

## **Urban Landscape Cultivation in Contact With Protected Nature; How to Solve Fuzzy Relations by Design?**

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### ***Abstract***

*This paper explores the process of cultivation of specific areas within Bratislava urban landscape located in close proximity to protected areas of Little Carpathians included in the Natura 2000 BA project towards Restoration of NATURA 2000 sites in cross-border Bratislava capital region. However, the concept of landscape management of contact zones of urban and natural structures is not reflected in the project and existing policies. Therefore, responsibility for decision making and sustainability of these areas are fuzzy and divided between many actors with conflicting interests, such as residents and vacationers, environmentalists, municipalities, developers and activists. Hence, the emergent need is to cultivate these spaces - to develop their relations into deeper levels of understanding, participation and sharing by visionary planning, innovative design and sensitive management in the complexity.*

*The output of the research is the framework of development measures for sustainable development and cultivation of the urban fringe natural areas developed by author in cooperation with NGOs Daphne and BROZ - the Natura 2000 BA partners. Using field research, analyzing historical and existing characteristics of the sites, by the participation of residents and visitors, and consulting with experts, the concept of landscape plan was developed. Segments of the plan designed in detail respect both the interests of nature and also human requirements - democratic, accessible places with more opportunities for sociability. This paper contributes to the debates on practical examples of managing various interests in specific locations, characterized by fuzzy relations between natural and urban aspects.*

### **1. Introduction**

Urban fringe, where rural and urban environments intertwine and where the most intense growth and change happen (Friedberger, 2000), is under constant pressure. Urban fringe natural areas (UFNA) are facing various challenges arising largely from dynamics of contemporary human lifestyle and needs, dealing with process of urbanization and also from alterations in relationship between people and nature. Particularly significant is the problem of urban sprawl in contact zones of densely urban and highly protected natural structures (Gažová, 2006; Arnberger et al., 2013). The new development on the border of such contrast environments is related also to disharmony of relations, territorial conflicts and fuzzy division of responsibilities between diverse actors with conflicting interests, such as residents and vacationers, environmentalists, municipalities, developers and activists.

Protected areas within the borders of urban areas are very valuable since they provide many ecosystem services - the benefits people obtain from ecosystems and nature (Millennium Ecosystem Assessment, 2005). UFNA in conservation are biodiversity hot spots, producing drinking water, regulating hot summer temperatures, providing wildlife viewing, recreational, spiritual and eco-tourism opportunities and wellbeing for their visitors and residents of the locality (Daniel et al., 2012). At the same time,

they constantly suffer from high recreation use pressures because of their attractiveness (Arnberger et al., 2013).

This paper focuses on the important case of the UFNA – the area Devínska Kobyla. The case study Devínska Kobyla is unique massif belonging to the protected mountains Little Carpathians. This area is significant in several aspects: by the location on the edge of Bratislava city whole surrounded by its urban areas and separated by two rivers Danube and Morava from Austria. Due to unique landscape character and rare flora is the locality of Devínska Kobyla highly protected. Its natural areas are involved in the Natura 2000 BA project - Restoration of NATURA 2000 sites in cross-border Bratislava capital region by LIFE Programme. However, the Devínska Kobyla areas are intensively used settings and the pressure of human needs for recreation with lack of complex established infrastructure causes degradation of the landscape.

Subsequently, it is highly important to deal with the conflict resolutions in such areas, since fuzzy relations and conflicting interests can impact negatively the natural resources and consequently the quality of the resident well-being and the visitor experiences.

There are many positive examples of landscape design, planning and management of protected areas in close proximity to large city. Such important previous study is focused on Donau-Auen National Park in Vienna, where effectiveness of buffer zones is deeply investigated (Gál, 2013; Arnberger et al., 2013).

However, the previous studies differ considerably from this study mainly due to the character of transition zones between urban environment and protected nature. The focused case Devínska Kobyla is characterized particularly by direct bordering of the protected nature with housing developments, with almost any buffer zones. Furthermore, contribution of this study is also deep emphasis on human needs and requests on natural environment, since the studies from similar cases mainly focus on demands of the protected nature.

## **2. Literature review**

### **2.1 Cultivation of urban landscape**

The process of cultivation is elucidated and defined briefly in this paragraph. Currently, cultivation is still predominantly connected with agriculture field; even if in the connection with urban landscape (May and Rogerson, 1995; DeLind, 2002, Diogo et al., 2010). Although despite of that the expression of “cultivation” fits exactly to the main objective of the study; improvement of fuzzy management in the contact zones of contrasting environments towards sustainable and resilient by appropriate planning and design. Cultivation process is grasped and shaped as the complex concept responding to current challenges of the studied areas.

Generally, the meaning of cultivation is according to Oxford Dictionaries defined as;

- “The action of cultivating land, or the state of being cultivated”, where cultivating means process of improving, developing and promoting into growth

While in Oxford Advanced Learner's Dictionary definition is;

- “The deliberate development of a particular relationship, quality or skill”
- “The preparation and use of land for growing plants or crops”

In connection with landscape, cultivation is defined as the process based on human existence, when things are growing and it is possible to show up the core ability of culture. Then developing spatial

opportunities lead to multitude of possibilities, expanding knowledge, innovation, valuing beauty, perception, enriching experiences (Marques, 2014).

Hence, the concept of cultivation in the specific areas of Bratislava urban fringe is understood as the process, when conflicting interests and complex relations of actors in both environments are taken in account and developed into higher, deeper or richer levels of understanding, participation and sharing. And so the fuzzy relations between urban and natural structures are harmonized, such as relationship between people and nature.

### **3. Research objectives**

Whereas the relations in these areas are fuzzy, many problems occur. The landscape suffers from the conflicting interests of many various actors. Underestimation results to unsatisfactory compromises or to severe neglecting of some interest groups, heading to physical and philosophical decay, deviating from sustainability and resilience of the environment.

The question of arises whether is possible to plan, manage and design effective infrastructure for recreation with attractive entrance spaces which will satisfy the demands of various users and concurrently will help to protect the nature of Devínska Kobyla, despite very tight buffer zones.

Thus, this research aims to identify the optimal planning and designing measures and management options useful for answering fuzzy conflicting relations between natural and urban aspects towards sustainability of the landscape.

The proposed output is the framework of development measures and the landscape design concept for cultivation of the UFNA “Devínska Kobyla”.

### **4. Core construct - Urban vs. natural relations**

#### **4.1 Cultivating harmony in the urban fringe of Bratislava**

To achieve relevant approach to cultivation, the core construct was developed on the basis of the most important characteristics of the area. This process involves many layers, aspects and specifics in the case study Devínska Kobyla. The research should be complex, noticing enough attention to all of aspects, so then is possible to avoid negative impact at the natural resources, at the quality of the recreation and quality of living environment for residents in the locality. However, the limits resulting from nature conservation should serve as fundamental mantinels for planning process, while the conservation of the natural and historic values is the priority in the area.

The uniqueness and strengths of the locality bring a lot of opportunities for whole Bratislava region, but it also entails some challenges; majority of the most important and brief relevant proposals for solutions are outlined below.

#### **4.1.1 Management of recreation in contact zones - infrastructure for recreation, entrances and buffer zones**

In the contact zones – specific areas where is occurring direct contact of settlement and nature, there the relations of city and protected nature intertwined and emerging conflicts then lead to degradation of the environment. The recreation use pressure makes the situation much more alarming.

Thus, linking, structuring and hierarchization of the system of natural environment from the core entrance zones and urban recreation areas are essential (Gažová, 2006). Subsequently, areas of major intervention of city to the country would become the core areas of interest for the urban dwellers. Although the buffer zones practically not exist, the main recreational areas and points of interest should

be defined within the infrastructure for the recreation. Defined structure of the connected trails and nodes helps to clearer spatial fuzziness.

Further, satisfactory quality of particular recreational areas, urban green spaces and interest points should be managed, since their design and program significantly influence well-being of visitors during their recreation. Hence, the research should focus also on human requirements and needs - democratic, accessible places with more opportunities for sociability (Thompson, 2002).

#### 4.1.2 Protection of the nature by motivational approaches

##### Learning landscape design – cultivating the positive relationship to nature

Next important challenge in the area is the lack of awareness of the importance for nature conservation by some visitors and especially local dwellers. The issue of increasing respect for nature and cultivation of the positive relationship should be underpinned by creative peaceful means. Whereas there is demonstrated high contribution of early childhood education to sustainable society (Herbert, 2008; Didonet, 2008), to cultivate human values is very effective from the earliest age.

Appropriate solution then could be planning and design of interactive learning parks – Nature Play areas, emphasizing the need to introduce nature to children by inspiring, interactive and playful way. Initiator of such areas in Oregon - landscape architect Mathis (2013) states that the intent behind Nature Play Areas is to provide creative, free form play spaces that spark children’s connection to, and love of nature. Obviously, planning the interconnected infrastructure of educational trails is also a proven and widely used method for improving environmental awareness of human society.



Figures 1 and 2 - Learning landscape design in Devínska Kobyla applied by Daphne NGO

##### Sustainable grazing management

The locality of Devínska Kobyla is protected mainly because of occurrence of unique xerothermic grasslands that spread through human agricultural activities (Senko, 2010). It is therefore essential to find the ways of sustainable maintenance of these plant communities, since the expansion of invasive tree species is rapid and almost uncontrolled.

To suppress the overgrowing of rare grassland and ensuring regular removal of biomass is suitable to apply the management of traditional grazing and mowing (Dúbravková et al., 2011). Application of grazing also increases the attractiveness of the site and naturally adopts people to appreciate the values of

nature. At the same time, further benefit is utilization of goat milk for production and sale of desired organic food.

## **5. Methodology**

### **5.1 Case study Devínska Kobyla**

The case study area is defined on the western slopes of the robust mountain Devínska Kobyla, part of the massif of Little Carpathians, while its whole area belongs to the Little Carpathians Protected Landscape Area. The wooded mountain is located in the northern part of Bratislava, the capital city of Slovakia, with a population of about 0,5 Mio. This massif is surrounded from all sides by neighborhoods of Bratislava. The area of focused segment is almost 400 ha, while the urban areas of the city districts Devín and Devínska Nová Ves extend into the study area. The highly protected National Nature Reserve Devínska Kobyla occupies most of the study area, containing unique protected paleontological sandstone Sandberg. The area is managed by organization Urban forests in Bratislava, involved in the Natura 2000 BA project - Restoration of NATURA 2000 sites in cross-border Bratislava capital region by LIFE Programme, lasting 2012-2017.

Locality is unique for an incomparable landscape character, rare protected steppe flora, significant geological, topographic and singular paleontological structures and beautiful views of the landscape from steep slopes and for historic and cultural wealth.

#### **5.1.1 Data collection methods and approaches**

In first phase, the basic and deeper research about Devínska Kobyla area was necessary; for understanding the conditions, potentials and limits of the territory. It was conducted from Sept. 2013 to May 2014 on the basis of field survey and mapping, then literature and documentations survey on various aspects of landscape country and also by meetings and consultations with experts; environmentalists, stakeholders from NGOs Daphne and BROZ participating on Natura 2000 BA project in the area, stakeholders from local government and by interviewing the public.

In next phase, data from the survey were analyzed in the complex context – using also historic plans. Analyses of land-use, relief, functions, legislative, dendrologic, visual and compositional relationships were included.

In third phase the qualitative research with the users of area was conducted. The knowledge and views from the “experts of the locality” – the users and residents were obtained. Data were collected by method of individual interviews with random representative sample of the public across study area Devínska Kobyla.

#### **5.1.2 Sampling**

Locality of survey was conducted mainly on routes leading to the "main entrances" to Devínska Kobyla, especially in the district Devínska Nová Ves, where are the most significant conflict zones between natural and urban environments.

A total sample of respondents involved in the survey was 51; respondents were chosen randomly, trying for varied and representative sample (Figure 3).



Figure 3 – Basic pattern of respondents – structure of domicile and age structure

Pattern of the motives for visiting UGS in case study Devinska Kobyla – frequency of responses in percent – from 51 interviews with participants

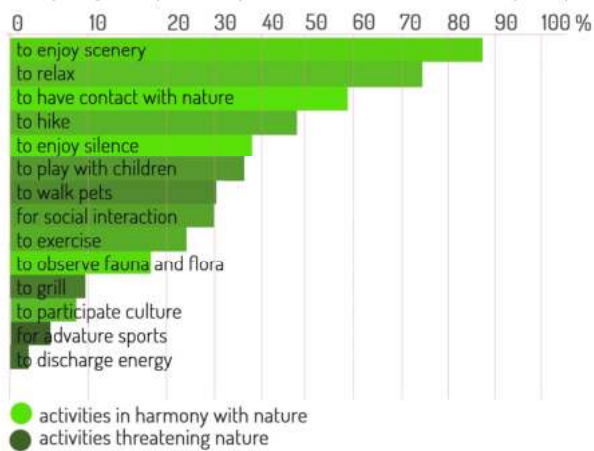


Figure 4 – Pattern of the motives for visiting the natural areas in case study Devinska Kobyla

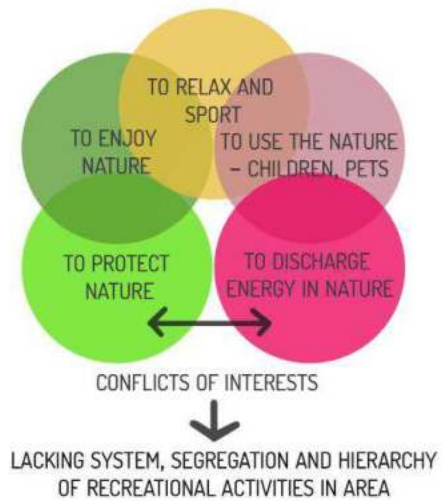


Figure 5 – Conflicts of interests in the locality

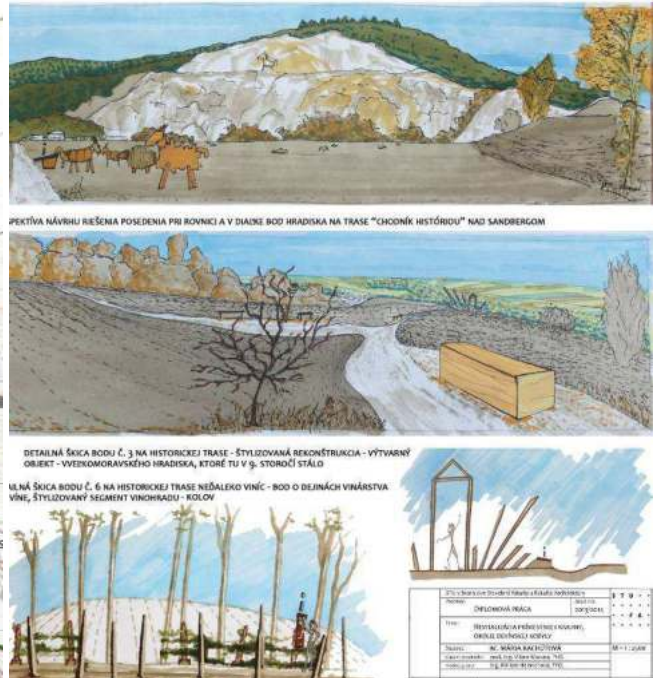
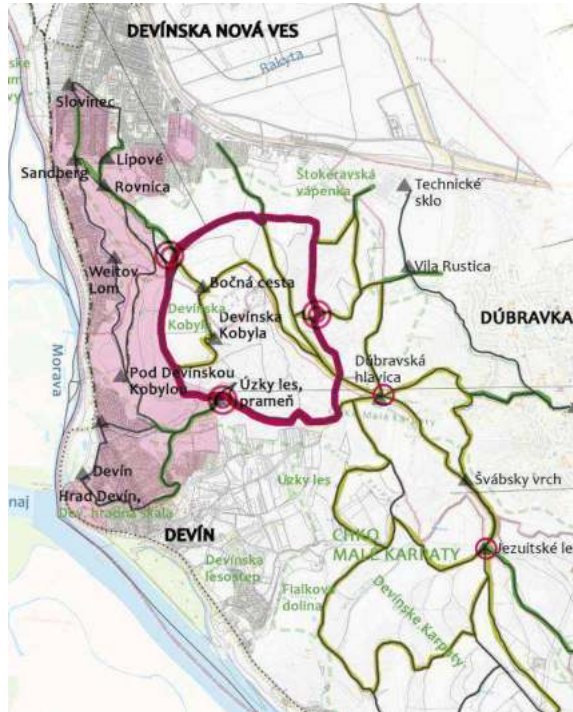
## 6. Discussion of results

By synthesis of complex knowledge from previous stages of the research was developed the design concept for the landscape plan, applicable in practice. Whereas the focus of Natura 2000 BA project aims on measures beneficial for natural aspects of the locality, the output of the research significantly addresses the measures improving recreational infrastructure in the locality, although by respecting the nature – whereas conservation is the priority among conflicting interests.

Cultivation plan for sustainable management of Devinska Kobyla locality is designed across multiple scales to complex design concept; from the overall design of the infrastructure of routes and trails and its hierarchization, mutually connected to the principal interconnecting sports circuit, to the detailed design of various recreational spaces, points of interest and interactive stops.

Since in the transparent recreational infrastructure of Devinska Kobyla is cumulated the main pressure of visitors, the Nature Reserve Devinska Kobyla is protected from the degradation of lively activities. These activities are transferred to peripheral buffer zones in the contact with urban zones and also inside the forested massif, beyond of the highest protected Nature Reserve with unique grasslands. Furthermore, by the network of trails, the city districts surrounding the massif are mutually interconnected. In the strategic crossroads, where the main sports circuit intersects the other trails from

the districts, hubs for recreation are designed. Particular recreational spaces are according to their hierarchy equipped with several components for rest and recreation, accessible and attractive for various visitors.



Figur. 5. The connection of trails to systematic infrastructure for recreation; main sports circuit Figure 6. Sketches of the educational and recreational areas and nodes - interactive point on the trails

The core philosophy of the design concept for cultivation of Devínska Kobyla UFNA is based on the very nature of the locality. The concept "From fairy tale to fairy tale" indicates tremendous wealth and uniqueness of the Devínska Kobyla.

Particular stories about different layers of the area are introduced by individual segments, creating the mosaic of the complex history of the locality.

1. Three main interactive trails in the Nature Reserve Devínska Kobyla introduce specific aspects of Devínska Kobyla. These trails and their themes are: "The Story of Nature", "The Path of History" and the sports "Circuit Kobyla".
2. Interactive hubs and points of interests at these trails have learning, informative and recreational character with the character of Nature Play areas – inspired by Learning landscape design.
3. Navigation element in the form of a mare reference to the name of locality - Devínska Kobyla (kobyla in Slovak = mare). Land-art elements are incorporated in the whole locality, made out in the form of sculptures, statues, playground components. These navigation elements highlight the identity of the site and unite the locality into a unified whole. They also elevate the artistic value of the site, creating the art libretto.



Figure 7. Complex plan of development measures in Devínska Kobyla

The protected grasslands are proposed to be maintained by sustainable grazing management in accordance of the intention of LIFE project, managed by BROZ and Daphne NGOs. Children from the urban areas are attracted by present goats and sheep, serving as the magnet for the visitors. Hence, the visitors learn about the need of conservation and the uniqueness of the locality also by this way.

The main recreational spaces and entrances to the Nature Reserve are located in the peripheral zones of the urban areas, as their inhabitants visit the natural environment most frequently. Each of the spaces provides other forms of activities, answering also on the need of lively recreational activities as downhill, skating and dog exercises.

## 8. Conclusion

The study solves the area of Devínska Kobyla by set objectives. The resulting output answers to the conflicts of nature and the city by proposing facilities for recreation in accordance with the protected landscape by management and design measures.

Methodology and creative approaches in the process of development could contribute to solving similar territories with spatial fuzziness, where the great pressure of urbanization on highly protected nature negatively impact the landscape and where residents and visitors have a high demand for recreational use of the environment.

The research has not solved the policies and governance of the locality more in details, next phase of research propose to focus on this issue.

The paper contributes to the debates on practical examples of synchronizing various interests in specific locations with fuzzy relations between natural and urban aspects in general.

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