Floodplain forest protection in agriculturally intensive areas (from design to implementation)

Ochrana lužných lesov v poľnohospodársky intenzívne využívanej krajine (od návrhu až po realizáciu)

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Abstract

Floodplain forests are Europe's most endangered forest habitats. In many areas they have either been transformed into arable land or cultivated as poplar plantations. The Territorial System of Ecological Stability (TSES) used in Šaľa, Slovakia, creates the ecological framework for agriculturally intensive areas. This paper discusses the study of floodplain forests in the Lower Váh River composed of willows of the *Salix* genus and poplars. It presents a design for applying recommendations from scientific research related to TSES for legislation to protect the last natural fragments of floodplain forests in Šaľa district through the Luhy na Bystrom Protected Landscape Element in agriculturally intensive areas.

Keywords: agriculturally intensive areas, biotope, floodplain forests, habitat, territorial system of ecological stability

Abstrakt

Lužné lesy patria k najohrozenejším lesným biotopom Európy. Na mnohých miestach boli premenené na ornú pôdu alebo plantáže šľachtených topoľov. V zmysle miestneho územného systému ekologickej stability (MÚSES) mesta Šaľa tvoria ekologickú kostru poľnohospodársky intenzívne využívanej krajiny. Príspevok sa zaoberá výskumom vŕbových (rodu *Salix*) a topoľových nížinných lužných lesov na dolnom toku rieky Váh. Predstavuje návrh aplikácie odporúčaní vedeckého výskumu spojeného s MÚSES do legislatívnej ochrany posledných fragmentov prirodzených

lužných lesov okresu Šaľa v podobe projektu ochrany Chráneného krajinného prvku Luhy na Bystrom v poľnohospodársky intenzívne využívaných oblastiach.

Kľúčové slová: biotop, habitát, lužné lesy, poľnohospodársky intenzívne využívané územia, územný systém ekologickej stability

Detailný abstrakt

Lužné lesy, v pôvodnom drevinovom, krovinatom a bylinnom stave sa, na Slovensku, nachádzajú iba zriedkavo. V intenzívne poľnohospodársky využívanej krajine sa jedná o roztrúsené fragmenty najmä na náplavových kužeľoch väčších vodných tokov. V príspevku prezentujeme zhodnotenie biotopu lužných lesov v lokalite Luhy na Bystrom metódou Favourable Conservation Status (FCS). Modelová lokalita sa nachádzajú v okrese Šaľa na rozmedzí katastrálnych území Šaľa, Trnovec nad Váhom a Selice na vodnom toku Váh. V rámci vymedzeného územného systému ekologickej stability územia hodnotená lokalita spadá medzi biocentrum regionálneho významu Millerove domy. Mapovaním boli hodnotené nasledovné kritériá/indikátory: typické druhy biotopu, štruktúra lesného biotopy a negatívne dopady. V rámci typických druhov biotopu sa hodnotilo: druhové zloženie stromového poschodia, druhové zloženie krov a bylinných druhov. Štruktúra lesného biotopu bola hodnotená na základe: vekovej štruktúry, prirodzenej obnovy drevín, priestorovej štruktúry, prítomnosťou hodnotných stromov a výskytom mŕtveho dreva. Negatívne dopady boli hodnotené na základe odhadu zdravotného stavu a širších kontextových vzťahov.

V mapovanom biotope boli vytypované tri lokality. Na základe zhodnotenia jednotlivých kritérií možno konštatovať, že hodnotený biotop v lokalite 1 je v optimálnej kondícii. V biotope prevládajú zachované fragmenty pôvodných lužných lesov, lokalita má vhodné pozvoľné napojenie na okolitú krajinu. Lokalita 2 sa len približuje vlastnosťami k optimálneho stavu, horšie bolo hodnotené kritérium kontextových vzťahov. Biotop je značne ovplyvňovaný ostro vymedzenou hranicou s intenzívne využívanými pozemkami. Lokalita 3 je v optimálnej kondícii s výskytom pôvodných druhov v stromovej, krovitej a bylinnej etáži.

Komplexne možno konštatovať, že štúdium lesného biotopu rozšírilo znalosti ohľadom mapovania lužných lesov, ktoré čoraz viac ustupujú činnosti človeka. V mapovanom území bolo zmapovaných zo živočíšstva 15 druhov európskeho významu, z rastlinstva 31 druhov národného významu. Nachádzajú sa tu dva biotopy európskeho významu: Ls 1.1, Ls 1.2. Výsledky štúdie dokazujú, že biotop má, v súčasnom stave, mimoriadny ekologický význam.

Je otázne, prečo aj napriek odporúčaniam v dokumentáciách ochrany a tvorby krajiny a v krajinno-ekologických štúdiách daná oblasť doposiaľ nie je vyhlásená za chránenú. Pre ochranu ekologicky hodnotnej oblasti modelovej lokality by bolo postačujúce vyhlásiť/zaradiť územie s výmerou 23.44 ha do kategórie chránený krajinný prvok - Luhy na Bystrom v 5. stupni ochrany.

Introduction

Forests have been on Earth for more than 350 million years. As they evolved, forests managed to adapt excellently to varied conditions, surviving meteorite impacts, climatic changes, ice ages, and it is also believed they will survive human intervention. They are highly developed systems composed of millions of organisms, where each one of them has its own place, time and function. Along rivers whose water bring life to a country as blood vessels nurture human bodies, floodplain forests have developed that accompany the rivers as they flow through the landscape (Stranovský, 2008).

Central European floodplain forests have a specific forest geobiocenosis, where species diversity depends on the ecotope, consisting of Quaternary river alluvium, regular or irregular inundations and a high level of groundwater during the first half of the vegetation period (Vašíček and Prax, 1983).

Nowadays, floodplain forests are very rare in Europe as a natural formation, appearing in its potential natural range along alluvial basins only to a historically limited extent. In the usually extensively deforested and agriculturally exploited landscape of the current alluvia, any preserved remnants of floodplain forests are extraordinarily valuable refuges for biotic diversity and are irreplaceably important for the ecological stability of the entire alluvium and wider river basin (Machar, 2001). The main characteristics and functions of floodplain forests are to provide high biomass production and high biodiversity based on special forest type variability, protecting rivers against erosion and pollution, ensuring a high number of nature preserves and also recreation and aesthetics in the landscape, becoming an important source of water evaporation and holding back floodwaters (Klimo and Hager, 2001).

Development of floodplain forests closely depends on climatic conditions and changes in the river alluvium. The landscape of valley alluvia looks completely different today than it did in prehistoric times and the early medieval period. Only locally were the indented gravel-sand beds of the river valleys covered with loam or younger soils. Based on an analysis of plant macro-remains, the tumbled nature of the alluvial plain's development becoming intolerant to regular flooding is documented for valley alluvia in the Early, Middle and Late Holocene. It was influenced by intensive grazing of cattle and hogs. Periodical flooding associated with the layering flood sediments are the result of massive deforesting of submontane and montane zones starting in the 13th century and lasting until recently. Soft alluvium has been spontaneously created as a result of flooding and the onset of flooding led to the end of constant populating of river alluvia. Soft alluvium had probably dominated in the lowlands until the 19th century when the influence of regulated flows gradually regenerated the formation of hard alluvium, while remaining under the influence of the forest economy (Machar, 2007). Loss of floodplain forest agricultural land in Central Europe, mainly in the 20th century has been confirmed in several papers (Baus et al., 2014; Blažík et al., 2011; Havlíček et al. 2014; Machar et al., 2013; Mojses and Boltižiar, 2011; Skokanová et al., 2015). After a series of major, even catastrophic flooding in the Lower Váh, a number of important changes in the riverbed were instituted in 1888. On some stretches, the riverbed was shifted and straightened, embankments to prevent flooding were built on both sides of the river

(Karafa, 2006) and the river system was substantially restricted by artificial obstructions. Tributaries were separated from the main river and absorbed into agricultural lands.

The river system suffered further impact from the construction of the hydraulic Kráľová dam in the 1970s. The dam caused extensive areas of the unregulated river system with its natural floodplain forests to disappear. The main factors endangering floodplain forests in Slovakia are the regulating of rivers, depletion of groundwater from over pumping, clear cutting by the forest industry and transformation of natural floodplain forest into plantations for cultivating poplars (Vološčuk and Šíbl, 2001).

Figure 1. Development of the river near Bystré (Šebeš)

Obrázok 1. Vývoj riečnej krajiny na lokalite Bystré (Šebeš)

Cutting through a meandering by the river created an island and oxbow lake beyond the embankment and away from the inundation area.

Source: Šaľa city office

Priepichom meandrov vznikol riečny ostrov a mŕtve rameno, ktoré je v súčasnosti za hrádzou, mimo inundačného územia.

Zdroj: Mestský úrad Šaľa

Nowadays, only isolated remains of the river branches can be found here - Figure 1. Floodplain forests remain only around the embankment. The forestry industry has transformed more than 70% of the area into poplar plantations and only fragments remain from the natural willow-poplar and mixed oak-elm-ash forests of great rivers, which continue to decline in size (Stranovský, 2008).

A landscaping approach aims to harmonize human activities with a healthy functioning countryside. The intensively farmed country in Šaľa district has experienced one of the lowest percentages of forestation, and such an approach is more than needed. It should be provided by Territorial Systems of Ecological Stability with proposed functional system of bio-centers, bio-corridors and interactive elements. In terms of the Local Territorial System of Ecological Stability for the city of Šaľa in 1996 (Mederly et al., 1996), the entire embankment along the river Váh has been designated a bio-corridor of supra-regional importance. The Local Territorial System of Ecological Stability (LTSES) earmarks the natural floodplain forests and river branches to be bio/centers of local importance and one bio-center of regional importance to be called Millerove domy. The authors of the document recommend

the most ecologically preserved bio-centers, such as Millerove domy to be declared as a nature reserve. The recommendations from the LTSES are also confirmed in the Land Use Plan (LUP) issued by the city of Šaľa of 2006, and the documents also outline ecologically significant locations such as gene pool locations for animal and plant species. The binding part of the document recommends establishing the Ostrov Váhu Nature Reserve, while projecting the concept of a greater landscape in recommendations for protecting nature and landscape protection mentioned within the concept of city development.

Unfortunately, everything is completely different in reality. The recommendations remain just recommendations, as none of the city representatives has worked out or had anyone work out specific protection projects. Meanwhile, no gene pool locations and bio-centers have been incorporated into forest management plans, with foresters already having cut down some of the designated stands and planning to cut down the remainder. This recommendation and the legislatively non-binding character of the LTSES and LUP in environmental protection make these documents toothless.

Material and methods

The methodology behind the proposed floodplain forest research is based on assessing a habitat's favorable conditions in terms of its protection (Favourable Conservation Status, FCS), Polák and Saxa (2005), with resulting development of the Luhy na Bystrom Protected Landscape Element.

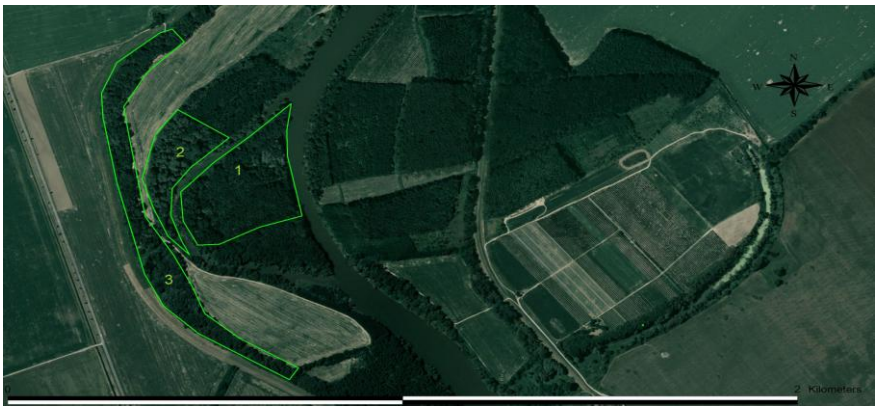

Figure 2. Localization of assessed locations

Obrázok 2. Lokalizácia hodnotených lokalít

1. Mixed oak-elm-ash forests of great rivers – Site of Community Importance on an island on the Váh, JPRL (JPRL - unit spatial distribution of forest) n. 85; 2. Willow-poplar lowland floodplain forest – precedence Site of Community Importance, JPRL n. 83; 3. Mixed oak-elm-ash forests of great rivers – Site of Community Importance in a borrow pit JPRL n.537a.

Source: Šaľa city office

1. Dubovo-brestovo-jaseňový nížinný lužný les – biotop európskeho významu na ostrove Váhu, JPRL (JPRL - jednotka priestorového rozloženia lesa) č. 85; 2. Vŕbovo-topoľový nížinný lužný les – prioritný biotop európskeho významu, JPRL č. 83; 3. Dubovo-brestovo-jaseňový nížinný lužný les – biotop európskeho významu v materiálovej jame, JPRL č. 537a.

Zdroj: Mestský úrad Šaľa

Studied forest covers are located in the district of Šaľa on the border between the cadastral areas of Šaľa and the municipalities of Trnovec nad Váhom and Selice near Bystré (Šebeš), at the 49.3 kilometer river marker - Figure 2. The LTSES indicates the Millerove domy are to be part of a bio-center of regional Importance.

Natural floodplain forests were studied after 2005, simultaneously forming the bio-centers for the LTSES in Šaľa (Mederly et al., 1996). The bio-centers comprise mostly habitats of willow-poplar lowland floodplain forests and mixed oak-elm-ash forests on great rivers in areas with a well-preserved river system.

Table 1. Favorable condition of forest habitats (FCS) identified by three main criteria (Polák and Saxa, 2005)

Tabuľka 1. Priaznivý stav lesných biotopov (FCS) určený pomocou troch hlavných kritérií (Polák a Saxa, 2005)

Assessment of the forest habitat condition in terms of its protection (FCS)	
Criteria (FCS)	Indicators (FCS)
Typical habitat species - a	a1. Species composition of the tree layer (degree of approximation to the model and the presence of invasive woody plants)
	a2. Herbaceous vegetation and shrubs
Forest habitat structure - b	b1. Age structure (development and growth stages)
	b2. Natural regeneration of woody plants
	b3. Spatial structure (vertical, horizontal, structural mosaics)
	b4. Coarse and especially valuable trees
	b5. Coarse dead wood
Adverse impact - c	c1. Health condition (as a result of the impact of negative factors)
	c2. Broader spatial context

The 2005 methodology (Polák and Saxa, 2005) assesses the favorable condition of selected forest biotopes in terms of how they are protected. Act No. 543/2002 on Nature and Landscape Protection considers the favorable condition of habitats in terms of protection to be such a condition where its natural area and the area it covers in the assessed location are stable or expanding, its specific structure and functions are preserved and the condition of its typical species is favorable.

The particular criteria were assessed directly in the field using an indicator and sub-indicators. The criteria are considered to be the basic characteristics or components compared with which FCS is assessed. There is a need to quantify an assessment of the Condition of Forest Habitats included in the network of protected Sites of Community Importance, based on an agreed methodology for evaluating the basic spatial unit of the forest. It assesses species composition (a) internal structure of the habitat (b) and adverse impacts acting upon it (c) according to clearly defined criteria and indicators (listed in Table 1). The result is to include each of the habitat's signs into one of four categories characterizing "favorable habitat status" as A – Excellent; B Good; C – Disturbed and D - Unsatisfactory. This produces for each spatial unit of forest a quality rating for at least three criteria (a, b, c), for example (A, C, B) or also several indicators (ai, bi, ci). Every criterion is assessed by qualitative and quantitative indicators that have to be measurable or can be monitored, sufficiently expressing to what extent the criterion is fulfilled (i.e. in what condition it is) - Table 1.

The condition of the habitat in terms of its protection is classified into four basic qualitative categories by the percentage of approximation to the optimal condition. Two categories are considered to be favorable: A – excellent condition (100% – 90%) and B – good condition (90% – 70%). Unfavorable protection is likewise classified into two categories: C – disrupted (70% – 49%) and D – insufficient (49% and less). Based on the criteria and their indicators and sub-indicators, authors used the numeric quantifiers to calculate the percentage rate of the habitat's favorable condition.

Results and discussion

The habitat at Area 1 is a mixed oak-elm-ash tree forest of a great river (Site of Community Importance) - on an island on the Váh in the cover map for the Nitra Forest Management Unit (FMU), presented in JPRL No. 85. It is a 70-year-old forest cover growing out of forest lands (a so-called "white area"). The species composition of the tree layer corresponds to a "transitional floodplain forest" with the predominance of *Populus alba, Acer campestre* and a mixture of *Populus nigra*, *Ulmus laevis, Quercus robur, Padus avium, Fraxinus angustifolia*. On the south side of the island, the domesticated *Juglans regia* starts to permeate here.

The FCS assessment indicates the habitat in Area 1 is in excellent condition (94% approximation to the optimal condition). All of the assessing indicators except a1 are in excellent condition. The species composition of Tree Layer a2 is in a good condition (the undergrowth has some mixing of *Juglans regia* and sporadically *Negundo aceroides*. It represents one of the most preserved fragments of natural floodplain forests in the Lower Váh River and together with the cover on the south side of the island (the old poplar monoculture) they create the core of the proposed protected area with the potential of protecting natural processes.

The habitat in Area 2 is the willow-poplar lowland floodplain forest (precedence Site of Community importance) growing among a smattering of smaller branches of the Váh River. The FMU Nitra cover map presents it as JPRL No. 83 and 84. It is an approximately 70-year-old forest cover of the soft alluvium currently disintegrating as the forest lands grow out (a so-called "white area"). The species composition of the

tree layer are dominated by *Salix alba* and *Salix fragilis*, mixed with *Fraxinus angustifolia, Fraxinus excelsior, Alnus glutinosa, Ulmus laevis, Acer campestre* and *Acer tataricum*. There are also species classified as invasive woody plants: *Negundo aceroides* and *Fraxinus americana.*

The FCS assessment indicates the observed habitat in Area 2 is in excellent condition (92% approximation to the optimal condition) - Figure 3. All the assessing indicators except a1 and c2 are in excellent condition. The species composition of Tree Layer a2 is in a good condition (presence of the earlier mentioned invasive woody plants), while the c2 indicator – broader spatial context - is in a good condition (up to 30% of the entire polygon area shares a border with unfavorably impacting areas – a field). Together with the cover in Area 1, they create the core of the bio-center of regional importance designated as Millerove domy, as well as the proposed protected area. The tree grows in barely accessible places of the river branches and has the potential of protecting natural processes.

Figure 3. Willow-poplar lowland floodplain forest in a stage of disintegration (precedence Site of Community importance) in Location 2

Obrázok 3. Vŕbovo-topoľový nížinný lužný les v štádiu rozpadu (prioritný biotop európskeho významu) na lokalite č. 2

According to the FCS assessment, it is in excellent condition.

Podľa hodnotenia metodikou FCS vo výbornom stave.

The habitat in Location 3 is a mixed oak-elm-ash tree forest of a great river (Site of Community Importance) growing linearly in the borrow pit of an anti-flooding embankment. The FMU Nitra cover map shows JPRL no.537a. It is an approximately 70-year-old forest cover of transitional or hard alluvium. The species composition of the tree layer is dominated by *Populus alba, Quercus robur* predominate*, Fraxinus excelsior, Ulmus laevis, Acer campestre, Cerasus avium, Populus nigra* and *Salix fragilis, Salix alba* is mixed in.

The FCS assessment of the observed biotope at Location 3 indicated it to be in excellent condition, as it approximates 95% to the optimal condition. All the assessed

indicators are in excellent condition, except c2 – broader spatial context is insufficient according to the methodology (up to 30% of the entire polygon area shares a border with unfavorably impacting areas – a field). However in this case of a line character habitat of high quality, the LTSES and LUP state that there is a gene pool location in the Millerove domy bio-center. In terms of preserving a Site of Community Importance, it would be suitable to accommodate forestry activities in this cover, for instance by selective logging while retaining selected trees of each species - Figure 4.

Based on scientific sources about the ecological significance of selected areas, in 2007 Protected Landscape Element (PLE) Luhy na Bystrom started to be prepared with the collaboration of the Regional Association for Nature Conservation of Bratislava (BROZ). The observed area was suggested for designation as a Protected Landscape Element under Act § 25, defined as an important landscape element functioning as a bio-center, bio-corridor or interaction element of mainly local or regional importance. The local district office may declare it as a protected landscape element in a generally binding legal notice.

The PLE protection project was developed according to a legal notice issued by the Ministry of Environment of the Slovak Republic, No. 24/2003 of App. 25 (part D) implementing Act 543/2002 on nature and landscape protection.

Figure 4. The oak-elm-ash tree lowland floodplain forest (the biotope of European significance) in the area no. 3

Obrázok 4. Dubovo-brestovo-jaseňový nížinný lužný les (biotop európskeho významu) na lokalite č. 3

According to the assessment by the FCS methodology , it is in a great condition. After the realization of the study, the mining by the small-scale strip clear-cut took place by which the half of the valuable biotope was destroyed.

Podľa hodnotenia metodikou FCS vo výbornom stave. Po realizácii výskumu tu prebehla ťažba maloplošným pásovým holorubom, čím bola polovica cenného biotopu zničená.

The study of forest habitats was supplemented with basic zoological and detailed ornithological research conducted in 2008 and 2009 (Stranovský, 2009). In the area of the proposed PLE, 15 animal species of Community interest were discovered: *Aspius aspius*, fire-bellied toad (*Bombina bombina*), Northern crested newt (*Triturus*

cristatus), Great White Egret (*Egretta alba*), Black-crowned Night Heron (*Nycticorax nycticorax*), White-tailed Eagle (*Haliaeetus albicilla*), Western Marsh Harrier (*Circus aeruginosus*), White Stork (*Ciconia ciconia*), Common Kingfisher (*Alcedo atthis*), Middle Spotted Woodpecker (*Dendrocopos medius*), Syrian Woodpecker (*Dendrocopos syriacus*), Black Woodpecker (*Dryocopus martius*), Collared Flycatcher (*Ficedula albicollis*), Red-backed shrike (*Lanius collurio*), European otter (*Lutra lutra*), Eurasian beaver (*Castor fiber*), European crayfish (*Astacus astacus*).

In the area of proposed PLE, 21 animal species of national significance were discovered: Moor Frog (*Rana arvalis*), Common Toad (*Bufo bufo*), European Green Toad (*Bufo viridis*), European tree frog (*Hyla arborea*), Slow Worm (*Anquis fragilis*), Grass Snake (*Natrix natrix*), Dice Snake (*Natrix tessellata*), European Green Lizard (*Lacerta viridis*), Grey Heron (*Ardea cinerea*), Mute Swan (*Cygnus olor*), Mallard (*Anas platyrhynchos*), Eurasian Coot (*Fulica atra*), Great Crested Grebe (*Podiceps cristatus*), Common Merganser (*Mergus merganser*), Common Goldeneye (*Bucephala clangula*), Great Cormorant (*Phalacrocorax carbo*), European Turtle Dove (*Streptopelia turtur*), Little ringed Plover (*Charadrius dubius*), eurasian Wryneck (*Jynx torquilla*), African Stonechat (*Saxicola torquata*), Spotted Flycatcher (*Muscicapa striata*).

The results of the proposed studies present the extraordinary ecological significance of the observed area. The quality of the location has also been highlighted by other authors (Mederly et al., 2003a, 2003b; Stranovský, 2008).

In the article, authors point out that local planning documentation has been unsatisfactorily ineffective in terms of environmental protection and regarding the TSES. There is no openly functional continuity among what has been proposed and what has already been implemented. The landscape plan itself and the LTSES are only recommendations; they do not provide any implementation of the proposed concept. They have not been implemented in completion plans issued by water engineers, agriculturists and foresters, they practically do not exist for them and there is no compliance with them in practice. What are concepts if they are not being followed?

Part of the LUP and LTSES should also be incorporated into the projections of concepts to be utilized by other departments making use of the landscape and to legally binding implementation in practice of projects that apply the landscape concept and do not remain stuck in the drawer when documents are recommended. The proposed PLE Luhy na Bystrom's objective is to incorporate legislatively non-binding provisions of LUP and LTSES, supported by the study that floodplain forest habitats are in a favorable condition, into legislatively binding practice.

Revitalizing alluvial landscape ecological stability and increasing the size of natural floodplain forests is also being supported in the state nature and landscape protection program operated by the Czech Republic (Mlčoch et al., 1998). Many of alluvial biotopes and biological species are becoming environmentally threatened and have become critically endangered (Bezák and Petrovič, 2006; Hutárová, 2011; Tarasovičová et al. 2013).

When water management was being remodeled for the Upper Rhine in 1955 and 1957, only 1% of the natural ecosystems remained in the alluvial landscape. This low

ecological aspect is the reason to reclaim alluvial landscapes and increase the size of natural ecosystems and processes (Dister et al., 1990).

On 16th June 2008, the protection project was submitted to the Local District Environmental Office in Šaľa. On 4th August 2008, the Local District Environmental Office issued a notice of intention to commence proceedings toward declaring Luhy na Bystrom a PLE. Currently, these proceedings, a complex bureaucratic process, have not been completed.

Conclusions

Scientifically collected data entering the protection project of PLE were projected for the reasons of protection. The requirements for legislative preservation of this area for environmental reasons originate from the LTSES for the city of Šaľa, where the proposed PLE would be part of the Millerove domy bio-center of regional significance lying on the river Váh, a bio-corridor of regional significance. In the city of Šaľa's land-use plan, part of the proposed PLE is supposed to be a nature reserve. The Váh island and forests in the borrow pit are designated to be a gene pool area. Favorable conditions assessed for the habitat using Schwarz's methodology mean that the forest cover provides an excellent condition for the biotope. This particular occurrence represents the most valuable preserved demonstration of the given biotope. In the area of the proposed protected landscape element, there are sites of Community importance.

Ls 1.1 (91E0) Willow-poplar lowland floodplain forests – precedence site

Ls 1.2 (91F0) Mixed oak-elm-ash forests of great rivers

Animal species of Community and national significance, their habitats, Sites of Community Importance and all other elements and natural processes creating a functional and stable floodplain forest ecosystem are subject to environmental protection. The main aim is to preserve the ecological function of the area as a bio-center of regional importance lying on the Váh global bio-corridor. Authors are engaged with forest and wetland associations concerned about the natural character with minimum human intervention. Protection aims to let the core part of the Millerove domy bio-center naturally develop, with no other interventions because they fully provide the required function of a bio-center in their current favorable condition. In the buffer zone, authors propose applying environmentally friendly forest management with regard to the ecological value of the given area.

For the protection of ecologically valuable areas, the proposed area with the extent of 23.44 ha is in the category Protected Landscape Element Luhy na Bystrom with the 5th degree of protection.

Acknowledgements

Results obtained in the research tasks/projects VEGA no. 1/0673/16 and 1/0496/16 have been presented in this paper.

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