WATERCOURSE AS CULTURAL HERITAGE IN CONTEMPORARY URBANISM: Preservation approaches from Košice and Prešov in Slovakia

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Abstract
We examine the current architectural and urban planning approaches towards preservation and regeneration of historical and cultural values represented by watercourses in the urban structure of the city. Using the examples of two Slovak cities Košice and Prešov, the paper highlights the need for preservation and conservation of the watercourse corridors in the urban structure, even in the cases without the contemporary presence of water, as they represent significant cultural and historical values. Their preservation in the contemporary urban structure creates a base for the possibility of their future revitalization with the recovery of water, or the possibility of their future use as attractive tourist, pedestrian, bicycle, and green corridors with recreational and environmental functions.

Keywords: Watercourse; urban stream; mill water channels; cultural values.

INTRODUCTION
Watercourses, rivers, streams, or water channels, represent multiple values for urban structure. Location of settlements is related to water issues since early times. Water has influenced development of villages, rural areas, cities, towns and metropolitan areas, has influenced development of housing, commercial, or industrial production. The multilateral aspects of the relationship between human settlements and water represent specific values for the urban structure related to water bodies (Bašová, 2011).

However, the requirements towards the use of water and towards the roles of watercourses in the urban structure are changing during the history. Watercourses, formerly used as sources of water, as sources of energy for production purposes, as transport communication corridors, or as sewage effluent recipients, often changed and lost their former historical functions. The change and loss of functions in many cases caused that their corridors disappeared from urban structure; the watercourses were rechanneled, piped or covered, reflecting new land use requirements. Today the watercourses are often transformed and rehabilitated to fulfill their new contemporary roles in urban environment, most often to fulfill recreation, aesthetic, and ecological functions. The contemporary landscape design approaches towards the utilization of water elements in urban structure require understanding of the relationship between human needs and use of water (Seçkin, 2010).

Due to the various negative effects of urbanization on ecosystem processes of urban streams, the scientific studies focus predominantly on ecology of urban streams and the “urban stream syndrome” (Seager & Abrahams, 1990; Paul & Meyer, 2001; Beavan, Sadler & Pinder, 2001; Booker & Dunbar, 2004; Walsh et al., 2005). Due to the fact that the engineering modifications and adjustments of watercourses in the urban areas in the past, engineered to stabilize the channel size and position and to increase flood conveyance, have altered the natural character of watercourses and deteriorated their ecological functions, the current revitalization aims focus mainly on the recovery of these functions.

However, Findlay & Taylor (2006) argue, that tangible socio-economic or biophysical reasons for why urban streams should be rehabilitated are often hard to identify, since maintenance of
ecological integrity and ecosystem services are not readily achieved or are identifiable in urban areas. As noted by Walsh et al. (2005), because humans dominate urban ecosystems, research on urban stream ecology will require a broadening of stream ecological research to integrate with social, behavioral, and economic research. Managing water within urban spaces is an essential infrastructure requirement, but has historically been undertaken in isolation from other urban functions and spatial requirements (Lundy & Wade, 2011). The aim to pursue ecological worthiness in protection leads to situations that other values important for preservation – for example, cultural and historical values of the engineered river channels are overlooked.

Less attention is devoted to the aspects of preservation of the cultural and historical values of the waterways – to the aspects of conservation of their main features, resulting not from the values of the natural, but from the historical heritage and human activities, accompanying the historical existence of the watercourse in the urban structure. The historical manmade adjustments of the watercourses in the past, for the purposes of industrial production, transport, or recreation activities, often constitute important cultural values that today represent the historical heritage, the symbiosis of natural and cultural, worth to maintain.

As noted by Lundy & Wade (2011), effective water management within urban settings requires robust multidisciplinary understanding. It is possible to study the impact of urbanization on structure and function of river systems (Yuan, James & Yang, 2006), but also the influence of rivers on the urban spatial structure, fusing important environmental factors with history and cultural connotations (Cheng, 2007), or to examine the impact of city cultural rivers on tourism development (Shen & Feng, 2006). Rehabilitation of river systems has become an important objective of many local, state and national governments around the world, who allocate substantial investment into various river projects, and as mentioned by Findlay & Taylor (2006), an understanding of the various factors influencing stream condition and potential rehabilitation options is essential in order to determine how the process is undertaken, and how success is measured.

The cultural, historical and heritage values of the watercourses may be represented by their urban-architectural modifications, landscape design, technical works and objects, as well as their wider surroundings. The requirements of conservation of these cultural, historical and heritage values create specific claims towards the ways of revitalization and regeneration of the watercourses. Contemporary concepts of revitalization of the water flows are understood as multifunctional restorations of their specific values, and need interdisciplinary approaches and solutions (Wernerová, Putrová, & Gécová, 2007).

Using the examples of two Slovak cities, Košice and Prešov, the paper examines the current architectural and urban planning approaches towards conservation and regeneration of the historical and cultural values, which are represented by artificially-created and natural water flows and their adaptations in the historic urban structure of the city.

MATERIAL AND METHODS

For the purposes of examination of the current architectural and urban planning approaches towards conservation and regeneration of the heritage values represented by artificially-created and natural water flows and their adaptations in the historic urban structure of the city, two cities located in the eastern part of Slovakia, Košice and Prešov have been used. These cities have common characteristic features – the core of their historical urban structure has developed as a fortified medieval settlement around lens-formed main street, and both cities have developed in the vicinity of the river, Košice near the river Hornád and Prešov near the river Torysa.

Košice is the biggest city in eastern Slovakia. It is situated on the river Hornád in Košice Basin at the eastern reaches of the Slovak Ore Mountains, and South Slovak Basin in the south, near the border with Hungary. Košice lies in the North Temperate Zone, and has a continental climate with four distinct seasons, characterized by a significant variation between hot summers
and cold, snowy winters. It lies at an altitude of 206 meters above sea level and covers an area of 242.77 km². With a population of approximately 240,000, Košice is the second largest city in Slovakia. Being the economic and cultural centre of eastern Slovakia, the city is the seat of the Košice Region, the Slovak Constitutional Court, three universities, and many museums, galleries, and theatres. It is an important industrial centre, the U.S. Steel Košice steel mill is the largest employer. The town has extensive railway connections and an international airport. The first evidence of inhabitance can be traced back to the end of the Paleolithic era. The first written reference to the Hungarian town of Košice, as the royal Villa Cassa, comes from 1230. The city was made of two independent settlements: Lower Košice and Upper Košice, amalgamated in the 13th century around the long lens-formed ring, of today's Main Street. The first known town privileges come from 1290. The privileges given by the king were helpful in developing crafts and business, and in 1307, the first guild regulations were registered here and were the oldest in Kingdom of Hungary.

Prešov with a population of approximately 91,352, it is the third-largest city in the country. It is located in the north-eastern Slovakia, at the northern reaches of the Košice Basin, at the confluence of the Torysa River with its tributary Sekčov. Prešov lies at an altitude of 250 meters above sea level and covers an area of 70.4 square kilometers. Mountain ranges nearby include Slanské vrchy, Šarišská vrchovina, Bachureň and Čergov. The neighboring city of Košice is 34 kilometers to the south. Prešov lies in the North Temperate Zone and has a continental climate with four distinct seasons, with hot summers and cold, snowy winters. Habitation in the area around Prešov dates as far back as the Paleolithic period. Continuous settlement dates back to the 8th century. The first record of a school dates from 1429. In 1572, salt mining began in Solivar, at that time a nearby town, now part of Prešov. Prešov's increased importance meant that in 1647 it became the seat of the Šariš County.

The research of the current architectural and urban planning approaches towards conservation and regeneration of the heritage values represented by artificially-created and natural water flows and their adaptations in the historic urban structure of the two cities followed two main steps:

- identification of the places with historical existence of watercourses in the past, and their characteristic features and values, within the urban structure of the historical core of these cities
- examination of the contemporary existence of watercourses and contemporary interpretations of their values in the urban structure of today

For identification of the places with existence of watercourses in the past, within the urban structure of the historical core of these cities, we have used historical maps, historical photographs and literary sources.

The contemporary existence of watercourses in these places, and approaches towards the preservation of their still existing values, or towards regeneration of their extinct values, have been checked in the contemporary urban structure, using current maps, aerial photographs and by field research and on-site observations. Planned intentions have been detected by investigation of the current urban and spatial planning documents, aims of the monument protection care, or planned project investments.

**FINDINGS**

The both cities historically developed as fortified medieval settlement around lens-formed main street, and both cities developed in the vicinity of the river, Košice near the Hornád river and Prešov near the river Torysa. Their location in the secure proximity from the main watercourse, provided protection against floods, and at the same time allowed to gain benefits from the natural arms of the main course, or from its tributary streams, in the form of modified and manmade channels, used as sources of water, for fortification purposes, and sources of energy for
production purposes, mills, also as sewers and effluent recipients, but as well as for recreation purposes.

The historical spatial patterns of the watercourses and their characteristic features, documenting their former historical multiple use, represent cultural and historical values in the contemporary urban structure of the examined cities. The study of the approaches towards their preservation and interpretation in Košice and Prešov shows, that the multiple values of their corridors in the contemporary urban structure are often unappreciated or underrated.

**Watercourse as cultural heritage in urban structure of Košice**

In the urban fabric of the historic city of Košice, the two dominant lines of watercourses represented the Mlynský náhon – Mill race and the Čermeľský potok – Čermeľ creek. The Mill race, the channel which was created by adjustment of the former natural arm of the river Hornád raced around the historical core of the city from its eastern side, and the Čermeľ creek, flew through the centre of the city and through its main lens-formed street from North to South and was regulated. There were also a number of smaller streams, which were regulated in the forms of canals and ditches and helped to drain the urbanized area during rain storms. The corridors of these watercourses, and the architectural and engineering objects related to the use of water, as well as green recreation areas connected to water are depicted for example in the Otto's plan of the city (see Figure 1 and 2).

![Figure 1. The Mill race in Košice depicted and highlighted on the map Plan der Königl: Freistadt Kaschau by Joseph Ott from 1832 (Source: Mollova mapová sbírka, mapy.mzk.cz, Joseph Ott, Leipzig: Lith. v. O. Apelt, 1832).](image)
Figure 2. The Čermel creek channeled through the main street of Košice highlighted on the map Plan der Königl: Freistadt Kaschau by Joseph Ott from 1832 (Source: Mollova mapová sbírka, mapy.mzk.cz, Joseph Ott, Leipzig: Lith. v. O. Apelt, 1832).

The corridor of the Mill race was very popular as recreation area for city inhabitants until the fifties of the 20th century. It provided opportunities for rowing, bathing, in winter skating, and strolling in the area of the main city park connected to the watercourse (see Figure 3).

Figure 3. The corridor of the Mill race was very popular as recreation area for city inhabitants in the beginning of the 20th century (Source: Authors).
In the sixties, the big redevelopment and rebuilding of Košice, aiming to create the pedestrian zone in the main street and in the area of the historical core, meant the shortening of the corridor of the Millrace and its abolition in its most important middle part connected to the historical core. The corridor of the former Millrace in this section was used for building a communication corridor, the four-way ring road (see Figure 4). That meant the demise of the recreation, relaxation and aesthetic functions of the watercourse in the city, as well as reduction of the recreational opportunities in the adjacent City Park. Drop of the groundwater level had a negative impact on the status of its woody plants, too.

Figure 4. The corridor of the Mill race is used as transport corridor today. Photograph from the seventies of the 20th century (Source: Authors).

However, an effort to bring back the values of the former Mill race resonates in the activities of the citizens, civil society organizations and as well as municipality today. The ideas of the Mill race revival have been proposed for example by the project Urban Interventions in 2011, or within the European project Košice – Capital of Culture in 2013, by the activities of the municipal festival Návrat vody do mesta – Return Water to the City, and alike. The northern part of the corridor of the Mill race was restored as a walled channel and is filled by water, the southern fragment is forgotten as a green corridor within the brownfield area between railway lines, former industrial premises and allotment gardens.

The former Čermeľský potok – Čermeľ Creek has vanished from the city structure, it has been diverted from the historical city centre and channeled into the Hornád River. But within the framework of the reconstruction of the Main Street in the years 1996-1998, it has been re-interpreted in the northern part of the pedestrian zone. The reminder of the Čermeľ Creek in the Main Street is created as a construction of a shallow straightforward channel, in which water is circulated with the aid of pump. It is a very popular attraction of the pedestrian zone during summer months, especially for children (see Figure 5).
Watercourse as cultural heritage in urban structure of Prešov

In the urban fabric of the historic Prešov, similarly as in Košice, the dominant line of the watercourse was represented by Mlynský jarok – the Mill race. It served from the 13th century for the two city mills, and supplied the fortification system of the city with water in the cases of emergency. Later it served as source of service water, with the aid of the unique wheel which pumped water into city reservoirs. During the 19th century the Mill race was used also as source of energy, driving the water turbine of the Prešov Electric Power Plant, established in 1894. It also provided water for the city bathing pool; several city baths on the Kúpeľná Street and during winter it served for the skating-ring of the local Ice-skating Society as source of water for ice production (see Figure 6 & 7).
Figure 6. The Mill race - Mlynský jarok in Prešov in contact with the historic core of the city on the map of Prešov dating from 1811-1812 (Source: Pamiatková rezervácia Prešov - zásady ochrany pamiatkového územia).

Figure 7. Ice skating ring pavilion and the Mill race in Prešov in the beginning of the 20th century (Source: http://www.presov.sk/portal/).
The single sections of the Mill race – Mlynský jarok have been gradually filled in. The section connected with the heart of the city, that time already dry ditch corridor, was filled during the reconstruction of the Okružná Street during the years 2008-2009. Simple solution of the street space, following only traffic and technical requirements, has not benefited from the architectural, cultural and historical values offered by dry corridor, has not used these values in landscape architectural design (see Figure 8).

![Figure 8. With demise of the Mill race during reconstruction, Okružná street lost its identity and unique character (Photograph: Katarina Kristianova 2014).](image)

The section of the Kúpeľná Street was gradually filled in, too, with the aim to build a bike route. But also here the valuable architectural-landscape features, cultural and historical values of the dry corridor of the Mill race have not been used to create an interesting, specific, unique and green corridor. Some other parts of the Mill race corridor, for example in the zone of single-family housing, have been parcelled and sold. The multifaceted values of that time already dry watercourse corridor, not only cultural and historical values, but also the potential to create a green corridor, a greenway, from the former watercourse corridor became lost. Even without water, as linear corridor in the urban structure of the city it had the potential to offer options of "green" solutions of walking or biking routes, and it could become an attractive historical and cultural tourist route of the city. The municipality of Prešov today declares appreciation of the values of the last remnants of this remarkable water system. In 2010 the surviving parts of the Mill race entered the list of the historical monuments of the city and the municipality plans to renovate some of the preserved parts of the system.

**DISCUSSION**

The study of the approaches towards the preservation and regeneration of the values of watercourses in the historic urban structure of Košice and Prešov, points out that the values which represent the corridors of watercourses for the contemporary urban structure are underestimated. Neither legal instruments of monument protection nor urban planning regulations, guiding development and building construction activities in the both examined cities, Košice and Prešov, were able to distinguish the multiple values of the watercourses, to set principles of their protection and to guide the development of the cities in the ways ensuring the maintenance of their values. Only few examples of the use and reinterpretation of the values of
historical water corridors in the urban structure of Košice and Prešov have been found. The most parts of the watercourses and their corridors vanished from the contemporary urban structure of the examined cities.

Our study has not measured the usage patterns along the watercourse corridors, as today they are used as transport and communication corridors, where the values of former water corridors are not identifiable. But observation of the few sites where certain values of the former water courses are still preserved or restored, prove that the revitalized sites attract users and visitors, as for example the artificial water channel reminding the former Čermeľ Creek in Košice, or the small park without water near the former first electric power station, in the part of the Mill race in Prešov. Successful revitalizations of urban watercourses in Slovakia, for example that of Domanižanka river in Považská Bystrica, or Dubová river in Piešťany, or examples from neighboring countries, for example revitalization of the mill race in the form of education trail “Blue axis” in Chrudim, Czech republic, show that the revitalization projects are able to change the usage patterns of the revitalized sites and increase significantly their use as public and green spaces (Wernerová, Putrová, Gécová, 2007). The still remaining fragments of the historical water corridors in the urban structure of Košice and Prešov, for example the forgotten part of the Mill race within the brownfield area of the former industrial premises and allotment gardens in Košice, or surviving parts of the Mill race – Mlynský Jarok in Prešov, hold the potential to become revitalized as attractive public spaces and green spaces, representing the cultural heritage and the continuity of the cultural identity in the projects of urban regeneration and redevelopment.

CONCLUSION

Watercourses and their corridors in urban structure of cities represent a wide range of values. Watercourses played their historical roles in formation of urban settlements, on the one hand representing benefits for urban structure, on the other hand often representing threats – of floods, or threats of waterborne diseases. The perceptions on the roles and functions of water in urban environment influenced the manmade adjustments of the watercourses during history. The perceptions of contemporary society on the roles of water in urban environment again influence their contemporary adjustments. Benefits of revitalization of urban rivers today are most often associated with their daylighting, opening from their culverts, with restoring watercourses to more natural conditions, or with the aim to pursue their ecological worthiness. Our research on the examples of mill races and watercourses in the historic environment of the Slovak cities points out the need to preserve the watercourse and its corridor within the urban structure of a city as historical and cultural heritage, and presents the need to interpret the cultural, historical, social and urban spatial values that the watercourse corridors represent for urban structure, even in the cases without the contemporary presence of water. Protection of the watercourse corridors in the urban structure, appreciating not only their ecological values, which are often hardly achievable in the contemporary urban conditions, but also their cultural and historical values, values of their urban open space and landscape architectural values, can create a base for their multiple use as attractive tourist, pedestrian, bicycle, and green corridors with recreational and environmental functions and can create the possibility of their future revitalization with recovery of water. Revitalized attractive public spaces and green spaces along watercourse corridors, enhancing local specifics and identity, are able to increase the residential and recreational values of the adjacent urban areas, serve as stimulators and facilitators of urban regeneration and redevelopment, and represent multiple benefits for urban structure.
REFERENCES


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