

Level 3 Project Study Plan

2014 Cuyahoga River Environmental Monitoring

(1) Objectives

The lower Cuyahoga River has been designated as one of 42 Great Lakes Areas of Concern (AOC) by the International Joint Commission. Past monitoring indicated impairment of aquatic biota in the river and was the basis of a Total Maximum Daily Load (TMDL) for the Lower Cuyahoga River. The causes of impairment to the river were classified as organic enrichment, toxicity, low dissolved oxygen, nutrients and flow alteration (Ohio EPA, 2003)¹. Recent monitoring by the Northeast Ohio Regional Sewer District (NEORS), however, has shown recovery of the biological community in some reaches of the river. The purposes of this study, therefore, are to determine the attainment status of the river in relation to point and nonpoint sources of pollution and measure the magnitude of some potential causes of impairment.

During the course of the study, fish communities, benthic macroinvertebrate communities, habitat and water chemistry will be surveyed at ten sites in the Cuyahoga River between River Mile (RM) 16.20 and RM 0.20. The results from these surveys will be used to characterize the overall fish and macroinvertebrate community health in the river.

Fish and macroinvertebrate community health will be evaluated through the use of Ohio EPA's Index of Biotic Integrity (IBI), Modified Index of Well-Being (MIwb), and Invertebrate Community Index (ICI). An examination of the specific characteristics of the biological communities will be used in conjunction with water quality data, the NEORS Macroinvertebrate Field Sheet, and Qualitative Habitat Evaluation Index (QHEI) results in order to identify impacts to the communities. Results will be compared to historic data to show 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, 2011).

Finally, the data collected from this study may be used to support three grants funded as part of the Great Lakes Restoration Initiative (GLRI). One of these grants is the *Cuyahoga River Larval Fish Study* funded by the U.S. Army Corps of Engineers that is being implemented by the Cuyahoga County Planning Commission. The second is a grant funded by the GLRI, from the Cuyahoga County Department of Public Works, titled *Cuyahoga AOC Urban Riparian Habitat Restoration*. The last one is the Ohio Department of Natural Resource's *Cuyahoga AOC Habitat and Fish Restoration Opportunities* grant. These projects are generally focused on restoration of habitat and fish within the Cuyahoga River.

¹ See appendix H for a list of all references.

(2) Point/Nonpoint Sources

Point Sources (Location on river)	Nonpoint Sources
Tinkers Creek (RM 16.36)	Urban runoff
Mill Creek (RM 11.49)	Landfills
West Creek (RM 11.05)	Spills
Southerly WWTC (RM 10.57)	Agricultural Runoff
Ohio Canal (RM 8.78)	
Big Creek (RM 7.20)	
Combined Sewer Overflows	
Storm Sewer Overflows	

A map has been provided in section 6 to show point sources that may be influencing the water quality at each sample location. These sources, along with the ones listed in the table above, may be impacting the health of the fish and benthic macroinvertebrate communities in the Cuyahoga River watershed.

(6) Sampling Locations

The following electrofishing and macroinvertebrate sample locations, listed from upstream to downstream, will be surveyed during the 2014 field season. Benthic macroinvertebrate and water chemistry collection sites are located near the midpoint of each electrofishing zone, indicated by RM, unless otherwise noted. GPS coordinates are recorded at the downstream end of each electrofishing zone.

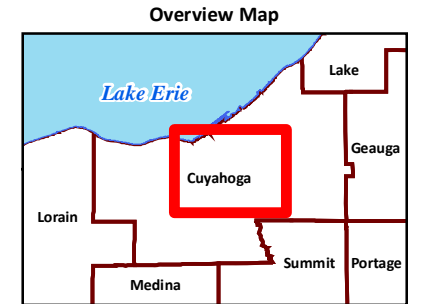
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Location	Latitude	Longitude	River Mile	Description	HUC	Purpose
Downstream of Tinkers Creek	41.3678	-81.6139	16.20	Downstream of confluence with Tinkers Creek near Old Riverview Road	04110002 - Cuyahoga	Background data for fish, habitat, macroinvertebrates, and chlorophyll <i>a</i>
Upstream of Mill Creek	41.4123 41.4101	-81.6364 -81.6346	12.10 ² 11.95	Upstream of the confluence with Mill Creek (I-480)	04110002 - Cuyahoga	Evaluate Mill Creek discharge on fish, habitat and macroinvertebrates
Downstream of Mill Creek	41.4179	-81.6446	11.30	Downstream of confluence with Mill Creek	04110002 - Cuyahoga	Evaluate Mill and West Creek discharges on fish, habitat and macroinvertebrates
Upstream of Southerly WWTC	41.4196	-81.6547	10.75	Upstream of Southerly WWTC effluent discharge	04110002 - Cuyahoga	Evaluate West Creek and Southerly WWTC discharges on fish, habitat and macroinvertebrates and Southerly WWTC discharge on chlorophyll <i>a</i> levels
Downstream of Southerly WWTC	41.4242	-81.6638	10.10	Downstream of Southerly WWTC effluent discharge	04110002 - Cuyahoga	Evaluate Southerly WWTC discharge on fish, habitat, macroinvertebrates, and chlorophyll <i>a</i> levels
Upstream of Big Creek	41.4381	-81.6680	8.60	Upstream of the confluence with Big Creek	04110002 - Cuyahoga	Evaluate Big Creek discharge on fish, habitat and macroinvertebrates
Downstream of Big Creek	41.4497	-81.6815	7.00	Downstream of the confluence with Big Creek/ Upstream of habitat restoration project	04110002 - Cuyahoga	Evaluate Big Creek discharge on fish, habitat and macroinvertebrates; Southerly WWTC discharge on chlorophyll <i>a</i> levels; and effectiveness of habitat restoration in navigation channel on fish
Head of Navigation Channel	41.4619	-81.6816	5.90	Head of navigation channel/Upstream of artificial habitat near ArcelorMittal	04110002 - Cuyahoga	Evaluate effectiveness of habitat restoration in navigation channel on fish

² HD and water chemistry collection site

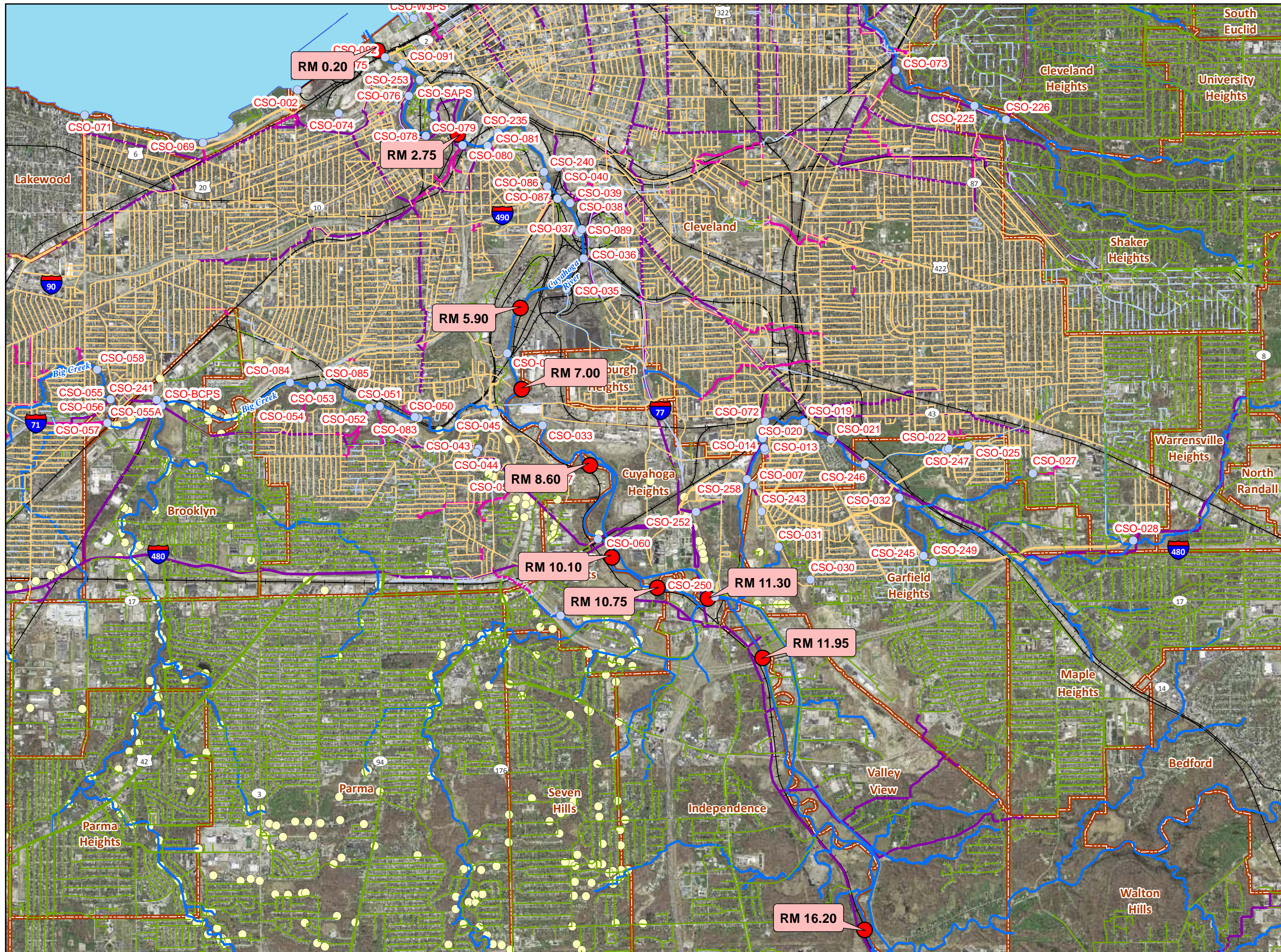
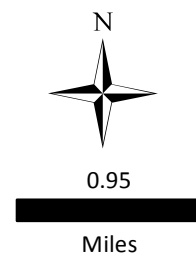
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Location	Latitude	Longitude	River Mile	Description	HUC	Purpose
Abandoned Marina (formerly Scaravelli's)	41.4881	-81.6938	2.75	Mid-navigation channel/Proposed site of GLRI habitat restoration project	04110002 - Cuyahoga	Evaluate effectiveness of habitat restoration in navigation channel on fish
Cuyahoga River Mouth	41.5008	-81.7098	0.20	Near mouth of river in navigation channel	04110002 - Cuyahoga	Evaluate effectiveness of habitat restoration in navigation channel on fish



Cuyahoga River Environmental Monitoring

- Study Site
- ~ Stream
- CSO Outfall
- Outfall
- District Facility
- NEORSO CSO Combined Sewer
- NEORSO CSO Responsibility Sewer
- NEORSO Intercommunity Relief Sewer
- NEORSO INTERCEPTOR
- Local Combined Sewer
- Local Culverted Stream
- Local Sanitary Sewer
- Local Storm Sewer



This information is for display purposes only. The Northeast Ohio Regional Sewer District (NEORSO) makes no warranties, expressed or implied, with respect to the accuracy of and the use of this map for any specific purpose. This map was created to serve as base information for use in Geographic Information Systems (GIS) for a variety of planning and analysis purposes. The NEORSO expressly disclaims any liability that may result from the use of this map. For more information, please contact: NEORSO GIS Services, 3900 Euclid Avenue, Cleveland, Ohio 44115 ----(216) 881-6600 --- GIS@neorsd.org