First International Conference "Horticulture and Landscape Architecture in Transylvania"
Agriculture and Environment Supplement (2011) 93-99

Landscape Architecture in the Lower Tisza Valley: Classification of Oxbow Lakes

Zsófia MOLNÁR

Corvinus University of Budapest
Department of Landscape Protection and Reclamation
e-mail: mzsofitaj@gmail.com

Manuscript received April 2011; revised August 2011, accepted August 2011

Abstract: Ten oxbow lakes are located in the region of the Lower Tisza Valley. The states of the area's oxbow lakes are rather different. There are protected, highly valuable sites in terms of landscape and nature conservation, yet degraded areas utilized for economic purposes can also be found. The attributes or usage of oxbow lakes allow for a diverse system of categorisation. The examination and classification of oxbow lakes can establish the grounds for state assessment, as well as for planning the interventions of landscape rehabilitation.

Keywords: oxbow-lakes, Lower Tisza Valley, classification, landscape architecture

1. Introduction

The active floodplain area has a high importance in many aspects, it plays an important role in preserving and subsistence of strictly threaten wetlands. Beside this, as active flood plain it preserves the rich wildlife of the area before the river regulation. As part of Tisza Valley it plays an important part in the life of ecological corridor of Tisza. But for nowadays the degradation of the valuable, semi-natural areas can be observed. In addiction recreation-function and welfare exploitation of the oxbow-lake has been strengthened in XX. century, while line-fishing and fishing claim were come up, however the quantitative and qualitative

protection of oxbow-lake water were not followed by the development. Long-term sustainability of the valuable biotops is not resolved.

Oxbow lakes offer numerous favourable potentials and are exceptional natural resourses. As wetlands, however, they belong to the most endangered types of sites. In the early 1990s, more and more signs implied a gradual silting, aging, and at certain places, even the contamination of oxbow lakes, as well as a degradation of the active floodplains' wetlands.

2. Materials and Methods

Ten oxbow lakes are located in the region of the Lower Tisza Valley. The states of the area's oxbow lakes are rather different. There are protected, highly valuable sites in terms of landscape and nature conservation, yet degraded areas utilized for economic purposes can also be found.

The background research of literature was completed with several forensics and fieldwork (eg. habitat-mapping). The establishment of the former landuse was helped by research of the literature, local history texts, historical maps and archaeological research. Pálfai [1] edited a summary book about oxbows.

The oxbow lakes of the research area are:

- Serházzugi-oxbow
- Sulymos-oxbow II.
- Sulymos-oxbow I. (Labodár)
- Osztorai-oxbow
- Mártélyi-oxbow
- Körtvélyesi-oxbow
- Sasér-oxbow
- Atkai-oxbow
- Nagyfai-oxbow
- Gyálai-oxbow

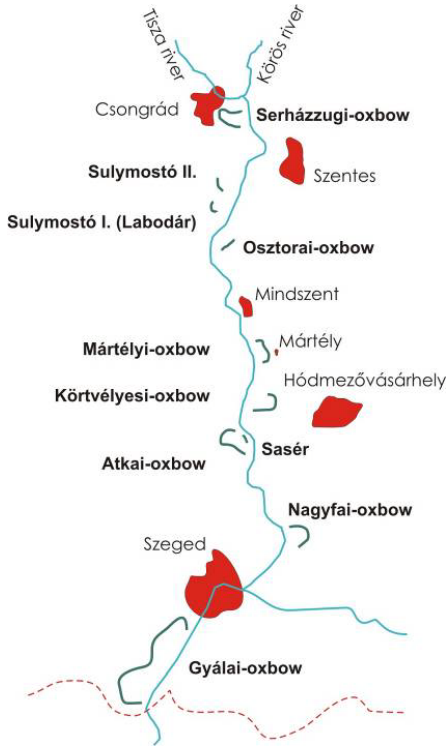

Figure 1: Map of oxbow lakes in the Lower Tisza Valley

3. Results and discussions

The attributes or usage of oxbow lakes allow for a diverse system of categorization [2,3,4]. The main aspects of such a classification are the following:

- evolution, location
- water recharge
- ecology, nature preservation
- the exploitation of oxbow lakes

At the same time, oxbow lakes and the landscapes adjacent to them can be classified according to regional aspects. Four units of classification can be separated:

1. the types of the oxbows' stream bed (1)
2. the types of the oxbows' water surface (2)
3. the types of the oxbows' riverine zone (3)
4. the types of landscapes related to oxbows (4)

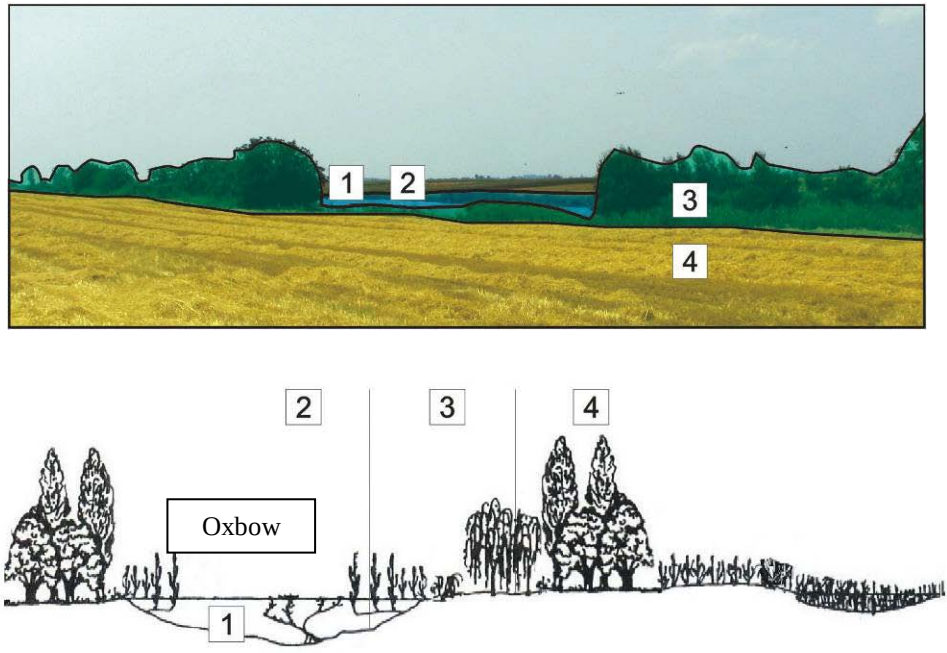

Figure 2-3: The divisions of oxbow lakes and the relating landscape

Examples of classification:

1. Local types of oxbow lakes in Lower Tisza Valley

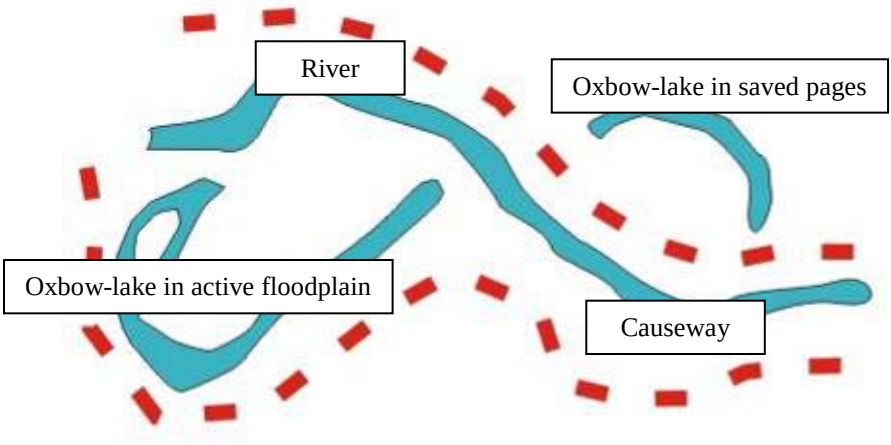

Figure 4: Local of oxbow lakes

2. The types of the oxbows' water recharge in Lower Tisza Valley

The water supply is a priority in case of oxbows. It affects the elutriation's measure of oxbows, the state of the oxbows' stream bed and wildlife.

Possible ways to water recharge:

- Precipitation
- Leaking water (e.g.: groundwaters)
- Surface water-onflow (e.g.: inland water-channel discharges)

3. The types of the oxbows' water surface in Lower Tisza Valley

The oxbows' water surface are usually covered with vegetation and the two ends are strongly charged, which is depends on the measure of water supply and eutrophication [4].

The types of the oxbows' water surface:

- open water surface oxbow (*Figure 5*.)
- covered with plants oxbow (*Figure 6*.)
- filling up oxbow (*Figure 7*.)
- filled oxbow (*Figure 8*.)

Figure 5: Nagyfai-oxbow

Figure 6: Atkai-oxbow

Figure 7: Mártélyi-oxbow

Figure 8: Körtvélyesi-oxbow

4. The types of land use of oxbow lakes and land use in related area to oxbows in Lower Tisza Valley

There are many different ways to group the topical landscape uses and water uses. On the one hand according to the exploitation forms of the oxbows' water surface, on the other hand according to the segregation of the oxbows' and related areas' landscape using forms.

The land use of oxbow lakes were grouped according to their ages [1, 5]:

- Water management (eg. floods, inland water , drinking water, storage of irrigation water)
- Economic exploitation including industrial, agricultural, forestry (eg. fish and duck breeding, reed production,)
- Recreation (eg. bathing, , aquatics, hobby fishing)
- Landscape protection and nature protection (eg. habitat protection, reclamation area)

The types of land use in related area to oxbows:

- urban land use (*Figure 9.*)
- agricultural land use (*Figure 10.*)

- garden of economic land use (*Figure 11.*)
- forestry land use
- recreational land use (*Figure 12.*)
- land use protection
- water management land use

Figure 9: Serházzugi-oxbow

Figure 10: Gyálai-oxbow

Figure 11: Atkai-oxbow

Figure 12: Mártélyi-oxbow

4. Conclusion

The examination and classification of oxbow lakes can establish the grounds for state assessment, as well as for planning the interventions of landscape rehabilitation.

Today only the variable width active floodplain is able to fill the ecological and water management role of the previously extensive floodplains. Therefore the protection of oxbow lakes and active floodplain, (which evolved in the course of the river control), stopping the degradation of natural values in this area, the protection of wetlands, habitat reclamation and oxbow lake reclamation are very important tasks.

The rehabilitation of the oxbow lakes and floodplain habitat should be concerted action coordinating environment, conservation and water management

sciences. Our primary aim is to achieve an optimum ecological condition of the oxbow lakes and the shore-zones. Then define and plan the treatments and the long-term tasks according to the natural functions, in order to ensure the conditions for sustainable development.

Acknowledgements

The research has been made as a part of TÁMOP-4-2.1.B-09/1/KMR- 2010-0005.

References

[1] Pálfai, I. (2001): "*Oxbow-lakes of Hungary*". Ministry of Transport and Water Management. Budapest. p. 231.

[2] Báthoryné Nagy, I.R. (2007): "*Landscape architectural priciples and methods of small watercourse restoration*". Corvinus University of Budapest. Budapest. p. 146.

[3] Boromisza, Zs. – Csima, P. (2008): "Assessment of bank forming and landscape loading in terms of Velence-lake's riverine zone". In: Dublinszki-Boda, B. – Csima, P. (edit) "*Landscape-protection research and planning methods*". Budapest. Corvinus University of Budapest. pp. 125-128.

[4] Dévai, Gy.(2004): "State assessment of the oxbow-lakes". In: Pálfai, I. (edit). "*Presentations of the 2nd oxbow-lakes conference in Szeged*". Ministry of Environment and Water Management. Budapest. pp. 186-205.

[5] Tőkei L., Madarassy L., Csima P. (1994): "*Environmental, landscape-protection and climatic aspects of oxbow-lakes and surroundings' utilization. Rehabilitation project of the Tisza-valley's oxbow-lake*". Conference Proceedings. MTA Szegedi Területi Bizottsága and OVF. Szeged. pp. 44–56.