

Proceedings of the Fábos Conference on Landscape and Greenway Planning

Volume 3

Issue 1 *Proceedings of the Fabos Conference on Landscape and Greenway Planning 2010*

Article 37

2010

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Recommended Citation

Laukaitytė-Malžinskienė, Giedrė I. (2010) "Preservation of natural patterns visual expression peculiarities and development planning in the peri-urban areas of contrasting topography," *Proceedings of the Fábos Conference on Landscape and Greenway Planning*: Vol. 3 : Iss. 1 , Article 37.

Available at: <https://scholarworks.umass.edu/fabos/vol3/iss1/37>

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Preservation of natural patterns visual expression peculiarities and development planning in the peri-urban areas of contrasting topography

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Introduction

The physical sprawl of a town is one of the main factors having an influence on peri-urban functional development and economic expansion. After Lithuania became a member of the EU, the biggest towns and especially the capital Vilnius have undergone considerable changes in the landscape of peri-urban areas: agricultural functions are gradually changed by urban functions, what makes negative anthropogenic influence on the landscape character and its ecological stability. The general plan for Vilnius even up to the year 2005 formulated the concept of city greenbelt. Unfortunately, this concept remained unrealized because of juridical assumptions and insufficient collaboration between neighbourhood municipalities. Despite this fact, the problems of landscape preservation and urban development in peri-urban areas still need further scientific research.

Practice of landscape inventory, assessment and planning in Lithuania is commonly confined to general physical or visual landscape characteristics and their description. Fundamental landscape classification based on natural and cultural morphology is the mainstream in the country. Applied, perceptual classification of landscape refer just to visual landscape characteristics and often do not consider the morphology of the natural landscape patterns. In practice, this type of classification is used as a tool for landscape planning in recreational or protected territories, such as national or regional parks. In the country, the territory planning practice mostly refers to ecological landscape classification, where the main aspects are processes, analysing circulatory relations. The aspect of landscape in urban development plans at the district level takes only a common descriptions and are not orientated in an integrative way concerning urban development. Obviously Lithuanian theory and practice of peri-urban planning needs a complex tool for landscape and urban development, which leads to the integrated character-based planning, cited on physical, functional, visual and mainly individually perceived natural features of the landscape. The efficiency of landscape planning mostly depends on the way of landscape classification. The review of landscape classification methods is the main issue for the background of this report.

Background

The analysis of such a complex phenomenon as landscape depends on the goals we set. One way of landscape analysis is when we want to determine landscape quality which is directly related to landscape functions and values (Ahern, J., 2002; Antrop, M., 2000), another way of landscape analysis when we want to determine the character of the landscape that makes one landscape different from another, not

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better or worse (Countryside... 2002, Countryside...2001, The Heritage... 2006). Both methods are oriented to monitor changes in the landscape, but the latter approach is mostly oriented to concrete locations in the landscape, its sensitivities to development, what is very important and useful avoiding negative effects on concrete valuable landscapes, places which have a strong existential meaning. New landscape elements and structures, looking all alike, emerge and show no link with the specificity of the place. Qualities encompass material utilities as well as spiritual and symbolic needs, such as the *genius loci* (Antrop, M., 2004). The *genius loci* of the place is a key for positive landscape perception. As people perceive landscape 80 percent visually, visual landscape dimension and condition become very important in landscape assessment and planning, particularly at the landscape level when evaluating potential significant natural patterns and landscapes. Landscape image does not only comprise its spatial and structural parts but also the formal visual and cultural aesthetic expression of the landscape. Landscape image and identity and its natural or cultural variety are the most important criteria for evaluation, classifying and protecting against possible impacts on the local and regional landscape levels (Krause, Ch., L., 2001). To ensure the aims of natural patterns visual expression peculiarities preservation in the context of urban expansion, special methods of landscape classification is needed, which respond in detail to known issues of the landscape in peri-urban areas. Nowadays the conception of landscape character is the dominating trend in landscape assessment and planning in Europe (Countryside... 2002, Krause, Ch., L., 2001, South... 2002). The analysis of landscape character is based on holistic understanding of landscape when physical, visual, aesthetical and landscape perception aspects are interconnected. In this report the concept of landscape character is chosen as a core for the development of applied landscape classification at the landscape level, which could complement the hierarchical system of landscape types with useful and practical information for concrete and sustainable solutions of urban development.

Landscape inventory and classification methods

The aim of this literature review is to analyze the use of various landscape inventory and classification methods which are used for different planning goals. It is important and useful to understand the relation between the methods of landscape classification and planning goals, because the main research object of this report is situated in peri-urban areas, which are very complex in their landscape nature and potential future functions and designations. The classification methods are divided in to two main groups: fundamental and applied, with appearance of the terms *landscape types*, *landscape character areas*, *visual units* and their different variations.

Fundamental (classic) landscape classification – *landscape types*

Landscape types are generic in nature landscape units which share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern (Countryside... 2002, The Heritage... 2006,

Countryside... 2001, Kavaliauskas, P., 1992, Aberdeen... 2002, South Cambridgeshire... 2002) and are found in the landscape classification for the landscape planning, greenbelt planning purposes.

Applied landscape classification – *landscape character areas, visual units*

Landscape character areas – single, unique and discrete geographical areas of a particular landscape type. Each has its own individual character and identity. Even though, landscape character area shares the same generic characteristics with other areas of the landscape type. The individual elements, which contribute to the character of the area, such as hedges, arable fields and farm buildings are mapped at more local scale. Local assessments may also consider the contribution made by the site to the character of the surrounding area as well as views into and out of it. (Countryside... 2002, Countryside... 2001, South Cambridgeshire... 2002). In Ireland the individuality and identity of *landscape character areas* at the local level are determined by visual and image units of the landscape. Homogeneous visual units, the boundaries for which are either the extent of visual fields, the transition from one landscape type to another. Image units are associated with a particularly dominant feature, which acts as a focal point (The Heritage... 2006). *Landscape character areas* are used as integrative landscape planning tools to inform decisions and the range of approaches to making judgements about the landscape: landscape strategies, landscape guidelines, attaching status for landscapes, landscape capacity.

Visual units. During literature review, these variations of term *visual unit* and its explanations are found: a) *visual unit/landscape unit/landscape scenery unit*, basically defined by homogeneous and consistent visual landscape character, derived from the combination of land uses, vegetation cover, topography, and the relationship with the bodies of water (if any) (*visual units* (Susquehanna... 2002), *landscape units* (Far North... 1995, Stauskas, V., 1966, Environmental... 2003b, Orange County... 2000), *landscape scenery units* (Herb, H., Forster, M., Kleinschmit, B., 2009). This type of *visual unit* is found in: recreational planning (Susquehanna... 2002, Stauskas, V., 1966), landscape planning (Far North... 1995), scenic quality assessment (Herb, H., Forster, M., Kleinschmit, B., 2009), visual impact assessment (Environmental... 2003b, Orange County... 2000), b) *visual unit/landscape space* is firstly defined by spatial enclosure such as basins, valleys, watersheds and after differentiated in it visual character. Differentiation and classification of the landscape into homogeneous *visual units/landscape spaces* is embodied according to appearance between landscape nature and technology. This type of *visual unit* is found in the example of classification of the recreational territories (Daniulaitis, G., 1980), c) the term *visual unit/landscape unit*, explained as characteristic configuration of space, structural elements (topography, water, vegetation, colonisation) and their landscape mosaic pattern, is found in the example of the visual landscape managing of town settings (Krause, Ch., L., 2001). In this source, it is suggested: to distinguish *visual unit/landscape unit* according to appearance between nature and technical expression of visual landscape character and to divide it into smaller (meso, micro) compartmental units in accordance with the visual character of the main *landscape unit* (Krause, Ch., L., 2001), d) *visual units* as *landscape types* and *settlement types* –

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homogeneous in character and basically defined according to the composition and form of built-up and un-built up areas. These examples of *visual units* are found in the assessment of peri-urban landscape structure (*landscape types* (Antrop, M., Van Eetvelde, V., 2000), *settlement types* (Dubois-Taine, G., 2002)), e) *visual unit* defined by visibility of specific areas, points, or objects in the landscape, as seen from certain viewing locations is identified as: *viewshed* (Environmental... 2003b, Orange County... 2000), *visual catchment area* (Far North... 1995), *landscape setting unit* (Lake Macquarie... 2004). These terms are found in scenic quality assessment (Far North... 1995, Lake Macquarie... 2004), visual impact assessment (Environmental... 2003b, Orange County... 2000), e) *visual units* primarily determined by image of places or elements: *specific elements* (physical elements that enhance landscape character and value, patterns and compositional factors that enhance landscape character and value, elements and patterns that adversely affect landscape character and value, elements that contribute to visual absorption capability), *landscape categories* (significant features, significant viewing points and significant ridgelines) are found in scenic quality assessment (Far North... 1995, Lake Macquarie... 2004), *landscape setting elements* (vantage points/intermediate areas which allow particular views of city landscape, landmarks/features, which offer a diversity of landscape character types, landscape elements which help to enrich the local landscape experience of residents and visitors), *area highlights* (territories which are individual because of their physical, visual or functional aspects) are found in greenbelt planning (Aberdeen... 2002, National Capital... 1995).

According to the author, the most important result of landscape inventory and classification is when concrete aesthetical meanings are attributed to concrete natural or cultural landscape objects or particular places. Thus the characteristics of subjective landscape visual expression, such as beautiful, harmonious and etc. conform to physical elements, which are the objects of territory planning. It is possible to state that mostly in all applied landscape classification methods the concept of landscape character area is of primary importance, but for each different case it gains some specific features. In the peri-urban areas of contrasting topography special care of natural patterns visual expression is required. Development planning needs to not only protect natural features and provide natural open space, but also reflect the character of its particular natural patterns. Classification of landscape natural patterns need to be differentiated taking into account the specifics of latter and urban expansion.

As in peri-urban expansion landscape levelling processes are very strong, landscape individuality and originality are the most vulnerable landscape character elements. The differentiation of natural patterns according to the natural patterns visual expression potential could be the first, strategic and fundamental step to the protection of natural patterns and landscape aesthetical and visual quality in general. Only when natural territories aesthetical and visual individualities, meanings are determined clearly, it helps to perceive their not as a territorial reserve for building, but as the basis, the starting-point for the qualitative environment creation. In this

approach landscape will be judged in an integrated way, with considerations of landscape and sense of place set alongside other matters such as biodiversity, historic and cultural aspects, access and broader social, economic and environmental benefits.

Goals and objectives

The study of this report focuses attention on the methodology for landscape classification as a tool for preservation of landscape natural patterns in peri-urban areas, assessing into account the specifics of contrasting landscapes and issues of the peri-urban areas.

Methods

How can we research landscape totality not only as an object of some kind of value, but also as an object of perception? In this case we invoke the Gestalt theory, which analyses the psychology of the perception of our surrounding. The theory refers to the concept, that the wholeness is much more than the sum of separate parts (Kohler 1947, Lothian 2000). This concept could be useful when analysing landscape, because the aesthetical delight of the landscape comes from its totality, which, as we see is explained in a subjective landscape conception. Appealing to the main laws of Gestalt theory, the author brings the idea, that the different potential of landscape natural elements, spaces and views, determines distinct initial impression of landscape wholeness. Field observations proves, that different topographical areas of hilly landscape create distinct places of natural pattern visual expression. In the open landscapes the form of relief shows very clearly. In the places, which are distinguished like the mosaic of open and forested areas, the visual expression of spaces and masses, proportion, relation between them, takes the first place. In the sharp expressed relief such as valleys, is a good opportunity for the continuous observation of natural spaces. In the marginal territories of contrast and not so expressed relief the focal views of natural landmarks are very valuable. According to these remarks the idea of landscape classification according to the potential of natural pattern visual expression is suggested. This applied landscape classification could be practical and efficient in peri-urban areas and also could be suggested as extra practical material next to fundamental geographical landscape classification. There is no minimum size for these visual units. The definition of visual units is based on compositional functions of primary perceived visual objects of natural landscape patterns. These units are basically defined during field study observations and desk study, using topographical and geomorphological maps. The delineation of visual units are carried out with the help of visually perceptible space edges such as forest borders, the topography.

Results

While city urbanistic processes are developing rapidly, landscape inventory and classification is becoming the main issues for positive future development of Trakai

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region part, which is included into Vilnius Metropoly area and is a case study of this report. Combining the preservation of natural patterns expression peculiarities with the problems of building expansion in the analyzed part of Vilnius metropoly area which also is included into natural framework, geoecological watershed and the protective zone of urban greenbelt, it is suggested to classify the landscape into *visual units* according to the primary and dominant natural objects and their principal arrangement: a) compositional potential of landscape. Set of visual units according to primary, dominant natural elements: hills, ridges, slopes, riparians, slope top edges and areas close to top edges, rolling open landscape, b) internal expositional potential of landscape. Set of visual units according to primary, dominant natural spaces: valleys, hollows, spatial mosaic of open and forested rolling landscape with single hills or slopes, spatial mosaic of lakes and forests in rolling/hilly landscape, c) external expositional potential of landscape. Set of visual units according to primary, dominant natural feature views out of landscape unit, d) background potential of landscape. Set of visual units according to primary dominant forested rolling or forested hilly landscape.



Figure 1. Compositional potential of landscape. Dominant natural elements: hills, ridges, slopes

According to this classification method, the use of the valuable landscape territories is differentiated and regulated taking into account the aspect of urban expansion. This method of classification is used as a base for future harmonized ratio determination between the current natural patterns visual expression and newly included anthropogenic structures, location of development in respect of natural elements, spaces and feature views in defined places. The process of urban development in peri-urban areas can be used creatively to promote the change in a way that provides positive landscape outcomes into the future. To achieve this, the focus should be on managing the effects of landscape change. Physical, functional and visual changes need to be analysed combining them together in the actual landscape.



Figure 2. Internal expositional potential of landscape. Dominant natural elements: spatial mosaic of open and forested rolling landscape with single hills or slopes (left), valley (right)

Discussion and conclusion

In Lithuanian practice of peri-urban planning the integrative tool for sustainable landscape and urban planning is wanting. This raises the need for the creation of the method of character-based landscape classification. Comprehension that differentiated and purposeful preservation of natural patterns visual expression peculiarities, orientated to the concrete landscape places and their specific features is at the same time fundamental for the preservation of the whole landscape character.

According to this landscape classification, settlements, situated in peri-urban areas could be classified relating to their position in landscape units of different natural pattern visual expression. This would result as integrated landscape framework for controlling of the urban development in peri-urban areas.

It is important while integrally planning peri-urban areas: a) to apprehend peri-urban landscape as the whole complex of territorial processes and landscape patterns; b) to determine the interrelation between landscape aesthetics and ecology; c) to evaluate and plan not only separate built or natural patterns and their functions in the landscape, but also create spatial, visual, aesthetical, cultural expression of the landscape; d) landscape variety and landscape integrity – the strategic principles of the landscape harmonious planning.

Landscape visual units which are set apart according to the potential of natural patterns visual expression is firstly suggested to be applied in peri-urban areas of contrasting topography, in the stages of general or selective planning.

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