CleanWaterWorks

A technical journal of the Northeast Ohio Regional Sewer District

VOLUME 5

A NEW DAY FOR THE CUYAHOGA

Celebrating 50 years of a river reborn

Northeast Ohio Regional Sewer District

From the Chief Executive Officer



DREYFUSS-WELLS

Dear Reader,

The year 2019 marks 50 years of progress since the most famous of fires on the Cuyahoga River. It's a past worth remembering, and a future worth protecting.

On June 22, 1969, a spark set ablaze a blackened coat of oily pollution floating on the Cuyahoga.

It was not the first such fire: other cities had seen them, and the Cuyahoga itself had blazed more than a dozen times prior. But this time, the response was different, and it changed the country's future.



It was through our city's courageous leaders, like Mayor Carl Stokes, and Sewer District leadership, who turned words into action by investing billions in sewer infrastructure, that a positive impact on our local waterways has been felt.

In this issue of *CleanWaterWorks*, and in events throughout 2019, we'll revisit the history of the 1969 blaze and what led to it, and consider the political and environmental realities that made the fire a turning point for the nation.

Our community is proud of how far the Cuyahoga has come. Today, more than 60 species of fish call the river home, and Cleveland's aquatic recreation and sporting enterprises are thriving.

But our ability to defend the Cuyahoga, Lake Erie, and all our waterways from decline requires an ongoing commitment from all of us. As a community, we cannot turn our back on environmental progress, and we must continue to invest in projects that protect our natural resources.

Together, we are telling the story of our river's rebirth, and looking to the clean-water policies, practices, and people protecting its future.

I by well

Formerly Deputy Director of Watersheds Programs, Kyle Dreyfuss-Wells was appointed Chief Executive Officer of the Northeast Ohio Regional Sewer District in February 2017.







Cuyahoga River fires: 1949, 1951, and 1961

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River reborn

The Cuyahoga River has experienced a remarkable recovery since its famous, flame-ridden past. The Sewer District's efforts to protect and restore local waterways is one factor in the region's environmental transformation, which local communities and organizations are celebrating during the 50th-anniversary year of the fire.

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Cleveland sunrise as viewed from the bank of the Cuyahoga River (photo by Henryk Sadura/iStock).

Our Mission is to provide progressive management of sewage and stormwater through fiscal responsibility, innovation, and community partnerships.

Our Vision is to be the environmental leader in enhancing quality of life in the region and protecting its water resources.

This annual magazine gives subjectmatter experts the opportunity to explain in greater detail our work and that of our partner agencies.

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COVER STORY

Clean water in Northeast Ohio

A brief history

t the time of Cleveland's incorporation as a city in 1836, civic leaders were satisfied with discharging raw sewage into Lake Erie and the Cuyahoga River, simply to divert it away from public scrutiny. But as people continued to settle in Cleveland, growing amounts of sewage began to mix with the same water that citizens drew from for drinking. The combination was deadly, causing water-borne illnesses that claimed hundreds of lives. The fatalities encouraged the development of the wastewater-treatment process.

In the late 1960s, evidence that Cleveland's industrial prosperity had resulted in environmental neglect reached a breaking point. Burning rivers were only one sign of society's collective abuse of area waterways. Water quality deteriorated to the point that it could no longer be ignored.

A GREAT INDUSTRIAL CITY IS BORN

The Cuyahoga River and Lake Erie were the two primary features that led Moses Cleaveland to stake land at the mouth of the Cuyahoga in 1796. Along with the low banks, dense forests, and high bluffs, Mr. Cleaveland felt these features presented an ideal location for the capital city of the Western Reserve.

The business district of our early city exploited the river, where steamers, schooners, and canal boats exchanged imports and exports. The steel industry took off, and John D. Rockefeller began his oil empire on the shores of Lake Erie. Prosperity ensued, but polluted waters followed close behind.

Until 1856, most Clevelanders got their water from springs, wells, and cisterns, or in barrels filled with water from area waterways. City leaders built a new public wa-



Aerial view of Cleveland, 1937. The Easterly Wastewater Treatment Plant went online a year later. (National Archives)



Not enough was done to treat wastewater in our booming industrial city, and there were no discharge regulations. (National Archives)



A Cleveland Plain Dealer photo by Marvin Greene shows the state of the Cuyahoga River in the 1960s.



Construction of sewage treatment facilities began at Edgewater Park began in 1919, and the Westerly plant was placed into operation in 1922.

ter system to supply unfiltered Lake Erie water to a limited portion of the city. Twenty years later, the sewage and filth of a growing city added to the problem of industrial waste, thereby turning the water supply into a health risk. Several times, the intake pipes were relocated farther from the shoreline and sewer outlets, to reduce the incidence of typhoid fever and other water-borne diseases, but the benefits of those changes were short-lived.

As early as 1881, Mayor Rensselaer Herrick declared Cleveland's riverfront "an open sewer through the center of the city." Despite a lack of public support, there began a series of public works to improve the quality of Cleveland life, including the construction of a public water system and drainage sewers.

One of the first sewer pipes that transported waste to the lake was the Easterly Interceptor (constructed in 1905), which ran parallel to the lake shore. At this time, the Cuyahoga River had 50 sewers emptying into it, along with a large quantity of manufacturing waste.

THE LAKE AND RIVER PAY THE PRICE

Until 1911, officials intended to ultimately collect sewage from the entire city in the Easterly Interceptor and discharge it into the lake, untreated. In 1911, city officials seriously considered the lake's future. They had doubts about the economy and wisdom of transporting sewage many miles from the western and southern parts of the city to the main Easterly outlet, especially if the sewage required treatment. As a result of a study, they decided to



Map showing Cuyahoga County's "Political Subdivisions and Metropolitan Sewerage Districts," 1945



Easterly construction, 1932

collect and treat sewage and industrial waste from four general districts: Westerly, Easterly, Southerly, and Low Level. These districts were the forerunners of today's Westerly, Easterly, and Southerly service areas.

City officials decided to test the various methods of sewage treatment. The Easterly Sewage Testing Station was established on the shore of the lake, next to the Easterly Interceptor outlet, to determine the most effective method of treating sewage so it could be safely discharged into the lake without causing unsanitary and unsightly conditions.

Design and construction of full-sized preparatory works with chlorination facilities and a second submerged outfall for Easterly began in 1919. The plant was completed and began operation in 1922. That same year, the Westerly Wastewater Treatment Plant began operating as a primary treatment facility, followed by the Southerly Wastewater Treatment Plant in 1927.

By 1930, Westerly and Southerly had been upgraded to provide higher levels of treatment, and the Easterly plant had become the subject of additional studies. With the intake for the proposed Nottingham water filtration plant just four miles from Easterly's outfall, considerable improvement in the plant's treatment capacity was necessary. The result was upgrading Easterly to become Cleveland's first activated-sludge plant, which went online in 1938.*

The treatment plants were further upgraded and expanded through the next four decades, but despite these improvements, not enough was done to adequately treat wastewater in a booming industrial city. Compounding matters, no industrial discharge regulations existed. The increased production and use of persistent toxic chemicals during and after World War II raised environmental concerns beyond those that accompanied the industrial and sewage pollution of earlier years.

> Forewarned by Rachel Carson's 1962 book *Silent Spring*, which stated that chemicals such as DDT accumulate in the food chain and cause reproductive and developmental health defects, local members of the League of Women Voters helped form the League's Lake Erie Ba-

* The "activated-sludge" process uses bacteria to remove waste from water. The bacteria then settles out, and the clean water is returned safely to the environment.





Firefighters extinguish hot spots on a railroad bridge burned in the 1969 Cuyahoga fire. (Mitchell Zaremba/The Plain Dealer)



The 1969 fire captured the public's imagination and ignited a growing environmental movement.



The August 1, 1969, issue of Time magazine included an article about the Cuyahoga's burning.



In 1970, the National Environmental Policy Act passed in Congress, helping to establish the Environmental Protection Agency.

sin Committee in 1963 to educate the public about such threats. Nevertheless, during the 1960s and early 1970s, the cumulative effects of neglect reached a new low.

AN INFAMOUS FIRE

Then, on June 22, 1969, it happened. After enduring years of abuse, the Cuyahoga River caught fire and thrust Cleveland into the national spotlight. The 1969 fire was benign compared to previous incidents: a 1912 blaze that killed five men and a fire in 1952 that resulted in \$1.5 million worth of damage to surrounding structures and water vessels. Comparatively, the 1969 fire on the Cuyahoga caused just \$85,000 in damage and no fatalities, but tim-

ing, as they say, is everything. In 1969, the Cuyahoga's burning captured the public's imagination and ignited a growing environmental movement. More than a century after the river's pollution was first noted, it became an international symbol of environmental neglect.

Cleveland Mayor Carl Stokes, a long-time advocate for environmental responsibility, criticized the federal government and vowed to fight for a cleaner river. The August 1, 1969, issue of *Time* magazine detailed Stokes's fury in an article about the river's burning titled "The Price of Optimism." The article mentioned the Federal Water Pollution Control Administration's report that the lower Cuyahoga had "no visible life."



Mayor Carl Stokes near the site of the Cuyahoga River fire in 1969. (Cleveland State Library Special Collections)



The Sewer District took responsibility for Cleveland's wastewater treatment needs, including clamping down on industrial discharges.



Once declared "dead," the Cuyahoga now boasts more than 60 different species of fish and has been found to be a home of freshwater mussels.

Congress had to do something about the sorry condition of America's water systems. In 1970, a groundbreaking piece of environmental legislation, the National Environmental Policy Act (NEPA), passed in Congress, helping to establish the Environmental Protection Agency (EPA). In 1972, Congress passed the Federal Water Pollution Control Amendments, which formed the basis for what would become the Clean Water Act of 1977.

The objective of the Act was to restore and maintain the chemical, physical, and biological integrity of the nation's waters. To achieve this objective, the Clean Water Act set two national goals. The first was to eliminate the discharge of all pollutants into the navigable waters of the United States by 1985. The second goal was to achieve an interim water quality that would protect fish, shellfish, and wildlife and recreation by July 1, 1983.

Within this framework, Congress gave the EPA administrator the legal tools to help advance water-pollution control, while continuing to recognize the primary rights and responsibilities of the states to prevent, reduce, and eliminate pollution.

It was in this national context that the Northeast Ohio Regional Sewer District was created. **CWW**

This article originally appeared in Northeast Ohio Regional Sewer District: Our History and Heritage. Copies of this book are available upon request by emailing askus@neorsd.org.

The Cuyahoga's upward trend towards better health

In 2017, the Northeast Ohio Regional Sewer District and the Ohio Environmental Protection Agency conducted a project to assess the biological communities and the water and habitat qualities of the Cuyahoga River.

Eight locations along the length of the river, from Big Creek (in the Harvard/Denison area) to Chippewa Creek (just upstream of the Station Road dam), were chosen for sampling and analysis.

HABITAT ASSESSMENT

The Qualitative Habitat Evaluation Index (QHEI) measures the physical attributes of a stream—such as gradient, bank condition, and substrate (stream bottom) type, among other factors—which can help explain why fish species are present or absent.

A QHEI score was determined for each location on the Cuyahoga. Ohio EPA's target score is 60. All but one of

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the sites scored at least 60. The scores ranged from 54 to 82.

ELECTROFISHING

An electrical current is applied to the water to stun the fish, causing them to float to the surface where they can be caught with a net. The fish are counted, identified, weighed, and examined for any deformities, eroded fins, lesions, or tumors. The fish are then released back into the water.

The results are used to evaluate the health of the fish community. The Index of Biotic Integrity (IBI) looks at fish numbers, diversity, feeding strategies, environmental tolerances, and disease symptoms. The Modified Index of Well





Being (MIwb) looks at the number of individual fish and their weights.

The Cuyahoga's IBI and MIwb scores have been improving since the District began conducting electrofishing in 1990. In 2017, all but one of the Cuyahoga sites had MIwb scores attaining the Warm Water Habitat use designated by Ohio EPA, and all but two had IBI scores attaining the designated use.

The presence of pollution-sensitive fish is an indication of improved water quality. Since 1990, the number of native fish species and the proportion of pollution-sensitive fish have increased as the Cuyahoga's water quality has improved.





In 1990, no pollution-sensitive fish could be found at the river sites electrofished by the District. In 2010, the proportion of pollution-sensitive fish found at the sites electrofished by the District had increased to as high as 62%.

MACROINVERTEBRATE SAMPLING

The Cuyahoga's macroinvertebrates (insect larvae, worms, snails, etc. living in or on the bottom of the river) were sampled using Hester-Dendy samplers, which consist of stacks of small plates held together with a bolt. The samplers are attached to a concrete block and placed in the water for 6 weeks. Then the samplers are removed and the macroinvertebrates that have colonized the plates are identified and counted.

The results were evaluated using the Ohio EPA's Invertebrate Community Index (ICI), which compares the sampled locations with relatively unimpacted reference sites.

The Ohio EPA's minimum Warm Water Habitat ICI score is 34. All of the Cuyahoga sites except two exceeded this score. The highest score obtained was a 48, which is considered to be Exceptional.

SUMMARY

The overall health of the fish and macroinvertebrate communities in the Cuyahoga River has improved substantially over the past several decades.

In 2017, six of the eight locations were in full attainment of both the fish and macroinvertebrate criteria. In 1969, when the Cuyahoga last burned, many people would have thought results like these were impossible.

Tunnels and beyond

Project Clean Lake a tall task and a team effort

n 1972, the Clean Water Act was created to address the nation's water-quality issues, among them the foul spectacle of raw sewage discharging into the environment. In Cleveland, the Sewer District's construction projects during the next several decades would reduce these discharges significantly—from an estimated 9 billion gallons a year down to 4.1 billion (in 2015).

However, in 1994, the U.S. EPA adopted a Combined Sewer Overflow Control Policy, which required wastewater agencies to develop long-term plans to further reduce combined sewer overflow (CSO). Cleveland and hundreds of cities around the country have negotiated long-term plans with the EPA to address these overflows.

Project Clean Lake will reduce CSO volume in Cleveland from 4.5 billion gallons to under 500 million gallons annually. By 2035, the number of overflows will be reduced to four or less per year, resulting in an estimated 98% capture and treatment of all wet-weather flows in Cleveland's combined-sewer system.

At the heart of the Project Clean Lake is the construction of seven large-scale storage tunnels, ranging from two to five miles in length, up to 300 feet underground, and up to 24 feet in diameter—large enough to park a semi-trailer truck. This technology is widely used in CSO-control plans across the country. The tunnels can hold tens of millions of gallons of CSO, rather than allowing it to discharge into Lake Erie and the Cuyahoga River. After the rain stops, massive hydraulic pumps convey the flow back to the surface and to one of the District's three wastewater treatment facilities.

In April 2011, the Sewer District broke ground on its



The tunnel boring machine and Dugway Storage Tunnel construction crew. (Photo by Ryan Sullivan)

Euclid Creek Tunnel project, which includes an 18,000foot long, 24-foot wide storage tunnel 200 feet underground. Just over two years later, in August 2013, "Mackenzie," a 1,500-ton tunnel boring machine, completed its three-mile-long excavation. The finished tunnel has the capacity to capture about 65 million gallons of combined wastewater and stormwater, and will directly impact water quality in Lake Erie and local streams. In 2018, Mackenzie (renamed "Fulvio") finished digging a second tunnel, the Dugway Storage Tunnel.

"We see every project as an opportunity to be better," said Director of Engineering and Construction Devona



The Fleet Avenue Green Infrastructure project includes new storm sewer systems and a bioretention basin to convey and treat stormwater runoff from a 15-acre drainage area. (Photos courtesy of AECOM drone)

Marshall. "All of us, our employees and our contractors together, see Dugway [Storage Tunnel] as the latest example of that mindset."

"It's a testament to the crews on the job, the management team, and our leadership not losing sight of our mission," she continued. "This is a huge accomplishment for all of them, but we know we have years of projects ahead."

Project Clean Lake also includes a minimum of \$42 million in green infrastructure projects, which the federal government had never before included in its CSO-control consent decrees. These stormwater-control measures, which include such technologies as bioswales and detention basins, can store, infiltrate, and evapotranspirate rainfall before it even makes its way into the combinedsewer system.

Enhancements to the District's three wastewater treatment plants, which together treat over 90 billion gallons each year, are another crucial component of Project Clean Lake. At the Easterly and Southerly plants, the amount of wastewater that can receive treatment will increase. This is necessary to accommodate the greater volumes of combined flow that will no longer be allowed to discharge into the environment. In particular, Easterly has undergone major construction to expand its secondary treatment capacity, including installation of six additional final settling tanks.

Despite ongoing construction, the District's three treatment plants consistently are recognized with the highest performance honors from the National Association of Clean Water Agencies for meeting National Pollutant Discharge Elimination System permits. **CWW**

Portions of this article previously appeared in Water Innovations magazine in September 2015.



PICHTHOSE PILLS!

Flushing pills down the toilet is harmful to our water supply and the environment. Wastewater treatment plants are unable to remove pharmaceuticals, so they end up in our waterways threatening the environment and public health.

The best way to dispose of unwanted or expired medicine is at a local drug collection site. To find a location near you, dial 211 or visit RxDrugDropBox.org.





One of many fires on the Cuyahoga River, 1952.

The Cuyahoga burned HOW many times?

hen the oozing Cuyahoga River caught fire in 1969, it may not have even made the "Top 10" list of Cleveland river fires—and few realized it was actually the thirteenth time it had happened.

The 1969 fire was mild compared to its predecessors. It was extinguished even before photographers arrived (a photo you frequently see is actually from 1952) and it caused a "measly" \$85,000 in damage. Compare that to a 1912 blaze that killed five men and resulted in almost \$1 million worth of damage.

The Cuyahoga River fire we remember holds a prominent place in Cleveland's history: the punchline of jokes and a lasting symbol of environmental neglect, despite the fact that many actions had already begun to improve our nation's water resources. Over the last five decades, the river's ongoing resurrection is a testament to the work that brought it back to life, and a reminder of how easily it can be taken for granted.

Elected in 1967, Cleveland Mayor Carl Stokes, a longtime advocate for environmental responsibility, criticized the federal government and vowed to fight for a cleaner Cuyahoga. The next year, things started to change. The blaze inspired the formation of the Environmental Protection Agency, the Clean Water Act, and, in Ohio, the Cleveland Regional Sewer District (renamed the Northeast Ohio Regional Sewer District in 1979). The District took responsibility for the wastewater treatment needs of Greater Cleveland, including clamping down on industrial discharges into the lake and river—important work that the District continues to this day.

Once declared "dead" by the national media, the Cuyahoga River now boasts more than 60 different species of fish and has been found to be a home of freshwater mussels. The fish and benthic macroinvertebrates collected within the past few years demonstrate that the water quality in the river is improving and its capacity to support a more diverse aquatic community is increasing.

Even though additional aquatic organisms have been identified, there is still more work to do within the watershed to improve water quality conditions. As agencies, businesses, and citizens continue to appreciate and protect our natural resources, Lake Erie and the Cuyahoga River will continue to improve. May the only thing left burning on the Cuyahoga River today be our desire to do better. **CWW**

UPCOMING EVENTS

A selection of local, national, and international clean-water happenings in 2019



World Water Day March 22 World Water Day focuses attention on the importance of water.

National Association of Clean Water Agencies Water Week 2019 March 31 - April 6 Washington, DC Water Week communicates the value of water to environmental protection, economic development, and job creation—and inspires action.

Infrastructure Week May 2019

A national week of education and advocacy highlighting the state of our nation's infrastructure and the projects, technologies, and policies necessary to make America competitive, prosperous, and safe.

American Water Works Association Drinking Water Week May 5-11 Water professionals and the communities they serve join together in recognizing the vital role water plays in our daily lives. 12th Annual Ohio Stormwater Conference May 8-10 Sharonville, OH An annual conference dedicated to advance the knowledge and understanding of comprehensive stormwater management for those dealing in all aspects of planning, design, implementation, and regulatory compliance.

ASFPM Flood Fest 2019 May 19-23 Huntington Convention Center Cleveland, OH

Flood-risk professionals from all over the world attend the Association of State Floodplain Managers' annual conference.

Share the River Ramble June 2019 Cleveland, OH Cleveland's running and walking tour of the Cuyahoga River corridor trails.

The City Club of Cleveland 2019 State of the Great Lakes June 2019 Cleveland, OH Annual City Club forum on issues pertaining to the health of our lakes. Burning River Fest June 2019 Cleveland, OH The Fest returns for its 18th year of music, beer, and community at one of Cleveland's most beautiful waterfront locations.

River Rally 2019 June 21-24 Cleveland, OH A national conference for river and water champions.

World Water Week August 25-30

The annual focal point for the globe's water issues, organized by the Stockholm International Water Institute. The 2019 theme of World Water Week is "Water for society— Including all."

Northeast Ohio Regional Sewer District Annual Open House & Clean Water Fest Saturday, September 21 Cuyahoga Heights, OH A celebration of community and all things water as the District opens the doors of its Southerly treatment plant and lab facilities for a day of education and entertainment.

See the latest events and info at neorsd.org/RiverReborn

A river's rebound

Several District projects have reduced pollution

he overall health of the fish and bug communities in the Cuyahoga River has improved substantially since 1969, when debris in the Cuyahoga last burned. Fish collected in recent years demonstrate that water quality in the Cuyahoga is improving and its capacity to support a more diverse aquatic community is increasing. (Between 2006 and 2018, 18 fish species that had never been collected before by the District in the Cuyahoga were found.) Several Sewer District projects and programs have helped reduce the amount of pollution in the river.

INDUSTRIAL PRETREATMENT

Since 1984, the District has had an EPA-approved Industrial Pretreatment Program, which has reduced the amount of metals flowing to our Southerly Wastewater Treatment Plant.

District crews inspect hundreds of local companies

each year. Some companies are subject to annual inspections, based on the type of manufacturing processes in their facilities. Some of these processes create wastewater that is potentially more toxic than others, and companies may be required to have a pretreatment system to remove pollutants from their wastewater before it enters the sewer system.

When a company is found to be violating pollutant discharge limits, the District works with the business in its effort to return to compliance. In some cases, enforcement action is necessary: fines may be levied or sewer service revoked. The District may also refer cases to the U.S. EPA for potential criminal prosecution.

INTERCEPTOR SEWERS

In the 1970s, protecting Lake Erie bathing beaches, particularly at Edgewater Park, became a priority. At the same time, the opportunity to decommission numerous small,



Construction of the Cuyahoga Valley Interceptor Lift Station, 1978

inefficient wastewater treatment plants discharging into the upper section of the Cuyahoga River, particularly in the Cuyahoga Valley National Recreation Area, prompted the Sewer District to design and construct the Cuyahoga Valley Interceptor, a separate sanitary interceptor serving communities in Cuyahoga and Summit counties.

Construction of the Heights-Hilltop and Southwest Interceptors in the 1980s would prevent suburban sanitary sewage from entering Cleveland's combined system, and instead "express" it directly to the Southerly plant.

These two interceptors provide capacity to alleviate sewer flooding and overflow issues in local sewer systems. The removal of separate sanitary sewage from the combined system reduced annual combined sewer overflow (CSO) as well. The District also has worked with its member communities to help them upgrade their local sewer systems, further reducing sanitary overflows into the Cuyahoga.

UPGRADES AT SOUTHERLY

A massive upgrade at Southerly was completed between 1975 and 1987. The plant treatment works were totally redesigned with new processes for the removal of ammonia and residual chlorine, both of which are harmful to the aquatic community.

Ammonia reduction occurs during an aeration process called *nitrification*, during which the ammonia is oxidized in a two-step biological reaction, first to nitrite (NO2) and then to nitrate (NO3). Success of the nitrification process depends on proper pH, temperature, retention time, and aeration. (The gaseous byproducts of biological respiration, mainly carbon dioxide, are passed into the atmosphere.)

In 1991, Southerly personnel successfully tested sodium hypochlorite for disinfecting plant effluent, and a new disinfection facility allowed them to discontinue the use of liquid chlorine—a change made with plant and commu-



Ammonia concentrations in Southerly effluent dropped significantly following treatment process enhancements in the late 1980s, benefiting the Cuyahoga aquatic community.

nity safety in mind. (Sodium hypochlorite is significantly less dangerous than liquid chlorine.)

FEWER DRY-WEATHER DISCHARGES

The capture and treatment of *illicit discharges*, or improperly connected sanitary pipes that were sources of dryweather sewage discharges into area waterways, has been crucial to reducing pollution in the Cuyahoga.

Illicit discharges flow through stormwater pipes and out into creeks, rivers, and other waterbodies, often right by people's homes. The District's Illicit Discharge Detection and Elimination (IDDE) program is aimed at detecting, tracing, and eliminating these discharges.

Once a problem has been traced, the District's watershed team leaders will talk to a community representative about possible solutions and what the District can do to help remediate the problem.

In 2017, the District's Water Quality & Industrial Surveillance department reduced sewage discharges to area streams by approximately 693,440 gallons per day.

CSO-CONTROL PROJECTS

Increased collection of *combined sewer overflow* (CSO) for treatment at Southerly, through projects like the Mill Creek Tunnel, which eliminated numerous CSO loca-

without an integrated approach for sanitary wastewater and storm drainage.

PARTNERS IN THE RIVER'S RECOVERY

District efforts to improve conditions in the river have been complemented by the work of dedicated agencies and organizations, notably the EPA, with its ability to enforce the mandates of the Clean Water Act, and the Cleveland Metroparks, West Creek Conservancy, Western Reserve Land Conservancy, and many regional watershed organizations for their land conservation and restoration efforts.

The Cuyahoga River Area of Concern (formerly Cuyahoga River Remedial Action Plan) has raised community awareness of issues along the river, and continues to work on sound management actions towards removal of beneficial-use impairments.

In addition, the contributions of the Cuyahoga County Board of Health, Department of Public Works, and Cuyahoga Soil & Water Conservation District in assisting communities with eliminating illicit discharges, and the Cuyahoga County Solid Waste District for providing household hazardous waste collections (as an alternative to dumping paint and motor oil into storm drains), cannot be overstated. **CWW**

tions, has resulted in reduced pollution in the Cuyahoga.

Additional tunnels constructed through the District's Project Clean Lake program will significantly reduce overflows into our waterways (see story, page 12).

STORMWATER MANAGEMENT

Implementation of a regional stormwater management program to address erosion, flooding, and pollution problems is the most recent step forward in the District's work to protect the Cuyahoga and other waterways. Stormwater is a major contributor of pollutants to receiving waters, and the District's water-quality objectives cannot be met

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Northeast Ohio

Teamwork makes the streams work

Maintaining the regional stormwater system

hile efforts to clean up the Cuyahoga River over the last 50 years are getting much deserved accolades in 2019, it is important to note that the river is but one part of a regional system that includes the Ohio Erie Canal, portions of Tinkers Creek, Rocky River, Chagrin River, and many tributaries feeding into it.

For decades, these waterways were plagued by flooding, erosion, and pollution problems. In recent years, communities have enjoyed the benefits of the Sewer District's work to address regional stormwater issues.

"Our stormwater service area is roughly 375 square miles, from a drainage area perspective, but the Cuyahoga River watershed is 800 square miles, the Rocky River watershed is roughly 300 square miles, the Chagrin River watershed is roughly 250 square miles, and the Lake Erie direct tributaries are over 150 square miles," said George Remias, Manager of the District's Stormwater Inspection & Maintenance (SWIM) group, which keeps track of all of the region's stormwater-system assets. "That's a total of 1,500 square miles of drainage."

Given the severity of water pollution problems in Cleveland at the time of the District's creation in 1972, the organization's early focus was on wastewater. "But as we started getting sanitary issues under control, we decided to get back to stormwater, which was in our original court order," Remias said.

The Sewer District conducted surveys and interviews with communities in the 1970s, 1990s, and 2000s, and learned of worsening stormwater issues. "Problems were becoming more severe, complicated, and costly," said Remias. Due to communities' lack of money, understanding, or ability to handle the problems, the District created its Regional Stormwater Management Program (RSMP) in 2013. "This is a relatively new service that the District is providing."



District SWIM crews examine properties impacted by failing streambanks, poorly-planned culverts, and other issues.

"Few projects were being built, due to lack of money for stormwater-related issues," said Remias. "Sometimes a problem was seen as too complicated, or no one knew who should take the lead." Because sub-watersheds cross jurisdictional boundaries, even if Community A and Community B share a stream, the two often cannot coordinate a solution because each is legally bound to only do projects within its own border.

Even if a stream-related problem lies within a community, people may have difficulty determining who is responsible for addressing it. "A private property owner will ask the community, 'Here's the problem, can you come fix it?' Some communities say they'll help, but many will say, 'That's your property and your responsibility'."

The RSMP was formed was to help address problems, regardless if they're on public or private, or residential or nonresidential properties. "We just want to make sure water is safely conveying downstream," Remias said. His team determines if a particular stream, culvert, or basin is in good condition, or clogged, broken, or flooding. "If there's something we can do, we'll take action," he said. "If it's a bigger issue, we'll will flag it for further analysis and action by the District's design and construction group, or by the property owner."

The regional system differs from the local system. The District declares a stream to be regional if it drains an area of at least 300 acres, or if there is an intercommunity-related issue. Once the District declares an asset part of the regional system, it takes the lead on fixing the problem, which may include sharing project costs with the owner. If the problem is located on the local system, then the District supports the community or owner with fixing a problem.

"We've had examples where there was a culvert and stream owned by a homeowner association [HOA] and it failed, and it was the HOA's responsibility to fix that," said



Branches and other debris collect on Doan Brook, near Martin Luther King Jr. Drive in Cleveland.

Remias. "They had no idea! In the end, the District went in and helped do a replacement, and shared the project costs with the owner."

"We try to be proactive and preventative, and customers let us know about problems," said Remias. "Anytime we've approached someone to perform maintenance on their property, they're usually delighted that someone's there to address a problem that's been there for a while." The SWIM group has completed almost 600 maintenance projects since the program was formed. "Problems are widespread across our service area," said Remias.

Much of the work is removing large woody debris, sediment buildup—and the occasional surprise. "Recently, we found a shelving unit wedged in a drainage pipe at the Kerruish Basin, and a whole bunch of debris piled up behind it," said Remias. "You can imagine it like a cork in a wine bottle. We figured out what was wrong and "uncorked" it, and we also dredged thousands of cubic yards of sediment that had collected." All of that flood protection has since been restored, and a debris rack has been installed to help prevent another "cork."

The District has maintained rain gauges for years, and recently installed dozens of stream gauges and trail cameras across the service area to help monitor what happens when it rains. "We get notifications when it rains really hard, or flooding occurs, and can mobilize maintenance based upon live data feeds, which improves our response time," Remias said. As the SWIM team collects more storm data, Remias can also demonstrate how District projects are mitigating flooding problems.

The District has improved its partnership with the National Weather Service to get advanced warning notifications of potentially damaging weather events to help mobilize contractors to help mitigate flooding. "The more we can ensure basins and culverts function as designed, the more we can keep the public safe during big storms," said Remias.

"As our program moves forward, and we learn how our streams react to storms, what areas flood, and what streams erode, we can improve both our maintenance of the regional system and prioritization of projects," Remias said. "Our average project size for removing sediment and debris has started to decrease, and I think that has to do with finally fixing things that people didn't realize were a problem, or weren't tackling. We can keep small problems from becoming big ones." CWW

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11

Northeast Ohio

Building a better bulkhead

Branches, bristles, balls help migrating fish

n October 2015, customized contraptions along the steel walls of part of the Cuyahoga River were installed to help provide habitat for migrating fish.

This stretch of the Cuyahoga flows through the industrial center of Cleveland, and hosts freighters carrying materials to and from the ArcelorMittal steel plant and other sites. Bulkheads of steel and concrete hold back the river banks and ensure clear passage for 700-footlong ships as they navigate the river.

Because the river has been altered from its natural state, it's not a welcoming place for fish. "Larval and juvenile fish coming out of the shallow natural river have to make it through what is basically a big, deep, hard-walled tub to get to Lake Erie," according to the website of the non-profit Cuyahoga River Restoration. "The welcoming habitats that provide oxygen, food, and shelter are very few and very far apart." This lack of habitat for young fish affects the health of the lake and river fishery that is important to the Great Lakes economy.

The Northeast Ohio Regional Sewer District helped to install 36 metal baskets along the bulkheads of the navigation channel. The baskets are filled with one of three different test materials: some contain sticks, others brushes, and the rest contain wiffle balls.

Cuyahoga River Restoration monitors and maintains the baskets to see which materials attract algae and other aquatic components needed for quality fish habitat. The baskets are intended to replicate the natural conditions of an aquatic environment. This is known as *biomimicry*.

The baskets have accumulated organic matter that young fish can feed on, and woody debris to provide shelter for small fish.

Cuyahoga River Restoration works with many partners to increase the chances for both migrating fish and the river's permanent residents. **CWW**

cuyahogariver.org















A new trail along the river

The Cleveland Foundation Centennial Lake Link Trail is a 1.3-mile abandoned railroad right-of-way in Cleveland's industrial river valley that has been transformed into a trail and natural stormwater management system. On its southern end, the trail connects to the popular Ohio and Erie Canalway Towpath Trail, which unfolds southward from Cleveland more than 80 miles through a scenic National Heritage Corridor.

From the Towpath, the Lake Link Trail traverses through the west bank of the Flats, and ends in Wendy Park on Lake Erie. The trail connects the downtown and near west side neighborhoods with the Lake, and provides access to the Cuyahoga River. It runs along the former Cleveland and Mahoning Railroad, which dates back to the 1850s.

In 2014, LAND studio, Cleveland Metroparks, and the Trust for Public Land secured several grant commitments that enabled the trail project to move forward. Construction of a pedestrian walkway, the Wendy Park Bridge, which will connect the Lake Link Trail to Lake Erie, will start in Spring 2019.

Plans for a park along Irishtown Bend are in the works. This park will link Ohio City, Downtown, the Lake Link Trail, and the Flats to each other and the Cuyahoga.

PHOTO COURTESY OF LAND STUDIO

The river that burned is dead. Long live the river that burned.

Fifty years ago, the Cuyahoga River fire sparked a movement. We can't go back, which is why we should not forget.

n Cleveland, the phrase "burning river" has many emotional ties. It's a local brew. A national punchline. A badge of honor. A painful reminder. It has inspired music and missions, policy and pride, advocacy and awareness. A symbol some wish would be extinguished like the very plumes of 1960s pollution, and a vision others see as a future we must fight to avoid.

Not the 1969 fire, but a larger Cuyahoga River fire from the 1950s.

Today, a half a century since the 1969 Cuyahoga River fire—the last of more than a dozen such river fires in Cleveland—memories of the actual June 22 event may be fading as a new generation is growing up only knowing a reborn and revitalized river.

Should we allow the memory to fade? What significance does June 22, 1969 hold today?

We say the burning river of 1969 is dead. "Dead" in that we can't allow such a reality to rise again.

Yet at the same time, the fact that it happened is exactly why we choose to commemorate it and, more specifically, our river's progress with each passing year. Progress is not measured without points of reference. The fire was all-in-one an ending, a pivot, and a beginning. We see a burning river as both a "Never forget" and a "Never again" moment.

THREE PROVIDE

Not without its challenges, the Cuyahoga River since the 1970s has been a national environmental success story. Fish health and diversity of species, riverfront activity, river-based entertainment and recreation, all have made remarkable progress, and the improvements continue trending upward. Pollution is way down, and current threats are being further reduced with long-term investments and programming like ours.

While threats remain, from environmental to regulatory to relational, our ability to defend the Cuyahoga River and Lake Erie from conditions like 1969's requires an ongoing commitment to keeping our Great Lake great.

We, your Sewer District, are committed. And we thank you customers and residents of the region who have invested in that commitment.

June 22 will forever be an anniversary. One we celebrate not to relive, but to remember. **CWW** **CleanWaterWorks**

video extras:

Streambank Stabilization

Camp Clean Water

Zach the Mad Scientist



Watch the videos at youtube.com/neorsdccr

Watch our CleanWaterWorks program on TV20 Cleveland:



CleanWaterWorks

Northeast Ohio Regional Sewer District 3900 Euclid Avenue Cleveland, Ohio 44115-2506

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A celebration of progress begins with an understanding of its spark

The recovery of the Cuyahoga River is considered by some to be a national success story. The river's present and future is best understood in relationship to its polluted past.

Sewer District Communications Specialist Yolanda Kelly set out to commemorate the 50-year anniversary of the 1969 Cuyahoga River fire, the last such fire and the beginning of a nation-wide environmental movement.

The mark we're using for the celebratory year 2019 acknowledges the river's suffering as well as its connection to the improvements that nursed it back to health. Its style is illustrated and organic, providing a sense of movement. The color palette emphasizes the flame that burned and the brilliant blue of a brighter future.

You will see this mark used on our @neorsd materials, and you will find us, the City of Cleveland, and many regional partners celebrating 50 years of progress with events and promotions in 2019.

> #RiverReborn neorsd.org/RiverReborn

