ECONOMIC VALUATION OF HIGH NATURAL VALUE AREAS IN CENTRAL ROZTOCZE

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ABSTRACT

The paper discusses and analyses some basic issues about economic valuation of high natural value areas. As a concrete illustration, but also to enable an account of some central general topics, the paper also deals with the valuation of high natural value areas in Central Roztocze. The valuation was performed using the individual travel cost method. The valuation was carried out on the basis of results of a survey (n = 323) and statistical data. The calculation includes the travel cost, the costs of accommodation, the costs spent on special equipment rental and other costs associated with the visit to the study area. Moreover, the calculation takes into account the information about the amount of time respondents spent in the study area and information about the total number of visitors per year to the study area. The determined total travel cost was PLN 66.861. The average individual travel cost per one user amounted to PLN 207. In order to determine the total value of the high natural value areas of Central Roztocze it was necessary to combine the number of tourists visiting the site during the year and the average cost of travel. The total number of visitors per year is 750.000. The calculations show that the total economic value (understood as defined here) of the high natural value areas in Central Roztocze is PLN 155.250.000.

Keywords: economic valuation; travel cost method; recreational value

INTRODUCTION

Natural environment resources and assets or qualities are believed to be invaluable. They are limited in supply and therefore the public has to be made aware of their essential role in the economy and their important impact on the quality of human life. No better method of bringing these relationships closer to people has been found so far than putting a monetary value on environmental resources and qualities. The goal is to improve public awareness and foster eco-minded attitudes. It significantly affects the way natural wealth is

managed as well (Zydroń, 2016). We appreciate that when data and statistics are communicated to the public or to management decision-makers, any change or specifically any improvement will depend on additional societal factors (such as the state of the economy or education), or supplementary information or attitudes in context, factors, information or attitudes not the focus of our analysis here. We must for the sake of analysis start to build an account that excludes many possible variables.

In order to be able to manage natural resources, which undoubtedly include high natural value areas,

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one needs access to data concerning their economic value. Being aware of its economic value may help make key decisions concerning how the resource is used. This is particularly useful at the time when the degradation of areas of high natural value continues (Żylicz, 2004).

Today, the valuation of natural areas is becoming more popular in particular in the fields of environmental economics and natural resources. This is primarily because the impact of these areas on the economy and society is understood better now. An additional argument for the popularity of the valuation of such areas is that the currently available methods have been refined to offer more reliable estimates. Over years, experts have developed a number of methods for economic valuation of the environment, but the travel cost valuation method remains the most popular one. This method is widely applicable also because it can be used to estimate the value of sites available for free. Another very common reason the travel cost method is used to estimate the economic value is that this approach if thoughtfully used is compatible with the sustainable development economics. This, in turn, significantly improves its position in local and regional development planning (Zawilińska, 2014). It should be added that the value of sustainable development, often asserted and used in policy and planning, while important, is also rather general and complex, involving many features. There will often be theoretical and practical issues about whether and how sustainable development is relevant to improved environmental decision-making. We proceed here by arguing that our attention to the travel cost valuation method is a necessary (though not assuredly a sufficient) approach to estimate the value of high natural value areas. This is implied by our claim that two aspects of high natural value areas must emerge from environmental and economic aspects.

The goal of this paper is to estimate the value of high natural value areas in Central Roztocze using the individual travel cost approach.

HIGH NATURAL VALUE AREAS AND ECONOMIC VALUATION

The literature offers many definitions of areas of high natural value based on various criteria, but it is difficult to determine the best one (Jalinik, 2009).

The most comprehensive criteria seem to require some among the definitions of high natural value areas emerging from the combination of two aspects: the environmental one and the economic one. From the environmental point of view, they are on-shore or off-shore areas with high biodiversity together with their resources, both natural and cultural, that objectively require preservation in an unchanged condition. We should note that in the literature some researchers would question the limitation of the purposes of environmental protection or improvement to serving solely human needs. From the economic perspective, high natural value areas are sites where the biological and landscape diversity is (or may be) a significant factor for a business activity or significantly limits the traditional ways of land use (Jalinik, 2016).

Areas of high natural value are protected by the law partly due to their unique and often immeasurable value. The areas may be organised in various ways. Each of the forms of protection plays a different role in the environment conservation scheme. They, therefore, have various protection regimes and limitations for economic use (Lipińska, 2013; Kołodziejczak, 2016).

Areas of high natural value can be perceived in two ways: as development obstacles or stimuli. The areas are a barrier for some forms of intensive production and new investment projects that could significantly and possibly negatively impact the environment. This does not mean that business activity has to cease completely in these areas. They should be adjusted to preserve the biodiversity of the place. High natural value areas may be an important stimulus for local development based mainly on recreational, tourism, and cultural assets of the sites (Kołodziejczak, 2016).

In Poland, areas of high natural value are sites under legal protection listed in the Environmental Protection Act (2004), i.e. national parks, nature reserves, landscape parks, protected landscape areas, Natura 2000 areas, natural monuments, documentation sites, ecological sites, nature and landscape complexes, and areas protected because of the occurrence of protected plant, animal, and fungi species.

The primary objective of high natural value areas is the protection of natural environment resources, in particular preserving biodiversity and continuity of

basic biological processes. These areas significantly contribute to economic growth, thus improving the standard of life for local communities as well. They provide numerous consumer-oriented benefits and their qualities ensure a large potential for tourism and recreation. Moreover, they are an opportunity for research and can support processes aimed to improve environmental awareness. They contribute to the popularisation of sustainable development principles in the context of shaping areas of high natural value and principles of managing such areas. Apart from that, they provide numerous intangible benefits related to aesthetic, spiritual, historical, and cultural values (Zielińska, 2012; Zwolińska-Ligaj, 2015; Jalinik, 2016).

High natural value areas have numerous functions in the society-economy-natural environment macrosystem, which directly affects their value. The value is of economic nature as long as the sites or their resources affect the management (direct usefulness) and provide services for life maintenance, system self-regulation, and many other that influence the life of man (non-economic potential) (Guzal-Dec, 2015).

Economic use valuation of the environment means the placement of monetary value on goods and services provided by the natural environment. It is also a method for estimating the monetary value of physical changes in environment quality resulting from actions or failure to act, in particular in environmental protection. The fact of putting a monetary value on environmental qualities or resources is strictly related to the application of the same approach to the natural environment and labour capital. This is because goods and services provided by the environment are not marketed usually and their value is not expressed as market prices (Guzal-Dec, 2015). The relevance of markets to goods and services provided by the environment is a large and interesting area for research that in some respects is beyond the scope of this paper (though to some extent addressed here).

With time, environmental economics developed a number of methods for estimating the economic value of the natural environment. The estimation is possible thanks to in-depth monitoring of physical relationships between tangible effects for health, productivity, and resources and environmental quality indicators. The literature offers three primary components of the economic value of the natural environment (Zielińska, 2011; Szkop, 2015).

The economic valuation of the natural environment has a number of intangible benefits. The most important are:

1) determination of the benefits brought by investment projects that support the natural environment;
2) estimation of the costs of production and consumption activities, including the determination of the amounts of fines and charges for any negative impact on the environment;
3) determination of the pace the resources are consumed at;
4) information about signs of depletion of specific resources while reminding us of their finite availability;
5) improving the credibility of economic growth indicators;
6) assistance for administrative actions taken to protect the environment (Puto, 1998; Piontek, 2012; Becla et al., 2012).

It is difficult to estimate the economic value of the natural environment, in particular as regards areas of high natural value, because it requires substantial knowledge of the influences the areas are subject to and the results of these influences. It is also important to determine the volume of environmental resources available. An objective determination of losses caused by degraded landscape qualities or loss of important socio-cultural components of a local community poses a real challenge. Another key restriction is the subjective bias of the researcher who evaluates areas of high natural value (Guzal-Dec, 2015; Popławski, 2013).

MATERIAL AND METHODS

The study focused on the Central Roztocze located in south-eastern Poland. It spans over the south-eastern part of the Lubelskie Voivodship and a small part of the north-eastern Podkarpackie Voivodship. It follows the Wieprz River between Szczebrzeszyn and Zwierzyniec and the depression along Rebizanty-Narol-Lubycza Królewska (Krupa et al., 2013). According to the physiographic subdivision of Poland by Kondracki (2000), Central Roztocze is a mesoregion of the Roztocze macroregion (see: Fig. 1).
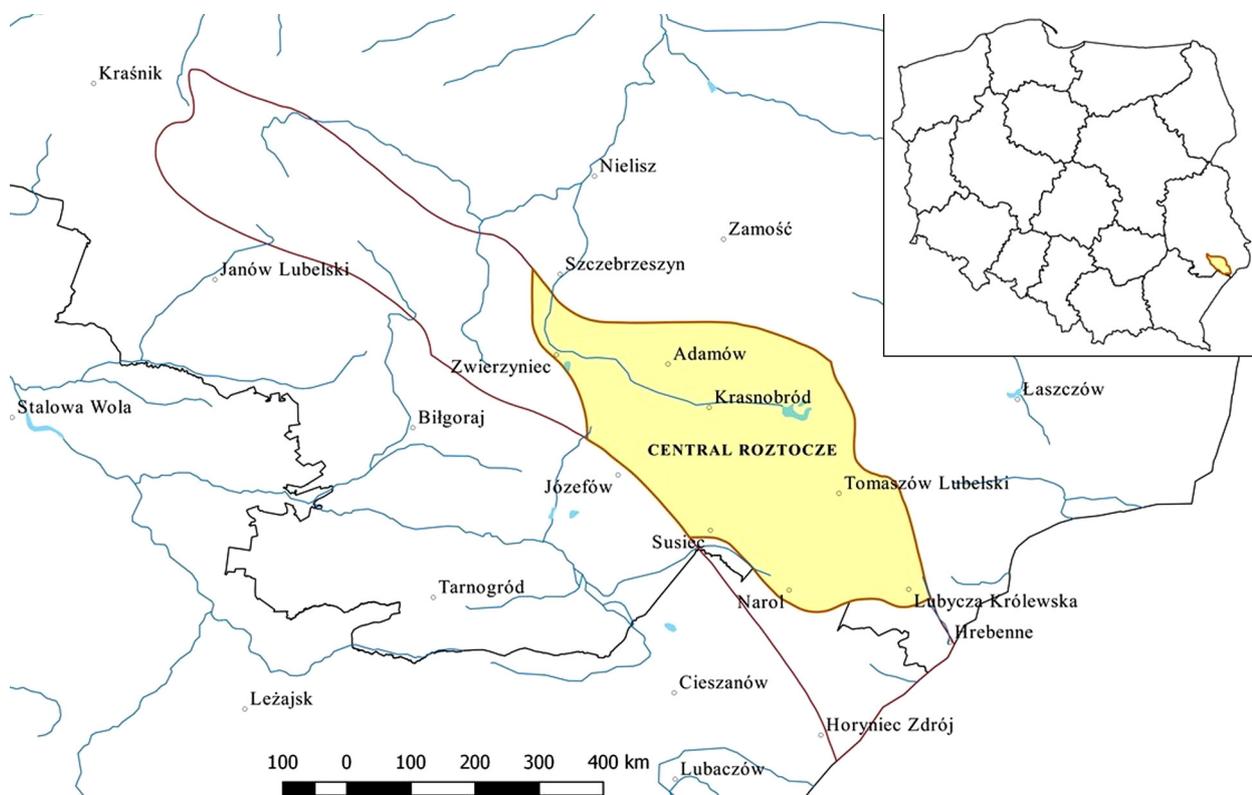
Fig. 1. Research area – Central Roztocze

Source: own work

The economic valuation of high natural value areas in Central Roztocze was performed using the travel cost method (TCM). The estimate necessitated the collection of data from individual users of the sites through a questionnaire survey.

The questionnaire consisted of two main parts. The first part was relevant to general information about respondent's presence in Central Roztocze. Questions concerned the purpose of travel, transport cost, and frequency of travel to the area. The other part included questions about the socioeconomics of the respondent (sex, age, residence, education, type of professional activity, and net income per capita). The survey was completely anonymous. In the introduction, the participants were informed about the purpose of the study and average time necessary to respond to the questions.

The survey targeted only people who visited Central Roztocze. This was in line with one of the con-ditions of the TCM that the method may be applied solely to revealed preferences (Marks-Bielska and Zielińska, 2014). The survey excluded participants of school trips and summer camps. This was because the children could not make an independent decision to come to Central Roztocze. In many cases parents could decide about participation their children in that kind of trips. Moreover, the trips could be the part of their educational process – outdoor classes or practises in which the presence was mandatory. If a person does not make an independent and free decision to visit a specific place, they are excluded from the estimation procedures (Panasiuk, 2001). It might seem arbitrary to restrict the estimation procedures in this way. After all, parents or school system administrators do make decisions that have an economic impact, so why not count the results as relevant? We, however, exclude these factors since we are specifically more interested in how independent decision-makers reflecting their

own values yield evidence about their revealed preferences.

The surveys were carried out in two ways. Some results came from field surveys. These surveys were carried out in places considered great tourist attractions such as trails in the Roztoczański National Park, near the chapel of Saint Roch in the Saint Roch Reserve, in the Piekiełko Reserve near Tomaszów Lubelski, near the Beetle Monument in Szczebrzeszyn, near the waterfalls on the Jeleń River, on the path to the Wapielnia Mountain, and at the entrance to the viewing deck in Krasnobród. Online surveys were performed in parallel to the field surveys. The survey questionnaire was posted on some social media where interested people could participate in the study. Both for field surveys and online surveys, respondents were selected randomly.

The next stage involved an analysis and verification of collected data. Questionnaires without responses to key questions or with responses irrelevant to the question were excluded. The final data set was made of 323 responses used in the following estimates.

The sample can be considered representative. Central Roztocze high natural value areas are visited the most during the time the survey was carried out. People who visit the place once a year or once a few years do so mostly in or around summer. Using the collected data on the number of visits in a year and assuming the visits are similar, it was possible to include all visits of people who came to Central Roztocze more than once a year. People who visit the area in the period outside of the study period are a small group and their main purpose of the visit is often not related to areas of high natural value. They can, therefore, be excluded.

Using the data collected during the surveys and taking into consideration the assumptions listed below, the annual value of the travel cost for an individual user of high natural value areas in Central Roztocze was estimated. The following formula was used for the estimation:

$$ITC = (2 \cdot D \cdot C_1 + 2 \cdot D \cdot C_2 + 2 \cdot C_3 + T + A \cdot P + E) \cdot N$$

where:

ITC – the total cost of travel to Central Roztocze, PLN/person;

D – the distance from the place of residence of the respondent to Central Roztocze, km;

C_1 – the car travel cost, PLN/person;
C_2 – the motorcycle travel cost, PLN/person;
C_3 – the public transport travel cost, PLN/person;
T – the travel time cost, PLN/person;
A – the number of days of accommodation;
P – the price of accommodation, PLN/person;
E – additional expenses, PLN/person;
N – the number of visits per year.

The formula is by courtesy of Zydroń and Pruchlat (2014). The formula was modified to facilitate the estimation of the value based on the type and scope of available raw data.

In order to estimate the value of high natural value areas precisely, it is necessary to determine needs or desires that motivate people to visit these sites. The surveys collected information about the primary purpose of the visit to Central Roztocze as well. This way, responses of people who were visiting friends or family and other responses that did not indicate the intention to consume assets of areas of high natural value were excluded. This is in line with the assumption that every trip to a protected area, i.e. an area of high natural value, results from a need to benefit from the contact with these sites. These profits include peace and quiet, natural environment and landscape qualities, etc. (Mazurkiewicz and Bosek, 2013). It is important because the fact that the study area was visited in addition to a visit to another place may significantly distort analysis results (Trojnarski, 2010).

As some values of transport cost for the trip to Central Roztocze were overestimated or no response was given to the question regarding this cost, values in accordance with the Regulation (2007) were used in the calculations:
−   for car: 0.8358 PLN/km;
−   for motorcycle: 0.2302 PLN/km.

When a visitor to Central Roztocze declared they hiked or cycled to Central Roztocze, the cost estimate was PLN 0. When a respondent declared travelling by bus or train, the transport cost was calculated using the amount specified by them in the questionnaire. When calculating car travel cost, it was divided by the number of people in the vehicle assuming they shared the cost. The information on the number of people in a single car was obtained in the questionnaire survey.

The value of high natural value areas in Central Roztocze was calculated conservatively. This approach assumes travel time cost to be PLN 0. It is based on the assumption that travel time neither increases nor decreases the level of usability. What is more, the time travel value may depend on various factors that are difficult to foresee and control such as road conditions and the time of travel (weekday, weekend, during the day or at night). Some find it pleasant to travel and do not consider the travel time a cost. It can, therefore, be assumed that the results would be less distorted if travel time cost is set to PLN 0 than if average values are used (Bartczak, 2011). However, it might be considered, as we do not take into account, that willingness to spend time travelling may well be one indicator of the revealed preferences of a person who could have decided to do something else, such as working or engaging in some other form of recreation. The conservative approach was selected because of the nature of the study area. High natural value areas in Central Roztocze are considered attractive recreational sites.

The vast majority of visits took place during holidays, which was confirmed by the small number of income losses caused by the visit to Central Roztocze. The estimate of the economic value did not include the value of time spent in the valuated area. Note that most visitors to Central Roztocze are university or school students. They represent a social group the income of which is not based solely on work. They should, therefore, not be ascribed the average value of time spent in Central Roztocze as it could considerably contribute to an overestimation of the value (Zydroń and Pruchlat, 2014).

The distance from the place of residence to Central Roztocze was specified by the respondents in one of the questions in the questionnaire. In order to verify the actual distance from Central Roztocze to the place of residence, the respondents were asked about their place of residence, which was then entered into Google Maps to determine the estimated distance in kilometres.

Accommodation costs were calculated from responses of individual participants. The number of nights and their price were taken into account. For those who did not use accommodation, the cost was set to PLN 0.

The amount of additional expenses incurred during the visit to Central Roztocze that is the sum of food, entrance fee, souvenirs, and special-purpose equipment rent expenses was calculated using survey results. If a respondent had not responded to this question, the amount of the cost was set to PLN 0. Data on the number of visits in a year was taken from the survey.

Using formula (1), the annual value of travel cost for an individual user of high natural value areas in Central Roztocze was estimated. Then, the value was used to calculate the total economic value of high natural value areas in Central Roztocze according to formula (Zydroń and Pruchlat, 2014):

$$V = \frac{\sum ITC}{n} \cdot T \qquad (2)$$

where:
- V – the economic value of high natural value areas in Central Roztocze, PLN;
- $\sum ITC$ – the sum of values of annual travel costs for individual users, PLN;
- n – the number of respondents;
- T – the approximate number of people who visited high natural value areas in Central Roztocze.

The approximate number of visitors to high natural value areas in Central Roztocze was estimated using the data collected. It was difficult to estimate the actual number of visitors because most of the study area is free to access so the tourist traffic is not recorded. The number of persons visiting the high natural value areas was estimated using data in Świeca et al. (2015). For some facilities, data provided by their administrators was used. The approximate number of visitors was calculated using the data shown below (Table 1.).

Because no detailed data on the number of visitors to high natural value areas in Central Roztocze was available, the number of 750 thousand was considered reliable and used in the estimates.

The paper draws from the available literature. The generally available, online databases turned out to be a valuable source of information as well. Previous valuations published online were often used. The calculations involved data collected by the authors (questionnaire survey).

Table 1. The approximate number of visitors to high natural value areas in Central Roztocze in 2016

Facility	Number of users
Zwierzyniec	80.000
Roztoczański National Park and the Education and Museum Centre	158.896
Bicycle and hiking trails	95.000
Guciów Homestead	17.000
Krasnobród	100.000
Museum – Memorial Site in Bełżec	30.000
Józefów	80.000
Susiec	90.000
Wieprz and ponds	95.000

Source: own work based on Świeca et al., 2015

RESULTS AND VALUATION OF AREAS OF HIGH NATURAL VALUE

The survey was performed from 1 May to 31 October 2016. Its results were then used to estimate the value of high natural value areas in Central Roztocze using the travel cost method.

The study involved 330 people: 197 women and 133 men. Seven questionnaires were excluded during verification, which resulted in a final sample of 323 responses. The participants were selected randomly and represent various age groups. Almost half of the respondents were aged 18 to 25. People aged 26–35 years constituted a relatively numerous group. The smallest group were underage people and those older than 65, which made 2% in total.

The largest group of respondents lived in cities with over 100 thousand residents (42%). The smallest group lived in small towns up to 30 thousand residents (16%).

Over half of the respondents (52%) held a university degree, 37% finished secondary schools, and 2% had primary education.

They were mostly employed people (48%) and students (41%). The smallest group were homemakers (2%).

Thirty per cent of the respondents had a monthly net income per capita exceeding PLN 2000. The smallest group set their income below PLN 400 (8%)

Details of socioeconomic data were shown in Table 2.

Table 2. Socioeconomic profile of the respondents

CRITERION	CATEGORY	SHARE
age	below 18	1%
	18 – 25	46%
	26 – 35	25%
	36 – 45	15%
	45 – 65	12%
	over 65	1%
residence	village	19%
	town up to 30 thousand	16%
	town up to 100 thousand	23%
	city over 100 thousand	42%
education	primary	2%
	vocational	9%
	secondary	37%
	higher	52%
activity	student	41%
	homemaker	2%
	employee	48%
	currently unemployed	5%
	retired/pensioner	4%
monthly net per capita income	up to PLN 400	8%
	PLN 401 – 650	15%
	PLN 651 – 1,000	22%
	PLN 1,001 – 2,000	25%
	over 2,000	30%

Source: own work

The primary question that the survey was designed to answer was data on travel costs individuals were willing to incur to visit Central Roztocze.

One of the first questions concerned the average frequency of visits to Central Roztocze. According to the responses, the largest group of 41% visited Central Roztocze once a year. A relatively large group (28%) visited the area once in several years. The detailed distribution of visit frequency is shown in Figure 2.

In order to verify the frequency results, the respondents were asked whether they intended to visit Central Roztocze again in the future. Every respondent declared an intention to return to the area.

The most popular reasons for visiting Central Roztocze were the need to rest in close contact with nature and the need to commune with nature. The need to rest in an active manner and a tourist trip were other quite popular reasons. The least popular cause was a business trip. Other reasons included returning to one's roots and visits to graves of loved ones. The distribution of these factors was shown in Figure 3.

One of the key questions was the one concerning the distance the participants had to travel to arrive at Central Roztocze. The visitors travelled 116 km on average. The largest distance was covered by people from Wrocław (550 km). The respondents mostly came from places 100 to 250 km from Central Roztocze (30%). The other distance groups, less than 5

km, 26–50 km, and more than 250 km were of similar sizes (15–16% each). The smallest number of people travelled between 26 km and 50 km.

Most visitors to Central Roztocze were from the Lubelskie Voivodship (75%). People from Mazovia, Subcarpathia, and Upper Silesia constituted a much smaller share. Isolated individuals came from Lesser Poland, Lower Silesia, area around Kielce, or Opole. Among people from the Lubelskie Voivodship, the largest group was from Lublin. Every third visitor was from that city.

The respondents most often travelled in twos (35%) or groups of four (21%). The remaining persons travelled alone, in groups of three, or groups larger than four (15%, 13%, and 16%, respectively). Detailed distribution was shown in Figure 4.

The means of transport used by respondents to reach their destination is an inseparable component of travel cost. The most popular means of transport was
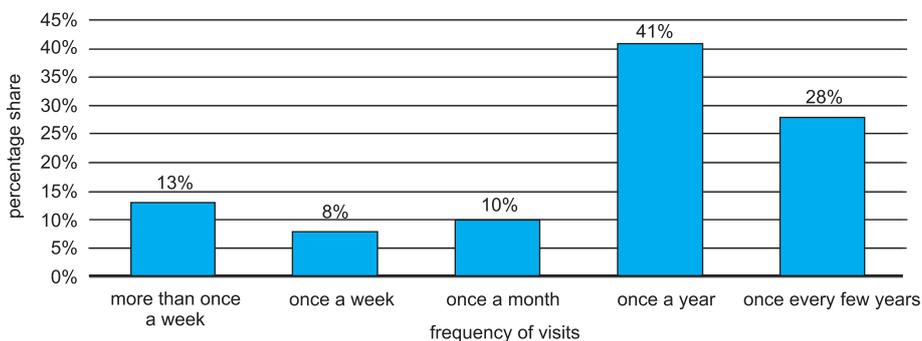

Fig. 2. Percentage distribution of the frequency of visits to Central Roztocze

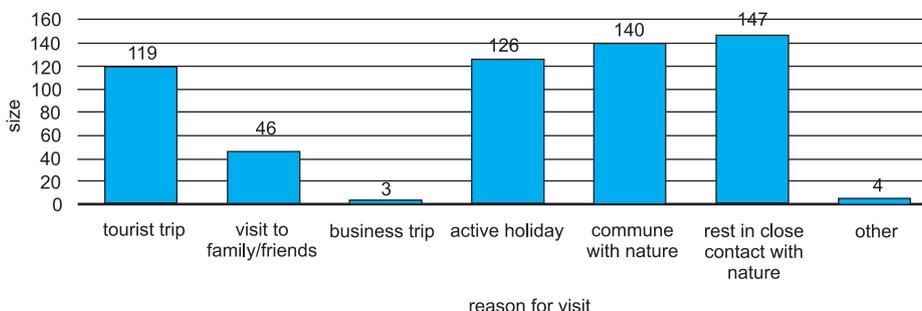Source: own work based on an original study

Fig. 3. Reasons the respondents came to Central Roztocze

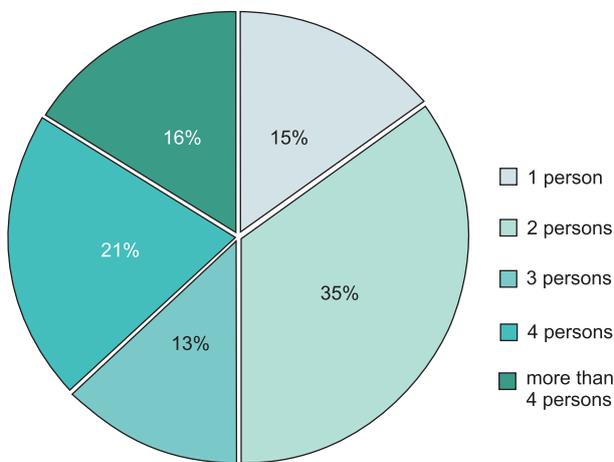Source: own work based on an original study

Fig. 4. Size of groups the respondents travelled with

Source: own work based on an original study

a car used by 56% of the respondents. Bus (16%) and bicycle (14%) were popular as well. Two per cent of the respondents did not specify the means of transport they used to visit Central Roztocze (see: Fig. 5.).

The average time of travel to the valued area had to be determined for the travel cost method. Most often, it took the respondents between one and two hours to come to Central Roztocze (29%). The least numerous group travelled less than half an hour (14%). The detailed distribution of travel time is shown in Figure 6.

Another important question was the duration of stay in Central Roztocze. The respondents spent most often two to three days there (38%) or, very often, several hours (37%). The least popular duration of stay was two weeks and more, 14% of respondents in total. The distribution of stay duration is shown in Figure 7.

A stay exceeding several hours necessitates accommodation arrangements. The vast majority of visitors
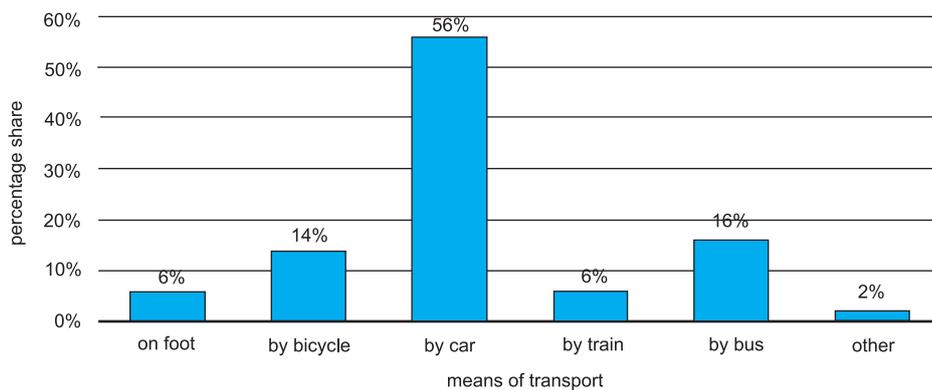

Fig. 5. Means of transport used to reach Central Roztocze

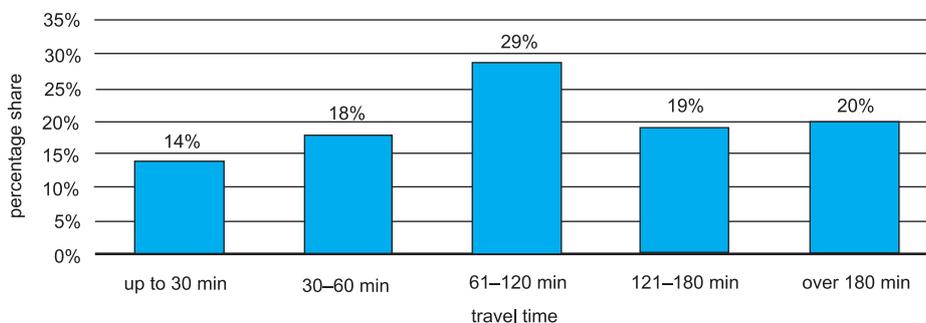Source: own work based on an original study

Fig. 6. Percentage share of average travel time to Central Roztocze

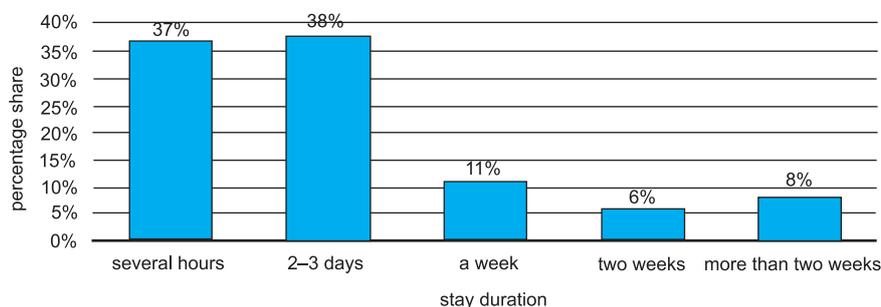Source: own work based on an original study

Fig. 7. Percentage distribution of the average duration of stay in Central Roztocze

Source: own work based on an original study

to Central Roztocze booked two or three nights. The cost of accommodation for one night amounted to PLN 50 on average. Note that there was a large group of visitors who declared a stay lasting several days with no accommodation cost. This may be a result of spending the night with family, friends, at own house, or in a tent.

Visitors to Central Roztocze have to take into account additional expenses. These include food, entrance fees, souvenirs, and rental of special-purpose equipment. The amounts the respondents earmarked for this purpose vary (see: Fig. 8.). The most popular interval was PLN 21 to 50 (33%). The amount reached over PLN 150 in very rare cases.

Sometimes a tourist visit entails lost profit. The questionnaire contained a relevant question. As many as 97% of the respondents declared they did not lose any earnings because of the visit to Central Roztocze. It was mainly because the visits took place during holidays or paid annual leave. For the remaining 3%, the stay entailed lost earnings. The amount was PLN 65 per day, on average.

Another matter was whether the visit to Central Roztocze was the only goal of the travel. As many as 98% of the respondents declared that their visit to Central Roztocze indeed was the only purpose of their trip.

The respondents were asked about the key drivers for selecting Central Roztocze as the place to spend free time. Their task was to put a set of factors in order of descending importance in their personal opinions. According to the study, the most important feature determining the attractiveness of Central Roztocze was the clean natural environment. Beautiful landscape was another important factor. The travel distance and
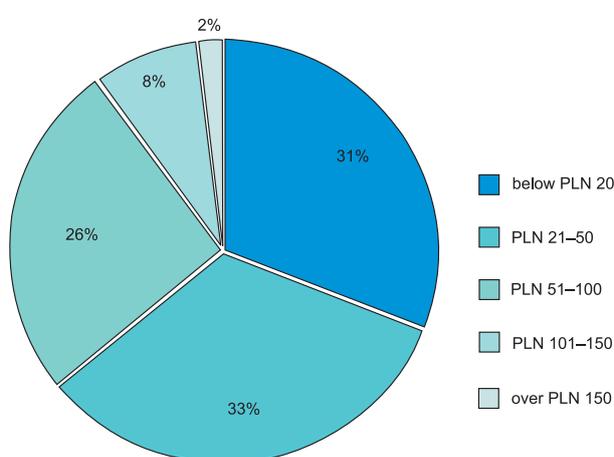

Fig. 8. Percentage distribution of additional expenses related to the visit to Central Roztocze

Source: own work based on an original study

the current tourist services offer were the least important (see: Fig. 9.).

The valuation of high natural value areas in Central Roztocze was performed using the travel cost method. The estimate employed a modification of the TCM, the individual travel cost approach. The value estimation involved two stages. The first stage estimated the value of individual travel costs for each respondent with formula (1). This way, 323 individual values were obtained. The average individual annual travel cost was PLN 207. The lowest value was PLN 0. This figure shows that the travel cost may not always reflect the actual value of the site. For some people, the cost estimate was PLN 0 or was relatively low. This does not necessarily mean that the area is worthless for the

specific person. This is often because the person lives near the recreational spot, which results in a very low financial cost of access to the assets of the place or no cost at all. Moreover, they often use means of transport that do not generate costs, such as a bicycle or walking. The highest value was PLN 1.659.

The relationship between the total individual cost of travel and the number of visits in a year was investigated as well. It turned out that as the travel cost increases, the frequency of visits in a year decreases. This dependence is shown in the chart below (see: Fig. 10.):

The second stage involved the estimation of the total value of high natural value areas in Central Roztocze using formula (2).

$$V = \frac{66.861}{323} \cdot 750.000$$

$$V \approx \text{PLN } 155.250.000$$

This resulted in an approximate value of high natural value areas in Central Roztocze, which is **PLN 155.250.000.**
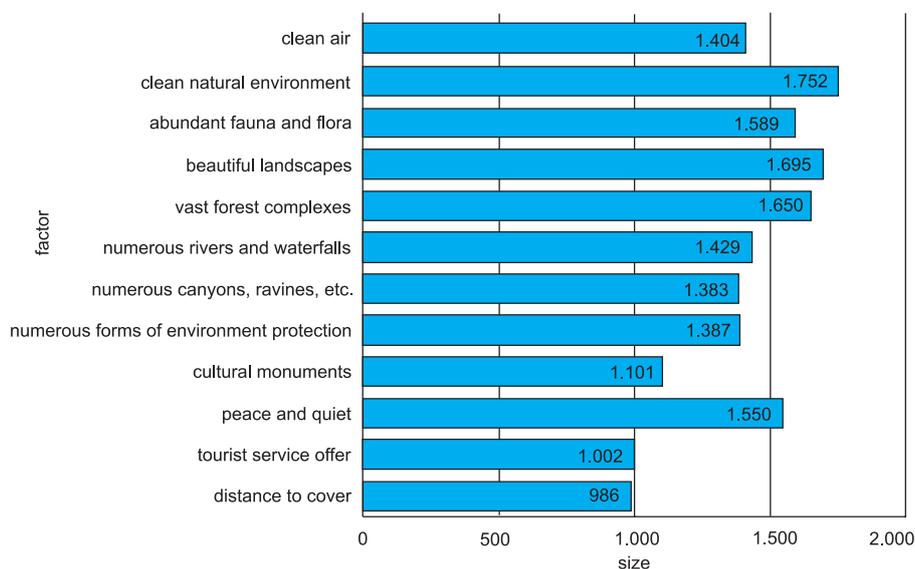

Fig. 9. Factors affecting the attractiveness of Central Roztocze
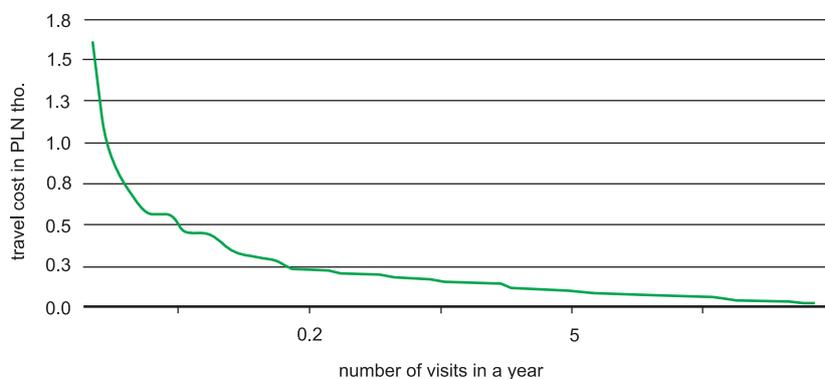
Source: own work based on an original study

Fig. 10. Relationship between the cost of travel and the number of visits in a year

Source: own work based on an original study

SUMMARY AND CONCLUSIONS

Studies on the economic value of high natural value areas is significant for building public awareness of the value of the natural environment. When this value is known, public support for the protection of natural sites can be won easier. Central Roztocze has a significant share of diverse forms of high natural value areas. It is, therefore, necessary to manage these sites appropriately, which is hindered when decision-makers are not aware of the value of the resources in their control. These reasons were the primary drivers for the attempt to estimate the economic value of high natural value areas of Central Roztocze.

The value of high natural value areas in Central Roztocze was estimated with the economic valuation method – travel cost method. The individual travel cost approach was used. The method consists in the determination of the value of high natural value areas based on individual costs of travel for individual users and on the total number of visitors to the study area in a year. The travel cost means the total value of the cost of the journey, accommodation, and other expenses related to the stay in the study area.

A questionnaire survey was carried out for the purpose of the paper. The survey collected data necessary to estimate the value of a single individual travel cost. Answers provided by the respondents were used to calculate values of individual travel costs. Resulting values were significantly varied. The minimum calculated value of travel cost was PLN 0. This value does not mean that high natural value areas of Central Roztocze have no value to the visitor in each case. In most cases, the result stemmed from free means of transport and no additional expenses during the several hours spent in the study area. The maximum individual travel cost value was PLN 1.659. It resulted from a large distance to Central Roztocze and the two-week stay with paid accommodation. The mean value was PLN 207.

The analysis of the calculated individual travel costs revealed that the number of visits to high natural value areas in Central Roztocze within a year depends largely on the amount of costs of the trip. A trend was noted where people who have to travel further to come to Central Roztocze visit the place less often than those who have a smaller distance to cover.

This is because when the distance grows, the cost of travel usually grows as well. At the same time, those who have to travel a longer distance, stay in Central Roztocze longer than those who live closer, usually a week. Another important factor for the frequency of visits was the economic situation of visitors. People with lower income who live far from Central Roztocze used the assets of the site much less often than those with higher income living at a similar distance.

This suggests a topic about sustainable development that probably raises questions beyond the scope of this paper, but worth mentioning here. Sustainable development in its canonical formulations has built into it repeated references to different types of justice (or equity). To the extent that decision-makers using the economic valuation methods and results in this paper take account of relevant justice, equity, fairness considerations, there will be no obvious relevant conflict between TCM and sustainable development. However, there is often a risk that decision-makers will misuse TCM and its results, by an uncritical use of the monetary value that results from calculations based on TCM. This is mentioned here because even a very large contribution to aggregate monetary transactions in a society (e.g., from tourism and recreation) may be implicated in inequitable or unjust processes and results. One modest illustration of this is that enjoyment of a high natural value site may be (unjustly) out of reach for those persons with significantly lower income. Some economists are interested in addressing distributive justice issues in a serious way, but some prefer the ease and ready calculability of aggregative, more readily measurable conceptions of development. We, on the other hand, acknowledge that some features of environmental value and sustainable development are more difficult to measure, and are perhaps even immeasurable (though we are not certain about the immeasurability of distributive justice or injustice, the equitable or the inequitable, as regards access to areas of high natural value).

The application of the individual travel cost method resulted in the recreational value of areas of high natural value. The value was based on the average value of individual travel costs for individual users and the approximate number of people who visited Central Roztocze in 2016. It was impossible to estimate an exact value because the precise number of tourists who

visited the study area was impossible to come by. The estimated value of high natural value areas in Central Roztocze is PLN 155,250,000. The information and reasoning that leads us to this figure, if well understood, should be useful for decision-makers.

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WYCENA EKONOMICZNA OBSZARÓW PRZYRODNICZO CENNYCH NA PRZYKŁADZIE ROZTOCZA ŚRODKOWEGO

ABSTRAKT

W pracy zawarto zarys problematyki wyceny wartości ekonomicznej obszarów cennych przyrodniczo. Zaprezentowano także wycenę wartości obszarów przyrodniczo cennych Roztocza Środkowego przy zastosowaniu metody indywidualnych kosztów podróży. Wycenę przeprowadzono w oparciu o wyniki badania ankietowego (n = 323) i dane statystyczne. W obliczeniach uwzględniono koszty dojazdu, zakwaterowania, wypożyczenia sprzętu specjalistycznego oraz innych kosztów związanych z pobytem na Roztoczu Środkowym, a także czas pobytu i częstotliwość odwiedzin w ciągu roku. W badanej próbie całkowity koszt podróży wynosił 66 861 zł. Średnio na jednego użytkownika przypadało 207 zł. W celu ustalenia całkowitej wartości obszarów cennych przyrodniczo Roztocza Środkowego średnią wartość indywidualnych kosztów podróży odniesiono do liczby odwiedzających te tereny, która wynosi 750 000. Ostatecznie wartość obszarów przyrodniczo cennych Roztocza Środkowego wyniosła 155 250 000 zł.

Słowa kluczowe: wycena ekonomiczna, metoda kosztów podróży, wartość rekreacyjna