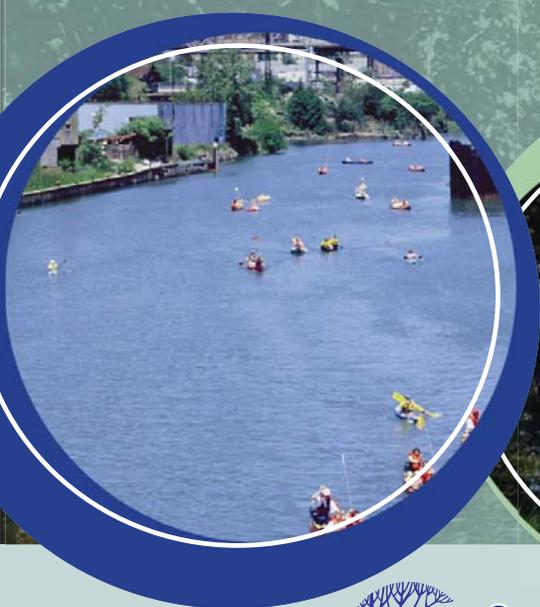


Case Studies Guide:

Conceptual Alternatives
for Onondaga Creek

May, 2008

- Bronx River, NY
- Guadalupe River, CA
- South Platte River, CO
- At-A-Glance:
Cases Across the U.S.



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**onondaga
creek**
CONCEPTUAL REVITALIZATION PLAN

The [Case Studies Guide: Conceptual Alternatives for Onondaga Creek](#) was produced by Onondaga Environmental Institute as a work product of the Onondaga Creek Conceptual Revitalization Plan Project (OCRCP). Visit www.esf.edu/onondagacreek for more information.



The [Onondaga Lake Partnership](#) (OLP) sponsors the Onondaga Creek Conceptual Revitalization Plan Project with federal funds from Congressman James T. Walsh granted through the U.S. Environmental Protection Agency.

Visit www.onlakepartners.org for more information about the OLP.

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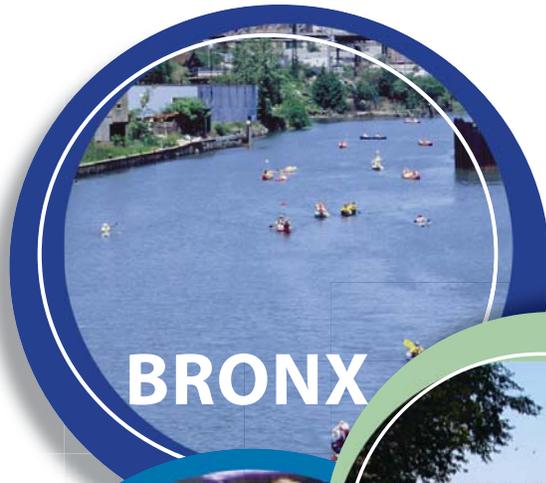
Graphic Design | Julia M. Renn, Onondaga Environmental Institute

Acknowledgements

- Seth Ausubel and Christopher Dere, U.S. Environmental Protection Agency Region 2
- The Onondaga Creek Conceptual Revitalization Plan Project Team (Lee Gechas, Canopy; William Owens, City of Syracuse; Samuel H. Sage, Atlantic States Legal Foundation; Amy Samuels, Cornell Cooperative Extension of Onondaga County; Richard Smardon, State of New York College of Environmental Science and Forestry)
- Jeff Shoemaker, The Greenway Foundation, Denver, Colorado
- Staff at Sustainable South Bronx
- The Onondaga Creek Working Group



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BRONX



GUADALUPE



South PLATTE



at-a-GLANCE

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- ⑷ Twelve case studies that highlight facets of river or creek revitalization that are relevant to the Onondaga Creek project.

introduction

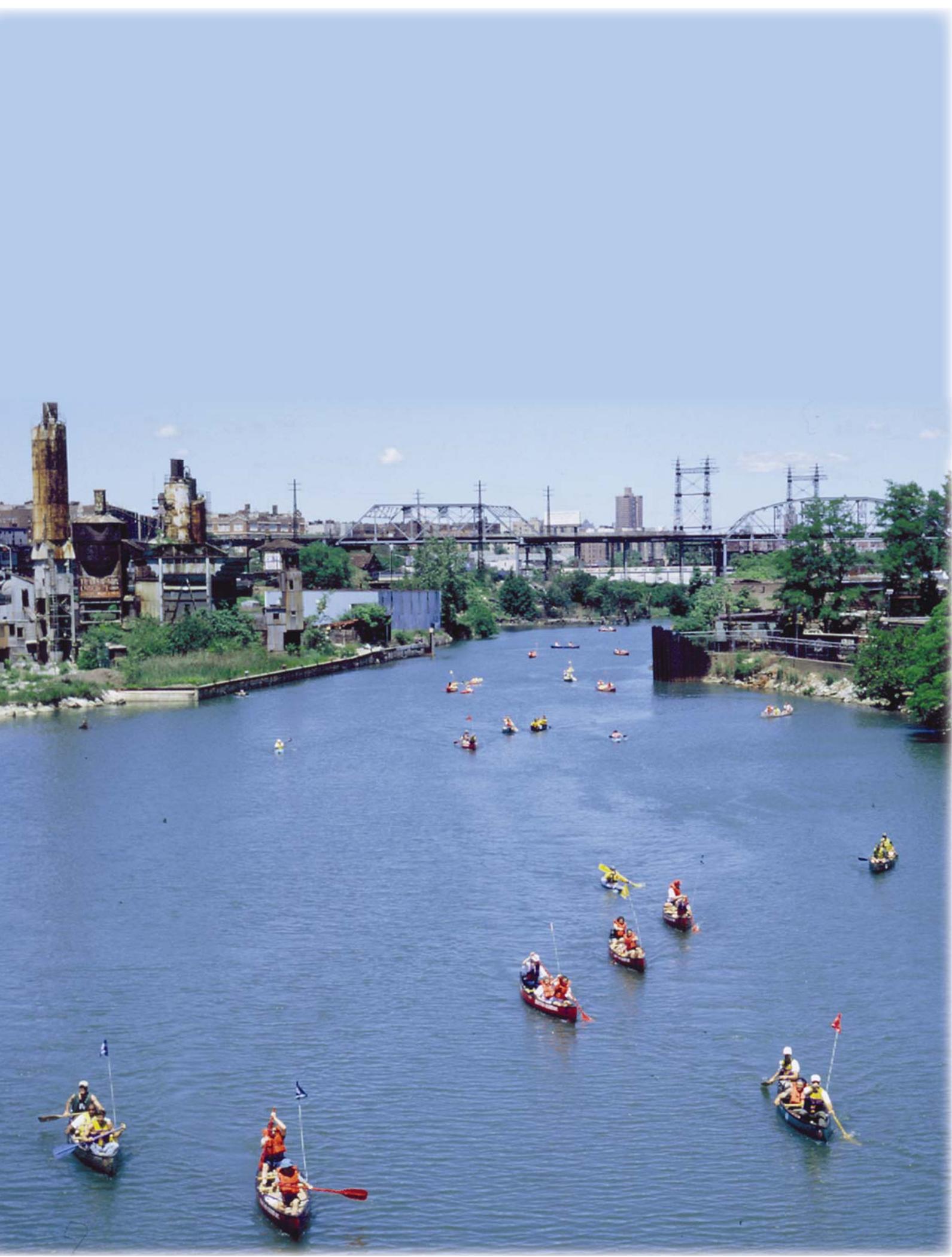
by Samuel H. Sage



Waterways are of great importance to communities around the world. Most of the great cities were built along riverfronts as they provided essential services: water supply, waste removal, transportation, and energy. As the modern industrial revolution created manufacturing complexes within these cities, the waterway corridors became the preferred location as industry needed water, water power and an easy means to dispose of wastes. While these industries were turning natural resources into product, and providing jobs and wealth for their communities, little was said about the natural function of the riverine community. Recreation and resource needs such as fishing, boating, and a place for quiet contemplation were largely overlooked and considered to be frivolous concerns without value to a growing economy.

Now in the twenty-first century with many older American cities largely bereft of any manufacturing, there is a new appreciation for these waterways and their adjacent corridors. Cities, whose citizens have abandoned old neighborhoods for the suburbs, are now focusing attention on “quality of life” issues in part as an attempt to keep residents in the city and to attract suburbanites back home. New jobs are no longer in “smoke-stack” industries and workers are now concerned about clean air and water and ample places for passive and active recreation in natural settings. Furthermore, as Richard Louv has persuasively written in *Last Child in the Woods*, children are increasingly suffering from “nature deficit disorder” and their mental and physical health is being compromised by not being able to learn, explore, and play in the outdoors. Rehabilitating urban waterways has become one answer that people are finding for making their cities once again a desirable place to live, work, and recreate.

The movement to enhance urban river corridors both in the United States and abroad keeps growing. The Coalition to Restore Urban Waterways (CRUW) has put on various national conferences. One of CRUW’s founders, Ann L. Riley has written an excellent primer on the subject. As part of the Onondaga Creek Revitalization Planning Project, this document highlights several waterway projects within the United States. We discuss three rivers in some detail and then a dozen others are briefly mentioned with attention drawn to the most important issue(s) faced by those communities. None of these accounts parallels Onondaga Creek where de-channelization and alternative flood control issues are most prominent; however, there are valuable lessons to be learned from each case study. Furthermore we have supplied references for further reading and you can find more interesting materials on our web site or with internet browsing. ■



the bronx river story

Originating near Valhalla, NY, in one of the nation's wealthiest counties, the Bronx River flows southward, from the affluent suburbs of Westchester through the neighborhoods of Bronx County into Long Island Sound. Along its course, the tidal river passes through semi-rural neighborhoods and open space just north of New York City. "Pocket" landscapes filled with greenery provide homes for a variety of plants, birds, and other animals.

Continuing south, the river crosses into Bronx County at its northern border. With a median annual household income just over \$27,000, the Bronx has the nation's highest poverty rate. Here the river is fragmented, crossed by railroads and highways, and flanked by industrial development. Rainwater brings sewage and urban runoff into the river, while the shoreline is often hidden from view by industrial parks or piles of trash.

The story of the Bronx River is punctuated by industrial transformations. The changing scenery along its current path somewhat reflects its evolution from past to present condition.

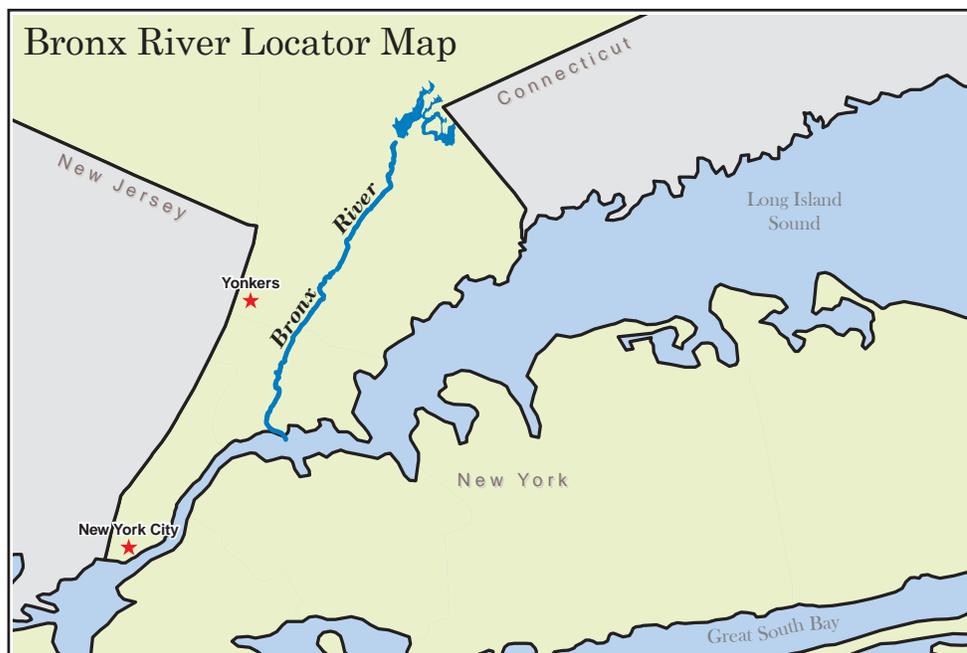
In 1898, when the five surrounding boroughs were integrated into New York City, the Bronx was named after the river. Today, people of the Bronx recognize that the county's fate may be partially tied to its namesake. For many, Bronx River revitalization means more than picking up garbage and creating greenspace — it defines their sense of belonging.

This is true for Ms. Alexi Torres-Flemming, a member of the Bronx River Working Group who grew up in the projects just several blocks from the river. As a child, she believed, "*I will be successful when I can escape from here*" (Hopkins qtd. 153). As she grew, her perspective changed. For youth and residents of these urban neigh-

borhoods, such as Ms. Torres-Flemming, restoring the river has resurrected their sense of value and community importance.

No longer regarded as a garbage dump or an open sewer, the Bronx River and its banks are becoming a clean, sustainable haven for the many people and animals who now call it home.

The river was named for Jonas Bronck, a wealthy Swedish sea captain who became one of the first Europeans to settle in the area. He bartered for and purchased 500 acres next to the river in 1639. The mill he constructed on his property was the first to use the river's water. His entrepreneurship initiated a spiral of industrialization that would ultimately engulf the entire river valley.



The Bronx River's utility as an energy source and transportation corridor made it one of the first waterways in the country impacted by industrial development. The river's initial decline began in the 19th century with construction of numerous mills and dams. In 1841, the New York and Harlem Railroad was completed, providing commuter transportation between the Bronx and Manhattan. The railroad combined with the other manufacturing enterprise soon transformed the ecologically rich river valley into an industrial corridor.

The city's rampant population and industrial growth led to increased use and abuse of the river. Until the 1830s, the Bronx River had been clean enough to supply drinking water. By the 1880s, it was considered an open sewer.

The growth of New York City from the 1600s until the end of the 19th century had been vigorous and dynamic, but had come at great cost to the natural ecosystem of the Bronx River. Over time, industrialization, adjacent roads and railways, realignment and alteration, and intense

development and urbanization throughout the watershed resulted in a severely polluted river. By the late 1800s the Bronx River resembled a natural waterway in name alone. Only the elderly remembered what the river had once been.

Degradation of the Bronx River was a civic issue by the end of the 19th century. Yet despite numerous government-sponsored capital works projects intended to help clean up the Bronx River during the late 19th and most of the 20th centuries, conditions remained seemingly irreparable.

Restoration seemed impossible until the 1970s when citizens started to take action on their own. They founded the *Bronx River Restoration Project, Inc.*, a grassroots not-for-profit corporation. A subsequent increase in citizen interest led to the formation of the Bronx River Alliance in 2001.

Today, under the same name, the Alliance works with New York City Parks to manage the river's restoration. They continue to expand citizen participation through grants, education, and outreach.

Before Bronck

"The river's story began more than 150 million years ago when a waterway, whose origins lie in present day Westchester County, began carving a channel for itself through the bedrock on its way towards the Bronx. Geologists believe that the Bronx River once emptied into the Hudson River, which lay to the east of its present location. A huge ice mass blocked the Bronx River's flow during the last Ice Age and forced it to cut a new channel. As the Bronx River meandered on its way, it created a deep gorge before finally emptying out into the East River and Long Island Sound. This striking gorge, most visible as the river travels past the New York Botanical Gardens, inspired the Native Americans who lived along the river to name it Aquehug or 'River of High Bluffs.'

These local Native Americans, the Weckquasgeek and Siwanoy, were Algonquin speaking people whose lives had intertwined with the river for centuries. The river held spiritual significance for them, and they used its water for annual ritual baths. On a more daily basis they drank its water, fished along its banks, and hunted in the thick woods beyond its shoreline. Game was very plentiful, and the particularly large presence of dam-building beavers in the

surrounding area led the Siwanoy to call the river valley 'Laaphawachking' or 'Place of Stringing Lakes.'"

- Excerpt from NYCgovparks.org

At the time Bronck bought his land from the Native Americans, the area was forested and not developed beyond the existence of some Indian settlements. As the area became more settled, the river provided an excellent recreational fishery.

"John Rosch of White Plains likes to recall that prior to 1890 the Bronx River was one of the best trout streams in the State. As a boy, he passed many happy hours fishing for big brook trout in bright, clear waters between Scarsdale and his home town. "

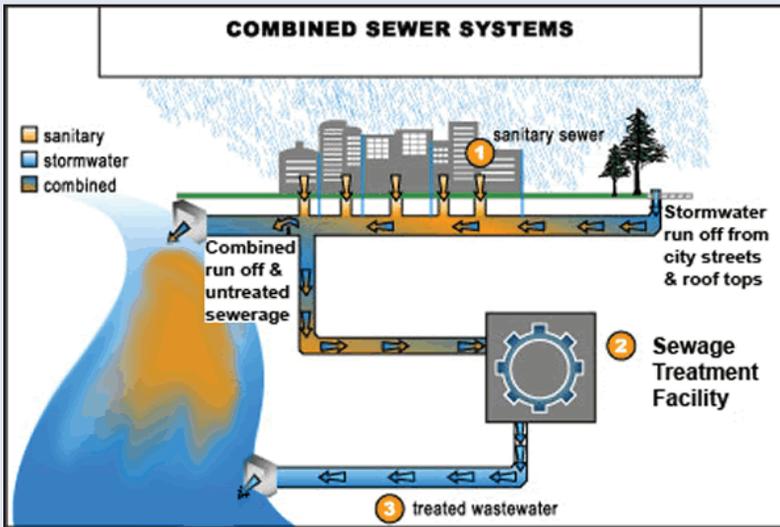
- New York Times

March 22, 1936: Sport Page 57 [<http://select.nytimes.com/gst/abstract.html?res=F2091FFD345C167B93C0AB1788D85F428385F9>]

Combined Sewer Overflows

A Combined Sewer Overflow (CSO) serves as an outlet for both domestic waste and storm water. During storms, as little as 1/20 of an inch of rain can cause the sewers to overflow, spilling raw sewage into the Bronx River.

Photo Source: Sustainable South Bronx
www.ssbx.org



This map of New York harbor depicts the locations of some of the 460 CSOs that empty into the New York City waters.

Image Source: Sustainable South Bronx
www.ssbx.org

Stormwater Control

In urban areas, streams and rivers are the receptacle for polluted runoff from roofs, streets, parking lots, and sidewalks. This stormwater is often highly contaminated and must be remediated. Implementation and cleanup of our nation's waters increasingly requires creative solutions called green infrastructure. Enhancing river corridors is linked with stormwater control effects and merging the two interests has created a powerful common end point of clean water.

Compounding the Problem

Bronx River pollution problems have been exacerbated by combined sewer overflows (CSO) which discharge a mixture of runoff and raw sewage into the river during rain storms. Consequently, pathogen contamination has plagued the Bronx River for decades. New York State listed the lower Bronx River in the 2006 Section 303(d) List of Impaired Waters. Pathogens were identified as the main pollutant, with urban storm water runoff and CSOs as the main sources of pollution.

Combined sewer overflows have become a matter of contention between the Alliance and the City of New York. The City, in an attempt to reduce costs, has requested a deadline extension until 2022 for reducing the CSO discharges, and has further indicated it will request a lowering of the water quality standard that the river will have to meet in order to be in "compliance".

The Alliance's position is that legally changing a pollution discharge limit is not the same as cleaning up the pollution, and that such a temporary and superficial fix will only pass the real cost of restoring the Bronx River on to future generations. City opponents cite a values difference between regarding the river either as a conduit for sewage, or as a piece of nature to be respected for giving sustenance and community enjoyment. They note that a city renowned for its terrestrial parks and open space amenities should not hold such a short sighted view of water resources.

Organizational Evolution

1974 - 1986: The Bronx River Restoration Project

Frustration with living conditions in the Bronx came to a head in 1974. Bronx Police Commander Anthony Buza observed that water quality conditions of the Bronx River were reflected by the surrounding neighborhoods. *“In Westchester, by my home, it was a bucolic, sylvan, beautiful place,”* he told New York Times reporter Barbara Stewart. *“In the South Bronx, it was a yellow sewer. There were lots of tires, hundreds. Old refrigerators, auto bodies. One or two occasional human bodies.”*

Buza realized the sociological value of a clean river, so he held a meeting in which he called upon the youth to get involved. He hoped to draw upon the relationship between environmental and psychological health to improve community pride and involve teens in a positive activity.

Ms. Ruth Anderberg, a Bronx citizen, attended the meeting and was inspired. When no government agencies would claim jurisdiction over the river she quit her job, formed the *Bronx River Restoration Project*, and started cleaning the river of garbage on a full time basis.

Ms. Anderberg and her small cadre of volunteers were the first truly engaged citizens. Soon, it became a question, not of how officials would involve the Bronx community, but rather how citizens would be able to move the city toward river restoration.

1986 - 1997:

Isolated Improvement Projects

For 12 years Ms. Anderberg worked single-handedly or with small groups of volunteers, to clean the Bronx River, primarily between 177th and 180th streets. When she retired in 1986, the organizational reigns were handed over to Ms. Nancy Wallace, another dynamic leader. Ms. Wallace realized that government resources were needed to really effectuate river restoration. She piqued New York City Parks Commissioner Henry J. Stern’s interest in the *Bronx River Restoration Project* in 1987 with a tour of the river.



Source: Sustainable South Bronx
www.ssbx.org

“In the South Bronx, it was a yellow sewer. There were lots of tires, hundreds. Old refrigerators, auto bodies. One or two occasional human bodies.”

Afterward, with the New York City Parks Department on board, she continued to solicit financial and political support from public officials and business leaders. As more city officials became involved and realized responsibility for the river, more resources were allocated and more citizens were recruited. Local citizens’ groups joined the effort and contributed more opinions, ideas, and goals for the river. Facing this rush of awareness, the organizational structure and authority of the *Bronx River Restoration Project* was insufficient to coordinate such a convergence of interests.

Environmental Issues

Although coordination activities orchestrated under the umbrella of the *Bronx River Restoration Project* were successful, environmental needs and water quality improvements were not addressed. The groups participating in the *Bronx River Restoration Project* in 1974 originally limited their focus to visible defects such as litter and trash rather than environmental revitalization.

This is a typical early response to pollution. In this case, efforts centered on beautification and removing garbage from the river. Follow-up activities included creation of attractive open space and human use areas. This new utility brought more people to the polluted waters, and to the realization that spotty cosmetic remediation is inadequate for the long term.

Bronx River

Restoration Timeline

*A brief progress summary. How did organizers come this far?
Where do they stand now?*

1974

Ruth Anderberg forms the *Bronx River Restoration Project* (BRRP).

With a small core of volunteers she removes litter and debris from the Bronx River between 177th and 180th streets for the next 12 years.

1986

Ms. Nancy Wallace takes over the BRRP from Ms. Anderberg.

Ms. Wallace, who has some political experience, successfully engages New York City Parks Commissioner Henry J. Stern and Mayor Edward Koch to give limited public funds for river restoration. Progress is made, but it is spotty with isolated capital projects being built.

1997

Jenny Hoffner convenes 60 organizations and forms the *Bronx River Working Group* to develop a greenway plan and river restoration plan. This is the first effort to treat the river as an entire system.

2001

The *Bronx River Alliance* is formed from the Working Group. Having overseen development of the Greenway and Restoration Plans, Ms. Hoffner steps down and the new organization emerges.

2007

The *Bronx River Alliance* has become a community force, but still must battle counter influences. Today, they balance cooperating with one branch of the New York City government, Parks and Recreation, while opposing the policy of the Department of Environmental Protection regarding sewers.

1997: Bronx River Working Group takes holistic approach

Although Ms. Wallace was able to garner governmental financing and volunteer support, projects were still planned individually, and were architectural in nature. Designs were solely for human use and enjoyment rather than for improving water quality and ecological integrity. A more holistic and schematic approach would be necessary before any lasting ecosystem improvement would be possible.

In 1997 the *Bronx River Restoration Project* partnered with the New York City-based program, *Partnership for Parks*, to “begin collective, strategic river improvement” (Hopkins 2005). They hired Ms. Jennifer Hoffner to be the Bronx River Coordinator.

Almost immediately, Ms. Hoffner held an informal meeting to form the *Bronx River Working Group*. A coalition of 60 citizens’ groups and government agencies convened to develop a greenway plan for the river that would address strategies from the confluence with the East River to the northern city border.

The City of New York Parks and Recreation Department decided to partner with the Working Group in order to focus civic resources on the river’s problems. Their collective efforts produced the *Bronx River Action Plan*, released in 1999. The plan was the first attempt to treat the

entire river corridor as a single integrated entity.

Still primarily an architectural approach that developed open space for human use, the plan paid little if any attention to water quality conditions or the ecological functioning of the river. Treating the greenway as a single comprehensive corridor, however, was a beginning for restoring the Bronx River using a systems approach.

2001: Bronx River Alliance releases plans

After four years of planning, the *Bronx River Working Group* was re-formed with additional partners to become the *Bronx River Alliance*, a public-private partnership dedicated to restoring the river. Housed in the Bronx offices of the New York City Department of Parks and Recreation, the Alliance has both a board of directors and a staff to implement its mission to “serve as a coordinated voice for the river and work in harmonious partnership to protect, improve and restore the Bronx River corridor and greenway...” (Bronx River Alliance, undated). The Alliance’s Executive Director is also the Bronx River Administrator for the Department of Parks and Recreation.

Finally an organization existed that represented interests of the local citizenry while bringing to bear the capabilities, authority, and



“In those years, the mid-70s, the Bronx was fast becoming a burned-out wasteland, the victim of arson, rampant drug addiction and a host of other urban ills. ”

Barbara Stewart
New York Times
December 3, 2003

Source: : Bronx River Alliance

resources of the New York City Parks and Recreation Department, along with other local, state, and federal agencies.

The Alliance works closely with New York City Parks and Recreation to implement four program areas to further their mission: ecological restoration and management, greenway implementation, outreach, and education. A team for each program area was formed, consisting of community members, scientists, planners and educators. Each team works closely with Alliance staff to implement programs.

The Alliance maintains the spirit of “harmonious partnership” through their board of directors. The board is comprised of up to 25 voting members. Each Alliance team nominates two members to serve on the board. The remaining 17 board members are selected by the board. Appointments require at least a two-thirds majority vote. Additional board members are expected to contribute geographic representation, fund-raising ability, and community leadership. The board maintains ties with elected officials via non-voting, ex-officio membership to designees of the Bronx Borough President, the Parks Commissioner, and New York City Council Members representing districts adjacent to the river. This powerful structure fosters a sustainable organization that works to restore the Bronx River.

After nearly a decade of community activism and planning, the *Bronx River Alliance* released the *Bronx River Ecological Restoration and Management Plan* in May 2006, and the *Bronx River Greenway Plan* in June of the same year.

Planning for Ecological Renewal

Complete restoration is practically impossible due to the extent and impact of development along the Bronx River corridor. Instead, the Alliance established their goal as “*increas[ing] the number and length of river reaches which meet the conditions of an ecologically functional river in order to create a system that is sustainable and resilient and that possesses desired ecosystem conditions*” (Bronx River Ecological Restoration and Management Plan, 2006). The *Ecological Restoration and Management Plan* “*develop[s] a framework that will ensure a consistent and comprehensive approach to restoring wildlife habitat and water quality in the lower Bronx River*”.

While ecological integrity is paramount, the



This map breaks the river into the five segments dictated by the Greenway Plan.

Source: Bronx River Alliance



Created by Matthews Neilsen Landscape Architects, this drawing presents an alternative to the harsh, urban landscape of the South Bronx. Source: Sustainable South Bronx



Sustainable South Bronx

Majora Carter came to advocate for Bronx River restoration from a background similar to that of Torres-Flemming. She too grew up close to the river without knowledge of its presence. She had been raised with the goal of excelling in school and escaping the urban blight. Instead, though, she returned to the Bronx after graduate school to work for the Point Community Development Center. While working, she was contacted by Jenny Hoffner about generating interest in river restoration within the African American community.

She joined the Bronx River Working Group and, in 2001, became the founding director of a new not-for-profit, Sustainable South Bronx (SSBX).

Founded to address issues of land-use, energy, transportation, water and waste policy, and education, the SSBX aims to contribute to environmental and economic rebirth in the South Bronx area.

The SSBX obtained an initial grant of \$1.25 million for open space, and today has developed the Bronx Greenway Project. They have garnered nearly \$30 million for comprehensive development of green corridors coupled with river access throughout the South Bronx. Recently, SSBX has taken an innovative approach in applying for federal energy improvement grants in order to build green rooftops in the Bronx, thereby providing safe green space, and capturing or delaying the runoff into the Bronx River.



Despite all the progress to date, Carter stated that one of the greatest challenges was *“persuading people to join a cause when their home turf was deemed worthless by almost every action made by local, state, and federal government”* (Hopkins 2005). As she observed, *“The main issue was not simply that the South Bronx was ugly and dirty - rather that land use and zoning policy decisions helped to perpetuate the conditions and the problems.”*

Bronx River must also serve as a recreation corridor for Bronx neighborhoods. A series of parks and gardens are located along the Bronx River which tend to host waterborne activities such as canoeing, kayaking, swimming and fishing. The *Greenway Plan* attempts to accommodate recreational activities by defining a park system that will run the entire 26 mile length of the Bronx River including the an eight-mile bike/pedestrian path and linear park in the Bronx.

Balancing recreational needs with environmental concerns has been historically difficult. To facilitate cooperation among interested organizations, the Alliance segmented the Bronx River into five sections between its mouth and the northern city line. Stream sections were determined according to the general character of the river, local environs, and agencies with authority or jurisdiction. Each segment has local citizens and agencies working together on plans for their river segment, while the Alliance coordinates efforts and allocates funds among the segments. This structure balances local interests for recreation and greenspace with the need for an entire watershed approach to address environmental and water quality issues. In this way, the Alliance realized that development of the greenway must focus on the ecological integrity of the Bronx River in order to maintain the clean, sustainable system that people desire.

Uncertain Future

Efforts to revitalize the Bronx River have come a long way since the 1970s, but there is still much work to be done. Combined sewer overflows still dump raw sewage into the river after storms. The CSOs are viewed as a high priority for future analysis and restoration.

Stormwater management and water quality improvement are being jointly addressed by efforts to increase vegetation to intercept storm water runoff. A program to establish 'greenscape' on building rooftops has been instituted in the South Bronx. By planting grasses and trees on rooftops, and adding vegetation at ground level, precipitation is slowed and evapotranspired, thus reducing the effect of CSO overflows. First, the volume of water discharged to the river is lowered. Second, the remaining water is filtered so that it is less likely to carry pollutants. Con-

sequently, runoff related pollution and flooding are mitigated.

Conclusions

In summary, the Bronx River case study is one of the most complex and involved citizen based river restoration projects in the nation. The river has been impaired for nearly 300 years, and a grassroots movement has required over 30 years to reach the current level of organization and cooperation that exists under the umbrella of the *Bronx River Alliance*.

Today, the *Bronx River Alliance* consists of over 100 organizations which contribute to the restoration of the Bronx River and its watershed. Multiple projects and programs are conducted which engage thousands of people through member organizations, thereby maximizing citizen participation across a widespread geographical range and diverse public.

Documents such as the *The Bronx River Ecological Restoration and Management Plan* and the *The Bronx River Greenway Plan* set forth a framework of goals and policies providing for the river; thus allowing community groups a common understanding and vision when working on diverse projects with specific interests, such as park planning or recreational fishing.

From the beginning, the *Bronx River Alliance* hoped to achieve the following:

1. Protect and improve water quality.
2. Protect and improve aquatic and riparian plant and animal diversity and increase habitat.
3. Reduce environmental stresses on the ecosystem.

The plans "*established sound, achievable ecological goals, identified opportunities for restoration, and suggested priorities for restoration projects, management and policy.*" Yet the Alliance understood that it was necessary to modify desired environmental standards in order to accommodate political, economic, and social constraints.

Although much remains to be done, owing to the *Bronx River Alliance* and their partners, the Bronx River will shed its legacy as an open sewer system and soon become the river corridor that Bronx residents treasure.

Key Factors:

Bronx River Restoration Case Study

Identify the need:

[What problems indicate that the water body is in need of restoration?]

- Vast amounts of litter and debris in and along the river.
- Pathogen pollution from Combined Sewer Overflows.
- Toxic industrial chemicals in the river from discharges and runoff.
- Lack of riparian habitat and overall habitat diversity.
- Impervious surfaces increase the speed and quantity of runoff pollution entering the river.

History and Cause:

[What led to the water quality problems?]

- The Bronx River's utility as an energy source and transportation corridor made it one of the first rivers in the country impacted by industrial development.
- Numerous dams were built during the 1700's - 1800's.
- In 1840, the New York Central Railroad was built along the Bronx River, transforming the river valley into an industrial corridor.
- The rapid growth of New York City led to municipal and industrial pollution of the river.
- Combined Sewer Overflows (CSOs) dump a mixture of runoff and raw sewage into the Bronx River during rain storms.

Catalyst:

[What was the seminal event that led to public awareness and action?]

Progress made towards restoring the Bronx River was the result of a few persistent individual efforts. Before Bronx River restoration gained notoriety, the early cleanup efforts were led by lone visionaries such as Ms. Ruth Anderberg and Ms. Nancy Wallace, who were relentless in performing hands-on work as well as drawing attention to the Bronx River's potential.

- Police Commander Anthony Buza was disturbed by the correlation between the river's condition and the socio-economic class of the surrounding neighborhoods. He believed that cleaning up the river would help to build Bronx residents' sense of importance.
- Commander Buza held a meeting that was attended by Ms. Anderberg, a Bronx citizen. She was so inspired by what he said that she quit her job and founded the *Bronx River Restoration Project* to clean up the river full time.

Organizational Structure:

[How were committees and friends groups organized to accomplish tasks?]

- The movement to clean the Bronx River was grassroots driven for the initial years.
- As stewardship of the Bronx River became a greater issue, key individuals provided continuity across changing organizations that evolved over time.
- Multiple stakeholder groups cooperated by finding common ground among their individual interests.
- Planning for the Bronx River was performed along discrete stream segments according to neighborhoods. Decisions involved citizens from diverse ethnic and cultural backgrounds, key stakeholder groups, and city park planners. Local residents were well represented in key decisions.
- The *Bronx River Alliance* has become an umbrella organization that coordinates the activities of many separate organizations which share common goals for the river and surrounding communities.

Funding:

[What funding strategies were successful? Which were not?]

- During the 1970's and 1980's, little if any public funding was available for river cleanup or restoration. At the time, the *Bronx River Restoration Project* consisted of a small group of citizens that volunteered their time and money to clean litter and debris from the Bronx River.
- In 1997, the *Bronx River Working Group* was granted limited funding to complete the *Greenway Plan* and *River Restoration Plan* within several years.
- In 2001, the *Bronx River Working Group* was restructured to form the *Bronx River Alliance*, a not-for-profit corporation that could solicit and receive donations; thereby providing a mechanism to constantly fund new capital projects.
- The City of New York Parks and Recreation Department designated part of its annual budget and staff to provide ongoing maintenance and operation of greenspace along the Bronx River corridor.

Community Living & Design:

[How did organizers address open space needs and involve community members?]

Success of the *Bronx River Alliance* led to creation of the *Sustainable South Bronx* organization, which promotes ecological principles toward the entire watershed. Relationships between stormwater, impervious surfaces, pollutants on the ground, water quality, and human health is being taught to the community. Instead of avoiding the river, people's thoughts turn to recreation and enjoyment.

Community activities extend across the seasons and throughout the watershed. A group named "Rock the Boat" works with local children during the winter to build a replicate of a traditional Bronx River boat used in the 19th and early 20th centuries. In the spring, the boat is launched and used to conduct scientific research on the river. Most participants come from disadvantaged homes and boat building provides a focus and purpose.

The Bronx River has become an integral part of the community, and ironically it seems the river has become a tool to assist efforts to heal the community by reducing youth crime and vandalism while at the same time, the community has stepped up efforts to heal the river.

Water Quality:

[How were water quality issues addressed?]

- Removed litter and debris.
- Shifted away from polluting land uses along the river.
- Planted native vegetation along the river's banks to stabilize the shoreline and filter runoff.
- Established a program to construct new waste water treatment plants and to close the CSOs over time.
- Created new wetlands adjacent to the river.
- Improved storm water management within New York City.
- Upstream from New York City, Westchester County has implemented a watershed Best Management Practices plan to mitigate non-point pollution sources.

Habitat:

[How were habitat needs addressed?]

- Replaced concrete walls with shell filled gabions to create attachment points for aquatic plants and estuarine invertebrates.
- Removed invasive species and reintroduced indigenous plant species.
- Increased the number of plants in the riparian corridor.
- Stocked herring in order to restore the once naturally spawning species to the river.

Degree of Similarity:

[In what ways is the Bronx River's situation similar to Onondaga Creek's issues? In what ways is it unique?]

Bronx River has greater human impact

The magnitude of impact is larger than that to Onondaga Creek because of the dense urban environment and greater population in the Bronx. The overall length of the Bronx River is 23 miles; about three miles shorter than Onondaga Creek, but the sources of pollution are greater in New York City.

Different Impetus

Historic disregard for the water body by public officials is a factor shared by the Bronx River and Onondaga Creek. After 30 years Bronx environmental and community activists have transformed a grassroots effort into a major river stewardship organization that eventually garnered official support from New York City. The attention of community activists and local citizen groups was drawn to Onondaga Creek by several Onondaga County CSO control projects that were negotiated via federal court as a result of a citizens' lawsuit over Clean Water Act violations in Onondaga Lake.

Ad hoc working groups as incubators for more formal organizations

The important transition point for the Bronx River project was the formation of the *Bronx River Working Group*. The Working Group created the Greenway and Restoration plans, and then reformulated as the *Bronx River Alliance* to implement projects, and advocate for the river. The Onondaga Creek project has a similar working group approach, although commensurately smaller relative to the density of citizens living near the creek as compared with the Bronx.

Garnering the working group inertia and using it to establish a more formal organization is a lesson to be learned from the Bronx River case study. The Onondaga Creek initiative might also evolve a sustainable organization from the current Working Group or Project Team. Any resultant or-

ganization would be responsible for oversight and implementation of the *Onondaga Creek Conceptual Revitalization Plan*.

Access to the Water

A lesson from the Bronx River case study, and from most others, is to gain access to the water. Barriers to public access, whether a fence or a highway, isolates people and prevents recreational use. A sense of ownership is lost; whereas contact with natural waterways tends to foster different attitudes.

Some of the first people to promote cleaning the Bronx River in the 1970's sought recreational opportunities such as fishing, boating, or bird watching. As contact with the river increases, so too does public pressure for improved water quality. Over time, more and more people take enjoyment, ownership, and eventually pride in the river.

People began to protest the river's condition and petitioned for cleanup and restoration only after the river was used as a recreational resource. Thus the spiral of decline was reversed. Promoting recreational use of Onondaga Creek may be one of the means to help in its restoration.



In the cases of both Onondaga Creek and the Bronx River, making the water accessible to the public is a central strategy used to gain public and political support

Summary & Lessons:

[Recap and summarize; identify lessons for Onondaga Creek]

Government support is important

Public officials and citizens must work together towards common goals. Some politicians will aid a cause because they are interested in the issue; all politicians will respond to public will and political force. Progress on the Bronx River was slow until the city administration realized in the mid-1990s that the public saw restoration as an important and enduring issue.

A lesson for the Onondaga Creek Project is that a special opportunity presents itself. Community forums and the working group have raised community awareness and public expectations of Onondaga Creek. Organizers need to harness public sentiment and gain political action.

Continuity of effort is essential

For the Bronx River, despite different organizations that sequentially directed river cleanup and restoration efforts, there was always a passing of the organizational reigns during the transition. This important member continuity sustained consistent pressure to improve the river. Institutional knowledge and influence was not lost during reorganization.

Onondaga Creek can benefit from this lesson by transitioning members of organizations currently working on revitalization to any new entity that will manage and/or execute future projects. This needn't be a permanent situation, but it is important that current working group or project committee members help establish any new organization in order to preserve institutional learning achieved to date.

River renewal and urban renewal go hand in hand

The Bronx River runs through some of the most economically depressed neighborhoods in New York City. With little disposable income for travel, the river can be a critical natural asset for local residents, providing it is accessible and safe. Efforts around the Bronx River have affected nearby communities. Neighbors along the River have recently repaired abandoned buildings

to improve residential neighborhoods. Property values are increasing, crime is falling, and people and investors are moving back to the Bronx. Economic and social improvements are potential secondary and tertiary benefits of river or creek restoration. The repayment cannot be estimated in dollars alone.

Onondaga Creek can serve as the nexus for urban revitalization in the poorest parts of Syracuse. A delapidated house, when located near a new park with a fishing pond and small wetland for wildlife, will increase in value and desirability. It is well understood that brief encounters with nature are good for mental health and wellbeing. An important lesson learned from the Bronx River case study is that urban blight and neighborhood decay can be mitigated and reversed by reconnecting communities with nature. In New York City, the value of land increases with proximity to Central Park. In a similar way, it is predictable that community pride, property values, and occupancy will increase, while crime and disrepair will decrease, if projects to open access and restore Onondaga Creek can be accomplished in Syracuse.



the guadalupe river story

The Guadalupe River is fed by a watershed 170 square miles in size. With 80 miles of surface streams and rivers, and six reservoirs along the way, the river travels from its mountainous headwaters, through the city of San Jose, to where it empties into southern San Francisco Bay.

Between 1846 and 1975 the Guadalupe River Watershed was home to the largest mercury mine in North America. Today the mine's legacy lives on with elevated mercury concentrations in sediments, water, and the aquatic food chain. The reservoirs thermally stratify in the warm summer months when sediment bound mercury is released to lower anoxic (oxygen-deprived) waters. The cycling of mercury between sediment and surface water is continuous, while aerobic river waters work to re-sequester the mercury back into stream sediments. With the onset of turnover and the re-introduction of oxygen at depth in the reservoir, major precipitation events can rapidly redistribute sediments and disperse mercury down the watershed, creating widespread problems.

History

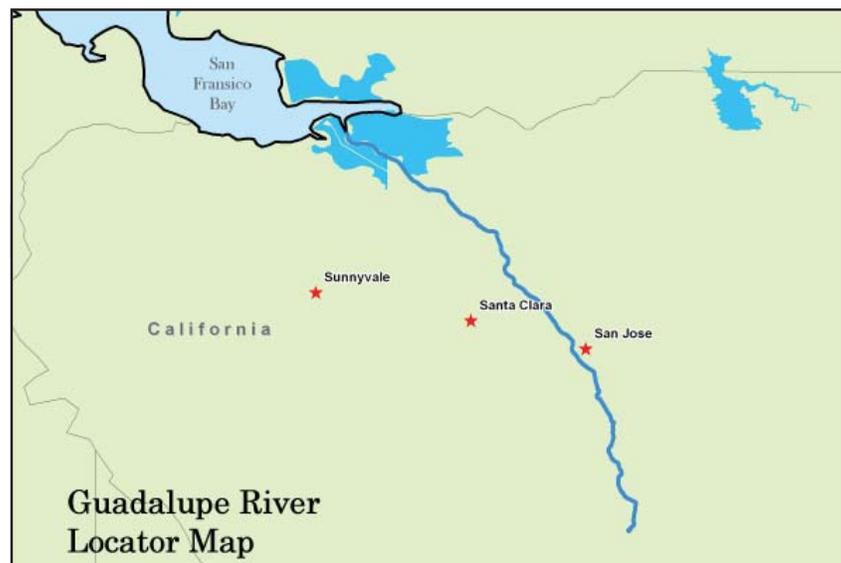
Flooding and Development

The City of San Jose grew along the Guadalupe River, which was historically important for irrigating fruit crops and transportation. Today the fields and orchards are gone and San Jose is an urban center. Rapid development of the area occurred with the rise of the computer industry. Land was cheap and local governments were ill prepared to plan for the future. As human settlement quickly spread along the banks of the Guadalupe, floods went from bad to worse with severe flooding causing millions of dollars in damage.

In the 1960s two separate planning initiatives involving the river were introduced. One suggested creating a linear central city park to provide open space next to the River. The other proposed constructing flood control structures to mitigate floods. In the following decades, these two divergent plans melded to create a concerted effort to rehabilitate the Guadalupe River.

In 1992, after nearly 30 years of planning and analysis by the U.S. Army Corps of Engineers (USACE), the Guadalupe River Flood Control Project began construction. Unfortunately, the USACE plan called for deep, channelized river sections surrounded by chain link fence, which were fundamentally at odds with the public's desire for a park and recreational space.

By 1996 a habitat impact study conducted by the U.S. Fish and Wildlife Service (USFWS) concluded that implementing the flood control project would cause adverse habitat impacts and would negatively affect the threatened



steelhead trout and Chinook salmon. Both migrate through the Guadalupe to reach breeding grounds. Listing the once numerous migratory steelhead trout as a threatened species drew the attention of several regional environmental groups, such as the Guadalupe-Coyote Resource Conservation District, the Natural Heritage Institute, and Trout Unlimited.

Timing of the impact study coincided with the announcement of the Flood Control Project, and the groups mobilized. In May of 1996, the environmental organizations filed lawsuit against the Santa Clara Valley Water District, the City of San Jose, and the USACE. In order to avoid litigation, the USACE and the Santa Clara Valley Water District entered into negotiations with the environmental groups. All parties agreed to work toward an acceptable mitigation plan. Construction on the channelization project was halted, and eventually the groups decided to formally work together on a comprehensive design solution. The new project would devise a better solution to address the collective problems of flooding and habitat loss. The resultant partnership was named the *Guadalupe River Flood Control Project Collaborative*.

Organization

Guadalupe River Flood Cooperative

The *Collaborative* evaluated three design scenarios with concerns for flood control, park plan goals, and habitat requirements:

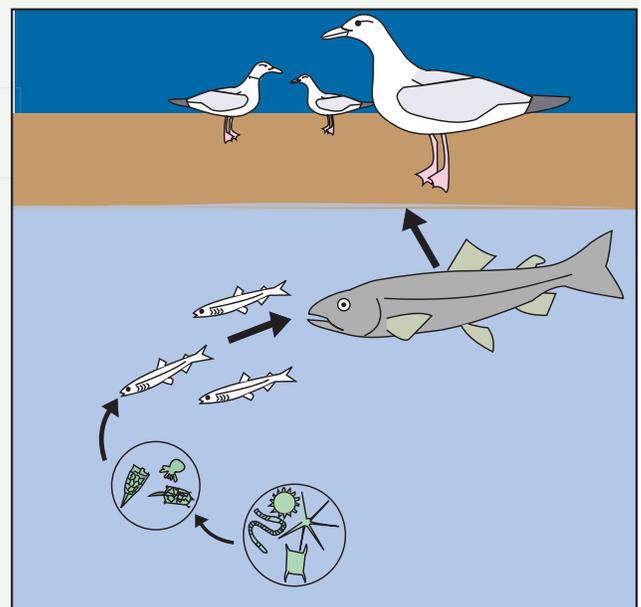
1. The original USACE flood control design.
2. A 'cured' USACE design which applied mitigation techniques to the original design to improve habitat
3. A redesign with a different engineering approach involving large underground culverts (17 ft high by 25 ft wide) to detain and carry away flood waters.

This third design option had previously been considered by the USACE but was thought to be too expensive. Despite levying the greatest initial capital cost, especially since work already constructed would have to be removed and rebuilt, the third option had the best habitat restoration potential and lowest annual operating costs. By meeting migratory fish habitat requirements, and considering the economic impacts of the fishery,

Bioaccumulation in the Food Chain

Mercury in sediments and overlying surface waters is incorporated into living tissue via microbes, fish, and birds where it bioconcentrates in the food chain.

Tiny anaerobic micro-organisms metabolize metallic mercury into methyl-mercury, the most toxic form of mercury, within the oxygen free sediments. Benthic invertebrates feed in the sediments and can uptake the mercury. Bottom feeding fish consume benthic invertebrates. When overlying surface waters are devoid of oxygen, methyl-mercury diffuses from the sediments to the water column where it assimilates into phytoplankton and algae. Zooplankton feed on phytoplankton and algae, which in turn are fed upon by fishes. Each successive step in the food chain concentrates the mercury at higher levels in living tissues, a phenomenon known as bioaccumulation.



Guadalupe River Restoration Timeline

*A brief progress summary. How did organizers come this far?
Where do they stand now?*

1846-1975 *The largest mercury mine in North America operates in the Guadalupe River watershed.*

1960s *Two separate planning initiatives are introduced to address flooding problems. One suggests creating a park to provide open space next to the river. The other proposes concrete flood control structures and fences that restrict access.*

1992 *The U.S. Army Corps of Engineers begins construction of the second proposal, despite public opposition.*

1996 *A habitat impact study conducted by the U.S. Fish and Wildlife Service concludes that the project is detrimental to local wildlife. Construction is halted. Guadalupe River Flood Control Project Collaborative is formed to find a socially and environmentally suitable solution.*

2002 *Construction of new design commences. This design incorporates large underground culverts that detain and carry away flood waters but leave habitats in tact.*

2005 *The Guadalupe River Watershed Mercury Total Maximum Daily Load Project releases data about reducing mercury concentrations in Guadalupe River and San Francisco Bay.*

the third option was deemed financially feasible in the long term. Re-construction according to the new design commenced in 2002.

The resulting project is a subtle melding of major flood control facilities and a popular urban park. The ecological vitality of the Guadalupe River has been restored. Rather than deepening the riverbed and adding steep concrete walls bound with chain link fences, adjacent lands are dedicated instead to open green space, forming flood control channels to divert the flow during severe storms. Major floods are further mitigated by underground culverts which detain and redirect water. New indigenous plantings in riparian zones slow storm water concentration times and provide cover for birds, fish, and wildlife. The greatest benefit is provided to residents, however, by the river park that runs through the center of San Jose.

Guadalupe River Park & Gardens Corp.

While the Flood Control Cooperative focuses attention on the physical design and capital projects associated with the river, the *Guadalupe River Park and Gardens Corp.* attends to recreation and stewardship in and around the river. The not-for-profit organization was formed in 1995 when two existing Guadalupe Park advocacy groups merged into one. Now, the *Guadalupe River Park and Gardens Corp.* (<http://www.grpg.org>) is the leading organization in citizen volunteer coordination.

Guadalupe River Today

Today the flood control project is about half-way finished, and the more than three mile long linear park system is about one third complete. In March 2007, the Santa Clara Valley Water Authority started releasing pulses of water from the reservoirs to the river's tributaries to compensate for unusually low water levels and accommodate trout migration. Juvenile steelhead need deeper water to successfully migrate from the creeks to the ocean. Thus the system is now managed to address a variety of dynamic environmental needs such as critical water flows as well as the physical and biological characteristics of essential habitat.

The final design provides better flood water management, a superior park system with ample open space, outdoor activity areas, educational



Today the Guadalupe River provides citizens of San Jose with a safer, healthier river, and an extensive park system in an urban, industrial setting.

exhibits, and public access to the river. From an ecosystems perspective, the river harbors suitable habitat, maintains fish navigation features, and supports steelhead and salmon spawning runs.

The area that had once been a degraded urban flood plain and deleteriously impacted by surrounding land uses is now the heart and common identity of San Jose California. The citizens of San Jose are proud of their new park system. The residents have learned that by working together rather than against each other they built a stronger community and a more beautiful and economically sound city in which to live.

Revisiting Guadalupe's Mercury Legacy

The issue of mercury has yet to be completely resolved. The *Guadalupe River Total Maximum Daily Load Project (TMDL)* was formed to research the water quality problems and produce a watershed-wide mercury management strategy. Headed by the Santa Clara Valley Water District, the TMDL released a report in 2005 detailing a conceptual model for mercury dissemination throughout the watershed. Project team members are currently trying to understand the genesis, transport, and fate of the mercury in the river. Once this system is better understood, a plan for amelioration will be drafted. In addition to serving as a means by which to clean up mercury in the Guadalupe River, the TMDL will also endeavor to reduce the amount of mercury that reaches the San Francisco Bay.

Key Factors:

Guadalupe River Restoration Case Study

Identify the need:

[What problems indicate that the water body is in need of restoration?]

- Mercury pollution from mining.
- Flood control problems.
- Public demand for green space in San Jose's urban landscape.

History and Cause:

[What led to the water quality problems?]

- Mercury contamination in sediments from former mining operations.
- Over a period of years, unorganized, unplanned growth from a rural agricultural society to an urban residential industrial complex resulting in rapid, uncontrolled storm water runoff and flooding
- Poor water quality and loss of fish habitat for migration and spawning.

Catalyst:

[What was the seminal event that led to public awareness and action?]

Several regional environmental groups, (the Guadalupe-Coyote Resource Conservation District, the Natural Heritage Institute, and Trout Unlimited) filed a lawsuit after steelhead trout were listed as a threatened species and the U.S. Army Corps of Engineers and the Santa Clara Valley Water District announced a plan to channelize the river with 1.5 miles of concrete in order to control floods. Implementation of such a design would have extirpated steelhead trout from the Guadalupe River.

Organizational Structure:

[How were committees and friends groups organized to accomplish tasks?]

- Two existing park advocacy groups merged in 1995 to create the *Guadalupe River Park and Gardens Corporation*.
- A year later, the City of San Jose, the Santa Clara Valley Water Authority, the U.S. Army Corps of Engineers, Guadalupe-Coyote Resource Conservation District, the Natural Heritage Institute, and Trout Unlimited joined together to create the *Guadalupe River Flood Control Project Collaborative*.
- Respective organizational roles are defined such that the *Park and Gardens Corporation* oversees park and open space development, while the *Flood Control Collaborative* oversees environmental remediation.

Funding:

In any project, funding plays a major role. In the case of the Guadalupe River, funding has mostly been derived from grants and matching funds. Some examples of funding sources for 2001 illustrate the strategy to implement projects by stream segment:

UPPER GUADALUPE RIVER :

\$7,000,000 to \$9,000,000 estimated total

- \$730,000: State Resources Agency;
- \$2,000,000: Safe Neighborhood Parks and Recreation.

DOWNTOWN SEGMENT :

\$4,000,000 - \$5,000,000 estimated total

- Total project costs/Park Avenue to Coleman: \$12,000,000 in trail improvements/park acquisition and landscaping funded as betterments to the Flood Control Projects from RDA and State Funding.

AIRPORT SEGMENT :

Total cost unknown, part of transportation project

- Part of the Caltrans freeway extension project.

LOWER GUADALUPE RIVER :

\$800,000 to \$1,000,000 estimated total

- Trail project funding unknown at this time, but could come from transportation sources as an alternative commuter project.

LOS GATOS CREEK SECTION

(no total estimate)

- \$2,750,000: City Park Bond

LOS GATOS CREEK REACH 4:

\$2,000,000 - \$3,000,000 estimated total

- Lincoln Avenue to Auzerais Avenue: \$200,000 Recreational Trails Program grant (State)
- \$100,000: Habitat Conservation Program grant (State)
- \$500,000: San Francisco Bay Conservancy grant
- \$750,000: Transportation for Livable Communities grant
- \$2,750,000: City Park Bond
- \$462,000: other City funds

The Parks Manager concludes his memo with a list of possible sources for future funds:

Possible funding sources to augment City's funds are:

- State Transportation Improvement Program and/or Congestion Mitigation, Air Quality
- Improvement Program and/or Bicycle Lane Program
- State Environmental Enhancement Program
- Federal Transportation Equity Act for the 21st Century (TEA-21) and/or Transportation for Livable Communities
- MTC's SB45-Congestion Management Program and/or Regional Trails Transportation
- Improvement Program
- Community Development Block Grant Program
- San Francisco Bay Area Conservancy Program
- Land and Water Conservation Fund
- Transportation Fund for Clean Air Program
- California Recreational Trail Program
- Santa Clara Valley Transportation Authority's Measure A/B
- Santa Clara Valley Water District's Trails Program

Community Living & Design:

[How did organizers address open space needs and involve community members?]

Efforts to develop open space along the river have been ongoing since the 1960s. The San Jose Planning Department oversaw early projects with minimal public input. However, as a city agency the Planning Department had acquiesced to the political focus on flood control and adjacent open space, rather than on the river as a living corridor.

Citizen involvement occurs via several member organizations, such as Trout Unlimited, who could petition the government as an organized group. A small group of environmentally focused organizations brought a lawsuit against San Jose to stop construction of flood control channels that would destroy the remaining fish habitat. The lawsuit compelled the city of San Jose and the USACE to collaborate with the environmental groups to come up with a design that would accommodate fish habitat requirements and ecosystem needs of the Guadalupe.

Water Quality:

[How were water quality issues addressed?]

- Restore and protect the floodplain.
- Design so that flooding occurs in the flood plain, thereby retaining runoff, filtering precipitation, and recharging ground water.
- Potentially damaging floods are diverted and detained by underground storage tunnels.
- Mercury monitoring, TMDL estimates, and chemical transport and fate analysis research is underway to develop strategies to control mercury deposition in the river.

Habitat:

[How were habitat needs addressed?]

- A restored natural floodplain provides riparian habitat.
- Water releases from reservoirs are scheduled to maintain deeper waters and shift flows needed for steelhead migration.
- Water releases also maintain cold water temperatures necessary for fish survival.

Degree of Similarity:

[In what ways is the Guadalupe River's story similar to Onondaga Creek's? In what ways is it unique?]

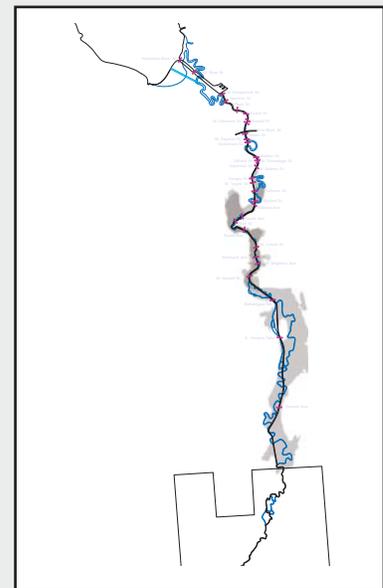
Similar impacts

The Guadalupe River and Onondaga Creek have been similarly impacted by residual industrial/mining waste products that remain environmentally active at present. The approach to flood control was also similar: enlarged concrete lined channels bordered by chain link fence. The respective times were different, however. Syracuse channelized Onondaga Creek in the first half of the 20th century, when ecological disturbance was not an engineering consideration. By the 1992 proposal to channelize the Guadalupe River, the environmental consequences of river channelization were well understood.

Similar intervention but less enlightened local government

Environmental groups in San Jose brought legal action to halt projects known to be detrimental to the environment. The courts have also been important for Onondaga Lake and Onondaga Creek cleanup. In both cases, local governments have placed short term economic savings ahead of long term environmental health.

In San Jose, the proposed government plan was seen as the least expensive alternative due to lower construction costs. An earlier study had proposed underground storage to lessen flood damage, but that alternative was thought to be too expensive. A more in depth study, after the courts halted construction, showed that long term operational costs would be less with the more environmentally friendly design; thereby rendering the preferable plan the most cost effective one as well as the favorable environmental solution. In the case of Onondaga Creek, the local government is still promoting a CSO mitigation strategy that uses disinfection to mitigate wet weather bacteria discharges, while not attending to dry weather releases from old leaky sewers, nor will nutrient discharges be reduced to the degree required for long term environmental health.



In response to Onondaga Creek flooding (shown below), concrete channels were constructed to control the river's flow (above).



Summary & Lessons:

[Recap and summarize; identify lessons for Onondaga Creek]

Similar citizen dynamics

Of the three case studies reviewed in some depth, the organizational approach of the Guadalupe is the most similar to that of advocates for Onondaga Creek. The Bronx River story is one where grassroots activism mobilized the community. The South Platte River is an example where enlightened top-down leadership unified the community around a common goal. The Guadalupe River and Onondaga Creek are case studies where environmental groups have been the impetus for change. Neither the Guadalupe River nor Onondaga Creek, to date, have enjoyed full or open support from local governments.

The lesson is to establish environmental coalitions and engage the public. If possible, advocates need to cultivate a constituency for Onondaga Creek and promote the creek as a prominent issue during local political campaigns as a means to gain government support. Another strategy would be to focus and maintain media attention on the creek.



Environmental groups have been the major drivers behind the changes in both the Guadalupe River and Onondaga Creek cases. Here, volunteers lead educational tours of the Onondaga Creek area to raise public awareness.





The South Platte River was called "a mile wide and an inch deep, too thin to plow, too thick to drink."

Photo Source:
Greenway Foundation

the south platte river story

The South Platte River flows in a northwesterly direction from its headwaters in the Rocky Mountain Front Range, to Denver where it runs through the city for 10.5 miles. It continues through rural agricultural areas of eastern Colorado and Nebraska, finally joining the North Platte River. At the confluence, the North and South Platte become the Platte River, which eventually joins the Missouri River and then the Mississippi River, on the way to the Gulf of Mexico.

The broad nearly flat Platte River Valley derives its name from the French word for “dull” or “shallow.” Historically, the South Platte was an ephemeral river that could dry up in the summer months. It was infamously described by early settlers as “a mile wide and an inch deep, too thin to plow, and too thick to drink.” The riparian corridor was devoid of trees and shrubs, and when the river contained water, it was slow moving, shallow, and hot most of the time; except during the spring when snowmelt could turn the river into a raging torrent. A shifting river bed resulted from the interspersed periods of slow stream meandering and deep rushing torrents. The lack of a reliable flow and volume of water made the South Platte unsuitable for agriculture or transportation, and the destructive floods and shifting riverbed made development risky if not impossible.

These characteristics discouraged settlement along the South Platte. The only economic activity was trapping, primarily for beaver pelts, which were called “furry bank notes.” For years, the South Platte River and its surrounding areas held no attraction for settlers because it was “a raging torrent one moment and a dry bed of sand the next” (Silkenson, 1992).

History

1858-1860: GOLD! Boom and Bust

So things remained, with little in the way of human settlement until November 22, 1858 when prospectors discovered gold at the confluence of Cherry Creek and the South Platte River. Word spread quickly and prospectors rushed to the place where Denver would one day stand.

Between 1858 and 1860, the territory saw an influx of some 100,000 new residents either searching for gold or looking to get rich by providing services to the prospectors. Most people didn’t stay long since only a few claims produced significant amounts of gold. The barren environment and fluctuating river made agriculture impossible, and the lack of ready raw materials,

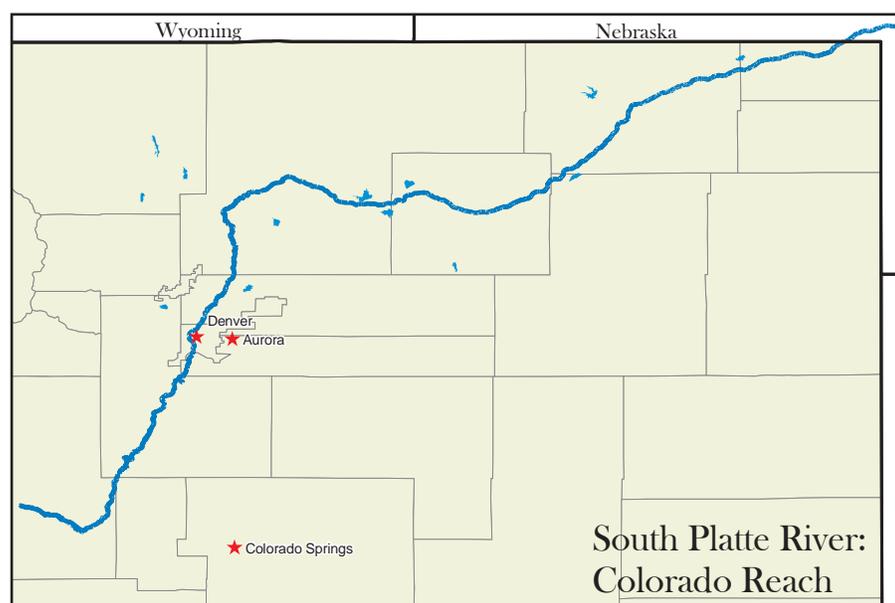




Photo Source: Greenway Foundation

Lack of reliable flow and volume of water made the South Platte unsuitable for agriculture or transportation.

reliable water power, and good transportation routes, limited manufacturing and trade opportunities. In fact, out of 100,000 arrivals between 1858 and 1860 only 34,000 remained by the end of 1860.

1860-1870: **Struggles without an Economic Base**

For the next decade, people continued to trickle out of Denver so that by 1870 the population was down to nearly 5,000 people. With the realization that neither gold nor agriculture would serve as an economic base for the new city, Denver's civic leaders pinned their hopes on geography. Situated at the edge of the Rockies, Denverites knew that they had a location that could serve as a hub for trade and transportation between the east and west.

Denver struggled to survive for a brief period after the gold boom and bust. Its first newspaper, the *Rocky Mountain News*, announced boat departures from Denver to Pittsburgh, New

York, and New Orleans, in an attempt to establish Denver as the steamboat hub of the Rockies. This was wishful thinking on the part of the newspaper and civic leaders. The misguided effort to develop the South Platte as a commercial transportation corridor ran aground for the same reason that the steamships did – the South Platte could not sustain enough reliable flow of water to maintain a shipping industry.

1870-1900: **Railroads to the Rescue**

Denverites quickly learned the South Platte River was unsuitable for navigation, but the city continued to promote deceptive claims. Civic leaders were correct in asserting that Denver's location along trade corridors could be its salvation, but they were wrong to expect the South Platte to serve their purpose. The river was still a trickle that could become a torrent and shift its course in an instant.

The much needed mode of reliable transportation arrived with the railroad. The Denver Pacific Railroad opened on June 24, 1870. A web of steel grew from Denver into the surrounding mountains and valleys, bringing mined ore from the region around Denver to the city for smelting. Crops and hides were shipped for consumption or trade. Denver was back on track.

By 1900 dozens of railroads served Denver, and a hundred trains a day ran through Denver's Union Station, making it the central rail hub of the Rocky Mountains. Once again development attracted people to Denver. Between 1870 and 1900, Denver's population grew from 4,759 to 106,713.

Land Use Change and Urban Infrastructure

Unlike the transient gold rush population bubble of 1859, the new railroad growth resulted in well established communities by the end of the 19th century. The need for urban infrastructure such as roads, water supply, and sewers increased commensurately. The demand for water could not be met by the South Platte River. Consequently, the draw from across the conti-

ental divide increased, along with the number of dammed reservoirs for drinking water and irrigation.

The first irrigation ditches were built in 1870 near Greeley Colorado. By 1886, Denver had constructed a sewer system to serve 54,000 people through 3,050 toilets and 3,226 kitchen sinks. The untreated sewage was piped directly to the South Platte River.

1900-1950

A River Grows Through It

During the first half of the 20th century, Denver and the South Platte River Basin experienced gradual, yet constant growth. Denver's economy diversified from a foundation of railroads, agriculture, livestock, and minerals, into derivatives such as smelting, leather products, flour, brewing, canneries and other industries that were natural offshoots of the area's natural resource base. As the need for petroleum increased with automobile use during the first half of the 1900s, a number of oil and natural gas companies located headquarters in Denver. With the advent of powered flight, Denver was determined to not be bypassed by the new mode



By 1886, Denver already had a sewer system serving 54,000 people through 3,050 toilets and 3,226 kitchen sinks. The untreated sewage was piped directly to the South Platte River.

Photo Source: Greenway Foundation

of transportation. Having benefited so from the railroads, Denver aggressively promoted itself as an aviation hub. The Denver Municipal Airport was completed in 1929 and was rededicated as Stapleton Airport in 1944.

An increase in food production and services was necessary to support the growing city. Agricultural communities emerged and spread into areas around Denver in order to meet the growing demand for food. The South Platte River, the only local source of water despite its unpredictable nature, was used for irrigation. Farmers soon became frustrated, however, by the fluctuating water level and shifting river bed which would move far from irrigation head gates after periodic floods. To tap a more reliable source of irrigation water, farmers started to use transmountain diversions from across the continental divide, which had originally been constructed to supply miners' sluices.

Throughout the first half of the 20th century more diversions were built, along with irrigation reservoirs to regulate the flow of water. As more and more irrigation projects and municipal water supply projects brought water from other watersheds across the continental divide to Denver, the South Platte River was left to carry the spent water away. During this same time period, polluting land uses such as Department of Public Works storage yards, slaughterhouses, locomotive maintenance yards, electric power plants,

and other insults to water quality were located along or near the river. This new and constant supply of irrigation water combined with sewage inputs and industrial pollution, dramatically changed the nature of the South Platte from an intermittent 'flashy' river to one with a relatively constant and increasingly polluted flow.

1950's - 1970s: Post War Explosion Degrades the New River

After World War II, booming oil companies built 40 and 50 story skyscrapers in Denver; forever changing Denver's skyline and increasing the density of people using the urban core along the South Platte River. The channelized, constantly flowing South Platte River, fed by transmountain diversions and regulated by an array of reservoirs, was no longer the ephemeral "nothing of a river" of the mid-1800s. It seemed the river had been tamed; it was no longer considered a flooding threat to the city.

No longer important for commerce, and mostly mitigated from flooding, the South Platte River became easy to ignore. Urban blight festooned its banks with rubbish, garbage, and litter. Incompatible uses such as Department of Public Works storage yards, automobile re-



The South Platte was dramatically changed from an intermittent 'flashy' river to one with a relatively constant, and increasingly polluted flow.

*Photo Source:
Greenway Foundation*

South Platte River

Restoration Timeline

*A brief progress summary. How did organizers come this far?
Where do they stand now?*

1965

After the 1965 flood, two flood control dams were built. A study of methods by which to clean and revitalize the South Platte produced a large-scale plan with a \$625 million price tag. The plan was shelved due to complexity and expense.

1974

The Platte River Development Committee is formed and successfully improves the river corridor and adjacent open space.

1980s

The Platte River Development Committee begins to lose momentum. The organization disbands.

1990s

South Platte River Working Group was established to review success of revitalization efforts and recommend future improvement projects.

1995

South Platte River Commission oversees the Platte River Corridor Project, and develops the Platte River Long Range Management Framework to insure future stewardship of the river.



Whatever item you could think of, chances were you could find one or a thousand discarded in the South Platte.

Photo Source: Greenway Foundation

cycling facilities, and railroad equipment and maintenance facilities were located against the river banks. Flow consisting mainly of irrigation and sewer effluent wound its way through Denver. Power plants, business and industry, and economically depressed neighborhoods flanked much of the shoreline. These blighted neighborhoods with high levels of crime and vermin dissuaded visitors and caused people from outlying areas to avoid the river altogether. This lack of

connection between people and the water left the river without a champion to advocate for its revitalization.

So the South Platte was used as a public dumping ground. Denver continued to prosper, and little attention was given to the river amidst the distractions of a bustling city. The polluted garbage filled river snaked through Denver. Mr. Joseph Shoemaker, who became a leader in the revitalization efforts, vividly described conditions

of Denver's River during the 1960s and 1970s in this way:

"Whatever item you could think of, chances were you could find one or a thousand discarded in the South Platte – old mattresses, refrigerators, grass clippings, dishwashers, lawn mowers, stoves, TV sets – anything that people threw out. At one point the river even carried a layer of discarded feathers from a pillow factory. But as many feathers as there were, they were unlikely to outnumber the most plentiful item of all, rubber tires. They were spread along the shores, bounced and tumbled in the white water, and suspended on bushes and trees beside the river. If the supply ever dwindled, a good rain seemed to flush tires out of the hill-sides, and the South Platte's staple in rubbish was quickly replenished."

Denver's river had no constituency, unless the multitudes who misused it were counted as such.

July 16, 1965: **The River Floods**

Misused and disregarded the South Platte River constantly washed the effluent away and wore the city's trash along its banks. The impact of this abuse remained relatively unremarkable until June 16, 1965. On that day, a one hundred year flood hit the South Platte River basin.

Average flows for the South Platte River are around 300 cubic feet per second (cfs); high water flows can sometimes be ten times greater. Rainfall on June 16, 1965 swelled the river's flow to an astounding 150,000 cfs, 500 times the average rate. Destruction was widespread and catastrophic. The raging flood picked debris from the river's banks and hurled it downstream. Moving mountains of water-born debris slammed into and knocked down bridges. Where the bridges did not collapse, huge piles of debris formed dams which forced the river out and over its banks. Power plants were blacked out. Pieces of entire buildings, automobiles, furniture, and all sorts of matter were swept from city streets downstream. The railroad yards were

underneath 12 feet of water.

The flood damage bill totaled \$325 million. Denver could no longer afford to disregard its river, but disrespect was still an issue. In order to prevent such floods in the future, Denver added the Chatfield Dam on the South Platte and the Bear Creek Dam on the Bear Creek tributary, both upstream from the city. These new flood control structures, along with the already existing Cherry Creek Dam, provided Denver future protection against floods. The city responded to the 1965 flood with a study that not only examined the flooding, but also attempted to identify ways to revitalize and beautify the South Platte River corridor. However, with construction of new dams to regulate water flow, and without further flooding, the city reverted to past habits of neglect and abuse.

The status quo remained for the next decade. Denver had mitigated the flood threat, and despite the initial promise of revitalization, turned its back on the South Platte once again, allowing the incompatible uses and trash accumulation along the river's edge. The desire to make the South Platte River cleaner, healthier, and attractive for human use languished in the hearts of many Denver citizens, but the political will and funds did not exist.

Organization

1974: **The Platte River Development Committee**

A convergence of political will and funding finally occurred in 1974 when Mr. Joseph Shoemaker, a state senator from Denver, and Mayor William McNichols briefly met in the Mayor's office. That meeting launched the *Platte River Development Committee*, by targeting federal revenue sharing funds, tax money that the federal government distributed back to local governments for discretionary projects. Mayor McNichols received \$1.9 million in revenue sharing funds for Denver in 1974 and he decided to use the money to help the South Platte River.

In June of that year, Mr. Shoemaker visited San Antonio, and after seeing the San Antonio River as a vital part of the urban landscape and a popular amenity for citizens and tourists, he

returned to Denver with the idea of something similar for the South Platte. A few days later, he made an unannounced visit to Mayor McNichols. The Mayor was already looking to form a committee to direct how the \$1.9 million could best be spent to improve the river. Mayor McNichols appointed Mr. Shoemaker as chairman of the new *Platte River Development Committee* (PRDC). Synchronicity finally favored the South Platte River.

Rallying the community to the cause

The PRDC performed extensive public outreach. Outreach to the community was conducted on several fronts, and a communication and education campaign was initiated to market the vision for the river. Important decision makers including members of the Colorado Legislature, business leaders, and the media were regularly given lunchtime tours of the River. The tours targeted influential people, who in turn would become well informed about the goals for the South Platte, and could then foster more financial and political support within their organizations.

Something for everyone to do

The PRDC is a quasi-governmental organization. Several committee members were former public administrators familiar with the workings of government, yet the committee is not bound by the regulations or procedural hurdles of government. Government officials conveyed an aura of authority while the all volunteer membership of the committee helped stem issues of job protection or political favoritism that can often be damaging in the public eye. The PRDC became the nexus for government and the people of Denver to rally around South Platte revitalization.

The PRDC involved multiple branches of government, employed multiple design firms, and engaged civic and cultural groups and solicited numerous volunteers. The committee provided a role for everyone. Civic participation and pride grew as a result.

Organizing the revitalization process

Members of the PRDC were aware that past efforts to improve the South Platte had bogged down in bureaucracy and over analysis. Previous discussions ended with several studies but

Something for Everyone to do:

- Schools, scouts, churches, and civic organizations provided plantings and labor.
- Denver's public works and parks departments were put at the disposal of the committee to provide assistance.
- Denver's planning department provided adjunct committee members.
- Formation of Greenway Trail Rangers to maintain the park system along the river.

no action. The PRDC maintained that action was necessary and they needed to do something for the river that would be visible and used by the community. They also felt that getting some results in short order would give credibility to the committee and encourage more citizens to join the effort.

The committee took a divide and conquer approach to the river corridor. They divided the 9.8 mile stretch of river flowing through Denver into four sections roughly equal in size. Two committee members were assigned to each section to act as stewards. Stewards oversee projects for their stretch of river. This formula worked well since every section received constant attention. The committee as a whole was then able to focus the bulk of their resources on the current phase of work, which might involve just one of the four sections.

Effective development strategies on the South Platte have taken a two-pronged approach:

1. Break the river into segments that can be developed independently of each other.
2. Sharing the work and the credit.

Breaking the river revitalization project into sections allowed the design work for each stream segment to be performed by a different local design firm. This meant that all sections were get-

ting simultaneous attention, a greater variety of design ideas were available, and the money dedicated to design was being spread throughout the community.

The sectional approach also allowed projects to proceed independent of the work in other sections. If a project in one section was delayed for some reason, then progress on other projects in other sections would not be impeded. Another advantage of the sectional approach was that neighborhoods along the river were empowered. Residents could identify with and felt ownership over a particular stretch of stream. They also had a direct point of contact. Having two designated PRDC committee members appointed as section stewards gave a name and face for public comments and ideas regarding revitalization.

'Concrete' Results are Real

Past efforts to improve the South Platte River became mired in analysis and study, with little to show but a report or two, and nothing "on the ground." The committee understood that the best way to rally the community was to demonstrate visible success. The seminal project was the riverfront plaza at Confluence Park. This location was significant since it provided a public gathering place and access to the water in one of the most developed areas of downtown. The site was also historically important. It lay at the confluence of the South Platte River and Cherry Creek, where gold was first discovered,

and Denver's first settlement was founded. The river's revitalization would commence right where its story of use and abuse began in 1858.

It was important to advance the belief among citizens that the river could be a community asset, that the task was doable, and it was getting done. Confluence Park was a good first choice since the site was in broad public view and received a lot of daytime traffic. Once the park was established, the large downtown plaza along the river was hard to ignore. Daily use by citizens created the desire for more open space and access along the river. A popular success like Confluence Park can go a long way to silence opponents and naysayers.

The Greenway Foundation

The PRDC realized that \$1.9 million was only a start and that on-going funding was needed to revitalize the entire corridor. Consequently, the committee formed the Greenway Foundation as a quasi-governmental not-for-profit charitable organization to receive donations for river improvements. The Greenway Foundation solicits funds from individuals, businesses, foundations, and governments. Opportunities multiplied when the foundation could offer prospective donors matching funds. This charitable donation and matching fund strategy would not have been possible for a government entity without the Greenway Foundation serving as a financing engine for projects.



Confluence Park offers open space and recreation opportunities to the Denver community.

*Photo Source:
Greenway Foundation*

1990's - Today

Despite great strides made in the 1970s and 1980s, the PRDC efforts had lost inertia by the early 1990s. Much of the effectiveness had come from individual members. As people left the committee and the political stakeholders changed over time, the PRDC could no longer sustain the prior level of involvement.

In the early 1990s, Denver's Mayor Wellington Webb decided that South Platte River revitalization needed to be reinvigorated. He formed the *South Platte Working Group* to review the current status and make recommendations on how to proceed. Based on those recommendations, Mayor Webb formed the *South Platte River Commission* in 1995. The new commission, comprised of a coalition of government agencies, not-for-profit organizations, and representatives from the community, oversaw the new *South Platte River Corridor Project*.

While the PRDC focused on blight, trash, and gross neglect in 1974, the *South Platte River Corridor Project* focuses on restoring the river ecosystem, and enhancing recreational and open space areas in the corridor.

An important lesson learned from the PRDC in the 1970s and 80s is that stewardship involves more than periodic attention by environmen-

tally conscious leaders. Full time management is required for restoration. Once certain leaders retired, or when other civic issues demanded attention, care of the South Platte River languished. To provide for the future, the commission is developing a *South Platte Long Term Management Framework*. The document will outline goals and objectives, provide a management structure, and identify parties responsible for implementation. A new *South Platte River District* has also been created. The special maintenance district covers 10.5 miles of the river and is maintained by the Denver Parks Department.

Conclusion

The South Platte River is fairly unique because restoration to its pre-settlement condition is not a desirable option. Only 12 highly tolerant fish species were identified in the river by 1891, and riparian habitat along the shifting river bed was sparse to non-existent. Yet today trout survive in the river, and researchers are able to study the behavior of large mouth bass. Unlike the original South Platte, the riverfront is a fixed feature and is festooned with parks, gardens, walkways, and bikeways. All these benefits, stemmed from decades of hard work and organization, have completely transformed the South Platte.



Photo Source:
Greenway Foundation

Key Factors:

South Platte River Restoration Case Study

Identify the need:

[What problems indicate that the water body is in need of restoration?]

- A disastrous flood in 1965 focused public attention on the South Platte River for the first time in decades.
- Large amounts of garbage was strewn along more than ten miles of riverbed and banks.
- The river banks were flanked with inappropriate land uses such as DPW facilities and railroad maintenance yards.
- Polluted waters were discharged from industrial sources and sanitary sewers.
- Denuded banks were absent of riparian habitat.

History and Cause:

[What led to the water quality problems?]

- Unlike conditions that drove most early American settlements, the South Platte River was not a primary reason for Denver's growth. People were drawn to the area for gold, not for the water resource.
- The South Platte was an ephemeral river with a highly irregular flow; therefore, the river was easily over taxed by human settlement.
- The South Platte watershed was greatly enlarged by transmountain diversions.
- The river's flow regime was heavily modified by irrigation and flood control dams.
- Today the river's flow is constant. Irrigation runoff and sanitary effluent constitute about 90% of the river's flow. Consequently, water treatment is critical. The South Platte River is a highly regulated and managed system.

Catalyst:

[What was the seminal event that led to public awareness and action?]

- A devastating flood in 1965 caused \$325 million in damage. As part of the flood response, a \$635 million project to restore the South Platte was developed, but the plan was too expensive and complex.
- The idea of revitalizing the South Platte River languished until 1974 when Denver Mayor William McNichols received \$1.9 million in revenue sharing funds and decided to use the money on river restoration. At the same time, Mr. Joseph Shoemaker, a Colorado State Senator and former Denver Department of Public Works manager, offered his support and became the first chairman of the *Platte River Development Committee*.
- Impetus was revived in 1995 when another visionary, Mayor Wellington Webb, formed the *South Platte River Commission*, and commenced the *South Platte River Corridor Project*.

Organizational Structure:

[How were committees and friends groups organized to accomplish tasks?]

The Platte River Development Committee was organized from the top down. Original committee members were named by the Mayor and future members were selected by the existing membership. Although not a grassroots initiative, the process was inclusive and several members recommended by the mayor were from minority or economically disadvantaged neighborhoods.

The PRDC answered only to the mayor and had the support of his office and of several city departments such as planning and public works. This quasi-governmental status, along with \$1.9 million in seed money allowed the committee to have substantial freedom in how to proceed with projects.

Funding:

[What funding strategies were successful? Which were not?]

Federal revenue sharing funds (\$1.9 million) served as seed money to start restoration work. Later, the Greenway Foundation, a non-governmental tax-exempt not-for-profit, was formed to receive donations.

Some of the money collected by the Foundation in its first few years of operation included:

- Bureau of Recreation (BOR): \$300,000 (down from \$850,000)
- First private donation by Pepsi Cola plant owner: \$50,000
- Private funds to elicit matching funds
- Gates Foundation: \$780,000
- Denver City Council: \$850,000

Community Living & Design:

[How did organizers address open space needs and involve community members?]

- Some of the initial committee members were community leaders, which lent public acceptance and credibility to the effort.
- Community design critiques were held to garner ideas and comments from the public.
- Tree plantings are conducted entirely by volunteers to save funds and promote public participation and ownership.
- Key but isolated open space locations were identified and built along the river. Next, connections were established. As the greenway trail expanded more connections were made to other parts of Denver, eventually a vast network of trails was created linking neighborhoods to parks and points of interest along the river.
- Festivals and celebrations have kept the greenway at the center of the community's social life.

Water Quality:

[How were water quality issues addressed?]

The South Platte receives many industrial and sanitary waste inputs from surface and subsurface drainage. The river's flow was irregular and dependent upon rain events and irrigation regimes, with sanitary effluent comprising a large percentage of the river during low flow periods.

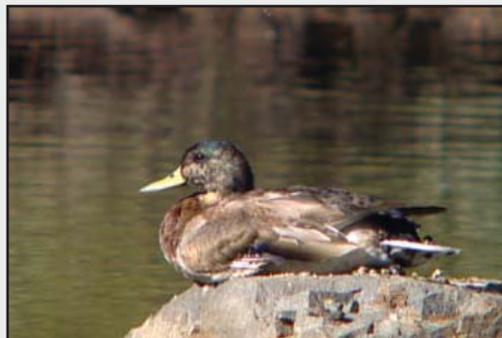
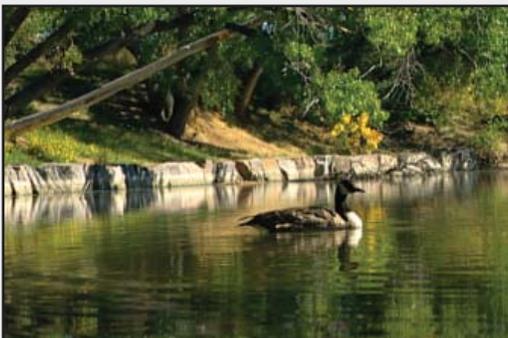
Water quality issues were addressed by:

- Reducing industrial and sanitary inputs. This was accomplished by closing combined sewer overflows and moving incompatible land uses, such as the DPW facilities, away from the river. Man-made white water stream segments were created for recreation and provided aeration.
- The committee acquired water rights via donation, to insure steady flows and stabilize the riverbed. The committee also negotiated with irrigation reservoir managers to release water at strategic times to allow for recreational use during the day.

Habitat:

[How were habitat needs addressed?]

- Trees and shrubs were planted along the banks throughout the greenway.
- The river bed was developed to provide a variety of habitat such as fast riffles and slow pools.
- Recent efforts have focused on additional riparian habitat and ecological functioning.



Degree of Similarity:

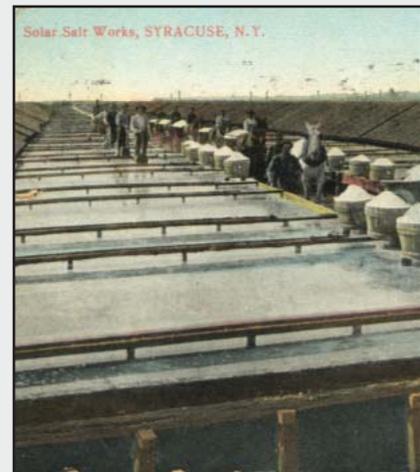
[In what ways is the South Platte's situation similar to Onondaga Creek's? In what ways is it unique?]

The environmental history of the South Platte River is very different from most rivers in the U.S. Typically, people settled near water for drinking, commerce, and transportation. Then, due to years of over development and environmental degradation urban waters are usually polluted and surrounding lands are neglected. More recently, waterfront revitalization has become a phenomenon. Efforts to eliminate or reduce municipal and industrial discharges combined with land use changes that reduce non-point source pollution can cause marked improvement in water quality conditions. In addition to these environmental improvements, waterfront redevelopment can promote drastic economic and social benefits. In the case of the South Platte River, 90% of the flow is ground water runoff from irrigation and treated sanitary effluent from public waste treatment facilities.

The South Platte River's history could not be more different than that of Onondaga Creek'. First, Onondaga Creek and Onondaga Lake attracted settlers as a source of sustenance and transportation. People were not drawn to the South Platte River, but rather to gold. Settlers used the South Platte because it was the only water in town.

Organizationally the difference is striking as well. At the direction of Denver's Mayor, the *Platte River Development Committee* was formed by a state senator, a group of civic activists, and stakeholders. Thereafter, the committee proceeded without bureaucratic overhead. Onondaga Creek and Onondaga Lake, on the other hand, required a lawsuit in order to prompt action from government and responsible parties. Onondaga Creek's more contested and litigious approach adds delay and layers of bureaucracy that were not an issue in Denver.

These antique postcards and photograph depict the industrial appeal of Onondaga Lake and Creek.



Summary & Lessons:

[Recap and summarize; identify lessons for Onondaga Creek]

The South Platte River case study reflects the increasing value human society places on water, especially in a semi-dry area like Denver. Original settlers did not care for the South Platte since other sources of drinking water existed, and transportation was not accommodated by the shallow, slow moving river. In essence, this river died. New life came when water became a precious commodity and the opportunity to stimulate and expand the economic vitality of the region was recognized. Denver is a booming metropolis and so community pride and growth allowed for major expenditures of funds to renew the river. Syracuse is just now beginning to understand the values once again - spiritual, economic, cultural, etc. - that healthy water systems can provide. Syracuse is located in a water rich part of the world and the vitality of Onondaga Creek (and Lake) was carelessly destroyed; yet, a legacy was left that can and should be an integral part of a revitalized metropolis. The South Platte revitalization is an externality of a booming Denver; Onondaga Creek (and Lake) revitalization is integral to the well-being of Syracuse and its surroundings.

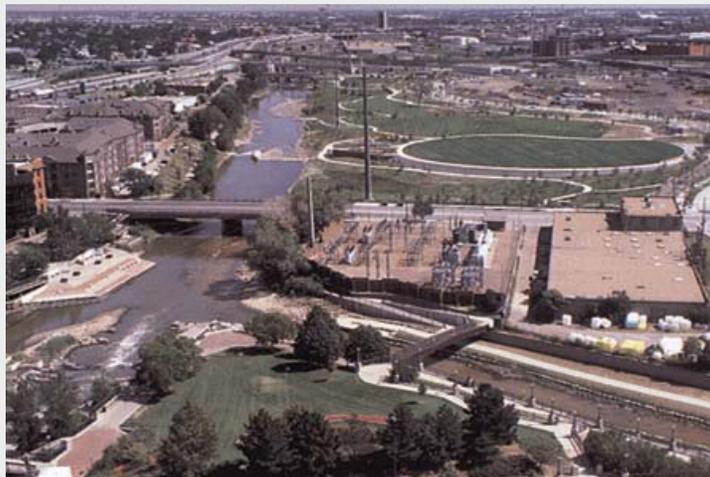
A lesson learned from the South Platte River story is that moving several independent projects forward simultaneously can be instrumental in maintaining momentum and public support. By dividing the river into sections and implementing multiple initiatives at the same time, any delays at one location did not affect the other projects.

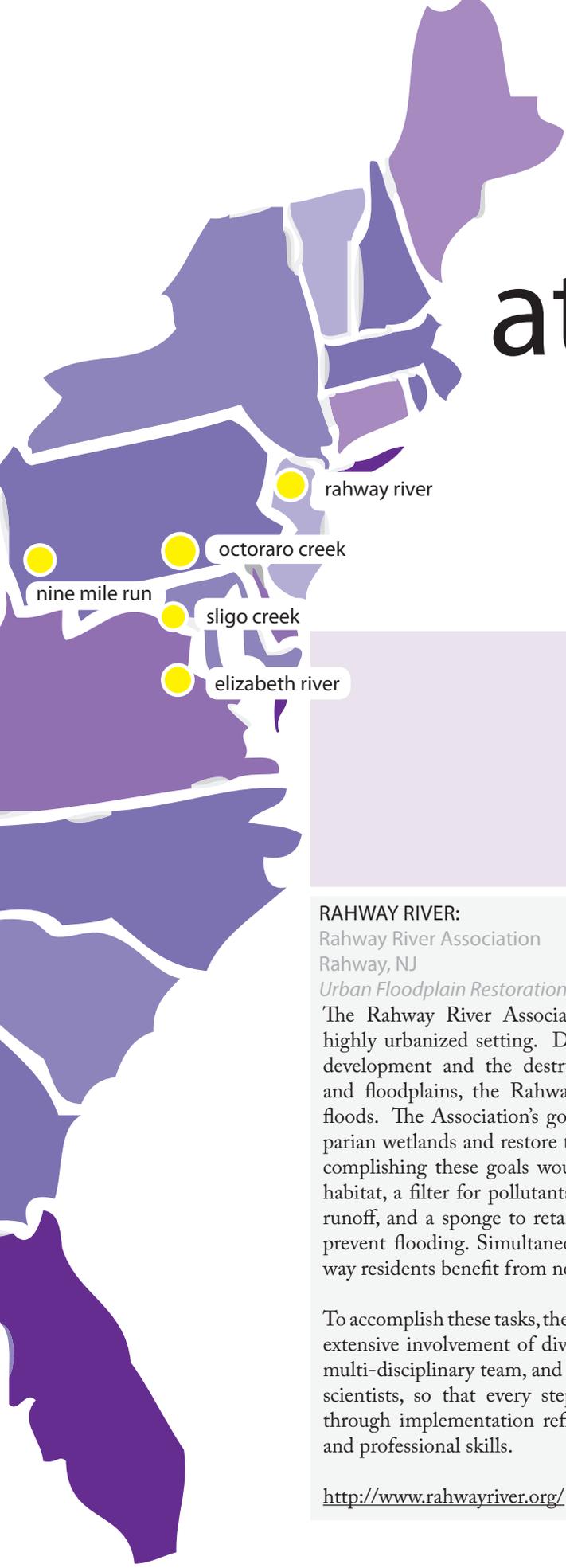
Another lesson is to begin with projects that engage large numbers of people and garner public support. The riverside plaza at Confluence Park was situated amongst dense residential and workforce populations. The site attracts many daytime users from the greater metropolitan region. Contrast

this with the Inner Harbor development where Onondaga Creek enters Onondaga Lake. Neither located near daytime business activity or a residential area, the Inner Harbor receives little use to date, and has not realized its potential as a community asset.

It is also important to make provisions to sustain the revitalization efforts long term. Denver succeeded in 1974 due to a fortunate convergence of people and money, but such fortuitous circumstances can't be counted on in the future. Therefore, Denver has created a special district for the river corridor and assigns park employees to the task of river maintenance. A special district for Onondaga Creek may be a similar way to provide funding. The ongoing maintenance of the creek, which travels through several towns and the City of Syracuse, provides an opportunity for intermunicipal cooperation centered on shared interest in Onondaga Creek.

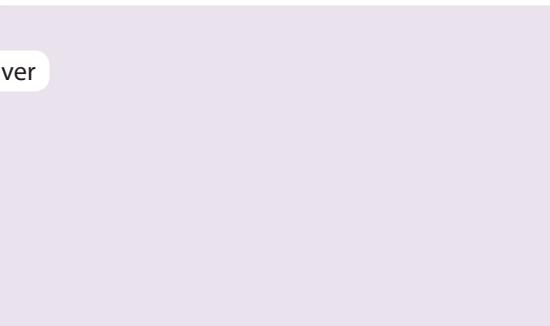
In the case of the South Platte River, development of Confluence Park in a dense residential and commercial area brought the public into contact with the river. While Onondaga Creek's Inner Harbor was constructed with a similar goal in mind, its location is not optimal for attracting public attention.





at-a-glance:

These case studies highlight areas throughout the United States that have successfully addressed issues that currently confront Onondaga Creek. Below are brief project descriptions. All information was obtained from the respective web sites.



ELIZABETH RIVER:

Elizabeth River Project
Portsmouth, VA

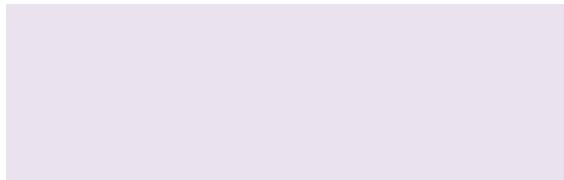
Coalition Building, Watershed Action Plan

The Elizabeth River Project is self-described as a “catalyst” for reviving the Elizabeth River, a tributary to the Chesapeake Bay. The mission is “to restore the Elizabeth River to the highest practical level of environmental quality through government, business, and community partnerships.”

After meeting with 45 diverse stakeholders, the Elizabeth River Project developed a full Watershed Action Plan to address the river’s pollution. The plan was endorsed by 70 local leaders.

High levels of sewage and pollution caused a ban on oyster harvesting in the early 1900s. The Elizabeth River Project convened in 1991 to establish River Stars, a partnership that has grown to encompass 60 local businesses and industries. Through this program, pollution has been dramatically reduced, and wetlands and oyster beds are being restored.

<http://www.elizabethriver.org>



RAHWAY RIVER:

Rahway River Association
Rahway, NJ

Urban Floodplain Restoration

The Rahway River Association operates in a highly urbanized setting. Due to concentrated development and the destruction of wetlands and floodplains, the Rahway River frequently floods. The Association’s goals are to repair riparian wetlands and restore the floodplain. Accomplishing these goals would provide wildlife habitat, a filter for pollutants from storm water runoff, and a sponge to retain storm water and prevent flooding. Simultaneously, City of Rahway residents benefit from new open space.

To accomplish these tasks, the Association sought extensive involvement of diverse stakeholders, a multi-disciplinary team, and experienced project scientists, so that every step from conception through implementation reflected public needs and professional skills.

<http://www.rahwayriver.org/>

NINE MILE RUN:

Nine Mile Run Watershed Association
Pittsburgh, PA
Sewage Overflow Strategy

The Nine Mile Run in Pittsburgh, PA runs most its course via underground culverts. Much of the urban landscape surrounding the stream is impermeable; runoff flows directly into the stream's waters. Although neither is healthy, these conditions are not uncommon for urban streams. Compounding the problem are combined sewer overflows, which dump raw sewage into the stream during periods of heavy precipitation.

To ameliorate these problems, the U.S. Army Corps of Engineers and Pittsburgh's Department of City Planning sponsored the Nine Mile Run Aquatic Ecosystem Restoration, an aquatic habitat improvement project, "the largest of its kind to be undertaken in a major metropolitan area."

The Nine Mile Run Watershed Association endeavors to find "cost effective, citizen-based solutions that complement the municipal work." Their Rain Barrel Initiative directly involves citizens in creek maintenance. The locally produced rain barrels are capable of holding 133 gallons of storm water. They collect and reroute rooftop runoff into permeable surfaces such as gardens rather than inundating the storm sewers and flooding the creek. The barrels, free for residents in one of four "study neighborhoods," are available for a reduced price to other watershed residents.

In order to maintain water quality in Nine Mile Run, seventeen ecostewards volunteer to monitor and remove invasive plants, pick up litter, and catalogue native plants. These community members directly contribute to improving the creek's ecological health.

<http://www.ninemilerun.org>

SLIGO CREEK:

Friends Of Sligo Creek
Silver Springs, MD
Community Involvement

Friends of Sligo Creek strive to restore Sligo Creek's water quality, natural habitat, and ecological well-being by "bringing neighbors together to build awareness, improve natural habitat, and protect our community's heritage."

Hands-on projects are orchestrated and organized according to fifteen creek segments. Each segment has a steward who organizes local events and monitors needs. These community members are responsible for making recommendations on behalf of their segment, locating and removing invasive species, organizing outreach events, and generating newsletters to update the public.

<http://www.fosc.org/>

OCTORARO CREEK

Octoraro Watershed Association
Nottingham, PA
Rural Conservation/Protection, Stream Bank Stabilization, Landowner Cooperation

The Octoraro Creek watershed spans 208 square miles, draining rural areas in Chester and Lancaster Counties in Pennsylvania and Cecil County, Maryland. The creek flows into the Susquehanna River and ultimately to the Chesapeake Bay. Founded in 1967 to protect water quality, promote sound land use practices, and raise environmental consciousness, the Octoraro Watershed Association's (OWA) continuing mission is to protect the area's natural and historical resources.

To accomplish their goals of protection and preservation, the OWA has successfully advocated for placement of 34 creek miles into the Pennsylvania Scenic Rivers Program, developed a task force to make recommendations for stream and corridor protection, and worked with citizens' groups to prepare a watershed conservation plan.

Today, under the U.S. Fish and Wildlife Service's "Partners for Wildlife" Program, property owners are installing steambank fencing and riparian buffers to restrict creekside livestock access, prevent erosion, and filter pollution.

<http://www.theowa.org/index.htm>

SAN ANTONIO RIVER:

Paseo del Rio/ San Antonio River Foundation
San Antonio, TX
Economic Development, Channel Modification

Considered the number one tourist attraction in Texas, the well-known San Antonio River Walk is run by the Paseo del Rio Association. A not-for-profit organization established in 1968. The goal is to promote economic growth by establishing shopping, dining, and entertainment on the river banks of downtown San Antonio.

The economic success of the Paseo del Rio has enabled the San Antonio River Improvements Project, a \$216.6 million “on-going investment” sponsored by the City of San Antonio, in partnership with private organizations such as the San Antonio River Foundation, and the U.S. Army Corps of Engineers. By renaturalizing the formerly straightened river channel, the project addresses issues of flood control, ecosystem restoration, and recreation along a 13 mile stretch of river. Public education and input has been incorporated by the River Improvements Project website, which features highly interactive models of proposed improvements.

<http://www.thesanantonioriverwalk.com>
<http://www.sanantonioriver.org/overview.html>

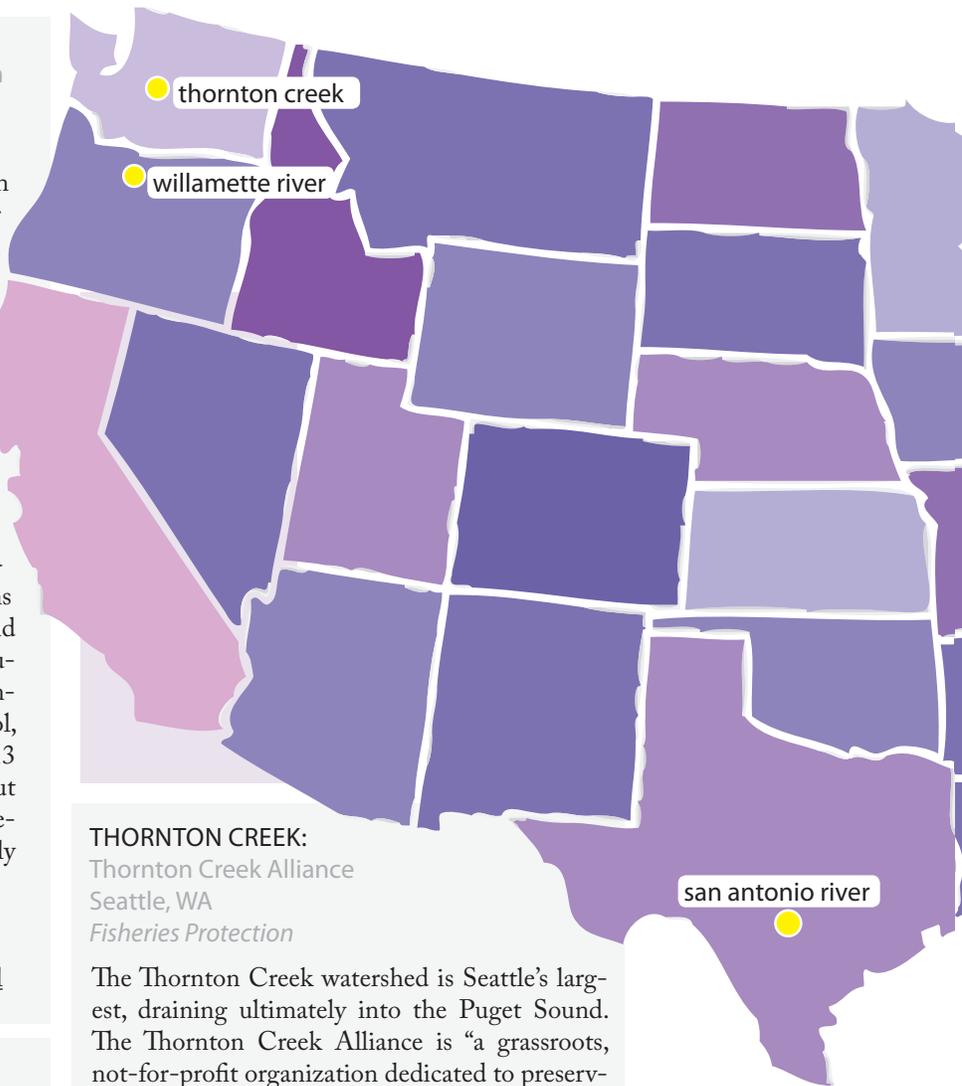
WILLAMETTE RIVER:

City of Portland River Renaissance
Portland, OR
Visioning, Strategy, Community Involvement

The Willamette River has been impacted by industrialization and urbanization. In 2000, River Renaissance was launched to “reclaim the Willamette River as Portland’s centerpiece.” To accomplish this goal, the organization had to recognize, not only the river’s environmental needs, but also its economic and urban social components.

Through a series interactive community meetings, the River Renaissance created the *River Renaissance Vision*. The vision was subsequently endorsed by the Portland City Council. Once a clear idea of the public’s wishes was established, eight city bureaus worked together to produce the *Willamette River Conditions Report*. The report evaluated the river’s ecological, economic, and social conditions. Thereafter, the *River Renaissance Strategy* was developed to propose policy, establish progress measures, and guide river-related revitalization activities.

<http://www.portlandonline.com/river/>



THORNTON CREEK:

Thornton Creek Alliance
Seattle, WA
Fisheries Protection

The Thornton Creek watershed is Seattle’s largest, draining ultimately into the Puget Sound. The Thornton Creek Alliance is “a grassroots, not-for-profit organization dedicated to preserving and restoring an ecological balance in the Thornton Creek watershed.

The goal is to “benefit the creek by encouraging individuals, school groups, businesses, and government to work together to address the many issues associated with the creek system.”

One area of particular attention is the impact of creek pollution on habitat health and biodiversity. Once home to at least five species of Pacific salmon, the creek still supports the migration of three to four salmon species and numerous trout.

To help protect these sensitive fish, the Thornton Creek Alliance encourages the public to report any pollution to the creek including that carried by storm water runoff. Seattle’s Public Utilities will send surface water quality inspectors to investigate incidents such as leaky automobiles, concrete dumped on streets, and paint poured down drains.

<http://www.scn.org/tca/>



MILL CREEK:
 Mill Creek Restoration Plan
 Cincinnati, OH
Greenway Master Plan

The Mill Creek Restoration Plan provides “a sound strategy for achieving multiple environmental, economic, and social objectives.” By developing a greenway, the Mill Creek Restoration Project hopes to improve water quality, aquatic and wildlife habitat, and the overall health of the Mill Creek corridor ecosystem. *The Greenway Master Plan*, includes programs such as Freedom Trees, in which participants have planted at least 10,000 native trees within the creek corridor. Altogether, fourteen active pilot projects are underway. Many are focused on environmental education and others call for watershed action.

The goal of the Greenway Project, in particular, is to develop brownfield sites and abandoned industrial properties into parks, for increased recreational and economic opportunities. The parks are linked by biking and hiking trails.

Public input was incorporated into the *Mill Creek Greenway Master Plan* at every step of the restoration project, from the development phase in which 150 community groups participated, to the interdisciplinary environmental education programs for children. The *Mill Creek Greenway Plan* approached creek revitalization from the development and education perspectives, and found both to be successful to date.

<http://www.millcreekrestoration.org/>

MILWAUKEE RIVER:
 Milwaukee River Basin Partnership
 Milwaukee, WI
Land trust, Restoration project

Three local organizations joined forces to form the Milwaukee River Work Group to advocate for the river. The group developed a comprehensive plan to set aside natural spaces, guide nearby development, and guarantee public access. A key part of the plan is land protection. The River Revitalization Foundation (RRF) acts as the urban river land trust for the Work Group. The RRF protects riverside land by purchasing and holding land in public trust, and by partnering with landowners to create voluntary legal agreements, or easements, to allow for stewardship and access on private riverside land.

protectmilwaukeeiver.org

CHICAGO RIVER
 Friends of the Chicago River
 Chicago, IL
Recreation, Gentrification

Friends of the Chicago River have been working since 1979 to improve the health of the Chicago River, establish a desirable place for people, and habitat for fish and wildlife. The vision is to create a corridor of greenspace that is easily accessible from metropolitan Chicago.

While conditions along the river have improved over the years, neighborhoods along the riverfront, close to downtown, have experienced gentrification where the poor and immigrant communities have been displaced for the benefit of development and business interests. Gentrification often occurs when there is substantial demand for expensive housing in previously low income neighborhoods. While not the direct result of waterfront revitalization, it is important that improvements to riverfronts include careful neighborhood planning so that all residents have access to good housing and greenspace.

<http://chicagoriver.org>

DES PLAINES RIVER:
 Des Plaines River Wetlands Restoration Project
 Lake County, IL
Restoring Wetlands, Strong Scientific Framework

The Des Plaines River Wetland Restoration Project is a research project that began in the 1980s. It was designed to record the rehabilitation process of a wetland area. Project leaders selected a 550 acre plot of abandoned fields and gravel quarries to be rehabilitated into wetland habitat. The goal was to improve water quality, wildlife habitat, flood control, and recreational possibilities.

Today, the river is visible through a grove of oak trees. Wetland-dependent plants and animals have returned and are forming a complex ecosystem. The wetland has improved water quality by acting as a filter for sediments. The area is now a popular recreational spot.

<http://www.wetlandsresearch.org/>

Bronx River:

Bronx River Alliance

<http://www.bronxriver.org/>

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<http://www.washingtonmonthly.com/features/1999/9904.worth.bronx.html>

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Partnerships for Parks

<http://www.itmypark.org/>

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http://www.dec.ny.gov/docs/water_pdf/303dlist06.pdf

South Bronx Environmental Health and Policy Study
http://www.icisnyu.org/south_bronx/index_001.html

Southern Bronx River Watershed Alliance
<http://www.southbronxvision.org/>

Sustainable South Bronx
<http://www.ssbx.org/>

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Guadalupe River:

California Redevelopment Association. 2006. Award of Excellence in Public Spaces & Linkage. Online
http://www.calredevelop.org/success_stories/2006AoEWinners/SanJose06.pdf

Guadalupe River Park & Flood Protection Project
http://www.valleywater.org/water/Watersheds_-_streams_and_floods/Watershed_info_&_projects/Guadalupe/Downtown/index.shtm

Guadalupe River Park and Garden

<http://www.grpg.org/>

Guadalupe River Flood Control Project Collaborative
<http://www.spd.usace.army.mil/cwpm/public/plan/pdact/02workshop/hannah.htm>

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http://www.sanjoseca.gov/cityManager/memos/trails_memo.htm

San Francisco Bay Regional Water Quality Control Board, 2004 August. Guadalupe River Watershed Mercury TMDL Preliminary Project Definition. Online.
http://www.swrcb.ca.gov/rwqcb2/TMDL/guadalupe_river_mercury/project_defn_guadalupe_river_mercury.pdf

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<http://www.sfgate.com/cgi-bin/article.cgi?file=/chronicle/archive/1998/09/28/MN89789.DTL>

South Platte River:

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Noel, T. J. Undated. Mile High City- 2. The Golden Gamble. Online.
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Alaska:

COPPER RIVER, CORDOVA

The Copper River Watershed Project

<http://www.copperriver.org/>

SHIP CREEK, CHESTER CREEK, ANCHORAGE

Anchorage Waterways Council

<http://www.anchoragecreeks.org/>

USDA Natural Resources Conservation Service, Chester Creek Project

<http://www.nrcs.usda.gov/news/>

thisweek/2004/041006/chestercreek.html

USFWS Ship Creek salmon restoration project

<http://alaska.fws.gov/fisheries/fieldoffice/>

anchorage/habitat_projects.htm

California:

GUADALUPE RIVER, SAN JOSE

The Guadalupe River Park and Flood Protection Project

<http://www.grpg.org/FloodControl/>

Friends of Guadalupe River Park and Gardens

<http://www.grpg.org/Home.html>

LOS ANGELES RIVER, LOS ANGELES

Friends of the Los Angeles River

<http://www.folar.org/>

The Los Angeles and San Gabriel Rivers Watershed Council

<http://www.lasgrwc.org/>

YUBA RIVER, NEVADA CITY

South Yuba River Citizens League

<http://www.syrcl.org/>

Colorado:

BOULDER CREEK, BOULDER, COLORADO

Boulder Creek Watershed Initiative

<http://bcn.boulder.co.us/basin/bcwi/bcwiindex.htm>

NORTH FORK OF THE GUNNISON RIVER, PAONIA

North Fork River Improvement Association

<http://www.nfria.paonia.com/>

SOUTH PLATTE RIVER, DENVER

The Greenway Foundation

<http://www.greenwayfoundation.org/>

Illinois:

CHICAGO RIVER, CHICAGO

Friends of the Chicago River

<http://www.chicagoriver.org/>

DES PLAINES RIVER, LAKE COUNTY

Des Plaines River Wetlands Demonstration Project

<http://www.wetlandsresearch.org/>

Upper Des Plaines River

Ecosystem Partnership

<http://www.upperdesplainesriver.org/>

Maryland:

ANACOSTIA RIVER, BLADENSBURG

Anacostia Watershed Network

<http://www.anacostia.net/>

Anacostia Watershed Society

<http://www.anacostiaws.org/>

Natural Resources Defense

Council Fact Sheet

<http://www.nrdc.org/water/pollution/>

fanacost.asp

SLIGO CREEK, SILVER SPRING

Friends of Sligo Creek, Silver Spring/

Hyattsville

<http://www.fosc.org/fosc.htm>

Massachusetts:

BLACKSTONE RIVER, UXBRIDGE

Blackstone River Coalition

<http://www.zaptheblackstone.org/inner/>

whywehere/whywehere.htm

Blackstone River Watershed Association

<http://www.thebrwa.org/>

Blackstone Headwaters Hydrology Project

<http://www.nichols.edu/headwaters/>

CHARLES RIVER, BOSTON

The Charles River Conservancy

<http://www.charlesriverconservancy.org/crb/>

crb.html

Charles River Watershed Association

[http://www.crwa.org/index.html?wavestop.](http://www.crwa.org/index.html?wavestop.html)

html&0

EPA Charles River Special Programs

<http://www.epa.gov/boston/charles/index.html>

MERRIMACK RIVER, LOWELL

Merrimack River Watershed Council

<http://www.merrimack.org/>

Upper Merrimack River Local

Advisory Committee

<http://www.merrimackriver.org/>

New Jersey:

HACKENSACK RIVER, HACKENSACK

Hackensack Riverkeeper

<http://www.hackensackriverkeeper.org/>

RAHWAY RIVER, RAHWAY

Rahway River Association

<http://www.rahwayriver.org/>

PASSAIC RIVER, WARREN

Passaic River Coalition

<http://www.passaicriver.org/>

Lower Passaic River Master Plan

[http://conservationresourcesinc.org/](http://conservationresourcesinc.org/LowerPassaicRiverMasterPlan.htm)

[LowerPassaicRiverMasterPlan.htm](http://conservationresourcesinc.org/LowerPassaicRiverMasterPlan.htm)

New Jersey Community Water Watch

<http://www.waterwatchonline.org/nj/>

RARITAN RIVER, SOMERVILLE

Raritan Basin Watershed Alliance

<http://www.raritanbasin.org/>

New Jersey Community Water Watch

<http://www.waterwatchonline.org/nj/>

Edison Wetlands Association

<http://www.edisonwetlands.org/>

New York/New Jersey Baykeeper

[http://www.nynjbaykeeper.org/geography/](http://www.nynjbaykeeper.org/geography/geography_rrc.php)
[geography_rrc.php](http://www.nynjbaykeeper.org/geography/geography_rrc.php)

New York:

BRONX RIVER, BRONX

The Bronx River Alliance

<http://www.bronxriver.org/index.cfm>

HUDSON RIVER, GARRISON

Riverkeeper

<http://www.riverkeeper.org/>

NIAGARA RIVER AND TRIBUTARIES, BUFFALO

Friends of the Buffalo Niagara Rivers

<http://www.fbnr.org/>

North Carolina:

ENO RIVER, DURHAM

Eno River Association

<http://www.enoriver.org/>

Ohio:

MONDAY CREEK, NEW STRAITSVILLE

Monday Creek Restoration Project

<http://www.mondaycreek.org/>

MILL CREEK, CINCINNATI

Mill Creek Restoration Project

<http://www.millcreekrestoration.org/index.cfm>

Mill Creek Watershed Council

<http://www.millcreekwatershed.org/home.html>

Oregon:

WILLAMETTE RIVER, PORTLAND

River Renaissance

<http://www.river.ci.portland.or.us/>

Pennsylvania:

NINE MILE RUN, PITTSBURGH

Nine Mile Run Watershed Association

<http://www.ninemilerun.org/>

SCHUYLKILL RIVER, PHILADELPHIA

Schuylkill Action Network

<http://www.schuylkillactionnetwork.org/>

Schuylkill River Greenway Association

<http://www.schuylkillrivergreenway.org/?tabId=1>

Schuylkill River Watershed Report

<http://www.schuylkillreport.org/index.html>

Schuylkill Watershed Conservation Plan

<http://www.schuylkillplan.org/index.html>

OCTORARO CREEK, NOTTINGHAM

Octoraro Watershed Association

<http://www.theowa.org/index.htm>

Lancaster County Watersheds

<http://www.lancasterwatersheds.org/index.php>

Rhode Island:

WOONASQUATUCKET RIVER, NARRAGANSETT BAY SYSTEM, PROVIDENCE RIVER, PROVIDENCE

Narragansett Bay Commission

<http://www.narrabay.com/rivers.asp>

Woonasquatucket River Watershed Council

(and numerous other associations, see links)

<http://www.woonasquatucket.org/>

Texas:

SAN ANTONIO RIVER, SAN ANTONIO

San Antonio River Improvements Project

<http://www.sanantonioriver.org/overview.html>

San Antonio River Authority

<http://www.sara-tx.org/>

The Edwards Aquifer Homepage

<http://www.edwardsaquifer.net/sariver.html>

Paseo del Rio Association

<http://thesanantonioriverwalk.com/Index.asp>

Virginia:

ELIZABETH RIVER, PORTSMOUTH

The Elizabeth River Project

<http://www.elizabethriver.org>

FOUR MILE RUN, ARLINGTON

Northern Virginia Regional Commission

<http://www.novaregion.org/fourmilerun.htm>

Washington:

ELWHA RIVER, PORT ANGELES

Lower Elwha Klallam Tribe

River Restoration Project

<http://www.elwha.org/River%20Restoration.htm>

Elwha Restoration Project Office,

National Park Service

<http://www.nps.gov/archive/>

[olym/elwha/home.htm](http://www.nps.gov/olym/elwha/home.htm)

[http://www.nps.gov/olym/naturescience/elwha-](http://www.nps.gov/olym/naturescience/elwha-ecosystem-restoration.htm)

[ecosystem-restoration.htm](http://www.nps.gov/olym/naturescience/elwha-ecosystem-restoration.htm)

LONGFELLOW CREEK, SEATTLE

Longfellow Creek Community Web Site

<http://www.longfellowcreek.org/index.htm>

THORNTON CREEK, SEATTLE

Thornton Creek Alliance

<http://www.scn.org/earth/tca/index.htm>

Wisconsin:

FOX RIVER, GREEN BAY

Clean Water Action Council, Fox River Watch

<http://www.foxriverwatch.com/>

MILWAUKEE RIVER BASIN, MILWAUKEE

Milwaukee River Basin Partnership

<http://basineducation.uwex.edu/milwaukee/index.html>

Milwaukee River Basin Homepage

<http://www.dnr.state.wi.us/org/gmu/milw/>

Milwaukee Metropolitan Sewerage District

(MMSD) Flood Management Projects

<http://www.mmsd.com/floodmanagement/>

[milwaukee_river_watershed.cfm#main_body](http://www.mmsd.com/floodmanagement/milwaukee_river_watershed.cfm#main_body)

MMSD Lincoln Creek Environmental

Restoration and Flood Management Project

<http://www.mmsd.com/floodmanagement/>

[milwaukee_river_watershed_lincoln_creek.cfm](http://www.mmsd.com/floodmanagement/milwaukee_river_watershed_lincoln_creek.cfm)

River Revitalization Foundation

<http://www.riverrevitalizationfoundation.org/>

[homepage.html](http://www.riverrevitalizationfoundation.org/homepage.html)

General Resource Web Sites:

American Rivers, national organization dedicated to healthy rivers.

<http://www.americanrivers.org/site/PageServer>

Center for Watershed Protection, provides technical tools for watershed organizations.

<http://www.cwp.org/>

National Watershed Network, registry of local watershed partnerships.

<http://www.ctic.purdue.edu/KYW/nwn/nwn.html>

River Network, nationwide environmental organization that builds and supports grassroots river and watershed groups.

<http://www.rivernetwork.org/>

US Environmental Protection Agency, Wetlands, Oceans and Watersheds webpage:

Multiple links and resources, including a watershed page for kids.

<http://www.epa.gov/owow/>

Waterkeeper Alliance, grassroots advocacy organization that works to preserve and protect waterbodies from polluters.

<http://www.waterkeeper.org/>

In addition to the case studies cited, there are many other websites listing ongoing efforts to control non-point pollution and urban runoff.

Visit the U.S. EPA websites using the keywords: stormwater, green infrastructure, watersheds, etc.

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The Onondaga Environmental Institute is a non-profit organization whose mission is to advance environmental research, education, planning, and restoration in Central New York.



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