

RIVER REHABILITATION WITH CITIES IN MIND: THE ESKİŞEHİR CASE (1)

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1. This study is mainly based on the dissertation of Şimşek (2011).

DEFINITION, CLASSIFICATION AND EVOLUTION OF INTERDEPENDENCE BETWEEN URBAN RIVERS AND CIVILIZATIONS

Large flowing waters are defined as *rivers* or as *streams*. By definition “A *river* is a natural, flowing stream of water that provides an avenue for drainage of water from higher elevations to a standing body of water at lower elevations, which is typically a lake or ocean.” (Lerner and Lerner, 2009). *Stream*, on the other hand, is a general term for a body of flowing water, a natural water course containing water at least part of the year (Kemp, 2009, 714). *Stream* involves a body of water flowing in a channel or watercourse, whether it is as small as a brook or as large as a river (Stream, 2011). The word stream has many different meanings as well, and has a larger context involving several types of flowing waters. Another concept that may be used in place of rivers or streams is *waterway*. A waterway is defined “as a body of water that is navigable by boat” (Lerner and Lerner, 2009, 714). A “waterway can be a river, but this concept also includes lakes, oceans, and human-made canals” (Lerner and Lerner, 2009, 714). The term river has a wide range of usage areas in literature, and unlike the term river, the term stream can be used for anything that flows. Within the context of this study, the term *river* is used to simply describe flowing waters. *Urban river*, is a formerly natural water path that flows through a heavily populated area. Urban rivers are different from other rivers in the nature as they are connected and related to human behavior and human processes. Sustainability of urban rivers depends on the living organisms, in particular citizens as urban inhabitants, and their environment.

From the beginning of known history, settlements have been located at *water's edge* and it is in these locations that the greatest cultures and empires of history developed. The availability of sufficient clean and abundant water determines whether land can be used for different purposes. As Adler (2007) states, waterfront areas have been among the first lands

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to be developed because proximity to water was useful for navigation, irrigation, industry, defense etc. Girardet (2004) stated, as well, that being close to these areas, people could obtain water easily. What is more, *urban waterfronts* stimulate economic and recreational activity and provide public access.

Most historians agree that *civilization flourish in river valleys*. There are five main urban hearts in the world, from which urbanization sprang: *Mesopotamia* (developed in the flood plains of the *Tigris and the Euphrates*), *Egypt* (developed along the narrow flood zone of the *Nile*), *China* (developed in the valleys and alluvial fans of the *Huang or Yellow River*), *Pakistan* (developed along the *Indus River Valley*), and *Mesoamerica* (Boone, 2006; Madeiras, 2009). "Proximity to fertile soils, delivered annually by river floods, made these places ideal for the *birth of cities*." (Boone, 2006, 3).

In *Mesopotamia*, *Tigris and Euphrates* rivers had been used for navigation, so they provided trade, irrigation, drinking, fishing, and water for use. In Ancient Egypt, fertile soil and predictable flow and flooding of *River Nile* were the main factors for the development of Nile Valley civilizations (Madeiras, 2009). Agriculture had been invented along the *Huang River* 4800 years ago (Riley, 1998, 129). Lastly, *Indus River* civilizations had invented grid-pattern cities, plumbing and sewer systems; they constructed public baths, drinking water infrastructure, water storage facilities; and intricate sewage network systems (Civilizations, 2010).

Flowing waters have an embedded dual nature. The most important role that rivers played in the development of human culture is the opportunity they provided for transformation from migratory to sedentary mode of life. In urbanization history the river has been one of the most important *location factors*. As a location factor, river has provided clean water for drinking, for domestic use, for elimination of wastes, for irrigation and animal husbandry, thus providing an opportunity for settling down and fishing which then was an important source of food. Rivers also provided easy protection against hostile threats from outside, and navigation boosted economic ventures of the time. These contributions of the river to the development of human culture constitute the *positive face* of the duality embedded in urban rivers.

Interrelation of rivers with human settlements has not displayed a linear course. In time, as human communities flourished, developed and expanded in space with rising population, the *negative impact* of rivers became more apparent. Although they have allowed civilizations to grow, in time due to natural and mostly man-made causes and interventions such as careless exploitation (sediment load, dam construction, land use changes, pollution and the like), the negative impact of rivers flowing within cities started to take their toll on human settlements, the location and growth of which they once had supported. The most common of natural hazards, flooding of unregulated rivers, and inundations resulted in tremendous damage to human lives and communities.

Urbanization in the modernist era began to develop in the 19th century and it developed as increasing population concentrated on areas without proper infrastructure and the advent of the industrial age aggravated the condition of the urban rivers. Technical infrastructure was still not well developed therefore new industries could not afford to move away from the transport and energy systems, from water sources and waste collectors. As population grew in size and density over insufficient technical

infrastructure, along with increasing and mostly manual manufacture, and location of nearby farms, running waters became polluted, turning into garbage and sewage channels. So in the process of evolution of urbanization the negative impact of running waters overshadowed the positive one, with increasing pollution and damaging the ecosystem of the rivers and of the settlements. Reclamation of land from wetland for housing, industrial sites, and agriculture worsened the ecosystem of the habitats. The condition of rivers became so acute that many of them were given names that expressed the bad smell, wastes accumulating on their banks, flood hazard, and other such negativities which they have now come to be identified with, for example, about 50 years ago, *River Thames* was so polluted that it was declared biologically dead and between 1860 and 1960, this river assumed the status of sewer.

MAJOR ISSUES RELATED TO URBAN RIVERS AND THE CONCEPT OF URBAN RIVER REHABILITATION

In view of the acute environmental pollution caused by urban rivers, they became subject to rehabilitation. The term *river rehabilitation* involves return of a degraded stream ecosystem to a close approximation of its remaining natural potential" (Shields et al, 2003, 575). That is, by alterations, additions or deductions, implementation of new technology and engineering practices, the main characteristic features of the river including its historical, cultural, and functional values and features may be returned to their natural states in the process of rehabilitation. So, rehabilitation projects on urban rivers aim at reduction of their harmful impact on the environment, increase of sanitation, improvement of their use in provision of clean water to the residential areas, building of an efficient waste water system, and creation of reserve water areas.

With the rapid urbanization of 1950s and 1960s particularly in developing countries, the first rehabilitation intervention to rivers in cities aimed at *prevention of floods*. Floods have been taking place since the ancient times, so preventive techniques such as planting of vegetation, terracing to slow down landslides, building of channels to divert the river have been used ever since. The traditional approach emphasized building of straightened concrete channels along with *enlargement and deepening of the river* bed and building of high banks to achieve flood control. In fact, over 90% of streams in lowland countries of Europe has been channelized including measures like the widening and restructuring of riverbed, building of banks, creating and/or connecting side channels, reconnecting backwaters, restructuring of longitudinal connectivity by removing barriers that cause habitat fragmentation for organic life and the like. However, these approaches did not prove very effective in controlling floods as certain failures were experienced. In some cases, designers of channelization projects have overestimated or underestimated roughness by ignoring the effects of sediment. Consequently, the traditional implementations thereby have appeared to control flood, but they could fail to perform properly (Kondolf et al, 1991).

Rehabilitation of urban rivers was taken up almost universally after the second half of the 20th century. In 1970s, as mentioned above, river management mainly focused on flood control and water use. At the time, the approach was purely technical in nature and concentrated on and was confined solely to the individual river itself so the rehabilitated rivers lost their environmental functions, ecological habitat, self-purification and

Period	Transition of River Rehabilitation Practice
Before 1850s	<i>Natural Stream</i> Most rivers were in natural condition.
1860s-1960s	<i>Sewer status stream</i> A few artificial structures existed.
1970s	<i>Flood Prevention Stream</i> River management mainly focused on the flood control (channelization). Rivers lost environmental functions, such as provision of ecological habitat, self-purification, and riparian scenery.
1980s	<i>Park Stream</i> Parks along urban streams were constructed. Most parks were constructed on the floodplains.
1990s	<i>Ecological river improvement</i> techniques have been employed to enhance the environmental function of the stream.
2000s	<i>The relationship between river and human, nature and community</i> improved.

Table 1. Transition of River Rehabilitation Practice in Time. Adapted from Kim (2006), Wada (2010).

riparian scenery. In early 1980s, floodplains of streams were occupied by parking lots, roads, farmlands and recreation areas and the like. In the late 1980s, social needs emerged for *improvement of river environment* (water quality and aesthetics). To this end, walkways, cycling roads and green parks were created along certain sections of the rivers and rehabilitation was again confined to the relevant river and its immediate environment. The breakthrough came about the 1990s, with the introduction of *ecological river improvement* techniques (Kim, 2006). Main targets of river restoration were transformed from improvement of water quality of the 1950s and the 1960s, to enforcement of relevant techniques of the 1970s, and then to landscaping and amenities of the 1980s, to nature and ecosystem of the 1990s, and finally it came to rest on improvement of relationship between river and human values of the 2000s (Wada, 2010)(2).

Rivers are now valued as an important environmental and urban resource which is multi-dimensional, therefore is now accepted as a non-ubiquitous urban asset which has to be preserved and upgraded not only as an environmental element, as has been the case so far, but for the maintenance of sustainability of relationship between the living organisms and their environment.

BEYOND THE RIVER ITSELF: INTEGRATION OF THE RIVER AND THE CITY

It is now accepted that problems related to urban rivers in their relation to the city are complex, they cannot be handled individually and merely with structural upgrading techniques. It is no longer sufficient to attempt to preserve both natural and manmade environment and related degradations and problems in the traditional manner. Urban river rehabilitation not only contributes to improvement of the ecology of the river but, through provision of a sanitary, pleasant and attractive environment, it can contribute to the city itself. One of the aims of the contemporary urban plans is therefore to create an urban environment where sustainability is raised with inclusion of new and current technical and planning issues, along with the emphasis on the unique and attractive historical and contemporary assets of the city. Contemporary urban administrators

2. See Table 1 for this changing steps in implementation on urban river rehabilitation from 1850s to 2000s.

concentrate on transformation projects involving eradication of low-income neighborhoods, renewal of certain urban neighborhoods, creation of gentrification areas, returning old abandoned industrial properties (brownfields) to productive use, creation of spectacular and specialized centers. In this process, all urban elements are revalued according to the criteria of increasing provision of a favorable image of the city, making the city more market compatible as much as possible. It is accepted that increase in the spatial integration of the city through planning of focal points together would contribute to creation of a pleasant and feasible image of the city.

In the new approach to urban rivers and to their rehabilitation, the concept of urban river now involves the following specifications, qualities and contributions to the city and to urban ecology and it is accepted that it is crucial for a city to sustain a balance between natural components and of the most important of which is the urban river, and the built environment.

- River is considered as an element incorporating the nodes of the city and an element incorporating the mental maps of the citizens and visitors.
- River as a path unifies the linking elements of the city itself, physically, culturally, socio-economically. It displays viable characteristic and is conducive to change over time.
- It is a central axis and linkage for a network among activities as nodes and combines them to form the image and identity of the city.
- It creates a sense of solidarity and unification.
- It brings together local recreation areas, local leisure, and other recreative activities.
- Wayfinding via gateways, signage, street furniture, and greenery serve as guidelines combining nodes and river edge.
- It provides for coherent public transportation systems (Eran, 2001).

From the point of view of the urban planning, citizens should be pleased with and proud of their city, especially with the unique global, national, local, historical, contemporary urban cultural assets, which provide an image and identity to the city. Clearing and restoring immediate surroundings of urban *landmarks* and provision of accessibility to them was the attitude of urban plans in the early 20th century. With the oncoming of globalization and the accompanying changes in attitudes towards urban visions and strategies, this singular treatment of cultural urban assets has been abandoned and the new approach is to enhance, emphasize and underline their impact on the city and on the attraction of the city conveyed through its image and identity, by a comprehensive and integrative approach to these assets.

The assertion at this point is the relationship between river and city should exceed singular, individual restorations and mere provision of accessibility and connectivity. This relationship should involve continuity, orientation, and legibility. This overall handling and combination of the elements of the city is expressed by the term *integration*. Integration in the field of urban planning is often discussed along with the term *readability (or intelligibility)*, *wayfinding*, *focal points*, and *spatial cognition*. The structures with different functions open to the public in the city increase the possibility of people

coming together. In this sense, within the scope of this study, integration does not refer to social integration; it is specified as 'spatial integration' the extent of which is urban space. Within the urban plan, the river rehabilitation project itself is standing as an element that helps to provide this integration, underlining the urban river as the main path of the integration of the social and cultural assets of the city.

This study concentrates mostly on a unique example of implementation of the new concept of urban river rehabilitation from Turkey, involving integration of the urban river with the city itself, namely the river Porsuk and the city Eskişehir which may be accepted as a Turkish *best practice*. In this study urban river restructuring is defined as integration of the river with all aspects of urban life and awareness and appreciation of the river by citizens as they live and move in the city. If citizens identify the city with the river and vice versa, if the river has become part of their daily lives, if they enjoy and utilize the river, and protect it while they utilize it, if the citizens consider it as one of their 'shelters' in the city where they find peace and therefore feel the need to protect it and use it with utmost care, then the river may be considered as closely integrated with urban life. So to achieve integration, the river should not remain as a dysfunctional element, should be perceived not only as a landscape element, but should be used actively and should become a living organism of the city, in an analogical sense, maybe its heart. Below, Eskişehir case is examined in detail.

CITY OF ESKİŞEHİR AND PORSUK RIVER

In Turkey, there are 26 major river basins (**Figure 1**). Some of the rivers and creeks with miscellaneous dimensions have cities on them. Most of them are not noticeable due to the limitedness of the efforts on integrating cities and their respective rivers. Two cities have limited navigable rivers like Bartın and Manavgat; there are cities with rivers some of which associated with rivers such as Adana, Adapazarı, Ağrı, Amasya, Antakya, Ardahan, Bayburt, Çanakkale, Çarşamba, Ceyhan, Diyarbakır, Edirne, Elbistan, Eskişehir, Kars, Mersin, Osmaniye and Samsun. There are cities with lost rivers such as Ankara, İstanbul. As aforementioned, there are limited works on Turkish river cities within the context of urban river rehabilitation. Eskişehir is standing as having the most successful example in the country. This study focuses on the city of Eskişehir and its respective river, Porsuk.

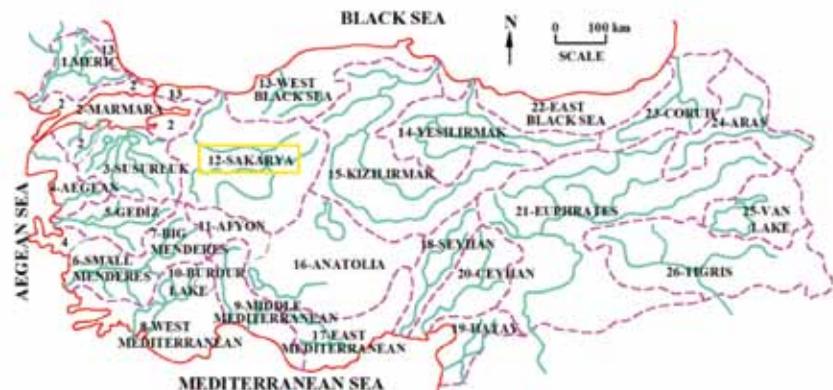


Figure 1. A Map of Major River Basins in Turkey.
Source: Küçükali, 2011.

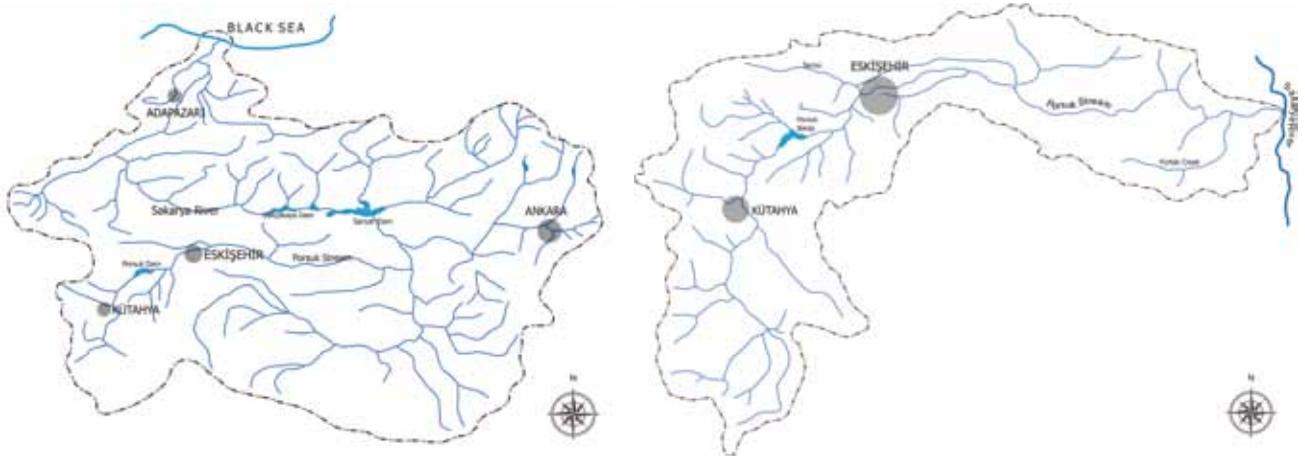


Figure 2. A Map of Sakarya River Basin.

Figure 3. A Map of Porsuk River Basin.

Porsuk River and the Urban Development Project

Before examining the case of Porsuk River in the Eskişehir urban scale, it had better to start with the facts about the river basin. Porsuk River is the longest tributary of Sakarya River (Figure 2) and originates at the Oysu Village in Kütahya on Murat Mountain. Two large Central Anatolian cities, Kütahya and Eskişehir are located in its watershed area (Figure 3). The river flowing generally in a narrow and sloped valley enters the province of Eskişehir and diagonally flows through the city. While the basins of rivers are critical in their rehabilitation, the context of this study will be the urban scale. Accordingly the river of Eskişehir is the main topic to study in depth, referring to the policies of the local administration.

In the late 1800s the river had abundant clean water and served as a fishing, recreation area and gathering and strolling site for the dwellers. At the beginning of the early years of the Republic (Figure 4), spacious parks and new roads were built in the city along with six new bridges on Porsuk



Figure 4. A Scene from Porsuk River in 1930s (The Road Turning to the İsmet İnönü Avenue and Kızılıklı Mahmut Pehlivan Avenue, Porsuk River and beyond, Porsuk Avenue).

Source: Kılıç (1998, 50-51)

River and two of the existing ones were restored. In 1950 a great flood damaged the city and surrounding villages. Hence canals and reservoirs were built on Porsuk. In general up till the 1960s Porsuk was very clean, inhabitants of Eskişehir fished on the river, strolled along the shores, even swam in the River. In the early 1970's the river became polluted as it flowed in Kütahya, before it entered Eskişehir, due to returning waters from irrigation, agricultural pollution, effluent waters and slaughterhouse wastes, wastes of sugar plant, thermal power plants and ceramic plants (Atuk, 2002; EBB, 2010).

Although the river renewed itself in the Porsuk Dam before entering Eskişehir, it was re-polluted as it entered Eskişehir. With the beginning of the 1960s, the density of settlements around the river increased and untreated industrial wastes were dumped in the river. During the first years of the 1970s industries which had been located in the immediate vicinity to benefit from its waters, discharged their waste waters into the river. Another factor underlying the pollution in the Porsuk River was mixing of fertilizers and pesticides used in agriculture into the groundwater. Thus starting from the late 1960s, the Porsuk River became a veritable open sewage and dumpsite due to industrial and domestic wastes, and leaks in connected urban sewage and rainwater lines. Some parts of its bed were filled by the former municipality administrations to create parks, and this posed an overflow risk for the city (EBB, 2010).

As a result of these factors, the river gave off an unpleasant smell during the summer months and its polluted waters displayed a dark displeasing color. The aquatic life was considerably affected due to pollution, and the existing ecosystem became unbalanced. Porsuk River was reported to be one of the most polluted waters of Europe in 2002 by the Organization for Security and Cooperation in Europe. Accordingly, Porsuk River was rehabilitated in 2001 with credit obtained from the European Investment Bank. Eskişehir Greater City Municipality obtained a loan agreement with a package project titled '*Urban Development Project*'. The components of



Figure 5. A Scene from Porsuk River around the City Center at the beginning of 2000s
Source: Şimşek, Personal Archive, 2010

the project included; the Tram project, a project for reducing the damages of disaster (involving building of overflow section, construction of 24 vehicle and pedestrian bridges over the Porsuk, and renewal of irrigation channels), renewal of rainwater, drinking water and sewage lines of Eskişehir, and the establishment of domestic water and wastewater treatment plants (Büyükerşen and Efeleli, 2010; ESKİ, 2013) (**Figure 5**).

To be able to support the discussion, some major urban rivers and efforts conducted under the name of rehabilitation in the context of new understanding around the world can be given here. One of them is a project in Rome in which the River Tiber runs through. In 2003, a new city plan was prepared for the city following the 1962 *Piccinato Plan*. In the new plan a section was allocated to a *project for Tiber*. It is mentioned in the plan that the emphasis of this project would not only be on reclamation and development of the river but also on its relation with the city as asserted in this study. The main objective of the Tiber project was to *'bring the city to the river again'*. For this aim the project proposes that inner city navigability be restored, mooring near focal points should be provided, the banks of the river should be modernized with easy access points to the river, and landscape perception of the city from the river should be provided. ("RiverLinks", n.d.).

Another example is from western China: In *Chengdu city, Fu-Nan River*, which is the tributary of Min River (a tributary of the Yangtze) encircles the inner city. ("Funan He River", n.d.). In Chengdu, the most popular pedestrian street, teahouses, musical street shows, walkways, major recreation places, temples are located on the riverside (What to See in Chengdu, 2011). In 1992, the city administration introduced a 5-year plan called the *Fu-Nan Rivers Revitalization Project* supported by funding received from European Community. Central to the plan was removal and relocation of the factories responsible for the pollution, replacing of the derelict shanties along the riverside, and restoring of the banks with public spaces. Forty-two kilometers of the riverbank were reconstructed as the city added 25 hectares of green public spaces. The project involved moving 100.000 citizens who were living in shacks along the river, building infrastructure for wastewater treatment, cleaning the river, rebuilding the floodwalls (Damon and Mavor, 2000).

As a third example, with a population of over one million, city of *San Antonio* is located at the headwaters of the springs of San Antonio River in Texas. *The River Walk* of San Antonio, actually a pedestrian street that is one level down from the traffic road, involves a network of walkways along the banks of the San Antonio River, and an important part of the city's urban fabric. Recently, *The San Antonio River Improvements Project* was developed. The project involves flood control, amenities, ecosystem restoration and recreational improvements. The bed of the river was deepened to make it navigable for small vessels. With this project, the river was given pedestrian paths that connected to all principal downtown streets over fifty bridges that span the river (Donecker, 2011; San Antonio River Flows, 2011). So, in short, the project involves integration of the city's nodal points and landmarks with the newly developed riverside activities.

Besides the projects implemented of the cities of Rome, Chengdu and San Antonio, it is seen that in these cities almost all main urban elements are located around and along the river and even if they are not, they are connected to the river by roads and/or by the new transport system. In general historical landmarks have already been located along or near the

river, yet new buildings as well like shopping centers, parks, recreation centers are also located near these rivers or are connected to the river through direct routes. Some new buildings are also located next to bridges or even on the bridges themselves. The bridges, themselves are often well designed spectacular urban elements, worth viewing and are unique. So, urban rivers are surrounded by important urban focal points becoming the main reference for them. The distribution of the nodes and landmarks (a part of Lynch's (1960) terminology) of the city around, along and on the river surpasses simple connection and accessibility among them but expresses the existence of a new, spectacular, impressive complex of the cultural and artistic assets of the city forcefully.

In the scope of the 'Urban Development Project' of Eskişehir, in addition to cleaning of Porsuk River and riverbed, landscape planning, reducing disaster risk, and renewal of old vehicle and pedestrian bridges, there is also a certain work for river trips nearby the city center. The river was opened to boats and gondolas for recreational purpose in the spring and summer in a distance of 10 kilometers on the river. Yet, at present the river is not an alternative mode of transportation for the city's residents. Docks on the river were built by monitoring the water levels (Yüzbaşıoğlu, 2009) (**Figure 6, Figure 7**).

Additional flood beds were added for times of disaster. The areas of the riverbed that had been filled to create space for parks were vacated and old canals were restored. A total of 26 bridges were built over the river. The river's threat to nearby building foundations was eliminated by the new concrete covering. Finally, in order to create Turkey's first artificial beach, 5,000 tons of sand were brought to Eskişehir from Ayvalık (Yüzbaşıoğlu, 2009). Pedestrianization of several streets and avenues around the river also has a positive impact to the project. İsmet İnönü Boulevard, İki Eylül Avenue, Hamamyolu Avenue, İletişim Street and streets along the river bank around Köprübaşı are the main pedestrian routes as it can be seen in the **Figure 8, and Figure 9** in detail.

In essence technical upgrading has been achieved in the water system of the city and in the river through foreign credit yet in this study it has been asserted that rehabilitation of the urban river should reach beyond the technical principles and should provide integration with the city and citizens. Such an approach would also stimulate the adoption and use of these areas by the urbanites. As Silva (2006) claims, a city is a living organism in total, so, urban elements, which may seem very different from each other, do affect and influence each other. The question now is, has this aspect been achieved in the rehabilitation of the River Porsuk. To answer this question for the city of Eskişehir this approach was tested in a field study conducted by the author. Beyond the analysis of available written and visual material, a series of interviews were conducted with the interested and relevant stakeholders including public and private planners living in the city (2).

After evaluating the literature, the case, and some of the foreign examples above, some key words emerge such as connection, accessibility, pedestrian access, green spaces, public spaces, distribution of urban assets etc. in the context of river-city integration. These keywords and rehabilitation itself will help to evaluate the case study in this research and then help to achieve a list of criteria to help investigating the integration status after the following section. While looking at the cases in Turkey, it should be noted that the rehabilitation of River Porsuk in Eskişehir has a unique position

2. The interviews were conducted with professional urban planners in the institutions such as the Eskişehir Metropolitan Municipality, General Directorate of Eskişehir Water and Sewage Administration, Tepebaşı Municipality, State Hydraulic Works 3rd Regional Directorate, Ministry of Environment and Urbanism, METU Department of City and Regional Planning, and a planning company. (See Şimşek (2011) for further details of interviews).

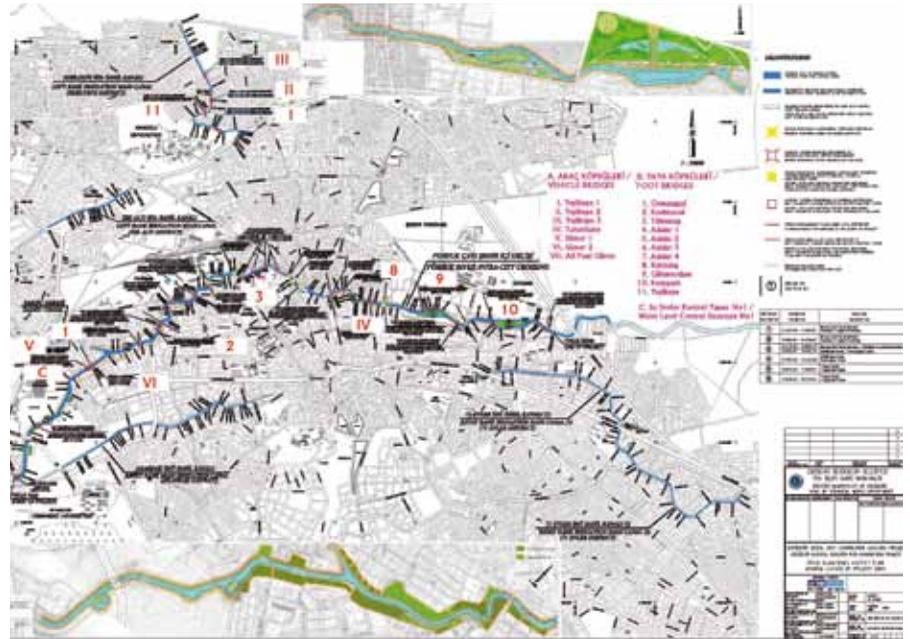


Figure 6. Porsuk River Project Layout Plan that Shows Vehicle Bridges, Pedestrian Bridges, and Water Level Control Structures
Source: The Archive of EBB Department of Technical Works.

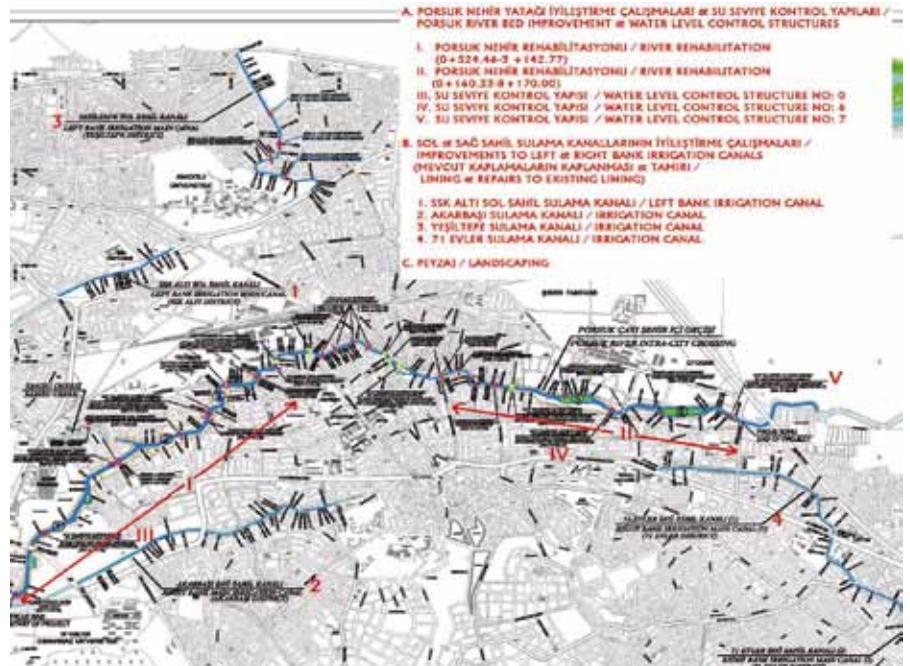


Figure 7. Porsuk River Project Layout Plan that Shows Porsuk River Bed Improvement, Improvements to Bank Irrigation Canals and Landscaping.
Source: The Archive of EBB Department of Technical Works.

and outlook. This unique aspect of the rehabilitation process of the River Porsuk does not originate from its technical restoration only, the similar implementations of which have also been realized in the cities above as well, but it is due to the measures taken to interrelate and integrate the river with the city in such a way so as to renew the image of this once industrial center now resurrected as a young and contemporary center of recreation, tourism and entertainment. This aspect in detail is discussed below.

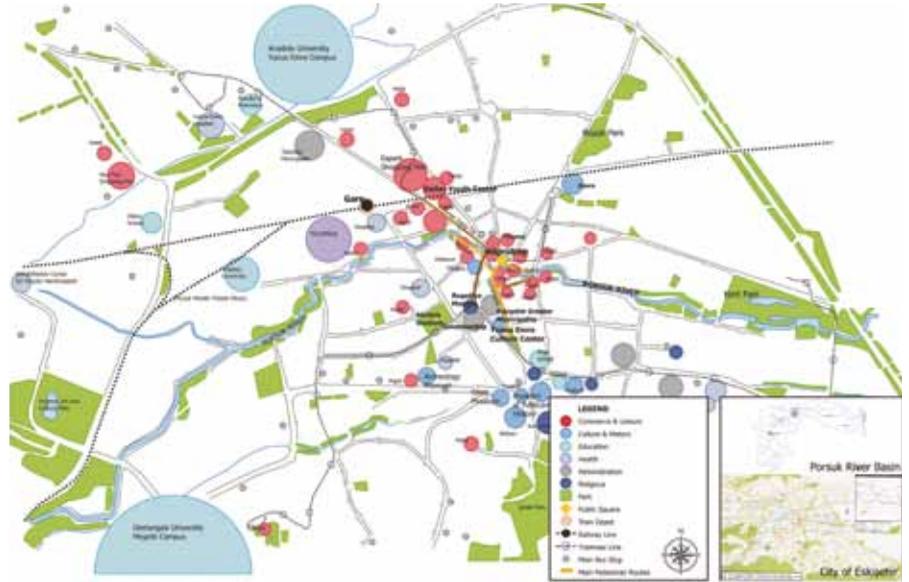


Figure 8. A Sketch on City of Eskişehir & Porsuk River..



Figure 9. A Sketch on Eskişehir City Center & Porsuk River.

Achieving the Level of Integration in the City of Eskişehir

The Eskişehir case may be termed as quite successful as at present, important urban functions are concentrated around the Porsuk River as shown in **Figure 8** and **Figure 9**. Yet the following *checklist* (3) has been prepared to express the implementation level of the concept.

The table shows that not all criteria of integration have been achieved but some have already been fulfilled and some others are on the way to completion. Those criteria which so far have been neglected involve mostly participation of especially civic groups into the decision, a fact which has not only been expressed in local papers and in relevant other media but also have been frequently related to the author during the area study. On the other hand, it is interesting to note that integration criteria have been included by the administrators in the rehabilitation project and it may be asserted that some of the success of the project leading to the general acceptance of it as a best practice may be attributed to this specific aspect of the project exceeding the technical upgrading to include close contact and integration with the city.

3. See Şimşek, 2011 for the details on determining this list.

Integration Criteria	Implemented (√) / Not-Implemented (X) / Partially Implemented (P)
Achievements of the Present Image of the River	√
Taking into Account of the Relation of the River and the City during the River Rehabilitation	X
Participation of Stakeholders such as NGOs and Chambers to the Project	X
The Priorities for Entering into a Connection with the City and the Phases were Passed during the Connection Process	P
Public Transportation and Accessibility	P
Parks and Green Spaces	√
Building Intensity in the City	√
Public Spaces along the or Accessible to River	P
Sufficient Pedestrian Access	√
Improvement of Bicycle Access	X
Coordination of the Stakeholders and of the Responsible Institutions at Project and Catchment Level	X
Mixed-use Urban Pattern	√
Removal of Water Banks and Separations along the River to Establish the Connection of the River to its Immediate Vicinity	P

Table 2. Integration Criteria Checklist for Eskişehir. Source: Produced by the Author.

CONCLUSION

Urban rivers have always been functional and even determinative elements in the evolution of urban history. In the Neolithic stage, which signifies transformation from migratory to sedentary way of life with domestication of plants and of animals, abundant, flowing, clean water was one of the main supports of life and civilization. Development of Neolithic settlements into civilizations also depended on development of irrigation, reservoirs, and water management techniques. Navigable waterways provided channels of communication, transfer of knowledge, information, art, culture and enrichment of civilization. They also served as channels for trade, maintaining economy and enlarging its hinterland to include hitherto unreachable resources. They enabled empires to be born and to feed large populations.

The payback for the careless and unplanned use of urban rivers came on and was added to the most common and dangerous natural hazard related to running waters, floods. From ancient times on people had learned to cope up with floods by building canals, levees and dikes. However, pollution and contamination which caused epidemics through the use of water could not be solved in an era where medical and sanitary knowledge was limited. This type of pollution increased its ill effect on the environment and the inhabitants in time due to increasing population of settlements. Development of riverside industry, location of warehouses and of loading docks in addition to river commerce, stormwater runoffs, toxic wastes, human and animal wastes, deliberate dumping of trash and wastes onto the running waters, primitive and limited infrastructure turned urban rivers into open sewers and garbage channels. Developing urbanization and increasing rent on urban land were added problems leading to paving roads over rivers, imprisoning water flows to channels or to underground.

In some cities the settlement choose to develop and expand in the opposite direction leaving only production near this source of pollution.

Towards the end of the 19th century and during the first half of the 20th century, development of technology and science led to *rehabilitation* of rivers. This process was mainly based on cleaning of the water, its bed and upgrading of the immediate vicinity and was limited to the river itself. These restructuring interventions were technical in essence and were confined to the river and the immediate riverside. The watercourses of rivers were arranged, high benches were built on both sides, their flow was altered and taken into the canals, their beds were dredged and artificial islands and peninsulas were built on some of them, dams were constructed and rivers were even buried underground. All these works aimed at restoring and preserving the natural structure of the river and transferring it on to the next generations. The concept of rehabilitation evolved with the 2000s and its content was enriched. The new concept; though involving technical measures, does not only focus on the river and the riverside but also concentrates on restructuring of the river within the scope of and concurrently with the city. A river is no longer an independent flowing component which should be cleaned and restructured in itself. It has become an integral part of the city and therefore requires to be restructured in line and in composition with the city. Currently, it does not simply aim at improving the eco-system of the river; but also at restructuring the ecosystem of the river in a manner to improve that of the city.

It is also asserted in this study that with the transformation in global socio-economic and cultural structure, the approach to urban administration and urban planning have been changed from second half of the 20th century on. The late 19th century and early 20th century city, with a single dominant cultural and commercial center, with homogeneous zones, well-defined suburbs displaying steady decline in land value away from the center has now been replaced by a multi-nodal urban structure with spectacular and specialized centers, specialized zones like high-tech corridors and socially and economically fragmented suburbs displaying fluctuating land value away from the center. This transformation brought new approaches and new definitions to urban concepts. Urban development is no longer defined through economic development but through quality of life and solutions are searched from bottom up. For the urban administrators, it is now important to create cities which have attractive, with high quality life images and identities. This new urban administration and planning approach to the city is observed in the transformation, gentrification, modernization, upgrading projects going on in the cities along with increasing service and spatial standards. All these upgrading improvement projects depend on existing economic, social, cultural, political resources, but also on natural resources of the city, among which the urban river outstands all as a spectacular natural urban resource with its unique characteristics, its difference, and its functional potentials.

Within the context of socio-economic and cultural global transformations, since the 2000s urban planning has gone beyond the technicalities of eco-considerations. Beyond striving to upgrade of the urban eco-system, in urban planning many of the nodal and focal urban elements are being *rediscovered*. The historical neighborhoods, which in the past have been neglected and turned into transition sites, are now being evacuated, upgraded, provided with increased accessibility, connected to other urban elements such as Odunpazarı in Eskişehir. Large green parks are

being redesigned, enriched with additional facilities and are connected to urban transportation network. Pedestrian walkways, cycling paths are created with recreational and entertainment facilities. It is asserted in this study that one such *rediscovered urban element is the urban river* and the concept of urban river rehabilitation should be enriched by introduction of integration.

The concept of integration involves re-interpretation of physical and cultural assets of the city which provide attraction, characteristic, image and identification to the city are correlatively oriented to the rivers. Urban assets like historical areas, important museums, historical and cultural monuments, key centers and large park areas are now planned in combination with and in reference to the urban river, pivoting around and about the river. At this point a relevant reference may be made to the rehabilitation project of Tiber River in Rome in 2003 the *slogan* for which was 'bringing the city to the river again'.

It is therefore proposed that context of the rigorous technical protection and improvement measures implemented so far should be enhanced by creative approaches. This approach has been tested on the *city of Eskişehir*, which provides a relevant best practice from Turkey with its rehabilitation project of the River Porsuk through which the river became symbol of the city, and identifying the city with the river. This is an interesting achievement for a city which has been known as the industrial center of the Turkish Republic throughout the past years up till the rehabilitation of the river. The rehabilitation process, although still lacking in certain aspects as discussed above, has enhanced the perspectives for dealing with urban rivers.

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AKARSU REHABİLİTASYONUNU KENTLE BİRLİKTE DÜŞÜNMEK: ESKİŞEHİR DENEYİMİ

Akarsular ve kentler eski uygarlıklardan bu yana daima süregelen içsel bağlar içerisinde olmuşlardır. Pek çok kentin can damarı olarak akarsular, ulaştırma, enerji, kullanma suyu, sulama, ticaret ve rekreasyon gibi birçok işleve sahiptirler. 19. yüzyılın sonlarıyla birlikte, çoğunlukla kentleşmenin etkileri akarsu ve akarsu kıyılarının önemini azaltmaya başlamıştır. Akarsular atıksu kanallarına dönüşmüş ve kent yaşamından koparılmış hale gelmişlerdir. Onyıllarca ihmal edildikten sonra kentsel akarsular, sorunların çözülmesi için özellikle 1970'lerden bu yana iyileştirme konusu olmaya başlamıştır. 1990'lara gelindiğinde kentsel akarsu iyileştirmelerindeki bu bağımsız ve tek boyutlu uygulamalar yerine, kentsel akarsu rehabilitasyonunda sorunları kapsamlı biçimde ele alan yeni tutumlar ön plana çıkmaya başlamıştır.

Bu yazıda, içinde bulunduğumuz 2000'li yıllarda, kentsel akarsuların iyileştirilmesi kavramında genel çağdaş küresel anlayışın iki yönlü olduğu iddia edilmektedir: Öncelikle, kentsel akarsular artık yalnızca kentsel altyapı unsurları olarak kabul edilmemekte, doğanın yenilenmesinin ve kentsel ekolojinin önemli temelerini oluşturmaktadırlar; bu yönleriyle kentsel ekolojik sürdürülebilirlik için yaşamsal bir katkı sağlarlar. İkinci olarak, bir yandan da tarihi alanlar, kentsel anıtlar ve odak noktaları gibi öğeleri barındıran kentsel kurgunun ayrılmaz parçalarıdır. Bu anlamda kentlilerin kentleri ile bağ kurmalarında önemi olan kentsel imge ve kimliğinin oluşmasına destek olurlar. Makalede, bu ikinci yön ele alınmakta, kentsel akarsuların ayrı kentsel bileşenler yerine çevresiyle birlikte bir bütün olarak değerlendirilmesi üzerinde durularak, kentsel akarsuların kentlerin bütünleşik bir parçası olarak nasıl planlanacağı üzerinde durulmaktadır. Bir başka deyişle makale, kentsel akarsulara ilişkin uygulamaların, çevresindeki önemli kentsel odakları içerecek biçimde genişletilmesi üzerine bir tartışma içermektedir. Bunun için, Eskişehir kenti, iyi uygulamalardan biri olarak ayrıntılı olarak değerlendirilmekte ve kentsel akarsuyun mekansal bütünleşmesi çerçevesinde bir ölçütler takımı geliştirilmektedir.

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