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ECOSYSTEM SERVICES IN TOURISM AND RECREATION. REVISITING THE CLASSIFICATION PROBLEM

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ŚWIADCZENIA EKOSYSTEMOWE NA POTRZEBY TURYSTYKI I REKREACJI. JESZCZE RAZ O PROBLEMIE KLASYFIKACJI

STRESZCZENIE: Na całym świecie obserwuje się rosnące zainteresowanie kulturowymi świadczeniami ekosystemów. Jakkolwiek znaczenie tej grupy świadczeń dla jakości życia ludzkiego jest niepodważalne, ten zakres badań pozostaje słabo rozwinięty tak pod względem metodycznym jak i teoretycznym.

Turystyka i rekreacja są zazwyczaj włączane do grupy świadczeń kulturowych. Jednakże nie bazują one wyłącznie na potrzebach duchowych; obejmują również konsumpcję różnego typu zasobów przyrodniczych. Celem artykułu jest analiza relacji między turystyką i rekreacją a różnymi kategoriami świadczeń ekosystemowych. Dla określenia wagi ośmiu wydzieleń drugiego poziomu klasyfikacji CICES dla turystyki i rekreacji posłużono się metodą analizy hierarchicznej. Analiza została przeprowadzona przez ekspertów reprezentujących geografię fizyczną oraz geografię turyzmu. Badanie potwierdziło, że turystyka i rekreacja bazują na zróżnicowanym spektrum świadczeń ekosystemowych, nie powinny być zatem traktowane jako świadczenie *per se*.

SŁOWA KLUCZOWE: turystyka i rekreacja, świadczenia ekosystemowe, klasyfikacja

Introduction

Tourism and recreation are the important element of human well-being. Natural values are concerned to be crucial for the most of leisure activities. Their identification and assessment can be conducted using ecosystem services concept which has gained its global popularity in the last 15 years. This paper does not aim at its characteristics, however three principal advantages of using ecosystem services concept should be mentioned. First, it allows to recognize relations between economic and ecological aspects of use of natural resources. Second, it makes possible to identify consequences of different scenarios of spatial development. Third, it has high potential as and information and educational tool.

Tourism and recreation find its place within the discussed concept and are typically listed as one of the cultural ecosystem services. However, their position remain unclear, as they are positioned at different levels and in various relations to other services (see table 1). One of the ambiguities is if recreational ecosystem services are of material of nonmaterial character. The popular Millenium Ecosystem Assessment (MEA)[1] classification recognizes tourism and recreation as one of the cultural services, thus promotes their nonmaterial character. In Common International Classification of Ecosystem Services (CICES 4.3)[2] classification recreation is also considered as a cultural service, and it is described even in a more narrow way, as physical and intellectual interaction with the environment. As tourism and recreation are a very diversified phenomenon, the existing classifications are supposed to be too limited. The one way to resolve this problem is to create new, more suitable typologies[3]. However, the use of common and well established frameworks would allow to easily combine research on tourism and recreation with those concerning other types of human activities. The implementation of common classification of ecosystem services is thus significant from scientific as well as from practical point of view. In our opinion ecosystem services for tourism and recreation cannot be limited to just one category. This paper attempts to identify the weight of different ecosystem services to tourism and recreation phenomenon.

CICES classification has been explored in order to describe the importance of different ecosystem services to tourism and recreation. The classification which was developed on the basis of environmental accounting undertaken by the European Environment Agency (EEA) is based on the requirement that any new

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[1] *Millenium ecosystem assessment. Ecosystems and human well-being. Synthesis*, Washington D.C. 2005.
[2] Common International Classification of the Ecosystem Services v. 4.3, www.cices.eu [27-09-2014].
[3] R. Costanza, *Ecosystem services: multiple classification systems are needed*, "Biological Conservation" 2008 no. 2(141), p. 350-352.

Table 1

Position of tourism and recreation in different classifications of ecosystem services

Classification	Level	Position of tourism and recreation	Recognition of material aspects	Recognition of nonmaterial aspects
Costanza et al. 1997[a]	first	One of 17 main categories	yes	no
De Groot et al. 2002[b]	first	One of 23 ecosystem functions	yes	yes
MEA 2005[c]	second	One of 4 subgroups of cultural ecosystem services	no	yes
Wallace 2007[d]	second	One of 6 subgroups of category socio-cultural fulfillment	no	yes
Boyd & Banzhaf 2007[e]	first	One of 6 benefits	yes	no
CICES 2013[f]	third	One of 20 service groups, belong to cultural section	yes	no

[a] R. Costanza et al., *The value of the world's ecosystem services and natural capital*, "Nature" 1997 no. 387, p. 254.

[b] R.S. De Groot, M.A. Wilson, R.M.J., Boumans, *A typology for the classification, description and valuation of ecosystem functions, goods and services*, "Ecological Economics" 2002 no. 41, p. 396.

[c] *The Millenium Ecosystem Assessment*, op. cit., p. 120.

[d] K.J. Wallace, *Classification of ecosystem services: Problems and solutions*, "Biological Conservation" 2007 no. 139, p. 241.

[e] J. Boyd, p. Banzhaf, *What are ecosystem services? The need for standardized environmental accounting units*, "Ecological Economics" 2007 no. 63, p. 616-626.

[f] *Common International Classification of the Ecosystem Services v.4.3*, op. cit.

Source: after: M. Kowalczyk, S. Kulczyk, *Ecosystem services in tourism research. Case study of aquatic recreation*, "Ekonomia i Środowisko" 2012 no. 2(42), p. 203, changed.

classification has to be consistent with previously accepted typologies[4]. Widely used in Europe and in other countries, it has three hierarchical levels and can be modified depending on scale and approach of undertaken research. CICES has gone through a number of evolutionary stages since it was first proposed in 2009. The most recent version (4.3) has been used as the basis of this work.

Method

The Analytic Hierarchy Process (AHP) has been implemented to identify which of CICES categories are supposed to be the most important for tourism and recreation. Developed by Saaty[5] in the 1970s, this multiple choice method is widely used both for management and scientific purposes. It has been also imple-

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[4] R. Haines-Young et al., *Towards a common international classification of ecosystem services (CICES) for integrated environmental and economic accounting (Draft V1)*, Report to the European Environment Agency for Contract No. EEA/BSS/07/007, Nottingham 2009.

[5] T.L. Saaty, *The analytic hierarchy process*, New York 1980.

mented in tourism research[6]. The method allows to incorporate both qualitative and quantitative elements of a problem within a single study and to arrange them in a hierarchical form. The AHP approach involves three basic steps: (1) decomposition – creation of the hierarchy (2) pairwise comparison of elements of the hierarchical structure; (3) synthesis of priorities. The values of the pairwise comparisons are determined according to the nine point scale, where 1 means that two activities contribute equally to objective and 9 that the importance of one over another is affirmed on the highest possible order. After the pairwise comparison a matrix is constructed, a vector of priorities is calculated and is then normalized to sum to 1.0. Finally, the reliability of the experts' judgments is checked using the consistency ratio (CR) metric. Inconsistency unveils exaggerated or careless judgments. Originally, T.L. Saaty considered CR = 0.1 as the acceptable upper limit, but depending on a character of an analysis and on a number of compared elements values up to 0.3 could also be accepted[7].

Due to limited human capacity for proceeding information the number of elements taken into account in AHP analysis should not exceed 9[8]. Accordingly, the second level of CICES classification has been assessed. These are 8 elements: nutrition; materials; energy; mediation of wastes, toxics and other nuisances; mediation of flows; maintenance of physical, chemical and biological conditions; physical and intellectual interactions with ecosystems and land-/seascapes, spiritual, symbolic and other interaction with ecosystems and land-/seascapes. The table 2 shows the position of analyzed elements within CICES classification. As it has been mentioned above, tourism and recreation activities themselves taken into account by CICES as a sublevel of "physical and intellectual interactions (…)".

Ten experts were asked to make comparisons of the elements presented above. Five of them were landscape ecologists and five were tourism geographers. For every set of judgments the individual AHP matrix were constructed. Results were finally synthetized to one final AHP matrix. The analysis was conducted with the use of free AHP Excel template elaborated by K.Goepel.

[6] C.F. Lee, H.I. Huang, H.R. Yeh, *Developing an evaluation model for destination attractiveness: Sustainable forest recreation tourism in Taiwan*, "Journal of Sustainable Tourism" 2010 no. 18(6), p. 811-828; L. Nahuelhual, A. Carmona, P. Lozada, A. Jaramillo, M. Aguayo, *Mapping recreation and ecotourism as a cultural ecosystem service. An application at the local level in Southern Chile*, "Applied Geography" 2013 no. 40, p. 71-82; T. Adamczyk, M. Nowacki, *Ocena atrakcyjności krajoznawczej destynacji żeglarskich z wykorzystaniem metody AHP*, „Turystyka Kulturowa" 2014 no. 8, p. 51-68.
[7] K. D. Goepel, *Implementing the analytic hierarchy process as a standard method for multi-criteria decision making in corporate enterprises–a new AHP excel template with multiple inputs, Proceedings of the international symposium on the analytic hierarchy process*, Kuala Lumpur 2013, p. 4.
[8] T.L. Saaty, M.S. Ozdemir, *Why the magic number seven plus or minus two*, "Mathematical and Computer Modelling" 2003 no. 3 (38), p. 233-244.

Table 2
CICES classification – 1st and 2nd level

Section	Division
Provisioning	Nutrition
	Materials
	Energy
Regulation & Maintenance	Mediation of waste, toxics and other nuisances
	Mediation of flows
	Maintenance of physical, chemical, biological conditions
Cultural	Physical and intellectual interactions with biota, ecosystems, and land-/seascapes
	Spiritual, symbolic and other interactions with biota, ecosystems, and land-/seascapes

Source: *Common international classification…*, op. cit.

Results

Figure 1 presents the results of the conducted analysis. Both included types of cultural services have occurred to be the most important for tourism and recreation, with physical and intellectual interactions with ecosystems and land-/seascapes at the first position. Provisioning services, especially nutrition, are also significant. The importance of regulation and maintenance remains unclear. The elements of this group have been weighted as less significant.

However the final matrix has high level of consistency (CR = 0.018), the judgments of the individual experts are less consistent. Only four experts reached the level of consistency suggested by T.L. Saaty (CR <= 0.1). CR for another six sets of judgments varied between 0.1 and 0.3.

The experts' academic background seems to have no influence on their judgments. As well those of physical geographers and specialists in tourism remain highly diversified (see Figure 2). In posterior personal communication experts admitted that the task appeared difficult for them. The main problems which they perceived were:
- broad and unclear categories, although some examples were given to make them clearer;
- a lack of knowledge of the assessed phenomena; especially regulating and maintenance categories were seen as problematic;
- the need to treat tourism and recreation in general; in reality it remains very diversified.

Figure 1
The results of AHP analysis
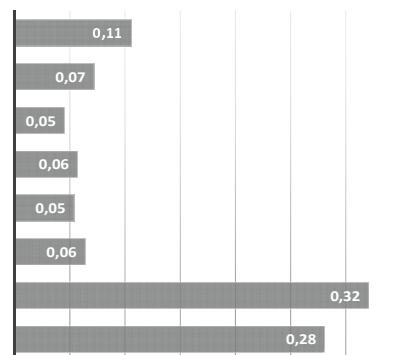
e 1…e5 – landscape ecologists, t1…t5 – tourism geographers.
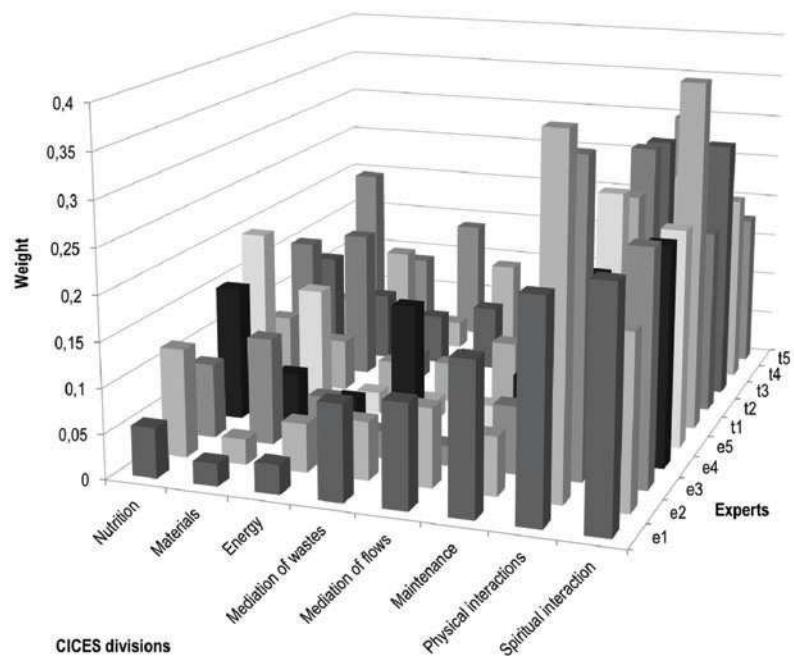
Discussion

The division into provisioning, regulating & supporting and cultural services originates from the MEA and is implemented also in CICES classification. This division is one the most used. Understandably, it could not fit all purposes. It has been criticized in context of environmental accounting[9] and poverty alleviation[10]. However considering ecosystem services complexity an idea of a single classification system should be approached with caution[11] common classifications such as MEA or CICES, allows for easy communication and comparisons within different contexts.

The CICES classification defines tourism and recreation as one of cultural services. The discussed phenomenon is included into the category of physical and intellectual interactions with ecosystems/landscapes. The conducted analysis shows clearly that tourism and recreation is too broad and complicated phenomenon to be treated as a single ecosystem service itself. However, cultural ecosystem services are definitely the most important for tourism and recreation (0,32). Physical and intellectual interactions with ecosystems of land/seascapes are followed closely by spiritual and symbolic interactions (0,28). Nutrition should be also considered as an important service (0,11). Its significance seems to respond to the growing popularity of regional food, that is in many cases an important driver of tourism activity.

The regulating and maintenance services occurred to be the most problematic ones. On the one hand, the expert were conscious that tourism and recreation influenced ecological functions, but they seemed not to have the detailed knowledge of the problem. In fact, the relations between different leisure activities and various types of ecosystems still remain unknown. Additionally, the enormous diversity of relations that should be included makes their evaluation very difficult if possible at all.

It has to be noticed, that the notion of tourism and/or recreation is very broad and its limit remain unclear. Therefore, it is difficult to identify any ecosystem – human relations as connected or separate to tourism. It is not just the case of regulating and maintenance services mentioned above, but also of the ecosystem services, that are easier to be identified and to quantified. For example nutrition service supports tourist interests as well as everyday human needs. Delivery of regional products is just a small fraction of the phenomenon and does not nec-

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[9] J. Boyd, S. Banzhaf, *What are ecosystem services? The need for standardized environmental accounting units*, "Ecological Economics" 2007 no. 2-3(63), p. 616-626; K.J. Wallace, *Classification of ecosystem services: problems and solutions*, "Biological Conservation" 2007 no. 3-4(139), p. 235-246; B. Fisher, R.K. Turner, *Ecosystem services: classification for valuation*, "Biological Conservation" 2008 no. 141, p. 1167-1169.

[10] T. Daw, K. Brown, S. Rosando, R. Pomeroy, *Applying the ecosystem services concept to poverty alleviation: the need to disaggregate human well-being*, "Environmental Conservation" 38 (4), p. 370-379.

[11] R. Costanza, *Ecosystem services multiple classification systems are needed*, "Biological Conservation" 2008, 2(141), p. 350-352.

Figure 3

Ecosystem services concept – ecological approach. b = benefit

Source: own elaboration.
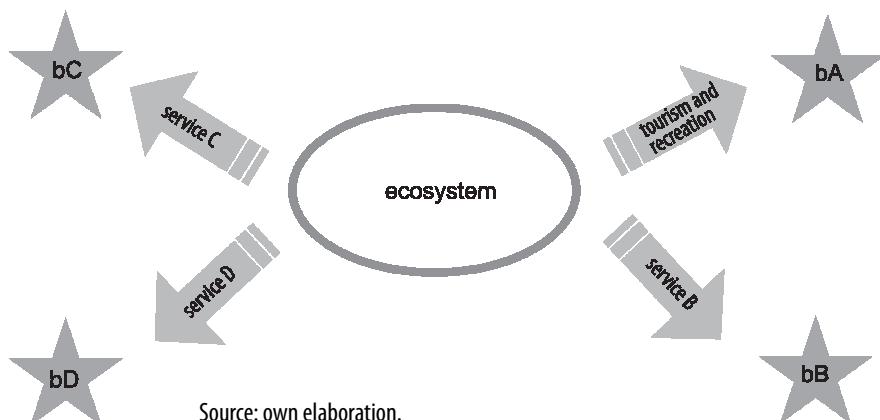
Figure 4

Ecosystem services concept – social approach. T&R = tourism and recreation b = other benefits

Source: own elaboration.
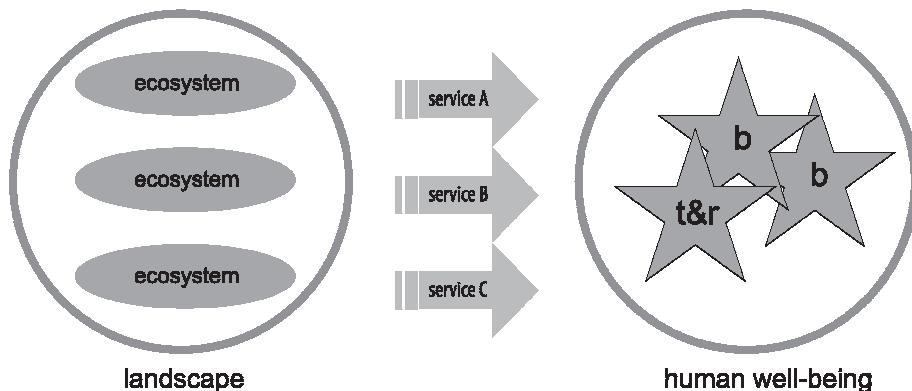
essarily concern only tourists. The mentioned products can be also consumed by locals. Also, if sold far from the place of their origin, they would lose their importance to tourism.

Originally, the concept of ecosystem services has been used as a tool for nature management and biodiversity conservation. Growing interest in the nature-human relations resulted in transformation of the original concept into the planning tool, where nature's services are used in a holistic approach centered around human well-being concept[12]. The followers of the second approach often

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[12] P. Lamarque, F. Quétier, S. Lavorel, *The diversity of the ecosystem services concept and its implications for their assessment and management*, "Comptes Rendus Biologies" 2011 no. 5 (334), p. 441-449.

refer not to ecosystem but rather to landscape services, as landscape is more complex term that include human activity[13].

The approach results in different position of tourism and recreation (Figure 3 and 4). If the research is socially focused, limiting tourism and recreation to one synthetic category could result in omitting some elements that are important to human-nature relation. However, the adopted level of detail should reflect spatial, social and time scale of the research.

Conclusions

The ecosystem services concept has been widely discussed in the scientific literature for the past 15 years. It can be very useful also in tourism studies, as an enormous part of tourism and recreation activities are undertaken in nature. In the existing classifications of ecosystem services, however, tourism and recreation are considered just as a single service. This paper proved that such an approach is too limited and it does not take into account the complexity of the studied phenomenon.

Natural ecosystems have an important value as a place where people can come for rest, relaxation, refreshment and recreation[14]. However, in order to use them as places for tourism and leisure, other ecosystem functions should also be considered. This paper aimed at discussing the position of tourism and recreation in classifications of ecosystem services. It showed, that they should be treated as a complex phenomenon and not just as a separate service. This approach should be continued and expanded.

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[13] J.W. Termorshuizen, P. Opdam, *Landscape Services as a bridge between landscape ecology and sustainable development*, "Landscape Ecology" 2009 no. 24, s.1037-1052; A. Tengberg et al., *Cultural ecosystem services provided by landscapes. Assessment of heritage values and identity*, "Ecosystem Services" 2012 no. 2, p. 14-26; M. Vallés-Planells, F. Galiana, V. Van Eetvelde, *A classification of landscape services to support local landscape planning*, "Ecology and Society" 2014 no. 1(19), p. 44, www.dx.doi.org [20-08-2014].

[14] R.S. de Groot, M.A. Wilson, R.M.J., Boumans, *A typology for the classification, description and valuation of ecosystem functions, goods and services*, "Ecological Economics" 2002 no. 41, p. 402.