Northeast Ohio Regional Sewer District

2021 Stream Restoration Projects Pre- & Post- construction Monitoring

Table of Contents

List of Acronyms

EPA	Environmental Protection Agency
GPS	Global Positioning System
HUC	Hydrologic Unit Code
IBI	Index of Biotic Integrity
ICI	Invertebrate Community Index
MIwb	Modified Index of Well-Being
NEORSD	Northeast Ohio Regional Sewer District
QHEI	Qualitative Habitat Evaluation Index
RM	River Mile
USGS	United States Geological Survey
WQIS	Water Quality & Industrial Surveillance

(1) Objectives

In 2021, the Northeast Ohio Regional Sewer District (NEORSD) will monitor environmental conditions at six (6) sites to determine the effectiveness of recently completed and upcoming restoration projects in improving water quality conditions, habitat, and fish and macroinvertebrate communities. Sites on Big Creek, Rocky River East Branch, and Stickney Creek will be assessed as part of post-project monitoring. Sites on Chippewa Creek and Mill Creek will be assessed as part of pre-project monitoring to establish baseline conditions prior to the completion of proposed stream restoration activities. Surveys at these locations will be conducted by the Environmental Assessment group of the NEORSD Water Quality and Industrial Surveillance (WQIS) Division.

The Big Creek Stabilization Project and Colombo Park Stream Restoration were both completed in November of 2019 and addressed hydrological issues affecting Big Creek in Cleveland and Parma Heights, Ohio. The Big Creek Stabilization project improved erosion and habitat issues along more than 1,200 linear feet of stream by replacing concrete lined streambanks with riprap and developed a sloped cascade of large rocks on top of an existing spillway structure that acted as a barrier to fish migration. The Colombo Park Stream Restoration addressed erosion and improved stream function along 400 feet of Big Creek in Parma Heights. The project halted stream-bank erosion that threatened public sanitary sewer infrastructure, and realigned, widened, and stabilized a section of the stream to establish new floodplain areas and slow in-channel velocities.

In 2017, the Cleveland Metroparks was awarded a grant to improve water quality and habitat along East Branch Rocky River and to restore adjacent areas within Bonnie Park in Strongsville, Ohio. The primary focus of the Bonnie Park Restoration project was the removal of a low-head dam that acted as a fish barrier and was significantly affecting upstream water quality and attainment of Warmwater Habitat status. The project also improved the area surrounding this section of Rocky River East Branch with floodplain and wetland restoration. By the request of the Cleveland Metroparks, the NEORSD completed a preconstruction limited environmental survey on the East Branch of the Rocky River upstream of the Bonnie Park Dam in July of 2017. In 2019, fish, macroinvertebrate, and water chemistry sampling were conducted at the same site under the yearly general watershed monitoring. The project's initial restorative actions were completed in Spring/Summer 2020, with the first post-construction fish survey conducted by WQIS in October 2020.

In Brooklyn, Ohio, the Stickney Creek Restoration project was completed on November 29, 2019. This project restored more than 1,000 feet of urban stream where erosion exposed and threatened the integrity of sanitary sewer infrastructure. Additionally, restoration efforts reestablished floodplain storage, slowed stream velocities, and created more in-stream habitat.

The Chippewa Creek Stream Stabilization Near Broadview Road project is in the preconstruction phase and aims to improve stream bed and bank stability where an unnamed tributary to Chippewa Creek is eroding its right streambank in Broadview Heights, Ohio. The eroding stream bank is within twelve feet of the Chippewa Creek Condominiums and approximately six feet from a parallel local sanitary sewer. The erosion

has also exposed storm sewer pipe and headwalls. The project will stabilize the eroding stream bank and protect sewer infrastructure assets with construction that is set to begin in Summer/Fall 2021.

WQIS preconstruction environmental monitoring will support the Mill Creek Stream Stabilization in Warrensville Heights project. The project concept plan expands and reconnects floodplains and addresses erosion by stabilizing banks and protecting an exposed sanitary sewer line. The goal of the project is to eliminate the threats to numerous properties along Mill Creek and restore the stream by improving access to its floodplain to better handle high-volume flow and improve overall urban hydrology.

Stream monitoring at these locations will be conducted by the Environmental Assessment group of the NEORSD WQIS Division, and will include fish and macroinvertebrate community surveys, habitat assessments, and water chemistry sampling. Sampling will occur between June 15 through September 30, 2021 (through October 15 for fish community assessments), as required in the Ohio EPA Biological Criteria for the Protection of Aquatic Life Volume III (1987b)[1].

Stream monitoring activities will be conducted at each sampling location by NEORSD Level 3 Qualified Data Collectors certified by Ohio EPA in Fish Community Biology, Benthic Macroinvertebrate Biology, Chemical Water Quality Assessment, and Stream Habitat Assessment. Fish and macroinvertebrate community health will be evaluated using Ohio EPA's Index of Biotic Integrity (IBI), Modified Index of Well-Being (MIwb) (when applicable), and Invertebrate Community Index (ICI).

Water chemistry assessment data, the NEORSD Macroinvertebrate Field Sheet, and Qualitative Habitat Evaluation Index (QHEI) results, will be utilized in conjunction with an examination of specific characteristics of the biological communities present within the stream sampling locations, to identify any impacts to those communities. These results will be compared to historic data to demonstrate temporal as well as spatial trends. Water chemistry data will also be compared to the Ohio Water Quality Standards to determine attainment of applicable uses (Ohio EPA, 2021).

Please see "2021 NEORSD Watershed Monitoring Study Plan" for further details regarding study activities and supporting documentation.

(2) Non-Point/Point Sources

Table 1. Potential Sources of Pollution	
Point Sources	Nonpoint Sources
NPDES permitted facilities	Urban Runoff
Storm Sewer Outfalls	Landfills
Sanitary Sewer Overflows	Spills

[1] See Appendix H for a list of references.

Table 1. Potential Sources of Pollution	
Point Sources	Nonpoint Sources
Home Septic Systems	Agriculture
Illicit Discharges	

The map presented in Section 6 shows point sources that may influence the water quality at each sample location. These sources, along with the nonpoint sources listed in the table above, may impact the health of the fish and benthic macroinvertebrate communities in restoration project streams. Ecological conditions at the sampling locations may also be influenced by periods of drought or precipitation during the study.

(6) Sampling Locations

The sample locations, listed in the following table, will be surveyed on each stream during the 2021 field season. Benthic macroinvertebrate and water chemistry collection sites are located near the midpoint of each electrofishing zone, indicated by RM. GPS coordinates are recorded at the downstream end of each electrofishing zone.

Water Body	Latitude	Longitude	River Mile	Station ID	Location Information	USGS HUC 8	Project Name	Purpose
Big Creek	41.3884	-81.7664	9.80	303734	Downstream of Pearl Road/Colombo Park	04110002 - Cuyahoga	Colombo Park Stream Restoration	Evaluate water chemistry, habitat, fish & macroinvertebrates postconstruction
Big Creek	41.4460	-81.7540	4.40	301193	Memphis Picnic Area	04110002 - Cuyahoga	Big Creek Stabilization	Evaluate water chemistry, habitat, fish & macroinvertebrates post-construction
Rocky River East Branch	41.3301	-81.8357	8.70	T01W29	Upstream of Former Bonnie Park Dam	04110001-Black-Rocky	Bonnie Park Restoration	Evaluate water chemistry, habitat, fish & macroinvertebrates post-construction
Stickney Creek	41.4334	-81.7351	1.15	303948	Upstream of Ridge Road	04110002 - Cuyahoga	Stickney Creek Restoration	Evaluate water chemistry, habitat, fish & macroinvertebrates post-construction
Chippewa Creek Unnamed Tributary	41.3309	-81.6848	0.55	TBD	Upstream of Broadview Road	04110002 - Cuyahoga	Chippewa Creek Stream Stabilization Near Broadview Road	Evaluate water chemistry, habitat, fish & macroinvertebrates pre-construction
Mill Creek	41.4437	-81.5392	9.55	TBD	Upstream of Longbrook Road	04110002 - Cuyahoga	Mill Creek Stream Stabilization in Warrensville Heights	Evaluate water chemistry, habitat, fish & macroinvertebrates pre-construction

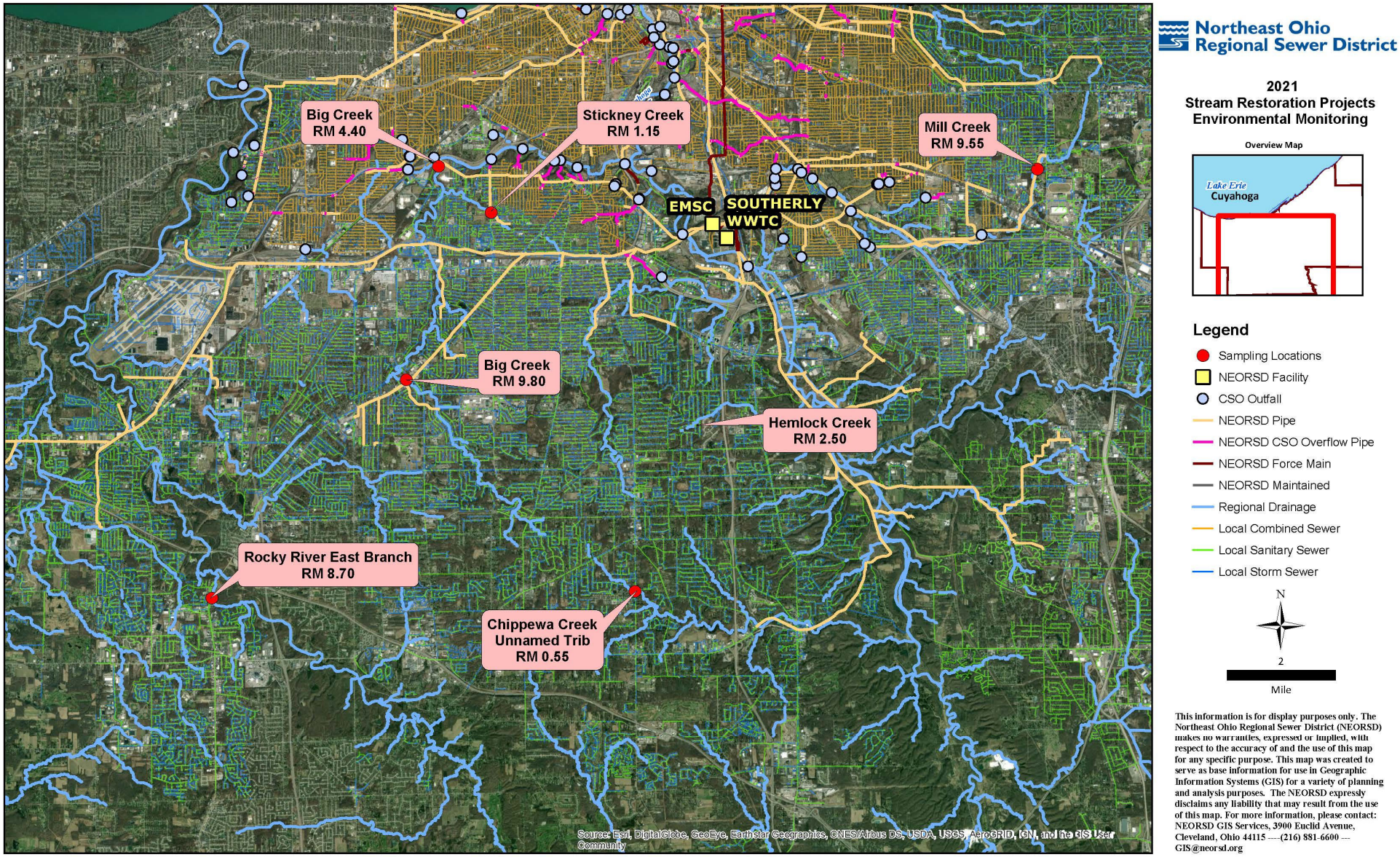

Figure 1. Map of Monitoring Sites