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INFLUENCE OF SELECTED FACTORS ON NUMBER OF VISITORS IN NATIONAL PARK ĐERDAP

SUMMARY

This paper analyses the impact of trip distance, the average income of visitors, and the spatial distribution of the national parks in Serbia and Montenegro, on the number of visitors to national park (NP) "Đerdap". Also assessment has been conducted for total and average cost of a trip to the NP "Đerdap". The assessment was done according to the concept of non-market valuation of ecosystem services, especially tourism and recreation services in the public forests.

The aim of the study is to identify the total and average costs of visitors and to determine the influence of various factors on the number of visitors to the National Park "Đerdap" in 2011.

The purpose of this research is to highlight the factors that influence the choice of the Đerdap as a tourist and recreational sites, and highlight the value of recreational services in public forest where visitors have no obligation to pay for it. Valuation of recreational services in NP "Đerdap" indicates that Đerdap can be compared with other destinations in the world used for tourism and recreation in forest ecosystems. Đerdap attract visitors with specific natural features. Trip distance to the NP does not affect the number of visitors, but the average income of employees in Serbia influence that visitors coming to the Đerdap mainly in groups.

Keywords: recreational services, national park “Đerdap”, travel cost, valuation, visitors

INTRODUCTION

This paper analyze the impact of trip distance, average income of visitors and the spatial distribution of the national parks in Serbia and Montenegro, on the number of visitors to national park (NP) "Đerdap". Also estimation was done for total and average cost of a travel to the NP "Đerdap". The estimation was based on the concept of non-market valuation of ecosystem services (Costanza et al. 1997, de Groot et al. 2002, Boyd, Banzhaf 2007), especially recreational services in the public forests (Riera et al., 2012). According to this concept, the cost of travel estimated value of tourism and recreation services in the NP "Đerdap" and it is equal to or greater than the cost of travel to selected tourist and recreational

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sites. When analyzing the travel costs into account were taken data on the place of residence of visitors, their average incomes and impact of the spatial distribution of other national parks in Serbia and Montenegro to number of visitor on Đerdap. All these factors are included in the regression analysis to determine the mutual influence. For recreational services in forest ecosystems are given the characteristics of the commodity, in terms of monetary expression of value. It is considered that these services meet the needs of visitors and that visitors are willing to engage other assets. In this case this other assets are the cost of travel to the NP "Đerdap". Recreational services have been offered for free to the visitors, and as such cannot be estimated by market methods (prices, supply and demand). Available analysis of non-market valuation of tourist and recreational services in the world suggests that visitors spend an average of USD 17.34 per trip for recreation in forest ecosystems. The value of the location for tourism and recreation is estimated between 2 and 6,000 USD/ha (Zandersen M., 2009). Estimates the total value of forests in Serbia indicate that the total value of all trips in nature for tourism and recreation in year 2007 was around EUR 80 million (2007). Visitors NP "Đerdap" in addition can enjoy in the particular natural beauty, were further motivated to visit Đerdap because they were able to choose more additional activities, including: a visit to the Visitors center, the use of marked hiking trails, off-road vehicle use, speedboat (2013/a). All of the above is taken into account during the assessment of the value of recreational services.

Based on concept of non-market ecosystem valuation, the overall travel cost represent the value of the NP "Đerdap" as a site for recreation and tourism in forest ecosystems. NP "Đerdap" as a site for recreation and tourism in forest ecosystems in divided into four specific purpose units. List of specific purpose units dedicated to recreation in NP "Đerdap" is given in Table 1.

Table 1. List of specific purpose units dedicated to recreation in NP "Đerdap"

Specific purpose unit	Area	
	ha	%
(67) Lookout Points	227,82	0,6
(83) Site with exceptional natural beauties	9216,83	24,9
(97) Cultural and Historical beauties	75,02	0,2
(73) Recreational forest areas	54,39	0,1
Total	9574,06	25,8

Source: (2001)

For the purposes of tourism and recreation are dedicated 9.574,06 ha in four different special purpose entities.

The subject of the research is the assessment of the impact of various factors on the number of visitors to NP "Đerdap" in the year 2011. In addition,

subject was the estimation of the total and average travel costs to the NP "Đerdap". The travel cost is an expression of the value of recreation services in the NP "Đerdap". Visitors benefit from travel to NP "Đerdap" and they are ready to spent money on it. Characteristics of the NP meet their needs and expectations toward recreation in nature.

The aim of the study is to determine the total and average costs of travel to recreational sites as well as to estimate the influence of selected factors on the number of visitors to the NP "Đerdap" in the year 2011.

The purpose of this research is to highlight the factors that influence the choice of the Đerdap as a tourist and recreational destination as well as to highlight the value of recreational services. The reported can be used when planning investments in recreational infrastructure, when applying for state funding as well as improving management of NP.

As the research is based on the concept of ecosystem services, first it is necessary to define and classify it. Ecosystem services are the result of natural processes and functions, such as regulation of water, regulating climate and atmospheric gases, medical, cosmetic, decorative and recreational functions, which, through natural processes and components, assisted by a man or not, provided the conditions for living, working and recreation, leisure and tourism in the natural environment (de Groot et al. 2002a).

Recreational services meet the needs of the population towards tourism and recreation in the forest, but also contribute to the multifunctional forest management (2007). It is a part of the extensive complex of ecosystem services, directly used by people and valuated mainly by non-market methods (Costanza et al. 1997, MEA 2005, Boyd, Banzhaf, 2007. Recreative services are used directly. Direct use of ecosystems for recreation and tourism has increased due to the increasing number of human population, rising living standards and the accumulation of free time to relax and development of the infrastructure to recreation and tourism (2008). The value of tourism and recreational services is equal to or greater than the travel cost to the chosen location.

Based on the concept of non-market valuation of tourism and recreational services were performed following research hypotheses:

The first hypothesis is:

H1: Recreational and tourist services in the national park "Đerdap", although it is offered to visitors at no charge, have monetary value.

The second hypothesis is:

H2: There is no statistically significant between the travel distance, average income of the visitors and spatial distribution of other national parks on the number of visitors to the national park "Đerdap".

MATERIAL AND METHODS

The research was conducted on a sample of visitors in NP "Đerdap" during 2011. Visits were recorded at the information desk in the town Donji Milanovac, the headquarter of the National Park “Đerdap”. The sample consisted of 761

visitors of national park. Zonal travel cost method (2010, Riera et al., 2012) was used for data collection. This method is based on the fact that the value of natural resources can be seen through the travel expenses to the certain recreational and tourist areas, picnic areas and national parks (de Groot et al. 2002). Costs of travel incurred by the need to consume recreational services are used as an approximate indicator of the value of recreational areas. Travel cost method estimates the average and total costs of travel to the recreational site. Travel cost is expression of the minimum value of recreational services in a given location. The method is used in evaluating recreational locations such as forests, places for fishing, walking and hiking, as well as locations with attractive landscapes, cultural destinations and national parks (Chen et al., 2004). Data were collected from the following sources:

Data collected at the information desk of the NP "Đerdap" are as follows: number of visitors at NP "Đerdap" in the year 2011, date of the visit, residence of visitors, other costs that visitors have made the NP.

Data collected from the website for route planning "Via Michelin" (2013/b) are: distance from residence to national park in km, travel time in hours (h).

Data collected from the database of the Institute of Statistics (2011) is average monthly income for the city visitors come from (RSD),

Data collected from the Republic database of laws and regulations "Paragraph" (2013/c) is transport costs per km.

The total cost of the visit is equal to or less than the benefits which are visitors made from a visit to the Đerdap. Total cost is calculated according to the following equation:

$$V = ((T \cdot w) + (D \cdot v) + Ca) \cdot n$$

where:

V = the total travel cost of a visit to the National Park "Đerdap"

T = time spent travelling (h)

w = average income for a specific city (RSD/h)

D = the total distance of travel (km)

v = travel cost per km (RSD)

Ca = other cost of recreation in NP (RSD)

n = number of visitors.

Analyse the influence of selected factors on number of visitors was done too. Selected factors were: travel distance, average visitor’s income and spatial distribution of national parks in Serbia and Montenegro. Analyse was done by multiple linear regression analysis. It was used methods, "Enter" method and "Stepwise" method. The dependent variable is the number of visitors NP "Đerdap" in 2011. Independent variables were: travel distance, average visitor’s income and spatial distribution of national parks e.g. distance to the nearest NP from visitor’s residence. Enter method have no selection of variables, predictor is constructed from all variables. In Stepwise method at each step every single

variable is included in the analysis so as it shows statistically significant correlation with dependent variable. If some of the variables have not been statistically significant, it has been removed from analysis.

RESULTS

Place of research was NP "Đerdap". The sample consisted of all registered visitors in the year 2011. Collected data are shown in Table 2.

Table 2. Data collected on visitors of NP "Đerdap"

Zone	N^{O} of visitors (n)	Proportion of visitors (%)	Distance to NP "Đerdap" (km)	Distance to the nearest NP (km)	Travel time, Average T (hh:mm)	Average income (RSD/EUR)	Av. income (RSD/h)	Aver. addit. visitor's cost (RSD/€) Ca
source	NP "Đerdap"		Website "ViaMichelin"			Data base of Republic Statistical Institute		NP Đerdap
Negotin	223	29	50	50	01:40	29,600/ 257	185/ 1.6	100/ 0.9
Kladovo	40	5	65	65	02:20	33,440/ 291	209/ 1.8	238/ 2.1
Beograd	304	40	192	58	05:32	42,560/ 370	266/ 2.3	220/ 1.9
Novi Sad	43	6	274	20	07:12	39,200/ 341	245/ 2.1	287/ 2.5
Budva	37	5	587	37	17:40	51200/ 445	320/ 2.8	238/ 2.1
Abroad	114	15	÷	÷	÷	÷	÷	464/ 4.0
TOTAL	761	100						

The visitors came from six different zones: City of Belgrade, City of Novi Sad, Negotin Municipality, Kladovo Municipality, Budva Munincipality and visitors from abroad (Austria, USA, Hungary, Italy, Germany). The sample consisted of 761 visitors. The largest number of visitors, 40%, comes from Belgrade, the least number come from Novi Sad, Budva and Kladovo. The frequency of visits by month is shown in Figure 1.

The highest recorded visit was in May 32% and October with 24% of the total number of visitors. In January, February, March, November and December, there were no recorded visits. The travel costs calculated by the equation 1 are shown in Table 3.

The average travel cost per visitor is 5.385 RSD (cca. 47 EUR). The overall travel cost was 4.097.895 RSD (cca. 35.634 EUR), for all visitors of NP "Đerdap" in the year 2011.

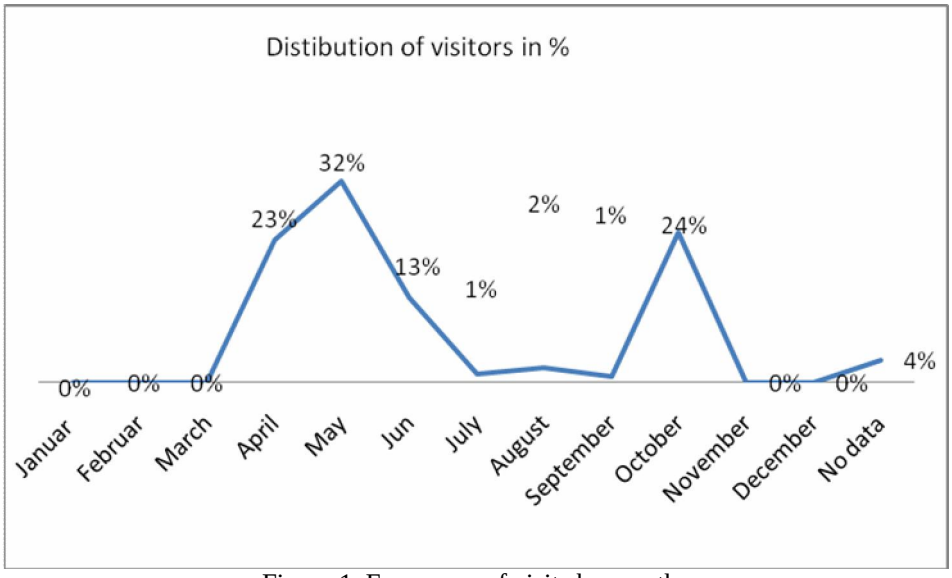

Figure 1. Frequency of visits by months

Table 3. Travel costs to the NP "Đerdap"

Zone	Travel distance D (km)	Average cost based on travel distance D · v (RSD)	Average cost of time spend in travel (T · *w*) (RSD)	Average visitor□s spending in NP Ca	Average travel cost (RSD /EUR)	Travel cost to NP "Đerdap" (RSD / EUR)
1	2	3 (2x15,2)	4	5	6	7 6 x n
1.Negotin	100	1.520	307,87	100	1.928	429.914,51
2.Kladovo	130	1.976	488,43	238	2.702	108.077,25
3. Beograd	384	5.836,8	1.465,87	220	7.523	2.287.021,83
4. Novi Sad	548	8.329,6	1.765,80	287	10.382	446.434,20
5. Budva	1.174	17.844,8	2.825,60	238	20.908	773.604,80
6.. Abroad	÷	÷		464	464	52.842,00
TOTAL					5.385 / 47	4.097.894,59 / 35.634

Source: calculation of authors

The total value of NP "Đerdap" as recreational site is estimated on 4.097.895 RSD in the year 2011. The average value is 428 RSD/ha (3.7 EUR/ha) in the year 2011. The value of tourism and recreation services in the NP "Đerdap", although it is offered to visitors for free, can be presented in the monetary form and Đerdap has a use value as a tourist and recreational sites.

The hypothesis H1 is accepted and concluded that the minimum monetary value of tourist-recreational services in NP "Đerdap" in 2011 is 4,097,895 RSD; the average visitor is ready to allocate 5.385 RSD to travel to the Đerdap, and the minimum value of national park as a tourist and recreational sites 428 RSD/ha.

The influence of travel distance and average income of visitors as well as spatial distribution of other NP parks have been analyzed by multiple linear regressions. The first step is obtained regression model based on all the variables entered. The model is presented in Table 4.

Table 4. Summary of regression model, dependence of travel distance and average income of the visitors as well as spatial distribution of other NP on number of visitors in Đerdap.

Model Summary[б]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimated
	,641[a]	,411	-1,356	193,011

ANOVA[a]						
Model		Sum of Squares	df	Mean Squares	F	Sig.
1	Regresion	25987,921	3	8662,640	,233	,870[б]
	Residual	37253,279	1	37253,279		
	Toral	63241,200	4			

a. Dependent Variable: Number_Visitors

b.Predictors: (Constant), Average_Income, Nearest_NP_km, Travel_Distance

Source: calculation of authors

The regression model revealed a correlation between the dependent variable (number of visitors) and a set of independent variables (travel distance, average income, distance from visitor's residence and neaerest NP). This correlation is represented by multiple correlation coefficients (R), which is R = 0.641, according to the Reomir Orphal scale indicates a strong correlation. Coefficient of multiple determinations (R Square) is 0.411, or 41.1% of the variance is explained by the number of visitors to the independent variables. However, to test the statistical significance F test was used. F test value is 0.87 indicating that there was no statistical significance between the observed variables. The number of visitors cannot be predicted with statistical significance.

The hypothesis H_2 is accepted and it is concluded that there is no statistically significant dependence between travel distance, the average income of visitors and distance to the nearest NP on the number of visitors NP "Đerap".

To test the influence of other factors on the number of visitors, the alternative hypothesis was formulated as follows:

H2/a: There is a dependence between some factors such as number of visitors, spatial distribution of national parks in Serbia and Montenegro as well as travel distance and average income of visitors of NP "Đerdap".

The hypothesis was tested by multiple regressions, using the "stepwise" method. The results of regression analysis are presented in Table 5.

Table 5. Correlation between variables “Stepwise” method

Correlations					
		Number_ Visitors	Nearest_NP	Travel_ Distance	Average_ Income
Pearsons Corr	Number_Visitors	1,000	,428	-,415	-,215
	Nearest_NP	,428	1,000	-,556	-,360
	Travel_Distance	-,415	-,556	1,000	,935
	Average_Income	-,215	-,360	,935	1,000
Sig. (1-tailed)	Number_Visitors	.	,236	,244	,364
	Nearest_NP	,236	.	,165	,276
	Travel_Distance	,244	,165	.	**,010***
	Average_Income	,364	,276	**,010***	.

Source: calculation of authors

Stepwise method indicates that there is a statistically significant correlation at the level of p = 0.01, between average income and travel distance. Regression model was created and shown in Table 6.

Table 6. Dependence travel distance and average income of visitors NP Đerdap

Model summary									
Model	R	R Square	Adjusted R Square	Std.Err. of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,935[a]	,874	,832	3428,79029	,874	20,870	1	3	,020
a Predictors: (Constant) , Travel_Distance									
b. Dependent Variable: Average Income									

Source: calculation of authors

In Table 7 regression coefficients (B) and statistical significance Sig. are shown.

Table 7. Regression coefficients (B) and statistical significance Sig.

Coefficients										
Model	Unstand. Coeff.		Stand .coef.	T	Sig.	Correlations			Colinearity Statistics	
	B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1(Cons)	**-721,122**	212,769		-3,389	,043					
Avr_Inc	**,024**	,005	,935	4,568	**,020**	,935	,935	,935	1,00	1,00
a. Dependent Variable: Travel Distance										

Source: calculation of authors

Based on the regression model, the equation was constructed. Equation represents readiness of visitors to travel to the NP “Đerdap” but based on their average income. The regression equation is:

$$Dis = 0{,}024 \cdot PZ - 721{,}122$$

where:
Dis – Travel distance
PZ – Average income of visitors from different towns.

In the Figure 2 dependence travel distance and average income is shown.

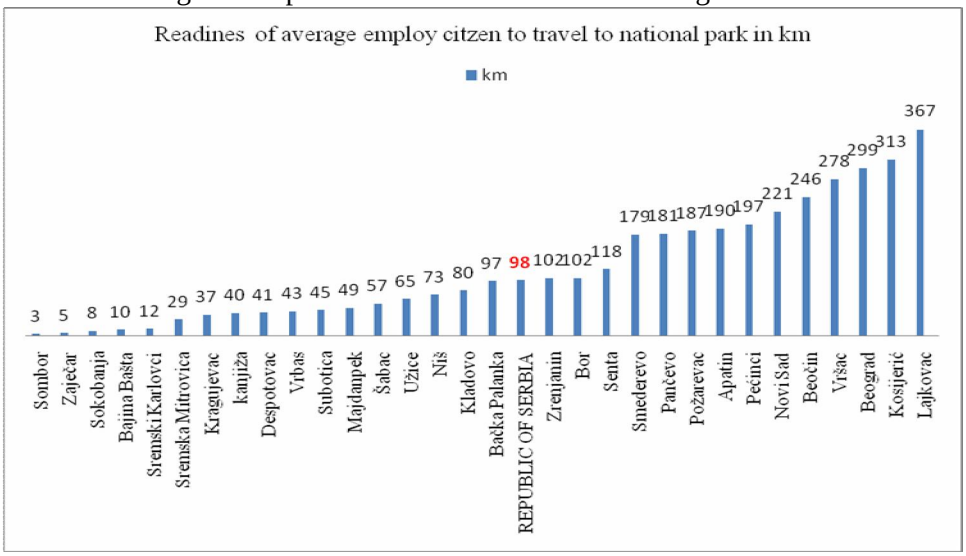

Figure 2. Readiness of visitors to travel to the NP "Đerdap" in km, based on average income

The average employee in the Republic of Serbia is ready to travel most 98 km to the National Park "Đerdap". At least citizens of Sombor are ready to travel to the Đerdap (3 km), and residents of Lajkovac are ready to travel 367 km. This means that at the Đerdap can generally expect a group visit.

DISCUSSION

In current practice different units of measurement has been used for estimation of ecosystems values. Such a forests, which provide many products and services are measured by hectares (ha), cubic meters (m^3) of wood or kilometres (km) of hiking trails, or metric tonnes of CO_2 equivalent (tCO_2eq). Some services, like erosion protection and water regulation in the Polimlje region (Spalevic et al. 2014a, 2014b, 2013a, 2013b), Coastal area of Montenegro (Spalevic, et al., 2012) and at the National Park "Biogradska Gora" area (Spalevic, et al., 2004) recently have been estimated but not in monetary value. For this reason, ecosystem services have been classified, according to the function from which they originate, as well as by the natural processes that provide (de Groot et al. 2002). Ecosystem services have been valued by various methods, such as: Replacement cost, Factor income, Travel cost method, Contingent valuation, Hedonic pricing. Based on this method, it is estimated that value of ecosystem services is between 16 and 54 trillion USD with average value of 33 trillion (10^{12}) USD/year (Costanza et al. 1997). Similar studies

indicate the value of the regulatory ecosystem services, that provide regulation of air and climate, is estimated between 7 and 265 USD/ha per year; the value of ecosystem services that provide drainage and irrigation water are estimated between 2 to 5445 USD/ha per year; value of ecosystems that provide recreational services were estimated from 2 to 6000 USD/ha per year (de Groot et al. 2002a) Valuation of nature protected areas is important especially when protection of nature has a long tradition, like on “Biogradska Gora” in Montenegro where protection can be traces from the year 1878 and it belongs to the group of the oldest nature protected areas in the world (Čurović et al., 2011).

The value of recreational services is based upon the total and average travel costs of visitors of NP "Đerdap" in the year 2011. Total travel costs indicate that the value of tourism and recreation services in the NP "Đerap" in the year 2011 was 35634 EUR or 3.7 EUR/ha. Visitors spent an average of 47 EUR per travel. This cost shows value of the recreational services in NP. That can be compared with similar studies in the world, where it is stated that European citizens spend between 0.66 and 112 EUR per trip in the nature (Zandersen M. 2009), and that the value of tourist and recreational sites in the world is between 2 and 6.000 USD/ha (de Groot et al. 2002). This results indicate that each recreational site have own value and it requires a number of studies in each country as well as region. Recent research indicates that the total value of the world's ecosystems is 125 trillion, which is greater than the total world gross domestic product (GDP), estimated at 75.2 trillion (Costanza et al., 2014).

Analyzing the impact of various factors on the number of visitors, it is concluded that there was no statistically significant correlation between the number of visitors and the travel distance, average income and spatial distribution of other national parks in Serbia and Montenegro on number of visitors of NP “Đerdap”. This suggests that visitors choose Đerdap mainly due to the specific characteristics of the national park. However, the average income in Serbia influences the readiness of visitors to travel to Đerdap. Thus, residents from Lajkovac can travel up to 376 km, to enjoy in the tourism and recreation in the Đerdap. Citizens from Sombor can travel only up to 3 km to visit national park. This indicates that if people are planning to visit the Đerdap it is necessary to arrange bus transportation. The average employee in Serbia is ready to travel up to 98 km to the Đerdap. This means that the Đerdap can expect mostly group visits. Although data from BiH indicate that 86% of visitors to the forest goes his own car (Avdibegović et al. 2006), what is opposite with this research where it is found that citizens in Serbia mostly, need to use group transportation, like bus, for visiting NP. Similar research from region indicates that citizens have need as well as opportunities to use ecosystem products and services (Vuletić et al. 2009) Valuation of recreational services become more important when takes into account that 2/3 of the population visit the forest and only 1/3 have no reason to go into the forest. Most of the people who visit forests, 62% goes because of tourism, sport, recreation and leisure, and only 17% for business (Vuletić et al. 2006).

CONCLUSIONS

Valuation of ecosystem services by non-market methods is an attempt to value recreational services in national park Đerdap when visitors are not required to pay. This method gives the possibility to use the results in order to determine incentives for the development of recreation and tourism in the Đerdap. Estimated value by this method does not allow full commercialization of recreational services. It is not possible all the costs of infrastructure to be charged to the visitors. But it provides a basis for discussing the various methods of compensation when some ecosystem services are offered free. From all of these results we can conclude the following:

- Visitors choose Đerdap because of the specific features that allow recreation and tourism, and not because of its proximity to resident;
- Visitors spent an average of 5.385 RSD (cca. 47 EUR) for travel to the Đerdap;
- The highest number of visitors comes from Belgrade;
- The value of tourism and recreational services in the 2011 is 4.097.895 RSD or 428 RSD/ha (3,7 EUR/ha);
- Đerdap is the most visited in the spring and in the fall;
- The average employee in Serbia is ready travel up to 98 km to visit national park;
- Organized trip to the Đerdap can allow a higher number of visitors.

The results of non-market valuation is hardly comparable with other economic analyses, in terms of the objectives to be achieved, the applied methods, usability data. It is clear that such valuation indicates that from a visit to forest ecosystems will benefit both visitors and society as a whole. As the results of non-market valuation of forest ecosystem services are mainly used to influence the incentives for improving ecosystem services and increase awareness of the value of natural resources is necessary to do more research based on Zonal travel costs method. It will allow comparison of the value of recreational services on different locations in different time periods. Increasing number of research and evaluation of non-market values of forest ecosystems would provide a basis for defining the mechanisms of compensation and financing of protected areas and ecosystems in general. Such mechanism will allow the financing of projects and investments that promote tourism and recreational as well as other ecosystem services, for example regulation and protection of torrents and floods, health services as well as the services that need to be preserved for future generations.

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UTICAJ ODABRANIH FAKTORA NA BROJ POSETILACA NACIONALNOG PARKA ĐERDAP

SAŽETAK

U radu su analizirani uticaji dužine putovanja, prosečnih zarada posetilaca i prostornog rasporeda nacionalnih parkova u Srbiji i Crnoj Gori na broj posetilaca nacionalnog parka „Đerdap“. Analizom ovih faktora procenjeni su ukupni i prosečni troškovi putovanja do NP „Đerdap“. Procena je urađena prema konceptu netržišnog vrednovanja ekosistemskih usluga, a posebno turističko-rekreativne usluge u državnim šumama.

Cilj istraživanja je da se na osnovu analize troškova putovanja, prema Zonskoj metodi troškova putovanja odrede ukupni i prosečni troškovi posetilaca turističko-rekreativnih lokacija, kao i da se odredi uticaj različitih faktora na broj posetilaca u NP „Đerdap“ u 2011. godini.

Svrha istraživanja je da se ukaže na faktore koji utiču na izbor Đerdapa kao turističko-rekreativne lokacije, kao i da se ukaže vrednost turističko-rekreativne usluge, odnono da se ona proceni u novčanom obliku, iako posetioci nemaju obavezu da je plate.

Ovako iskazana vrednost turističko-rekreativne usluge u NP „Đerdap“ ukazuje da se Đerdap može porediti sa ostalim destinacijama koje se u svetu koriste za potrebe turizma i rekreacije u šumskih ekosistemima. Posetioce Đerdapa privlače specifične prirodne karakteristike. Udaljenost NP ne utiče na broj posetilaca, međutim, prosečna zarada zaposelnih u Srbiji utiče da posetioci dolaze na Đerdap uglavnom u grupama.

Ključne reči: turističko-rekreativne usluge, Nacionalni park Đerdap, vrednovanje, troškovi putovanja, posetioci