Valuing Protected Areas: Socioeconomic Determinants of the Willingness to Pay for the National Park

Adam Zydron 1,*, Krzysztof Szoszkiewicz 2 and Cyprian Chwiałkowski 1,*

Abstract: The study aimed at estimating the variability of perception of the Wielkopolski National Park (WNP) value among different groups of society. The study was based on questionnaires conducted in 2018. Analyses were carried out on the basis of 1350 records. The results of the survey were subjected to statistical analysis using the canonical correspondence analysis (CCA) and the analysis of variance. The study revealed that the relation with the natural environment significantly differs among various groups of society. The application of diverse analytical tools in relation to the survey data allowed for the quantification of that diversity. The relationship between the economic situation of respondents and their willingness to pay for nature conservation is non-linear.

Keywords: value of the environment; national park; tourism development; nature protection; forest

1. Introduction

Different types of ecosystems perform a number of functions, among which the natural and social ones rise in importance. The valorization of land cannot be limited to the value of raw material or other elements of material value [1]. In recent years, an increasing number of ecosystem services placed under conservation protection has been recognized, while the positive impact on the development of tourism and recreation has been acknowledged for a long time.

Groundbreaking concepts of environmental valuation appeared in the 1940s [2] and based on the willingness to pay for the possibility of visiting a given place. The contingent valuation method serves to disclose a personal estimation of changes in environmental quality, based on the conventional theory of welfare [3]. Such a method enables the assignment of monetary values to the natural environment, as a result of which, the emotional response of the society can be systematized in a certain way, and the economical methods can be applied.

The method of contingent valuation that was used in our study is the only technique to measure the value resulting, which comes from the existence of goods [4]. The concept of contingent valuation is defined as any approach to the valuation of a commodity, which is based on individual responses for contingent circumstances in an artificially constructed market [5]. It is used in the case of estimating the economic value of goods, for which there is no market and, therefore, cannot be determined as a result of normal market processes. The scope of application of the contingent valuation method usually covers environmental threat situations or the valuation of planned activities related to its improvement [6].

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The application of the contingent valuation method in this study to the assessment of environmental, non-market benefits has significantly increased over the last few decades [7–10]. The method of contingent valuation has found numerous applications in areas of natural significance [11,12] and other fields, such as medicine [13,14]. This method
has been used in eastern Poland, among others, to assess the value of the Białowieża Forest [15].

The contingent valuation method was chosen in this paper to calculate willingness to pay for the preservation value in the area of the Wielkopolski National Park (WNP), located in central Poland. The work aimed at estimating the socioeconomic determinants of the willingness to pay for the conservation of nature. This study is one of the few attempts of contingent valuation application in Poland that can be used to resolve increasingly fierce nature conservation conflicts in national parks. The extensive number of questionnaires, comprehensive socioeconomic analysis of the respondents, and the use of multidimensional analytical methods make the study unique on an international scale and make the results useful for the development of contingent valuation methods. To reach the aim of the study two research hypotheses were verified: (a) various social groups perceive the value of the protected area differently and (b) the relationship between the economic situation and the willingness to pay for nature conservation is non-linear.

2. Research Material and Methodology

The research was conducted in the Wielkopolski National Park and its neighborhood, located in western Poland, 15 km south-west of the local agglomeration of Poznań (Figure 1). It is one of the smaller Polish national parks (15th in size), covering an area of 7584 ha, together with a buffer zone of 14,840 ha. The park was created in order to protect the land relief, formed as a result of the Scandinavian ice sheet activities, as well as various valuable clusters of vegetation and numerous animal species.

As a consequence of previous, intensive human activity, the Wielkopolski National Park in the vast majority is covered with forests, but the landscape is patchy and poor in large forest complexes. Due to conservation measures, there are many plant species in various habitats. The park’s vegetation is dominated by Central European species, such as the sessile oak, common hornbeam, or wood anemone, as well as Euro-Siberian plants, such as pine and rowan berry. Due to the diversified soil conditions, pine, pine-oak, oak, and oak-hornbeam forests are developed, as well as riparian, alder forests, and many others [16].

In the conducted research were taken into account the principles and recommendations for the application of the conditional valuation method developed by a team of experts under the direction of the Arrow [9].

The survey was conducted in 2018, on a representative group of 1350 respondents. The questionnaire had been prepared based on the research developed by Georgiou [4], Bateman [17], as well as Gołos [18] and consisted of three parts. In the first part, the ques-
tions concerned the general attitudes of the respondents to the WNP, as the self-estimated state of knowledge on the WNP (five-point scale), frequency of visits (seven-point scale), the most significant values perceived (nine attributes to be selected). The second part, and the main element of the survey, contained questions concerning the respondents’ willingness to pay the costs of conservation (voluntary allocation of money for the possibility of taking advantage of the WNP, including voluntary work instead). The third part included socioeconomic characteristics of the respondents, including gender, age, occupation, income per family member, education, and place of residence (Table 1).

<table>
<thead>
<tr>
<th>Sociological Feature</th>
<th>Sociological Feature Category</th>
<th>Percentage Share in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Female</td>
<td>61.0</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>39.0</td>
</tr>
<tr>
<td>Age</td>
<td>Under 18</td>
<td>15.1</td>
</tr>
<tr>
<td></td>
<td>18–25</td>
<td>37.1</td>
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<tr>
<td></td>
<td>26–40</td>
<td>23.1</td>
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<tr>
<td></td>
<td>41–60</td>
<td>20.1</td>
</tr>
<tr>
<td></td>
<td>Over 60</td>
<td>4.6</td>
</tr>
<tr>
<td>Monthly net income per person</td>
<td>Less than PLN 100</td>
<td>0.6</td>
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<tr>
<td></td>
<td>Between PLN 100–200</td>
<td>2.0</td>
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<tr>
<td></td>
<td>Between PLN 200–500</td>
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<tr>
<td></td>
<td>Between PLN 500–1000</td>
<td>26.1</td>
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<td></td>
<td>Between PLN 1000–2500</td>
<td>43.4</td>
</tr>
<tr>
<td></td>
<td>More than PLN 2500</td>
<td>18.9</td>
</tr>
<tr>
<td>Education</td>
<td>Primary</td>
<td>15.8</td>
</tr>
<tr>
<td></td>
<td>Basic vocational</td>
<td>5.6</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>41.8</td>
</tr>
<tr>
<td></td>
<td>University degree</td>
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<tr>
<td>Occupation</td>
<td>School student</td>
<td>8.4</td>
</tr>
<tr>
<td></td>
<td>University student</td>
<td>38.5</td>
</tr>
<tr>
<td></td>
<td>Office worker</td>
<td>16.6</td>
</tr>
<tr>
<td></td>
<td>Physical worker</td>
<td>5.1</td>
</tr>
<tr>
<td></td>
<td>University staff</td>
<td>5.3</td>
</tr>
<tr>
<td></td>
<td>Service and trade worker</td>
<td>8.0</td>
</tr>
<tr>
<td></td>
<td>Farmer</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Forester</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Company owner</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>Freelancer</td>
<td>4.4</td>
</tr>
<tr>
<td></td>
<td>Unemployed</td>
<td>4.4</td>
</tr>
</tbody>
</table>

Based on the conducted research, the value of WTP index was calculated with reference to declarations of incurring fees or performing voluntary service. The results of the questionnaires were statistically and mathematically analyzed with the assistance of Statistica and CANOCO programs. The study applied a canonical correspondence analysis (CCA). The analysis revealed correlations between basic data characterizing the respondents (age, income, education, place of residence’s distance from the WNP, frequency of visits), as well as their views on the value of the WNP for society and them personally. Moreover, an analysis of variance was applied to assess the significance of the relationship between the respondents’ wealth and their readiness to support WNP financially or in the form of voluntary service.

3. Results

The analyses demonstrated different inclination levels of various sociological groups of respondents to bear the costs for the benefit of WNP, expressed as the WTP index (Figures 2–8). Among the seven sociological criteria analyzed, three exhibited statistically
significant diversity in WTP values (Figures 2–4). They included the respondents’ age, the frequency of their visits to WNP, as well as the declared state of knowledge of the WNP. The study revealed certain diversity in WTP values in the surveyed groups, separated on the basis of wealth, place of residence’s distance from the WNP, size of the inhabited place of residence, and education; however, the differences were not statistically significant.

Figure 2. The willingness to financially support the WNP (WTP) differentiation based on the frequency of the respondents’ visits to the WNP.

Figure 3. The WTP differentiation based on the age of respondents.
Figure 4. The WTP differentiation based on the self-estimated knowledge on the WNP.

Figure 5. The WTP differentiation based on the economic affluence of respondents.

Figure 6. The WTP differentiation based on the distance between the respondent’s place of residence and the WNP.

Figure 7. The WTP differentiation based on the size of the respondent’s place of residence.
Figure 8. The WTP differentiation based on the respondent’s education.

The analyses presented a particularly strong differentiation in the readiness to financially support the WNP (WTP) among the surveyed groups, separated by the frequency of their visits to the park (Figure 3). The researchers found a general trend involving the WNP’s frequent visitors, who were more willing to bear the financial costs than those who visit the park sporadically. The highest differentiation was found among the respondents who visited the park most frequently. It resulted from the fact that the group consisted of nature tourism enthusiasts who were willing to bear certain costs and often visited the park, as well as a group of local residents, who were insensitive to nature, yet often visited the park because of their professional or family duties.

The analysis of variance confirmed the statistical significance of the WTP values differentiation between the surveyed WNP’s visitors of different frequencies \((p < 0.001)\). The Kruskal–Wallis test confirmed the statistical significance between the respondents who had never visited the park and three groups of frequent visitors (several times a year, once a month, and once a week), as well as between the respondents who visited the park only once and frequent visitors (once a month).

Strong differences in the willingness to financially support the WNP (WTP) were also found during the comparison of the distinguished age groups of respondents (Figure 3). The oldest people, particularly those over 60, declared their willingness to bear the highest financial costs for the benefit of WNP. It should be emphasized that the greatest divergence of responses (the highest variance) occurred in this group. Large amounts were also declared by the respondents of the 41–60 age group. The age group least likely to incur expenses for WNP comprised the 26–40 year olds.

The analysis of variance demonstrated a statistical significance of WTP’s value differentiation between the distinguished age groups of respondents. \((p = 0.005)\). The Kruskal–Wallis test confirmed the statistical significance \((p = 0.028)\) of the differences between the 26–40 and over 60 age groups only.

Strong differences in the willingness to financially support the WNP (WTP) were also determined between the groups of respondents declaring various levels of knowledge about the WNP. On average, those who had the best knowledge of the park declared their willingness to bear the highest financial costs for its benefit. As the level of knowledge about WNP decreased, so did the tendency to incur expenses for the park.

The analysis of variance revealed a statistical significance of the WTP’s values differentiation between the distinguished age groups of respondents. \((p = 0.005)\). The Kruskal–Wallis test confirmed the statistical significance between nearly all groups of respondents—only the differences between the second, third, and fourth, as well as between the third and fourth group, were statistically insignificant.
The study revealed a clear trend between wealth (family income per capita) and the willingness to financially support the WNP (WTP). Questions intended to estimate net monthly income, which was underestimated by students, but this group of respondents actually had very limited financial resources available. The group with the lowest monthly income per family member was less likely to incur financial costs than those who earned more (Figure 5). The divergence of responses in individual groups was very high, and the established differences were not statistically significant.

The study reported a specific trend among the WTP and the distance between the place of residence and the park. The research demonstrated that the group of respondents living in the vicinity of the WNP appreciated the park more than those living further away (Figure 6).

Further analyses demonstrated a much smaller diversity of the WTP values between the groups of respondents from towns of different sizes (Figure 7). The differentiation in the willingness to financially support the WNP (WTP) between the respondents representing various educational backgrounds was even smaller (Figure 8).

The CCA-based analyses enabled the explanation of many of the respondent’s behaviors revealed during the analysis of the relations among the sociological groups of the studied population in Figure 9 (the first and the second directions of variability). It was established that the group of the most frequent visitors particularly appreciates the current possibility of taking advantage of the WNP’s values. Similar sentiments were expressed by people interested in the WNP, who declared extensive knowledge about this area. However, the group of respondents from distant places of residence focused particularly on the aspect of nature conservation, which they did not regard as directly beneficial.

Figure 9. Canonical correspondence analysis (CCA) analysis graph for the sociological characteristics of the respondents in relation to their assessment of the WNP’s values.

The CCA analysis including the assessment of the WNP’s values revealed the greatest diversity in the respondents’ answers, resulting from their knowledge of the park, frequency of visits, as well as the distance between their places of residence and the WNP (Figure 10). The group of respondents who declared extensive knowledge of the WNP and was frequently characterized by advanced age, as well as better education and more economic affluence, noticed the park’s multigenerational significance and focused particularly on the aspect of water protection. The group of respondents visiting the WNP from a distant residence and, therefore, less frequently, placed special attention to the conservation protection of the park.
4. Discussion of the Results

The obtained results demonstrated that the vast majority of society values the WNP. Most of the respondents declared their willingness to support the WNP, either in the form of fees or voluntary service. Nowadays, we can observe a phenomenon, according to which the visitors are frequently willing to pay higher fees for entry into the protected areas, resulting from the benefits of such tourism [19]. Study results confirm the inclination of the society’s development towards an increase in the attachment to the natural, environmental values and intangible assets, observed in relation to the forest [20,21] or protected areas [22–24].

The results of the conducted questionnaires indicated the respondent’s great interest in the examined area in terms of its tourist and recreational exploration. As a consequence of the increase in the social standard of living, tourism and recreation are becoming more common, as this form of spending free time is chosen by an increasing number of Poles [25–27]. As a result of increased tourist activity, the appropriate entities are obliged to protect valuable areas through rational planning and management [28].

The legally protected areas are visited by various social groups, which significantly differ in terms of both the purpose and method of recreation chosen [29]. The results demonstrated that society acknowledges different values associated with the WNP. The analyses exposed the existence of three groups of respondents who exhibited different views on the value and role of the Wielkopolski National Park. One of these groups includes the local community, which frequently stays in the area of the WPN (as many as 144 people declared that they visit the park more than once a week). The second, very numerous group declared travels from a distance and, in many cases, indicated a large city (over 100 thousand people) as the place of residence. Based on the address data, it could be concluded that the group consists of mainly the inhabitants of a nearby agglomeration—Poznań. Studies conducted in previous years [30,31] revealed that it has been a crucial group of the WNP’s visitors for a long time, as tourists from further regions of the country constitute less than 5%. Moreover, the analyses indicated a specific group, distinguished by advanced age, better education, and more economic affluence. The group includes certain residents of Poznań, as well as people living in the vicinity of the WNP.

The analyses reported a variety of views from three separate groups of respondents regarding the nature conservation implemented in the WNP. The most numerous group of local residents particularly appreciates the current possibility of taking advantage of the WPN, focusing on the park’s recreational aspects. Local communities residing in the
vicinity of national parks frequently exhibit a positive attitude towards the development of tourism, regarding it as a catalyst for the development of other branches of the local economy [32]. The main group of commuting residents of Poznań appreciates the lakes a little more, distinguishing their value among other elements of the WNP's natural environment. They make use of the swimming areas or decide to stroll by the lakes. On the other hand, a separate group of the older, educated, and affluent respondents does not recognize any apparent personal benefits associated with the park and places smaller emphasis on its tourist and recreational values yet appreciates primarily the conservation and preservation of the natural values for future generations. The conducted analyses confirmed the thesis presented by Brieger [33], according to which social identification with a given region strengthens the necessity to undertake activities aimed at nature conservation.

Subsequent analyses revealed a significant correlation between the respondents' economic affluence and their attitude to the participation in the conservation of nature. The more financially prosperous declared their willingness to financially support the protective activities yet did not want to participate in activities requiring their own labor. The less affluent respondents were not as eager to declare their financial support. However, they more willingly claimed the possibility of devoting their time to perform work supporting the WNP. The analyses revealed that both the group of the least affluent, as well as the most financially prosperous respondents, certainly were not interested in any form of support of the WNP. The observed correlation between the respondents' economic situation and their willingness to pay for environmental protection is confirmed by the results obtained by Adams et al. [34] in a study carried out using contingent valuation on the example of the Morro do Diabo National Park in Brazil.

It should be emphasized that the conducted study was based on a significantly broad range of survey data. The analyzed data matrix included a total of 1350 questionnaires. In Poland, for the first time, this type of research was conducted 28 years ago [30], on a sample of 165 respondents. In the cases of research in other national parks, as well as different protected areas [23,24,35], the analyses were also based on much smaller data resources.

The conducted studies demonstrated that the perception of environmental values differs among various groups of society, which is confirmed by among others in a study carried out by Aseres and Sira [36] related to the assessment of the willingness to pay of society to bear the costs for nature conservation. The application of diverse analytical tools in relation to the survey data enabled the quantification of this diversity. The issues related to both the conservation of nature and economic development are always very difficult, as well as requiring a comprehensive and thorough analysis. According to Hall [37], the planning of tourism development and other forms of recreation in protected areas must be based on reliable programs, so that the effects of conducted activities do not result in unnecessary damage to the natural environment.

This study is related to contingent valuation method, based on a survey, which was constructed in such a way that the respondents were able to precisely indicate their preferences related to the conservation of legally protected areas. The answers received from the respondents made it possible to give value to non-market goods by defining non-market benefits resulting from environmental protection.

The application of the contingent valuation method allowed us to identify differentiation in the perception of the value of the protected area by different social groups. This study is an extremely important element in the discussion on the economic, social, and cultural importance of legally protected areas and indicates the most important and necessary directions for the development of public awareness in the context of nature conservation. The information obtained in the study may be important for policy makers and tourist operators involved in tourism development in the vicinity of protected areas. The management of such areas based on this research would represent an innova-
tive approach in the context of sustainable management of both natural and man-made landscapes [38,39].

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