



**URBAN RIVER
REVITALIZATION**

Assignment 2

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Introduction

Around the world, economically dynamic cities can be found on or very near to rivers, and even on river deltas. This is because rivers provide a variety of resources and possibilities that allow cities to flourish, such as water for drinking and agricultural and industrial activities, transportation along its stream, and recreation for city dwellers. Cities such as London, New Orleans, Moscow, Buenos Aires, and Amsterdam would not have been able to grow as they have had it not been for the river that serves them.

However, urban growth, industrialization, and mindless waste and sewer water disposal have led to the contamination of these rivers. This contamination does not only have local health and environmental implications, as rivers flow downstream, they carry all of these contaminants and health hazards to other cities and communities and eventually into the ocean. Furthermore, a comprehensive and sustainable urban river management is not only necessary for the health and environmental implications; rivers play an important role in a city's stormwater management strategy.

I still remember when my Hydrology professor was teaching us about watersheds. He said that any point on land belongs to a watershed. Even if we don't see a river close by, all the water that is captured by the soil will eventually end up in the ocean. Rivers, then, can be considered the veins of the land; the very visible, very vulnerable, veins of the planet. A reminder that the Earth is truly alive.

Continuing to neglect the role of rivers and their needs can be detrimental to a city's resilience and sustainability. Especially as Climate Change increases the risks to cities because of rising sea levels

and changing weather patterns, it becomes evermore important to take advantage of natural processes.

The purpose of this research is to study and analyze the most efficient governance mechanisms to improve urban river management, and consider whether they promote a more sustainable development of the cities. The research will look into three river revitalization efforts in three different cities: the Cheonggyecheon river in Seoul, South Korea, the Charles river (and Boston Harbor) in Boston, USA, and the Torres river, in San Jose, Costa Rica.

Literature Review

Quick river history recap

Humans and societies have always settled near water sources. Evidence of prehistoric settlements have been found near millenarian sources of water such as the Glen Canyon (Knight & Rummel, 2014). Most preindustrial cities lay on the margins of rivers, such as London, Seoul, and New York.

But when the Industrial Revolution accelerated in full steam, cities experienced a spike in rural to urban migration, increasing population density and demand of goods and services (Olson & Kenny, 2014). As more and more people moved into the cities, there was more need for water from the urban dwellers, as well as more sewer waters produced. People threw their dirty waters into the river. Eventually, the rivers would become so contaminated and putrid, governments decided to encase them and bury them underground (Bacle, 2012).

Another pressure created by this large movement of population to the cities was the need for developable land. In the United States, the US Army Corps of Engineers constructed hundreds of dams, for both flood control and to increase developable land in cities (Pinto, et al., 2018).

Industries as well contributed to worsening the problem in the same way as residents; they extracted water from the river to fulfil their industrial activities, and then gushed their used, contaminated waters back into the river. With all of these pressures, rivers went from being the focal point of cities, to being completely invisibilized.

The Industrial Revolution not only transformed society, economies and cities; it also transformed the city-river relation (Winiwarter, Haidvogel, Hohensinner, Hauer, & Burkner, 2016).

Issues associated with poor urban river management

The continuous abuse and neglect to the urban river systems have led to a series of negative consequences, and the magnitude and combination of them will depend on a variety of factors, such as the point being studied on the river, the geomorphology of the watershed, and the human activities being carried out in the surroundings. Some of the most common issues are (Lerner & Holt, How should we manage urban river corridors?, 2012):

- Flooding
- Bad smell
- Impacts on river ecology
- Impacts on water quality
- Alteration to sedimentation processes
- Health risks
- Aggravation of Climate Change risks

Urban river governance

Successful urban river governance requires the engagement of a range of stakeholders, which can be coarsely grouped into: government agencies, private and/or commercial interests, and community advocates (Plummer & FitzGibbon, 2004). In their paper, Plummer and FitzGibbon explored the management schemes that have been developed for co-operative environmental management, and developed a three dimensional matrix, using the following as its axes: form of process (from informal to formal), the amount of power the stakeholders will hold (from being informed to community control), and the representation (government agencies, private/commercial, and community). This matrix facilitates define the model of co-operative management that will best fit each case.

Implementation

The three selected cases for this investigation are: Cheonggyecheon river, in Seoul, South Korea; the Charles river and Boston Harbor, in Massachusetts, USA; and the Torres river in Costa Rica. These cases were selected because of the diversity in approach, culture, and government structures.

Cheonggyecheon River, Seoul, South Korea

The Cheonggyecheon river flows right through the heart of downtown Seoul South Korea. In the 14th century, the Joseon Dynasty selected the location as the capital of the nation (Cho, 2010). Since then, the river has experienced a series of drastic transformations, from the expansion of the stream in the early 15th century, to its transformation into a major double decker highway in the 1990's (Cho, 2010).

It was in the 1960's and the 1970's when the river was first built over and converted into a road, due to conditions of overcrowding, poverty, and traffic congestion on the margins of the river

(Cho, 2010). Around the world, other countries, such as the US, were favoring massive infrastructure projects to deal with natural hazards, and Seoul followed suit.

In the early 2000's, the river experienced a new phase of drastic transformation, when the government decided to “daylight” the river, by removing the highway and opening the stream to its surroundings. This decision was precipitated by a variety of reasons. First, the worldwide tendency towards urban river restoration was gaining traction. All around the world, cities were beginning to understand the role and the importance of the urban rivers in the urban metabolism. Second, Seoul's Central Business District (CBD) redevelopment had begun to slow down, with many businesses moving to the more attractive Gangnam (Lee I.-K. , 2006). Furthermore, the highway's infrastructure was so severely deteriorated, its maintenance had costed the government around US\$ 50 million between 1994 and 1995 (Lee I.-K. , 2006).

From its inception, the Cheonggyecheon river's restoration project was driven by the government (Mayer, 2012). During the 2002 mayoral election campaign, the candidate Lee Myung-Bak¹ ran on the platform of the Cheonggyecheon river's restoration. He successfully sold the idea to the population of environmental and economic benefits the project would bring, and won the election. (Cho, 2010).

Before beginning, the project was estimated to cost around US\$ 305 million, but ended up costing around US\$ 341 million (Lee & Jung, 2016). Nevertheless, the project was successfully completed in three and a half years (Kim & Jung, 2019). Considering it was their mayor who was promoting and supporting it, the government of Seoul assumed the cost of the project. However, they had to

¹ Lee Myung-Bak was the CEO of Hyundai Construction for 27 years before becoming the Mayor of Seoul, then went on to become the President of South Korea from 2008 to 2013. After his term, he was charged with bribery and embezzlement, among other. He was released early of his 15 year sentence in 2019 (Encyclopaedia Britannica, 2019)

obtain the approval of the Seoul Metropolitan Council to secure the funding. Once they did, the government made a series of budgetary adjustments to extract the necessary funding, such as reducing costs in other projects. (The World Bank, n.d.)

Three main organizations were created to coordinate all of the project's activities. The project's headquarter offices were established within City Hall, and were in charge of the project implementation. The Cheonggyecheon Research Group was established within the Seoul Development Institute, the city's official think tank. According to the World Bank, "the Cheonggyecheon Citizens' Committee was established to serve as an official channel to collect the opinions and concerns of the citizenry with regard to the project." (The World Bank, n.d.) The committee was formed by experts and citizen representatives, as well as the experts from the Cheonggyecheon Research Group. The committee was given important official powers, such as enacting legally binding ordinances, as well as conducting audits.

Fifteen years have passed since the project was completed. Many researchers have analyzed since then the impacts of this intervention, and have arrived at very conflicting positions. Kim and Jung (2019) carried out a literature review of all available publications, and analyzed the results using a sustainable development framework, using multiple dimensions of the three E's (environment, equity, and economy).

Their study presents several important findings. First, they found an imbalanced attention given to each of the three E's, being environment the most studied and the economy the least studied. Second, they found that several researchers had questioned the authenticity of the solution, considering water is pumped from a nearby affluent during the dry months to ensure a constant flow of water. The study also found a significant conflict of results regarding the equity of the

project, with some researchers stating that “conflict management between the government and citizen groups was successful” (Kim & Jung, 2019), while other researchers argue that the project was in fact led and controlled by a few powerful stakeholders. Before the project, many informal vendors used to be located on either side of the Cheonggyecheon Highway due to the high traffic, but once the project was completed, the vendors were relocated in another area of the city, severely affecting their incomes (Bacle, 2012).

Charles River and the Boston Harbor, Massachusetts, USA

The Charles river went from being one of, if not, the most polluted river in America in the late 20th century, to become an example of urban river revitalization. This accomplishment took many decades, a lot of environmental activism and litigation. The Charles river begins in Hopkinton, Massachusetts, and meanders for 80 miles through 35 of the state’s municipalities, discharging into the Boston Harbor.

It is very difficult to separate the story of the Charles revitalization from the story of the Boston Harbor Cleanup. While the Charles is one of several rivers that discharges into the Boston Harbor, along with the Mystic, the Chelsea, and the Neponset rivers, the efforts that led to the Boston Harbor cleanup contributed to the cause of the Charles river revitalization.

Human interventions to the Charles river began even before the Industrial Revolution. During the first half of the 17th century, businesspeople began creating dams on the river to divert water from it to power their mills (Charles River Watershed Association, n.d.). These dams, however, slowed the river’s flow significantly, affecting the river’s natural mechanisms. Since then, and especially after the Industrial Revolution, the Charles River became the preferred site for landfills, dumpsites,

and industrial waste discharge. By the 1960's, the river became so polluted, songs were written about it (The Standell's song "Dirty Water").

In 1908, the Charles river Dam was completed through federal funding, as it was the US Army Corps of Engineers who constructed it (Charles River Watershed Association, n.d.). The dam prevented the tidal flows from the Boston Harbor from flowing back into the river. This is considered the first successful step in cleaning the river. By then, the Boston Harbor was doing terribly, as the communities from all its river's watersheds were throwing their sewage straight into the Harbor.

In 1965, the Charles River Watershed Association was founded by a group of concerned citizens, who believed in the potential and importance of river conservation (Charles River Watershed Association, n.d.). This group of riparian activists has helped orchestrate the efforts necessary to protect and improve the health of the Charles River since then and until this date.

A few years later, the Federal government created the Environmental Protection Agency (EPA) in December of 1970 (Rothman, 2017), establishing the protection of the environment as one of their responsibilities. In 1972, the Federal Water Pollution Control Act of 1948 (FWPCA) was amended in order to include a requirement that publicly owned treatment works (POTWs) that dumped sewage into water bodies had to "install both primary and secondary treatment equipment by July, 1977" (Savage, 1995). This placed Boston in immediate violation of the requirement, but instead of moving forward with compliance, the city chose to commission a study, which took four years to complete. The reluctance of legislative and executive leaders both at city and state levels to comply and assume the responsibility of improving the quality of urban water systems left no option but for the public and other stakeholders to take the judicial path. Through litigation and

with the support of the federal government, the municipalities and state agencies were forced to correct the Combined Sewage Outflows (CSOs), as well as constructing the secondary and tertiary treatment plants. These efforts helped improve the river's water quality.

Back on the Charles River, the CRWA, led by Rita Barron, hosted the first public swim in the Charles on 1979, which helped begin changing the public's perception about the Charles River. Other similar activities followed, such as the annual "Run of the Charles Canoe & Kayak Race" (Charles River Watershed Association, n.d.). Such initiatives created awareness and demonstrated the potential value of the river to the public, who would then convince their elected officials on improving the Charles River.

The CRWA has also deployed other strategies to improve the Charles. In 1994 they began the "Scientific Water Quality Monitoring Program" (Charles River Watershed Association, n.d.).

The CRWA and their activities are financed by a range of funding sources, such as individuals, corporations, foundations, and government (CRWA, 2019).

Torres River, San José, Costa Rica

The Torres river flows on the northern side of Costa Rica's capital, San José, from east to west. It is currently one of the most contaminated rivers in the country. As with many rivers around the world, but in stark contradiction with the country's international image, the river suffers from poor sewage management, urban sprawl, spilling of agricultural and urban waste, and soot contamination from a collapsed transportation system (Trujillo-Acosta, Peraza-Estrella, Marina-Hipólito, & Feoli-Borashi, 2017).

The geomorphology of the river, as with the rest of the rivers in the Greater Metropolitan Area (GMA) of San Jose, hides the river deep within the canyons it has carved for centuries.

For decades, local and national governments have included the revitalization of the Torres river in their urban development plans, without making much progress. For example, the municipality of San Jose and the Institute for Municipal Promotion and Advice commissioned a study in 1977, which provided a diagnostic and possible policies regarding San Jose's hydrologic situation. These led to the Torres river Recovery Master Plan, but only got so far as the proposal (Briceño-Rodríguez, 2014).

However, progress has become more visible in the last few years. In 2013, the Amigos del Río Torres (Friends of the Torres River, or ART) was founded by a group of citizens who believed in the importance and potential of a cleaner river. Since then, they have organized a series of events, including awareness festivals and river cleanup volunteering days (Amigos del Rio Torres, s.f.).

In 2016, in collaboration with other nonprofits and individuals, they announced the project "Rutas Naturbanas". The proposal marries urban nature and urban river conservancy with non-vehicular mobility, connecting the different districts of the city. The Master Plan includes a thorough analysis of the city's mobility, activities, green spaces, and environment (Rutas Naturbanas, 2016).

In just four years, the first stretch of the project was inaugurated, attracting hundreds of people to walk the margins of the river for the first time in their lives (Gudiño, 2020). This first phase was possible thanks to Public-Private-Partnerships (PPP), which involved the nonprofits, the government, and private companies funding the project, and will serve as a proof of concept for the continuation of the project.

Analysis

The three river revitalization projects present different approaches to the objective of urban river revitalization. While the Cheonggyecheon river daylighting project may have improved

stormwater management through the city, introduced a natural feature into a blighted area, and was successfully completed, many have questioned the environmental sustainability and authenticity of the project, given that water is pumped onto the river during dry months to ensure a constant flow. Others have raised concerns regarding the equity aspect of the project, considering the organizations involved in coordinating the stakeholders were in one way or another related to the government.

On the other hand, the cleanup efforts in both the Charles river and the Torres river were initiated by passionate citizens, who raised awareness through entertaining outdoor activities, and slowly gathered the necessary support from strategic stakeholders. This approach proves to take longer to succeed, but when it does, it creates a lasting change in the social mindset.

The fact that rivers flow through different jurisdictions make the objective of a successful river management even more complex. In the case of the Cheonggyecheon river, the project was not as complex to carry out because it was all contained within the municipality of Seoul. However, the Charles and the Torres river flow through several municipalities, which makes it unfeasible for one of the municipalities to improve the situation by themselves. For this reason, nonprofit organizations and citizen groups are better equipped to coordinate the efforts, since they are not bound by geographic and jurisdictional limits. Being outside of the public government structure also provides continuity and protection to the goal from being politicized. If the national government decided to assume the revitalization of a river, it is very possible that a future political party decided to abandon the efforts. Nonprofits also possess the advantage of being able to act as a mediator between stakeholders in an environment where everyone joins voluntarily, rather than having some possess more power than others.

Considering that the Cheonggyecheon project was limited in scope and short in implementation ensured the success of the project; however, it is very questionable that this approach would succeed in longer term, larger scoped objectives. The top-down approach the government of Seoul selected created a sense of imposition on many, such as the street vendors who were displaced and their incomes impacted. And while many enjoy the features of the river and there might have been an increase in appreciation for nature in the city, the change in mindset will not include an empowerment of the citizens to create the change, but rather a continuation of the parental yet tyrannizing government.

The CRWA and ART organizations, on the other hand, work everyday passionately to achieve very ambitious goals, but do it by strategizing carefully and setting short term targets that keep them going. They will always depend on the charity and faith of others funding wise, and this probably keeps many of their members awake at night.

Conclusion

In the case of the environmental co-operative management model that enables a successful urban river revitalization, evidence shows that community advocacy and nonprofit organizations are vital to initiate and ensure social and environmental transformation. Analyzed through a sustainable development framework, these organizations are better able to provide solutions that ensure environmental, economic, and equity aspects are taken into account. However, they cannot do it alone; they need the co-operation of government agencies as well as the private sector in order to achieve their goals.

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