significantly differs in sensory stimuli from urban landscape – recreation in forest delivers new, complex and ambiguously perceptible stimuli.

In this study, an attempt was made of segmentation of the users of forest recreational services in terms of variable – 'the need for variety' in reference to landscape. A case study for this article was Białystok[3] agglomeration and forests which surrounds Białystok and are used for recreation by Białystok inhabitants. The focus was made on large complex of Knyszyn Forest in direct neighbourhood, from north and east, to Białystok.

3. Survey trial

Survey research was conducted among 395 inhabitants of Białystok agglomeration, during their free time, on Białystok recreational areas (e.g. city parks). Survey questionnaire was developed by the team of employees of Cathedral of Tourism and Recreation of Białystok University of Technology, with the use of so-called expert method. Chosen sample group of students of tourism and recreation specialization examined questions in questionnaire in terms of their clear understanding and fast associating with outdoor recreational behaviour.

[3] Urban areas of Białystok and vicinal towns.

The answers of tested sample group of students to the questions from questionnaires were examined in terms of possibilities of conducting the analysis of the outdoor recreational preferences of Białystok inhabitants in different landscapes, taking into account the 'experience seeking' character trait. The proper research was conducted in spring-summer season in years 2009–2010. Trained students of tourism and recreation of Faculty of Management Studies of Białystok University of Technologies were the pollsters.

Adopted survey trial, in terms of variable age and sex, represented statistically the society of Białystok inhabitants ($p < 0.05$) (Table 1).

4. Research tool

'Experience seeking' character trait was described with the category of landscape diversity in order to adjust the trait to the specifics of outdoor recreation in forest. According to Zuckerman *et al*. (1964) and Zuckerman (2005), this category can be analysed in the form of continuum from low -variety seekers to high-variety seekers, where the diversity concept refers to differences between stimuli related to recreation in forest and stimuli related to daily routine in their place of residence (in town).

4.1 The variety of recreational landscapes

For town inhabitants, recreation in forest is always connected with landscape otherness, that is, with stimulation of external stimuli. Nevertheless, the landscape can be the basis or just a background for recreational activity. In the first case, features of landscape (thanks to their newness, ambiguity and complexity) can provide high level of external stimuli, whereas in the second case, low level of external stimuli. The need for landscape diversity continuum was illustrated by seven categories of variety seekers (I – people with very small need; II – people with small need; III – people with average-low need; IV – people with average need; V – people with average-high need; VI – people with high need and VII – people with very high need). To category I assigned were people avoiding nontown landscape during recreation. Category VII included people preferring undeveloped forest landscapes.

In order to assign respondents to specific category, analysis of answers to three questions in questionnaire was performed. The questions were: (1) What is preferred form of tourism? Answer analysis in the spectrum from entertainment tourism to environment tourism; (2) What recreational sites of Białystok are the most attractive? Answer analysis in the spectrum from the shopping centres to undeveloped recreationally suburban forests; (3) What is the attitude towards nature? Answer analysis in the spectrum from aversion to philosophy of deep ecology. This allowed for further analysis of 'Declared need for landscape diversity for outdoor recreation purposes' in seven-step scale (DK).

After analysis of the answer for another question: (4) What landscapes near Białystok are used for recreation, it was possible to verify in the new seven-step scale the declared need for 'Realised need for landscape diversity for outdoor recreation purposes' (RK).

The analysis of usage of Knyszyn Forest for recreation purposes by Białystok inhabitants was performed in the next stage. Based on the analysis of answers to another four questions in the questionnaire, the respondents were assigned in seven-step scale of 'Realised need for landscape diversity for recreation purposes in Knyszyn Forest' (KL). Following questions were asked: (5) What are the most attractive areas of Knyszyn Forest?; (6) What areas of Knyszyn Forest are used for recreation? Analysis of answers in spectrum from nonforest urban areas to undeveloped recreational forest areas; (7) What factors decide about attractiveness of listed earlier recreation areas of Knyszyn Forest? Analysis of answers in spectrum from lack of interest in forest landscape to natural uniqueness of forests; (8) How often Knyszyn Forest is used recreationally? Analysis of answers in spectrum from never to regularly during the week.

At the same time, answers to questions (6) and (7) allowed for construction of nine-step scale of 'recreational attractiveness of forest landscape': I – lack of recreational interest in forest landscape; II – open recreational areas with forest panorama, valued for the aesthetics of the landscape; III – open recreational areas with forest panorama, valued for landscape diversity; IV – forest with recreational facilities, valued for aesthetics of landscape; V – forest with recreational facilities, valued for nature uniqueness; VI – forest adapted for sightseeing, valued for the aesthetics of the landscape; VII – forest adapted for sightseeing, valued for nature uniqueness; VIII – forest in natural state, valued for the aesthetics of the landscape; IX – forest in natural state, valued for nature uniqueness.

5. Results

Table 2 presents the declared (DK) and realised (RK) need for landscape diversity for outdoor recreation by inhabitants of Białystok agglomeration. Table 2 also presents realised need for landscape diversity during recreation in Knyszyn Forest. Evaluation, made by inhabitants of Białystok agglomeration, of recreational attractiveness of forest landscape of Knyszyn Forest, is shown in Table 3.

Table 1. Socio-demographic characteristics of respondents (N = 395)

	Characteristic	Per cent of all respondents N = 395 [%]	Per cent of visitors of the Knyszyn Forest N = 275 [%]
Age	16–24 yrs.	26.32	22.55
	25–44 yrs.	42.03	47.64
	45–60 yrs.	20.00	20.36
	above 60 yrs.	11.65	9.45
Gender	male	48.86	48.00
	female	51.14	52.00
Educational status	elementary education	11.90	8.73
	vocational/secondary education	48.86	46.55
	college/university education	39.24	44.73
Employment status	unemployment	14.94	13.45
	educatee/student	38.48	40.73
	learned profession	6.84	6.91
	employee	27.59	24.36
	self-employment	6.84	6.91
	manager	5.32	7.64
Family status	family with children	54.94	52.73
	childless family	17.72	16.36
	single person	27.34	30.91
Declared welfare status	above the national average	17.72	20.00
	the national average	58.23	59.27
	below the national average	24.05	20.73
Nature perception	deep ecology	3.80	4.00
	enthusiasm	22.28	24.73
	friendliness	60.25	59.27
	indifference	13.67	12.00
	antipathy	0.00	0.00
Inhabitance	Białystok	70.63	70.55
	vicinal places with Bialystok	29.37	29.45

Source: own elaboration

The conducted research indicates the percentage of the respondents, that is, inhabitants of Białystok agglomeration, who used the forest area for recreational purposes (N = 395):

- 83% use areas of forest landscape.
- 16% strongly prefer forest landscapes.
- 70% use region of Knyszyn Forest.

Table 2. The declared (DK) and the realized (RK) need of landscape variety during outdoors recreation, and the realized (KL) need of landscape variety during recreation in the Knyszyn Forest by inhabitants of the Białystok agglomeration

Need characterization	Per cent of all respondents N = 395 [%]	Per cent of visitors of the Knyszyn Forest N = 275 [%]
Very low need for landscape variety		
DK I	27.59	24.00
RK I	28.10	24.00
KL I	30.37	0.00
Low need for landscape variety		
DK II	2.78	2.55
RK II	6.33	2.55
KL II	32.66	46.90
Below the average need for landscape variety		
DK III	20.76	18.55
RK III	17.72	18.55
KL III	17.22	24.73
The avarage need for landscape variety		
DK IV	7.85	9.45
RK IV	7.85	9.45
KL IV	10.13	14.55
Above the average need for landscape variety		
DK V	11.14	14.18
RK V	12.41	14.18
KL V	4.30	6.18
The high need for landscape variety		
DK VI	17.22	18.91
RK VI	17.22	18.91
KL VI	3.29	4.73
The very high need for landscape variety		
DK VII	12.66	12.36
RK VII	10.38	12.36
KL VII	2.03	2.91
Need of low sensations		
DK I + DK II	30.37	26.55
RK I + RK II	34.43	26.55
KL I + KL II	63.03	46.90

Need characterization	Per cent of all respondents N = 395 [%]	Per cent of visitors of the Knyszyn Forest N = 275 [%]
Need of average sensations		
DK III + DK IV + DK V	39.75	42.18
RK III + RK IV + RK V	37.98	42.18
KL III + KL IV + KL V	31.65	45.46
Need of high sensations		
DK VI + DK VII	29.88	31.27
RK VI + RK VII	27.60	31.27
KL VI + KL VII	5.32	7.64

Source: own elaboration

Table 3. Recreational attractivity of forest landscape (AL) of the Knyszyn Forest, evaluated by inhabitants of the Białystok agglomeration

Preference of landscape	Per cent of all respondents N = 395 [%]	Per cent of visitors of the Knyszyn Forest N = 275 [%]
The lack of recreational interest in the Knyszyn Forest landscape	30.38	0.00
Recreational sites in the open landscape with forest view, highly esteemed for the scenic landscape	44.81	64.36
Recreational sites in the open landscape with forest view, highly esteemed for the variety of landscape	2.53	3.64
Recreational sites in the forest landscape, highly esteemed for the scenic landscape	10.13	14.55
Recreational sites in the forest landscape, highly esteemed for the uniqueness of nature	4.56	6.55
Recreational paths in the forest landscape, highly esteemed for the scenic landscape	3.54	5.09
Recreational paths in the forest landscape, highly esteemed for the uniqueness of nature	1.52	2.18
Natural forest without of recreational facilities, highly esteemed for the scenic landscape	1.52	2.18
Natural forest without of recreational facilities, highly esteemed for the uniqueness of nature	1.01	1.45

Source: own elaboration

Among respondents, inhabitants of Białystok agglomeration, who use Knyszyn Forest recreationally (N = 275):

- 32% use the inside of the forest.
- 68% do not use the inside of the forest, but only open areas with forest panorama.

Linear regression used in this research revealed connections statistically important at level of confidence $p < 0.01$, between:

- Declared (DK) and realised (RK) need for landscape diversity for outdoor recreation purposes (correlation coefficient 0.9894).
- Declared need for landscape diversity for outdoor recreation purposes (DK) and realised need for landscape diversity during recreation in Knyszyn Forest (KL) (correlation coefficient 0.1560).
- Realised need for landscape diversity for outdoor recreation purposes (RK) and realised need for landscape diversity during recreation in Knyszyn Forest (KL) (correlation coefficient 0.2091).
- Realised need for landscape diversity for outdoor recreation purposes (RK) and perception of recreation attractiveness of Knyszyn Forest landscape (AL) (correlation coefficient 0.1636).
- Realised need for landscape diversity during recreation in Knyszyn Forest (KL) and perception of recreation attractiveness of Knyszyn Forest landscape (AL) (correlation coefficient 0.6669).

During analysis of variables such as age, sex, family status, material status, education status, employment status and declared perception of nature, linear regression showed following, relatively weak, but statistically relevant relations:

- Declared, by inhabitants of Białystok agglomeration, need for landscape diversity for outdoor recreation purposes (DK):
  - increases with the increase of age of the respondent (correlation coefficient 0.1383 at $p < 0.01$),
  - increases with the level of empathy towards nature (correlation coefficient 0.2023 at $p < 0.01$),
  - increases with education status of the respondent, (correlation coefficient 0.1236 at $p < 0.05$)
- Realised, by inhabitants of Białystok agglomeration, need for landscape diversity for outdoor recreation purposes (RK):
  - increases with education status of the respondent (correlation coefficient 0.1451 at $p < 0.01$),
  - increases with the level of empathy towards nature (correlation coefficient 0.2082 at $p < 0.01$),
  - increases with the increase of age of the respondent (correlation coefficient 0.1293 at $p < 0.05$).
- Realised need for landscape diversity during recreation in Knyszyn Forest (KL):
  - increases with the increase of age of the respondent (correlation coefficient 0.1448 at $p < 0.01$),
  - increases with the level of responsibility in professional work (correlation coefficient 0.1427 at $p < 0.01$).
- Perception of recreation attractiveness of Knyszyn Forest landscape (AL):
  - increases with the increase of age of the respondent (correlation coefficient 0.1830 at $p < 0.01$),
  - increases with the level of responsibility in professional work (correlation coefficient 0.1106 at $p < 0.05$).

6. Discussion

The results revealed common interest of Białystok agglomeration inhabitants for outdoor recreation purposes. It means recreation in open areas with forest landscapes – over 80% of respondent use such landscapes and 16% prefer it decisively.

Variable of declared need for landscape diversity (DK) shows, among respondents, distribution close to normal: around 30% represent seekers of weak sensations, around 40% represent seekers of average sensations and around 30% represent seekers of strong sensations connected with landscape diversity during outdoor recreation. However, variable of realised need for landscape diversity (RK) shows small displacement of distribution towards smaller need for landscape diversity: around 34% represent seekers of weak sensations, around 38% represent seekers of average sensations and around 28% represent seekers of strong sensations connected with landscape diversity during outdoor recreation (Table 2). These small differences that were revealed in distribution of variables DK and RK, suggest fulfilment of the needs of Białystok inhabitants in the range of recreation access to the areas of high greenery (parks and urban forests) of Białystok. Those landscapes are characterised by vivid landscape diversity in contrast to urbanised landscape.

Declared (DK) and realised (RK), by inhabitants of Białystok agglomeration, need for landscape diversity for outdoor recreation purposes increase with age, education status and empathy of respondent towards nature. According to the theory of 'sensation seeking', the optimum level of stimulation (optimum level of stimuli) increases with age from early childhood to adolescence (18–20 years) and then it begins to steadily decrease (Zuckerman 2005). In this case, need for landscape diversity that increases with age is related most of all with 'susceptibility to boredom' feature, which, in contrast to other features of 'sensation seekers', remains at a constant level throughout life. At the same time, weak direct proportional dependence on age suggests that the choice of forest landscapes for outdoor recreation, for some respondents, is a form of limitation of stimuli from other features (thrill and adventures seeking, experience seeking and disinhibition). This confirms, in some way, the stereotype

of seeking the 'peace and quiet' in forest landscape. At the same time, education status increases the cognitive aspect of landscape diversity connected with 'experience seeking' among nature. The relation between need for landscape diversity and empathy towards nature is quite obvious – the choice of natural landscape for recreation is conditioned by respondent's worldview.

The variable of realised need for landscape diversity during recreation in Knyszyn Forest (KL) shows definitely different distribution than normal: around 63% represent seekers of weak sensations, around 32% represent seekers of average sensations and around 5% represent seekers of strong sensations connected with landscape diversity during outdoor recreation (Table 2). Vivid differences, revealed in distribution of variables RK and RL, suggest that during recreational trips to Knyszyn Forest, inhabitants of Białystok in small degree duplicate their recreational behaviour from Białystok agglomeration area (correlation coefficient 0.2091 at level of confidence $p < 0.01$). Despite the fact that Knyszyn Forest lies directly next to Białystok from northern and eastern part, and is easy accessible in terms of commute for all inhabitants, it is not treated by them as their natural recreational space strictly connected with their place of residence. Recreational trips to Knyszyn Forest are treated as separate category of recreation, not connected to the place of residence. That confirms the decisive impact of landscape surrounding on recreational behaviour – the bigger the diversity of landscape, the clearer is modification of routine recreational behaviour.

Perception of recreational attractiveness of forest landscape of Knyszyn Forest (AL) and realised need for landscape diversity during recreation in Knyszyn Forest (KL) increases with education status and with the level of responsibility in respondent's professional work. Those connections confirm the hypothesis made earlier. Stress from responsibility connected with professional work favours the selection of forest landscape for outdoor recreation with lower level of features 'seeking for adventures and threats', 'experience seeking' and 'disinhibition'. At the same, education status favours 'seeking for experience' in cognitive aspect on the basis of forest landscape diversity. Generally, recreational trips to Knyszyn Forest are treated as an escape from the routine of everyday life (including routine of recreation in the place of residence), and are used for lowering the level of stimulation for people stressed by professional work, or for increasing the level of stimulation for people bored with everyday routine.

Majority of respondents (68%) who visit Knyszyn Forest for recreational purposes use urbanised or open landscapes with forest panorama. Twenty-one percent of respondents visit forest areas of Knyszyn Forest with recreational facilities (Table 3). Only 11% of respondents use recreationally the inside part of Knyszyn Forest, which has no recreational facilities and only 8% are seekers of strong sensations in reference to diversity of Knyszyn Forest landscape (Tables 2 and 3). The majority of respondents (86%) visiting Knyszyn Forest see the landscape through the prism of aesthetic sensations, avoiding at the same time ambiguity of stimuli connected with forest environment. Only 10% of respondents visiting Knyszyn Forest appreciate forest landscape for its novelty, complexity and ambiguity of stimuli, that is, for its natural uniqueness (Table 3). At the same time, linear regression did not reveal connection of AL and KL with variable of empathy towards nature. This confirms that majority of people prefer open landscapes for outdoor recreation purposes. Forests, in dependence on degree of simplification of forest stand structure, represent closed or semi-open landscapes. One can be very empathetic towards nature and be a defender of its beauty and at the same time, due to 'experience seeking' character feature, one can avoid recreation in closed forest landscape. Those results are confirmed in extensive literature on landscape preferences of town inhabitants. For recreation purposes, open, stage and dynamic landscapes are definitely preferred. Among forests, preferred choices are semi-open landscapes (e.g. old coniferous opened-up forests), deprived of shrub layer, with natural landscape windows (e.g. watercourses or retaining reservoirs), dynamic (e.g. with bird sounds), with basic recreational facilities (Panagopoulos 2009; Price 2003; Roovers *et al.* 2006; Shelby *et al.* 2005; Tyrväinen *et al.* 2003).

7. Conclusion

Research results presented in this case study suggest that majority of respondents feel insecure in conditions of unfamiliar, closed landscape – they do not accept it in terms of outdoor recreation purposes. As recreation space, forest panorama is appreciated by majority of Białystok agglomeration inhabitants (83%). On the other hand, the inside of the forest, which constitutes closed landscape, as recreation space, is appreciated by substantial minority of Białystok agglomeration inhabitants (22%). The majority of them evaluate the diversity of Knyszyn Forest in aesthetic aspect (86%), but only 10% appreciate Knyszyn Forest's diversity in aspect of nature uniqueness[4].

[4] In this study, 'agglomeration of Białystok' defines urban areas of Białystok and its vicinal towns with around 310 thousand inhabitants of urban areas (Central Statistical Office of Poland 2011, http://stat.gov.pl/en/). Therefore, 22% of potential users of recreational offer of the inside of the forest constitute around 68 thousand people who create actual market of forest recreation services. At the same time, if general influence of forest on recreational behavior of town inhabitants is considered, then the formation of panorama on the forest borders has an impact on more than 80% of Białystok agglomeration inhabitants. As an effect, taking into account the aesthetic aspect of formation of developed ecotone zones of forest borders is very important element of recreational facilities of forests.

The inside of the forest, as a complex ecosystem with novelty and ambiguity of recreation stimuli, is appreciated only by 4% of Białystok inhabitants who visit recreationally Knyszyn Forest – recreation in forest in a cognitive aspect. It is possible to assume that there is 4% of loyal users of State Forests' educational offer in the form of forest educational paths. The inside of the forest, as a landscape with aesthetic aspect of recreational stimuli is appreciated only by 7% of Białystok inhabitants – recreation in forest has a relaxation aspect. For those two groups (11%), the offer of all hiking trails and educational paths localised in closed forest landscape of Knyszyn Forest is potentially acceptable. Ten percent of Białystok inhabitants, who visit Knyszyn Forest, appreciate developed recreationally inside of the forest with landscape windows (with accessible panorama) for complex ecosystem with novelty and ambiguity of recreational stimuli. In this case recreation in forest has a cognitive aspect. Inside of the forest developed recreationally with landscape windows (with accessible panorama), as a landscape with aesthetic aspect of recreational stimuli, is appreciated by 22% of Białystok inhabitants who visit recreationally Knyszyn Forest. That kind of recreation has a relaxation aspect. For those two groups (32%), potentially accepted is the offer of all 'forest parks' in Knyszyn Forest (e.g. Arboretum in Kopna Góra[5] and recreational object in Poczopek[6]).

The research refers to one study case – agglomeration of Białystok. The results describe recreational preferences of inhabitants of the average-size town (around 300 thousand inhabitants) next to large forest complex (around 105 thousand hectare). Nevertheless, these results can be the basis of market analysis for forest recreation services in other towns of similar size (100–500 thousand inhabitants).

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Conflict of interest

The author reports no conflicts of interest in this work.

[5] http://www.suprasl.bialystok.lasy.gov.pl/arboretum-w-kopnej-gorze#.VroqTlJ0zIUn (In Polish)

[6] http://www.krynki.bialystok.lasy.gov.pl/silvarium1#.VrorclJ0zIU (In Polish)

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