



# EUROSCAPES

**Landscape Management Plan  
STUBA**



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## 1. Introduction

In the frame of the EUROSAPES project, the Landscape Management Plan for City Municipality Bratislava Devin was developed. This city Municipality is located in the edge of the urbanised area of the Bratislava city and is representing by the extraordinary landscape values – natural and cultural.

The landscape characterization is based on the representatives landscape types with different features: the Morava river with according lowland and floodplain forests, Danube river with surrounding floodplain forests, the rocky cliff above Morava and Danube confluence, urbanised area, garden and orchards, Small Carpathian Mountains, protected areas with endangered species and thermophilous plant communities (Devínska Kobyla, Devínska lesostep, Fialkové údolie) .



*Picture: The Rocky cliff with the fortress castle ruins (photo taken from the Austrian side of Danube)*

The rocky cliff due the exceptional strategic location, was settled by Celts and Romans and slavic population. In the first written reference (dating from 864) the site is called “Dovina”. During the era of the Great Moravian Empire territory, the large hill-fort was build and was one of the most important fortresses.

The document is mainly focused on the management’s issues related with the green areas that are situated directly in the urbanised area of the city Municipality, as well as in the natural surroundings. The principal issue we were trying to solve was to find the appropriate conservation of the natural values, evaluation of the opportunities for the biodiversity conservation, suggestion of the appropriate management measures, etc. The document is in the same time following requirements from the Act 543/2002 on the Nature and Landscape protection, and based on the § 69 of the mentioned Act, especially in relation to the documents of the Local Territorial System of Ecological Stability and the management Document for the woods.

The document is structured into 3 main parts:

- 1) Part 1 - Text document (descriptive part of the LMP)
- 2) Part 2 – maps and cartographic visualization
- 3) Part 3 – GIS system and databases

Part 1 – The text document is descriptive part of the LMP. It is describing the methodology, including the framework of the administrative city boundaries. It contains as well as the set of the implementation specific guidelines, recommendations and possible solutions.

Part 2 - maps and cartographic visualization is reflecting and documenting the descriptive part. The maps are included in the annex to the text document.

Part 3 - GIS system and databases is envisaged to serve as an implementation and management tool

The phases of the LMP:

- Phase 1: Analysis: data collection, landscape characterization
- Phase 2: Synthesis: set-up the strategic objective and development concept
- Phase 3: Set-up protection, Management and Development Measures
- Phase 4: Implementation and monitoring

## **Phase 1: Data collection and analyses**

The Working Team were gathering the data, such as green spaces within the urbanised area, natural areas, cemeteries, residential areas, agricultural areas, closed areas, protected landscape areas' borders, flood lands, nature reserves borders, historical monuments, nature protection areas, woodlands, forests, allotments, historical buildings, transportation system, parking lots, etc.

### **Example of an data collection:**

#### **1. Introduction**

1.1 Tasks and legal basis

1.2 Spatial scope

1.3 Action and implementation framework (existing binding nature of the statements, position of the landscape plan within the planning system)

#### **2. Landscape structure**

2.1 Human settlements

2.2 Forests

2.3 Fields

2.4 Water management

2.5 Garden and orchards

2.5 Meadows and grass

2.6 Flood areas

...

The Working Team has elaborated the following forms of data collection:

##### **1.1 Environmental data**

brief characterisation including geographical classification of natural landscapes and landscape units, fauna, flora (including biotope types – see example below), soil, surface waters and flood areas, climate etc.

#### **Flora and fauna along the river Moravia (example)**

The landscape along the river Moravia is represented by alluvial wetlands, floodplain meadows and sand dunes with typical fauna and flora. The following plant species can be found here: alpine bulrush (*Trichophorum alpinum*), common bistort (*Bistorta major*) and some species of sphagnum

(*Sphagnum*). Other important plant species are fen orchid (*Liparis loeselii*), river crowfoot (*Batrachium fluitans*), flea sedge (*Carex pulicaris*), carnation (*Dianthus serotinus*), roundleaf sundew (*Drosera rotundifolia*) and solitary clematis (*Clematis integrifolia*).

As regards animals, there are water animals, such as molluscs, fish - Ukrainian brook lamprey (*Eudontomyzon mariae*), cyprinid fish (*Alburnoides bipunctatus*), common carp (*Cyprinus carpio*), Nase (*Chondrostoma nasus*), amphibians and many species of water birds. The beaver (*Castor fiber*) determines the character of riverbank floodplain forests. Another important animal on this territory is Eurasian otter (*Lutra lutra*)

From the point of view of avian fauna the river Moravia alluvium constitutes one of the most important sites. The system of conserved wetlands (watercourses, channels, wetlands, wet meadows, floodplain forests and periodical pools) creates quality conditions for the nesting of the following species: spotted crake (*Porzana porzana*), bittern (*Botaurus stellaris*), red kite (*Milvus milvus*), saker falcon (*Falco cherrug*), black kite (*Milvus migrans*), little bittern (*Ixobrychus minutus*), garganey (*Anas querquedula*), gadwall (*Anas strepera*), red-crested pochard (*Netta rufina*), common redshank (*Tringa totanus*), greylag goose (*Anser anser*), bluethroat (*Luscinia svecica*).

### Flora and fauna along the river Danube

Alluvia are sensitive and currently very threatened biotopes. Existence of alluvial forests is limited by high level of groundwater and by periodic floods (in case of soft alluvial forest). The level of groundwater was decreasing since 1980s on the Slovak part of the river Danube. It was caused by excessive extraction of gravel and by discontinuing inflow of gravel and sediments due to the system water works on the river Danube in Austria. This has influenced quality of alluvial forests, which started to change to more xerophylus communities. Lack or decrease of groundwater caused extinction and transformation of alluvial forest to another type of biotope depending on habitat conditions for given territory. Alluvial forests constitute unchangeable biotope where specific plants can survive in conditions where other plants are no able to survive due to abundance of water.



Picture: Danube and Morava rivers

The territory is also important from the point of view of zoology which is demonstrated also by representation of particular species. The system of river branches with surrounding forest vegetation creates good conditions for presence of valuable taxa. In the Bratislava alluvia there are good conditions for water, wet species leaved forests and types of forest-steppes. As regards mammals, there is interesting re-introduction of beaver (*Castor fiber*). Other animals include common newt (*Triturus vulgaris*), European tree frog (*Hyla arborea*), moor frog (*Rana arvalis*), pool frog

(*Rana lessonae*), agile frog (*Rana dalmatina*), edible frog (*Rana kl. esculenta*), European water frog (*Rana ridibunda*), more rarely Danube crested newt (*Triturus dobrogicus*), European fire-bellied toad (*Bombina bombina*), common toad (*Bufo bufo*), European green toad (*Bufo viridis*) and Spadefoot toad (*Pelobates fuscus*). Reptiles include ringed snake (*Natrix natrix*), more rarely Aesculapian snake (*Elaphe longissima*), sand lizard (*Lacerta agilis*), slow-worm (*Anguis fragilis*).

The river Danube belongs to important bird areas (IBA). The part of the Bratislava alluvia is also a part of proposed protected bird site the Danube alluvium. This territory provides good conditions for the nesting of little egret (*Egretta garzeta*), little bittern (*Ixobrychus minutus*), common tern (*Sterna hirundo*), redshank (*Tringa totanus*), white-tailed eagle (*Haliaeetus albicilla*) or black kite (*Milvus migrans*).

The Bratislava alluvia are proposed for the system of protected areas of European importance. Reasons include along with protection of biotopes and plant species also occurrence of animal species, such as: scarce large blue (*Maculinea teleius*), large copper butterfly (*Lycaena dispar*), dytiscid beetle (*Graphoderus bilineatus*), marsh fritillary butterfly (*Euphydryas aurinia*), *Eriogaster catax*, false ringlet (*Coenonympha oedippus*), ground beetles (*Carabus variolosus*), violet click beetle (*Limniscus violaceus*), European stag beetle (*Lucanus cervus*), compton tortoiseshell (*Nymphalis vaualbum*), Fenton's wood white (*Leptidea morsei*), dragon fly (*Leucorrhinia pectoralis*), *Dioszeghyana schmidtii*, *Bolbelasmus unicornis*, bullhead (*Cottus gobio*), streber (*Zingel streber*), Danube ruffe (*Gymnocephalus baloni*), tubenose (*Proterorhinus marmoratus*), golden spined loach (*Sabanejewia aurata*), bitterling (*Rhodeus sericeus amarus*), Kessler's gudgeon (*Gobio kessleri*), white finned gudgeon (*Gobio albipinnatus*), Danube crested newt (*Triturus dobrogicus*), European fire-bellied toad (*Bombina bombina*), Lesser horseshoe bat (*Rhinolophus hipposideros*), greater mouse-eared bat (*Myotis myotis*), pond bat (*Myotis dasycneme*), beaver (*Castor fiber*) and barbastelle bat (*Barbastella barbastellus*).

Species and vegetation structure of alluvial forest is closely connected to erosion-accumulation activity of the river Danube which along with mechanical intervention in vegetation cover also determines the level of groundwater. Alluvia are sensitive and today very threatened biotopes. Existence of alluvial forests is limited by high level of groundwater and by regular floods in the case of soft alluvium. These conditions allow creation of typical alluvial communities. Willow-poplar forest (soft alluvium) is in the closest vicinity to water and includes crack willow (*Salix fragilis*), white willow (*Salix alba*), poplars (*Populus alba*, *Populus nigra* and *Populus x canescens*), almond willow (*Salix triandra*).

Farer from water there are communities of ash tree-elm-oak alluvial forest (hard alluvium) where one can find species not so demanding water, such as European ash (*Fraxinus excelsior*), Narrow-leafed ash (*Fraxinus angustifolia*), elms (*Ulmus minor* and *Ulmus laevis*), oak (*Quercus robur*), common bird cherry (*Padus avium*), wayfaring tree (*Viburnum lantana*), blood-twig dogwood (*Cornus Swida sanguinea*).

In herb vegetation of the Bratislava alluvium one can see e.g. European dewberry (*Rubus caesius*), reed canarygrass (*Phalaris arundinacea* var. *arundinacea*), stinging nettle (*Urtica dioica*), common marsh bedstraw (*Galium palustre*), yellow loosestrife (*Lysimachia vulgaris*), water mint (*Mentha aquatica*), purple loosestrife (*Lythrum salicaria*), hedge false bindweed (*Calystegia sepium*), yellow marsh marigold (*Caltha palustris*), shoreline sedge (*Carex riparia*) and others.

The Bratislava alluvium is proposed to be included in the system of protected sites of European importance due to protection of biotopes of European importance: alluvial oak-elm-ash tree forests near lowland rivers, alluvial willow-poplar and alder forests, lowland and mountain watercourses with vegetation of the union of *Ranunculion fluitantis* and *Callitriche-Batrachion*, natural eutrophic and mesotrophic stable water bodies with vegetation of flowing and immersed vascular plants of *Magnopotamion* or *Hydrocharition* (3150) types and plant species of European importance, such as creeping marshwort (*Apium repens*).

1.2 **Socio-economical data collection:** demographic data collection, analyses of the needs inhabitants and visitors, accessibility of green spaces, current uses and expected changes of demographic structure

1.3 **Cultural and Historical data collection with the study of the cultural heritage, diversity, characteristic features and beauty** (natural scenery, nature and landscape experience).



*Picture: The Monuments to the “Iron curtain” and communist regime victims*

The collected data were mapped and presented also in a form of the thematic layers.

The collected data were analyzed and assessed from the point of natural values, biodiversity, urban design and with the special focus on the woody species, etc.

### **Assessment of the Existing and Expected Condition of Nature and the Landscape (example)**

Biodiversity function (biotope function, biotope development potential, trees conditions)

Recreational function, water resources function, retention function

Multifunctional areas (areas with high significance for different landscape functions)

Summary of the conflicts between landscape functions and existing and expected uses (including human settlement functions)

### **Phase 2: Synthesis: set-up the strategic objective and development concept**

Synthesis is providing the critical understanding of the territory in the term of risks, and help to formulate the suitable development concept. This will be elaborated in the further steps in detailed propositions of activities, measures, plans and policies. Based on the landscape analyses, the set-up of strategic objectives and development concept is formulated.

The Strategic objective and development concept of the Devin is based on the overall aim to ensure a healthy and vibrant Municipality, with a balance between human use and conservation by: providing leadership in the management of its resources; promoting understanding, conservation and beneficial use of the natural and cultural assets; and undertaking programs and projects for the benefit of present and future generations.

The strategic objectives of LMP are:

- the conservation of nature
- the improvement of trees and woody species
- promotion of the biodiversity
- the improvement and extension of recreational opportunities
- the improvement of rural-urban links and relationships.



*Picture: The Danube floodplain forest*

### **Phase 3 – Set-up of management and measures**

Based on the objective and development concept elaboration in the step before, the differentiated landscapes' management programmes is elaborated.

The LMP for the City Municipality Devin was focused on the green spaces management, especially introducing the system of the differentiated green space management and trees management.

The thematic layer focusing on tree management is elaborated, describing in details the measures to be undertaken to secure the good trees conditions.

The special layer aiming on the differentiated green space management – especially the cutting of meadows and grass was elaborated.

The LMP is stressing the biodiversity promotion in the City Municipality Bratislava Devin.

ulica	por_cislo	slov_nazov	vedecky_nazov	obvod_kmer	SH	Poskodenie	Poznamka
nam.A.Hlinku	1	Lipa veľkolista	Tilia platyphyllos	150	4	2	CHS, dutiny, rana na kmeni
nam.A.Hlinku	2	Lipa veľkolista	Tilia platyphyllos	150	3	3	dutiny
nam.A.Hlinku	3	Lipa veľkolista	Tilia platyphyllos	150	3	3	dutiny
nam.A.Hlinku	4	Pagastan konsky	Aesculus hippocastanum	150	2	3	sikmy, preschnuty
nam.A.Hlinku	5	Lipa veľkolista	Tilia platyphyllos	150	4	2	CHS
nam.A.Hlinku	6	Lipa veľkolista	Tilia platyphyllos	150	3	2	
nam.A.Hlinku	7	Lipa veľkolista	Tilia platyphyllos	100	3	2	
nam.A.Hlinku	8	Lipa veľkolista	Tilia platyphyllos	150	2	3	poskodeny kmen
nam.A.Hlinku	9	Lipa veľkolista	Tilia platyphyllos	150	4	3	CHS, poskodeny kmen,sikmy
nam.A.Hlinku	10	Pagastan konsky	Aesculus hippocastanum	150	3	2	
nam.A.Hlinku	11	Pagastan konsky	Aesculus hippocastanum	100	3	2	
nam.A.Hlinku	12	Pagastan konsky	Aesculus hippocastanum	150	3	2	
nam.A.Hlinku	13	Pagastan konsky	Aesculus hippocastanum	150	3	2	
nam.A.Hlinku	14	Lipa veľkolista	Tilia platyphyllos	150	3	2	sekundarne vyhony
nam.A.Hlinku	15	Lipa veľkolista	Tilia platyphyllos	150	3	2	sekundarne vyhony
nam.A.Hlinku	16	Pagastan konsky	Aesculus hippocastanum	100	3	2	
nam.A.Hlinku	17	Lipa veľkolista	Tilia platyphyllos	150	3	2	odstranovany kostrový vyhon
nam.A.Hlinku	18	Lipa veľkolista	Tilia platyphyllos	150	3	2	mensi, suche vetve, Z rez
nam.A.Hlinku	19	Lipa veľkolista	Tilia platyphyllos	150	2	3	suche vetve, Z rez, nekroza
nam.A.Hlinku	20	Lipa veľkolista	Tilia platyphyllos	150	3	2	
nam.A.Hlinku	21	Lipa veľkolista	Tilia platyphyllos	80	3	2	mensi, sikmy, rany po reze
nam.A.Hlinku	22	Lipa veľkolista	Tilia platyphyllos	150	3	2	
nam.A.Hlinku	23	Lipa veľkolista	Tilia platyphyllos	150	3	2	sekundarne vyhony
nam.A.Hlinku	24	Lipa veľkolista	Tilia platyphyllos	150	3	2	
nam.A.Hlinku	25	Pagastan konsky	Aesculus hippocastanum	150	3	2	
nam.A.Hlinku	26	Lipa veľkolista	Tilia platyphyllos	150	3	2	
nam.A.Hlinku	27	Lipa veľkolista	Tilia platyphyllos	150	2	3	priebezna dutina
nam.A.Hlinku	28	Lipa veľkolista	Tilia platyphyllos	150	3	2	
nam.A.Hlinku	29	Lipa malolista	Tilia cordata	150	3	2	vada koruny
nam.A.Hlinku	30	Lipa veľkolista	Tilia platyphyllos	150	2	3	prekryta dutina
nam.A.Hlinku	31	Pagastan konsky	Aesculus hippocastanum	150	2	2	
nam.A.Hlinku	32	Lipa malolista	Tilia cordata	150	3	3	znizena vitalita
nam.A.Hlinku	33	Lipa malolista	Tilia cordata	150	2	2	Z zdravotny rez
nam.A.Hlinku	34	Pagastan konsky	Aesculus hippocastanum	150	3	2	
nam.A.Hlinku	35	Lipa veľkolista	Tilia platyphyllos	150	2	3	dvojak
nam.A.Hlinku	36	Lipa veľkolista	Tilia platyphyllos	150	2	3	dve velke dutiny
nam.A.Hlinku	37	Lipa malolista	Tilia cordata	30	3	1	nova vysadba
nam.A.Hlinku	38	Pagastan konsky	Aesculus hippocastanum	150	2	2	
nam.A.Hlinku	39	Lipa veľkolista	Tilia platyphyllos	150	3	2	dvojak
nam.A.Hlinku	40	Pagastan konsky	Aesculus hippocastanum	150	2	3	dutina vel. rozmerov
nam.A.Hlinku	41	Lipa malolista	Tilia cordata	30	3	1	nova vysadba

*The geodatabase showing the detailed identification and the measures to be undertaken to secure the good trees conditions*

## Phase 4 – Implementation and monitoring

The last phase of the LMP is the implementation and monitoring phase. The landscape management plans will be implemented and the results will be monitored through the set of indicators proposed.