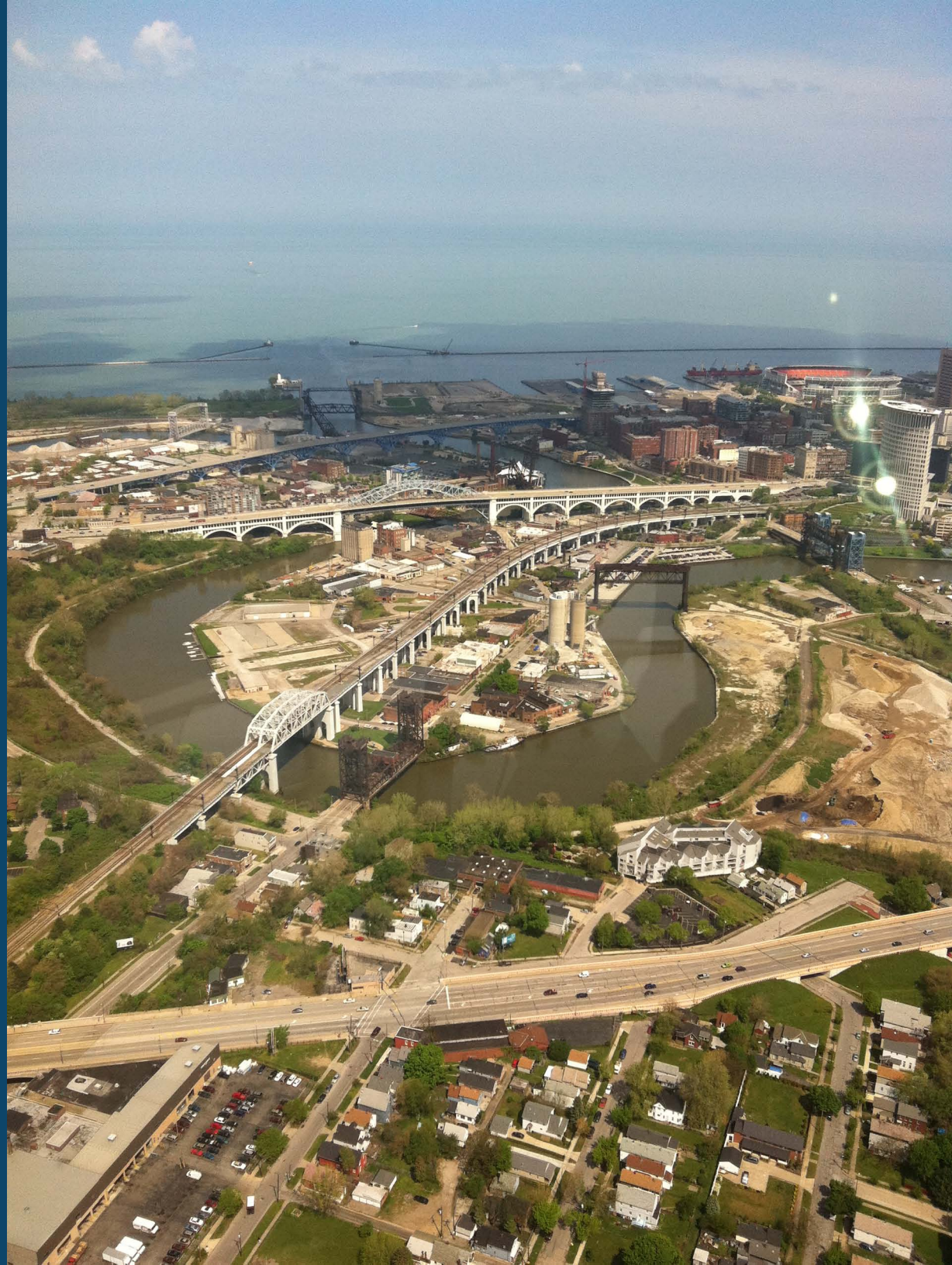


CASE
STUDY

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*Cleveland Flats'
Revitalization
Linked to
Recovery of the
Cuyahoga River*



Cleveland Flats' Revitalization Linked to Recovery of the Cuyahoga River

By Jane Goodman, *Cuyahoga River Restoration*, and Melinda Gigante, *Flats Forward*

The Haudenosaunee named this river *Cuyahoga*, or *crooked river*, for its meandering ways as well as for the overall shape of its watershed. The Cuyahoga is a u-shaped, 100-mile (160-kilometer), low gradient river located in northeast Ohio, draining over 800 square miles of land. The river begins its journey as two branches near the Lake Erie plain 30 miles east of its mouth at Cleveland. The branches join and the main stem heads south, away from Lake Erie, then makes a sharp right turn at Akron, redirected from its southerly course by the high ridge left by glaciers pushing the land into place. The river then flows north through the Cuyahoga Valley National Park and into Cuyahoga County on the way to its mouth at Lake Erie.

For much of the new country's earliest years, the Cuyahoga marked the American colonies' western border. Toward the end of the 18th century, the Colony of Connecticut's "Western Reserve," originally deeded to it by King Charles II, was sold to the Connecticut Land Company. These speculators sent Moses Cleaveland to survey and divide the land into townships, laying

the groundwork for the region's settlement and its development as an economic powerhouse.

The City of Cleveland (the original "a" removed, it is said, by a printer, to save space) was founded in 1796, followed by the growth of other cities and villages along the river where settlers had homesteads. Akron was founded in 1825 along the Little Cuyahoga tributary where the Cuyahoga would meet the new canal systems and open overland trade via the Ohio River.

The opening of the Erie Canal in 1825 (connecting Lake Erie to the Atlantic Ocean via the Mohawk and Hudson rivers) and the opening of the Ohio and Erie Canal in 1832 (connecting Cleveland to the Ohio River at Portsmouth) provided reliable passage for both people and goods. The Cuyahoga River provided the water for the canal between Akron and Cleveland. To handle and facilitate the movement of goods flowing into and out of this new system, a maritime district was created near the mouth of the Cuyahoga River called *The Flats*, a reference to the original state of the Cuyahoga's mouth as a shallow, marshy area at the base of the river valley.

The Flats surrounds the Cuyahoga River along its last few miles at Lake Erie, and originally separated the City of Ohio, an independent municipality on the west bank, from the City of Cleveland on the east bank. The two cities competed fiercely over maritime and mercantile business until Ohio City was annexed to Cleveland in 1854.

During the 1820s, the Flats became the center of industry and commerce. The original river mouth, which met Lake Erie nearly a mile west of its current location, was too convoluted to provide optimal access for large ships, so in 1827 a new, straight, shipping channel was dug, bypassing what is now known as the Old River Channel. Shipping companies, docks, warehouses, and bars for sailors soon followed as the Flats developed into a shipping powerhouse. Soon Cleveland became the most important city between Buffalo, New York, and Detroit, Michigan.

During the mid-1800s, Cleveland became one of the leading wooden-ship building centers on the Great Lakes, rivaling Buffalo and Detroit. While water transportation on both Lake Erie and

the Ohio and Erie Canal did much to facilitate the early development of Cleveland, it took the appearance of the railroad, and later the synergy between rail and maritime shipping to fully develop Cleveland's industrial base. For an entire century beginning in the 1860s, railroads served as the principal transporter of goods and people to and from Cleveland. The city, strategically located on Lake Erie, became the inevitable meeting place of coal brought in by the railroads from Pennsylvania, Ohio, Virginia, and Kentucky mines, and the ores brought down by ship from the Lake Superior region. People came, settled, worked, prospered, and developed Cleveland into an industrial hub with the Cuyahoga River, where rail and water met, as its center.

The city's and river's history during 1860-1930 was dominated by heavy industry, most notably steel, petroleum, chemical products, paint, and automobiles. In 1863, John D. Rockefeller and business partners entered the oil business as refiners in Cleveland, and in 1870 he and his partners organized The Standard Oil Company and developed its refinery on the banks of the Cuyahoga. By the early 1880s, Cleveland had become the center of the American petroleum production, with 90% of U.S. refineries and pipelines. In 1870, Sherwin-Williams set up its paint production facility on the Cuyahoga's east bank. The mid-1800s saw the growth of ironworks

and steel mills along the industrial end of the Flats, adding to the region's prosperity. But the wealth it created was facilitated, in large part, by the ability to dispose of waste into the river at no financial cost.

Consequences of Industrialization

As Cleveland became an industrial powerhouse, the industry-heavy channel of the Cuyahoga River became grossly polluted with industrial waste. Sitting at the bottom of a valley, the river was not readily visible to most of the population. Growing public awareness of water pollution in Lake Erie and the Cuyahoga River during the 1960s led to substantial public outcry. During the mid-1960s, the Federal Water Pollution Control Administration (the predecessor of the U.S. Environmental Protection Agency) characterized the Cuyahoga River as one of the most polluted rivers in the United States. Then on June 22, 1969, the Cuyahoga River caught on fire and ignited national outrage over water pollution.

The 1969 Cuyahoga River fire was a catalyst for change, in some measure, because it was part of a perfect storm of circumstances that drew attention to the fire and the city. *Time* magazine's August 1, 1969, issue was one of the most widely read issues at a time when access to news was

more limited than it is today. It was the week after Apollo 11 returned from its mission to the moon and the magazine featured the flight. It was also the first issue with a new environment section, with the river as its focus. The story featured Carl Stokes, the first African-American mayor of a large city. His brother, Louis, Ohio's first black congressman, had just been elected to his seat and was at work on the Clean Water Act.

The river fire and its national coverage helped awaken the nation to widespread environmental degradation. But 1969 was not the first time the Cuyahoga River caught on fire. Fires occurred on the Cuyahoga River in 1868, 1883, 1887, 1912, 1922, 1936, 1941, 1948, and 1952. Indeed, the Cuyahoga fire became a national symbol of industrial indifference to the environment, and the weakness of public regulation. It should be noted that in November 1968, the year before the infamous Cuyahoga fire, Cleveland residents had passed a \$100 million bond issue to finance river protection and cleanup efforts, including sewer improvements, storm water controls, harbor improvement facilities, and debris removal efforts. The fire and the attention it drew to other endangered waterways helped lead to the passage of both the Clean Water Act and the U.S.-Canada Great Lakes Water Quality Agreement in 1972. The environmental movement needed a poster child and the burning Cuyahoga River became it.

The Cuyahoga River Remedial Action Plan

During the 1970s and early 1980s, most of the environmental effort was placed on controlling discharges from industries and municipal wastewater treatment plants. Governments soon recognized that a much broader effort would

be required to address all sources and causes of pollution and use impairments, and to adequately involve all stakeholder groups in comprehensive use restoration. In 1985, the State of Ohio committed to developing remedial action plans (RAPs) for its four Great Lakes Areas of Concern (AOCs, or pollution hot spots) under the auspices of the U.S.-Canada Great Lakes Water Quality

Agreement. The goal of the RAPs was to restore all impaired beneficial uses using an ecosystem approach.

In 1988, the Ohio Environmental Protection Agency (EPA) appointed a 33-member planning committee to develop the Cuyahoga RAP (Table 1) for the AOC that includes the lower 46.5 miles of the river, the subwatersheds that drain to it, and direct Lake Erie tributaries along 10 miles of lakeshore. This organization, called the Cuyahoga River RAP Coordinating Committee, or CCC, was made up of a balanced representation of stakeholders in the planning and implementation process. In 1989, the nonprofit Cuyahoga River Community Planning Organization (later renamed Cuyahoga River Restoration) was created to support the RAP's activities.

The goal of the RAP was to restore the river and all impaired beneficial uses through the remediation of existing problems, and to protect the resource for future generations. Beneficial use impairments included restrictions on fish consumption; degradation of fish populations; fish tumors or other deformities; degradation of benthos; restrictions on dredging activities; eutrophication or undesirable algae; beach closings (recreational contact) and public access and recreation; degradation of aesthetics; and loss of fish habitat. The initial Stage 1 RAP (i.e., identification of use impairments and



Cuyahoga River fire, November 3, 1952. Credit: James Thomas, Cleveland Press Collection, Michael Schwartz Library, Cleveland State University.

YEAR	MILESTONE
1985	The International Joint Commission identifies the Cuyahoga River as an AOC
1988	Ohio EPA establishes the Cuyahoga River RAP Coordinating Committee to develop the Cuyahoga River RAP
1989	Coordinating Committee establishes Cuyahoga River Community Planning Organization to support RAP activities (later named Cuyahoga River Restoration)
1992	Stage I RAP completed, identifying beneficial use impairments and causes
1996	Stage 1 RAP updated
1998	The Cuyahoga River is recognized as one of 14 American Heritage Rivers
2006	Bald eagles establish at least two nesting sites within the AOC, including a new nest along the main stem of the Cuyahoga River between Akron and Cleveland in the Cuyahoga Valley National Park
2008	Ohio EPA releases a revised version of the delisting targets for the Ohio AOCs
2010	U.S. EPA expands the AOC boundary to include the Gorge Dam pool
2013	Stage 2 RAP completed, identifying remedial actions and responsible organizations
2014	Ohio EPA releases a revised version of Delisting Guidance and Restoration Targets for Ohio AOCs
2015	Stage 2 RAP updated, including delisting implementation plan
2017	Two beneficial use impairments removed: degradation of aesthetics and lack of public access

Table 1. A timeline of significant activities related to the restoration of impaired beneficial uses in the Cuyahoga River AOC.

causes) was completed in 1992 and updated in 1996 (Cuyahoga River Community Planning Organization, 2008) (Table 1). A Stage 2 RAP (i.e., that identifies remedial actions and responsible organizations) was completed in 2013 and updated in 2015 (Cuyahoga River Restoration, 2015).

With the initiation of Great Lakes Restoration Initiative (GLRI) funding in 2010, the Ohio EPA, Cuyahoga River Restoration, and an AOC Advisory Committee began in earnest to implement restoration projects. This partnership has used a community-based planning model in enhancing legitimacy through direct stakeholder participation in decision making, achieving community ownership of the work, and achieving progress through partnerships.

Restoration: A Work in Progress

In 2017, two of the original 10 impaired beneficial uses (aesthetics and public access) were deemed no longer impaired and removed from the list. However, much remains to be done to restore all impaired beneficial uses on the list.

Under the GLRI, more than \$9 million of habitat restoration and enhancement was

completed within the Cuyahoga River AOC from 2010 through 2017, including restoration of coastal wetlands and shoreline habitat on Lower Euclid Creek, rehabilitation of 900 feet (274 meters) of shoreline habitat in headwaters of two Euclid Creek tributaries and 2,400 feet (732 meters) along Euclid Creek, enhancement of fish habitat along the Cuyahoga River Ship Channel, restoration of wetlands along Mill Creek, and control of invasive species and enhancement of riparian habitat in Cuyahoga Valley National Park and regional park systems.

Several million more in GLRI funds have come to the AOC to build debris harvesting vessels that keep the ship channel clear, perform studies to assess aquatic health, develop restoration plans, manage stormwater, prevent runoff, and assess and monitor water quality and bacteria at AOC beaches.

Much has been accomplished in terms of pollution prevention and control, allowing aquatic life a better chance to thrive and human recreational uses to increase as nutrient and bacteria loads are reduced. The Northeast Ohio Regional Sewer District has spent over \$2 billion on wastewater treatment facilities and collection system improvements since 1972, as well as more than \$850 million reducing combined sewer overflows by nearly 50%. It has also carried out stormwater management projects and stream

restorations targeting aquatic life impairments in tributary areas of the AOC. The district is now implementing its Combined Sewer Overflow Long Term Control Plan over a 25-year period at a cost of \$3 billion. The City of Akron is also implementing a Long-Term Combined Sewer Overflow Control Plan at a cost of \$890 million.

Restoration projects have been identified that will lead to the removal of impairments relating to fish habitat, fish populations, and benthos. With funding support from U.S. EPA, Ohio EPA, GLRI, and other sources, many of these are now underway. Removal of one dam in the national

park will soon be complete, offering fish passage through sections of the AOC. The second, much larger Gorge Dam, is in the planning phase for removal.

The lower six miles (nine kilometers) of the Cuyahoga River are designated a federal navigational channel, where water depths must be maintained at a minimum of 23 feet (seven meters) to allow the passage of 700-foot-long (213-meter-long) ships supplying the steel mill and other users. Upper portions of the Cuyahoga River contribute considerable amounts of sediment into the federal navigational channel,



Rowing in navigational channel of the Cuyahoga River. Credit: Cuyahoga River Restoration.

requiring the U.S. Army Corps of Engineers to dredge approximately 225,000 cubic yards (172,025 cubic meters) of this sediment each year. Since 1979 these sediments were deemed contaminated and had to be placed in confined disposal facilities along the Lake Erie shore. In 2009 approximately 300,000 cubic yards (229,366 cubic meters) of dredged sediment was used to remediate a brownfield site to create the Cuyahoga Valley Industrial Center beside the river. In 2011, bedload collectors were installed in the river upstream from the ship channel, capturing clean sediment before it reaches the channel and conveying it onshore where it is used in the production of engineered soils. Clean sediment mined from segregated areas of the lakefront disposal facility is also being repurposed on land. New uses and markets for dredged sediment will allow the AOC to remove the impairment related to restrictions on navigational dredging, and create new economic opportunities based on the use of the material.

Evidence of the Revival of the Cuyahoga River

Fish are one of the best indicators of the Cuyahoga's recovery. In 1969, when the Cuyahoga River last caught fire, there were few, if any, fish in

the lower river. Systematic fish monitoring in the Cuyahoga River by Ohio EPA, both in the natural river and the ship channel, has documented dramatic improvements both in numbers and in species. Today you can find 70 species of fish, including many pollution-sensitive species like smallmouth bass. Pollution-sensitive benthic

macroinvertebrates are present in most reaches, and peregrine falcons, bald eagles, and osprey have returned to the banks. Even the industrial Flats now has resident blue and green heron, cormorants, and seasonal visits from migrating birds and waterfowl, evidence of increased fish populations. Benthic macroinvertebrate



Improving fishing access to the Cuyahoga River. Credit: Cuyahoga River Restoration.

communities now meet Ohio EPA criteria in many stream segments.

Fish have become so abundant, toward the southern, upriver end of the AOC, that park personnel enforce fishing limits on net fishing in order to help sustain the recovery of the fishery. The river at the dam in the national park has become a popular spot for steelhead fishing.

Recreational use of the AOC for fishing, kayaking, canoeing, and other outdoor sports has grown, and increases every year, making the Cuyahoga a recreational destination. New

outfitters and river-guide services have grown along with it. Once the last dams in the middle and lower river are removed, the river will become even more of an economic driver for Northeast Ohio.

Transformation of the Flats Leads to Economic Benefits

During much of the 1800s and the early 1900s, the Flats was ‘ground zero’ for the second industrial revolution, with heavy industry,

manufacturing, transportation, warehousing, and distribution. However, with the industrial decline after World War II, the Flats became a symbol of the aging Rust Belt, complete with massive environmental degradation. The burning of the Cuyahoga River in 1969 was a harsh symbol of Cleveland’s decline.

However, what was once a civic embarrassment would become a source of community pride. Between the 1970s and 1990s, the Flats underwent a dramatic transformation from a manufacturing and distribution center to

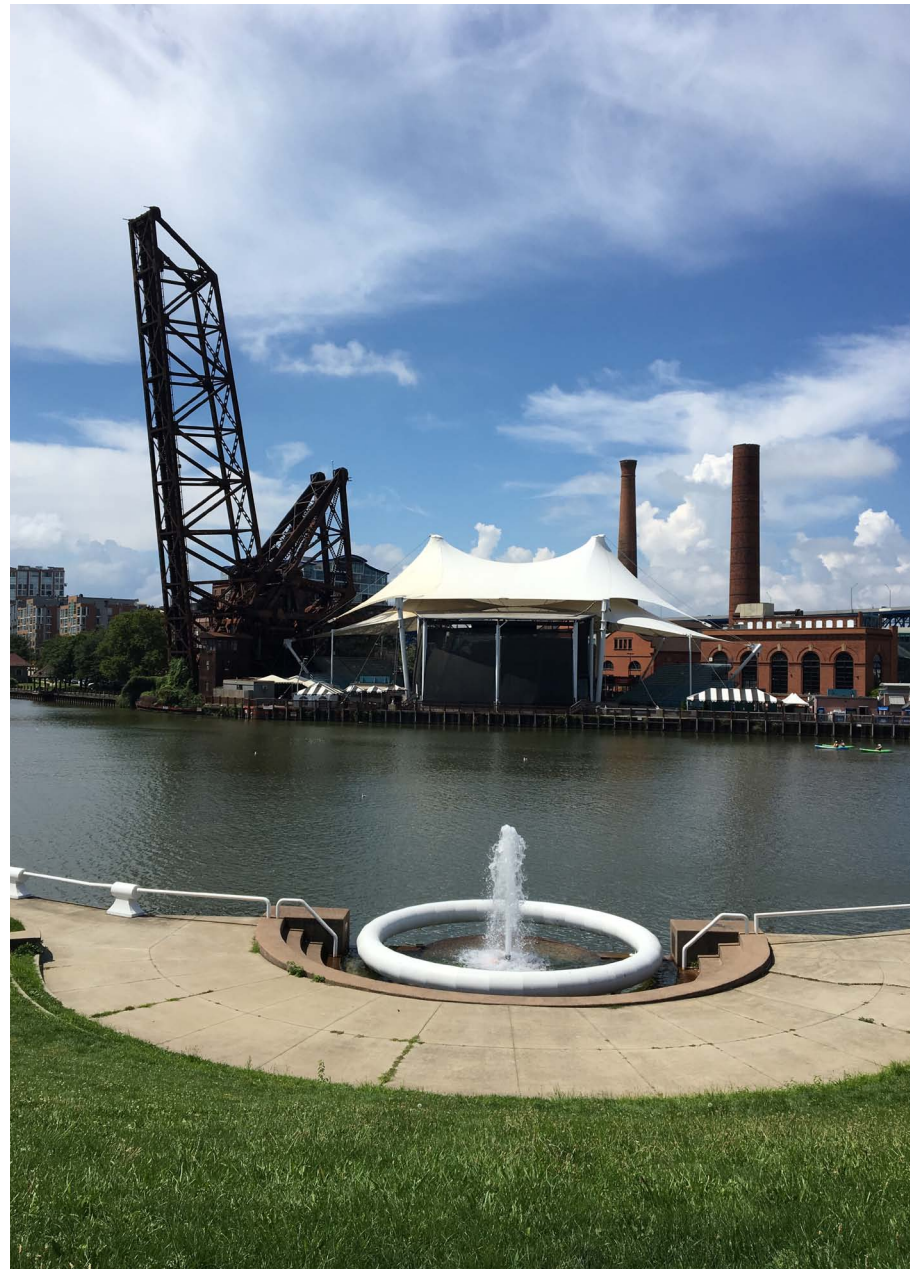


Flats East Bank development along the Cuyahoga River in Cleveland, Ohio. Credit: Flats Forward.

a district that combined restaurants, entertainment, and some housing with industrial and transportation activity. This redevelopment first peaked in the 1990s when the Flats was recognized as the region's entertainment mecca. Then, in the early 2000s, the Flats was hit by the recession, properties were neglected, and crime increased. Now, however, the Flats is experiencing another wave of transformation, with former warehouses turned into housing to meet the high demand for high-quality downtown residences, and massive investments in new eateries and entertainment venues.

Today, the Flats is a unique urban neighborhood that is inherently Cleveland, where nature, commerce, and industry live together. Leading the current transformation is Flats Forward, a neighborhood organization dedicated to enhancing the quality of life and economic well-being of all Flats stakeholders. Established in 2012, Flats Forward builds upon earlier community and economic development efforts, advocates for residents and businesses, and fosters strong neighborhood connections. The organization has documented that Cleveland's Flats has experienced \$750 million in economic development since 2012, including Flats East Bank, The Foundry, Settler's Point, Scranton Flats Towpath Trail, and Cleveland Foundation Centennial Trail. In addition, \$270 million of new Flats development projects are in the planning phase (Table 2).

The economic benefits of a revitalized neighborhood along the banks of a restored river can be seen in the people who want to live, work, and play in the Flats. Flats visitation in 2016 was approximately 577,000. In addition to the music venues and entertainment options, both banks of the Flats now host unique festivals year round. Take-a-Hike walking tours afford visitors the opportunity to learn about the area's history. Other unique attractions include a 5,000-seat amphitheater called Jacobs Pavilion at Nautica, a repurposed power plant that houses the Greater Cleveland Aquarium and a party and conference center, the Nautica Queen cruise ship, the landing for Cleveland Metroparks' new Water Taxi, and a watersports rental facility



Settler's Landing Fountain and Jacobs Pavilion at Nautica, Cleveland, Ohio. Credit: Flats Forward.

(Flats Forward, 2018). Across the river, the Flats East Bank Boardwalk offers pedestrians sweeping views of the Cuyahoga River and Cleveland's iconic bridges and provides dock space for transient boats.

Farther up the channel, Columbus Peninsula has become the outdoor recreational hub of the Flats, home to the Cleveland Rowing Foundation and The Foundry, which offers competitive rowing. This is also where the foundation's annual Head of the Cuyahoga Regatta attracts rowing teams from across the country to compete each fall. The Columbus Bridge area on the peninsula features Cleveland Metroparks' Rivergate Park and Merwin's Wharf restaurant, Hart Crane Park, Crooked River Skate Park, and the Ohio City Bicycle Coop.

Around the bend on the next peninsula, new mixed-use development is planned. A network of trails connects it all, taking people to and through pocket parks and greenspaces. Eventually, trails will connect to the lakefront at Wendy Park.

"Without the cleanup of the Cuyahoga River, the revitalization of the Flats would not have been conceivable," notes Melinda Gigante, Director of Flats Forward. "The revival of the Cuyahoga River has been a major catalyst for this revitalization."

This is seen from the headwaters, down the Class V whitewater to the AOC at the Gorge in Akron and Cuyahoga Falls, through the Summit

Project Name	Description	Estimated Cost
Canal Basin Park	Greenspace	\$34.65 million
Flat East Bank – Phase 3	Retail/residential	\$150 million
Irishtown Bend	Greenspace	\$49 million
Metroparks Projects	Trails	\$16.45 million
Northeast Ohio Regional Sewer District Pump Station	Infrastructure development	\$19.8 million

Table 2. Flats development projects planned as of August 2018.



Having dinner at Flats East Bank while watching the fire boat. Credit: Cuyahoga River Restoration.

Metro Parks, Cuyahoga Valley National Park, and Cleveland Metroparks reservations, and along the Ohio and Erie Canal Towpath Trail and the Cuyahoga Valley Scenic Railroad: all waters that lead to Cleveland and Lake Erie.

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Cover photo shows the Cuyahoga River at its mouth in Cleveland, Ohio. Credit: Cuyahoga River Restoration.

All monetary amounts are in U.S. dollars.

Contacts

Jane Goodman
Executive Director
Cuyahoga River Restoration
goodmanj@cuyahogariver.org

Melinda Gigante,
Director
Flats Forward
MGigante@flatsforward.org

John Hartig
Great Lakes Science-Policy Advisor
International Association for Great Lakes
Research
johnhartig1@gmail.com



The Cuyahoga River case study is part of a larger project to evaluate achievements and lessons learned from 32 years of efforts to clean up Great Lakes AOCs. Case studies will be used to help sustain support for cleaning up AOCs and to inspire and motivate others to restore other degraded aquatic ecosystems.

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