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A METHOD OF INTEGRATED EVALUATION OF CULTURAL ECOSYSTEM SERVICES AT THE LANDSCAPE SCALE AND ITS APPLICATION IN THE VISTULA RIVER GORGE IN THE KAZIMIERZ LANDSCAPE PARK

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METODA ZINTEGROWANEJ OCENY KULTUROWYCH USŁUG EKOSYSTEMOWYCH W SKALI KRAJOBRAZU I JEJ ZASTOSOWANIE NA OBSZARZE MAŁOPOLSKIEGO PRZEŁOMU WISŁY W KAZIMIERSKIM PARKU KRAJOBRAZOWYM

STRESZCZENIE: Koncepcja usług ekosystemowych umożliwia w sposób syntetyczny przedstawienie powiązań między koncepcjami ekologicznymi i ekonomicznymi oraz zintegrowaną analizę tych dwóch podsystemów. Umożliwia również przeprowadzenie oceny różnych scenariuszy rozwoju gospodarczego i różnych strategii ochrony przyrody określonego obszaru. W myśl Europejskiej Konwencji Krajobrazowej, w tego typu analizach istotne znaczenie powinna mieć ocena wpływu rozwoju zagospodarowania terenu na walory estetyczne krajobrazu.

W publikacji przedstawiono metodę zintegrowanej oceny walorów estetycznych krajobrazu i oferty kulturowych usług krajobrazowych. Inspiracją do opracowania tej metody była z jednej strony metoda „krzywej wrzeń" K. Wejcherta, z drugiej zaś – prace nad metodami oceny ekologicznej wartości i gospodarczej przydatności systemów krajobrazowych.

Pierwszą próbę praktycznego zastosowania tej metody przeprowadzono na obszarze Małopolskiego Przełomu Wisły w granicach Kazimierskiego Parku Krajobrazowego. W niniejszej publikacji zaprezentowano najważniejsze rezultaty tych prac.

SŁOWA KLUCZOWE: walory estetyczne krajobrazu, kulturowe usługi ekosystemowe, Małopolski Przełom Wisły, Kazimierski Park Krajobrazowy

Introduction

In September 2004, Poland ratified the European Landscape Convention. According to the document, landscape is understood as *an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*[1]. The European Landscape Convention emphasises the importance of beautiful, harmoniously designed, and sustainably managed landscapes as an essential element of quality of life of local and regional communities.

The first step towards such a situation should be to identify, analyze, and evaluate the resources and values of various landscapes[2].

The process of evaluation of particular values of land is called *valorisation.* The concept of land valorisation involves the assessment and comparison of the value of particular parts of a given area. Land valorisation may be carried out by a variety of methods and techniques. Different objectives and criteria of evaluation can be developed based on geographical, biological, social, and economic sciences, as well as for a variety of planning studies. It follows a wide variety of land valorisation methods[3]. By analyzing different approaches to the assessment of land values, Chmielewski distinguishes five basic groups of methods based on certain evaluation criteria as follows:

1) land valorisation conducted according to the criteria of universal values (abundance of resources, diversity, uniqueness, beauty forms, etc.), mainly used for the delimitation of protected areas;
2) land valorisation conducted according to the criteria of land suitability to perform specific functions (agricultural, recreational, residential, etc), mainly used for planning studies;
3) land valorisation focusing on the abilities of land (environmental, social, economic potential, resistance to degradation, the ability to regenerate, etc.), mainly used for studies with a character of a policy or strategy (e.g. strategy of development, environmental protection strategy);

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[1] European Landscape Convention, Florence, 20 October 2000; www.coe.int/europeanlandscapeconvention [Date entry: 20-09-2012].

[2] Landscape and sustainable development. *Challenges of the European Landscape Convention*. Council of Europe Publishment, Strasburg 2006, p. 1-214.

[3] S.W.F. Ploeg, L. Vlij, *Ecological evaluation nature conservation and land use planning with particular reference to methods used in the Netherlands*, "Biological Conservation" 1978 Vol. 14, p. 197-221; P.G.R. Smith., J. B.Theberge, *A Review of Criteria for Evaluating Natural Areas "*Environmental Management" 1986 Vol. 10(6), p. 715-734; K.H. Wojciechowski, *Problemy percepcji i oceny estetycznej krajobrazu*. Uniwersytet Marii Curie-Skłodowskiej, Lublin 1986, p. 1-283; T.J. Chmielewski, *System planowania przestrzennego harmonizującego przyrodę i gospodarkę*. Politechnika Lubelska, Lublin 2001 Vol. 1, 2; M. Kistowski, B. Korwel-Lejkowska, *Waloryzacja środowiska przyrodniczego w planowaniu przestrzennym*, "Problemy Ekologii Krajobrazu" t. 19; Uniwersytet Gdański, PAEK; Gdańsk, 2007, p. 1-305.

4) land valorisation based on an integrated analysis of values, problems, and potentials, used for the development of strategies and protection plans;
5) multi-criteria land valorisation used for particularly difficult problem and conflict areas[4].

The methods of assessment of the values of landscape physiognomy raise particularly heated debate. The results of such assessment largely depend on the subjective perception of the landscape by individual recipients[5]. These methods include one particularly appreciated in Poland, namely the „experience curve method", developed by K. Wejchert in the 1970's. It is applied for the evaluation of urban composition[6]. The method has been recently adapted by Chmielewski and Michalik-Śnieżek to assess the degree of anthropogenic transformation of landscape, including open landscapes[7].

Nowadays, ecosystem services, constituting the third group of valorisation methods, have become a very popular research subject, and a conceptual framework for numerous research projects.

Ecosystem services are *ecological components directly consumed or enjoyed to produce human well-being*[8].

Ecosystem services are usually classified into four categories:

1. *Provisioning services*, including: water resources and water supply,food production, sourcing organic raw materials (wood, fibrous materials, fuel from biomass), genetic resources, natural medical resources, decorations of natural origin.
2. *Regulating services*, including: climate control, soil formation processes, erosion prevention, biological control (at the level of populations and ecosystems), absorbing dust and gas pollutants, water self-purification processes, etc.
3. *Supporting services*,such as circulation of elements, hydrological cycle, primary production.
4. *Cultural services*,including: aesthetic values, recreation, cultural and artistic resources, intellectual and spiritual inspiration, science and education[9].

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[4] T.J. Chmielewski, *Systemy Krajobrazowe, Struktura-Funkcjonowanie-Planowanie*, PWN, Warszawa 2012.

[5] K.H. Wojciechowski, *Problemy percepcji i oceny estetycznej krajobrazu*. Uniwersytet Marii Curie-Skłodowskiej, Lublin 1986, p. 1-283; E. Malinowska, *The influence of visual quality of landscape on the touristic potential of the Narwiański National Park and its buffer zone,* "Problemy Ekologii Krajobrazu" 2010 Vol. 27, p. 277-285.

[6] K. Wejchert, op.cit., p. 1-279.

[7] T.J. Chmielewski, M. Michalik-Śnieżek, *Adaptacja metody krzywej wrażeń K. Wejcherta dla potrzeb badań krajobrazów o różnym stopniu antropogenicznego przekształcenia*. Uniwersytet Przyrodniczy, Lublin 2011, mat. niepublikowany: 1-16; T.J. Chmielewski, *Systemy Krajobrazowe...*, op. cit., p. 1-408.

[8] J. Boyd, S. Banzhaf, *What are Ecosystem Services?* The Reed of Standarized Environmental Accounting Units. RFF DP 06-02. Resourece for the Future 2006 Washington.

[9] MEA, *Ecosystem and Human Well-being: Current State and Trends*; Vol. 1. *Findings of the Condition and Trends. Working Group of the Millennium Ecosystem Assessment (MEA)*, Island Press, Washington, Covelo, London 2005, p. 1-917; DEFRA. *An Introductory Guide to Valuing Ecosys-*

The concept of Ecosystem Services demonstrates, in a synthetic manner, the links between the basic ecological and economic concepts, as well as the integrated analysis of these two subsystems[10]. It also permits the evaluation of different scenarios of economic development, and different conservation strategies[11]. Finally, it constitutes an effective tool to explain and promote the idea of sustainable development. The methods of mapping ecosystem services offered at the landscape scale, however, are still at the early stages of development[12].

The aesthetic value of landscape is one of the essential components of cultural ecosystem services. The authors of this paper attempted to develop a method for the integrated assessment of cultural ecosystem services at the landscape scale (including the aesthetic value of the area). This paper presents a method of performing such an assessment, and the results of its application in the Vistula River George in the Kazimierz Landscape Park.

Study area

The Lesser Poland Vistula River Gorge is mainly developed by the Vistula River valley, with two Polish uplands on both sides of the river – Małopolska Upland to the west, and Lublin Upland to the east. The gorge is 82 kilometres long, extending from the town of Zawichost in the south, to Puławy in the north. The valley is 1 to 10 km wide, and its banks are very steep, reaching up to 60-90 meters above the water level[13]. The river banks reach their highest approximation and elevation in the Kazimierz Landscape Park, in the vicinity of the following locations: Podgórz, Męćmierz, Janowiec, Kazimierz Dolny, Bochotnica, Parchatka. This section of the Vistula River Gorge was selected as the study area (Figure1).

This section of the Vistula river is very attractive in visual terms. The river flows at the edge of the Nałęczów Plateau, covered with a thick layer of loess (up to 30 meters thick) with the densest network of gorges in Europe. Creamy-white limestone walls locally protrude from the loess layer. In spite of the flood embankments constructed in the 1950's and 60's, this section of the Vistula River retained the features of a wild river, with a highly variable stream. Numerous

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tem Services. Department for Environment, Food and Rural Affairs (DEFRA), London 2007, p. 1-214.

[10] J. Solon, *Ecosystem Services concept and its application in landscape-ecological studies,* in: *The Problems of Landscape Ecology,* ed. T.J. Chmielewski, Wydawnictwo Print 6, Lublin 2008, p. 26-44.

[11] F. Wätzold et al., *Cost-effectiveness of managing Natura 2000 sites: an exploratory study for Finland, Germany, the Netherlands and Poland* in: "Biodiversity and Conservation" 2010 No. 19, p. 2053--2069.

[12] T.J. Chmielewski, *Systemy Krajobrazowe* ..., op. cit., p. 1-408.

[13] J. Kondracki, *Geografia regionalna Polski*, Wydawnictwo Naukowe PWN, Warszawa 1998, p. 1-441.

Figure1.
The location of the study area: A – in Poland, B – in Kazimierz Landscape Park. 1 – boundaries and names of physico-geographical mezoregions, 2 – simplified boundary of the research area, 3 – reservoirs and watercourses, 4 – Kazimierz Landscape Park area, 5 – Kazimierz Landscape Park buffer zone, 6 – Natura 2000 areas.

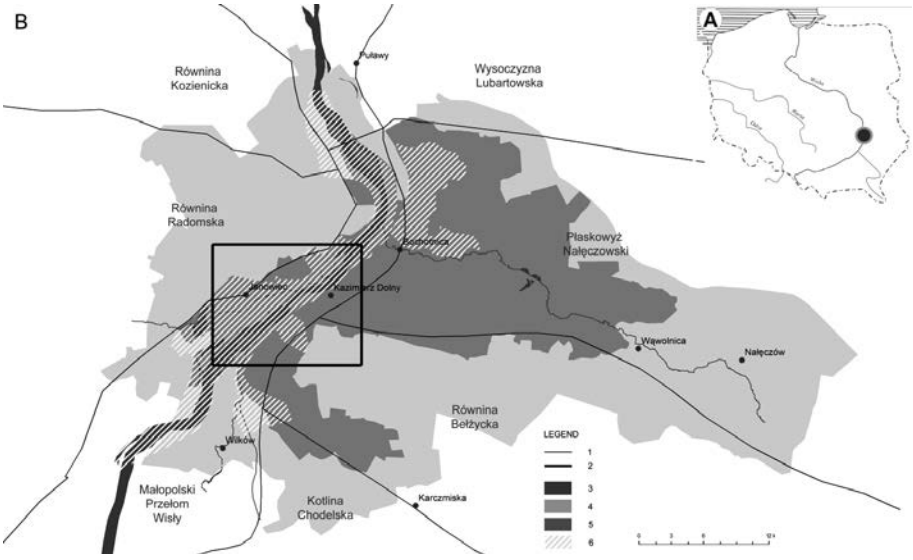
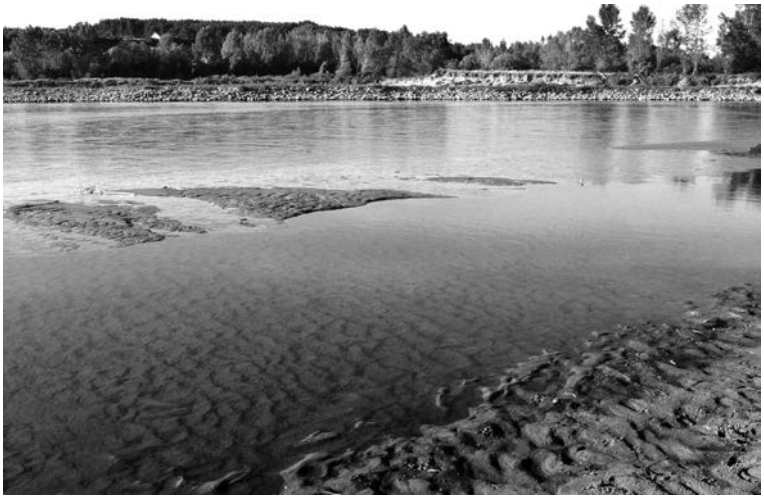


Figure 2.
The Vistula River in the Kazimierz Landscape Park (photo by T.J. Chmielewski)



sandbars and sandy islands make the river unique at the European scale[14] (Figure 2).

The most valuable plant communities include: a) xerothermic grasslands, thermophilic shrub communities, and small patches of oak forests occurring on steep, sunny slopes of the Vistula River valley, b) riparian willow and poplar trees growing on the valley floodplain terraces, and c) linden-hornbeam forests occurring on the slopes of ravines (Figure 3). Wide riparian scrub wicker belts are typical of this section of the Vistula River[15].

The Lesser Poland Vistula River Gorge has a very rich fauna. It is an important part of Europe's bird habitat area. Vistula sandbanks and islands are nesting places and feeding areas for many rare species of avifauna. For this reason, the region has been established a Natura 2000 area of Special Bird Protection[16]. A number of valuable insect species also occur there, mainly in the xerothermic grasslands.

The fragment of the Lesser Poland Vistula River Gorge located in the Kazimierz Landscape Park also has unique cultural heritage values. The Kazimierz Dolny and Janowiec urban systems are iucluded in the register of historic monuments. The architectural monuments worth special attention include: the

Figure 3.
Loessravine "Korzeniowy Dół" in Kazimierz Landscape Park (photo by T. J. Chmielewski)

[14] T.J. Chmielewski, *Skarby Małopolskiego Przełomu Wisły*, "Ezop" 1996 No. 9, p. 4-5.
[15] Ibidem.
[16] T. Wilk, J. Krogulec, P. Chyralecki, *Ostoje ptaków o znaczeniu międzynarodowym w Polsce*. Ogólnopolskie Towarzystwo Ochrony Ptaków, Marki 2010, p. 1-595.

ruins of the late Gothic-Renaissance castles in Kazimierz Dolny and Janowiec, as well as the great Renaissance architecture of Kazimierz Dolny, including: the Parish Church, Franciscan Monastery, sumptuously decorated town houses, 5 granaries, several wooden huts in the Męćmierz village, and many other historic buildings (Figure 4, 5).

Figure 4.
The main square in Kazimierz Dolny (photo by T.J. Chmielewski)

Figure 5.
Holiday cottage in Męćmierz (photo by T.J. Chmielewski)

Beautiful topography, wildlife, and valuable urban and rural complexes harmoniously integrated into the landscape, make the landscape of the Vistula River Gorge in the Kazimierz Landscape Park one of the most beautiful in Poland. The town of KazimierzDolny is one of the most popular tourist destinations in the country.

Methods

The paper presents an original method of the integrated assessment of cultural services of ecosystems at the landscape scale. In accordance with the recommendations of DEFRA, cultural services of ecosystems include:

- aesthetic values
- recreation (possible use of ecosystems for various forms of recreation)
- cultural and artistic resources
- functions of a spiritual experience (beyond aesthetics)
- science and education[17]

Due to the limited volume of the publication, this paper presents the results of the analysis of only the first, second, and third category. The quintessence of cultural ecosystem services are values of landscape physiognomy, associated with natural and almost natural ecosystems in the landscape, i.e. those with a certain degree of anthropogenic landscape transformation.

The method of assessment of the composition of the urban area called the "experience curve method" was developed by Kazimierz Wejchert in the 1970's. The authors of this article adapted this method to evaluate the aesthetic values of an open landscape.

According to K. Wejchert, the "experience curve" is a measure used to compare different fragments of space, compare their forms, architecture, greenery, and perspective views. "The experience curve" is presented as a graph, whereas the horizontal axis represents the temporal and linear scale designating subsequent vantage points along the route of an observer moving in urban areas. The vertical axis presents the subjective assessment of sensations resulting from viewing systems with different spatial and semantic values at a scale of 1 to 10 points. Monotonous systems with no urban or architectural values, with a limited view, receive the lowest number of points. The highest number of points is scored by complexes with high urban and architectural values, constituting an important element of the spatial structure of a city, involving several dominants of fundamental importance for the city's shape and landscape. The author admits that the graphical representation of the emotional experiences that occur while moving in space and time are only relative comparisons of the impact of consecutive urban interiors[18].

[17] DEFRA. *An Introductory Guide to Valuing Ecosystem Services*. Department for Environment, Food and Rural Affairs (DEFRA), London, 2007, p. 1-214.
[18] K. Wejchert, *Elementy kompozycji urbanistycznej*, Arkady, Warszawa 1984, p. 1-279.

A modification of this method of assessment of the aesthetic values of landscape was developed by Tadeusz J. Chmielewski in 1985, and applied in the draft of borders and scientific documentation necessary to establish the complex of the Ponidzie Landscape Parks[19].

Another modification of this method, presented herein, focuses on the integrated assessment of the degree of anthropogenic landscape transformation and its aesthetic values. Moving along a specified route at equal distance intervals (details will depend on the specific terrain situation), the intensity of anthropogenic landscape transformation is assessed. The assessment applies a 12-step classification developed by Chmielewski[20], awarding points from 1 to 12, according to the following list:

1 – degraded cultural landscapes,
2 – disharmonious cultural landscapes,
3 – cultural landscapes subject to renewal,
4 – harmonious cultural landscapes,
5 – degraded nature – cultural landscapes,
6 – disharmonious nature – cultural landscapes,
7 – nature – cultural landscapes subject to renewal,
8 – harmonious nature – cultural landscapes,
9 – degraded natural landscapes,
10 – natural landscapes subject to restoration,
11 – harmoniously used natural landscapes,
12 – primary landscapes.

The results of the assessment refer to the cultural landscape units distinguished on the map and evaluated in the field, and are presented as a graph. A different colour is applied for the evaluation of aesthetic landscape values (registered along the same route) on the same graph. The course of the two lines is compared. Maps of the spatial distribution of nature-cultural landscape units included in each bonitation rank are developed based on the analysis of the view range.

A trail of approximately 4 km was selected in the study area, leading from Góra Trzech Krzyży in Kazimierz Dolny to the Męćmierz village. A total of 13 observation points were determined along the route, used for the evaluation of view values with the application of the experience curve method.

A total of 31 such units (nature-cultural units[21]) were included in the fields of view. the units constituted a common area of the study concerning all of the three categories of the integrated assessment of cultural ecosystem services.

[19] T.J. Chmielewski, *Dokumentacja do utworzenia Zespołu Parków Krajobrazowych Ponidzia*. Instytut Kształtowania Środowiska, Lublin, 1985, mat. niepubl., Vol. 1-2.
[20] T.J. Chmielewski, *Systemy Krajobrazowe ...,* op. cit., p. 1-408.
[21] B. Sowińska, T.J. Chmielewski, *Metoda delimitacji i analiza typologicznego zróżnicowania jednostek przyrodniczo-krajobrazowych Roztocza i Równiny Biłgorajskiej*, in: ed. T.J. Chmielewski, *Struktura i funkcjonowanie systemów krajobrazowych: Meta-analizy, modele, teorie i ich zastosowania*, "Problemy Ekologii Krajobrazu", t. 21, Lublin – Warszawa, 2008 p. 161-176.

Services provided by ecosystems for recreational purposes are mainly related to:

- the possibility of using the natural values of the terrain and natural or semi-natural resources constituting elements of ecosystems (in particular: water, forests, grassland plant communities, and habitats of open sand and bare rocks),
- the possibility of using agricultural areas for recreational purposes (in particular: recreational walks through the fields, orchards and meadows),
- the presence of various elements of recreational development, such as: access roads and car parks, accommodation, restaurants, marinas, swimming pools, playgrounds, hiking trails, bicycle paths, tourist information centres, etc.

The adopted method of assessment of recreational ecosystem services was used to evaluate 31 nature-cultural landscape units for each of the three aspects, at a scale from 1 to 4 points. 1 point received units with not very varied terrain, with very little attractive forms of land cover, where were observed communication problems and low intensity recreation, whereas 4 points received units with very varied terrain, very attractive forms of land cover, with well-developed communication and with many elements of recreational development. Each of the units could receive a maximum of 12 points in this category. The bonitation results were registered in tables and presented in a valorisation map.

The artistic and cultural resources of a given area are the result of human activity conducted there in various historical periods. Therefore, they are not typical of natural or semi-natural ecosystems, but rather of settlements and agricultural areas.

The assessment of the cultural and artistic resources of individual nature-cultural landscape units was carried out taking into account the following criteria:

- maintenance of spatial layout typical of a specified historical era (both settlement systems, and the fields),
- presence of architectural monuments,
- performing the artistic functions (artistic centres, cultural festivals, art galleries, etc.).

Each of the units can be awarded from 1 to 4 points for each criterion. Analogically as in the case of other categories of assessment, one unit may receive a maximum of 12 points. 1 point received units with lack of preserved characteristic spatial systems, with lack of architectural monuments (or with very poorly preserved historical architectural forms), with lack of artistic functions, whereas 4 points received units with preserved characteristic spatial systems, with many historic buildings and with clear artistic functions. The bonitation results were registered in tables, and presented in a valorisation map.

The final stage of the work involved the presentation the results of cumulative bonitation in the form of a diagram and a map. Because the theoretical maximum number of points scored by 1 unit could be 48 (aesthetic value – 12, degree of anthropogenic transformation – 12, recreation – 12, cultural and artistic resources – 12), for practical reasons, the resulting scale was aggregated to 12 degrees evaluation.

Results

The integrated assessment of aesthetic values and degree of anthropogenic landscape transformation for nature-cultural landscape units revealed that in this part of the Vistula River Gorge, the aesthetic value rating was generally higher (in 8 out of 13 cases) than the assessment of naturalness/anthropogenic landscape transformation. In 3 cases, the situation was the opposite. In 2 cases, the assessment of aesthetic values and landscape naturalness resulted in the same valuation ratios (Figure 6A).

Units in which attractive anthropogenic forms (e.g., historic architectural buildings) are harmoniously composed with the landscape received the highest ratings in terms of aesthetic values. The lowest ratings were received by nature-cultural landscape units with no anthropogenic objects that would interfere with valuable ecosystems due to their structure, material, or functions (e.g. quarry, ugly and chaotically arranged buildings, flood embankments).

Two of the nature-cultural landscape units gained the maximum number of points. These are units No. 2 and 29, with the historic town of Kazimierz Dolny and Janowiec. Four other units were also highly evaluated, namely Nos. 1, 7, 8, and 30 (11 points each). They are in the immediate vicinity of the aforementioned towns. Also the units in which the Męćmierz village is located obtained high ratings. The lowest evaluation was received by the unit including the area of the flood embankment (3), as well as units 4, 6, 17, i.e. areas with anthropogenic objects particularly strongly conflicting with the surrounding landscape (Figure 6B).

Following the methodology, all of the nature-cultural landscape units were further assessed according to the possibility of use of their ecosystems for various forms of recreation. The highest potential of cultural ecosystem services related to recreation was recorded for units 4, 7, and 29 (this assessment is related to the possibility of use of the natural values of the terrain, and the presence of various elements of recreational development). The lowest potential was recorded for units 21 and 22 with monotonous area poor in varied elements of recreational development. Low potential for cultural benefits of ecosystem services related to recreation was also observed in the case of units 11, 12, and 13. These units include the islands on the Vistula River. Their low evaluation regarding the potential of their use is related to their low accessibility (Figure 7, line 3).

The next step was to evaluate the nature-cultural landscape units of the study area according to the potential of the use of their cultural and artistic resources. The assessment of the potential cultural ecosystem services related to artistic resources revealed the highest potential of units 2, 7, and 29 (they are units including centres of artistic life – the town of Kazimierz Dolny, Janowiec, and Męćmierz village). A high potential was also recorded for the areas in the immediate vicinity of the towns, namely units 1 and 8. The remaining units fulfil no artistic functions, or fulfil them to a very low degree (Figure 7, line 2).

Figure 6.

The integrated assessment of aesthetic values and degree of anthropogenic landscape transformation for nature-cultural landscape units in Kazimierz Landscape Park. A – line graph presents evaluation of aesthetic landscape values (blue line), and the degree of anthropogenic landscape transformation (red line) of nature-cultural landscape units which were included in the fields of view. B – map of aesthetic values of nature-cultural landscape units, a – observation points, b – route march, c – boundaries of nature-cultural landscape units, 1-12 assessment of landscape aesthetic values (1 – the lowest values, 12 – the highest values)

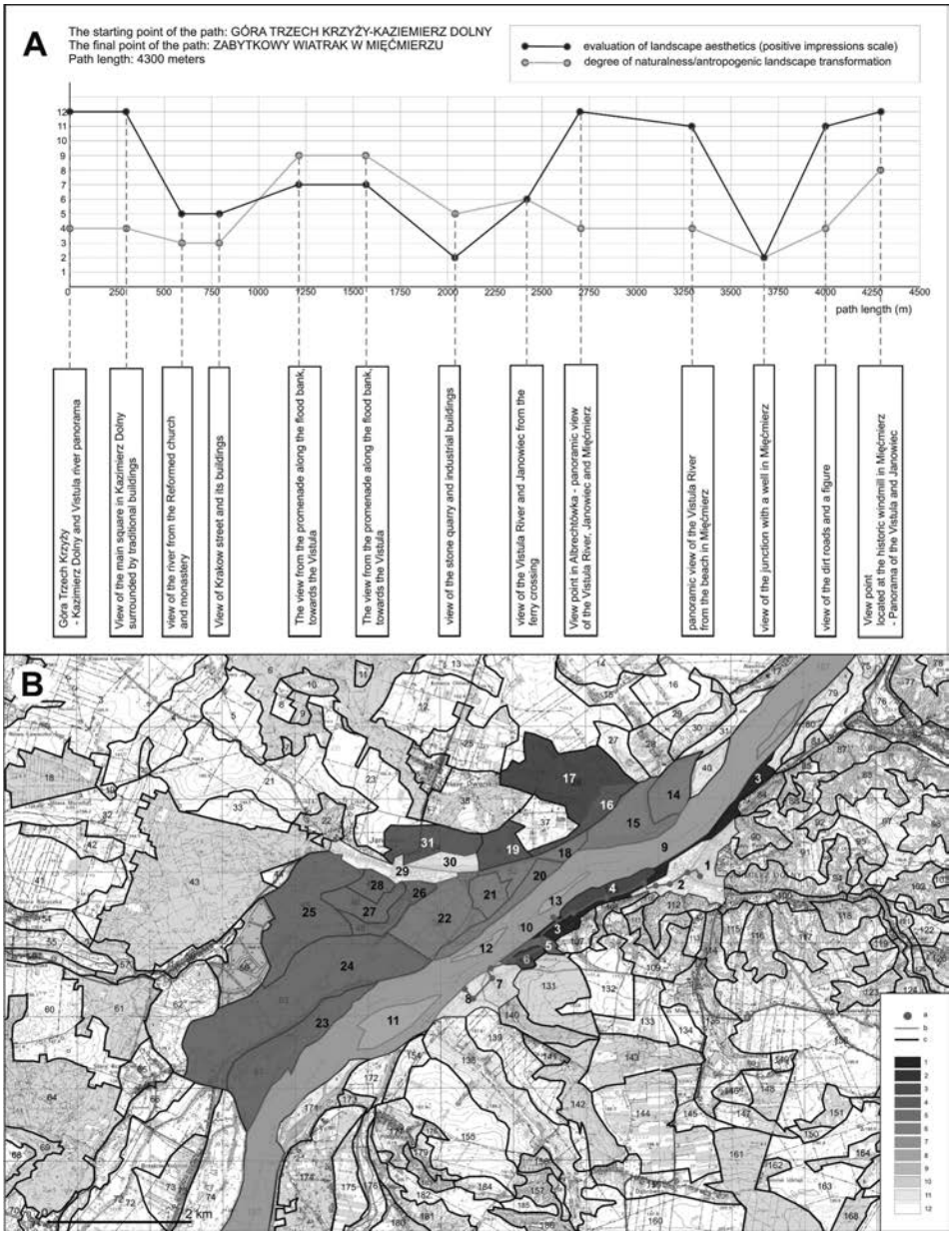


Figure 7.
Diagram of usefulness of the various nature-cultural landscape units (visible from the road march) to provide the specific type of cultural ecosystem services. The darker the color the higher bonitation of specific services offer

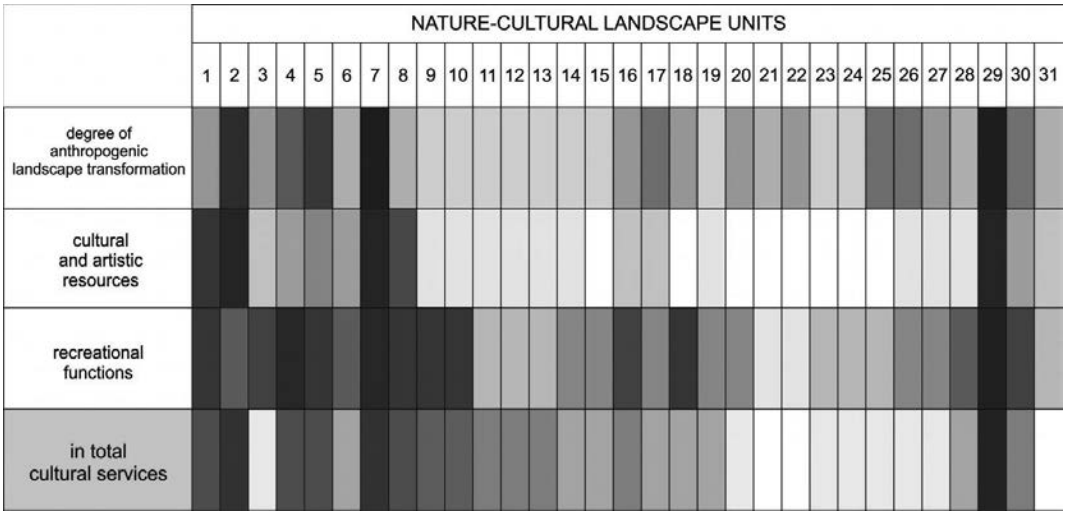
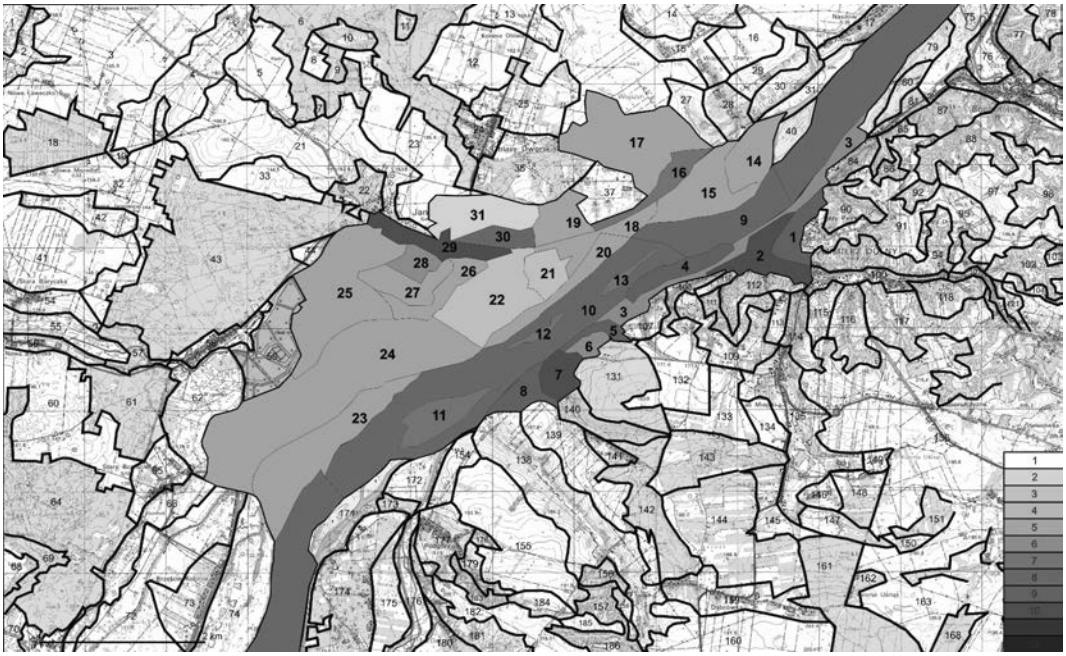


Figure 8.
The resulting bonitation of the complex of nature-landscape units (the darker the color the higher bonitation of specific services offer)



The resulting bonitation of the complex of nature-landscape units reveals the highest potential of cultural ecosystem services for 3 units (2, 7, and 29) the area of which includes centres of cultural life, i.e. Kazimierz Dolny, Janowiec, and Męćmierz. Also units 1, 4, 5, 8, and 30 have high potential. It is worth mentioning that units 4 and 5 were assessed relatively low in terms of aesthetic landscape values. The lowest potential of providing cultural services was recorded for units 21, 22, and 31. (Figure 7, line 4, Figure 8).

Conclusions

1. The presented method of the integrated assessment of cultural ecosystem services at the landscape scale can be applied in various types of environment assessment studies and in studies on the predisposition (usefulness) of specified landscapes for various forms of management.
2. The results of testing the method on the fragment of the Lesser Poland Vistula River Gorge located in the Kazimierz Landscape Park revealed among others that:
   - The bonitation of aesthetic sensations usually (in 8 out of 13 cases) showed higher values that bonitation of the scale of landscape naturalness;
   - The highest scores for aesthetic values were obtained by units in which attractive anthropogenic forms (e.g. historic architectural objects) were harmoniously composed with the natural landscape systems;
   - The lowest ratings in terms of aesthetic values were recorded for units including, among valuable ecosystems, anthropological objects colliding with them due to their structure, material, or functions;
   - The highest potential for the provision of cultural ecosystem services related to recreation occurred in the case of units offering the possibility of the recreational use of the natural land relief values, and the presence of a number of elements of recreational development;
   - 2/3 of the units located within the study area fulfils no artistic functions, or fulfils them to a very low degree;
   - Units assessed relatively low in terms of aesthetic landscape values can show high potential of cultural services.
3. The presentation of the results of the aforementioned evaluations in relation to the local complexes of nature-landscape units permits the development of a number of new landscape maps.