

**Mendel University in Brno  
Czech Society of Landscape Engineers – ČSSI, z.s.**

**Public recreation and landscape protection  
– with environment hand in hand?**



**Proceedings of the 14th Conference**

**Editor: Jitka Fialová**

**9th–11th May 2023, Křtiny**

**MENDEL UNIVERSITY IN BRNO**

**Czech Society of Landscape Engineers – ČSSI, z. s.,**



**and**

**Department of Landscape Management  
Faculty of Forestry and Wood Technology  
Mendel University in Brno**



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**Editor: associate Professor Ing. Jitka Fialová, MSc., Ph.D.**

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of prof. Dr. Ing. Libor Jankovský, the Dean of the Faculty of Forestry and Wood Technology,  
Mendel University in Brno,  
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of Ing. Dalibor Šafařík, Ph.D., the Chief Executive Office, Forests of the Czech Republic,



of JUDr. Markéta Vaňková, the Mayor of the City of Brno,



and of Mgr. Jan Grolich, the Governor of South Moravia,

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# METHODOLOGICAL OPTIONS FOR EVALUATING OF THE LANDSCAPE RECREATIONAL POTENTIAL

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## Abstract

The proposed methodology for evaluating of the landscape potential for recreation is grounded on the basic values of the territory, which make the area more attractive for visit in leisure time. For the purposes of the methodology, the landscape potential for recreation is the system of natural and cultural-historical elements of the area and its aesthetic values, which together create a harmonious complex, and can fulfill the ability of the landscape to provide opportunities for recreation. The proposed method of evaluating the potential for recreation was tested by the GIS on two chosen areas (the surrounding of the town Mladá Vožice in South Bohemia region and the surrounding of the town Mikulov in South Moravian region) and subsequently subjected to a critical assessment.

**Key words:** landscape values, landscape character, recreation, GIS

## Introduction

The topic of recreation in the landscape is a very comprehensive multidisciplinary topic, which significantly affects basic natural, humanitarian and social fields, but also interdisciplinary (so called multidisciplinary) topics, such as landscape ecology, social psychology, and also, for example, economics and business. The position of the landscape architecture field within the evaluation of the potential of recreation and tourism of the landscape is very important. Landscape evaluation, which contains its description, classification, analysis and subsequent synthesis presented as results formulation based on primary, secondary and tertiary structure, appears as a complete part of the components of subsequent process plans in the landscape. As stated by Sklenička (2003): „the landscape evaluation is a decisive factor for choosing the most suitable approach to the development of a certain territory, it enables a better understanding of the relationships between individual landscape components or elements that create a characteristic feature of the landscape.”

## Material and methods

For the presented methodology purposes, the potential of the landscape for recreation is considered as a set of natural and cultural-historical elements (or components) of the territory and its esthetic values, which create a harmonious unit and are able to fulfill the ability of the landscape to provide opportunities for recreation.

The proposed evaluation methodology of the landscape recreational potential is divided into 4 levels (categories) of evaluation.

- 1) Natural subsystem of landscape potential for recreation
- 2) Nature subsystem protection mode
- 3) Cultural-historical subsystem
  - Spot analysis
  - Area analysis
- 4) Landscape subsystem

A detailed description is given in Table No. 1

The natural subsystem of landscape potential for recreation is based on Míchal and Nosková's assessment of natural conditions for recreation (1970, in Kolář et al., 1981), which has been modified on the basis of a critical evaluation. The resulting value of the natural landscape subsystem potential for recreation is calculated using the formula below:

$$r = \frac{(A + B + C + D)}{S} * K$$

*r* – the value of the natural subsystem of the landscape potential for recreation

*S* – area of the territorial administration unit (e.g. municipal territory, cadastral territory and others)

*A, B, C, D* – values as per the table below

*K* (climate factor) is determined as the total annual value by summing the number of summer days with a temperature above 10°C (*L*) and the number of days with guaranteed snow cover for skiing (*Z*) and dividing them according to the formula:  $K = (L + Z) / 100$

The resulting value of the level of protection regimes of the natural subsystem is calculated for the territorial administrative unit according to the formula below

$$r_2 = (S_{BR} * 5 + S_{NP} * 5 + S_{CHKO} * 4 + S_{PPam} * 1 + S_{NPP} * 3 + S_{PR} * 2 + S_{NNR} * 3 + S_{PPark} * 3) / S$$

*r*<sub>2</sub> – the value of the natural subsystem of the landscape potential for recreation

*S* – area of the territorial administration unit (e.g. municipal territory, cadastral territory and others)

*S*<sub>*x*</sub> – area representation of individual protection regimes within the territory of the municipality

The resulting value of the cultural-historical subsystem is equal to the sum of spot and area analysis:

$$r_3 = r_{3a} + r_{3b}$$

The spot analysis (*r*<sub>3a</sub>) is calculated according to the formula:

$$r_{3a} = (X_{NKP} * 2 + X_{KP} * 1 + X_{EP} * 0,5) / S$$

*X*<sub>*x*</sub> – the number of elements in each category

*S* – area of the territorial administration unit (e.g. municipal territory, cadastral territory and others)

The area analysis (*r*<sub>3b</sub>) is calculated according to the formula:

$$r_{3b} = (S_U * 5 + S_{KPZ} * 4 + S_{PR} * 3 + S_{PZ} * 2 + S_{NKP} * 2 + S_{KP} * 1 + S_{EP} * 0,5) / S$$

*S*<sub>*x*</sub> – area of declared cultural-historical value or the protection regime of the NPÚ

*S* – area of the territorial administration unit (e.g. municipal territory, cadastral territory and others)

The analysis of the landscape character subsystem is based on the definition of the so-called places of landscape character, which are either taken from the territorial analytical documents for the addressed area or defined on the basis of field research and more detailed study of the primary, secondary and tertiary structure. Individual landscape character areas are assigned an importance, i.e. a weighting coefficient. The weighting coefficients are chosen based on the uniqueness of the image of the place, which is influenced by the set of natural and cultural values of the area. The evaluation criteria for the designation of landscape character areas are as follows:

1. Places with average aesthetic value (meaning 1): localities differ from the surrounding matrix in terms of their vegetation cover structure and therefore their ecological value, which increases the aesthetic perception of visitors. These are, for example, forest complexes, watercourse valleys, a system of scattered greenery, vineyards, etc.
2. Places with medium aesthetic value (meaning 2): localities with a different structure of vegetation cover or different land use in relation to the surrounding landscape, which have been influenced by the historical context during their development (whether by historical event or e.g. specific land use) or by the creation of architecturally valuable buildings and urban structures, thus giving rise to harmonious relationships and the scale of the landscape.
3. Places with significant aesthetic value (meaning 3): localities with a different structure of vegetation cover or different land use in relation to the surrounding landscape, with specific natural conditions (relief, water areas), which have been co-created during the historical development by significant human activity of a predominantly profane nature.
4. Places with high aesthetic value (meaning 4): localities with specific natural conditions (geomorphological structure, water areas and streams), often in great contrast to the relief or use of the area from the surrounding landscape; historically influenced by significant human activity of a profane and sacred nature.
5. Places with above-average aesthetic value (meaning 5): Very specific localities with their natural conditions and historical development, where human activity has co-created the structure of the landscape, often in a spiritual context or in profane composite units. These sites are also protected for their aesthetic values by conservation regimes such as landscape conservation zones or UNESCO sites.

The total value of the landscape character subsystem was calculated according to the following formula:

$$r_4 = (A_1 * 1 + A_2 * 2 + A_3 * 3 + A_4 * 4 + A_5 * 5) / S$$

*r*<sub>4</sub> – value of the area analysis of the landscape character subsystem of the landscape potential for recreation

*A*<sub>*x*</sub> – area of the landscape character area

*S* – area of the territorial administration unit (e.g. municipal territory, cadastral territory and others)

The final landscape potential for recreation result is equal to the sum of the four partial evaluation results, which can be written mathematically as

$$r = r_1 + r_2 + r_3 + r_4$$

In conclusion, eight classification classes of landscape potential for recreation were defined (see Table no. 2).

Tab. 1: Input factors of the landscape evaluation of the potential for recreation (Smetanová, 2023)

Category	Subcategory	Selected indicators	Indicator label or its abbreviation	significance of indicators <sup>1</sup>
Natural subsystem of landscape potential for recreation	A / Length of the forest edges	Length of the forest edges (km)		1
	B / Length of the water body margins	Length of the water body margins (km)		1,5
		Length of the watercourses (km)		1,25
	C / Geomorphology	Relief and elevation gain (height range) (hm)		1
	D / Territorial use	Built-up areas (km <sup>2</sup> )	ZU	0
		Arable land (km <sup>2</sup> )	OP	0,1
		Permanent grassland (km <sup>2</sup> )	TTP	0,3
		Gardens, orchards (km <sup>2</sup> )	ZS	0,5
		Vineyards, respectively hopyards (km <sup>2</sup> )	VI	0,6
		Forest community (including scattered green areas) (km <sup>2</sup> )	LS	0,7
		Water area (km <sup>2</sup> )	VP	1
K / Climate	Climatic factor (coefficient of the number of days of stay)	K		
Protection regimes of the natural subsystem	UNESCO	Biospheric reserve	BR	5
	Large-scale	National park	NP	5
		Protected landscape area	CHKO	4
	Small-scale	National nature reservation	NNR	3
		National natural monument	NPP	3
		Nature reserve	PR	2
	Protection of the landscape character	Natural monument	PPam	1
Natural Park		PPark	3	
Cultural-historical subsystem	Spot analysis	National cultural monument	NKP	2
		Cultural monument	KP	1
		Expert assessment	EP	0,5
	Area analysis	World Heritage	UNESCO	5
		Landscape conservation zone	KPZ	4
		Monument reservation	PR	3
		Monument zone	PZ	2
		National cultural monument	NKP	2
		Cultural monument	KP	1
	Expert assessment	EP	0,5	
Landscape subsystem	Places of landscape character	Places with above average aesthetic value		5
		Places with high aesthetic value		4
		Places with significant aesthetic value		3
		Places with medium aesthetic value		2
		Places with average aesthetic value		1

<sup>1</sup> The importance of monitored phenomena is classified into weight categories based on expert evaluation using the so-called scoring method. Individual weight categories are determined based on the context of individual topics. However, for the numerical evaluation of the significance of the monitored phenomena, it is common that the smaller the number, the lower the significance. This is due to mathematical calculations by multiplying the monitored phenomena by selected coefficients.

Tab. 1: Classification classes of landscape potential for recreation (Smetanová, 2023)

Category	Class	Characteristics	Point potential range (r)
Above average	I.	Areas with the best natural conditions, which together with the cultural and historical values of the area have a great influence on the formation of a specific landscape image with international significance for recreation.	40 and above
	II.	Areas with the best natural conditions, which together with the cultural and historical values of the area have a great influence on the formation of a specific landscape image with national importance for recreation.	35 – 40
Optimal	III.	Areas with high-quality natural conditions and rich historical development, which is reflected in a large concentration of cultural-historical monuments and in the formation of a unique image of the place. Large- and small-scale conservation regimes with national overlap.	30 – 35
	IV.	Areas of regional to national importance for recreation, with quality natural conditions, diverse historical development, which is reflected in the cultural-historical values of the area. They often fall under large-scale nature and landscape protection regimes, including a higher concentration of small-scale protection regimes (including cultural and historical).	25 – 30
Average	V.	Areas with quality natural conditions, contrasting relief, often with scattered vegetation elements, which together with valuable cultural and historical elements create a unique and specific image of the place. Protection regimes mainly in the form of small areas, or natural park or monument protection.	20 – 25
	VI.	An area with better natural conditions or with the presence of a lower concentration of attractive elements in terms of the cultural-historical subsystem for recreation, which create interesting places of landscape character.	15 – 20
Neutral	VII.	An area with a predominantly agricultural function, with less suitable natural conditions for the development of recreation. The concentration of cultural and historical elements of local importance is lower. Small-scale conservation schemes or sites of enhanced landscape character value may be recorded in the area.	10 – 15
	VIII.	An area with the least suitable natural conditions, often with a predominantly agricultural function and a low concentration of cultural and historical values, with only local significance. There are no significant conservation regimes recorded in the area.	0 – 10

## Results

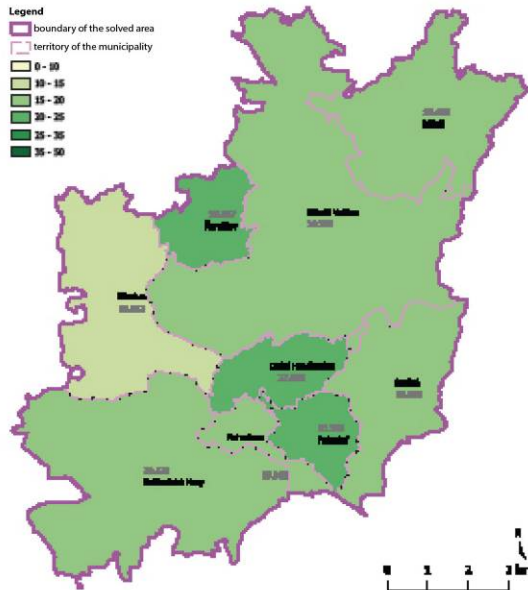
The proposed method of assessing the potential for recreation was tested in the GIS environment on two selected areas (Mladovozicko in the South Bohemian Region and Mikulovsko in the South Moravian Region). See Figure 1 and Figure 2.

## Discussion

The final value of the landscape potential for recreation is the sum of the partial results. During the design of the methodology, the input data and their weighting coefficients (meanings) were adjusted several times so that the total scores in the final evaluation corresponded to the representation of the meanings of the individual subsections. The highest scores are evident in the natural subsystem. This is because the natural conditions determine the use and historical development of the area and are therefore the basis for the perception of the habitability of the landscape. The conservation regimes of the natural subsystem, the cultural-historical subsystem, and the landscape subsystem are linked systems whose contribution to the overall score is comparable to each other but generally lower than that of the natural subsystem.

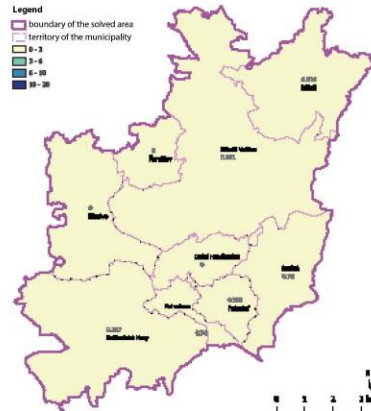
Due to the recalculation of the resulting value of the landscape potential for recreation per administrative unit, in the case of large areas of municipalities (e.g. Mikulov or Mladá Vožice) this value is also dispersed even to places with a lower value. A variant of the solution could be the evaluation of the territory within a regular geometric network with possible subsequent conversion into administrative units.

**The natural subsystem of landscape potential for recreation ( $r_1$ )**

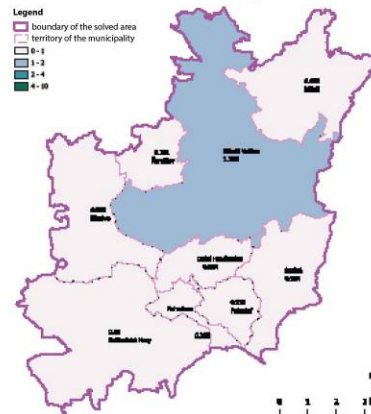


**MLADOVOŽICKO**

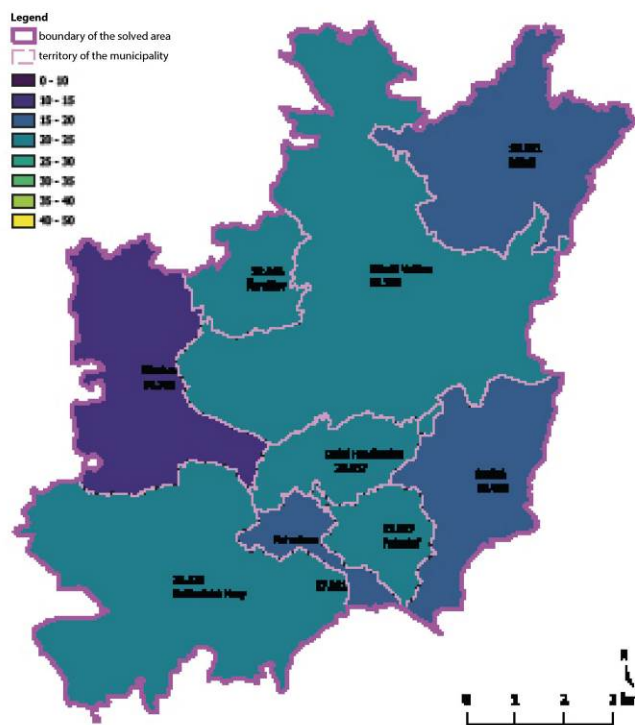
**Protection regimes of the natural subsystem of landscape potential for recreation ( $r_2$ )**



**Cultural-historical subsystem of landscape potential for recreation ( $r_3$ )**



**The final landscape potential for recreation ( $r$ )**



**Landscape character subsystem of landscape potential for recreation ( $r_4$ )**

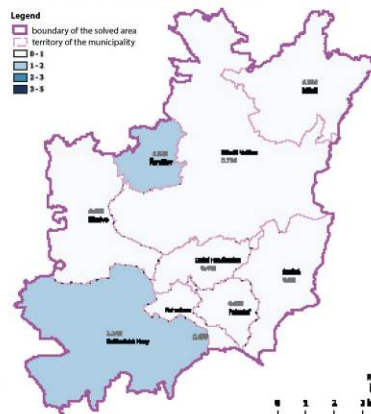
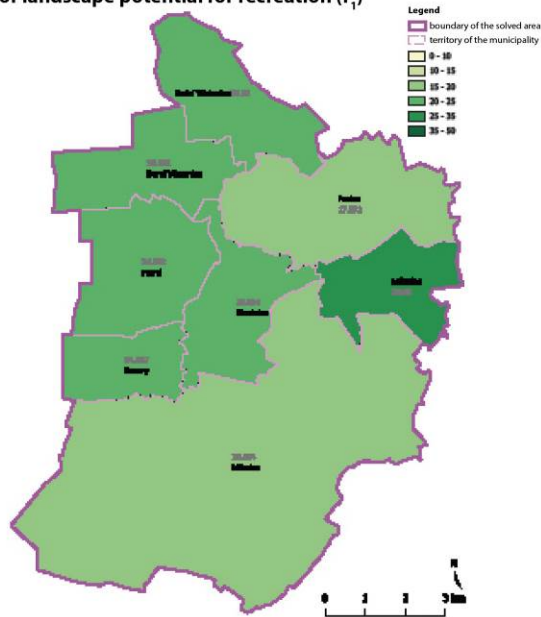


Fig. 1: The evaluation of landscape potential for recreation, Mladovožicko (Smetanová, 2023)

**The natural subsystem of landscape potential for recreation ( $r_1$ )**

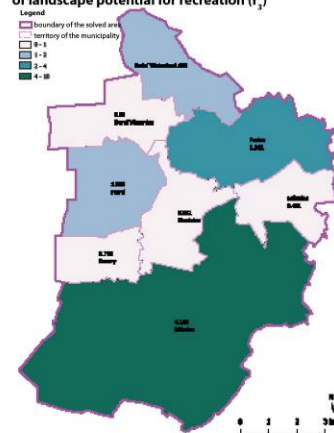


**MIKULOVSKO**

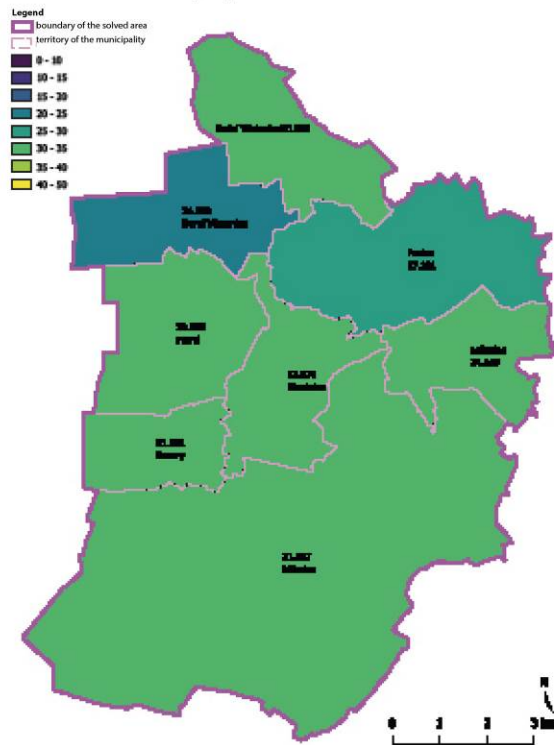
**Protection regimes of the natural subsystem of landscape potential for recreation ( $r_2$ )**



**Cultural-historical subsystem of landscape potential for recreation ( $r_3$ )**



**The final landscape potential for recreation ( $r$ )**



**Landscape character subsystem of landscape potential for recreation ( $r_4$ )**

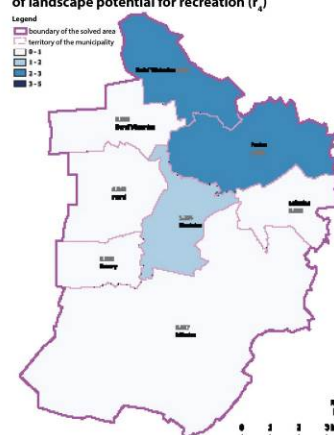


Fig. 2: The evaluation of landscape potential for recreation, Mikulovsko (Smetanová, 2023)

## Conclusion

The evaluation of the landscape using the proposed methodology can serve as a basis for subsequent planning processes enshrined in Act 183/2006 Coll. on spatial planning and building regulations and subsequent management and marketing of areas from the perspective of tourism on a local and regional scale. In the joint methodological guideline of the Ministry of Regional Development and the Ministry of the Environment for the commissioning of the landscape study, the analysis and framework definition of landscape potentials (including recreational potentials) is part of the requirements for the landscape study.

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## Souhrn

Předkládaný článek je velmi stručným shrnutím výsledků disertační práce na téma Metodické možnosti hodnocení rekreačního potenciálu krajiny, ve které byly v části věnované literatuře popsány různé přístupy a metodiky hodnocení krajiny z hlediska rekreace a cestovního ruchu. Na základě jejich kritického zhodnocení a testování vybraných z nich na dvou vybraných modelových územích byla vypracována vlastní metodika hodnocení rekreačního potenciálu krajiny na základě primární, sekundární a terciární struktury.

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