

Level 2 & 3 Project Study Plan

2015 Hemlock Creek Environmental Monitoring

(1) Objectives

In 2015, the Northeast Ohio Regional Sewer District (NEORSD) plans to conduct stream monitoring activities at nine sites on Hemlock Creek, a tributary to the Cuyahoga River. NEORSD will assess habitat and water chemistry conditions and evaluate the fish and benthic macroinvertebrate communities at four of the sites. An additional five primary headwater sites will be evaluated for habitat only. The purpose of the monitoring is to understand the general health of the watershed as part of NEORSD's focus on northern Cuyahoga tributaries in 2015 and 2016.

Three of the sites are along Hemlock Creek's main branch and are located at RMs 0.15, 1.15, and 2.10. The fourth site, RM 0.10, is located immediately southeast of the main branch on a separate direct tributary to the Cuyahoga River. These sites were selected to provide a representative overview of the watershed.

Stream monitoring activities will be conducted at those four sites by NEORSD Level 3 Qualified Data Collectors certified by Ohio EPA in Fish Community Biology, Benthic Macroinvertebrate Biology, Chemical Water Quality, and Stream Habitat Assessment. 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 NEORSD Macroinvertebrate Field Sheet, and Qualitative Habitat Evaluation Index (QHEI) results in order to identify impacts to the communities and to show any spatial trends. Water chemistry data will also be compared to the Ohio Water Quality Standards to determine attainment of applicable uses (Ohio EPA, 2011)¹.

For the five primary headwater sites, habitat assessments will be conducted at each site by NEORSD Level 2 Qualified Data Collectors certified by Ohio EPA in Stream Habitat Assessment. Habitat will be evaluated using the Ohio EPA Headwater Habitat Evaluation Index (HHEI).

(2) Nonpoint/Point Sources

Point Sources	Nonpoint Sources
NEORSD Interceptor	Urban Runoff
Sanitary Sewer Overflows	Spills
Storm Sewer Outfalls	Sedimentation

¹ See appendix H for a list of all references.

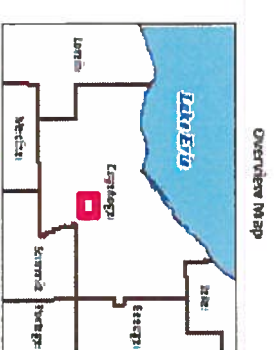
A map has been provided to show point sources that may be influencing the water quality at each sample location. These sources, along with the nonpoint sources listed in the table above, may be impacting the health of the fish and benthic macroinvertebrate communities in Hemlock Creek. Other factors that may influence ecological conditions during the study include periods of drought or precipitation.

(6) Sampling Locations

The following water chemistry, habitat, electrofishing, and macroinvertebrate sample locations on Hemlock Creek, listed from upstream to downstream, will be surveyed during the 2015 field season. Benthic macroinvertebrate and water chemistry collection sites are located within each electrofishing zone, indicated by RM. GPS coordinates are recorded at the downstream end of each electrofishing zone.

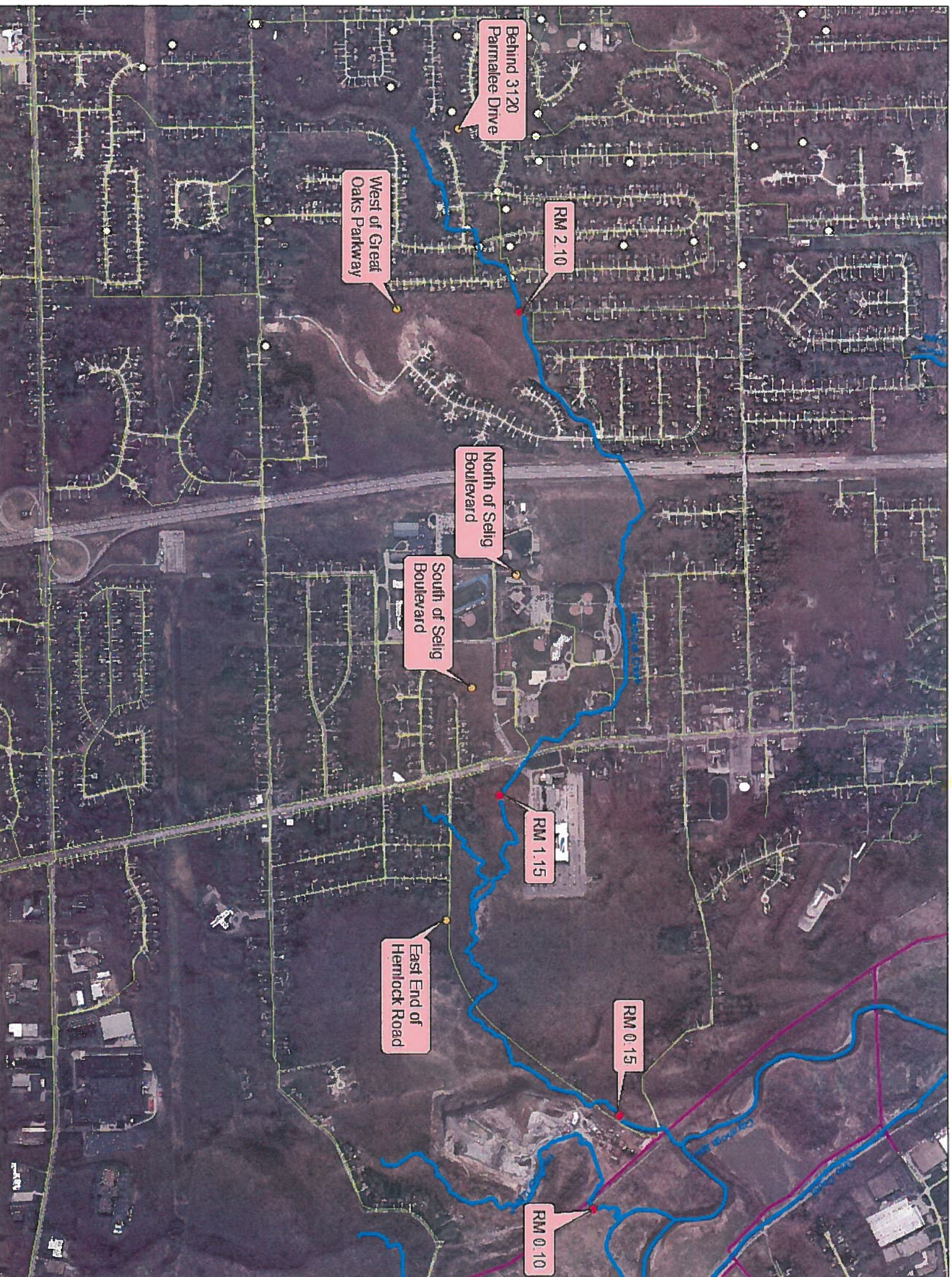
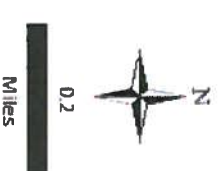
Water Body	Latitude	Longitude	River Mile	Location Information	USGS HUC 8 Number - Name	Purpose
Hemlock Creek	41.3802	-81.6535	2.10	Downstream Great Oakes Parkway	04110002 Cuyahoga	Evaluate overall watershed health
Hemlock Creek	41.3767	-81.6386	1.15	Downstream Brecksville Road	04110002 Cuyahoga	Evaluate overall watershed health
Hemlock Creek	41.3805	-81.6245	0.15	Upstream Hemlock Road	04110002 Cuyahoga	Evaluate overall watershed health
Hemlock Creek	41.3796	-81.6204	0.10	Southeast of Hemlock Road, trib to Cuyahoga	04110002 Cuyahoga	Evaluate overall watershed health
Hemlock Creek Tributary 7	41.375552	-81.667735	NA	Behind 3120 Parmalee Drive	04110002	Evaluate habitat
Hemlock Creek Tributary 5	41.373486	-81.659900	NA	West of Great Oaks Parkway	04110002	Evaluate habitat
Tributary to Hemlock Creek	41.375813	-81.643305	NA	South of Selig Boulevard	0411002	Evaluate habitat
Tributary to Hemlock Creek	41.377330	-81.648234	NA	North of Selig Boulevard	0411002	Evaluate habitat
Tributary to Hemlock Creek	41.374888	-81.633119	NA	East end of Hemlock Road	0411002	Evaluate habitat

Hemlock Creek Study Plan



Legend

- Monitoring Site
- Primary Headwater Monitoring Site
- Regional Drainage
- CSO Outfall
- District Facility
- Outfalls
- NEORSD CSO Combined Sewer
- NEORSD CSO Respon sibility Sewer
- NEORSD Intercommunity Relief Sewer
- NEORSD 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 (NEORSD) makes no warranty, 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 NEORSD expressly disclaims any liability that may result from the use of this map. For more information, please contact: NEORSD GIS Services, 3900 Euclid Avenue, Cleveland, Ohio 44115 --- (216) 881-6600 --- GIS@neorsd.org