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TOURISM ECOSYSTEM SERVICES – AN EXAMPLE OF BIRDWATCHING AT NATURE 2000 SITES

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ABSTRACT: In Poland, the most attractive areas for birdwatching is an areas of Nature 2000. To provide nature against habitat degradation, it is necessary to know the relationship between people and nature. This relationship allows to research the concept of ecosystem services. The aim of this study is to distinguish typology of Special Protection Areas for ecosystem services of birdwatching. Its development is a complex problem, wherefore the main research method is Analytic Hierarchy Process. As a result, it was possible to divide the studied areas into types that reflect the possibilities of development of birdwatching on each of them.

KEY WORDS: birdwatching, ecosystem services, Nature 2000, AHP

JEL: Q01; Q26; Z32

Introduction

Natural areas of high value are usually attractive to tourism and condition its development. These are protected areas: national parks, landscape parks, nature reserves and also Nature 2000 areas (Niedziółka, 2010, p. 569–570). These areas are an important factor in the development of many forms of tourism including ecotourism (Referowska–Chodak, 2006, p. 51–59; Symonides, 2008, p. 662–668). The fastest growing form of ecotourism is birdwatching (Cordell, Herbert, 2002, p. 54–61; Sekercioglu, 2002, p. 282–289) which is the subject of study in this article. This form of tourism is popular in many countries of the world (Great Britain, Sweden, USA). In Poland it is still developing (Janeczko, Anderwald, 2011, p. 308). However, a certain level of development has been achieved. This is proved by the activity of numerous ornithological associations and birdwatching trips organizers (tourism agency, guides) who organize or take a part in many ornithological events (e.g. European Days of Birds). Every year, the offer of ornithological events for bird lovers is growing (Kordowska, 2014, p. 130–148; Kordowska, Kulczyk, 2014, p. 15–21). The recognition of the benefits, that humans obtain from the natural environment, is the basis for the ecosystem services (ES) concept (Constaza, 2008, p. 350–360; Solon, 2008, p. 25–44; Rosin et al., 2011, p. 3–20.). Tourism and recreation in usually recognized as the one of cultural services (Millenium Ecosytem Assesment, 2003) which are described as nonmaterial benefits obtained from ecosystems. Cultural ecosystem services are difficult to describe and quantify, because they depend both on ecological and social contexts (Daniel et al., 2012, p. 8812–8819). Birdwatching is an example of a service that could not be used without the additional arrangements that make bird observation available. The service is provided only when birdwatcher present in an ecosystem (Kronenberg, 2014, p. 617–630). In this article the factors crucial for the responsible birdwatching development on Special Protection Areas Nature 2000 are identified in order describe the diverse patterns of birdwatching ES provision.

Research areas

The Nature 2000 site is the youngest form of environmental protection introduced to Polish legislation. Its legal basis is provided by the Habitats and Birds Directive. The first of the abovementioned directives designate the Special Areas of Conservation (SACs), second the Special Protection Areas (SPAs). The study focuses on SPAs. It includes 145 areas, which occupy 19,6% of the terrestrial area of Poland (Natura 2000, 10.10.2016). They are located une-

venly. The biggest number of SPAs are located in Lubelskie (20 areas), Zachodniopomorskie (19 areas), Mazowieckie and Warmińsko-Mazurskie (14 areas each) voivodships. Opolskie, Śląskie (3 areas each), Łódzkie (2 areas) and Świętokrzystkie (1 area) voivodships have the lowest number of SPAs. These areas are of different origin and land use, including forest, meadows, pastures, arable land, follow land, lakes (fig. 1), reservoirs, fish ponds, marine waters and built-up areas. Their ornitofauna is also extremely varied, including many rare and endangered species (such as: aquatic warbler, greater spotted eagle, ruff, short-eared owl, roller) (Sterno, 2015, p. 26). In the Annex I to Directive Birds 180 species are listed (Dyrektywa Rady 79/409/EWG w sprawie ochrony dzikich ptaków, 1979). Poland is also a very attractive place to watch migrating and wintering geese (Sterno, 2015, p. 27). Moreover the Special Protection Areas differ in their status and existing forms of protection. Most of them interfere with the national parks, landscape parks, nature reserves, protected landscape areas and ecological sites.

Figure 1. Świdwie Nature Reserve – Świdwie lake and wetlands around it

Research methods

The distinction of the types of SPAs Nature 2000 is the multicriteria issue. The complexity of the problem is associated with the number of analysed factors, the diversity of their characteristics and their value. For this reason, the research was carried out using method Analytic Hierarchy Process (AHP). AHP is a multicriteria decision-making technique which allow to solve problems which have more than one a decision criterion. It decomposes a complex problem into a hierarchy, in which each level is composed of specific elements (Saaty, Vargas, 2012, p. 23–25). AHP method consists of several steps. In the first phase, the hierarchical structure of the system is described. This means identifying the factors and criteria of the system and grouping them according to a hierarchy. All the criteria and decision alternatives located on a higher hierarchical level act on the elements situated a level lower (Ramanathan, 2001, p. 27–35). In this study, the hierarchical structure was created on the basis of the subject literature, statistical databases obtained from Central Statistical Office of Poland, Ministry of Development, The Agricultural Advisory Centres, also Nature 2000 Standard Data Form and digital and paper maps (table 1). The data were collected in the years 2014–2015.

Table 1. AHP – data acquisition

Source	Information
Nature 2000 Standard Data Form (SDF)	habitat humidity, type of land cover, total number of bird species, the number of protected birds, the number of migratory birds species, owner of land (privately-owned or state-owned), other forms of nature protection than Nature 2000
Central Statistical Office of Poland	the total number of municipalities and voivodeships within SPA, **accommodation (tourist collective accommodation)**, distance to the railway station, distance to the national road
Published ornitological data	total number of bird species, the number of migratory birds species
Public databases (websites of governmental and non-governmental organizations)	**tourism projects, environmental protection projects, accommodation (the number of farm tourism household), tourist information**
Digital and paper maps	length of hiking trails

Bold line refers to municipalities which included research areas.

The data collected have been assigned to one of five groups of factors: ornithological value, natural conditions, management conditions, availability for tourists, formal conditions (look at the table tab.2, criteria and alterna-

tives). This allowed to construct a goal tree of the researched problem. In the second phase, individual elements are evaluated by the group of experts. The experts are selected by the researcher according to their knowledge and experience. In the present study 25 experts attended. They represented 5 groups of interests: beginner birdwatchers, advanced birdwatchers, ornithologists, tourism researchers and organizers of birding tours. AHP questionnaires were collected from February to June 2016. Each of the participants filled the questionnaire independently. The detailed instruction was attached in order to facilitated the process. Each of the experts had to compare all pairs of elements at a given level ranging them on 1 to 9 scale (1 – both elements are equally important, 9 – one of them is of the most important). The result of the comparisons is a set of matrices which, after normalisation to sum to 1.0 and examination of consistency, forms the basis for the final evaluation of the system. Finally, the consistency ratio is calculated to check the consistency of the experts' responses. The experts' estimates are deemed acceptable if the Consistency Ratio (CR) is less than 10%. On this basis, it is possible to calculate the birdwatching potential for each area and to conduct SPA classification. This can be described by the following formula:

$$\textbf{Birdwatching potential} = \text{local weight}Y_1 \times \text{collected data}Y_1 + \text{local weight}Y_2 \times \text{collected data}Y_2 + \ldots + \text{local weight}Y_n \times \text{collected data}Y_n$$

where:
local weight – individual value of a single criterion derived from judgment
$Y_{1\text{-}n}$ – considered criterion,
collected data – criterion value per site estimated on the basis of maps and other obtained information.

Results of the research

Table 2 summarize the consistency test and local weights, respectively. It reveals that ornithological values (0.390) and natural conditions (0.270) are the two most important factors for birdwatching development on Special Protection Areas Nature 2000. They are followed by accessibility for tourists (0.139) and formal conditions (0.102). Management conditions (0,098) appears to be the factor with the lowest importance. The alternatives dominate humid (0.424), total number of bird species over 201 species (0.692), State Treasury (0.497), 3 and more environmental protection projects (0.474) and available of tourist information (0.697) show the highest importance with respect to each factor. In contrast, the alternatives of arable land (0.062), built-up areas (0.052) and areas devoid of vegetation cover (0.047) are at the bottom rankings.

Table 2. Local weight for each criterion in convention site selection. Weights in each group sum to 1.0

Factors	Criteria	Alternatives	
Natural conditions (0.270)	Humidity habitat (0.532)	Water (0.397); Dominate humid (0.424); Dominate dry (0.180)	
	Land cover type (0.468)	Forest and woodlot (0.163); Meadows, pastures (0.187); Arable land (0.062); Wasteland (0.070); Built-up areas (0.052); Areas devoid of vegetation cover (0.047); Fresh waters (0.211); Marine waters (0.207)	
Ornithological value (0.390)	Total number of bird species (0.305)	Below 200 species (0.308); Over 201 species (0.692)	
	The number of protected birds species (0.351)	Below 20 species (0.113); 21–40 species (0.274); 41 and more species (0.612)	
	The number of migratory birds species (0.344)	Below 20 species (0.183); 21–40 species (0.304); 41 and more species (0.513)	
Formal conditions (0.102)	Ownership structure (0.213)	Private (0.133); State Treasury (0.497); Mixed (0.370)	
	Other forms of environmental protection than Nature 2000 (0.388)	No protection (0.068); No national park (0,125); National park (0,875); No landscaped park (0,08); One landscaped park (0,487); Two and more landscaped park (0,435); No nature reserve (0,07); 1–5 nature reserves (0,509); 6 and more nature reserves (0,420); No other forms of environmental protection (0,115); 1–5 other forms of environmental protection (0,479); 6 and more other forms of environmental protection (0,405)	
	The number of municipalities per area (0.187)	1 municipality (0.381); 2–10 municipalities (0.333); 11 and more municipalities (0.270)	
	How many voivodeship area is covered (0.212)	1 voivodeship (0.421); 2 voivodeships (0.288); 3 and more voivodeships (0.291)	
Management conditions (0,098)	Tourism projects (0.417)	No projects (0.211); 1 – 2 projects (0.316); 3 and more projects (0.473)	
	Environmental protection projects (0.583)	No projects (0.189); 1 – 2 projects (0.338); 3 and more projects (0.474)	
Accessibility for tourists (0.139)	Outside (access to the area) (0,557)	Distance to the railway station (0.465)	Below 5 km (0.639); 6 and more km (0.381)
		Distance to the national road (0.535)	Below 5 km (0.614); 6 and more km (0.386)
	Linked to the area (0.443)	The density of hiking trails (0.265)	Lack of hiking trails (0.174); 1–10 km hiking trails/10 km^2 (0.276); 11–20 km hiking trails/10 km^2 (0.267); 21 and more km hiking trails/10 km^2 (0.282)
		Tourist information (0.348)	Available (0.697); Lack (0.303)
		Accomodation (0.387)	Lack (0.121); 1–10 (0.278); 11–50 (0.306); 51and more (0.295)

Source: based on the answers given by experts in the AHP questionnaire.

145 Special Protection Areas was divided into 6 types using the method of natural breaks (table 3).

Table 3. Types of SPAs in the context of opportunities and prepare them for ornithological tourism

Type	Number of areas	Interval numeric of birdwatching potential	Degree of birdwatching potential	Examples
I	12	34,9–49,2	very high birdwatching potential	Biebrza Refuge, Bay of Puck, Lower Odra River Valley, Vistula River Mouth, Otmuchów Reservoir
II	29	30,1–34,8	high birdwatching potential	Kampinos Forest, Białowieża Forest, Augustów Forest, Łuknajno Lake, Drużno Lake, Nysa Reservoir
III	31	27,7–30,0	average birdwatching potential	Upper Narew River Valley, Lower Bug River Valley, Nieliska Refuge, Liwiec Valley, Mietków Reservoir
IV	47	25,3–27,6	low birdwatching potential	Świdwie Refuge, Słupia Valley, The Swamp of Wizna, Chełm Calcareous Marshes, Podedwórze Reservoir
V	26	20,5–25,2	very low birdwatching potential	Ravine of the Wisła River in Małopolska, Szyszła Valley, Strzeleckie Forest, The massife of Babia Góra

Source: based on the collected quantitative data and answers given by experts in the AHP questionnaire.

The distinguished types differ from each other (table 4), but not in all considered features. This somewhat blurred image may be conditioned by lack of available and reliable data. Some little-known bird areas appear in high classes because they are adjacent to other attractive tourist areas. As data on tourist infrastructure had to been collected by municipalities, they reflect their overall tourist attractiveness. The good example is Górna Łabuńka Valley. This small river valley is situated next to one of the main tourist attractions of Lubelskie Voivodeship, the city of Zamość, which result in high accommodation availability. However, it should be taken in mind, that the accommodation facilities of Zamość are mainly used by people that visit the city, not the protected natural area in the neighbourhood. The visitors in Zamość are unlikely to recognize Górna Łabuńska Valley as the tourist attraction. On the contrary, some of areas which are well known among birdwatchers as good observation places are classified as type IV or V. These places are considered as interesting, such as Wizna fen or Chełm Calcareous Marshes – the third biggest breeding area of Aquatic Warbler in Poland. Some of them are promoted by the guidebooks and online forums, but they lack accommodation and other tourists facilities.

Table 4. Characteristic of distinguished types

Factors	Type I	Type II	Type III	Type IV	Type V
Habitat diversity	Moderate	Large	Large	Large	Large
Variety of bird species	Large	Average	Large	Average	Small
Rank of natural areas	High (6 national parks)	High (6 national parks)	Average (4 national parks)	Average (3 national parks)	Average (3 national parks)
Accesibility for tourists (Distance to the railway station; Distance to the national road)	Below 5 km	Less than 5 km for almost all areas	Less than 5 km for almost all areas	Less than 5 km for almost all areas	For half of the areas less than 5 km, for another half more than 5 km
Availability of accomodation (The average number of accommodation facilities in municipalities that comprise the research area)	27	14	13	8	7
Availability of hiking trails (density of hiking trails)	11 hiking trails/10 km^2	9 hiking trails/10 km^2	10 hiking trails/10 km^2	9 hiking trails/10 km^2	17 hiking trails/10 km^2
Availability of tourist information	Few tourist information points	Few tourist information points	Few tourist information points	Few tourist information points	Few tourist information points
Management conditions (mean number of projects funded from external sources)	16 tourism projects; 31 nature conservation-projects	9 tourism projects; 17 nature conserva-tionprojects	6 tourism projects; 19 nature conserva-tionprojects	5 tourism projects; 13 nature conservation-projects	2 tourism projects; 9 nature conservation projects
Share of the polish SPA's	1%	24%	30%	34%	11%

Source: based on the data from collected Standard Natura 2000 Data Form, Central Statistical Office of Poland, published ornithological data and cartographic materials available for the areas of interest.

Spatial distribution of distinguished types is shown by figure 2. Type I areas are located mainly in the northern and north-eastern Poland. Similarly arranged are the areas of the second type. They dominate in north-western Poland. Areas of other types are located fairly evenly all over the country. The exception is south-west Poland, where the number of Special Protection Areas is the smallest. It is surprising that the areas of exceptionally high and very high birdwatching potential border the areas of low and very low birdwatching potential. For the underdeveloped area this can affect both positively and negatively on the development of birdwatching. For example, the

proximity of the popular national park can help in the development of little-known areas in its neighbourhood by promoting them among tourists who visit the primary attraction.

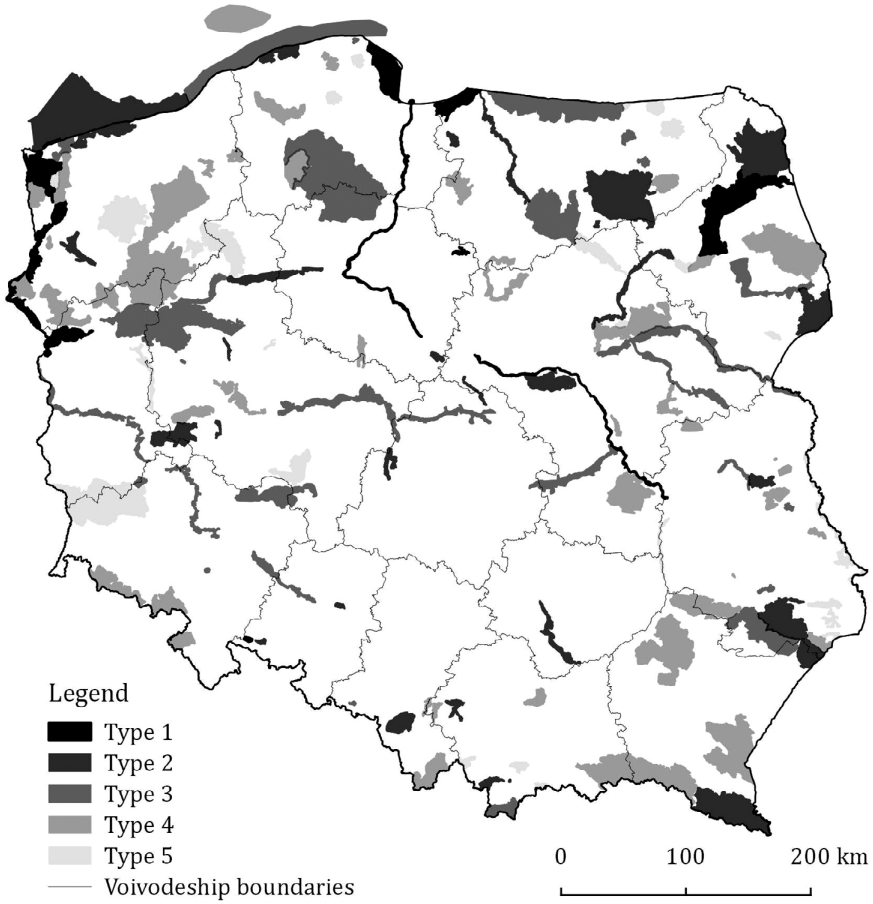

Figure 2. Spatial distribution of distinguished types that reflect the potential for development of birdwatching tourism; type 1 – very high potential, type 5 – very low potential

Conclusions

Birdwatching as a spatial phenomenon is constantly looking for new areas, often by far considered unattractive. That kind of areas are Special Protection Areas. Their natural value, while responsibly use and promoted, can be tourism ecosystem service which is significant to region's development.

The study shows that for bird lovers the nature itself, not facilities or attractions provided by people is the most important. These situation offer a great opportunity for areas that lack infrastructure and cultural attractions. Particularly, it gives the possibility of earning for inhabitants. However, we must be aware of mutual interactions between tourism and natural environment. The environment determines the development of tourism and may be endangered by the same factor. The overgrown tourist traffic threatens the sustainability of natural ecosystems. Taking this in mind detailed rules the tourism development should be set for all distinguished types of Nature 2000 areas. Not only values, but also natural barriers (for example low trampling resistance) should be taken in mind in planning process. The proper distribution of tourists traffic and adequate infrastructure seemed to be the best management tools. The propose typology would be helpful at the level of strategical planning, as it points out the areas of different management priorities.

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