



STAGE 2  
DELISTING  
IMPLEMENTATION PLAN  
Update  
and  
Progress Report

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Prepared by  
Cuyahoga River Restoration

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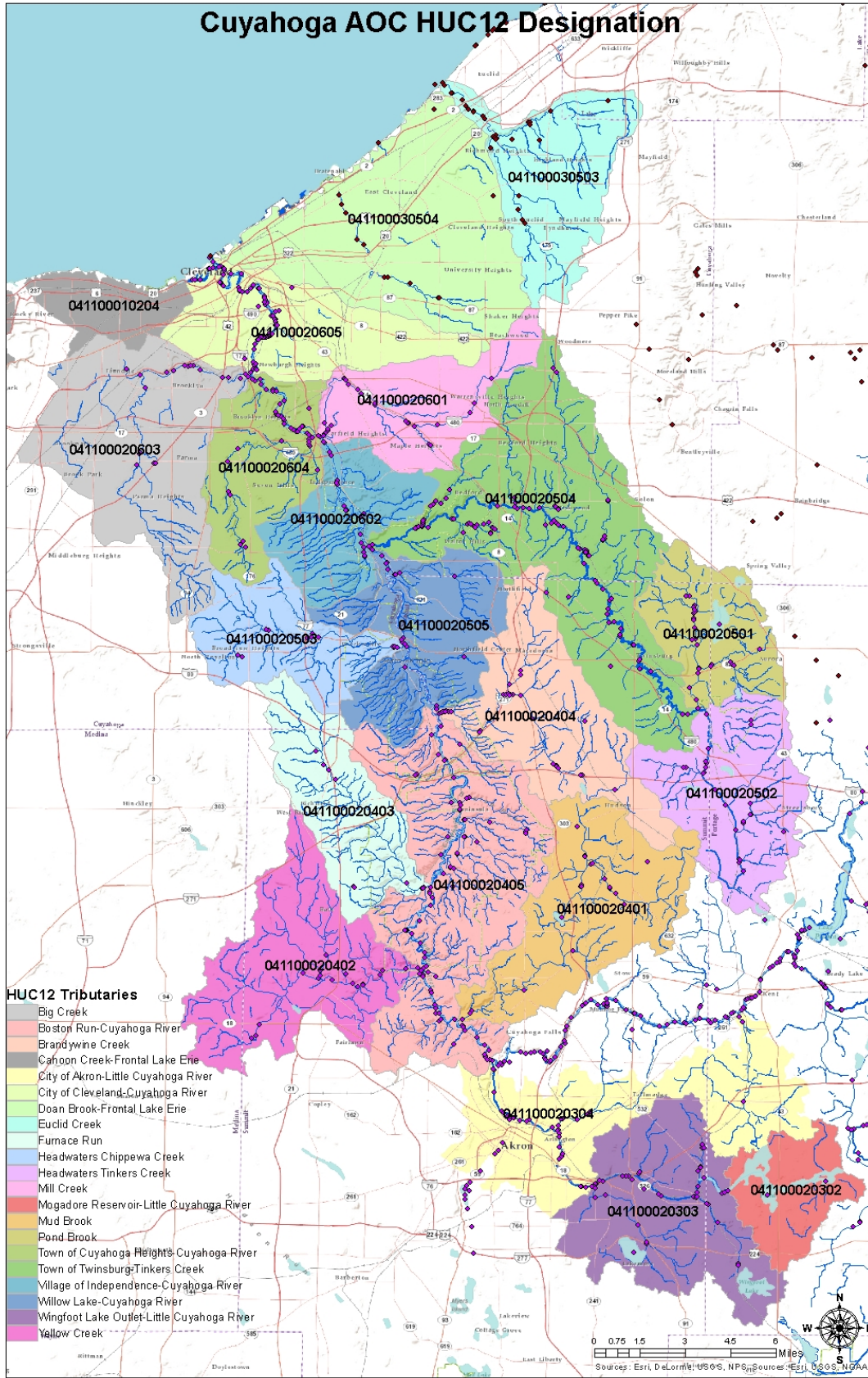
Their assistance, involvement, and commitment to the Cuyahoga River Area of Concern is most appreciated.

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# Cuyahoga AOC HUC12 Designation





## INTRODUCTION

**The Cuyahoga River Area of Concern** includes the lower 46.5 river miles – approximately half the full length – of the river, and approximately 500 square miles of watershed draining either to the river or to eleven miles of Lake Erie shoreline adjacent to the river mouth.

The Area of Concern begins at the upstream edge of the Gorge Dam pool in Cuyahoga Falls/Akron and extends north to, and including, nearshore Lake Erie at Cleveland.

There are 21 HUC12 subwatersheds within the Cuyahoga AOC. Some are so heavily urbanized that streams no longer flow anywhere but in pipes. Others are more rural in nature. The AOC includes 45 political subdivisions (cities, villages, and townships) primarily in Cuyahoga and Summit County. Twenty-two miles of the river's mainstem are protected and managed by Cuyahoga Valley National Park, and Cleveland Metroparks and Summit Metro Parks manage much of the land and streams in the subwatersheds that drain to the river and lake. Some HUC12s have beaches. In some cases a single municipality may be situated in multiple subwatersheds. In most cases a subwatershed includes several municipalities, each with its own set of codes and practices. For example, some may allow disconnecting downspouts for stormwater harvesting while others may not.

Stewardship of the subwatersheds varies as well. Seven have established watershed partnerships (Big Creek, West Creek, Yellow Creek, Euclid Creek, Doan Brook, Mill Creek, and Tinker's Creek.) Big Creek, Chippewa Creek, Furnace Run, and Brandywine Creek have Balanced Growth Plans and partnerships. Some have full-time staff while others are volunteer-driven. Little Cuyahoga is staffed by NEFCO, Cuyahoga Soil & Water houses Euclid Creek staff, Yellow Creek receives assistance from Bath Township, and Mill Creek staff works out of the Cuyahoga County Board of Health. Some staffed organizations receive funding from the Northeast Ohio Regional Sewer District and some are funded by their municipalities. The Cities of Akron and Cleveland share in the work. Organizations such Cleveland Metroparks, Summit Metroparks, West Creek Conservancy, and Cuyahoga River Restoration provide assistance across many of the HUCs.

*Although the sheer size of the AOC, the amount of urbanization, the range of impacts, and the lingering effects of previous contamination present challenges to restoration, the great number and wide variety of partners, stakeholders, and stewards with unique contributions and exceptional levels of commitment and resources makes delisting the Area of Concern within the foreseeable future a real possibility.*

### **Delisting the Cuyahoga River Area of Concern**

The Cuyahoga River Area of Concern is one of several Great Lakes waterways identified by the U.S.-Canada Great Lakes Water Quality Agreement (Annex 2 of the 1987 Protocol) and placed on a *list* of areas that "fail to meet the general or specific objectives of the agreement where such failure has caused or is likely to cause impairment of beneficial use of the area's ability to support aquatic life." In other words, it is an area that has itself experienced environmental degradation and that may, in turn, contribute to the degradation of the Great Lakes basin as a whole.

The criteria for identifying whether an area meets this description are presented as a *list* of Beneficial Use Impairments (BUIs) that are primarily concerned with the well-being and sustainability of aquatic life and human health.

Across the Great Lakes, a total of 14 impairments were identified, only 9 of which are impaired in the Cuyahoga River Area of Concern.

They address the following concerns:

- the amount, type, and health of aquatic life – fish populations, benthic communities, fish tumors and other deformities

- the conditions that support aquatic life – fish habitat
- conditions that may impair aquatic life or human health – eutrophication or undesirable algae, contamination in dredged sediment
- effects on human health related to conditions in the system – restrictions on fish consumption, beach use, and recreational contact in the main river
- aesthetics – odor, color or other nuisances

In addition to these, years ago the local coordinating committee identified a lack of public access as an impairment, allowing it to be added to the list for the Cuyahoga AOC only. As a local impairment its remediation or lack thereof does not affect the process of removing the Area of Concern from the list of impaired waters.

Since 1988, when the Great Lakes Areas of Concern were identified and the Cuyahoga River effort began, Ohio EPA, the Cuyahoga River Community Planning Organization (now Cuyahoga River Restoration,) and a dedicated group of dozens of stakeholders convening as a coordinating committee (now the Area of Concern Advisory Committee,) have developed a series of planning and implementation documents to guide efforts to remove impairments from the list locally, and to remove the AOC from the list of impaired waters – *together referred to as “delisting.”*

- The Cuyahoga River Remedial Action Plan (Stage 1), developed after years of investigation into the conditions causing the impairments and identifying the general course forward, was completed in 1992 and updated in 1996.
- The first Implementation Plan (Stage 2) was drafted in 2011, and completed in 2013.

*Throughout the years the Remedial Action Plan Stage 2 updates have presented overall themes, with related actions and, where possible, related projects. Until now, however, we had not possessed all the sampling data that would indicate how close or how far any particular impairment, in any particular subwatershed, is to the target metrics that would allow its removal.*

With this Stage 2 Update, we have included that information as progress and status information for each BUI and each subwatershed. This allows us to identify more specifically what needs to change, and where. We have also included the projects and actions currently proposed or underway to address specific issues in specific places that would move the needle toward delisting.

## **Delisting Criteria and Process**

In order for the Cuyahoga River Area of Concern to be delisted, all subwatersheds must meet the attainment targets outlined by the Ohio EPA for each of the Beneficial Use Impairments that apply in the particular HUC12 (e.g. not all have dredging or lacustrary targets.)

The Ohio EPA guidance offers two pathways to delisting:

1. *Removing a BUI* when restoration targets have been met across the entire AOC, or when the impairment is due to natural rather than human causes, or is not limited to the AOC but is comparable to lake-wide, or region-wide conditions, or is caused by sources outside the AOC.
2. *Removing a subwatershed* from the Area of Concern when all the restoration targets for all the impairments have been met in that subwatershed. A subwatershed is defined as the 12-digit Hydrologic Unit (HUC 12) as determined by the US Geologic Survey (USGS.)

Should Ohio EPA and the AOC Advisory Committee seek to proceed with removal of a BUI or a HUC, a technical review team would be convened for final review of its restoration status, a public review period follows, and a request for concurrence is sent to U.S. EPA. Once a favorable response is received, the BUI or HUC will be considered removed.

The Great Lakes Water Quality Agreement provides for an AOC to be designated as “In Recovery” on the way to full delisting, when all remedial actions have been implemented, monitoring shows that recovery

is progressing, and the applicable governments and partners have committed to continue monitoring and actions to maintain improvements.

## **Purpose**

This Stage 2 Progress Report and Implementation Plan Update serves as a tool to assess progress toward the removal of Beneficial Use Impairments in the Cuyahoga River Remedial Action Plan Area of Concern (AOC) and enumerate the current inventory of management actions and restoration projects for each BUI in each of the 21 subwatersheds, identified as 12-digit Hydrologic Units (HUC12.)

This analysis will help the AOC Advisory Committee, Ohio EPA, stakeholders, and other partners to:

- identify areas where data indicates a need for more sampling;
- focus on areas where restoration will have the most impact on a given impairment, and be most sustainable in a particular subwatershed;
- prioritize actions so as to meet delisting targets for any given impairment across a HUC12 subwatershed;
- consider where conditions might make removal of a particular BUI unattainable in a given subwatershed, in which case an appeal to amend the target might be in order; and
- begin the process to remove BUIs considered to have met their targets.

In order to determine the potential for removing any of the listed impairments across the entire AOC, or for removing individual subwatersheds from the Area of Concern once the targets for all applicable BUIs are reached in the HUC12, we needed first to collect and compile all available sampling data and compare it to the targets in the *2014 Delisting Guidance and Restoration Targets for Ohio Areas of Concern*.

This document provides this information, as well as actions and projects currently proposed or underway.

## **How to use the report**

Because of the two delisting methods, the status of each BUI is presented in two ways – across the whole Area of Concern, and within each subwatershed.

Therefore, this report is broken down into three sections. Section I shows a summary of progress relative to targets over the entire AOC, and the projects needed, planned, or underway to address those areas not meeting the targets.

Section II organizes the data by Beneficial Use Impairment, presents the delisting status of the BUI in each of the subwatersheds, and allows us to see which impairments are suitable for, or closest to, removing across the board. It also allows us to see what management actions can be implemented.

Section III organizes the data by subwatershed as delineated by USGS 12-digit Hydrologic Units (HUC12), and presents the impairments in that watershed, their status, and management actions or projects proposed for remediation. This allows us to see which subwatersheds might be ready for removal from the Area of Concern.

Using the maps, we can see where gaps exist in monitoring. Using the corresponding line graphs, we can identify where the most effective use of resources might raise the scores to reach delisting targets, and where barriers exist that might call for adjustments to the targets.

Appendix C contains the data tables showing the location, type, date, score, and source for each sample. Using the tables, we can see where widespread problems or specific challenges exist.



## Executive Summary

The Cuyahoga River Area of Concern is one of several Great Lakes waterways identified by the U.S.-Canada Great Lakes Water Quality Agreement (Annex 2 of the 1987 Protocol) and placed on a *list* of areas that “fail to meet the general or specific objectives of the agreement where such failure has caused or is likely to cause impairment of beneficial use of the area's ability to support aquatic life.” In other words, it is an area that has itself experienced environmental degradation and that may, in turn, contribute to the degradation of the Great Lakes basin as a whole.

The criteria for identifying whether an area meets this description are presented as a *list* of Beneficial Use Impairments (BUIs) that are primarily concerned with the well-being and sustainability of aquatic life and human health. Nine impairments apply in the Cuyahoga River Area of Concern.

They concern the following:

- the amount, type, and health of aquatic life – fish populations, benthic communities, fish tumors and other deformities
- the conditions that support aquatic life – fish habitat
- conditions that may impair aquatic life or human health – eutrophication or undesirable algae, contamination in dredged sediment
- effects on human health related to conditions in the system – restrictions on fish consumption, beach use, and recreational contact in the main river
- aesthetics – odor, color or other nuisances

The second list identifies the twenty-one subwatersheds in the Area of Concern identified as 12-digit Hydrologic Units by the US Geological Survey (HUC12s.)

This Cuyahoga River Remedial Action Plan Stage 2 Progress Report and Implementation Plan Update serves to assess the progress toward removal of Beneficial Use Impairments (BUIs) in the Cuyahoga River Area of Concern (AOC,) as well as to identify which of the 21 subwatersheds meet all criteria and could be removed from the Area of Concern. These removals are also referred to as “delisting.”

These are the two routes to delisting – either removing the impairment from the whole Area of Concern when all targets for that impairment are met across all subwatersheds, or removing a subwatershed from the geographic boundaries of the Area of Concern when all targets for all impairments are met within that subwatershed. Delisting the entire AOC can happen when all impairments are removed across all HUC12 subwatersheds and/or all subwatersheds are removed having met all targets.

Included in the Stage 2 Plan/Report is all the current credible data for all the metrics and targets for all the impairments in all the subwatersheds. In some areas, for some BUIs, data does not exist or there are too few data points to give a complete picture.

### **Potential for removing Beneficial Uses across all subwatersheds**

At this time, analyzing the data we have, the prospects are good for removing at least three, and possibly five, Beneficial Use Impairments from the list:

- BUI 1a – Restrictions on Fish Consumption – meets criteria
- BUI10b – Lack of Public Access (a local BUI) – meets criteria
- BUI 11 – Degradation of Aesthetics – meets criteria

The fourth impairment, which applies only to the navigation channel, is BUI 7 – Restrictions on Navigational Dredging. The criterion for removal of this BUI now being, for all intents and purposes, only the suitability of the dredged sediment for upland reuse, it may be possible to remove this impairment from the list in short order.

A fifth impairment, BUI 8 – Eutrophication or Undesirable Algae, may be eligible for consideration for removal as well, once sampling and analysis is done in the ship channel and Old River Channel.

## **Executive Summary (continued)**

### **Potential for removing subwatersheds from the Area of Concern**

Based on current data and observations, two subwatersheds may be considered for removal, having met all applicable targets within the HUC12 subwatershed, based on delisting criteria and sufficient data:

- Furnace Run
- Mogadore Reservoir-Little Cuyahoga River

In four of the subwatersheds, three of which are segments of the Cuyahoga River mainstem and one of which – Cahoon Creek – is a Lake Erie tributary, the only impairment keeping the HUC12s on the list relates to restrictions on recreational contact having to do with bacterial and chemical contamination. The delisting criteria addresses primarily bacterial contamination, and allows for removal based on management actions including control plans for Combined Sewer Overflows, Total Maximum Daily Load (TMDL) plans, and comparisons with other waterways. That said, there is the potential for negotiating for removal of these subwatersheds from the Area of Concern.

However, the fact that three of the abovementioned subwatersheds are at the heart of the Cuyahoga's mainstem, and that conditions can be expected to change in the near future once the two dams upriver are removed, it may be prudent to resist the urge to delist these particular HUC12s too quickly.

### **Beneficial Uses impaired in the most subwatersheds**

BUI 3a, Degradation of Fish Populations, is by far the greatest challenge to delisting. It is impaired in twelve of the twenty-one subwatersheds where data is available. Three subwatersheds have no credible data, no sampling having been done within the past ten years.

BUI 6, Degradation of Benthos, is impaired in five subwatersheds, but no data is available in eight other HUCs. It would be rational to expect that sampling in these eight subwatersheds would show data that would correlate with fish population scores – no bugs, no fish – and make this the second most widespread impairment.

### **Priorities for action**

1. Perform sampling in the following subwatersheds, so as to have a realistic picture of the state of impairments therein:
  - For Fish Populations (IBI)
    - Headwaters Chippewa Creek, Brandywine Creek, Mud Brook
  - For Benthos (ICI)
    - Headwaters Chippewa Creek, Tinker's Creek (Town of Twinsburg, Headwaters, and Pond Brook,) Brandywine Creek, Mud Brook, Yellow Creek, Wingfoot Lake-Little Cuyahoga
2. Complete sampling where insufficient data is available, and update sampling at existing sites, to gain a current and actionable picture of conditions and scores relative to delisting criteria.
3. Seek a consensus between Ohio EPA and the AOC Advisory Committee regarding pursuing removal of BUIs and/or HUC12 subwatersheds, and begin the process to request delisting for selected removals.
4. Review data relative to specific conditions in specific locations to identify insurmountable barriers to reaching delisting goals, such as immovable barriers to fish passage (e.g. falls,) and develop either special criteria for such sites or plans to improve BUIs in spite of such barriers.
5. Focus efforts and resources, and prioritize projects, to improve fish and benthic communities at specific sites as indicated in sampling analysis.

## Section II

# The Status of Beneficial Use Impairments

### BENEFICIAL USE IMPAIRMENTS - Status Summary

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (Recreation Contact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Euclid Creek	041100030503	Meets Target	DOES NOT Meet Target	DOES NOT Meet Target	DOES NOT Meet Target	NA	Meets Target	DOES NOT Meet Target	Meets Local Goals	Meets Target	Meets Target
Doan Brook (Dugway-Nine Mile-GreenCreeks, Doan Brook, Lake Erie Tributaries East)	041100030504	Meets Target	DOES NOT Meet Target	Meets Target	Needs Additional Data	NA	Meets Target	DOES NOT Meet Target	Meets Local Goals	Meets Target	Meets Target
Cahoon Creek-Frontal Lake Erie (Lake Erie Tributaries-West)	041100010204	Meets Target	N/A	N/A	N/A	NA	N/A	DOES NOT Meet Target	N/A	N/A	N/A
City of Cleveland-Cuyahoga River (Navigation Channel, Old River Channel)	041100020605	Meets Target	DOES NOT Meet Target	DOES NOT Meet Target	Needs Additional Data	DOES NOT Meet Target	Awaiting Evaluation	DOES NOT Meet Target	Meets Local Goals	Meets Target	Meets Target
Big Creek	041100020603	N/A	Needs Additional Data	Meets Target	Needs Additional Data	NA	Meets Target	NA	NA	Meets Target	Meets Target
Town of Cuyahoga Heights-Cuyahoga River (West Creek, Lower Cuyahoga)	041100020604	N/A	DOES NOT Meet Target	Meets Target	Meets Target	NA	Meets Target	DOES NOT Meet Target	Meets Local Goals	Meets Target	Meets Target
Mill Creek	041100020601	N/A	DOES NOT Meet Target	Meets Target	Meets Target	NA	Meets Target	NA	NA	Meets Target	Meets Target
City of Independence-Cuyahoga River (Lower Cuyahoga River, CVNP)	041100020602	N/A	Needs Additional Data	Meets Target	Meets Target	NA	Meets Target	DOES NOT Meet Target	Meets Local Goals	Meets Target	Meets Target
Town of Twinsburg - Tinkers Creek	041100020504	N/A	DOES NOT Meet Target	Meets Target	No Data Available	NA	Meets Target	NA	NA	Meets Target	Meets Target
Headwaters Tinkers Creek	041100020502	N/A	Needs Additional Data	Meets Target	No Data Available	NA	Meets Target	NA	NA	Meets Target	DOES NOT Meet Target
Pond Brook (Tinkers Creek)	041100020501	N/A	DOES NOT Meet Target	Meets Target	No Data Available	NA	Meets Target	NA	NA	Meets Target	DOES NOT Meet Target
Willow Lake-Cuyahoga River (Sagamore Creek, Cuyahoga River CVNP)	041100020505	N/A	Meets Target	Meets Target	Needs Additional Data	NA	Meets Target	DOES NOT Meet Target	Meets Local Goals	Meets Target	Meets Target
Headwaters Chippewa Creek	041100020503	N/A	Needs Additional Data	Meets Target	No Data Available	NA	Meets Target	NA	NA	Meets Target	Meets Target
Brandywine Creek	041100020404	N/A	Needs Additional Data	Meets Target	No Data Available	NA	Meets Target	NA	NA	Meets Target	Meets Target
Boston Run- Cuyahoga River (Cuyahoga River CVNP, Sand Run, Middle Cuyahoga River)	041100020405	N/A	Needs Additional Data	Meets Target	Needs Additional Data	NA	Meets Target	DOES NOT Meet Target	Meets Local Goals	Meets Target	Meets Target
Furnace Run	041100020403	N/A	Meets Target	Meets Target	Meets Target	NA	Meets Target	NA	NA	Meets Target	Meets Target
Yellow Creek	041100020403	N/A	DOES NOT Meet Target	Meets Target	No Data Available	NA	Meets Target	NA	NA	Meets Target	Meets Target
Mud Brook	041100020401	N/A	No Data Available	Meets Target	No Data Available	NA	Meets Target	NA	NA	Meets Target	Needs Additional Data
City of Akron-Little Cuyahoga River	041100020304	N/A	Needs Additional Data	Meets Target	Needs Additional Data	NA	Meets Target	NA	NA	Meets Target	DOES NOT Meet Target
Wingfoot Lake-Little Cuyahoga River	041100020303	N/A	Needs Additional Data	Meets Target	No Data Available	NA	Meets Target	NA	NA	Meets Target	Needs Additional Data
Mogadore Reservoir- Little Cuyahoga River	041100020302	N/A	NA	Meets Target	NA	NA	Meets Target	NA	NA	Meets Target	NA



## Projects to remove BUIs 3a, 6, and 14a

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY15				
Nearshore Habitat Beneficial Reuse	041100030504	Doan Brook-Frontal Lake Erie	CRCPO-ODNR-TNC-USACE	GLRI/NOAA			\$50,000 (estimate for planning)			3-6	Initial Scoping/ Feasibility planned for 2015-2016
Develop a comprehensive Nearshore Habitat Beneficial Reuse Feasibility Plan. Conduct inventory and identify priority areas and feasibility to expand nearshore habitat zones within AOC.											
Stream bank Restoration in Ship Channel	41100020605	City of Cleveland-Cuyahoga River	CRR/H4HP Work Group	LEPF/GLRI			\$500,000 (estimate)		No	3-6	Initial Scoping/ Feasibility planned for 2015-2016
Prepare planning documents to identify conversion potential of sites within the navigation channel to enhance natural habitat areas or behind-bulkhead habitat areas. Concept planning funding is being sought. Condition of bulkheads has been inventoried for areas of bulkhead repair or areas of habitat restoration. Costs estimates include design and construction for an estimated 5,000 linear feet											
Old River Channel Legacy Sediment	4110020605	City of Cleveland-Cuyahoga River	Port of Cleveland / City of Cleveland / US EPA	USEPA/ Legacy Act	Underway		\$10 million (estimate)			3-4-7-10a	Feasibility study complete. Development of project plan for next phase of planning.
Conducting a feasibility study to develop a scope of work for project proposal. Next steps will be a Feasibility Study and for EPA and locals to agree on preferred remedial action for which EPA would prepare plans and spec and hire contractor.											
Habitat for Hard Places	041100020605	City of Cleveland-Cuyahoga River	CRR/H4HP Work Group	Sustain Our Great Lakes	Dec. 2014 / Nov. 2016		\$290,000		Yes	3 - 6	First installations in spring / summer 2015
This 2.5 mile project is located between Marathon Bend and near the head of navigation at ArcelorMittal. The project will install fish habitat structures in areas where habitat does not currently exist within the Cuyahoga ship channel.											
Ship Channel Habitat	041100020605	City of Cleveland-Cuyahoga River	Cuyahoga County Planning Commission	USACE	Underway				Yes	3-6	Structures to be installed spring/summer 2015
CCPC and Biohabitats are installing fish habitat structures in the middle sections of the shipping channel.											

**Projects to improve BUI3a (continued)**

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15				
Trash Rack Removal	041100030504	Doan Brook-Frontal Lake Erie	DBWP NEORS	Sustain Our Great Lakes	May 2014 / Oct. 2015	\$180,000			Yes	3 -6	Funded, underway
Located upstream of MLK Blvd. The debris rack has failed and is a source of impairment. This trash rack prevents the natural movement of bed-load and is the cause of erosion issues and significant sediment loads to Doan Brook.											
Check Dams Altered	041100030504	Doan Brook-Frontal Lake Erie	DBWP NEORS	Requesting GLRI	May 2014 / Oct. 2014	\$150,000			Yes	3 -6	Funded for Design, 2015
This project is located upstream of Gordon Park, west of East 105th St. These check dams restrict fish migration, demonstrate lack of habitat for aquatic life and contribute to erosion. Alterations of the check dams is part of a Phase 1 process to remove sections of the check dams to allow flow.											
Sowinski Park	041100030504	Doan Brook-Frontal Lake Erie	DBWP NEORS	Requesting GLRI	Aug. 2014 / Dec. 2015	1.5 Million			Yes	3 -6	Funded for Design, 2015
This project is located at the northern end of Doan Brook, along Martin Luther King Drive. Restoration consists of reconnecting floodplains / creating wetlands, bank stabilization, create fish / benthos habitat, plant native vegetation within the riparian area											
Cleveland Lakefront NP/ Mouth of Doan Brook	041100030504	Doan Brook-Frontal Lake Erie	DBWP NEORS							3-6	Funded for Concept planning, 2015
Project would open the mouth of Doan Brook, which is currently buried under CLNP and I-90, to support fish passage and extend habitat. Funding needed for feasibility/strategies study.											
South Branch Restoration through Canterbury Golf Club	041100030504	Doan Brook-Frontal Lake Erie	DBWP NEORS							3 -6	
Intent is to restore / enhance headwaters											

### Projects to improve BUI 3a, 6, 14a (continued)

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15				
Forest Hills Dugway Restoration	041100030504	Doan Brook-Frontal Lake Erie	TBD				Concept Inventory \$25,000 estimate			3-6	Project sites identified by local group for evaluation.
Conceptual Planning to identify stream restoration opportunities within Forest Hills Park and subsequent corridor of the Eastside Greenway route for enhancement and habitat improvements.											
Acacia Phase 1	041100030503	Euclid Creek	Cleveland Metro parks	WRRSP	June 2014 / Oct. 2015	\$375,000				3-6	Funded for implementation, 2015
The project is located downstream of Beachwood Place mall and was formerly Acacia golf course. This project involves reconnection of Euclid Creek to its floodplain through a combination of channel invert fill and the creation of floodplain benches. Installation of natural riparian vegetation within the corridor of this 1,200 linear feet of stream will be incorporated. This project will not only reduce erosion and improve fish/benthos habitat, but a pre-treatment area will be created at the beginning of the project to prevent contaminants from the mall from flowing into the restoration area.											
Acacia Phase 2	041100030503	Euclid Creek	Cleveland Metroparks	GLRI	Oct. 2015 / Dec. 2016	\$375,000		Yes		3-6	Funded for design, 2015
Continuation of phase one. The focus for this project is bank stabilization and habitat restoration within an additional 2,100 linear feet of Euclid Creek.											
Richmond Road Dam Decommission	041100030503	Euclid Creek	Cuyahoga SWCD				NA			3-6	
Removing or bypassing this dam would open fish passage in Euclid Creek and normalize stream flow											
East 185th Spillway	041100030503	Euclid Creek	Cuyahoga SWCD	USACE			Study-\$300,000 Design/Const \$2,160,650			3-6	Feasibility Study Pending
Project would remove or bypass spillway south of I-90 to allow fish passage.											



**Projects to improve BUI 3a, 6, 14a (continued)**

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15				
David Myers Parkway Dam	041100030503	Euclid Creek	Cuyahoga SWCD				NA			3-6	
Removal or retrofit of 3'-4' dam on tributary of Euclid Creek Main Branch off Cedar Rd in Beachwood.											
Dumbarton Dam Removal	041100030503	Euclid Creek	Cuyahoga SWCD				NA			3-6	
Removal of 12'-14' dam structure on East Branch											
Mayfair East Branch Reforestation and Dam Removal	041100030503	Euclid Creek	Cuyahoga SWCD				\$1.2 million			3-6	Concept plan. Need conservation easements with adjacent property owners.
Remove dam and restore 1,600 linear feet of stream											
West Creek Confluence Phase 1	041100020604	Cuyahoga Heights-Cuyahoga River / West Creek	West Creek Conservancy, NEORS	Requesting GLRI	June 2014 / Oct. 2015	\$650,575			Yes	3-6	
This project is located between Independence Concrete Recycling and I-480 and consists of a failing concrete flume causing a major fish migration barrier, no in-stream or riparian habitat, erosion issues, and also prevents bed load transport. Phase 1 consists of removing the concrete flume, reestablishing the grade, and stabilizing the area to resemble natural conditions.											
West Creek Confluence Phase 2	041100020604	Cuyahoga Heights-Cuyahoga River / West Creek	West Creek Conservancy, NEORS	Requesting GLRI	Oct. 2015 / Dec. 2016		\$360K (may be more)		Yes	3-6	
Phase 2 is located downstream of the previous restoration. Grading is required to maintain proper elevation to continue downstream restoration. The channel will be stabilized resembling natural conditions to improve fish and benthos habitat, bed load transport, and minimize erosion issues.											

**Projects to improve BUI 3a, 6, 14a (continued)**

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15				
West Creek Flood Control	041100020604	Cuyahoga Heights-Cuyahoga River/ West Creek	Cleveland Metroparks	Requesting GLRI	June 2014 / June 2015	\$150,000			Yes	3-6	
	This tributary to West Creek demonstrates substantial downcutting of the stream leading to the washout of a three-side-by-side culvert. This project includes tributary realignment, floodplain bench creation, constructed riffle installation, culvert replacement, and riparian vegetation placement within 1,100 linear feet of stream. These enhancements will stabilize the stream bed and banks, reduce erosion, and improve fish and benthos habitats.										
West Creek Grade Control and Bank Stabilization	041100020604	Cuyahoga Heights-Cuyahoga River / West Creek	West Creek Conservancy and NEORS			\$165,000				3-6	
	This project involves the realignment and grade control of approximately 1,400 linear feet of West Creek mainstem that has multiple headcuts and sheer eroding bank. The installation of grade control, bank armor/vegetation, and floodplain access will address these headcuts. This project includes floodplain bench creation, constructed riffle/pool installation, bank stabilization and accompanying riparian vegetation replacement.										
Mill Creek Stream Restoration	041100020601	Mill Creek	CCBH/Mill Creek Partnership							3-6	
	Restoration of 250 feet of stream corridor.										
Kerruish Park Restoration	041100020601	Mill Creek	CCBH/Mill Creek Partnership							3-6	
	Restoration of 2,000 linear feet of stream corridor of main channel of Mill Creek through public park.										
Mill Creek Quarries Restoration	041100020601	Mill Creek	CCBH/Mill Creek Partnership							3-6	
	Restoration of 30 acres of surface area and 1,500 linear feet of stream channel on main stem of Mill Creek										

**Projects to improve BUI 3a, 6, 14a (continued)**

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15				
Wolf Creek Stream Restoration	041100020601	Mill Creek	Cleveland Metro parks							3-6	
Stream Restoration at Garfield Reservation Metroparks											
Stickney Creek Stream Restoration	041100020603	Big Creek	Big Creek Connects	GLRI-NOAA						3-6	Submitted for funding for implementation, 2015
Restoration of 500 linear feet of stream channel on tributary of Big Creek.											
I-71 Relocation and Restoration	042100020603	Big Creek	Big Creek Connects	Brooklyn, Cleveland, NEORS							Study completed 2015. Seeking Project funding
Proposes removing the Denison Access ramps of the abandoned "Parma Freeway" and opening up land in the Big Creek valley that will allow the creek to be naturalized by re-routing it into much of its historic streambed.											
Pleasant Valley Wetland Restoration	041100020602	Independence - Cuyahoga River	Cuyahoga Valley National Park	GLRI-NPS						3-6	Restoration plans are needed.
Site restoration of 10 acres of wetlands, largest within park boundary.											
Glenwillow Stream Restoration	041100020504	Tinkers Creek	Tinkers Creek Watershed Partners				NA			3-6	
Restoration of 600 linear feet of stream.											
Herrick Fen Dam Removal	041100020502	Headwaters Tinkers Creek	Tinkers Creek Watershed Partners				NA			3-6-14	
Dam removal											

**Projects to improve BUI 3a, 6, 14a (continued)**

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15				
Streetsboro Stream Restoration	041100020502	Headwaters Tinkers Creek	Tinkers Creek Watershed Partners				NA			3-6-14	
Restoration of 2,000 linear feet of stream											
Oakwood Riparian Restoration	041100020504	Tinkers Creek	Tinkers Creek Watershed Partners				\$800,000			3-6	
Stream Restoration of 3,000 linear feet.											
Wood Creek Stream Stabilization	041100020504	Tinkers Creek	Tinkers Creek Watershed Partners				NA			3-6	
Stream Restoration of 2,000 linear feet.											
Route 82 / Canal Diversion Dam	041100020505	Willow Lake-Cuyahoga River	Cuyahoga Valley National Park/OEPA				NA			3-6	Draft EIS is scheduled to be released for public comment in 2015.
Removal/Modification of Canal Diversion dam located in Cuyahoga Valley National Park.											
Stanford Run Stream Restoration	041100020404	Brandywine Creek	Cuyahoga Valley National Park	GLRI-NPS?			NA			3-6	Planning completed
Stream Restoration of 2,000 linear feet.											
Former Cuyahoga County Youth Developmt Ctr.	041100020404	Brandywine Creek	NEFCO	Requesting GLRI	Nov. 2014 / Dec. 2015	\$15,000	\$485,000		2015	3-6	
This project in the City of Hudson is along Brandywine Creek at RM 7.0 to 8.05. The project has three potential stream restoration areas totaling over 6,000 lf of stream with poor QHEI scores. Two sites are located at the former Cuyahoga County Youth Development Center purchased by Summit County and the City of Akron. The third site is adjacent to the Development Center and is owned by the Ohio Turnpike Commission. The project includes grading the stream to reconnect it with habitat features and an active floodplain.											

**Projects to improve BUI 3a, 6, 14a (continued)**

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15				
Sand Run Restoration	041100020405	Boston Run-Cuyahoga River	Summit Metroparks	GLRI-NPS?						3-6	Initial planning underway.
Stream restoration											
Adams Run Restoration	041100020304	Little Cuyahoga River	NEFCO/WRLC							3-6-14	
Stream Restoration of 1,800 linear feet on tributary to Little Cuyahoga											
LCR Sewer Crossing	041100020304	Little Cuyahoga River	City of Akron	Requesting GLRI	Oct. 2014 / June 2015	\$201,420			Yes	3-6-14	
Dam removal and stream restoration. This project is located near the intersection of Otto St. and Boder St. in Akron. Currently there is a low head dam with an active sewer pipe crossing the Little Cuyahoga River impeding fish passage, benthos habitat, causing erosion issues, and degrading fish habitat. Prior to removing the sewer crossing from the river, the sewer will be redirected as part of a pump station project paid by the city. Upon removal of the structure, the area will be restored to natural conditions.											
Gorge Dam Removal / Bypass	041100020405	Boston Run-Cuyahoga River	Ohio EPA/Summit Metroparks	USACE OEPA		\$500,000				3-6-14	Geotechnical Feasibility Study Pending
Removal / bypass of First Energy dam at southern end of Cuyahoga mainstem and AOC, located at border of Cuyahoga Falls and Akron. Essential for fish passage.											

The projects listed here are those that have been identified as of this printing. As projects proceed, especially dam removals, it is expected that additional restoration actions will be required to manage altered stream flow and impacts to habitat and benthos.

In all, these proposed projects include:

Dam removals – 9

Stream restoration – approximately 48,000 linear feet

Wetland restoration – 1

Freeway realignment and floodplain restoration - 1

## Section II

### **The Status of Beneficial Use Impairments in the Cuyahoga River Area of Concern by Beneficial Use Impairment**

#### **Beneficial Use Impairments Associated with the Cuyahoga River Area Of Concern and Progress Toward Removal – Status in HUC12 subwatersheds where BUI is applicable**

- BUI 1: Restrictions on Fish Consumption  
All 4 subwatersheds where this is applicable meet the target for BUI 1.
- BUI 3: Degradation of Fish Populations  
2 subwatersheds with sufficient data meet the target for BUI 3a; 8 do not meet the target; 8 need additional data; 1 has no data.
- BUI 4: Fish Tumors and Other Deformities  
18 subwatersheds meet the target for BUI 4; 2 do not meet the target.
- BUI 6: Degradation of Benthos  
4 subwatersheds meet the target for BUI 6; 1 does not; 6 need additional sampling, and 8 have no data at all.
- BUI 7: Restrictions on Navigational Dredging Activities  
The only area where BUI 7 applies, the Cuyahoga River Navigation Channel and Old River Channel, does not currently meet the target.
- BUI 8 Eutrophication or Undesirable Algae  
All but one subwatershed meet the target for this BUI. Conditions in the navigation channel and Old River Channel remain to be verified.
- BUI 10a: Beach Closings (Recreational Use)  
None of the 8 subwatersheds where BUI 10a is applicable meet the target.
- BUI 10b: Public Access  
All 8 of the HUCs where BUI 10b is applicable meet the target.
- BUI 11: Degradation of Aesthetics  
All subwatersheds meet the target for BUI 11.
- BUI 14a Loss of Fish Habitat  
14 subwatersheds meet the target; 3 do not; 2 require additional data.

#### **Actions needed**

Additional sampling of IBI for fish populations and/or ICI for benthos is needed in 11 subwatersheds, and gaps in other areas need to be filled where too few sites have been assessed.

Verification of data should be gathered and subsequent requests should be made, and the process begun, to remove BUI 1a, Fish Consumption, and BUI 11, Aesthetics, along with the local BUI 10b impairment.



## BENEFICIAL USE IMPAIRMENTS

### BUI 1a RESTRICTIONS ON FISH CONSUMPTION

#### Overview

Restrictions on Fish Consumption for the Cuyahoga AOC are documented by the Ohio Department of Health and its current "Ohio Sport Fish Health and Consumption Advisory," posted on their website as well as that of the Ohio EPA.

Referenced here: <http://www.epa.ohio.gov/dsw/fishadvisory/index.aspx>

A river body or subwatershed of that river is impaired as a beneficial use if the fish consumption is more stringent than one meal per month. In 2005, there was an addendum to the *Protocol for a Uniform Great Lakes Sport Fish Advisory* that included advisory protocol for PCBs and mercury.

<b>BUI 1 Restrictions on Fish Consumption: August 2014</b>				
Body of water	Area Under Advisory	Species	one meal per	Contaminant
Cuyahoga River	State Route 87 (Russell Park) to Ohio Edison Dam Pool (Geauga, Portage, Summit Counties)	Common Carp	Month	PCBs
Cuyahoga River	State Route 87 (Russell Park) to Ohio Edison Dam Pool (Geauga, Portage, Summit Counties)	Black Crappie, White Sucker 16" and over	Month	Mercury
Lake Erie All Waters	(Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, Sandusky Counties)	Common Carp 27" and over	Two Months	PCBs
Lake Erie All Waters	(Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, Sandusky Counties)	Channel Catfish, Common Carp under 27", Freshwater Drum, Lake Trout, Rock Bass, Smallmouth Bass, Steelhead Trout, White Bass, Whitefish 19" and over, White Perch	Month	PCBs
Lake Erie All Waters	(Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, Sandusky Counties)	Brown Bullhead	Month	Mercury
Lake Erie Tributaries All Waters	(Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, Sandusky Counties)	Steelhead Trout	Month	PCBs

PAHs = Polycyclic Aromatic Hydrocarbons

PCBs = Polychlorinated Biphenyls

## Restoration Targets:

### BUI 1: Restrictions on Fish Consumption

#### State of Ohio Restoration Target

In the riverine waters upstream from the lake affected waters (lacustrary or fresh water estuary), the fish consumption advisories issued by the Ohio Department of Health in the AOC are the same or less stringent than one meal per month; **AND**

In the lake affected waters (lacustrary or fresh water estuary), the fish consumption advisories issued by the Ohio Department of Health in the AOC are the same or less stringent than the current Lake Erie advisories; **OR**

If consumption advisories in the AOC are more stringent than the respective state-wide or lake-wide advisories and a study was conducted that demonstrates either (1) the source of contamination originates outside of the AOC or (2) the fish tissue concentrations within the AOC are not statistically different than non-AOC areas, reference sites or region-wide, background concentrations.

#### Potential Data Sources

- State of Ohio Sport Fish Consumption Advisories  
[www.epa.state.oh.us/dsw/fishadvisory/index.aspx](http://www.epa.state.oh.us/dsw/fishadvisory/index.aspx)
- Ohio EPA fish tissue data
- Other fish tissue studies

Ohio EPA refers to the area where river and lake water mix as a lacustrary (combination of the terms lacustrine and estuary). These areas could also be described as drowned river mouths (lake water flows into the river essentially “drowning” the river mouth). See Appendix A for more detail and a description of lacustraries within Ohio’s AOCs.

### Fish Consumption Status and Analysis

The current Ohio Sport Fish Health and Consumption Advisory restrictions show that the fish within the Cuyahoga River watershed are within Ohio EPA’s delisting target numbers.

The Lake Erie (includes the Cuyahoga River lacustrary) restrictions show Common Carp 27” and over at a stringent advisory to keep consumption to “one meal per two months”. This advisory is the same as the current Lake Erie advisories designating this as meeting the delisting target. The rest of the fish within this area are all within the “one meal per month” target.

The Lake Erie Tributary (includes the Cuyahoga River lacustrary and upper riverine) restrictions are all within the “one meal per month” delisting target.

In summary, based upon current data, the fish consumption targets for delisting that are applicable within the Cuyahoga AOC have been met, and the initial verification process leading to removing this Beneficial Use Impairment may begin.

## IMPAIRMENTS RELATED TO FISH POPULATION, BENTHOS, AND HABITAT

For the purposes of this Stage 2 Progress and Implementation Report, because remedial actions for fish BUIs benefit all three fish-related impairments, and so as to include the overall project planning and descriptions together in this section, we have grouped the following BUIs together:

**BUI 3a – Fish Populations, BUI 6 – Benthos, and BUI 14a – Fish Habitat.**

### BUI 3a: DEGRADATION OF FISH POPULATIONS

#### Overview

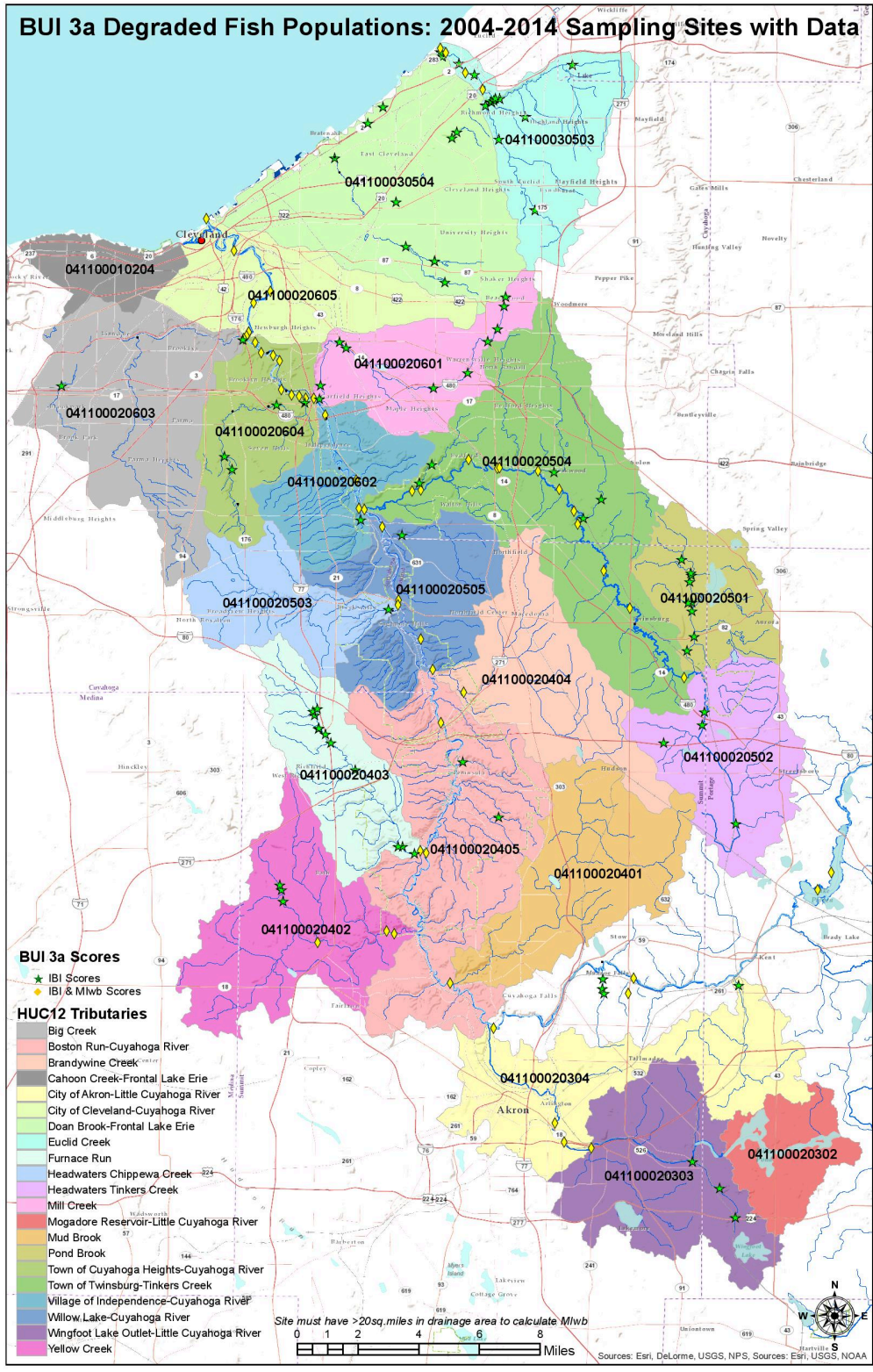
The status of fish populations in an Area of Concern (AOC) is based on the scores of the Index of Biotic Integrity (IBI) and the Modified Index of Well-Being (MIwb) as established by the Ohio EPA.

HUC 12 Subwatershed	HUC #	BUI 3A Degradation of
Euclid Creek	041100030503	DOES NOT Meet Target
Doan Brook (Dugway-Nine Mile-GreenCreeks, Doan Brook, Lake Erie Tributaries East)	041100030504	DOES NOT Meet Target
Cahoon Creek-Frontal Lake Erie (Lake Erie Tributaries-West)	041100010204	N/A
City of Cleveland-Cuyahoga River (Navigation Channel, Old River Channel)	041100020605	DOES NOT Meet Target
Big Creek	041100020603	Needs Additional Data
Town of Cuyahoga Heights-Cuyahoga River (West Creek, Lower Cuyahoga)	041100020604	DOES NOT Meet Target
Mill Creek	041100020601	DOES NOT Meet Target
City of Independence-Cuyahoga River (Lower Cuyahoga River, CVNP)	041100020602	Needs Additional Data
City of Twinsburg - Tinkers Creek	041100020504	DOES NOT Meet Target
Headwaters Tinkers Creek	041100020502	Needs Additional Data

HUC 12 Subwatershed	HUC #	BUI 3A Degradation of
Pond Brook (Tinkers Creek)	041100020501	DOES NOT Meet Target
Willow Lake-Cuyahoga River (Sagamore Creek, Cuyahoga River CVNP)	041100020505	Meets Target
Headwaters Chippewa Creek	041100020503	Needs Additional Data
Brandywine Creek	041100020404	Needs Additional Data
Boston Run- Cuyahoga River (Cuyahoga River CVNP, Sand Run, Middle Cuyahoga River)	041100020405	Needs Additional Data
Furnace Run	041100020403	Meets Target
Yellow Creek	041100020403	DOES NOT Meet Target
Mud Brook	041100020401	No Data Available
City of Akron-Little Cuyahoga River	041100020304	Needs Additional Data
Wingfoot Lake-Little Cuyahoga River	041100020303	Needs Additional Data
Mogadore Reservoir- Little Cuyahoga River	041100020302	NA

## BUI 3a Sample Site Location map

The following map shows the locations of the current credible data sampling sites (2004-2014) that are available for the Cuyahoga AOC. Any sampling site marked IBI & MIwb are sites with drainage over 20 sq. miles. Further analysis will be done at the individual HUC12 level in the "Delisting Progress Report per Subwatershed".





## Restoration Targets:

### BUI 3A: Degradation of Fish Populations

Fish populations are deemed to be impaired in the Cuyahoga River Area of Concern. Below are the state guidelines for delisting the BUI. The Cuyahoga River AOC is in the Erie/Ontario Lake Plain ecoregion. The “assessment unit” is the 12-digit HUC, shown on the map at on the preceding page.

#### State of Ohio Restoration Target

This beneficial use will be considered restored when the following conditions are met:

In the riverine areas upstream from the lake affected waters (lacustrary or fresh water estuary), the average Index of Biotic Integrity (IBI) and the average Modified Index of Well Being (MIwb) values within an assessment unit do not significantly diverge from state biological criteria.

Index Type - Site Type	Riverine Fish Population Restoration Targets							
	Erie/Ontario Lake Plain (EOLP)				Huron-Erie Lake Plain (HELP)			
	WWH	EWH	MWH	LRW <sup>1</sup>	WWH	EWH	MWH	LRW <sup>2</sup>
<b>IBI - Headwaters</b>	36	46	20	14	24	46	16	14
<b>IBI - Wading*</b>	34	46	20	14	28	46	16	14
<b>IBI - Boat*</b>	36	44	20	12	30	44	16	12
<b>MIwb - Wading</b>	7.5	8.9	5.7	4.0	6.8	8.9	5.1	4.0
<b>MIwb - Boat</b>	8.2	9.1	5.3	4.5	8.1	9.1	5.2	4.5

\*Wading and boat refer to sampling methodology (i.e., wading in shallow water and use of a boat in deeper water)

<sup>1</sup>Targets for Limited Resource Waters (LRW) are based on benchmarks as there are no criteria in Ohio WQS.

**OR**

In lake affected waters (lacustrary or fresh water estuary), the average L-IBI and the average MIwb values do not diverge from state guidelines.

Type	Lacustrary Fish Population Restoration Targets	
	L-IBI	MIwb
<b>Lacustrary</b>	42	8.6
<b>Lacustrary - LRW</b>	16	5.1

### Fish Population Status and Analysis

IBI and MIwb data have been collected by AOC partners to give the status of fish populations throughout the Cuyahoga AOC. The preceding tables show the most current data. By constructing these data tables with the targets for each sample type (lacustrary, headwaters, wading, and boat sites,) sampling sites can be compared with their appropriate target.

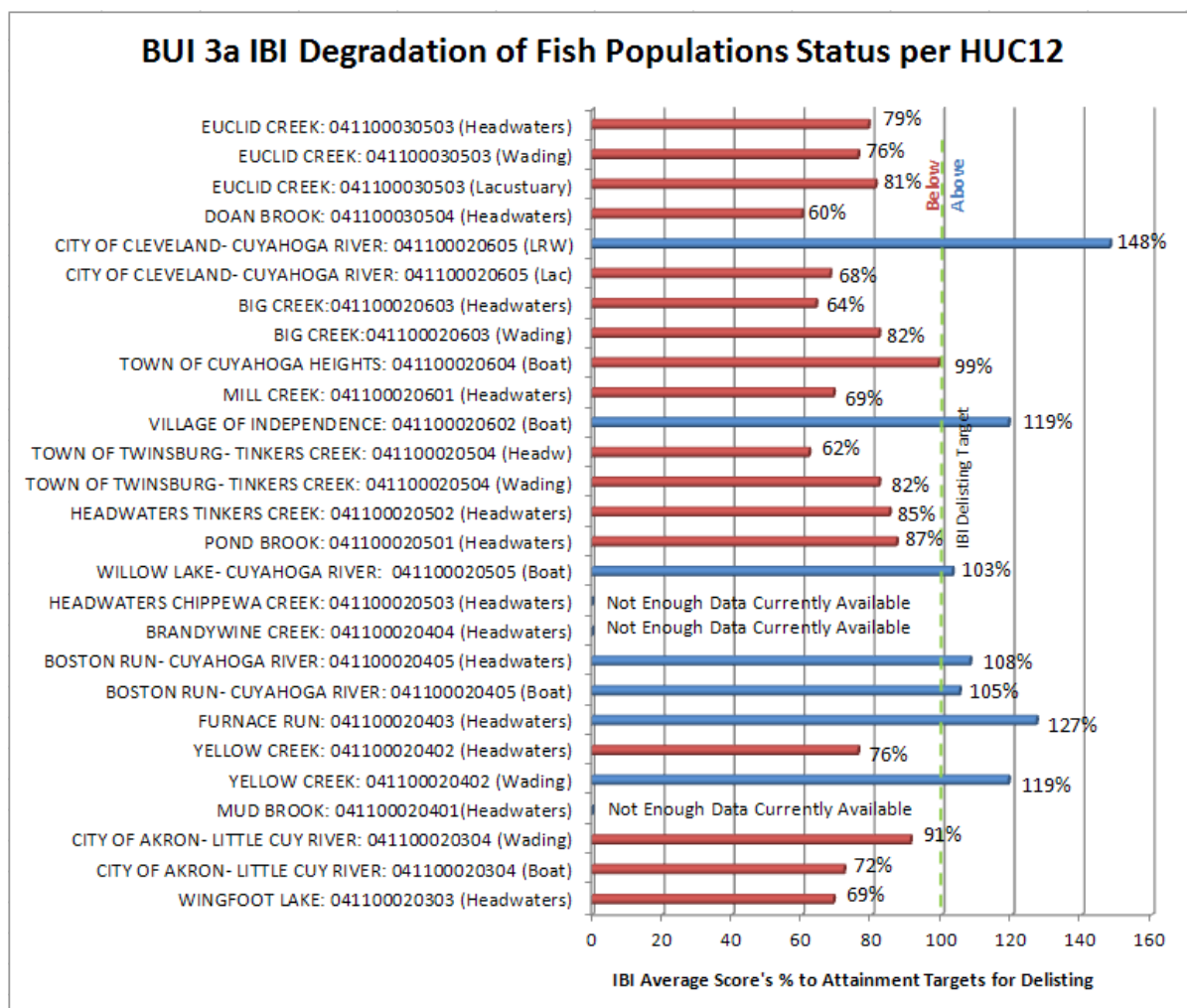
Of the subwatersheds that currently have credible data, 28%, or 5 of the 18, are above the target scores in this metric. 4 of the 5 subwatersheds in attainment are sections of the main channel of the Cuyahoga River. The additional subwatershed that meets the restoration target is Furnace Run. The population drop-off in the tributary watersheds is a factor of development, nutrient loading and pollution, obstructions blocking migratory fish passage (dams, drop-structures, etc.,) and in some cases a lack of sufficient habitat.

The most heavily developed subwatersheds show the lowest scores and, in turn, the lowest abundance of fish, the most degraded being Doan Brook, Mill Creek, and Euclid Creek. Further sampling is expected to show heavily urbanized Big Creek joining that group.

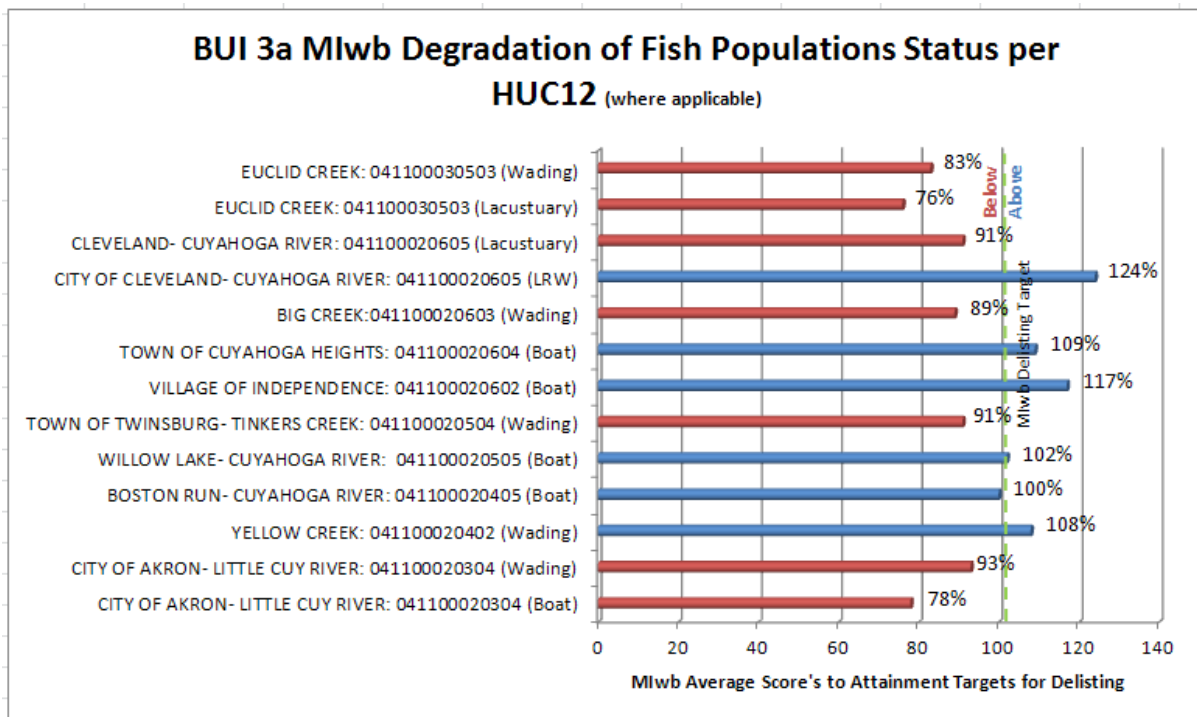
To get a full representation of the Cuyahoga River AOC, there is still sampling to be done. Cuyahoga River Restoration is working with Ohio EPA to design a plan to fill in the gaps in order to construct a more comprehensive data set for each subwatershed. This will provide the tools needed to pinpoint areas within each subwatershed so that effective restoration priorities and strategies can be identified.

The plan is designed to determine how many sites per subwatershed are needed in relation to drainage area. A tool that is used effectively to determine if a subwatershed is meeting the BUI restoration target is a 'Geometric Sampling Design'. (Appendix B)

With these average scores in hand, a percentage can be calculated to determine the level at which each sampling-type average is over or under the delisting target. The analysis shows a degradation percentage **under** the delisting target for 72% of the entire AOC's subwatersheds, or 13 of the 18 sampled. That leads to the conclusion that the Cuyahoga AOC does not meet the restoration target for Fish Population, although 5 subwatersheds do meet the delisting restoration target for this BUI. More detailed analysis is available in Section II's analysis by subwatershed.







### Sampling data

The tables in Appendix C show the scores, the sampling dates, locations, and sources for all known sampling in the entire AOC. The data is organized by sampling type and river mile, and indicates whether or not the specific sample meets the target for that sampling type.

## BUI 6: DEGRADATION OF BENTHOS

### Overview

When measuring the status of the benthic community in an AOC, the Invertebrate Community Index (ICI) is used.

Scores in the range of “Marginally Good” (30-32) are considered non-significant departures and are our basis for deciding the delisting targets for sample types Lacustrary, Headwaters, Wading, Boat.

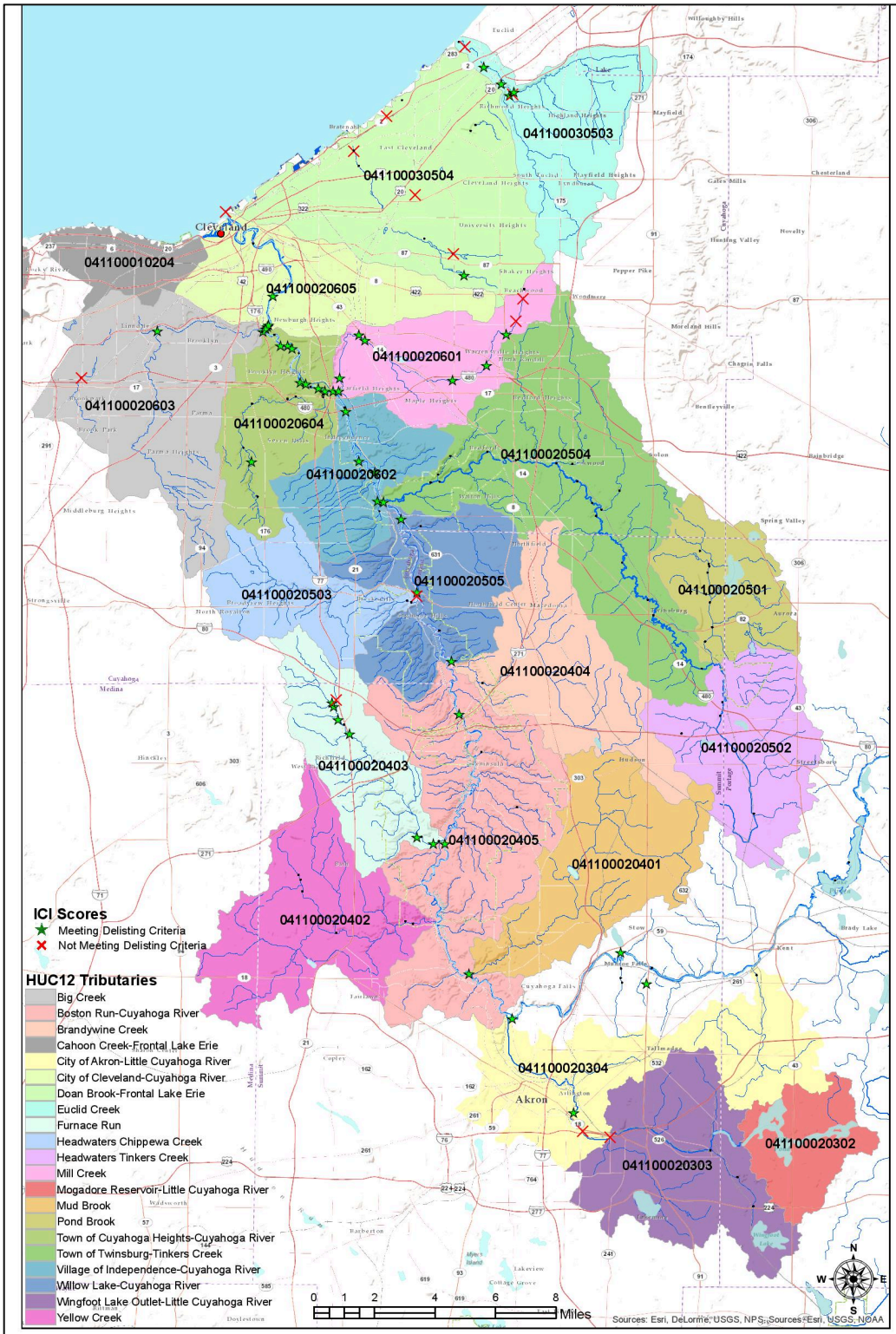
HUC 12 Subwatershed	HUC #	BUI 6 Degradation of Benthos
Euclid Creek	041100030503	DOES NOT Meet Target
Doan Brook (Dugway-Nine Mile-GreenCreeks, Doan Brook, Lake Erie Tributaries East)	041100030504	Needs Additional Data
Cahoon Creek-Frontal Lake Erie (Lake Erie Tributaries-West)	041100010204	N/A
City of Cleveland-Cuyahoga River (Navigation Channel, Old River Channel)	041100020605	Needs Additional Data
Big Creek	041100020603	Needs Additional Data
Town of Cuyahoga Heights-Cuyahoga River (West Creek, Lower Cuyahoga)	041100020604	Meets Target
Mill Creek	041100020601	Meets Target
City of Independence-Cuyahoga River (Lower Cuyahoga River, CVNP)	041100020602	Meets Target
City of Twinsburg - Tinkers Creek	041100020504	No Data Available
Headwaters Tinkers Creek	041100020502	No Data Available

HUC 12 Subwatershed	HUC #	BUI 6 Degradation of Benthos
Pond Brook (Tinkers Creek)	041100020501	No Data Available
Willow Lake-Cuyahoga River (Sagamore Creek, Cuyahoga River CVNP)	041100020505	Needs Additional Data
Headwaters Chippewa Creek	041100020503	No Data Available
Brandywine Creek	041100020404	No Data Available
Boston Run- Cuyahoga River (Cuyahoga River CVNP, Sand Run, Middle Cuyahoga River)	041100020405	Needs Additional Data
Furnace Run	041100020403	Meets Target
Yellow Creek	041100020403	No Data Available
Mud Brook	041100020401	No Data Available
City of Akron-Little Cuyahoga River	041100020304	Needs Additional Data
Wingfoot Lake-Little Cuyahoga River	041100020303	No Data Available

## BUI 6 Sample Site Location map

The following map shows the locations of the current credible ICI sampling sites (2004-2014) where data is available in the Cuyahoga AOC. Sampling sites marked with a red X do not meet delisting criteria. Sampling sites marked with Green stars do meet current delisting criteria. Further analysis will be done at the individual HUC12 level in Section II's analysis by subwatershed.

### BUI 6: SAMPLING SITES



## Restoration Target:

### BUI 6: Degradation of Benthos

#### State of Ohio Restoration Target

In the riverine areas upstream from the lake affected waters (lacustrary or fresh water estuary), the average of the Invertebrate Community Index (ICI) values within the assessment unit do not significantly diverge from state biological criteria; **AND**

In lake affected waters (lacustrary or fresh water estuary), the average of the L-ICI values do not diverge from state guidelines. (See Appendix B for additional information);

Index Type – Site Type	Invertebrate Community Index (ICI) Restoration Target				
	WWH	EWH	MWH	LRW <sup>3</sup>	Lacustrary <sup>4</sup>
Riverine <sup>1</sup>	30	42	18	4	NA
Lacustrary <sup>2</sup>	NA	NA	NA	12	34

<sup>1</sup>Ohio EPA has determined the non-significant departure value for riverine ICIs to be 4 points and the targets presented in this table reflect the non-significant departure from Ohio WQS.

<sup>3</sup>Targets for Limited Resource Waters (LRW) are based on benchmarks as there are no criteria in Ohio WQS.

<sup>4</sup>The ICI target for lacustraries is based on an Ohio EPA study in 1994 that identified 34 as a value considered an attainable goal for the Lake Erie lacustraries given the current altered habitat conditions in the absence of excessive sedimentation and water column enrichment or toxicity

#### Note

- Assessment units are the 12-digit HU, Large River Assessment Unit (LRAU) or other agreed upon stream segment or subwatershed.
- If waters have more than one designated use (i.e., Lacustrary and LRW or MWH) then the lowest target applies.
- This BUI will not be evaluated for ICI in waters that are routinely dredged as it is unrealistic for a healthy benthos community to be restored under these conditions.

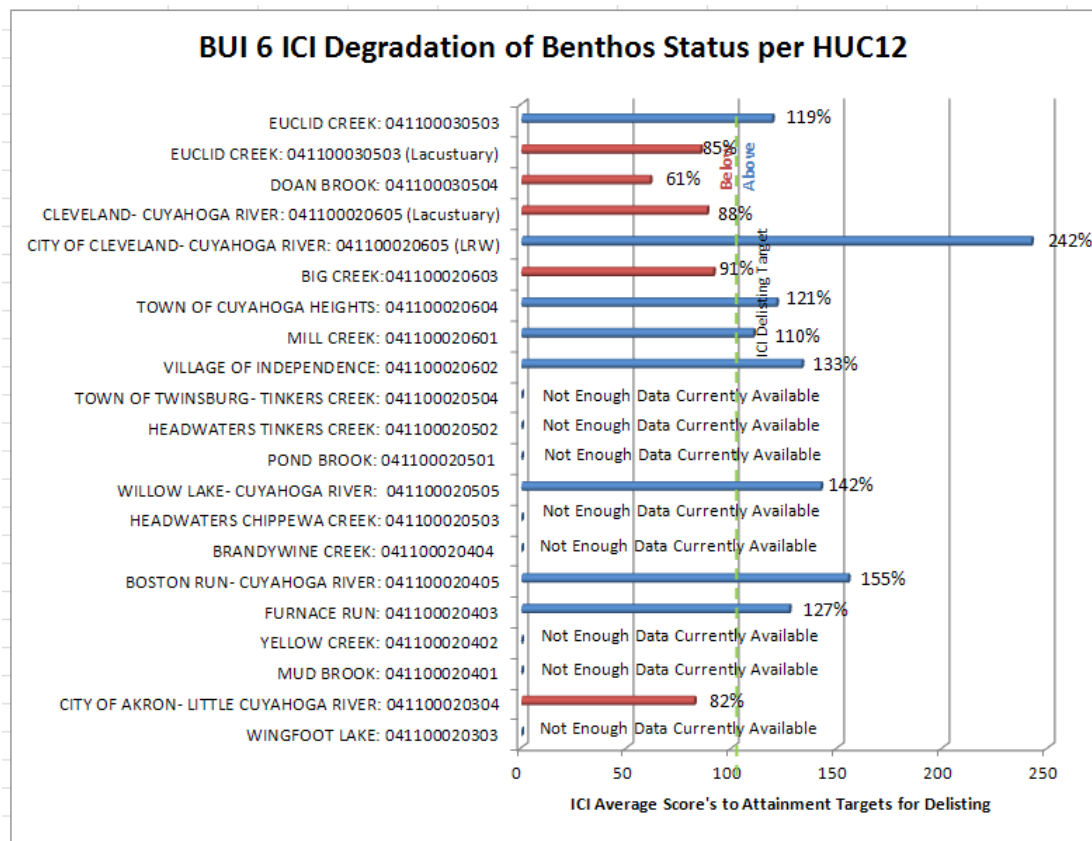
#### Potential Data Sources

- Ohio EPA ICI data

## Degradation of Benthos Status and Analysis

In 2014 data was collected and compiled for ICI to provide a status of the benthic community throughout the Cuyahoga AOC. The preceding tables show the current data. By constructing these data tables with the targets for each sample type (lacustrary, headwaters, wading, and boat sites) it can be demonstrated which sampling sites meet the delisting criteria for each HUC12 subwatershed. In the subwatersheds where credible data is available, 73% of the Cuyahoga AOC, or 8 of the 11 subwatersheds with current credible data, are above the target scores.





Based on the data, the subwatersheds with the most degraded fish habitat include Doan Brook and the Little Cuyahoga River. The chart above indicates that urbanization has taken its toll on aquatic habitat, with the more urbanized areas below the target and those in more rural or suburban areas above it.

Using these average scores, a percentage can be calculated relative to the delisting target. Currently, 73% of the subwatersheds with the required data meet the delisting target for BUI 6. 28% of the subwatersheds, or 3 of the 11 within the Cuyahoga AOC that have the required data, do not meet current restoration targets. (2 of the subwatersheds sampled were omitted from the prior table because of minimal available data).

To get a full representative sample of the Cuyahoga River AOC, additional sampling will be required. The Geometric Sampling Design being used to augment sampling is described in Appendix B.

### Sampling data

The tables in Appendix C show the scores, the sampling dates, locations, and sources for all known sampling in the entire AOC. The data is organized by sampling type and river mile, and indicates whether or not the specific sample meets the target for that sampling type.

## BUI 14a LOSS OF FISH HABITAT

### Overview

When measuring the status of the Fish Habitat in an Area of Concern (AOC), the QHEI score is used.

The Qualitative Habitat Evaluation Index (QHEI) gives an assessment of the physical characteristics of a sampled stream similar to IBI and ICI biologic data. QHEI represents a measure of instream geography. By combining evaluations of QHEI and IBI, for example, researchers can gain a well-rounded perspective of both the physical and biological conditions of a particular stream site. This comprehensive assessment is critical for evaluating disturbance and land use practices.

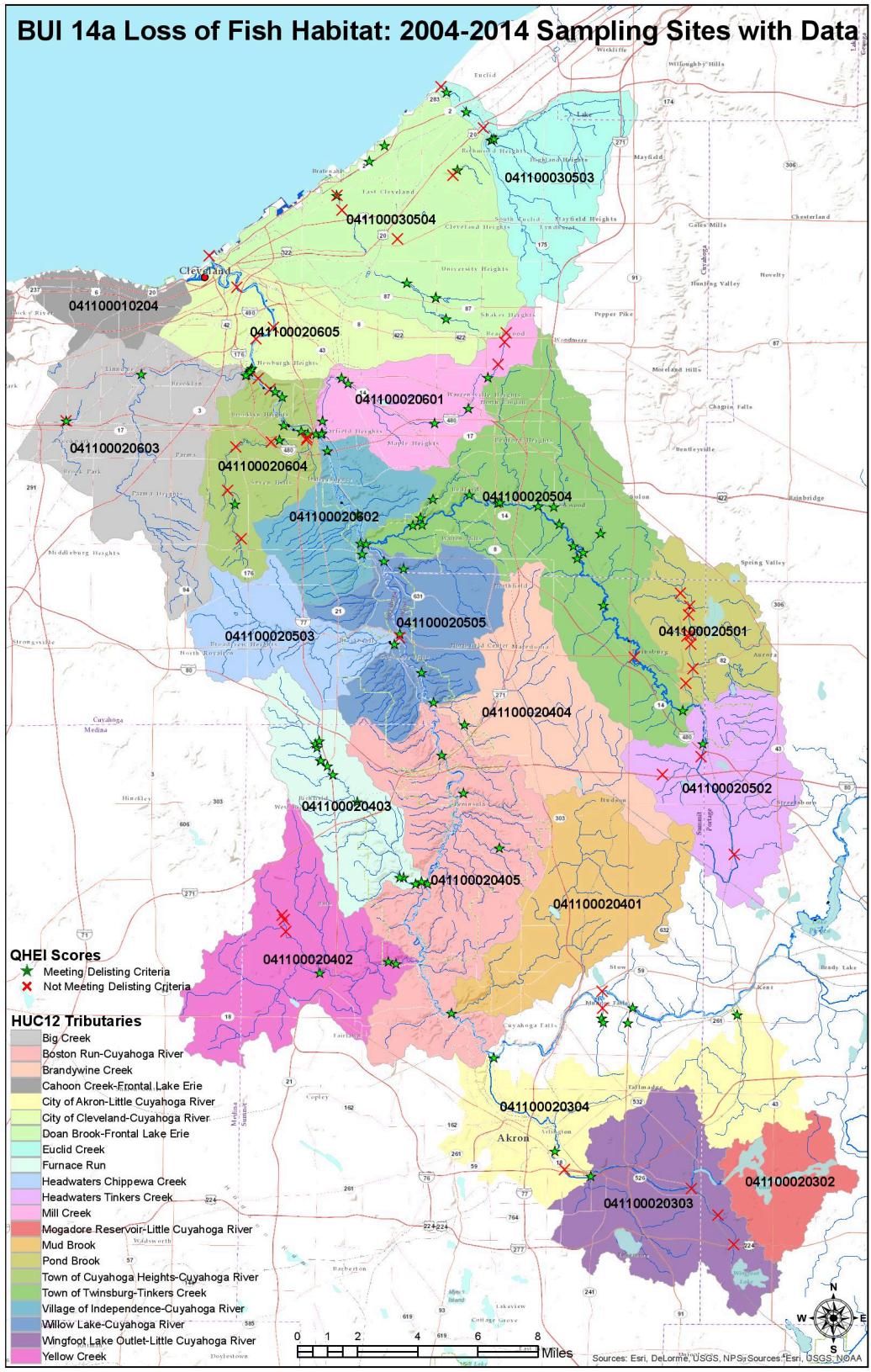
HUC 12 Subwatershed	HUC #	BUI 14a Loss of Fish Habitat
Euclid Creek	041100030503	Meets Target
Doan Brook (Dugway-Nine Mile-GreenCreeks, Doan Brook, Lake Erie Tributaries East)	041100030504	Meets Target
Cahoon Creek-Frontal Lake Erie (Lake Erie Tributaries-West)	041100010204	N/A
City of Cleveland-Cuyahoga River (Navigation Channel, Old River Channel)	041100020605	Meets Target
Big Creek	041100020603	Meets Target
Town of Cuyahoga Heights-Cuyahoga River (West Creek, Lower Cuyahoga)	041100020604	Meets Target
Mill Creek	041100020601	Meets Target
City of Independence-Cuyahoga River (Lower Cuyahoga River, CVNP)	041100020602	Meets Target
City of Twinsburg - Tinkers Creek	041100020504	Meets Target
Headwaters Tinkers Creek	041100020502	DOES NOT Meet Target

HUC 12 Subwatershed	HUC #	BUI 14a Loss of Fish Habitat
Pond Brook (Tinkers Creek)	041100020501	DOES NOT Meet Target
Willow Lake-Cuyahoga River (Sagamore Creek, Cuyahoga River CVNP)	041100020505	Meets Target
Headwaters Chippewa Creek	041100020503	Meets Target
Brandywine Creek	041100020404	Meets Target
Boston Run- Cuyahoga River (Cuyahoga River CVNP, Sand Run, Middle Cuyahoga River)	041100020405	Meets Target
Furnace Run	041100020403	Meets Target
Yellow Creek	041100020403	Meets Target
Mud Brook	041100020401	Needs Additional Data
City of Akron-Little Cuyahoga River	041100020304	DOES NOT Meet Target
Wingfoot Lake-Little Cuyahoga River	041100020303	Needs Additional Data
Mogadore Reservoir- Little Cuyahoga River	041100020302	NA



## BUI 14a Sample Site Location map

The following map shows the locations of the current credible-data QHEI sampling sites (2004-2014). Further analysis will be done at the individual HUC12 level in Section II's analysis by subwatershed.



## Restoration Targets

### BUI 14: Loss of Fish Habitat

#### State of Ohio Restoration Target

This beneficial use will be considered restored when the following conditions are met:

#### For Fish (aquatic habitat):

In the riverine areas upstream from the lake affected waters (lacustrary or fresh water estuary), the average Qualitative Habitat Evaluation Index (QHEI) value within an assessment unit do not diverge from state biological guidelines. **OR**

In lake affected waters (lacustrary or fresh water estuary), the average Lake Qualitative Habitat Evaluation Index (L-QHEI) value does not diverge from state biological guidelines (See Appendix B for additional detail information and lacustrary locations in each AOC).

Index Type – Site Type	Qualitative Habitat Evaluation Index (QHEI) Restoration Targets				
	WWH	EWB	MWH <sup>1</sup>	LRW <sup>2</sup>	Lacustrary
Riverine	60	75	50	NA	NA
Lacustrary <sup>3</sup>	NA	NA	NA	NA	55

<sup>1</sup> For MWH waters, a QHEI score of  $\geq 50$  is considered an acceptable target based on relationships observed between fish community health and habitat. If MWH waters cannot attain the QHEI target due to degradation or physical modifications that cannot be reasonable and cost effectively rectified, then these waters should not preclude the BUI from being removed in the AOC.

<sup>2</sup> For LRW waters, a QHEI evaluation is not applicable. LRW designations are waters that have been found to lack the potential for any resemblance of any other aquatic life habitat as determined by the biological criteria through a use attainability analysis such that the extant fauna is substantially degraded and that the potential for recovery of the fauna to the level characteristic of any other aquatic life habitat is realistically precluded due to natural background conditions or irretrievable human-induced conditions.

<sup>3</sup> For the Lake Erie shoreline and lacustrary areas, a L-QHEI  $\geq 55$  is considered an acceptable target (Thoma, 2006 and personal communication with Roger Thoma, 2013).

#### Notes

- Assessment units for the fish habitat are the 12-digit HU, Large River Assessment Unit (LRAU) or other agreed upon stream segment or subwatershed.
- Local RAPs need to develop Fish Habitat Restoration Plans to recommend the type and location of restoration that needs to be done to remove this BUI. The plan needs to be approved by Ohio EPA.
- If waters have more than one designated use (i.e., Lacustrary and LRW or MWH) then the lowest target applies.

#### Potential Data Sources

- Ohio EPA QHEI data
- National Land Cover Database

## Sampling data

The tables on the following pages show the scores, the sampling dates, locations, and sources for all known sampling in the entire AOC. The data is organized by sampling type and river mile, and indicates whether or not the specific sample meets the target for that sampling type (Y/N, Red/Green.)

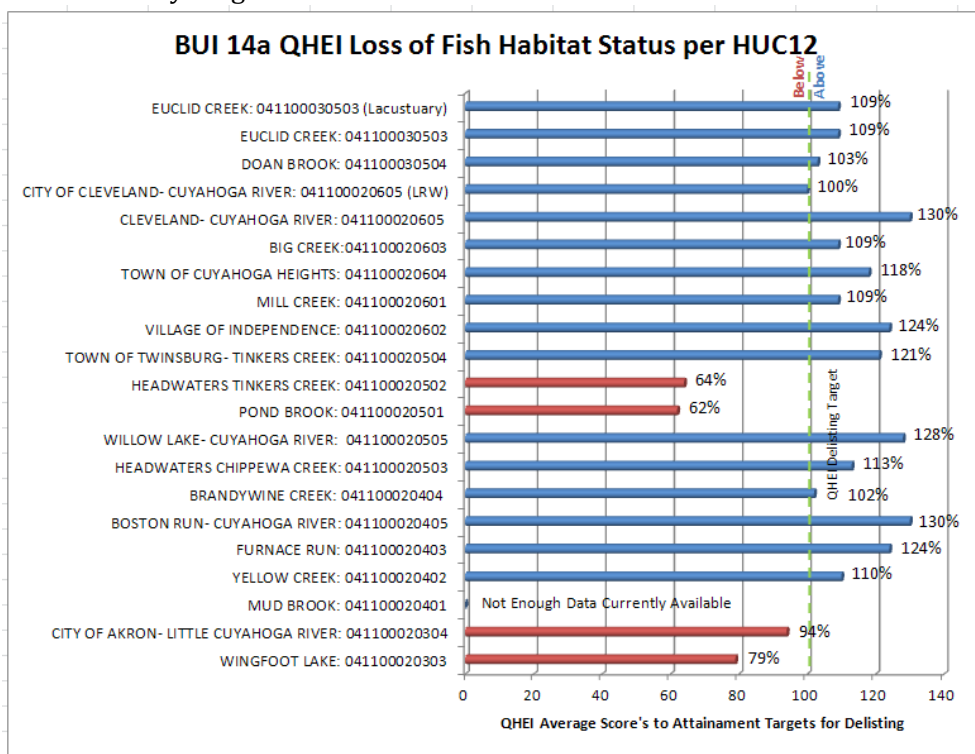
## BUI 14 Status and Analysis

Over the past year, data has been collected and compiled for QHEI data to provide the Cuyahoga AOC Advisory Committee with information on what kind of fish habitat conditions exist throughout the Cuyahoga AOC. The preceding tables show this current data. By constructing these data tables with the targets for each sample type (lacustrary, headwaters, wading, and boat sites) it accurately shows which sampling sites meet the delisting criteria per HUC12 subwatershed.

Of the subwatersheds that currently have credible data, 72% of the sub-watersheds, or 13 of 18, are above the target scores for the metric for BUI14. With this data, efforts can be focused on some of the more degraded stretches of streams within the AOC. The subwatersheds with the most degraded fish habitat include Pond Brook and the Little Cuyahoga River.

To obtain a full representative sample of the Cuyahoga River AOC, additional sampling will be necessary. The 'Geometric Sampling Design' used to identify additional sites is described in Appendix B.

From these average scores, the percentage of individual HUCs over or under the delisting target is calculated. Currently, 72% of the subwatersheds with data available are above the restoration target within the Cuyahoga AOC.



With restoration efforts, dam removals, and riparian reestablishment, delisting restoration targets for BUI 14a can be reached.

This information allows the Cuyahoga AOC Advisory Committee and staff to focus efforts on the 28% of subwatersheds, or 5 of the 18, whose scores need to be brought closer to restoration target scores. (2 of the subwatersheds sampled were omitted from the tables because of minimal data).

### **Sampling data**

The tables in Appendix C show the scores, the sampling dates, locations, and sources for all known sampling in the entire AOC. The data is organized by sampling type and river mile, and indicates whether or not the specific sample meets the target for that sampling type.

## BUI 4: FISH TUMORS AND OTHER DEFORMITIES

### Overview

DELTs (Deformities, Eroded Fins, Lesions, and Tumors) indicate both the health of the fish in the system and the system itself. Information on external anomalies is noted because many are either caused or exacerbated by environmental factors and often indicate the presence of multiple sub-lethal stressors. DELTs are one of the metrics used to determine Ohio's Index of Biotic Integrity (IBI). However, by themselves the DELT metrics can be clues to direct restoration toward preventing the causes of deformities and tumors.

Ohio EPA has identified the lacustrary zones of the following streams and reaches as areas where brown bullhead are present and where liver tumor incidence rates are the metric used.

Mainstem/Marina • Old River Channel • Euclid Creek

### Restoration Targets:

#### State of Ohio Restoration Target

The average DELT values within the assessment unit do not exceed either:

- DELT values of 3% (lacustrary and boat sites), or
- DELT values 1.3% (wading sites);

#### AND

Where brown bullheads are present, the liver tumor prevalence rate (i.e., neoplastic or preneoplastic liver tumors) should not exceed 5%.

### DELT Status and Analysis

Delisting Progress Matrix		
BUI 4 Fish Tumors or Other Deformities		
The average DELT values within the assessment unit do not exceed either: DELT value of 3% in Lacustrary or DELT values of 1.3% in wading sites; and (where brown bullheads are present) the liver tumor prevalence rate should not exceed		
HUC12 tributaries Sampled	HUC12	DELT anomaly %
Wingfoot lake Little Cuyahoga	41100020302	0.0000%
Little Cuyahoga	41100020304	0.0000%
Yellow Creek	41100020402	0.0000%
Furnace Run	41100020403	0.0000%
Brandywine Creek	41100020404	0.0000%
Boston Run	41100020405	0.0065%
Pond Brook	41100020501	0.0007%
Tinkers Headwaters	41100020502	0.0031%
Tinkers Twins	41100020504	0.0015%
Willow Lake	41100020505	0.0018%
Mill Creek	41100020601	0.0007%
Cuyahoga- Independence	41100020502	0.0074%
Big Creek	41100020603	0.0002%
Cuyahoga- Cuy. Hts.	41100020604	0.0054%
Cuyahoga- Cleveland	41100020605	0.0097%
Euclid Creek	41100030503	0.0000%
Doan Brook	41100030504	0.0109%



For the USGS/OEPA 2014 Brown Bullhead Assessment, fish “were collected at three areas within the Cuyahoga River AOC—the new channel, the old channel, and Euclid Creek. Only 27 fish were collected in the old channel, and four of these were age-2. No raised barbel lesions were noted; however, four (14.8%) lip or body surface lesions were observed. All of these were verified as neoplastic and included a papilloma, squamous cell carcinomas, and osteosarcomas. Only one fish from this site had a liver tumor, and it was of bile duct origin.

Twenty-four brown bullhead were collected from the new channel site and three of these were age -2. Raised lip lesions were observed on two (8.3%) of the fish; unfortunately, only one (4.2%) was collected for microscopic verification.

Forty brown bullhead were collected at Euclid Creek, and all of these were age 3 or older. Raised lesions on lips and barbels were observed on eight (20%) of the fish. Tissue was not collected from three of these fish; the remaining five (12.5%) were all neoplasms, including papillomas and a squamous cell carcinoma. Five brown bullhead from this site also had liver neoplasms, all with bile duct tumors and one with both a cholangiocarcinoma and a hepatocellular tumor.”

Analysis of all of the credible data for DELT anomalies throughout the past decade show a reduction in deformities throughout the AOC. The two HUC12s that are still impaired are Euclid Creek and the City of Cleveland- Cuyahoga River, primarily the Old River Channel.



## **BUI 7: RESTRICTIONS ON NAVIGATIONAL DREDGING ACTIVITIES**

### **Overview**

BUI 7 specifically addresses areas within the boundaries of AOCs that are historically dredged to maintain navigable depths for commercial and/or recreational vessels.

State of Ohio sediment quality guidelines determine where dredged materials may be disposed of. If there are restrictions on disposal of the sediment due to contaminants, this BUI is impaired.

In the case of the Cuyahoga River AOC, this BUI applies to the last 4.6 miles of the river, which is designated a federal navigation channel and is dredged annually to allow freighters access to and from ArcelorMittal Steel and other industrial users. Approximately 230,000 cubic yards of material from a two-mile section of the upper channel, which receives sediment flowing in from upriver, are dredged to maintain a 23-foot depth.

The following dredging activities are not impairments for delisting purposes:

- 1) Precautionary seasonal restrictions on dredging to prevent real or anticipated impacts to spawning fish, avian or macroinvertebrate species;
- 2) Local restrictions due to local detrimental effects of the dredging operation (increased turbidity, noise, channel restrictions, etc.); and
- 3) If open lake disposal is restricted solely due to volume.

For evaluation of other disposal methods, Ohio EPA, Division of Surface Water currently uses its 2010 *Guidance on Evaluating Sediment Contaminant Results* to determine proper management or disposal options for contaminated sediment. This guidance details how contaminated sediment can be assessed using a tiered approach (screening, evaluating and testing) and is available online at:

[http://www.epa.ohio.gov/portals/35/guidance/sediment\\_evaluation\\_jan10.pdf](http://www.epa.ohio.gov/portals/35/guidance/sediment_evaluation_jan10.pdf).

### **Restoration Targets:**

#### **BUI 7: Restrictions on Navigational Dredging Activities**

##### **State of Ohio Restoration Target**

There are no restrictions on navigational dredging or disposal activities due to contaminants in sediment, such that sediments are suitable for upland reuse/disposal, **OR** sediments meet Ohio EPA guidelines for open water disposal.

##### **Notes**

- Navigational dredging refers to dredging of a federally designated ship channel and historically dredged stretches of a river to enable the passage of commercial and/or recreational vessels. Restrictions to disposal activities refer to the prohibition of open lake disposal or upland re-use of dredged materials due to chemical contamination or biological toxicity of the sediment.
- This does not include the maintenance dredging of private marinas, slips, docks, etc. However, if sediment contaminant concentrations in these areas are a source of contamination that precludes attainment of remedial dredging goals of federally designated ship channels and historically dredged stretches of a river, then dredging of private marinas, slips, docks, etc. may be necessary.

## **Restrictions on Dredging Status and Analysis**

Sediment is suitable for upland reuse, but not for open lake placement.

The Dredge Task Force, convened by the Port of Cleveland, has been meeting to discuss short- and long-term strategies for managing the sediment dredged from the shipping channel in 2015 and beyond.

In February 2015, Governor Kasich issued an Executive Order allowing Ohio EPA to deny permits for any disposal that would increase levels of bio-accumulative contaminants, such as PCBs, or would violate international treaties (which forbid any addition of such chemicals to the Great Lakes.) Ohio EPA and the ODNR Coastal Management Agency cite testing that shows that the levels of PCBs in Lake Erie walleye are dangerously close to requiring a reduction in fish consumption advisories.

## **Management Actions**

The task force will continue to meet, and the partners are continuing to seek funding for alternative placement and dredging strategies.

The Port of Cleveland is carrying out two important initiatives:

- Bedload interceptors placed in the river upstream of the navigation channel to capture and remove marketable sediment before it enters the ship channel
- Restructuring confined disposal facilities to separate clean fill so as to mine and market the material for upland reuse

An increased effort to identify and facilitate upland reuse locations and beneficial uses of the sediment would bring us closer to delisting the "Restrictions on Dredging" impairment.

## **BUI 8: EUTROPHICATION OR UNDESIRABLE ALGAE**

### **Overview**

Eutrophic waters can represent a natural stage in the aging of a water body. For example, as a lake fills in it becomes shallower, warmer and more susceptible to supporting excessive growths of aquatic vegetation and algae. However, in many cases the eutrophication process is accelerated by human activities that cause increased nutrient and sediment loading. Impacts on the water body could be low dissolved oxygen concentrations, elevated phosphorus and nitrogen concentrations, excessive vegetation, algal blooms, taste and odor problems in drinking water, and high turbidity. Eutrophication is considered a BUI impairment if it is caused by human activity.

Eutrophication can be a localized problem in certain segments of streams that may be downstream of sources of high levels of nutrients (either point or nonpoint), loadings of oxygen-demanding substances or in areas of little circulation and low flow. In some areas, the natural stream channel has been dredged and deepened to accommodate shipping. If it is documented that this deepening is responsible for the failure to meet Water Quality Standards, this area would not be considered impaired under this target due to nutrient loading. However, should the opportunity arise to alter the stream morphology back to a more natural state, the AOC should encourage this option.

Specifically for the Cuyahoga River Navigation Channel, exceptions for the dissolved oxygen criteria are included in OAC 3745-1-26 for Limited Resource Waters (LRW) as the Cuyahoga River ship channel is designated (river mile 5.6 @ the Newburgh and South Shore RR Bridge to the Cleveland harbor portion of Lake Erie). According to the rule, "the physical habitat of the channel and the prevailing background dissolved oxygen regime are insufficient to support any resemblance of the warm water habitat aquatic life use designation. A use attainability analysis has been conducted and indicated the extant fauna is substantially degraded and the potential for recovery of the fauna to the level characteristic of other Lake Erie river mouth is precluded by irretrievable human induced conditions. However, the ship channel is used by fish as a migratory route in the spring months. This seasonal and stream-flow-related uses shall be recognized and protected through this rule." The section E(3)(a) of the rule describes the following exception related to dissolved oxygen, "The limited resource water dissolved oxygen criterion shall be 1.5 mg/L minimum. No dissolved oxygen average criteria apply." Section E(5) states "These standards reflect the desire for restoring and maintaining multiple uses of the ship channel expressed by the Cuyahoga River Remedial Action Plan Coordinating Committee. All parties, private and public, who contribute to the dissolved oxygen problem, may share a responsibility in the study and attainment of these standards. The dissolved oxygen criteria established in paragraph (E)(3) of this rule are intended to be the minimum planning targets for the remedial action planning process to use in evaluating beneficial use restoration." See Appendix A for the full full OAC Chapter text.

Based on the Cuyahoga rule, the Cuyahoga shipping channel dissolved oxygen criteria is utilized as the BUI restoration target for the federally designated shipping channels in the Black, Maumee and Ashtabula AOCs by the USEPA. It should be noted that if waters have more than one designated use then the lowest target applies and for lacustrine waters with no other use designation, dissolved oxygen will not be evaluated.

## Restoration Targets

### BUI 8: Eutrophication or Undesirable Algae

#### State of Ohio Restoration Target

This use will be considered restored when the follow conditions are met:

#### For Riverine waters (upstream of lacustuary or fresh water estuary):

When the Trophic Index (a tool included in Ohio's Nutrient Reduction Strategy (Ohio EPA, 2013) demonstrates that conditions are not impaired as a result of excessive algal growth due to sources of nutrients; **OR**

If the Trophic Index is not available, then no persistent nuisance growth of algae, such as filamentous *Cladophora*, or blooms of blue-green algae have been observed within the last three years due to sources of nutrients from within the AOC.

Dissolved Oxygen Restoration Targets		
Designated Use	OMZM <sup>1</sup> (mg/L)	OMZA <sup>2</sup> (mg/L)
WWH	4.0	5.0
EWH	5.0	6.0
MWH	3.0 <sup>3</sup>	4.0
LRW	2.0	3.0
Federally Designated Shipping Channels	1.5	NA

<sup>1</sup> OMZM = outside mixing zone minimum.

<sup>2</sup> OMZA = outside mixing zone average defined as the minimum twenty-four-hour average.

<sup>3</sup> The dissolved oxygen minimum at any time criterion for modified warmwater habitats in the Huron/Erie Lake Plain ecoregion, as identified in rules 3745-1-08 to 3745-1-30 of the Administrative Code, is 2.5 mg/l.

#### **AND**

No persistent nuisance growth of algae, such as filamentous *Cladophora*, or blooms of blue-green algae have been observed within the last three years due to sources of nutrients from within the AOC.

## Eutrophication Status and Analysis

All of the subwatersheds have been verified as having no persistent nuisance growth of algae. Recent OMZA measurements are being collected for the ship channel.

## **BUI 10a: BEACH CLOSINGS (RECREATIONAL CONTACT)**

### **Overview**

This impairment, as stated for AOC monitoring, is listed as impaired when the waters that are used for total body contact recreation exceed the standards, objectives, or guidelines for such use, whether at a beach or in a Class A water body, which for this AOC includes the Cuyahoga River.

The BUI title of "beach closings" severely limits its use when applied to the Areas of Concern. Many of the AOCs do not actually have beaches, but they do have areas where people frequently contact the water during recreational activities. Therefore, it is much more appropriate and protective of human health to expand the assessment for this BUI to more than just beach areas. Based on the IJC listing guidance, it does appear that the original intention of this BUI was to look at bacteria content in commonly used recreational waters, not just beaches. Ohio WQS for recreational use have changed since the previous targets were written; therefore this target has been updated to reflect the current method of measuring bacteria in Ohio (now measured by *E. coli* instead of fecal coliform bacteria). The new algal toxin target was added to address an increasing concern in Lake Erie, especially the western basin.

Sources of bacteria can include package plants, CSO/Sanitary Sewer Overflows (SSOs), home sewage treatment systems (HSTs), commercial on-site systems, land application of organic materials, storm water, concentrated animal feeding operations (CAFOs) and other livestock operations, and permitted wastewater treatment plants (WWTPs). These sources are present across Ohio AOC's and the tools to manage and address each source range from regulatory to voluntary actions.

The revised restoration targets for this BUI were designed to identify sources of contamination within the AOCs that represent extraordinary problems that can be addressed through implementation at the local level. It is also important to recognize the numerous ongoing efforts to address these widespread issues including Ohio's TMDL program, local health department efforts to identify and correct failing septic systems, targeted state funding and programs to address unsewered areas, and non-point source reduction programs. Additionally, communities have made tremendous investments to address storm water and correct CSO/SSO issues and will continue to reduce sources of contamination as the long term control plans are implemented.

In addition to bacterial contamination, this impairment may also be identified within the AOC when a state or local government agency has issued a warning to avoid contact with the water due to the presence of a chemical of concern, such as PCB or PAH contamination.

## Restoration Target

### BUI 10: Beach Closings (Recreation Use)

#### State of Ohio Restoration Target

This beneficial use shall be considered restored when the following conditions are met for public bathing beaches, Class A waters and chemical contaminant contact advisories:

#### Public Bathing Beaches:

This BUI will be considered restored when posted advisory days due to bacterial contamination (*E. coli*) do not exceed 10 percent (or 19 days) of the recreation season; AND posted advisory days due to algal toxins do not exceed 10 percent (or 19 days) of the recreation season. This target must be met in 3 out of the most recent 5 years; **OR**

In cases where public bathing beaches within the AOC have posted advisory days for either bacterial contamination (*E. coli*) or algal toxins that exceed 10 percent of the recreation season and CSOs are the primary cause, the BUI will be considered restored when the bacterial impacts from CSOs are being addressed under an approved long term control plan or other legally-binding document.

#### Primary Contact Recreation (Class A):

No Class A waterbodies within the AOC are included on Ohio's most recent 303(d) list of impaired waters due to bacterial contamination (*E. coli*) **OR**

If Class A waterbodies within the AOC are on the list of non-attaining waters because of bacterial contamination (*E. coli*) due to the presence of Combined Sewer Overflows (CSOs) this BUI will be considered restored when the bacterial impacts from CSOs are being addressed under an approved long term control plan or other legally-binding document; **AND**

If Class A waterbodies within the AOC are on the list of non-attaining waters because of bacterial contamination (*E. coli*) due to the presence of non-point source pollution, this BUI will be considered restored when a TMDL is approved and the State and RAP can document that the level of bacterial contamination is not significantly worse than similar watersheds.

#### Chemical Contaminant (all waters):

No local or state contact advisories related to the presence of a chemical contaminant exist.

#### Note

- In Ohio, popular paddling streams with identified public access points have been designated as Class A primary contact recreation streams. The Class A designation extends from the most upstream identified public access point to the mouth. Primary contact recreation stream segments are defined in the Ohio Administrative Code 3745-1-07 and, in most cases; do not include the entirety of any Ohio AOC.



## **Beach Closings / Recreational Use Status and Analysis**

### **Beaches**

There are five beach areas within the Cuyahoga AOC. Data was collected for all areas regarding the number of beach closings on an annual basis for each of the lakefront beaches for the past 5 years.

None of the beach areas within the Cuyahoga AOC meet the restoration target set for BUI 10a based upon the beach closing data.

A current analysis of the beach closing percentage per year from the years 2009 thru 2013 do not meet the delisting restoration targets for BUI 10a. There are no locations that meet the delisting targets for 3 out of the most recent 5 years. Three locations, Edgewater east and west and Shoreby Club never met the “beach closings under 10% of the recreation season” at any time within the last 5 years. Edgewater west and Edgewater east were both fewer than 10% in 2012 and Shoreby beach met targets only in 2010.

If CSOs are the primary cause of the impairment, this BUI can be considered to be restored when the bacterial impacts from CSOs are being addressed under an approved long term control plan or other legally-binding document. Currently, the Cuyahoga AOC consists of 126 permitted CSOs within the Cleveland area. Of those in the Cuyahoga AOC, 7 empty directly adjacent to an affected beach area and have overflows that occur annually.

### **Recreational Use (Mainstem)**

The mainstem of the Cuyahoga River does not meet the restoration target for BUI10a. The main channel of the river is identified on the State of Ohio’s current list of impaired waters under its 303(d) list. This includes the five HUC 12 subwatersheds of the Cuyahoga River main channel. The river from the mouth (through the Shipping Channel) down to the Cuyahoga Valley National Park is impaired with Polychlorinated Biphenyls (PCBs) in fish tissue according to a 2008 study. This is the same impairment that has been recorded for the Akron area.

In terms of the bacteria metric, the Cuyahoga Valley National Park in partnership with the United States Geological Survey has a “Nowcast” water monitoring program at one location on the Cuyahoga River that monitors the conditions for recreational use during the annual recreation season. The following table shows the results of this monitoring from 2009 through 2013. This area is monitored primarily for E. Coli levels. 2013/14 data shows that the river is only in “good” condition 37% of the recreational year.

The existing data that measures river water quality for recreation contact is limited to one location currently. To further examine the conditions for the recreation use on the Cuyahoga River, more monitoring locations would need to be identified and installed for data collection during the recreation season consistent with Ohio EPA water quality standards for recreation use and the restoration targets for BUI 10a.

*Cuyahoga River Recreation Use Monitoring Station Results, 2009-2013*

Location at Highland Road in the CVNP.

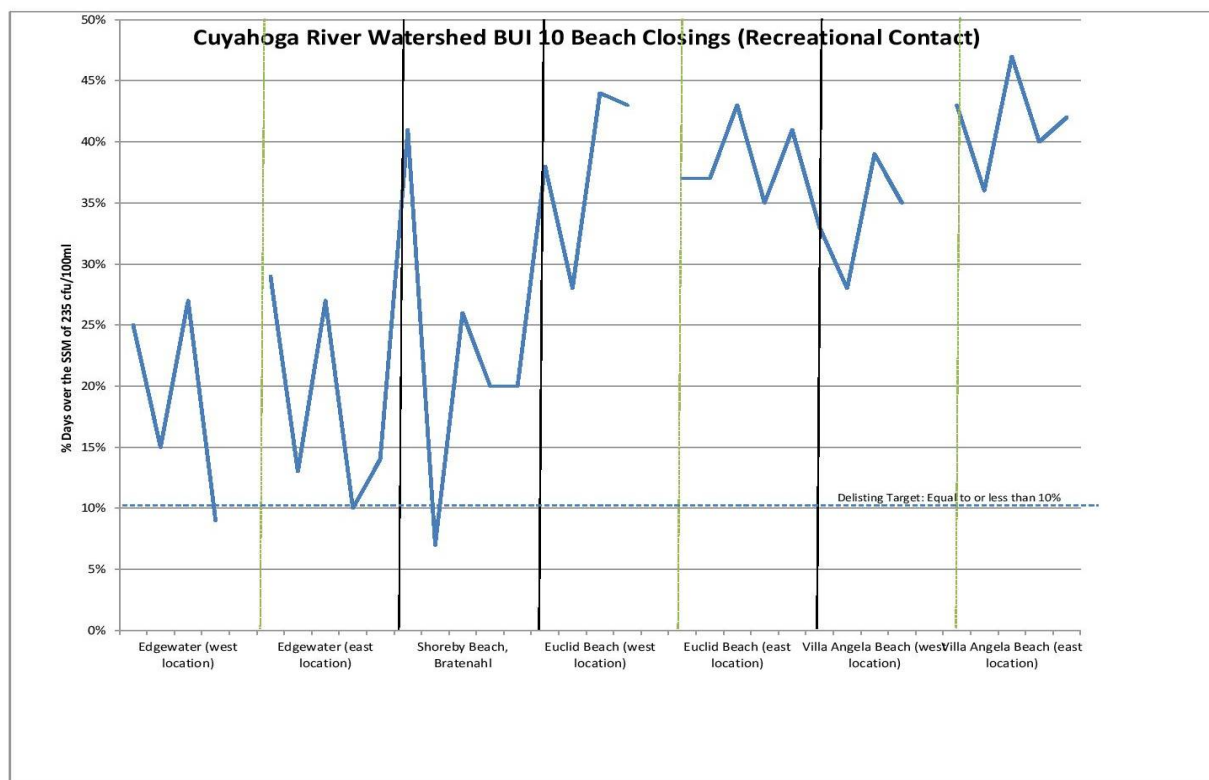
Monitoring Year	Number of Days Samples Taken during Recreation Season	Number of Days a Primary contact advisory was in effect.	Percentage of Days monitored during recreation season met recreation use targets.
2009	48	38	20%
2010	46	28	39%
2011	24	16	33%
2012	43	20	53%
2013	135	87	35%

[http://www.ohionowcast.info/nowcast\\_cuyahoga.asp](http://www.ohionowcast.info/nowcast_cuyahoga.asp)

The City of Akron's CSO discharges continue to contribute to bacterial loading, although the city's long term control plan and agreement with USEPA regarding CSO reductions will contribute to the ability to delist this impairment.

### Beach Closings Point Data

The following graph shows the Cuyahoga AOC broken down by beach HUC12 in relation to closings.



## **Management Actions**

Green Stormwater Infrastructure and Low Impact Development projects throughout the AOC will help to reduce CSO discharges and bacteria levels, as well as nutrient loads and other contaminants:

- Reducing the amount of impervious surfaces by removing unused paved areas and converting them to forested, vegetated or pervious surfaces
- Reducing the volume of runoff into combined sewer systems by retaining stormwater on site, using permeable paving with subsurface storage, increased forested areas, bioswales and rain gardens.

The NEORS is working on a series of combined sewer retention tunnels that will dramatically reduce the intensity of the output by the CSO's. With the Euclid Creek tunnel finished and ready to start accepting material within the 2015 calendar year, both the Euclid Creek west and east locations will be impacted in a positive way. AOC beaches will be monitored as this work progresses.

**BUI 10b PUBLIC ACCESS & RECREATION IMPAIRMENTS**  
**(Local BUI, does not affect federal AOC delisting)**

**Overview**

BUI 10B was established by the local Area of Concern coordinating committee as part of the Stage 1 Remedial Action Plan in 1992.

Its basis is founded on the identification of public access within the river corridor particularly related to fishing, other recreational uses and scenic viewing, as impaired due to limited facilities and limited access to the river. In 1995, the Stage 1 Update, developed by the local Area of Concern coordinating committee, identified that the river corridor from the Edison Dam to the head of navigation channel is not impaired for public access. However, the Committee concluded that the 5.6 miles within the navigation channel remains impaired for public access and that the 10 miles of Cleveland Harbor and Lakefront (nearshore area) is impaired in places. In the 2008 Stage 2 Assessment, the navigation channel remained as impaired due to 'access to Cuyahoga River is very limited in the ship channel due to the industrial nature of the area.'

In 2014, a Public Access Work Group comprised of community and local and federal agencies representatives of the Area of Concern Coordinating Committee was formed to identify BUI 10B criteria and removal goals. Four areas of public access goals were identified to inventory and assess their progress since 1995. The public access attribute categories for the navigation channel and Lake Erie shoreline AOC portion would include a) access for fishing, b) access for boater (paddle, motorized and non-motorized watercraft) c) public access for biking, hiking/walking/jogging, and d) public access for river viewing.

**Restoration Targets:**

**BUI 10b Public Access & Recreation Impairments**

As a locally-led use impairment, there are no state or federal restoration targets established for this BUI. The Cuyahoga AOC Public Access Working Group has identified the public access attribute categories and their progress of new facilities for public access since 1995 to measure the progress. The baseline for the BUI are the conditions of each of the five attribute categories in 1995 when the last review of the target was conducted by the Cuyahoga AOC Coordinating Committee.

## BUI 10b Public Access Status and Analysis

Since 1995, the following projects have been completed and are underway under each attribute category.

### New Areas for Public Access since 1995.

Public Access Attribute Category	
Access for Fishing	Wendy Park, Cleveland Metroparks Canal Reservation
Access for Boating (paddle, motorized and non-motorized)	Wendy Park, NorthCoast Harbor, Merwin’s Wharf, Cleveland Rowing Foundation, Cuyahoga Valley NP Livery Pilot Project, Cleveland Metroparks Water Taxi Service,
Public access for biking/hiking/walking/jogging	Ohio & Erie Canal Reservation, Towpath Trail extension to Cleveland (existing and projected), Lake Link Trail (projected), Lakefront Bikeway(projected), Euclid Creek Greenway Extension (projected), Cleveland Lakefront Preserve
Public access for river/lake viewing	Ohio & Erie Canal Reservation, Wendy Park, Cleveland Lakefront Preserve

As a result of the public access improvements completed by various community partners over the past ten years and the anticipated work for the next five years, through 2019, the Work Group anticipates a recommendation for removal of this BUI in 2015 to the Cuyahoga AOC Advisory Committee and the Ohio EPA with conditions set forth to address ongoing improvements for public access throughout the Cuyahoga River.

## **BUI 11: DEGRADATION OF AESTHETICS**

### **Overview**

The Degradation of Aesthetics Beneficial Use Impairment (BUI) is more subjective than the other beneficial use impairments. They were developed to address aesthetic conditions that interfere with public access or use of the water.

The International Joint Commission defines the impairment as “when any substance in water produces a persistent objectionable deposit, unnatural color or turbidity, or unnatural odor (e.g., oil slick, surface scum).”

The State of Ohio guideline states: “Ohio has not established numeric criteria that directly relate to this BUI. Based on Ohio water quality criteria applicable to all waters (OAC 3745-1-04, sections A-C), this beneficial use shall be listed as impaired when human activity routinely causes any of the following persistent conditions:

- Sludge deposits
- Oil sheens, scum and other objectionable materials
- Materials that produce color, odor, or other nuisances.

Many of the persistent conditions identified in the listing guideline can be attributed to the presence of active Combined Sewer Overflows (CSOs). Ohio EPA continues to implement CSO controls through provisions included in NPDES permits and using orders and consent agreements when appropriate.

### **Restoration Targets**

#### **BUI 11: Degradation of Aesthetics**

##### **State of Ohio Restoration Target**

This beneficial use will be considered restored when the following conditions are met:

There are no observed ongoing occurrences of sludge deposits, oil sheens, scum and other objectionable materials; specifically materials that produce color, odor, or other nuisances.

**OR**

If Combined Sewer Overflows (CSOs) are a significant cause of aesthetic impairments and the CSOs are being addressed under an approved long term control plan or other legally-binding document, this BUI may be considered restored. Where long-term remedies may take several years to be fully implemented, it may be necessary to develop short-term control strategies.

**AND**

If Municipal Separate Storm Sewer Systems (MS4s) are a significant cause of aesthetic impairments and the MS4 is regulated under an NPDES Permit or other legally-binding document, this BUI may be considered restored.



## **Degradation of Aesthetics Status and Analysis**

The Cuyahoga AOC currently has two long-term CSO control plans in place where applicable and all MS4 permits are in place within the AOC as required. Many of the actions set forth in the Control Plans have begun action in the past five years and their implementation will continue over the next 15 years.

The Northeast Ohio Regional Sewer District, under its long-term control plan has implemented a number of measures the past five years. These include a combined sewer overflow treatment facility to store and treat effluent adjacent to the District's Westerly Wastewater Treatment Center; construction of the District's Heights-Hilltop, Northwest and Southwest Interceptors, which have reduced CSO discharges in various locations; floatables control netting facilities constructed at ten locations to reduce the amount of litter and debris being discharged from CSOs.

Recently, the District has overseen the construction of a number of CSO control "early action" projects in the Easterly and Westerly Treatment Plant areas, and more are planned in the Southerly Treatment Plant district. Ongoing construction of the Mill Creek Tunnel has dramatically reduced CSOs to Mill Creek. - See more at: <http://www.neorsd.org/cso.php#sthash.HwEgHjDp.dpuf>

A consent decree established between USEPA and NEORSD details plans that NEORSD is calling "Project Clean Lake" that include the long term control plans for CSO's in the sewershed. At the heart of the proposed Consent Decree is the construction of large-scale storage tunnels and treatment plant enhancements. NEORSD completed the tunnels for Mill Creek and Euclid Creek. The 5 remaining tunnel projects slated for construction include: the Dugway Tunnel, Shoreline Tunnel, Southerly Tunnel, Big Creek Tunnel and the Westerly Tunnel.

Also, the District has been given an opportunity to demonstrate the effectiveness of lower-energy treatment options through pilot demonstration projects, including stormwater control measures to store, infiltrate, and evapotranspire stormwater before it makes its way to the combined sewer system. Additionally, NEORSD will work with the City of Cleveland to assess the use of vacant lots for green infrastructure projects.

The City of Akron has a similar consent decree, making it a top priority for the city to reduce the overflows of CSOs within their management area. This has started with strategically placed storage basins, starting with Cascade Village. The \$8 million Cascade Village Storage Basin Project is underway and will be completed in 2015 (source: MWH Global). The 125-foot diameter circular basin tucked away behind the Cascade Village neighborhood will be made of concrete and will be able to hold at least 1.5 million gallons of storm water after heavy rainfalls and will eliminate 46 overflow events a year.

The City of Akron's Long Term Control Plan includes seven sewer separation projects, two large tunnels, 11 storage basins and improvements to the city's Water Reclamation Facility. The largest project will be construction of the Ohio Canal Interceptor Tunnel.

With Long-term Control Plans underway with measurable targets established for reduction in overflow frequencies and contribution of conditions that attribute to aesthetics and the status of the MS4s within the Cuyahoga AOC, all sub-watersheds within the Cuyahoga AOC have met the restoration targets for BUI 11.

With all MS4s permitted to the appropriate municipalities in the AOC, this also will allow removal of this impairment.

## Section II

### **The Status of Beneficial Use Impairments and Management Actions in the Cuyahoga River Area of Concern by HUC12 Subwatershed**

**Euclid Creek:** 041100030503

- Meets 5 of its 9 applicable targets

**Doan Brook (Doan Brook, Dugway Brook, Nine Mile Creek, Green Creek, Lake Erie Tributaries East):** 041100030504

- Meets 6 of its 9 applicable targets; 1 needs additional data

**Cahoon Creek- Frontal Lake Erie:** 041100010204

- Meets 2 of its 3 applicable targets

**City of Cleveland- Cuyahoga River (Navigation/Old River Channel):** 041100020605

- Meets 4 of its 10 targets; one needs additional data

**Town of Cuyahoga Heights (West Creek/Lower Cuyahoga):** 041100020604

- Meets 6 of its 8 applicable targets

**City of Independence (Lower Cuyahoga/CVNP):** 041100020602

- Meets 6 of its 8 applicable targets; 1 needs additional data

**Willow Lake- Cuyahoga River (Sagamore Creek, Cuyahoga/CVNP):** 041100020505

- Meets 6 of its 8 applicable targets; 1 needs additional data

**Boston Run- Cuyahoga River (Cuyahoga/CVNP, Sand Run, Middle Cuyahoga):**  
041100020405

- Meets 5 of its 8 applicable targets; 2 need additional data

**Mill Creek:** 041100020601

- Meets 5 of its 6 applicable targets

**Big Creek:** 041100020603

- Meets 4 of its 6 applicable targets; 1 needs additional data

**Headwaters Chippewa Creek:** 041100020503

- Meets 4 of its 6 applicable targets; 1 needs additional data; 1 has no data

**Town of Twinsburg- Tinkers Creek:** 041100020504

- Meets 4 of its 6 applicable targets; 1 has no data

**Headwaters Tinkers Creek:** 041100020502

- Meets 3 of its 6 applicable targets; 1 needs additional data; 1 has no data

**Pond Brook:** 041100020501

- Meets 3 of its 6 applicable targets; 1 has no data

**Brandywine Creek:** 041100020404

- Meets 4 of its 6 applicable targets; 1 needs additional data; 1 has no data

**Mud Brook:** 041100020401

- Meets 3 of its 6 applicable targets; 1 needs additional data; 2 have no data

**Furnace Run:** 041100020403

- Meets all 6 of its applicable targets

**Yellow Creek:** 041100020402

- Meets 4 of its 6 applicable targets; 1 has no data

**City of Akron- Little Cuyahoga River: 041100020304**

- Meets 3 of its applicable targets; 2 need additional data

**Wingfoot Lake – Little Cuyahoga River: 041100020303**

- Meets 3 of its applicable targets; 2 need additional data; 1 has no data

**Mogadore Reservoir – Little Cuyahoga River: 041100020302**

- Meets all 3 of its applicable targets

**Potential for Removing HUC 12 subwatersheds from the Area of Concern**

Furnace Run and Mogadore Reservoir-Little Cuyahoga subwatersheds meet all applicable targets and may be considered for removal from the Area of Concern.

City of Independence-Cuyahoga River, Willow Lake-Cuyahoga River, and Boston Run-Cuyahoga River meet all targets except BUI 10a Recreational Contact. As mainstem HUCs, they remain on Ohio’s list of impaired waters due to bacterial contamination. However, if it can be shown that the contamination is due to CSOs where an approved long-term control plan is in place, the BUI may be removed IF a Total Maximum Daily Use (TMDL) is approved and it can be shown that the level of bacterial contamination is not worse than similar watersheds. And the area cannot be impaired because of chemical contaminants. Note, however, that the position of these mainstem segments in the geographic center of the AOC, and the potential for changes in the status of other impairments once the two upstream dams, especially the Gorge Dam, are removed, may make the case to retain these HUCs in the AOC for the time being.

Cahoon Creek-Frontal Lake Erie may be considered for removal due to the only impairment being related to the section of Lake Erie shoreline otherwise falling under the “CSO long term control plan” criteria.

Chippewa Creek, Brandywine Creek, and Mud Brook all need additional sampling to provide data that may place them in a position to be removed.

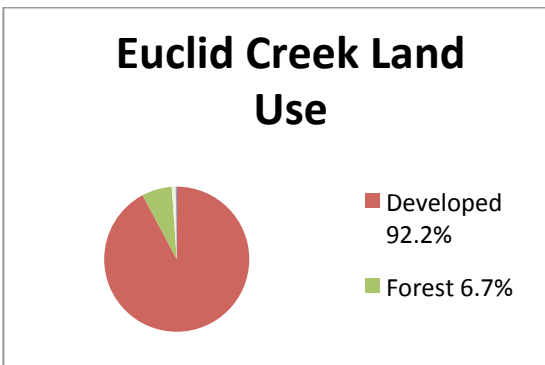
**Euclid Creek**  
**041100030503**

**Associated Tributaries:**

- Euclid Creek

**Overview:**

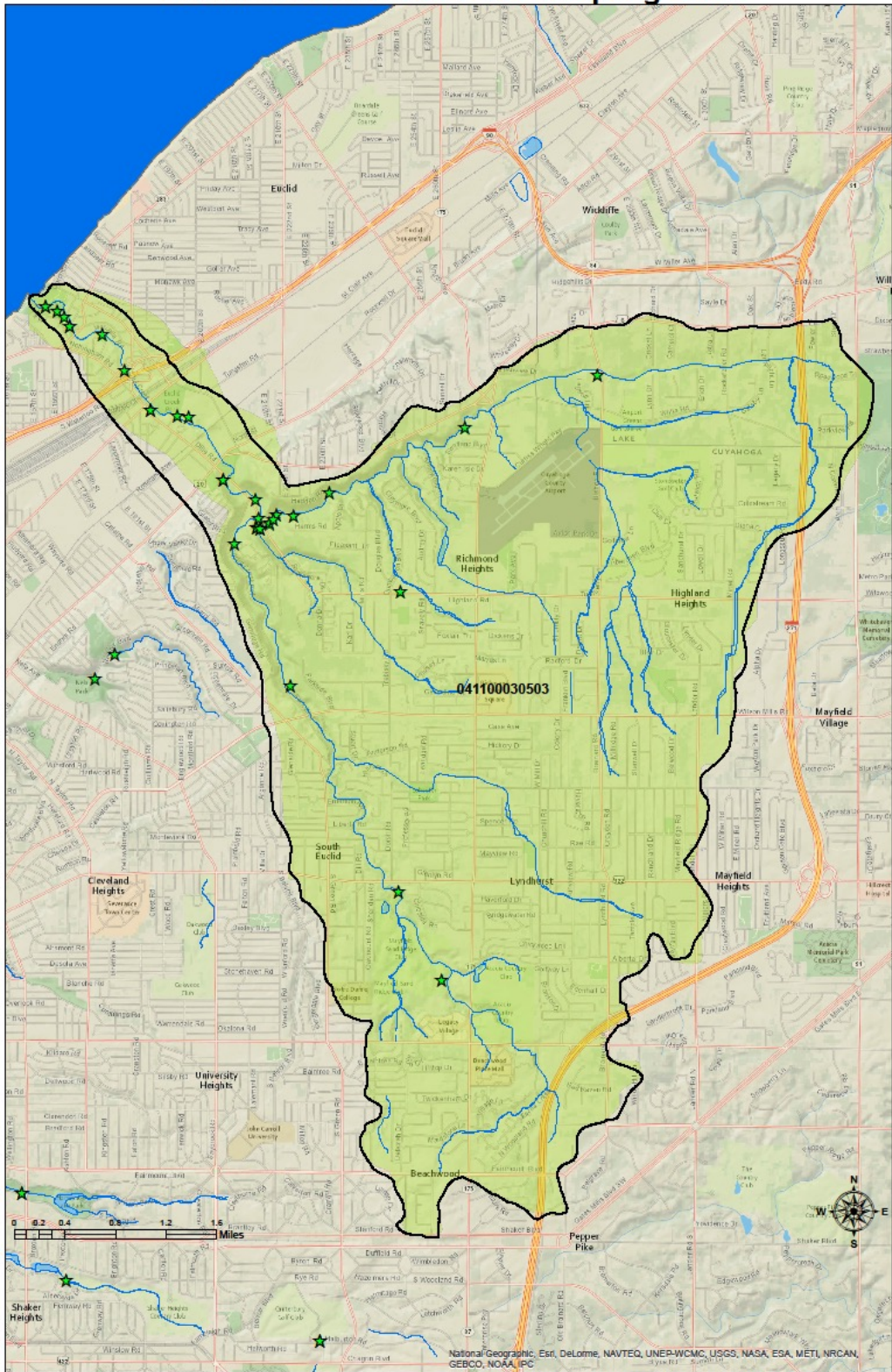
Euclid Creek, with an area of 23.31 square miles, is the 13<sup>th</sup> largest HUC12 in the AOC. It is designated as a “Frontal Lake Erie” HUC12. The majority of the land in this subwatershed is fully developed (92.2%). The 6.7% forest cover is located mainly near the waterways, which allows for some restoration potential throughout its stretches of streams.



**BUIs applicable to Euclid Creek are: 1, 3a, 4, 6, 8, 10, 11, and 14a**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (RecreationContact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Euclid Creek	041100030503	Meets Target	DOES NOT Meet Target	DOES NOT Meet Target	DOES NOT Meet Target	N/A	Meets Target	DOES NOT Meet Target	Meets Local Goals	Meets criteria to begin process for removal	Meets Target

# Euclid Creek's HUC12 BUI Sampling Sites



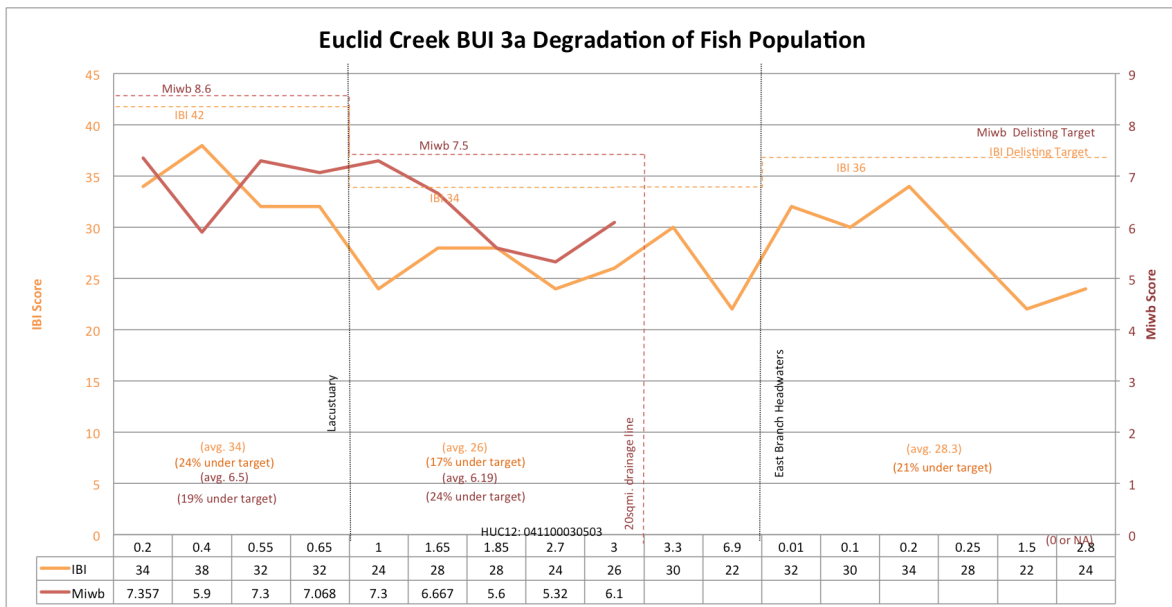
**Specific BUI Statuses for Euclid Creek:**

**BUI 1- Restrictions on Fish Consumption:**

All areas of the Cuyahoga River and surrounding Lake Erie tributaries are within attainment levels for delisting. This includes all areas of this HUC12.

**BUI 3a- Degradation of Fish Populations:**

This HUC 12 is unique in that it has each sampling type and target involved throughout its boundaries. These are an IBI score of 42 and MIwb score of 8.6 for Lacustrary, an IBI score of 34 and MIwb score of 7.5 for wading, and an IBI score of 36 for Headwaters outlined in the Ohio EPA Delisting Guidance (no MIwb score is necessary for headwaters below 20sq miles of drainage. This subwatershed is well below attainment numbers for delisting BUI 3a.



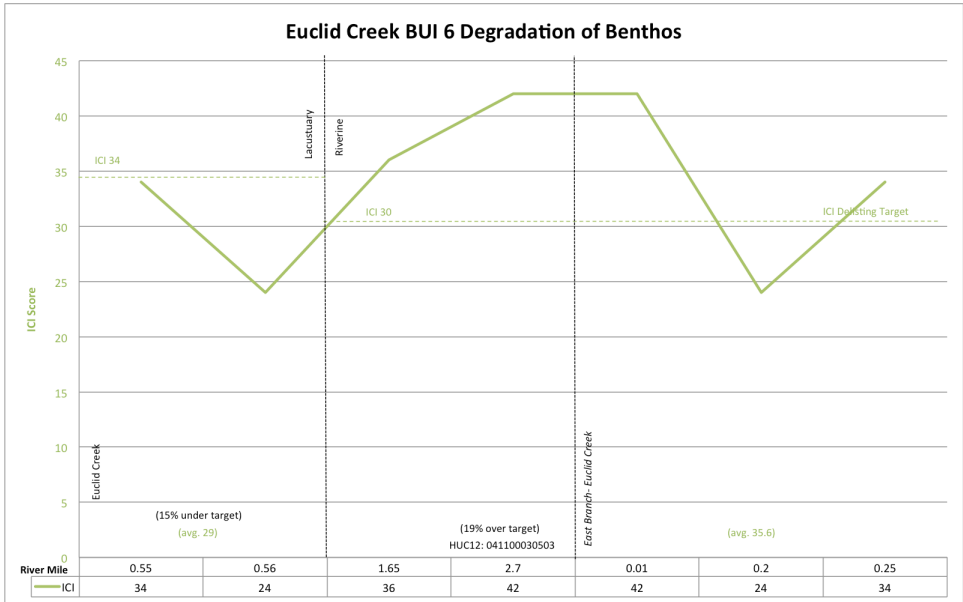
**BUI 4- Fish Tumors and Other Deformities:**

The delisting target for this BUI is a DELT value of 3% or below (1.3% in wading sites). A 2013 sample for liver neoplasms at the near shore area of Euclid Creek, showed a 12.5% prevalence rate, indicating that this BUI is not yet delistable, and more monitoring is needed.

**BUI 6- Degradation of Benthos:**

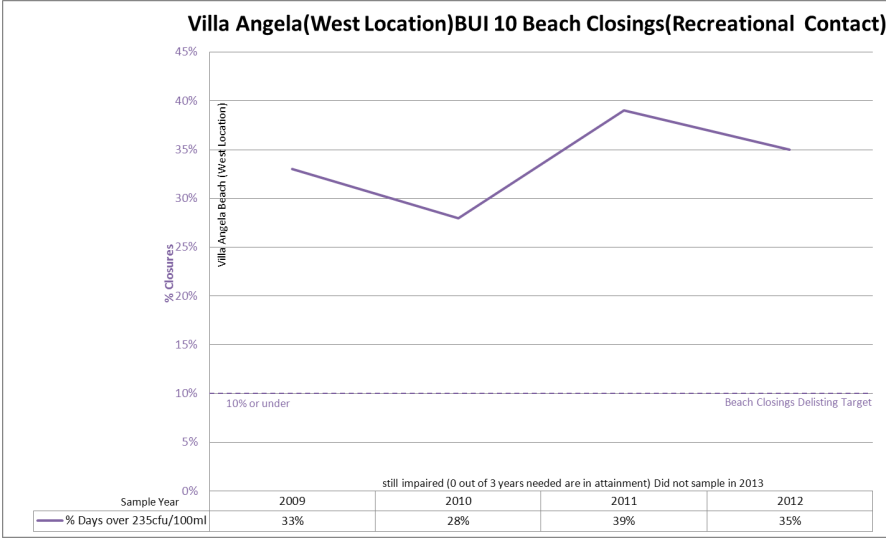
The delisting target for this BUI is an ICI score of 30 in Riverine sites. The average Riverine score here is 36, or 20% above the target. The ICI target for lacustrary areas is 34. The average score of the two lacustrary sampling sites is 29, or 15% below target.

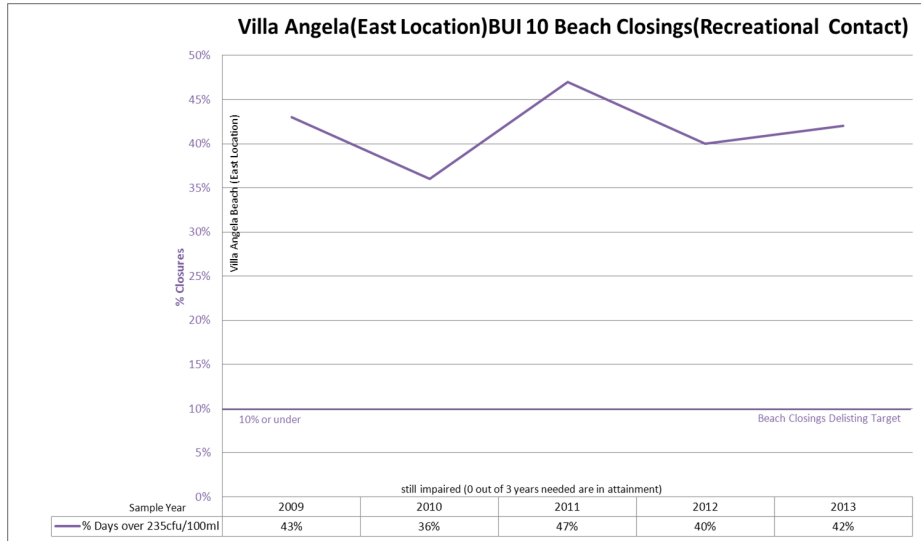




**BUI 8- Eutrophication or Undesirable Algae:**  
 No persistent nuisance growths algae reported. This HUC meets delisting criteria.

**BUI 10 - Beach Closings (Recreational Contact):**  
 This BUI’s delisting targets require beach advisories due to bacterial contamination to be issued for fewer than 10% (19 days) of the recreational season. This must be recorded in 3 out of the 5 most recent years. The 10% target has been met in only 1 of the last 5 years. However, where Combined Sewer Overflows (CSOs) are the primary cause of impairment, this BUI can also be considered restored when the bacterial impacts from CSOs are being addressed under a long term control plan. The Northeast Ohio Regional Sewer District currently is operating a long term control plan. Once the Euclid Creek tunnel is completed and sampling shows that it brings a reduction in bacteria counts this BUI can be considered for delisting.



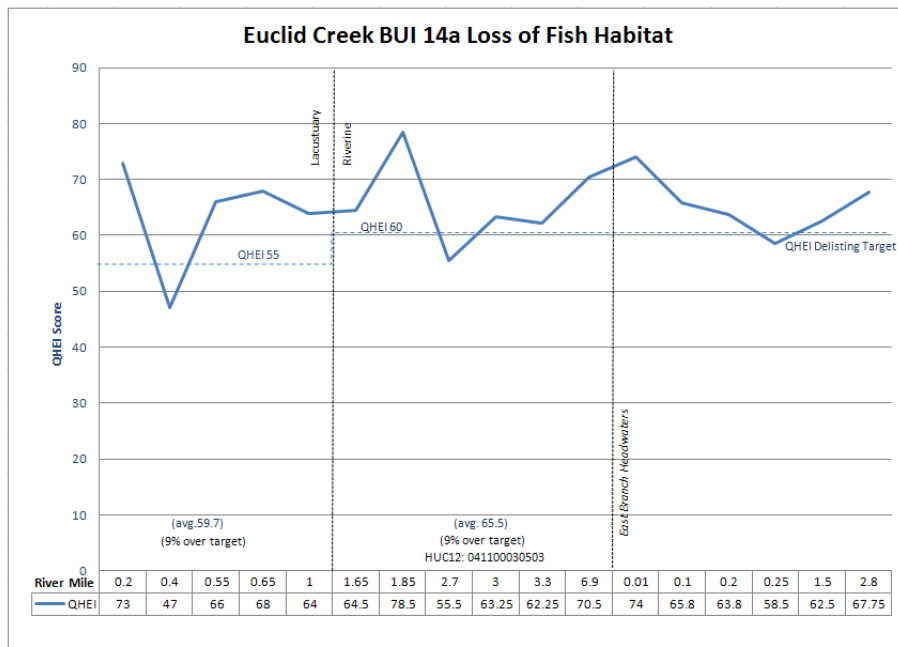


**BUI 11- Degradation of Aesthetics:**

The aesthetics BUI in this HUC12 appears to be within delisting ranges. Although there have been occasional reports of unusual discharges in discrete areas, they have neither been regular nor significant, and there have been no known persistent occurrences of floating scum or substances. A sampling protocol is being developed for the entire AOC, which will validate these findings and we expect will lead to removal of this BUI shortly.

**BUI 14a- Loss of Fish Habitat:**

The delisting target for this BUI is a QHEI score of 55 for lacustrine and 60 for wading/headwaters. The average lacustrine score here is 60, or 9% above the target. The average riverine (wading/headwaters) score of 65.5 is also 9% over the target. This subwatershed is within attainment for removing BUI 14a.



### **Overview BUI Status for Euclid Creek:**

The non-attaining BUIs in the Euclid Creek HUC are fish populations, deformities, and beach closings.

Barriers to fish passage in the form of dams, spillways, and especially culverts that take the creek under I-90, reduce the ability to meet fish population targets. The shallow character of the main stream segments also contributes to reduced fish communities.

More needs to be learned about the sources of deformities and tumors found in fish in the area closest to the lake, in order to determine if the source is within the HUC or the lake.

Although it is a direct Lake Erie tributary, Euclid Creek is included in the Cuyahoga River AOC so as to provide the opportunity to monitor the Euclid and Villa Angela beaches and because nearshore Lake Erie's health is affected by the conditions in this watershed. Conditions in the lower watershed are greatly impacted by NEORSD's CSOs. It is expected that over time, as CSOs are reduced, this will allow for removal of this BUI.

### **Future actions needed to improve Euclid Creek and remove BUIs:**

- Removal of the E. 185<sup>th</sup> St. spillway and other dams further up in the watershed
- Study of the sources of liver tumors in fish
- Nutrient runoff reduction strategies in heavily landscaped areas
- Completion of CSO reductions and ongoing monitoring to identify remaining sources of bacteria causing beach closings.

## Projects

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15				
Acacia Phase 1	041100030503	Euclid Creek	Cleveland Metro parks	WRRSP	June 2014 / Oct. 2015	\$375,000				3-6	Funded for implementation, 2015
<p>The project is located downstream of Beachwood Place mall and was formerly Acacia golf course. This project involves reconnection of Euclid Creek to its floodplain through a combination of channel invert fill and the creation of floodplain benches. Installation of natural riparian vegetation within the corridor of this 1,200 linear feet of stream will be incorporated. This project will not only reduce erosion and improve fish/benthos habitat, but a pre-treatment area will be created at the beginning of the project to prevent contaminants from the mall from flowing into the restoration area.</p>											
Acacia Phase 2	041100030503	Euclid Creek	Cleveland Metroparks	GLRI	Oct. 2015 / Dec. 2016		\$375,000		Yes	3-6	Funded for design, 2015
<p>Continuation of phase one. The focus for this project is bank stabilization and habitat restoration within an additional 2,100 linear feet of Euclid Creek.</p>											
Richmond Road Dam Decommission	041100030503	Euclid Creek	Cuyahoga SWCD				NA			3-6	
<p>Removing or bypassing this dam would open fish passage in Euclid Creek and normalize stream flow</p>											
East 185th Spillway	041100030503	Euclid Creek	Cuyahoga SWCD	USACE			Study-\$300,000 Design/Const \$2,160,650			3-6	Feasibility Study Pending
<p>Project would remove or bypass spillway south of I-90 to allow fish passage.</p>											
David Myers Parkway Dam	041100030503	Euclid Creek	Cuyahoga SWCD				NA			3-6	
<p>Removal or retrofit of 3'-4' dam on tributary of Euclid Creek Main Branch off Cedar Rd in Beachwood.</p>											

## Projects, continued

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15	FFY16			
Dumbarton Dam Removal	041100030503	Euclid Creek	Cuyahoga SWCD				NA			3-6-14	
Removal of 12'-14' dam structure on East Branch											
Mayfair East Branch Reforestation and Dam Removal	041100030503	Euclid Creek	Cuyahoga SWCD				\$1.2 million			3-6-14	Concept plan. Need conservation easements with adjacent property owners.
Remove dam and restore 1,600 linear feet of stream											

**Doan Brook**  
**041100030504**

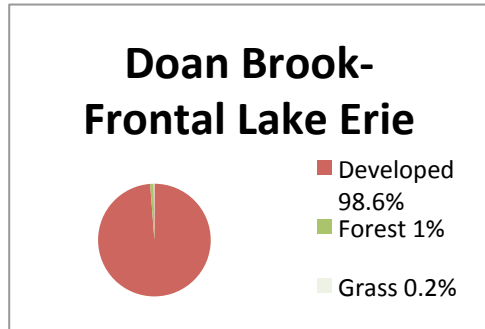
**Associated Tributaries:**

- Doan Brook
- Dugway Brook • Ninemile Creek • Green Creek
- Lake Erie Tributaries- East

**Overview:**

Doan Brook, with an area of 45.29 square miles, is the 3<sup>rd</sup> largest HUC12 in the AOC, a direct Lake Erie tributary designated as a “Frontal Lake Erie” HUC12. The land in this subwatershed is almost completely developed (98.6%), making it extremely unlikely that major portions of the HUC will ever see restoration of the waterways to a level where existing targets could be met.

The exception to this is Doan Brook itself, which forms the spine of the HUC, and where there are opportunities for significant restoration. The Brook begins in urbanized communities, but gains a natural foothold as it runs through the Shaker Lakes district and through its gorge from the heights to the lake plain. It enters University Circle underground, but soon daylights again flowing in a tight channel as the centerpiece of Rockefeller Park, only to submerge again under I-90. It flows out to Lake Erie through a pipe beneath Cleveland Lakefront Nature Preserve, a former confined disposal facility for the Cuyahoga River’s dredged sediment that has been naturalized to provide an oasis of nature and a significant site on the flyway for migrating birds.

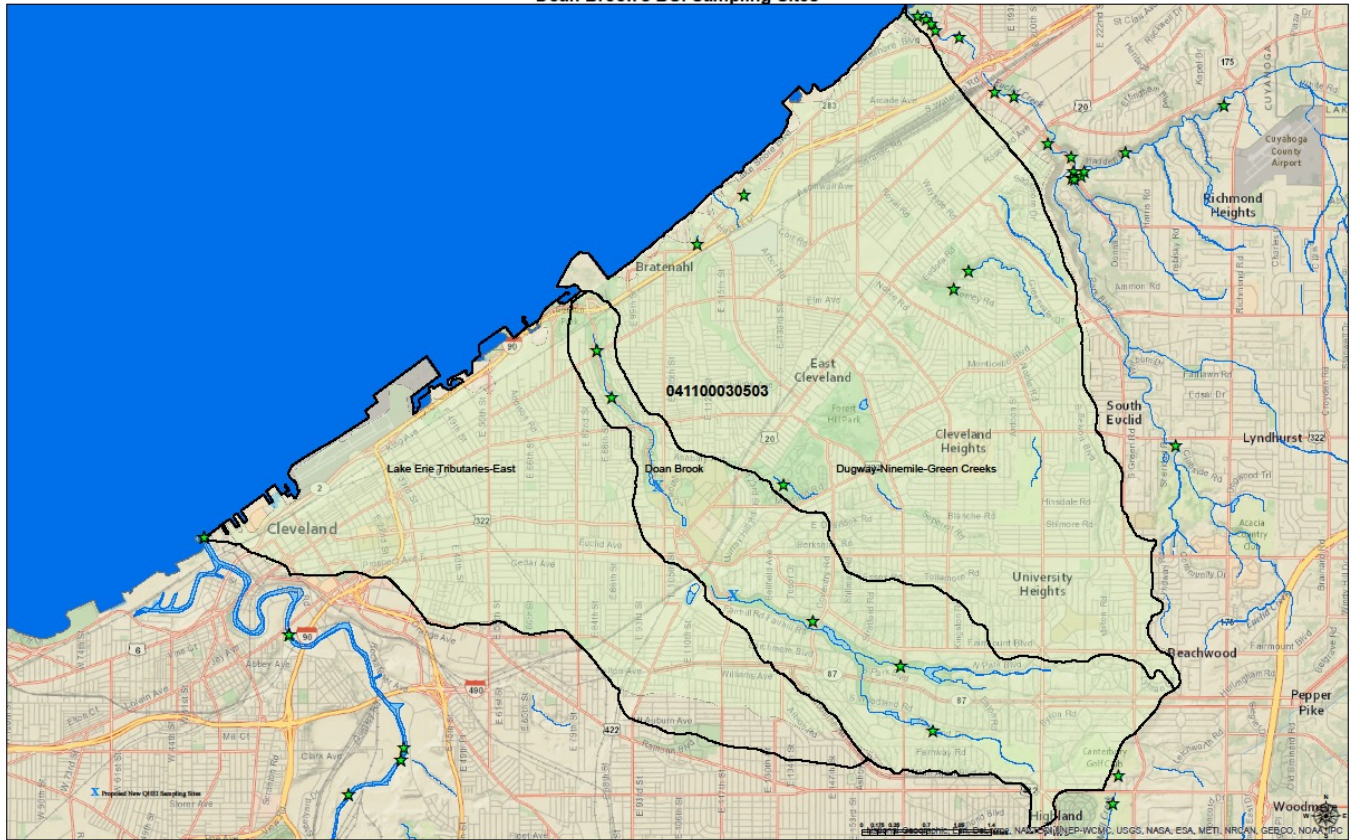


**BUIs applicable to Doan Brook are: 1, 3a, 4, 6, 8, 10, 11, and 14a**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (Recreation Contact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Doan Brook	041100030504	Meets Target	DOES NOT Meet Target	Meets Target	Needs More Data	N/A	Meets Target	DOES NOT Meet Target	Meets Local Goals	Meets criteria to begin process for removal	Meets Target



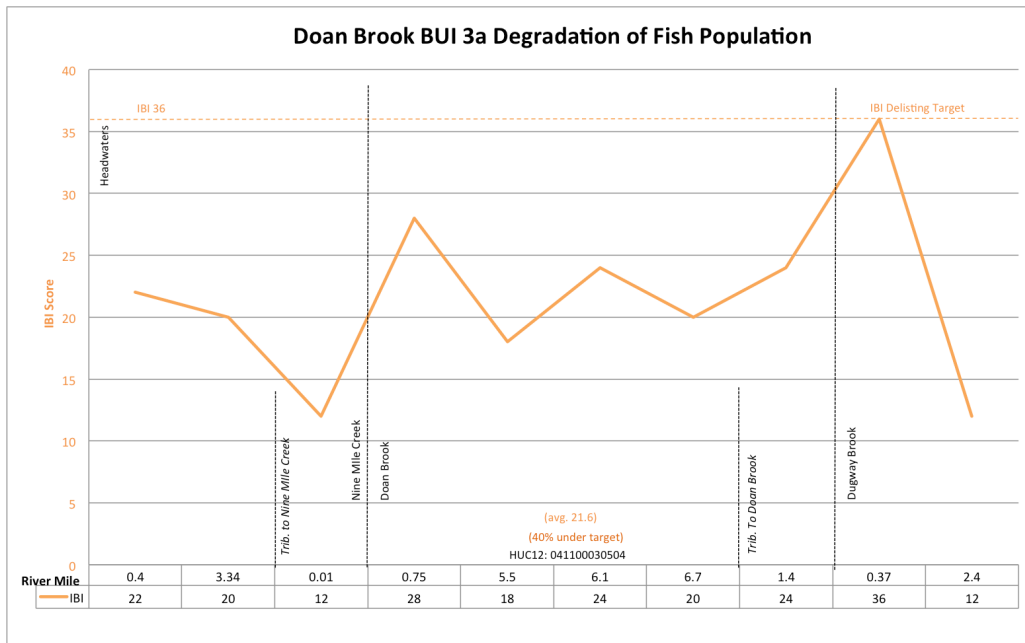
Doan Brook's BUI Sampling Sites



Specific BUI Statuses for Doan Brook:

**BUI 3a- Degradation of Fish Populations:**

The delisting target for this HUC 12 is an IBI score of 36 for Headwaters (no MIwb score is necessary for headwaters below 20sq miles of drainage). The average of headwaters scores, in this subwatershed where headwaters is the single sample type, is 40% below the delisting target. This subwatershed is well below attainment for BUI 3a.

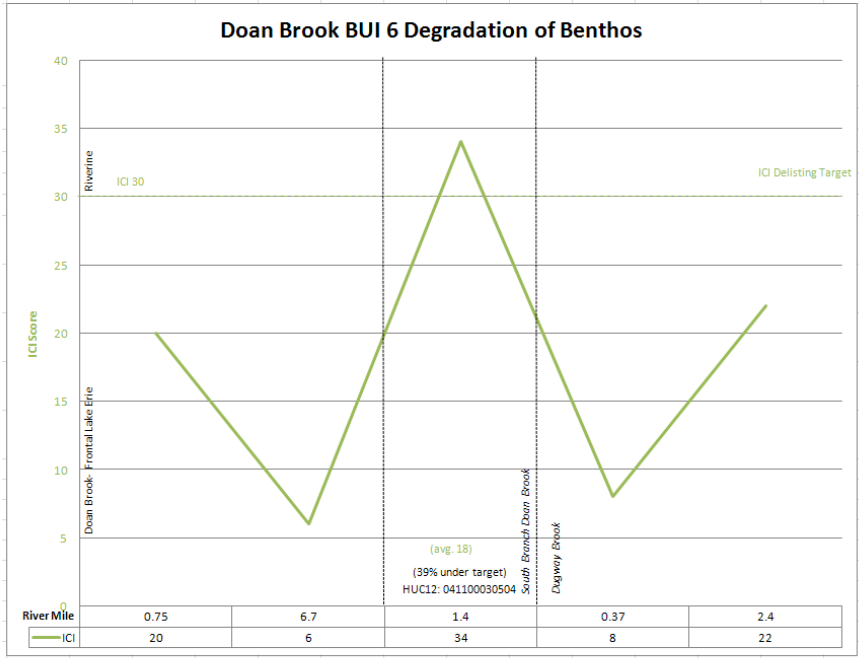


**BUI 4- Fish Tumors and Other Deformities:**

The delisting target for this BUI is a DELT value of 3% or (1.3% in wading sites). For the sites sampled in Doan Brook, the average DELT value is close to .0109% for the subwatershed, putting this subwatershed within attainment levels for delisting BUI 4. This number was derived from DELT sampling data from 2013-14. Long term monitoring is needed to substantiate this.

**BUI 6- Degradation of Benthos:**

The delisting target for this BUI is a score of 30 for ICI (34 in lacustrary). The average of scores in the five sampling sites is 39% below target levels. It should be noted that there are only 5 credible data sites currently available in this HUC12 – three for Doan Brook and two for Dugway Brook. There should be at least 10 sites in order to give a full representation of the subwatershed.

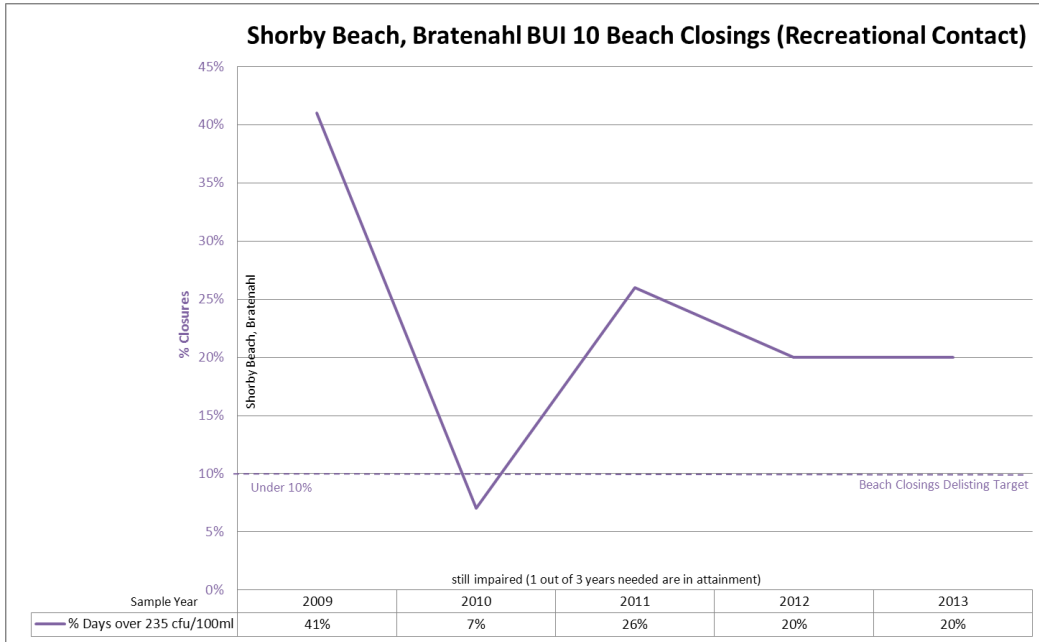


**BUI 8- Eutrophication or Undesirable Algae:**

No persistent nuisance growths algae reported. This HUC meets delisting criteria.

**BUI 10- Beach Closings:**

This BUI’s delisting targets are beach advisories due to bacterial contamination occurring on fewer than 19 days (10%) of the recreational season. The target must be met in 3 out of the 5 most recent years. This BUI can also be considered restored if CSOs are the primary cause of impairment and bacterial impacts from CSOs are being addressed under a long term control plan. The Northeast Ohio Regional Sewer District currently is operating under a long term control plan, so that, using this criteria, the target would be met in this HUC12.

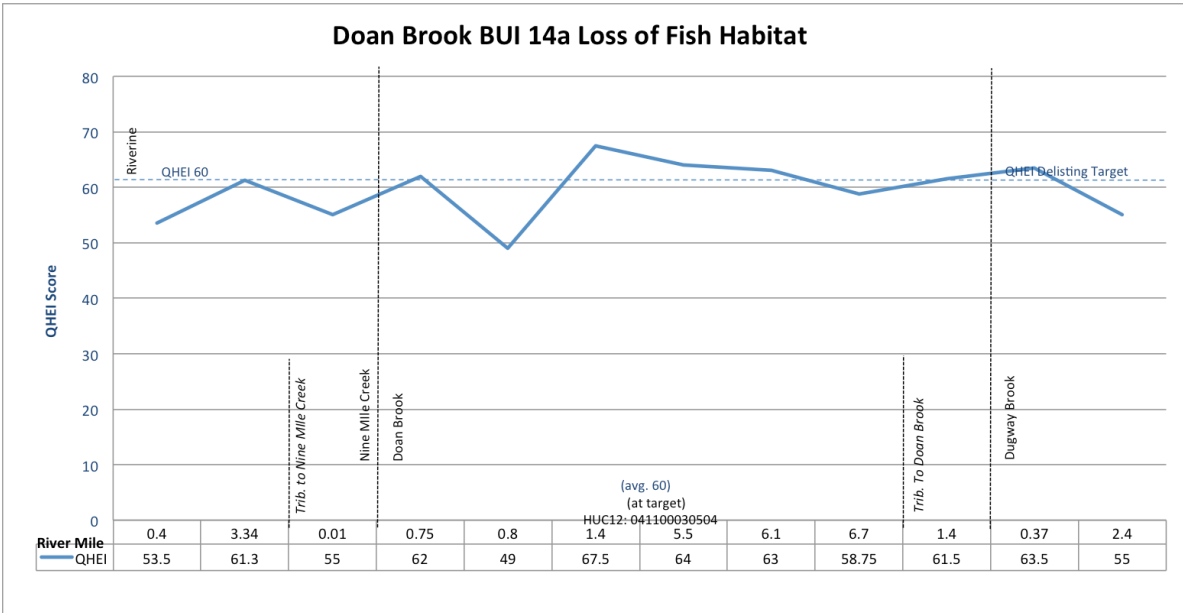


**BUI 11- Degradation of Aesthetics:**

The Aesthetics BUI in this HUC12 is in large part affected by the NEORS D’s CSOs. NEORS D is taking measures to ensure the reduction of all of the CSOs in its sewershed. Green Infrastructure and low energy treatment options are providing improvements while the long term plan is executed. No persistent noxious substances have been reported, and a protocol for validating the presence or absence of aesthetic impairments is being developed. We expect removal of this BUI in the near future.

**BUI 14a- Loss of Fish Habitat:**

The delisting target for this BUI is a QHEI score of 60 for both wading and headwaters, the sole sampling types in the HUC12. The average score is 60, putting it just at the delisting target level. This Lake Erie tributary’s fish habitat is within attainment range for delisting BUI 14a. Future restoration efforts and changes in land use may put the scores further above or below the target, so regular sampling is needed.



**Overview BUI Status for Doan Brook:**

Doan Brook is one of three direct Lake Erie tributary HUC12s in the Cuyahoga River AOC.

This HUC12 is not within attainment levels for delisting. Fish populations, Benthos, and Beach Closings are the BUIs that currently do not meet delisting goals.

Looking at Doan Brook itself, at sampling sites at River Mile .75 and 6.7 for example, QHEI scores for fish habitat are acceptable, but ICI scores for benthos and IBI scores for fish populations are low. This would indicate that there may be structural barriers that keep fish and benthos from inhabiting the sampled sites in this part of the HUC12. Having the mouth of Doan Brook submerged under Dike 14, and the existence of check dams along the Rockefeller Park stretch of Doan Brook, might account for this and might indicate where attention should be placed to remedy this situation.

The heavily urbanized character of the rest of the HUC12 – Dugway Brook, Nine Mile, and Green Creeks in the eastern third of the HUC, and the east side of Cleveland to the west of Doan Brook – have the waterways bound almost completely in pipes, so that restoration opportunities are fairly nonexistent.

**Future actions needed to improve Doan Brook and remove BUIs:**

Ongoing sampling is needed to focus priorities on areas that could conceivably reach attainment. Identification of areas that are so heavily impounded they could never reach attainment may be the appropriate next step, and those areas assigned an alternative delisting target based on this characterization. A proper number of sites with credible data per BUI, as necessary, should be up to date and scores calculated yearly to show progress of the HUC12.

## Projects

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15				
Trash Rack Removal	041100030504	Doan Brook-Frontal Lake Erie	DBWP NEORS	Sustain Our Great Lakes	May 2014 / Oct. 2015	\$180,000			Yes	3 - 6	Funded, underway
Located upstream of MLK Blvd. The debris rack has failed and is a source of impairment. This trash rack prevents the natural movement of bed-load and is the cause of erosion issues and significant sediment loads to Doan Brook.											
Check Dams Altered	041100030504	Doan Brook-Frontal Lake Erie	DBWP NEORS	Requesting GLRI	May 2014 / Oct. 2014	\$150,000			Yes	3 - 6	Funded for Design, 2015
This project is located upstream of Gordon Park, west of East 105th St. These check dams restrict fish migration, demonstrate lack of habitat for aquatic life and contribute to erosion. Alterations of the check dams is part of a Phase 1 process to remove sections of the check dams to allow flow.											
Sowinski Park	041100030504	Doan Brook-Frontal Lake Erie	DBWP NEORS	Requesting GLRI	Aug. 2014 / Dec. 2015	1.5 Million			Yes	3 - 6	Funded for Design, 2015
This project is located at the northern end of Doan Brook, along Martin Luther King Drive. Restoration consists of reconnecting floodplains / creating wetlands, bank stabilization, create fish / benthos habitat, plant native vegetation within the riparian area											
Cleveland Lakefront NP/ Mouth of Doan Brook	041100030504	Doan Brook-Frontal Lake Erie	DBWP NEORS							3 - 6	Funded for Concept planning, 2015
Project would open the mouth of Doan Brook, which is currently buried under CLNP and I-90, to support fish passage and extend habitat. Funding needed for feasibility/strategies study.											
South Branch Restoration through Canterbury Golf Club	041100030504	Doan Brook-Frontal Lake Erie	DBWP NEORS							3 - 6	
Intent is to restore / enhance headwaters											



## Projects, continued

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15				
Forest Hills Dugway Restoration	041100030504	Doan Brook-Frontal Lake Erie	TBD				Concept Inventory \$25,000 estimate			3-6	Project sites identified by local group for evaluation.
Conceptual Planning to identify stream restoration opportunities within Forest Hills Park and subsequent corridor of the Eastside Greenway route for enhancement and habitat improvements.											
Nearshore Habitat Beneficial Reuse	041100030504	Doan Brook-Frontal Lake Erie	CRCPO-ODNR-TNC-USACE	GLRI/NOAA			\$50,000 (estimate for planning)			3-6-14	Initial Scoping/ Feasibility planned for 2015-2016
Develop a comprehensive Nearshore Habitat Beneficial Reuse Feasibility Plan. Conduct inventory and identify priority areas and feasibility to expand nearshore habitat zones within AOC.											

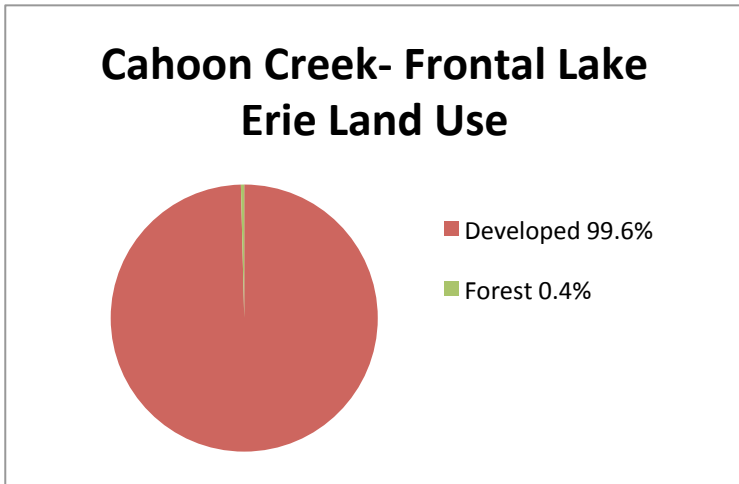
## Cahoon Creek- Frontal Lake Erie 041100010204

### Associated Tributaries:

- Lake Erie Tributaries- West

**Overview:**

Cahoon Creek is an oddity in the Cuyahoga River AOC, in that only approximately half of the HUC12, the eastern section between the mouth of the Rocky River and the mouth of the Cuyahoga, is included in the AOC. All of Cahoon Creek drains directly to Lake Erie, yet there are no daylight streams that run through this fully-developed subwatershed. This portion of the HUC12 was included for the primary purpose of monitoring Edgewater Beach and nearshore Lake Erie, which includes the Northeast Ohio Regional Sewer District’s Westerly Treatment Plant, Whiskey Island and Wendy Park. No sampling is done here other than monitoring beach closing data.



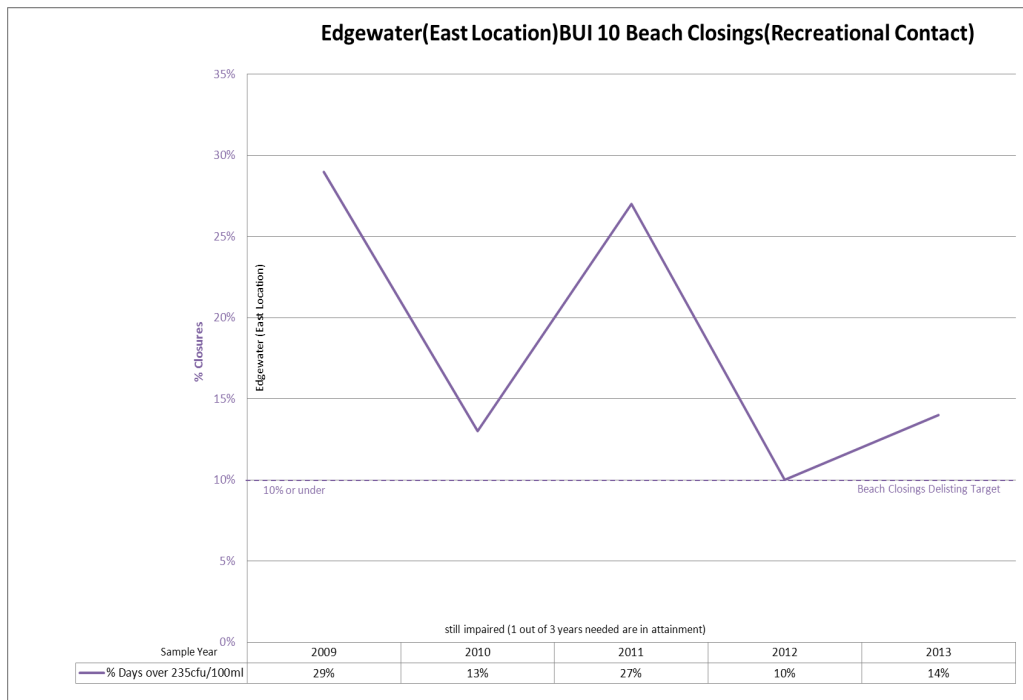
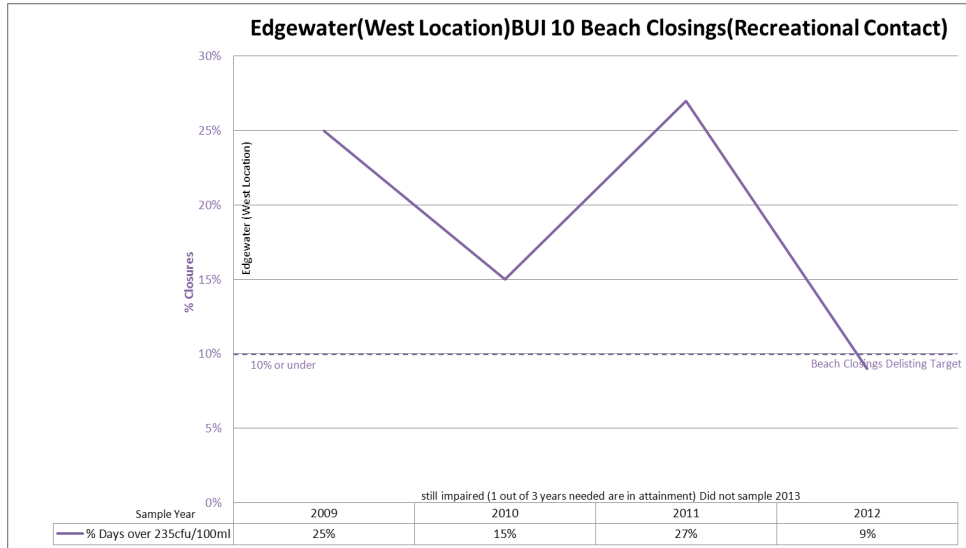
**BUIs applicable to Cahoon Creek are: 10, 11**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (RecreationContact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Cahoon Creek / Frontal Lake Erie	041100010204	Meets Target	N/A	N/A	N/A	N/A	N/A	DOES NOT Meet Target	Meets Target	N/A	N/A

## Specific BUI Status for Cahoon Creek:

### BUI 10- Beach Closings:

This BUI's delisting target is beach advisories due to bacterial contamination occurring on fewer than 19 days (10%) of the recreational season. The target must be met in 3 out of the 5 most recent years. This BUI can also be considered restored if CSOs are the primary cause of impairment and bacterial impacts from CSOs are being addressed under a long term control plan. The Northeast Ohio Regional Sewer District currently is operating under a long term control plan, so that, using this criteria, the target would be met in this HUC12.



**BUI 11 - Degradation of Aesthetics:**

The Aesthetics BUI in this HUC12 is solely affected by the NEORSD's CSOs. NEORSD has taken measures under a long term control plan, to ensure the reduction of all of the CSOs in its sewershed.

With no persistent noxious substances observed, and a protocol for validating such findings in development, this BUI is may be removed in short order.

**Overview BUI Status for Cahoon Creek:**

With the only impairments those related to beach closings and aesthetics, it is feasible to consider removing this HUC from the Area of Concern. If the Beach Closing target that uses the CSO long term control measures is applied, that BUI can be considered to have reached its target. Once official observations are made that verify no persistent instances of noxious substances or algae, that BUI can be considered delistable.

**Future actions needed to improve Cahoon Creek and remove BUIs:**

Ongoing monitoring will be needed to confirm attainment of the targets.

## City of Cleveland- Cuyahoga River

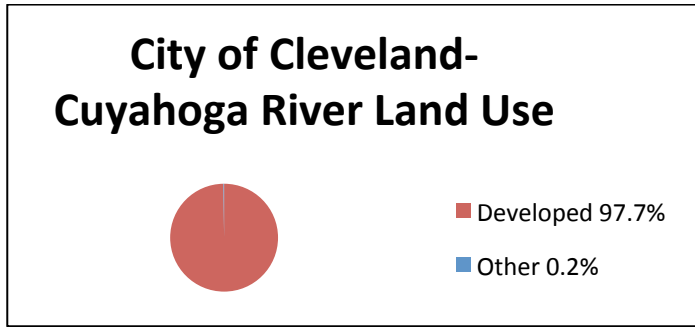
041100020605

**Associated Tributaries:** Cuyahoga River Navigation Channel

**Overview:**

The City of Cleveland- Cuyahoga River subwatershed, with an area of 23.58 square miles, is the 12<sup>th</sup> largest HUC12 in the AOC. It extends from the mouth of the river to river mile 7.1. With 97.7% of the land developed and highly urbanized or industrial, there are no streams of sufficient size outside the mainstem to warrant sampling. Therefore, no current or historical data is available for sites outside of the main channel.

The Federal Navigation Channel is used daily for shipments of bulk materials by large vessels to ArcelorMittal Steel, Marathon Oil, and other industrial facilities, and for offloading of sand, concrete, and other construction materials. This HUC also includes new office, commercial, entertainment, recreational, and residential uses, especially toward the mouth of the river in “the flats.”



**The Beneficial Use Impairments that apply to City of Cleveland- Cuyahoga River are: 1, 3a, 4, 6, 8, 10, 11, and 14a**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging Sediment	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (Recreation Contact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
City of Cleveland- Cuyahoga River (Navigation Channel, Old River Channel)	041100020605	Meets Target	DOES NOT Meet Target	DOES NOT Meet Target	NEEDS MORE DATA	DOES NOT Meet Target	Awaiting Evaluation	DOES NOT Meet Target	Meets Local Goals	Meets Target	Meets Target

# Cuyahoga Nav Channel's HUC12 BUI Sampling Sites



**BUI 1- Restrictions on Fish Consumption:**

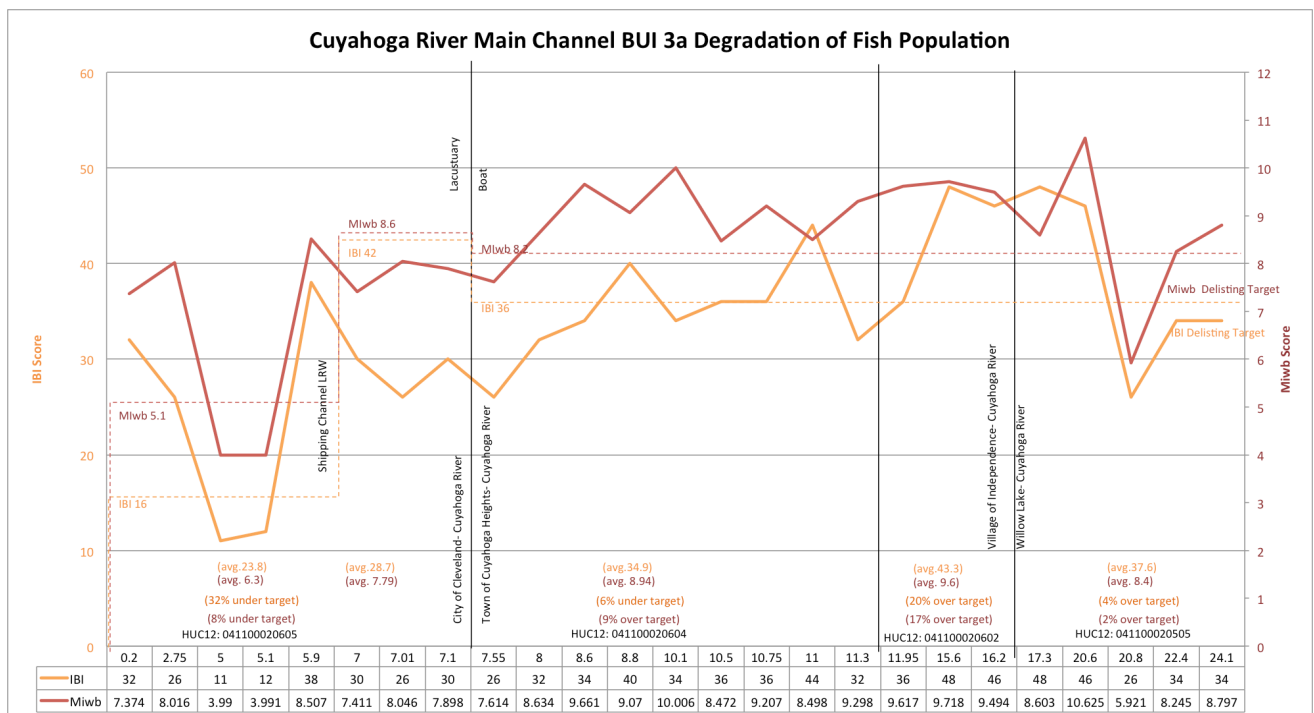
All areas of the Cuyahoga River and surrounding Lake Erie tributaries are within attainment levels for delisting. This includes all areas of this HUC12.

**BUI 3a- Degradation of Fish Populations:**

The first 5.9 river miles of this HUC12 lie within the Federal Navigation Channel, which is designated as lake-affected Limited Resource Waters (LRW), which has targets of 16 for IBI and 5.1 for MIwb. The average IBI score in the LRW area is 23.8, putting it above the target. The average MIwb here is 6.37, also above the target. The average MIwb here is 6.37, also above the target.

However...for lacustuary sites, the delisting target for this BUI is an IBI score of 42 and MIwb score of 8.6. The average IBI here is 28.7, or 32% below the target. The average MIwb here is 7.8, or 9% below target.

In spite of the lower targets for the LRW area, this HUC does not meet delisting targets for fish populations due to the low lacustuary scores.



In the navigation channel itself, the section with the lowest fish counts is the area at the upper half of the shipping channel, where the dredged depth is 23', the shoreline is almost completely bulkheaded, habitat is almost nonexistent, CSO discharges affect water temperatures, and the frequent disruption caused by the maneuvering of large freighters create conditions inhospitable for fish.



**BUI 4- Fish Tumors and Other Deformities:**

The delisting target for this BUI is a DELT value of 3% or lower for lacustuary areas, or 5% in the case of neoplastic or preneoplastic liver tumors in the Old River Channel where Brown Bullheads are present.

2013/14 sampling of this HUC12 has shown a DELT value of .0097% and a DELT value of 1.65% in the Old River Channel, which is well below the delisting targets outlined in the Ohio EPA’s Guidance for Delisting.

It should be noted that the Liver Neoplasm % in the Old River Channel is calculated at 3.7%, and 8.3% in the Mainstem Cuyahoga according to the recently published Attainment Study of the Fish Tumor and Other Deformities BUI report by the Ohio EPA. That number comes from a 2012 study of the Old River Channel. This HUC12, with that number in mind, is still within the delisting targets for removing BUI 4.

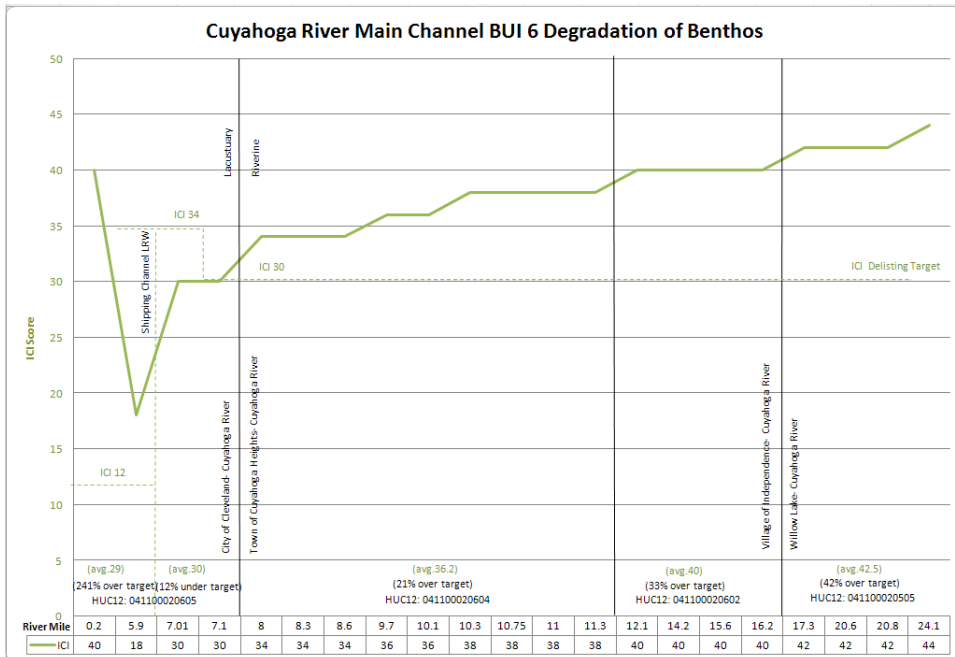
Additional initiatives underway by the Port of Cleveland, City of Cleveland, and USEPA to remove the remnants of toxic sediment in the Old River Channel are intended to remove the source of contamination, which should promote a reduction in brown bullhead liver tumors in the future.

**BUI 6- Degradation of Benthos:**

The first 5.9 river miles of this HUC12 lie within the Federal Navigation Channel LRW area that has an ICI target of 12. The average score here is 29, well above the target. The delisting target for this BUI in lacustuary areas is an ICI score of 34. The average score here is 30, or 12% below the target.

Due to the lacustuary scores, this HUC does not meet delisting targets.

It should be noted that there are only 4 credible scores for this HUC12. This number should be between 7-9 scores for a good representative sample of the subwatershed according to the Geometric Sampling Design outlined in Part 1 of this report.



**BUI 8- Eutrophication or Undesirable Algae:**

Currently waiting for data on seasonal averages.

**BUI 10a Beach Closings (Recreational Contact):**

The Cuyahoga River ship channel is on the 303(d) list of Class A streams, so this part of the HUC is not in attainment for BUI 10. The river from the mouth (through the Shipping Channel) is impaired with Polychlorinated Biphenyls (PCBs) in fish tissue according to a 2008 study, and suffers from high bacteria levels when Combined Sewer Overflows discharge in several places after heavy rains.

This HUC12 currently does not meet the restoration target for BUI 10a.

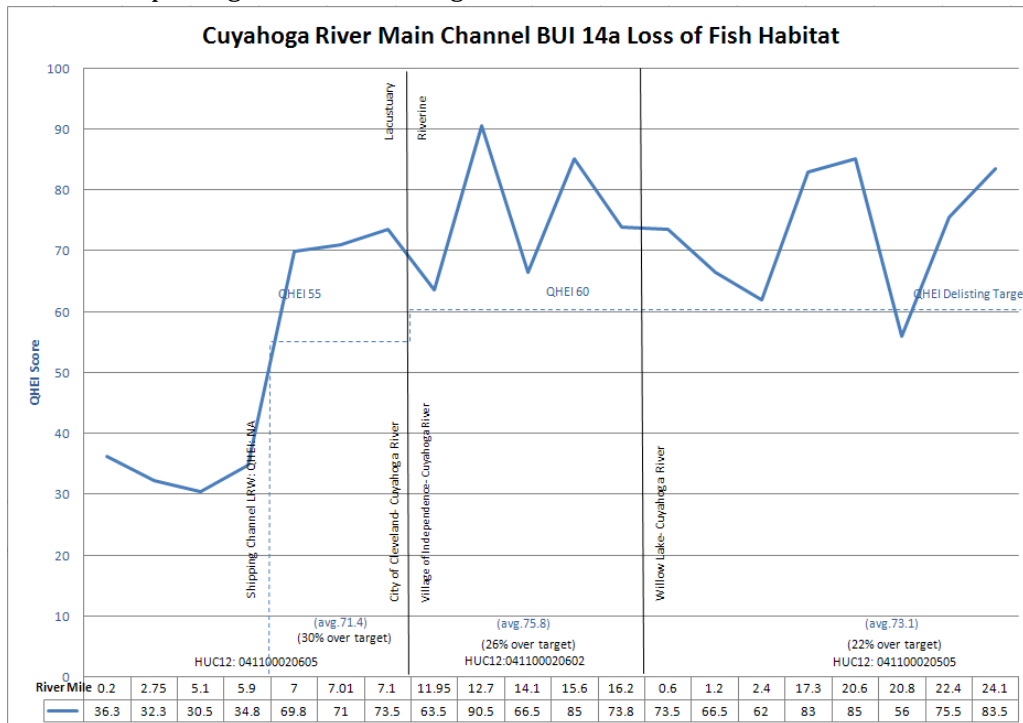
**BUI 11- Degradation of Aesthetics:**

The Aesthetics BUI in this HUC12, being more of a subjective impairment in regard to long term plans and short term measures, is in good shape. It is solely affected by the NEORS D’s CSOs. NEORS D has taken measures, and is taking further measures, to ensure the reduction of all of the CSOs in its sewershed. In the short term, the Green Infrastructure and low energy treatment options are providing improvements while the long term plan is executed. This entails the 7 large scale storage tunnels intercepting storm overflows.

In this HUC12, and throughout the AOC, this BUI will be studied to begin the process of removing it from the list of impairments.

**BUI 14a- Loss of Fish Habitat:**

The first 5.9 river miles of this HUC12 lie within the Navigation Channel, for which lower targets for Limited Resource Waters apply. For the Lacustrine areas, the delisting target for this BUI is a QHEI score of 55. The average lacustrine score here is 71.5, placing it well above target levels for fish habitat.



## **BUI Status for City of Cleveland- Cuyahoga River:**

The HUC12 that includes the Federally Recognized Shipping Channel has several associated BUIs meeting removal targets. There are sites that require attention when looking at the fish population (IBI) and benthic communities (ICI). Though the Shipping Channel has no fish habitat (QHEI) score requirements, areas along the banks are being evaluated and improved for fish habitat both within the river channel along the existing bulkheads, and land-based along the river bank to enhance and improve habitat for both larval and juvenile migrating species trying to travel the harsh conditions from Lake Erie to the natural river.

Removing the Restrictions on Dredging BUI depends on the suitability of the sediment for upland reuse. It is likely that 80% of the sediment already meets that criteria for some upland uses, and studies are underway to characterize the remaining portion in those terms rather than their suitability for open lake placement. Open lake placement is currently not an option, due primarily the presence of PCBs in the sediment and the prohibition against adding any additional contaminants that could raise PCB levels, or levels of any bioaccumulative contaminants, in lake fish, especially walleye.

DELTS were found in fish in the ship channel during 2014 sampling, though the levels are yet to be determined. The incidences of such findings are lessening, however, which bodes well for this BUI in this HUC. We anticipate that Ohio EPA will issue new measurement criteria and protocols for eutrophication, but based on the Trophic Indices previously used the ship channel has surprisingly decent oxygenation. This may be due to the frequent roiling of the waters by passing freighters.

Recreational contact remains a problem due to chemical contaminants and bacteria, but for purposes of removing this BUI it is only the chemical contaminants that are a factor. If in fact the bacterial contaminants are found to be primarily due to CSO discharges, the long-term control agreements between the sewer districts and USEPA would allow for BUI removal. However, it is generally accepted that even the planned reductions in CSOs may not fully reduce bacterial contamination to safe levels. So removing this BUI in this HUC and the rest of the AOC will require ongoing monitoring for bacteria, and continued efforts to reduce runoff of animal wastes, especially from agricultural lands upriver.

## **Future Actions to improve the City of Cleveland – Cuyahoga River (Navigation Channel and Old River Channel)**

Efforts are underway to enhance in-stream fish habitat in the hope of raising numbers for fish population, especially to serve migrating fish but also to create opportunities for more diverse populations of resident fish.

A planning process is beginning to identify areas of the ship channel where landside habitat may be created, either as behind-the-bulkhead areas or as connected pools, to provide more robust benthic conditions to increase fish populations.

Targeted restoration just above the head of navigation may also improve the status of this HUC.

The Port of Cleveland, City of Cleveland, and USEPA, are working to remediate contaminated sediment and remove sources of contamination in the Old River Channel, which would eventually allow removal of BUI 4, Fish Tumors and Deformities.

Reductions in CSO discharges through control agreements with NEORS and the City of Akron are expected to reduce both bacterial contaminants and temperature effects.

## PROJECTS

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY15				
Stream bank Restoration in Ship Channel	41100020605	City of Cleveland-Cuyahoga River	CRR/H4HP Work Group	LEPF/GLRI			\$500,000 (estimate)		No	3-6	Initial Scoping/ Feasibility planned for 2015-2016
Prepare planning documents to identify conversion potential of sites within the navigation channel to enhance natural habitat areas or behind-bulkhead habitat areas. Concept planning funding is being sought. Condition of bulkheads has been inventoried for areas of bulkhead repair or areas of habitat restoration. Costs estimates include design and construction for an estimated 5,000 linear feet											
Old River Channel Legacy Sediment	41100020605	City of Cleveland-Cuyahoga River	Port of Cleveland / City of Cleveland / US EPA	USEPA/ Legacy Act	Underway		\$10 million (estimate)			3-4-7-10a	Feasibility study complete. Development of project plan for next phase of planning.
Conducting a feasibility study to develop a scope of work for project proposal. Next steps will be a Feasibility Study and for EPA and locals to agree on preferred remedial action for which EPA would prepare plans and spec and hire contractor.											
Habitat for Hard Places	041100020605	City of Cleveland-Cuyahoga River	CRR/H4HP Work Group	Sustain Our Great Lakes	Dec. 2014 / Nov. 2016		\$290,000		Yes	3-6	First installations in spring / summer 2015
This 2.5 mile project is located between Marathon Bend and near the head of navigation at ArcelorMittal. The project will install fish habitat structures in areas where habitat does not currently exist within the Cuyahoga ship channel.											
Ship Channel Habitat	041100020605	City of Cleveland-Cuyahoga River	Cuyahoga County Planning Commission	USACE	Underway				Yes	3-6	Structures to be installed spring/summer 2015
CCPC and Biohabitats are installing fish habitat structures in the middle sections of the shipping channel.											

## Big Creek 041100020603

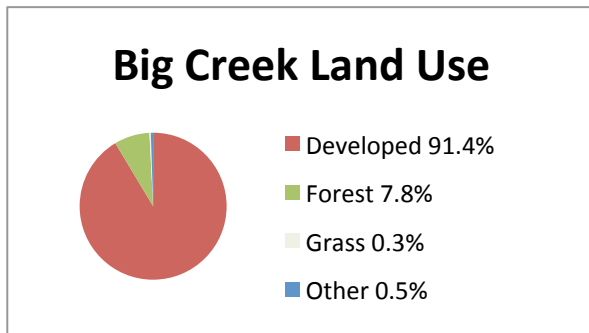
### Associated Tributaries:

- Big Creek

### Overview:

Big Creek, with an area of 37.37 square miles, is the 5<sup>th</sup> largest HUC12 in the AOC. The majority of the land in this subwatershed is fully developed (91.4%). Big Creek is the legally designated tributary. The 7.8% forest cover is located mainly near the waterways, which allows for some restoration potential throughout its stretches of streams. This subwatershed has park systems and neighborhood stormwater efforts in effect that aid in improving the health of these waterways.

It should be noted that the data for Big Creek’s attainment scores is based on only three sample sites for fish and benthic communities, and five sites for habitat assessment. Considering that this is one of the largest tributary subwatersheds, more sample sites would be required before the level of valid assessments required in order to request BUI removals could be reached.

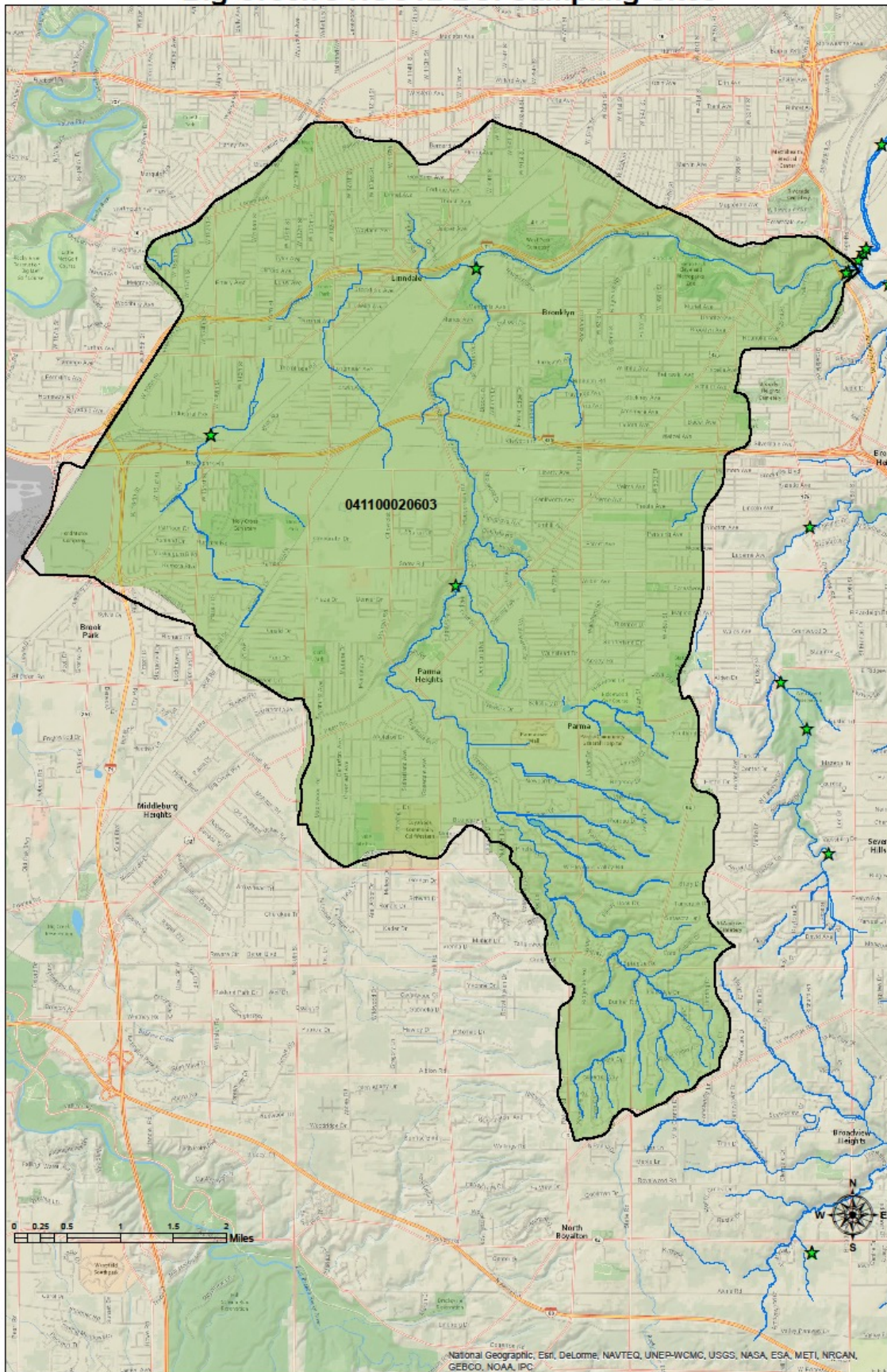


**BUIs applicable to Big Creek are: 3a, 4, 6, 8, 11, and 14a**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (Recreation/Contact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Big Creek	041100020603	N/A	Needs More Data	Meets Target	Needs More Data	N/A	Meets Target	N/A	N/A	Meets Target	Meets Target



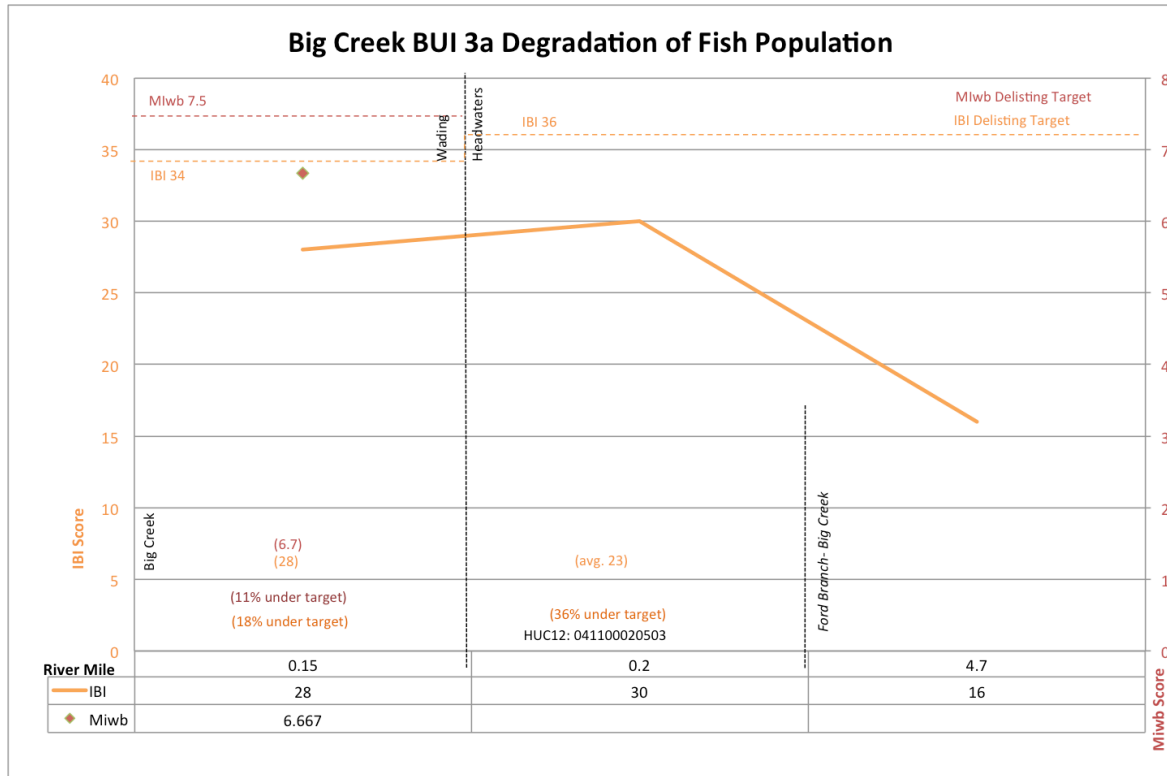
# Big Creek's HUC12 BUI Sampling Sites



## Specific BUI Statuses for Big Creek:

### BUI 3a- Degradation of Fish Populations:

The delisting target for this HUC 12 is an IBI score of 36 for Headwaters. The average of the two headwaters sites is 23, well below the target. The IBI target for wading sites is 34, and the MIwb score is 7.5 for wading sites. The single wading site measure of 28 IBI and 6.7 MIwb is also well below the target. This subwatershed is well below attainment numbers for delisting BUI 3a. It should be noted that currently there are only 3 credible sites with available data for analysis. This HUC12 needs at least 7 sites for a solid representative sample for this BUI.



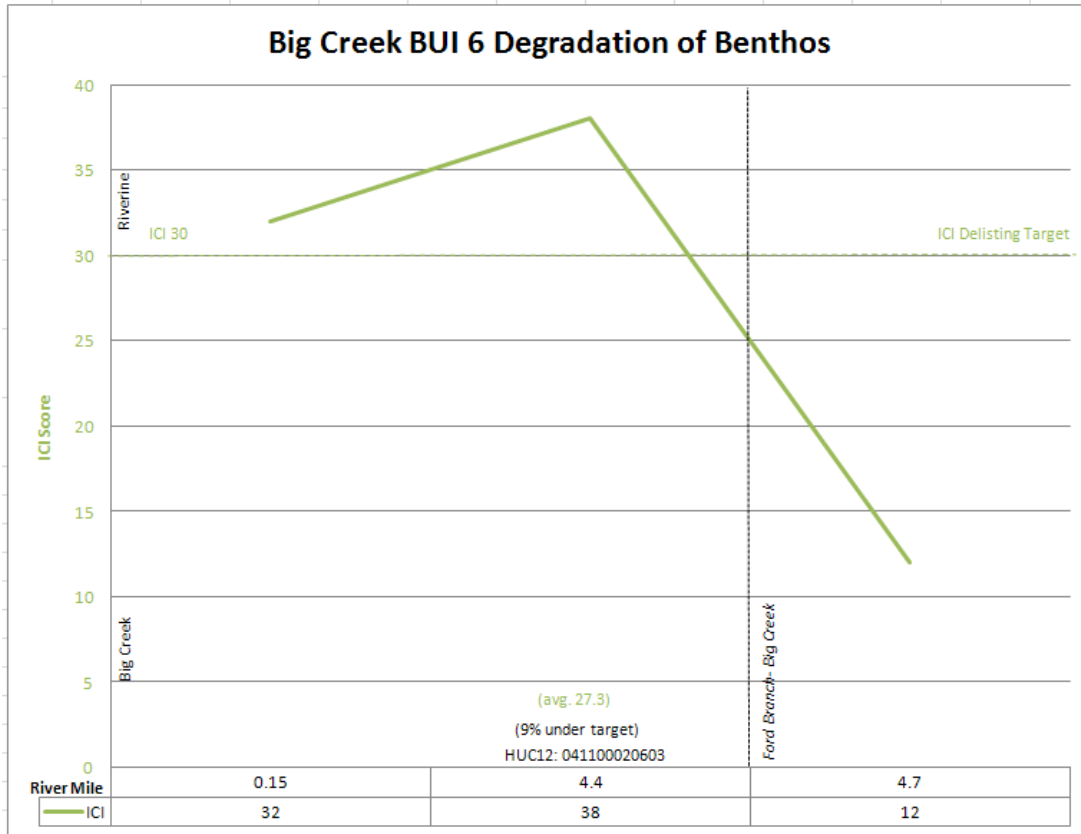
### BUI 4 - Fish Tumors and Other Deformities:

The delisting target for this BUI is a DELT value of 3% or below (1.3% in wading sites.) The average DELT value here is close to .0002%, derived from DELT sampling data from 2013-14. This subwatershed is in attainment for delisting BUI 4.

### BUI 6 - Degradation of Benthos:

The delisting target for this BUI is an ICI score of 30 for both wading and headwaters. The average score of 27.3 is just 9% below target. However, the Ford Branch score plummets to just 12, and any site with a score below 50% of target automatically puts the HUC out of attainment. It should be noted that there are only 3 credible sites with data for analysis. This HUC12 needs at least 7 sites for a good representation of the benthic community.





**BUI 8 - Eutrophication or Undesirable Algae:**

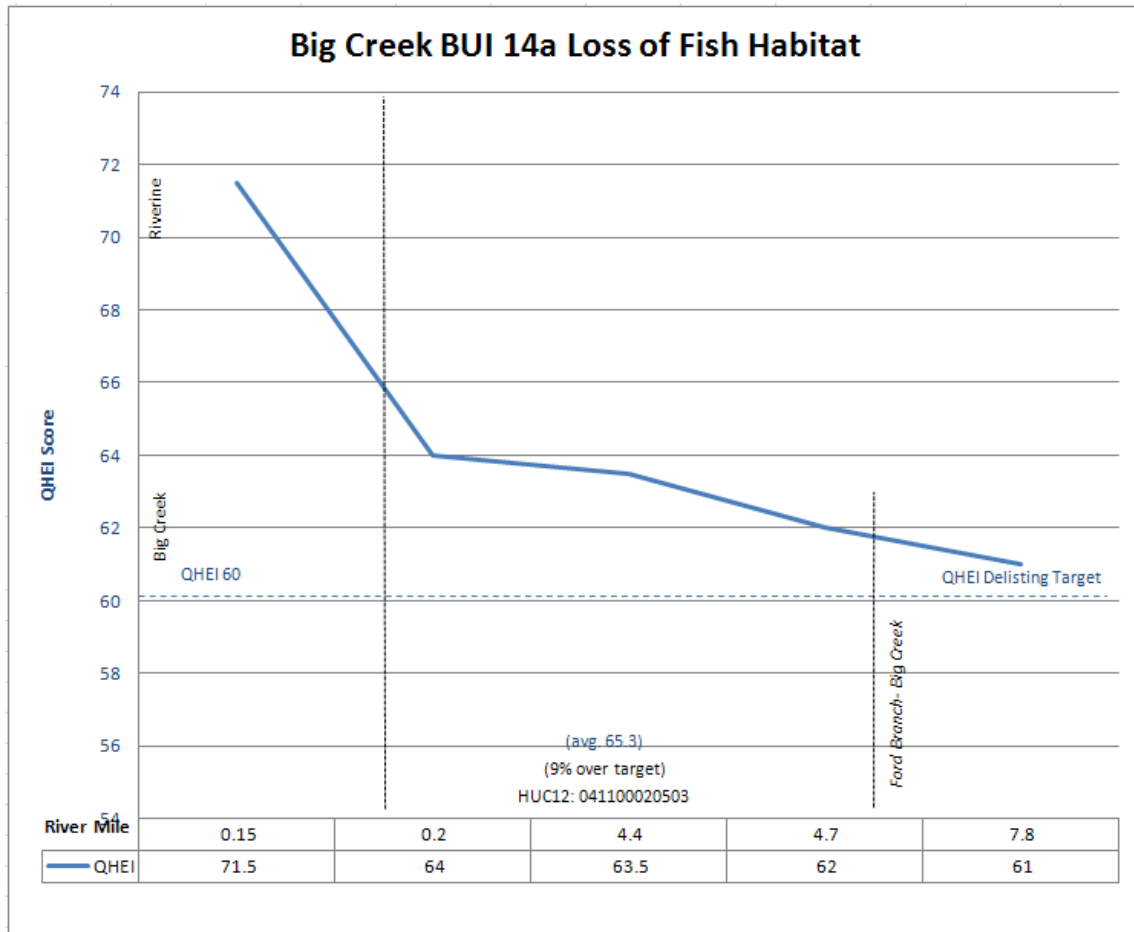
No persistent nuisance growths algae reported. This HUC meets delisting criteria.

**BUI 11 - Degradation of Aesthetics:**

There are currently no recorded persistent instances of aesthetics impairments in the Big Creek HUC. New sampling and observation protocols are being developed by Ohio EPA that will allow us to verify this status, at which time we expect to be able to remove this BUI.

**BUI 14a - Loss of Fish Habitat:**

The delisting target for this BUI is a QHEI score of 60 for wading and headwaters targets. The average of riverine scores in this HUC12 is 65, or 10% above the delisting target.



**Overview BUI Status for Big Creek:**

The fish habitat numbers for this HUC12 are in attainment, but this does not translate to target levels of fish populations (IBI) or the benthic community (ICI). A major reason for these low numbers is a drop structure approximately a mile upstream of the creek’s confluence with the Cuyahoga River. It will be difficult to improve these numbers until fish passage is established, either by removing or bypassing this structure. There are also minimal numbers of sampling sites providing credible data throughout the HUC. We will have a better idea as to the current status of Big Creek when a full representative sampling is completed.

**Future actions needed to improve Big Creek and remove BUIs:**

Efforts are underway to redesign or remove barriers to fish passage, especially the structure at I-71.

## Projects

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15	FFY16			
Stickney Creek Stream Restoration	041100020603	Big Creek	Big Creek Connects	GLRI-NOAA						3-6-14	Submitted for funding for implementation, 2015
Restoration of 500 linear feet of stream channel on tributary of Big Creek.											
I-71 Relocation and Restoration	042100020603	Big Creek	Big Creek Connects	Brooklyn, Cleveland, NEORS							Study completed 2015. Seeking Project funding
Proposes removing the Denison Access ramps of the abandoned "Parma Freeway" and opening up land in the Big Creek valley that will allow the creek to be naturalized by re-routing it into much of its historic streambed.											

# Cuyahoga River Main Channel

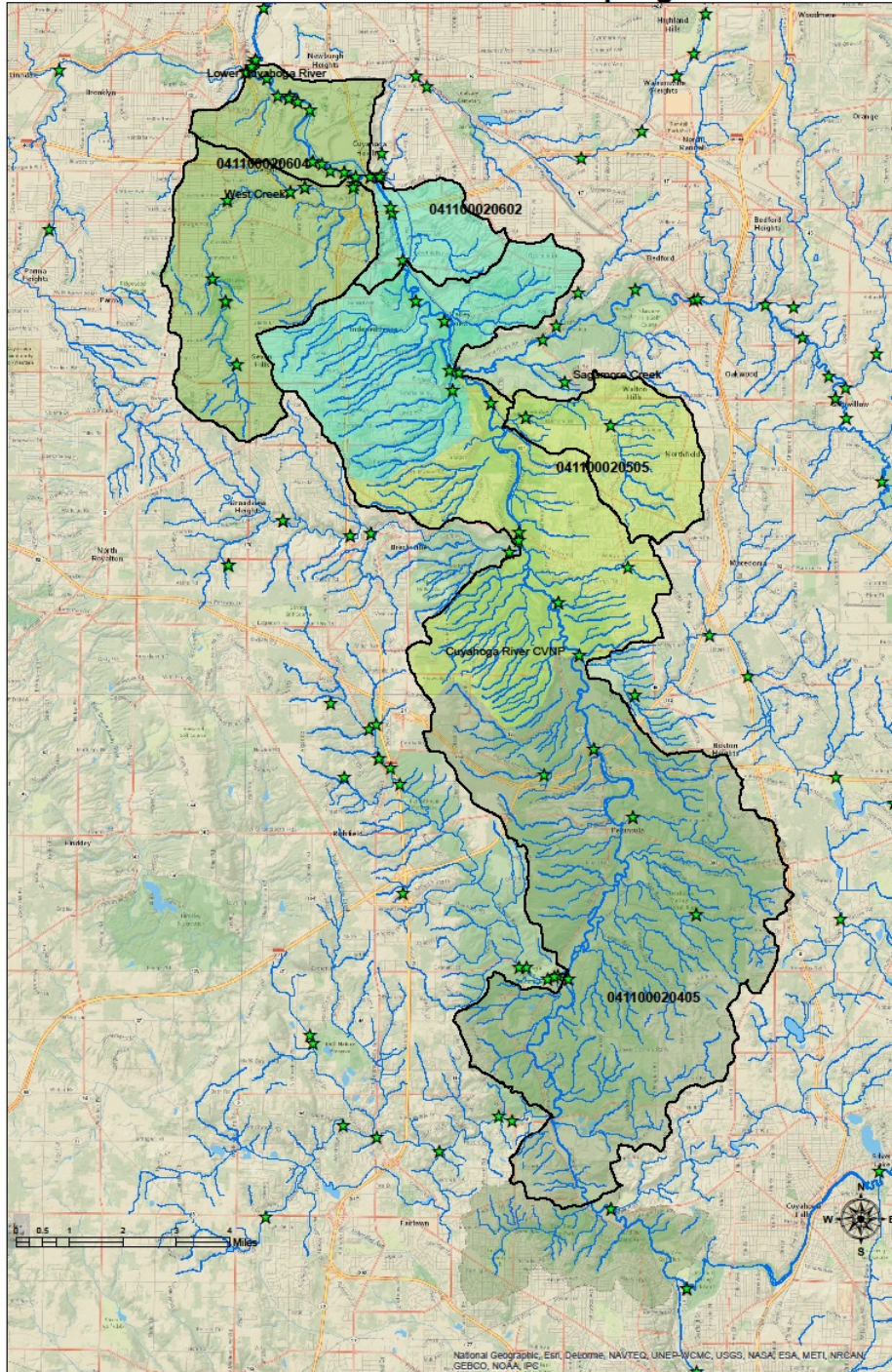
Town of Cuyahoga Heights-Cuyahoga River • HUC #041100020604

Village of Independence -Cuyahoga River • HUC #041100020602

Willow Lake- Cuyahoga River • HUC #041100020505

Boston Run- Cuyahoga River • HUC #041100020405

**Main Channel's HUC12 BUI Sampling Sites**



**Town of Cuyahoga Heights –Cuyahoga River (West Creek)  
041100020604**

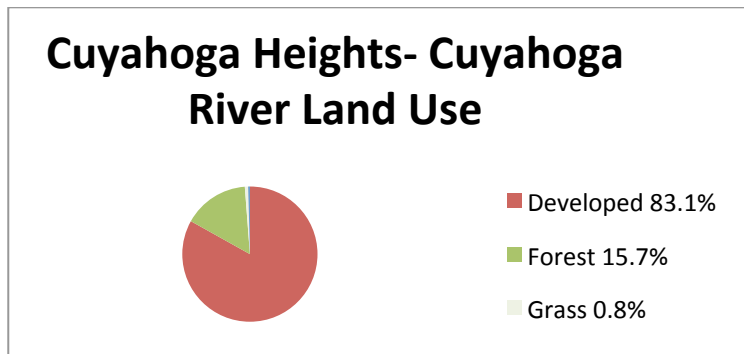
**Associated Tributaries:**

- West Creek
- Lower Cuyahoga

**Overview:**

The Town of Cuyahoga Heights – Cuyahoga River subwatershed, with an area of 19.08 square miles, is the 17<sup>th</sup> largest HUC12 in the AOC. The AOC legally-designated tributaries within this HUC12 include 4.4 miles of the Lower Cuyahoga mainstem, from river mile 7.1 to river mile 11.5, and the entire West Creek tributary, and includes all or parts of Cuyahoga Heights, Parma, Seven Hills, Brooklyn Heights, and Independence.

The majority of the land in this subwatershed is developed. Beside the industrial and residential development common to this urbanized area, there is also a 15.7% forest cover that gives this subwatershed the opportunity for meaningful natural resource management.



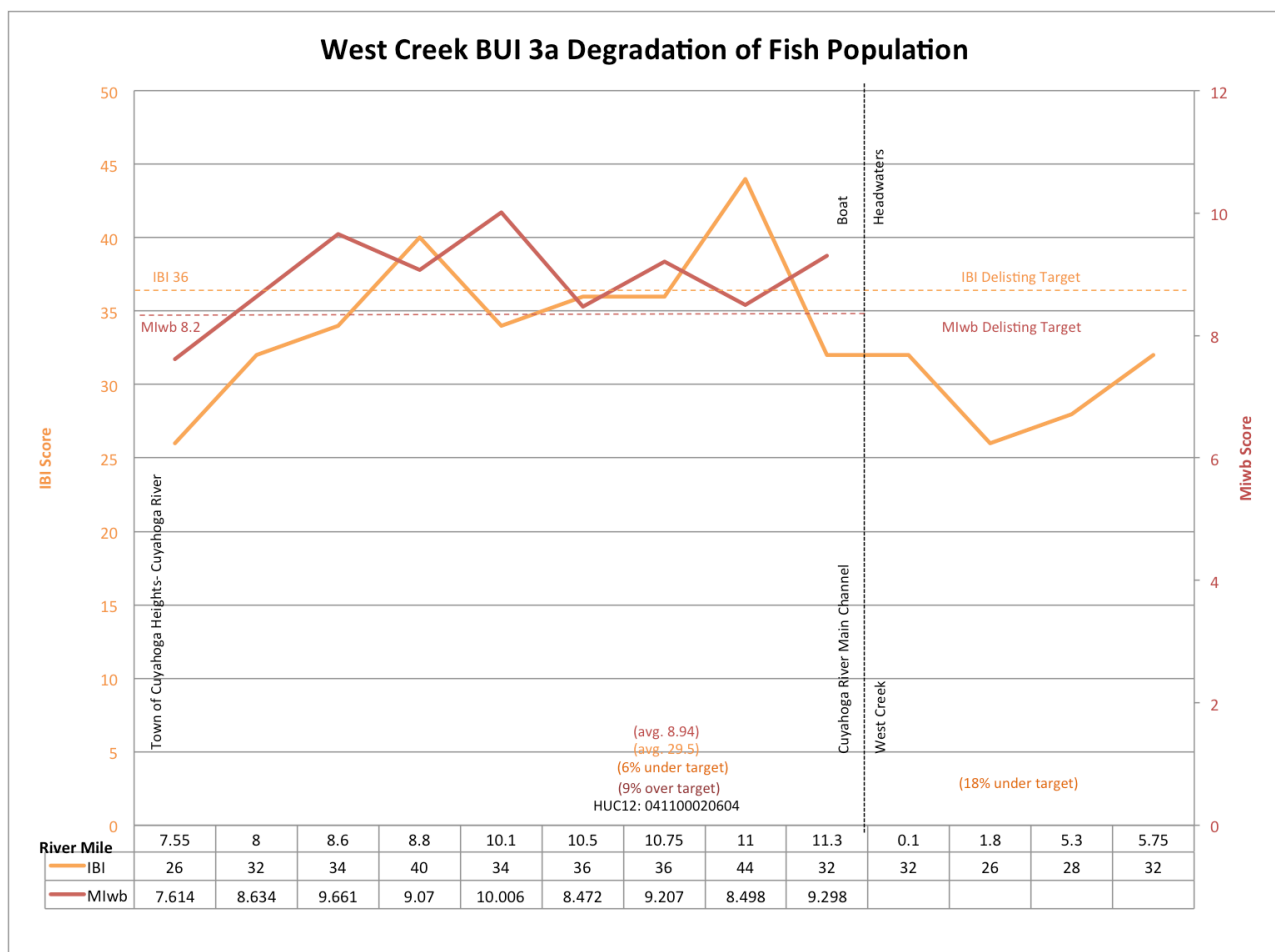
**BUIs applicable to Cuyahoga Heights- Cuyahoga River are: 3a, 4, 6, 8, 10, 11, and 14a**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging Sediment	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (Recreation>Contact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Town of Cuyahoga Heights – Cuyahoga River (West Creek)	041100020604	N/A	DOES NOT Meet Target	Meets Target	Meets Target	N/A	Meets Target	DOES NOT Meet Target	Meets Local Goals	Meets criteria to begin process for removal	Meets Target

**BUI 3a- Degradation of Fish Populations:**

The delisting target for this BUI is an IBI score of 36 at both Boat and Headwaters sites, and an MIwb score of 8.2 at Boat sampling sites (MIwb does not apply here.) Here the average boat sampling score is 35, the HUC is 6% below the target. In the Headwaters area representing West Creek, none of the samples met the goal, and the score toward attainment is substantially lower – 18% below target.

Looking at the line graph for this BUI in this HUC helps us see that populations improve in the mainstem as the distance from the navigation channel increases. However, we see a sharp decrease around the confluence with West Creek. Just above the confluence, the banks of the creek are heavily armored. Further upstream, the low point around river mile 1.8 at Granger Road and Lancaster highlights the challenges of degrading culverts and other obstructions.



**BUI 4- Fish Tumors and Other Deformities:**

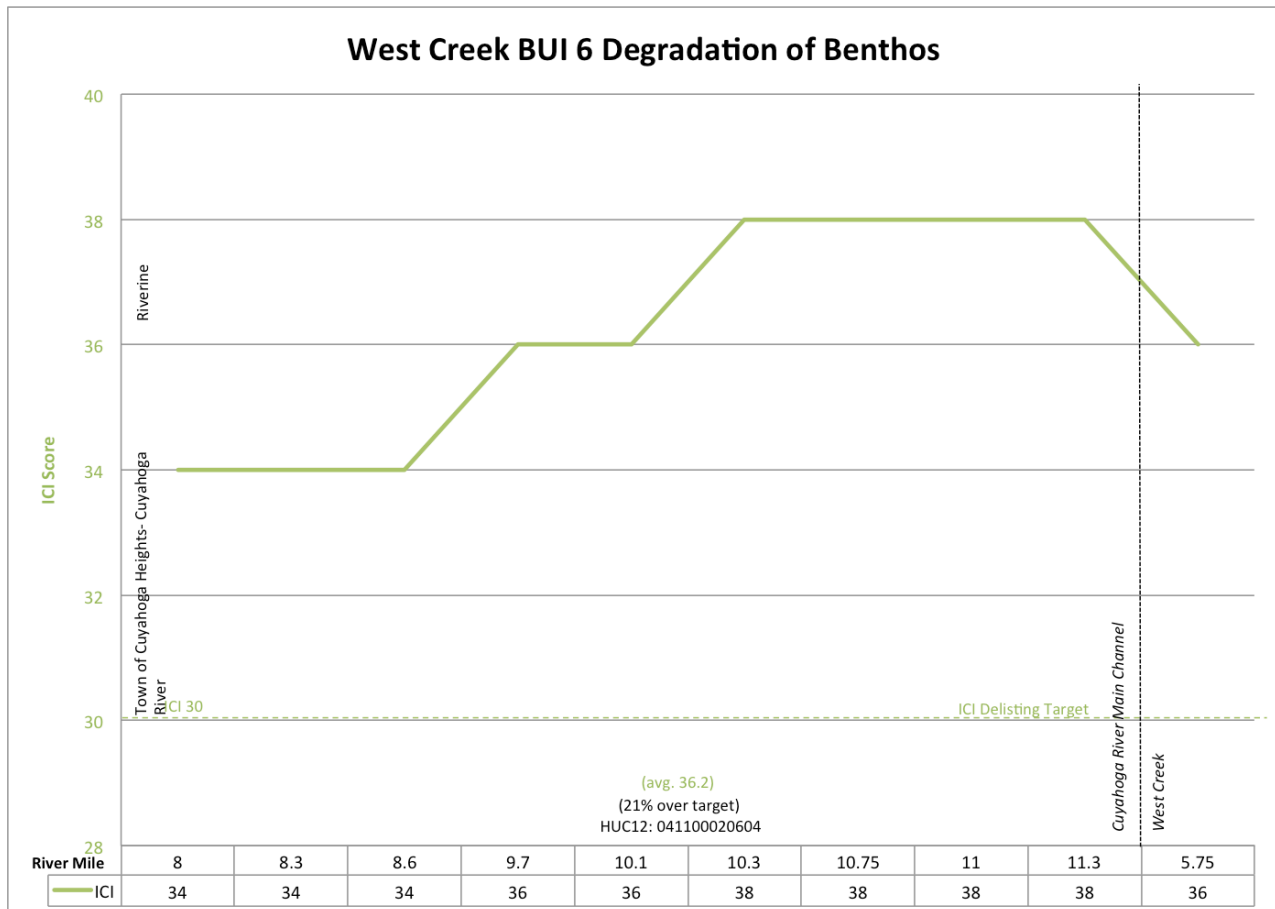
The delisting target for this BUI is a DELT value of 3% or under outlined in the Ohio EPA Delisting Guidance. The DELT value here is .0054%. This subwatershed is within attainment for delisting BUI 4.



**BUI 6- Degradation of Benthos:**

The delisting target for this BUI is an ICI score of 30 for Riverine (Boat and Headwaters) sampling. In this section of the mainstem, all 9 Boat-sampled sites scored at or above the target ICI score. The average in this category is well over the target, 21% over. The single Headwaters-sampled site in West Creek showed a score of 36, again 20% over the target.

This HUC meets the target for delisting. However, with the single headwaters sampling site having been located within the largest forested area in the watershed, it cannot be considered as representative of the overall state of headwaters benthos in this HUC.



**BUI 8- Eutrophication or Undesirable Algae:**

No persistent nuisance growths algae reported. This HUC meets delisting criteria.

**BUI 10 Beach Closings (Recreational Contact):**

In this river segment the Recreational Contact criteria apply. The mainstem of the Cuyahoga River is on the state’s Section 303(d) list of impaired waters, so remains ineligible for removing this BUI. The river from the mouth down to CVNP is impaired with



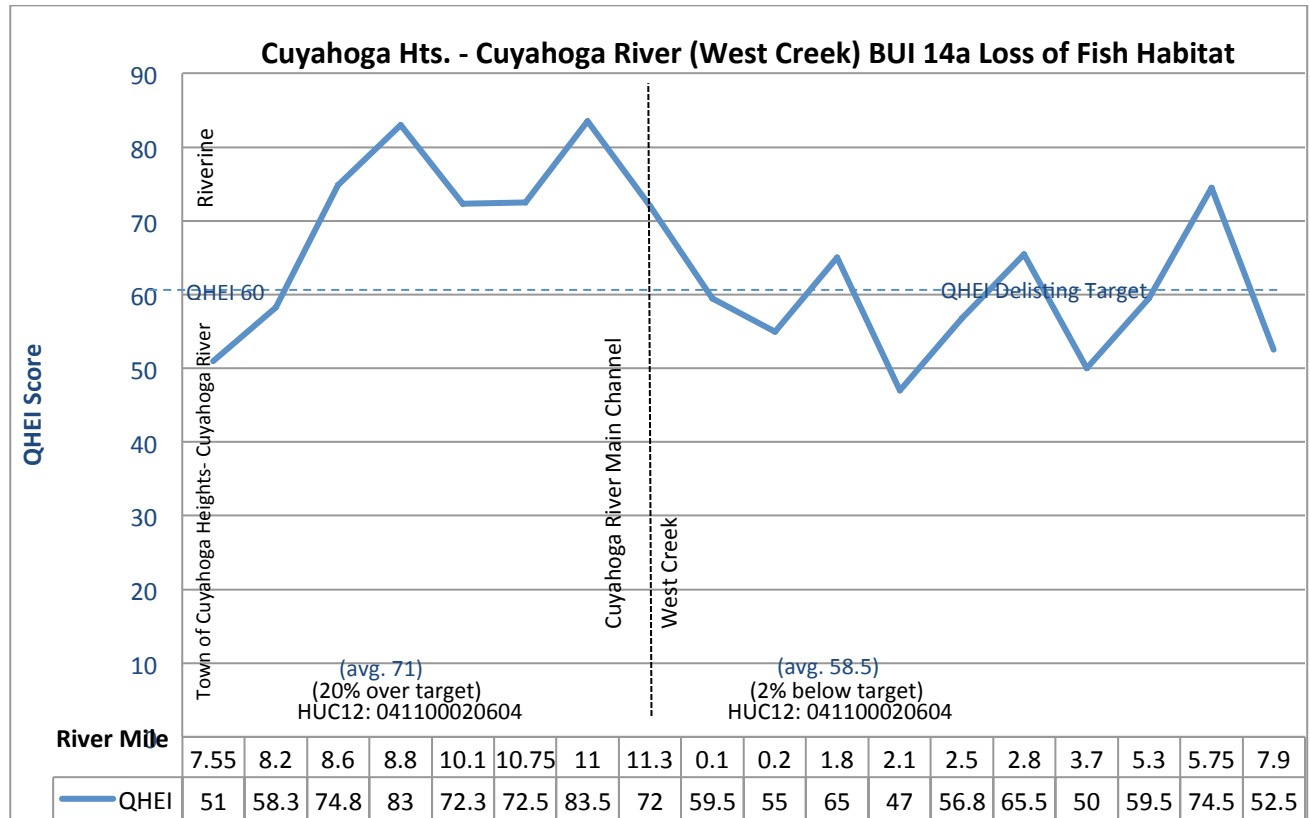
Polychlorinated Biphenyls (PCBs) in fish tissue according to a 2008 study. CSO outfalls in the HUC also contribute bacteria after heavy rains.

**BUI 11- Degradation of Aesthetics:**

Aside from a few CSO outfalls, which for BUI-removal purposes would not preclude delisting because of the NEORS D long-term control plan, there is little evidence of persistent aesthetic impairments.

**BUI 14a- Loss of Fish Habitat:**

The delisting target for this BUI is a QHEI score of 60 for Riverine (both Boat and Headwaters) sampling types. The average score for this HUC is 65, putting it above the attainment target.



**Overview BUI Status for Cuyahoga Heights- Cuyahoga River:**

Though numbers show favorable for delisting purposes in the 6 BUIs applicable to this HUC12, the West Creek tributary that is included within its boundaries is heavily developed and requires restoration attention to endure the numbers do not worsen in the long term.

## Future actions needed to improve Cuyahoga Heights- Cuyahoga River and remove BUIs:

Restoration of habitat at targeted sites in the West Creek headwaters could lead to improved fish populations. The discrepancy between relatively high habitat and benthic scores at the same approximate sampling locations as those that show low fish populations should be studied. In some areas immovable structural barriers impede fish passage, which may provide a case for certain revisions to delisting criteria in the West Creek section of the HUC.

There is a lot of opportunity for improvement in this tributary with both West Creek Conservancy and the Cleveland Metroparks having a stake in an abundant amount of forested land and waterways under their control.

Low fish habitat scores at river mile 7.55 (near Bradley Road just south of Harvard,) and RM 8.2 just upriver, need investigation for potential restoration, and possibly resampling.

## Projects

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15				
West Creek Confluence Phase 1	041100020604	Cuyahoga Heights- Cuyahoga River / West Creek	West Creek Conservancy, NEORS	Requesting GLRI	June 2014 / Oct. 2015	\$650,575			Yes	3-6	
This project is located between Independence Concrete Recycling and I-480 and consists of a failing concrete flume causing a major fish migration barrier, no in-stream or riparian habitat, erosion issues, and also prevents bed load transport. Phase 1 consists of removing the concrete flume, reestablishing the grade, and stabilizing the area to resemble natural conditions.											
West Creek Confluence Phase 2	041100020604	Cuyahoga Heights- Cuyahoga River / West Creek	West Creek Conservancy, NEORS	Requesting GLRI	Oct. 2015 / Dec. 2016		\$360K (may be more)		Yes	3 - 6	
Phase 2 is located downstream of the previous restoration. Grading is required to maintain proper elevation to continue downstream restoration. The channel will be stabilized resembling natural conditions to improve fish and benthos habitat, bed load transport, and minimize erosion issues.											
West Creek Flood Control	041100020604	Cuyahoga Heights- Cuyahoga River/ West Creek	Cleveland Metroparks	Requesting GLRI	June 2014 / June 2015	\$150,000			Yes	3-6	
This tributary to West Creek demonstrates substantial downcutting of the stream leading to the washout of a three-side-by-side culvert. This project includes tributary realignment, floodplain bench creation, constructed riffle installation, culvert replacement, and riparian vegetation placement within 1,100 linear feet of stream. These enhancements will stabilize the stream bed											

	and banks, reduce erosion, and improve fish and benthos habitats.										
West Creek Grade Control and Bank Stabiliza- tion	041100020604	Cuyahoga Heights- Cuyahoga River / West Creek	West Creek Conserva ncy and NEORS			\$165, 000				3-6	
	This project involves the realignment and grade control of approximately 1,400 linear feet of West Creek mainstem that has multiple headcuts and sheer eroding bank. The installation of grade control, bank armor/vegetation, and floodplain access will address these headcuts. This project includes floodplain bench creation, constructed riffle/pool installation, bank stabilization and accompanying riparian vegetation replacement.										

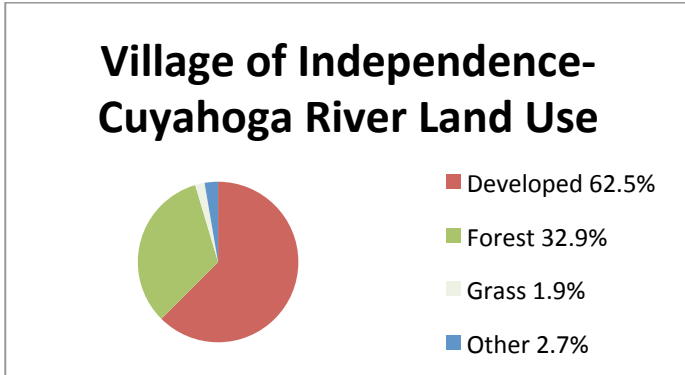
## Village of Independence – Cuyahoga River 041100020602

### Associated Tributaries:

- Lower Cuyahoga
- Cuyahoga River CVNP

### Overview:

The Village of Independence- Cuyahoga River subwatershed, with an area of 16.97 square miles, is the 19<sup>th</sup> largest HUC12 in the AOC (or 3<sup>rd</sup> smallest). It is designated as a HUC12 along the main channel of the Cuyahoga River from approximately river-mile 11.5 to river-mile 16, giving it a stretch of the river of 4.5 miles. The majority (62.5%) of the land in this subwatershed is developed. It also has a 32.9% forest canopy, giving this subwatershed the opportunity for some significant natural resource management and restoration potential. The AOC designated tributaries within this HUC12 include the Lower Cuyahoga and the first couple of river-miles of the Cuyahoga River in the Cuyahoga Valley National Park.



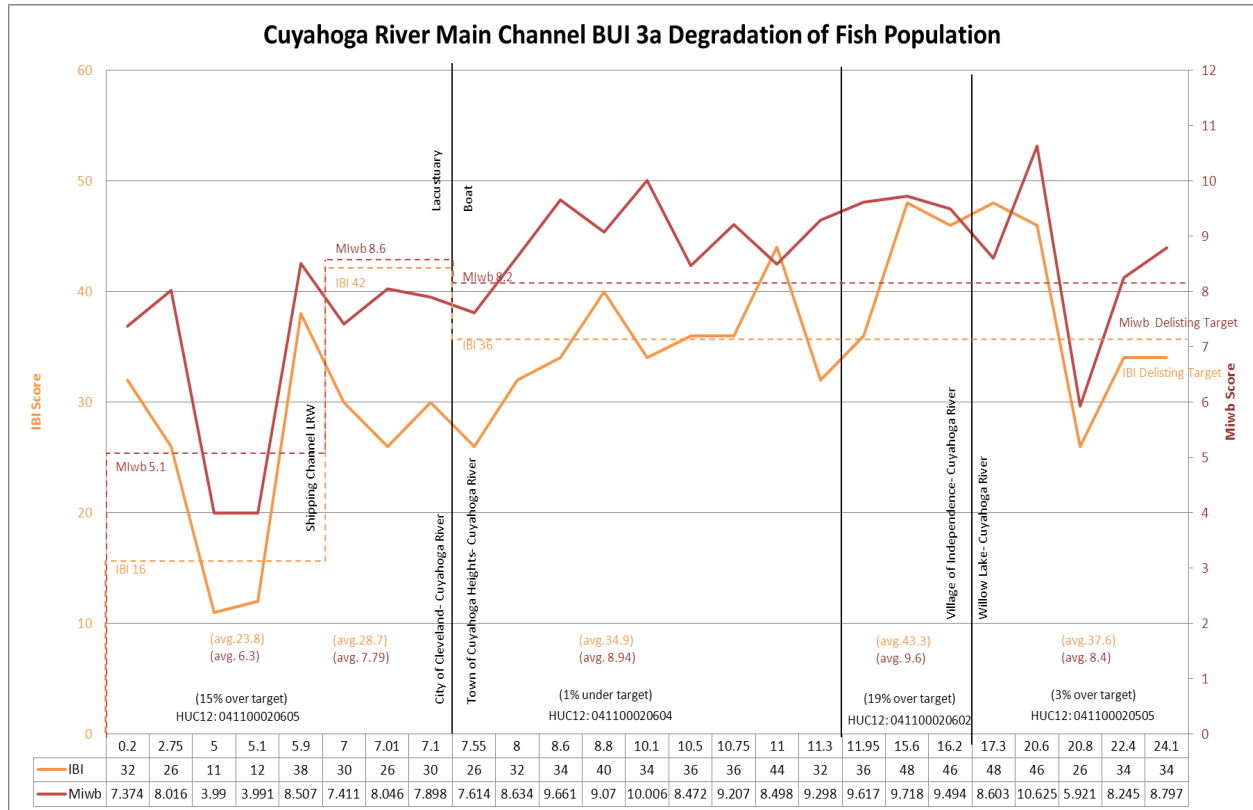
**BUIs applicable to Village of Independence- Cuyahoga River are: 3a, 4, 6, 8, 10, 11, and 14a**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (RecreationContact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
City of Independence – Cuyahoga River	041100020602	N/A	Needs More Data	Meets Target	Meets Target	N/A	Meets Target	DOES NOT Meet Target	Meets Local Goals	Meets criteria to begin process for removal	Meets Target

## Specific BUI Statuses for Village of Independence- Cuyahoga River:

### BUI 3 - Degradation of Fish Populations:

The delisting target for this BUI is a score of 36 for IBI and 8.2 for MIwb. This HUC12 is 19% above the delisting target. It must be noted that there are only 3 sites with credible scores available at this time. More sites would yield a better representation of the BUI for the HUC12. At this time, this subwatershed is within attainment for delisting BUI 3.

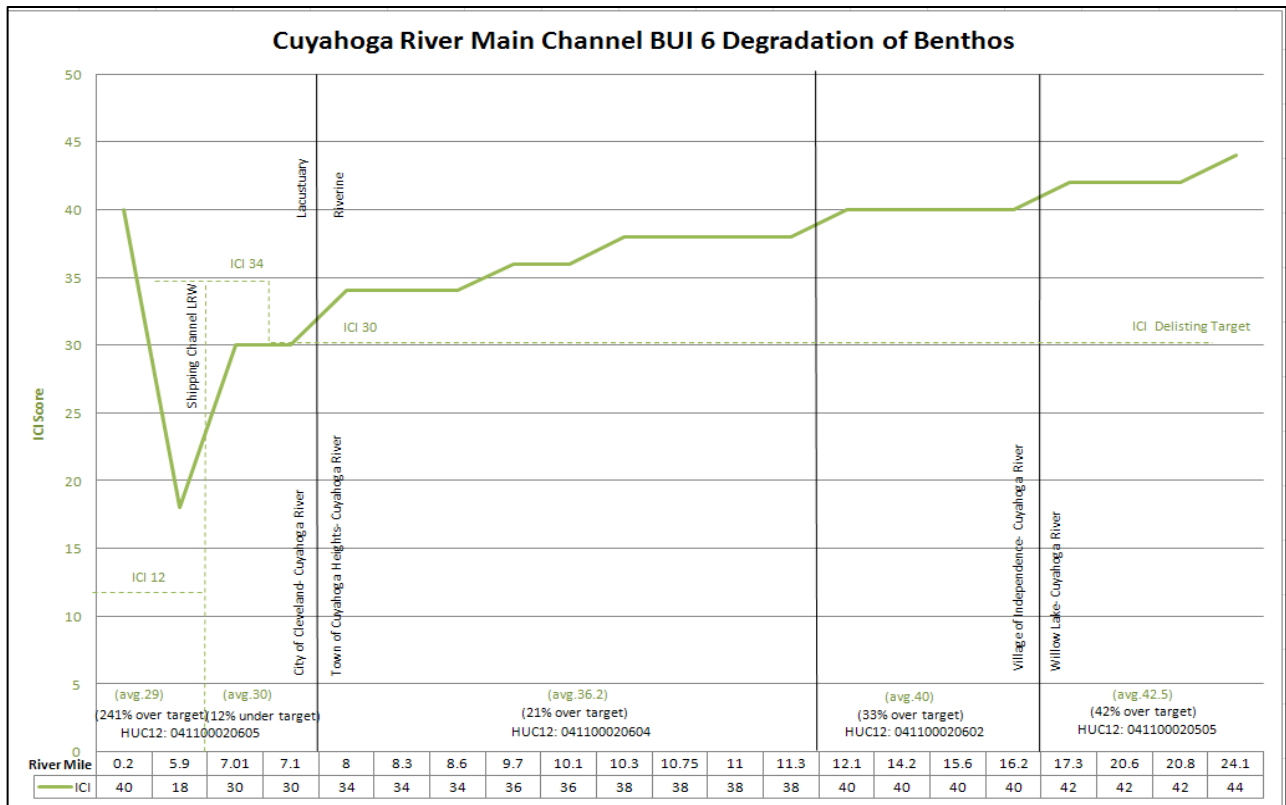


### BUI 4 - Fish Tumors and Other Deformities:

The delisting target for this BUI is a DELT value of 3% or below. The DELT score in this section HUC is .0074%. This subwatershed is in attainment for delisting BUI 4.

### BUI 6 - Degradation of Benthos:

The target for this BUI is an ICI score of 30. The average score in this section of the HUC is 40, or 33% above the target. This section of the main channel is in attainment for delisting BUI 6.



**BUI 8- Eutrophication or Undesirable Algae:**

No persistence nuisance algae growths are reported.

**BUI 10 - Beach Closings (Recreational Contact):**

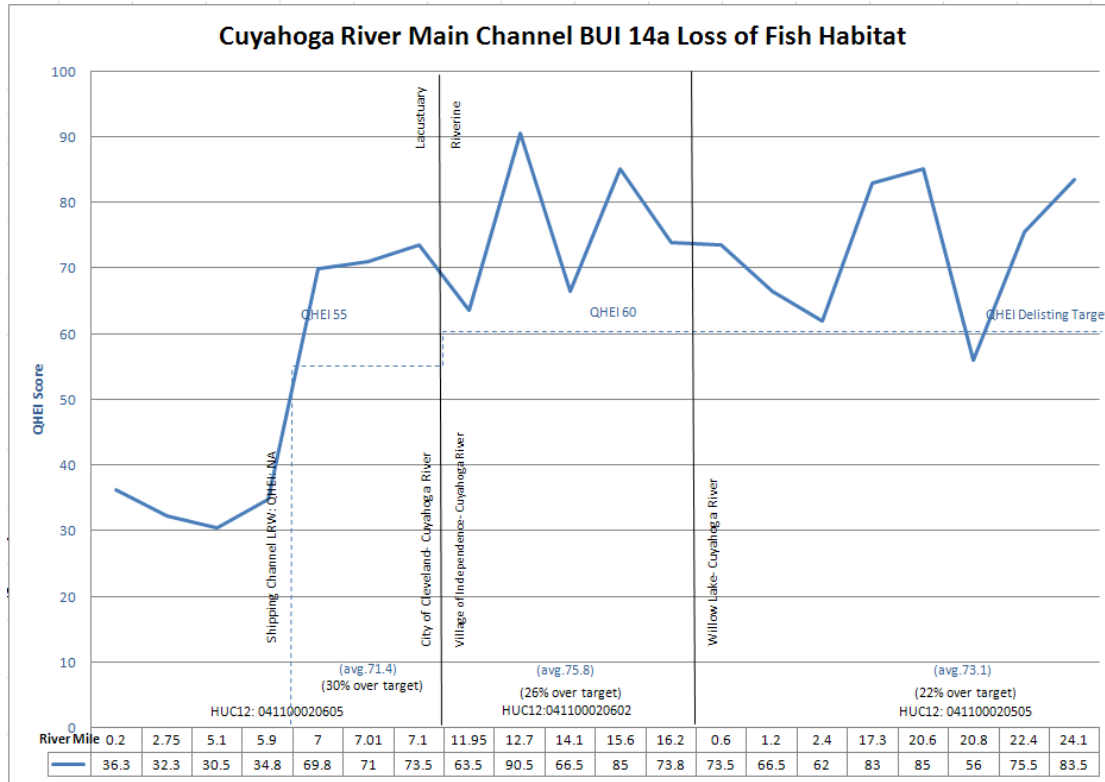
The mainstem of the Cuyahoga is on the state’s 303(d) list of impaired waters. The river from the mouth down to CVNP shows elevated levels of PCBs. New sampling is needed, but this section remains out of attainment.

**BUI 11- Degradation of Aesthetics:**

In this section of the river, potential sewage-related impairments come from Akron’s CSOs. The city’s long-term control plan is underway, technically placing this HUC in attainment for aesthetics under that criteria.

**BUI 14a- Loss of Fish Habitat:**

The delisting target for this BUI is a QHEI score of 60. The average score from the sampling sites in this HUC is 75, or 25% above the delisting target. This section of the Cuyahoga River’s fish habitat is within attainment for BUI 14a.



**BUI Status for Village of Independence- Cuyahoga River:**

Except for the Recreational Contact classification of BUI 10a, all other BUI metrics meet delisting targets. As long as the mainstem is on the state’s 303(d) list of waterways with chemical contaminants, it will remain impaired for recreational contact. Although scores are favorable relative to delisting targets, the sample size for many of the impairments is still too small to give a true picture.

**Future actions needed to improve Village of Independence- Cuyahoga River and remove BUIs:**

Sources of PCBs and other chemical and organic contaminants that keep the mainstem on the state’s list of impaired waters need to be identified and eliminated. The city of Akron’s CSO control measures may reduce some of the contamination, though non point sources may still pose problems.



## Projects

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15				
Pleasant Valley Wetland Restoration	041100020602	Independence - Cuyahoga River	Cuyahoga Valley National Park	GLRI-NPS						3-6	Restoration plans are needed.
Site restoration of 10 acres of wetlands, largest within park boundary.											

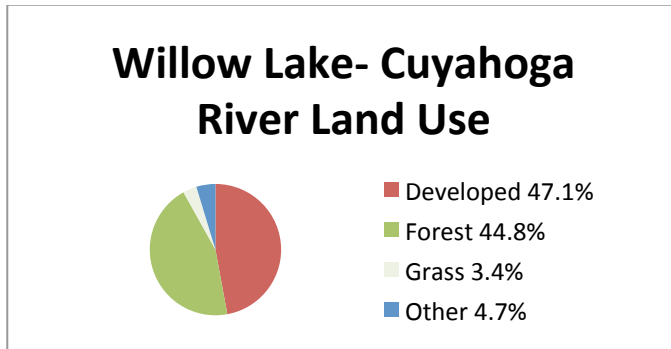
## Willow Lake- Cuyahoga River 041100020505

### Associated Tributaries:

- Sagamore Creek • Cuyahoga River CVNP

### Overview:

Willow Lake, with an area of 24.23 square miles along the Cuyahoga River main channel, is the 11<sup>th</sup> largest HUC12 in the AOC. It extends from approximately river-mile 16 to river-mile 25 giving it a stretch of the river of 9 miles. Most of the land in this subwatershed is controlled by the Cuyahoga Valley National Park (CVNP.) This gives the Willow Lake HUC a unique benefit in terms of natural resource management. It is also the main reason for the 44.8% forest cover. Being less than 50% developed allows for restoration potential. The AOC legally-designated tributaries within this HUC12 include the tributary of Sagamore Creek as well as the CVNP tributaries.



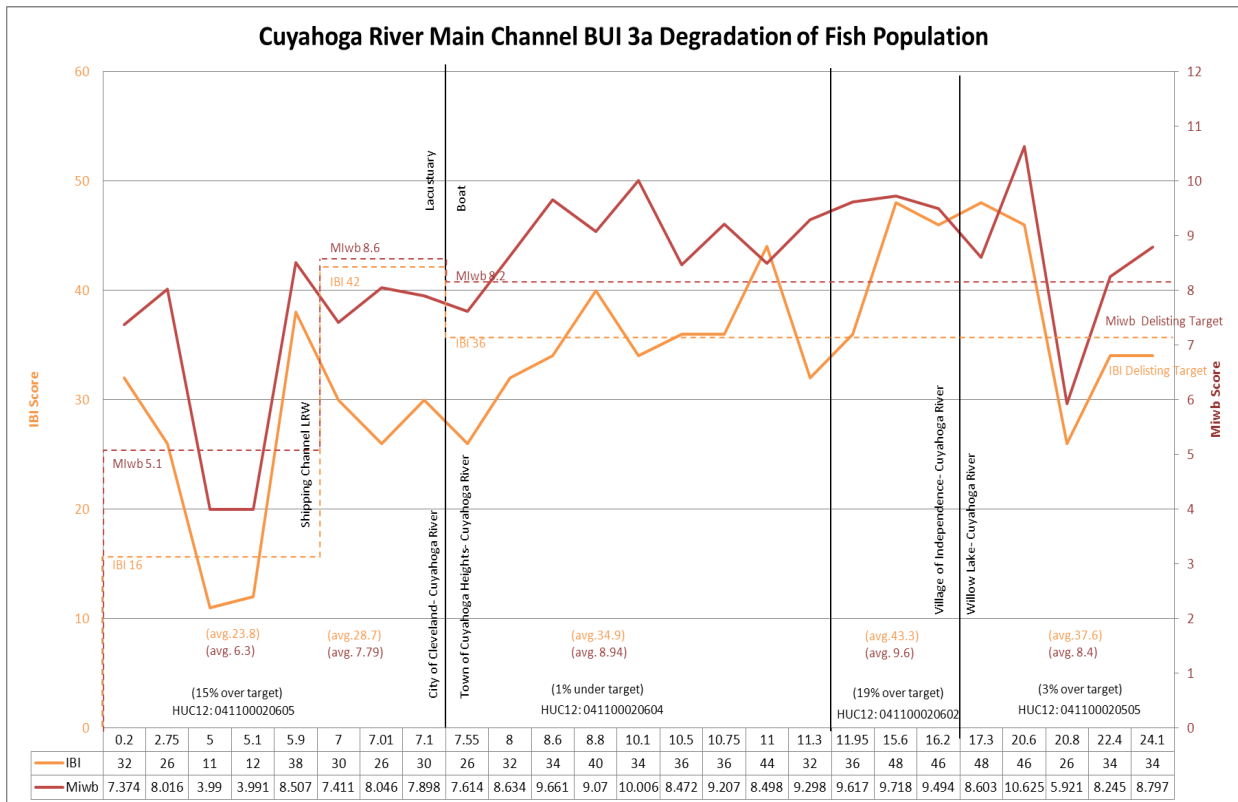
**BUIs applicable to Willow Lake- Cuyahoga River are: 3a, 4, 6, 8, 10, 11, and 14a**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (RecreationContact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Willow Lake – Cuyahoga River (CVNP)	041100020505	N/A	Meets Target	Meets Target	Needs More Data	N/A	Meets Target	DOES NOT Meet Target	Meets Local Goals	Meets Target	Meets Target

## Specific BUI Statuses for Willow Lake- Cuyahoga River:

### BUI 3a - Degradation of Fish Populations:

The delisting target for this BUI is a score of 36 for IBI and 8.2 for MIwb for Boat sampling sites. For sites sampled, this HUC12 is just above the delisting target, with an average IBI score of 37.6 and MIwb of 8.4. The highest scoring site is just below the Brecksville/Route82 dam, and the lowest scoring site is just above (upriver) of the dam.

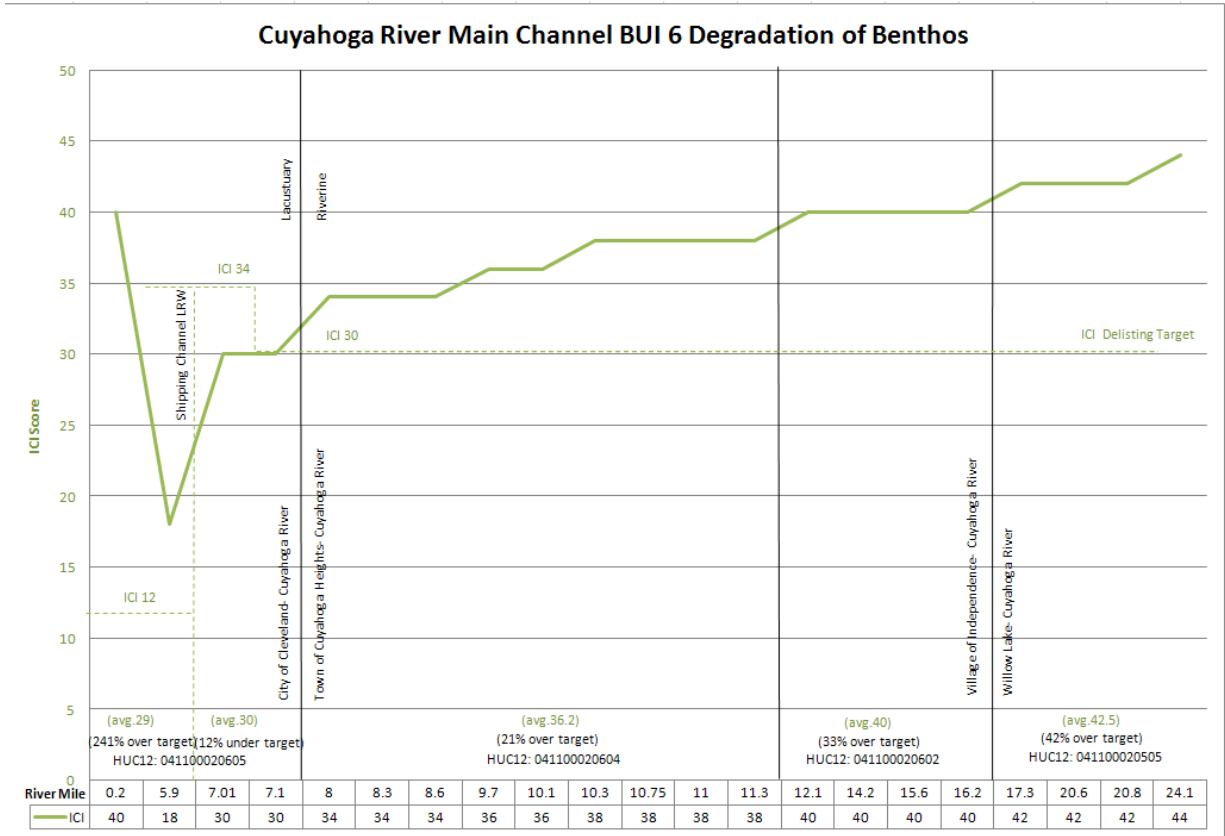


### BUI 4 - Fish Tumors and Other Deformities:

The delisting target for this BUI is a DELT value of 3% or under. The DELT value here is .0018%, putting the HUC in attainment for BUI 4.

### BUI 6 - Degradation of Benthos:

The delisting target for this BUI is an ICI score of 30. The scores average of 42.5 is 42% above delisting target levels in the entire HUC12, which is all Boat sampling type. The benthic community in this section of the main channel of the Cuyahoga River is in attainment for BUI 6. It should be noted that this score comes from only 4 credible sites. There should be at least 7 to be considered a good representative sample of the subwatershed. However, considering the locations in the national park, it is not likely that additional sampling would lower the average enough to take it out of attainment.



**BUI 8 - Eutrophication or Undesirable Algae:**

No persistent nuisance growths algae reported. This HUC meets delisting criteria.

**BUI 10 - Beach Closings (Recreational Contact):**

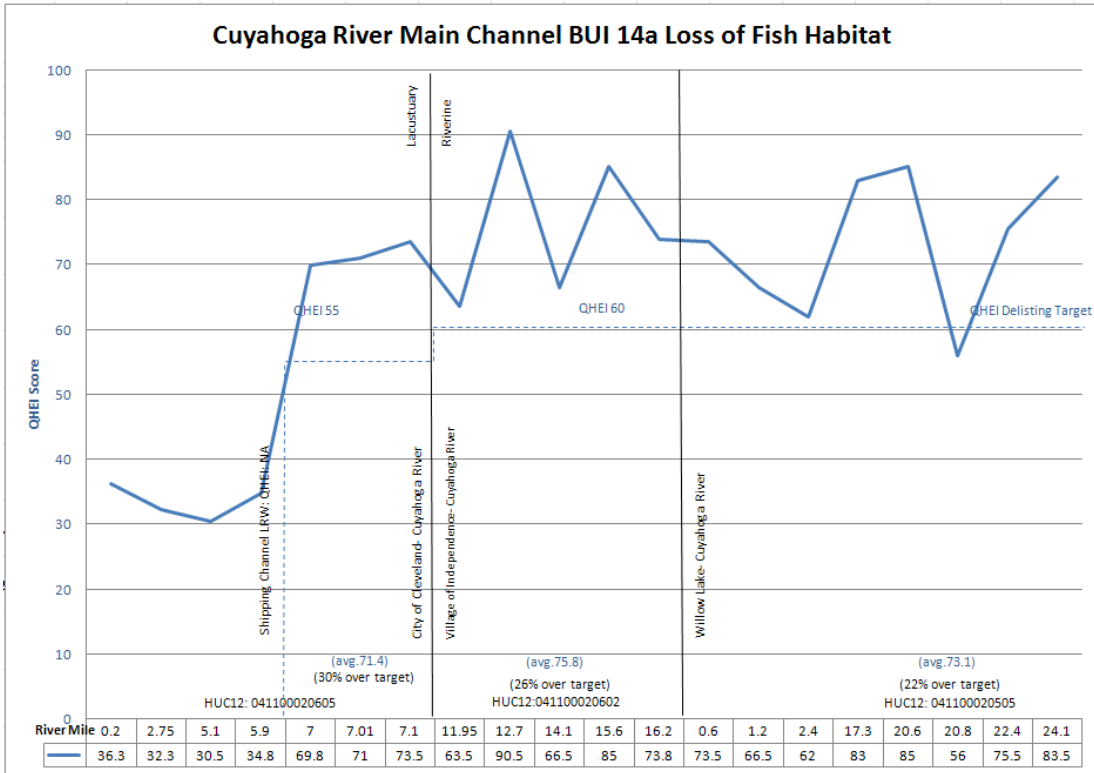
This part of the Cuyahoga is on the state’s 303(d) list of impaired waters, making it not delistable at this time.

**BUI 11 - Degradation of Aesthetics:**

The Aesthetics BUI in this HUC12 is assumed to be primarily affected by the City of Akron CSOs. The city is moving ahead with its long term control plan, which would allow removal of this BUI. It is being studied for removal.

**BUI 14a - Loss of Fish Habitat:**

The delisting target for this BUI is a QHEI score of 60 for Riverine (both Boat and Headwaters) sampling types. The average score in this HUC is 73, or 20% above the delisting target. This section of the main channel of the Cuyahoga River and Sagamore Creek’s fish habitat place it in attainment for delisting BUI 14a.



**Overview BUI Status for Willow Lake- Cuyahoga River:**

The Route 82 dam is an obstacle to fish passage, so although this section of the mainstem has some of the richest and most diverse fish populations, excellent habitat, and good benthic communities at RM20.6, it is so largely because fish migrating upriver collect below the dam, unable to swim over it. Conversely, the scores for fish population and habitat drop considerably at RM 20.8, just above the dam. The mainstem is out of attainment for recreational contact due to PCBs.

**Future actions needed to improve Willow Lake- Cuyahoga River and remove BUIs:**

The Route 82 dam in the Cuyahoga Valley National Park/Brecksville must be removed or reconfigured to allow fish passage while still allowing it to divert water into the Ohio & Erie Canal (the dam’s original purpose.) Restoring fish passage here will have a significant beneficial effect on fish populations here and in other areas of the AOC.

Identifying the sources of chemical contaminants is essential to remedying the recreational contact impairment.

**Projects**

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15				
Route 82 / Canal Diversion Dam	041100020505	Willow Lake-Cuyahoga River	Cuyahoga Valley National Park/ OEPA				NA			3-6	Draft EIS is scheduled 2015.
Removal/Modification of Canal Diversion dam located in Cuyahoga Valley National Park.											

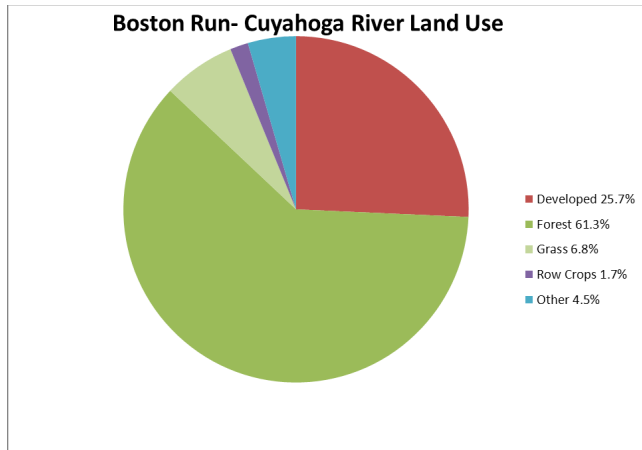
## Boston Run- Cuyahoga River 41100020405

**Associated Tributaries:**

- Cuyahoga River CVNP
  - Sand Run
- Middle Cuyahoga River

**Overview:**

Boston Run, with an area of 46.44 square miles, is the 4<sup>th</sup> largest HUC12 in the AOC. It is designated as a HUC12 along the main channel of the Cuyahoga River, extending approximately from river mile 25 to river mile 44. This HUC comprises 16 of the 22 miles of the mainstem that run through the heart of Cuyahoga Valley National Park, hence the 61.3% forest cover. This HUC12 includes the tributary of Sand Run, and a small portion of the Middle Cuyahoga.



**BUIs applicable to Boston Run are: 3a, 4, 6, 8, 10, 11, and 14a**

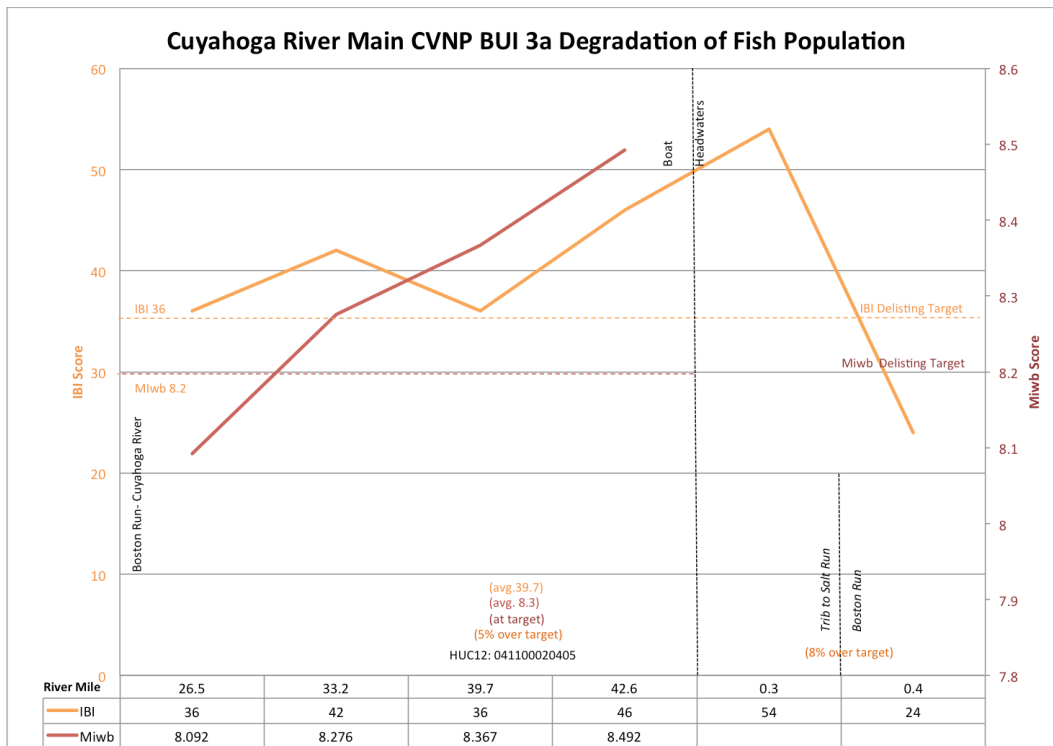
HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (Recreation/Contact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Boston Run – Cuyahoga River (CVNP, Sand Run, Middle Cuyahoga)	041100020405	N/A	Needs More Data	Meets Target	Needs More Data	N/A	Meets Target	DOES NOT Meet Target	Meets Local Goals	Meets Target	Meets Target



## Specific BUI Statuses for Boston Run:

### BUI 3a- Degradation of Fish Populations:

The delisting target for this BUI is an IBI score of 36 for Boat and Headwaters sites, and an MIwb score of 8.2 for Boat sites only (MIwb does not apply to headwaters with less than 20 sq. miles of drainage.) This average of Boat site IBI scores is 5% above the delisting target at 39.7, and the average at Headwaters sites is 39, also 5% above target. The average MIwb in the Boat sampling types is 8.3, barely above the target. This subwatershed is in attainment for BUI 3a, yet it needs to have at least 7 sampling sites to provide confidence in assessing delisting potential.

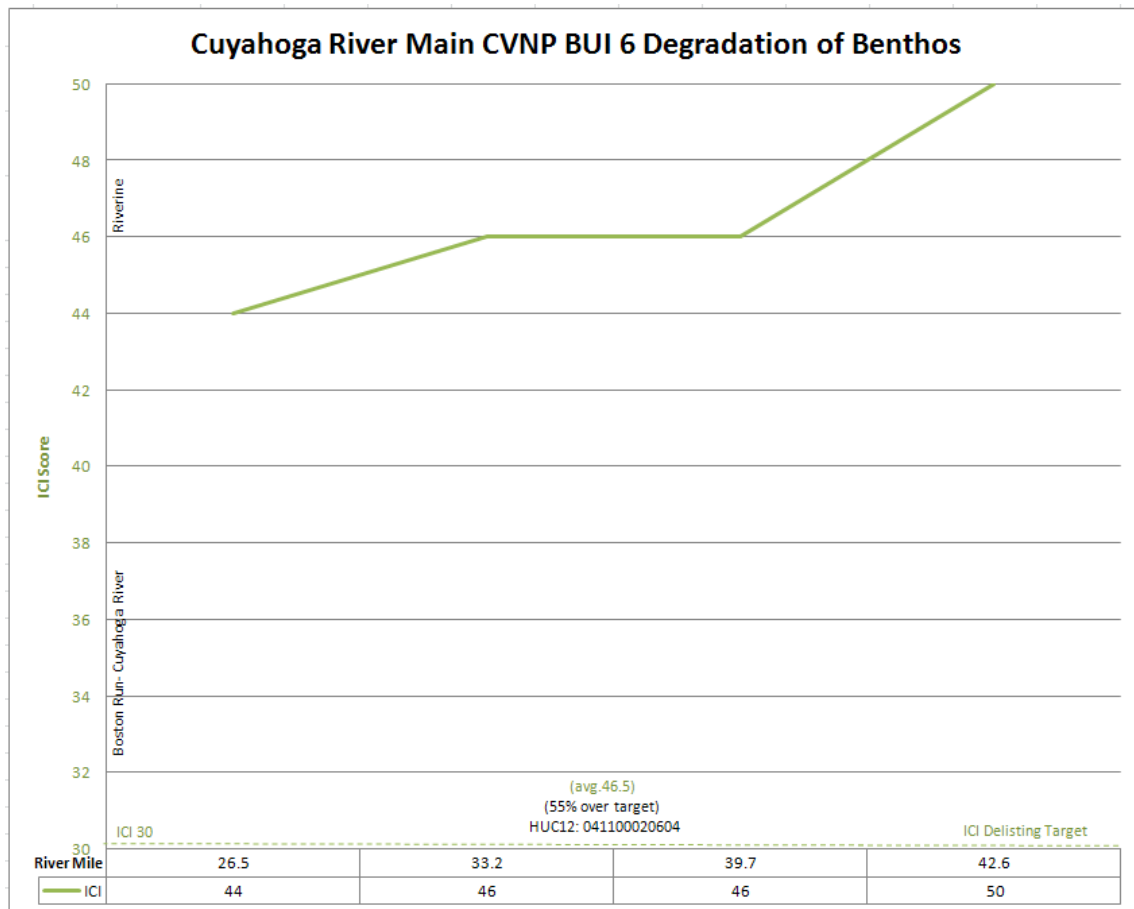


### BUI 4- Fish Tumors and Other Deformities:

The delisting target for this BUI is a DELT value of 3% or under. The DELT value in this HUC is .0065%. This subwatershed is in attainment for BUI 4.

### BUI 6- Degradation of Benthos:

The delisting target for this BUI is an ICI score of 30 for Boat sampling sites, which apply to all sites in the HUC. The average for this HUC is 46.5, or 55% above the delisting target. This section of the main channel of the Cuyahoga River's benthic community is in attainment for delisting BUI 6. It should be noted that this % comes with only 4 credible sites available. There should be at least 7 to have a truly representative sample of the subwatershed. Additional sampling, however, would not likely lower the scores to levels below the delisting target.



**BUI 8 - Eutrophication or Undesirable Algae:**

No persistent nuisance growths algae reported. This HUC meets delisting criteria.

**BUI 10 - Beach Closings (Recreational Contact):**

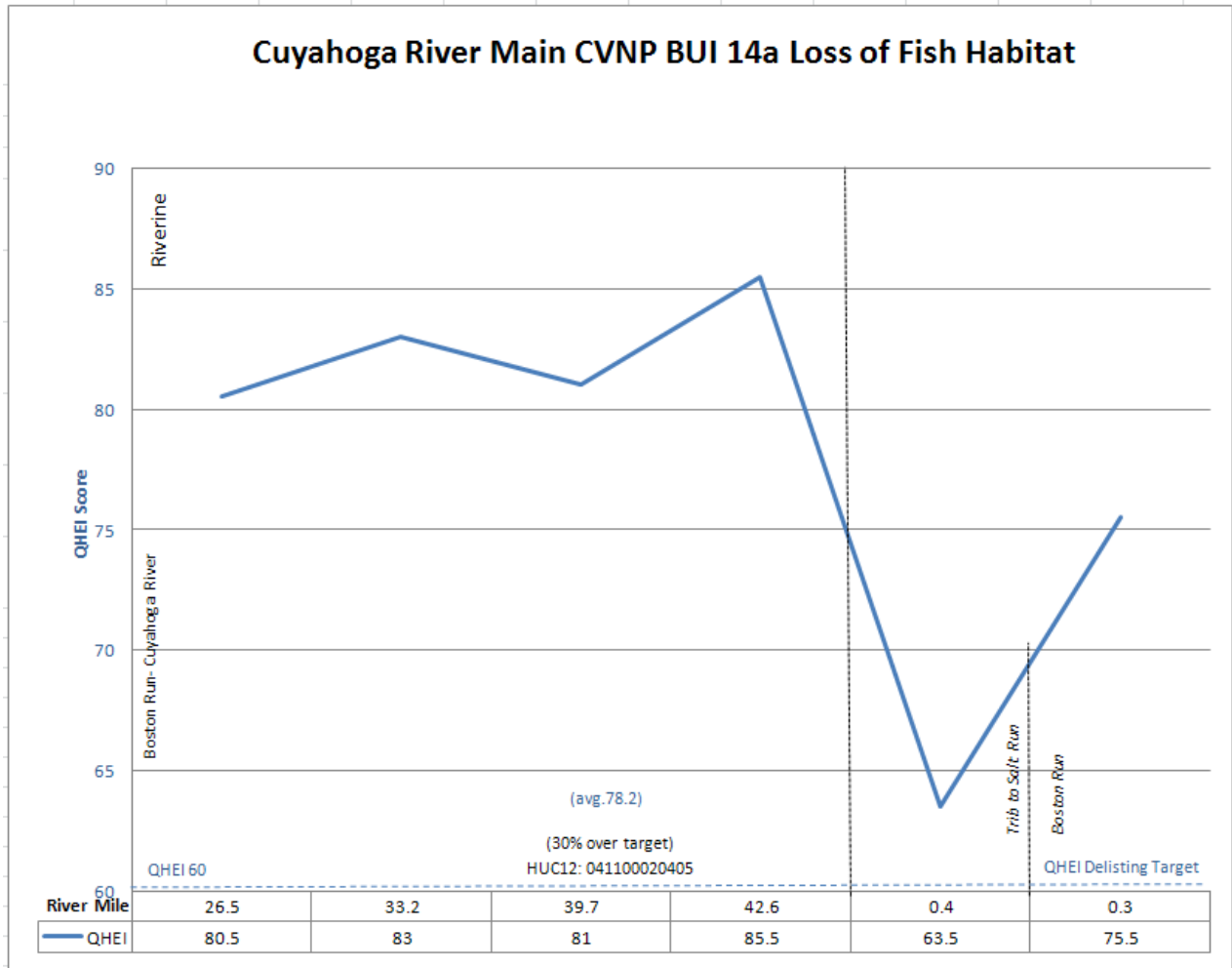
The Cuyahoga mainstem remains on the list of Class A impaired waters, taking this section out of consideration for removing BUI 10, even with the dispensation for the City of Akron’s long term control plan for CSOs. The CVNP has a “nowcast” water monitoring program that shows the most recent water quality. 2013 data shows that the river is in “good” condition in terms of bacteria only 37% of the recreational year. This area is monitored primarily for *E. Coli*, but the 303(d) list also considers PCBs and PAHs, which are present here.

**BUI 11 - Degradation of Aesthetics:**

This HUC is most affected by Akron CSOs, which are being addressed by the city’s long term control plan, and MS4s are operating under NPDES permits, allowing for removal of this BUI.

**BUI 14a- Loss of Fish Habitat:**

The delisting target for this BUI is a QHEI score of 60. The average Riverine score is 78, or 30% over the target score. One additional sampling site would add confidence to this assessment, though it is unlikely that it would change the status.



**Overview BUI Status for Boston Run:**

The Boston Run HUC12 is composed mainly of Cuyahoga Valley National Park protected lands. This put the subwatershed in a good position for both evaluation and stewardship. There is still sampling that needs to be done to show a full representation of the HUC12 for a few of the BUIs – the IBI/ MIwb for BUI 3a, ICI for BUI 6, and QHEI for BUI 14a. Once these gaps in sampling are filled, the favorable percentages above attainment for delisting allow for a degree of confidence for their continued strong scores.

The new metrics for eutrophication will allow that BUI to be assessed, and there is concern that the abundance of invasive species may have significant impact on the feeder streams in this HUC.

The river remaining on the 303(d) list of Class A impaired streams, both for bacterial and chemical contaminants, will keep the HUC from reaching all of the BUI targets.

This HUC is directly downriver from the Gorge Dam, and so the removal of that dam may have significant short-term impacts on fish populations (favorable) and benthos (not necessarily favorable.)

**Future actions needed to improve Boston Run and remove BUIs:**

Removal of the Gorge Dam upstream is expected to open fish passage and improve fish populations in this and other HUCs.

The aptly-named Sand Run restoration would help reduce erosion downstream and sediment loading into the Cuyahoga by allowing the stream access to flood plain

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15				
Sand Run Restoration	041100020405	Boston Run-Cuyahoga River	Summit Metroparks	GLRI-NPS?						3-6-14	Initial planning underway.
Stream restoration											
Gorge Dam Removal / Bypass	041100020405	Boston Run-Cuyahoga River	Ohio EPA/ Summit Metroparks	USACE OEPA			\$500,000			3-6-11-14	Geotechnical Feasibility Study Pending
Removal / bypass of First Energy dam at southern end of Cuyahoga mainstem and AOC, located at border of Cuyahoga Falls and Akron. Essential for fish passage.											

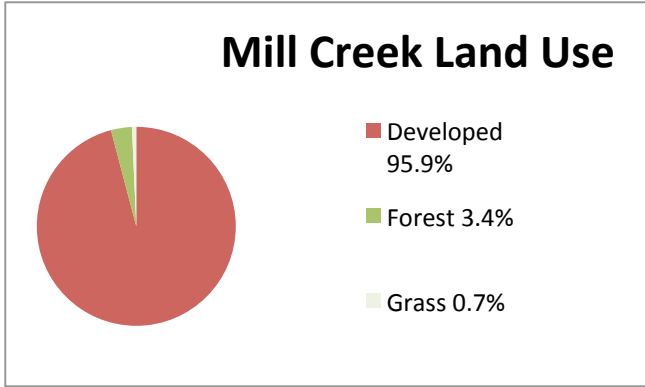
**Mill Creek  
041100020601**

**Associated Tributaries:**

- Mill Creek

**Overview:**

Mill Creek, with an area of 19.26 square miles, is the 16<sup>th</sup> largest HUC12 in the AOC (5<sup>th</sup> smallest). It is designated as an urban HUC12. The majority of the land in this subwatershed is fully developed (95.9%). The AOC legally designated tributary within this HUC12 includes the tributary of Mill Creek. The 3.4% forest cover is located mainly near the waterways which allows for some restoration potential throughout its stretches of streams. In this section, the applicable BUIs will be analyzed as well as statements on what is being done to remedy these impairments, known sources, and what still needs to be done.

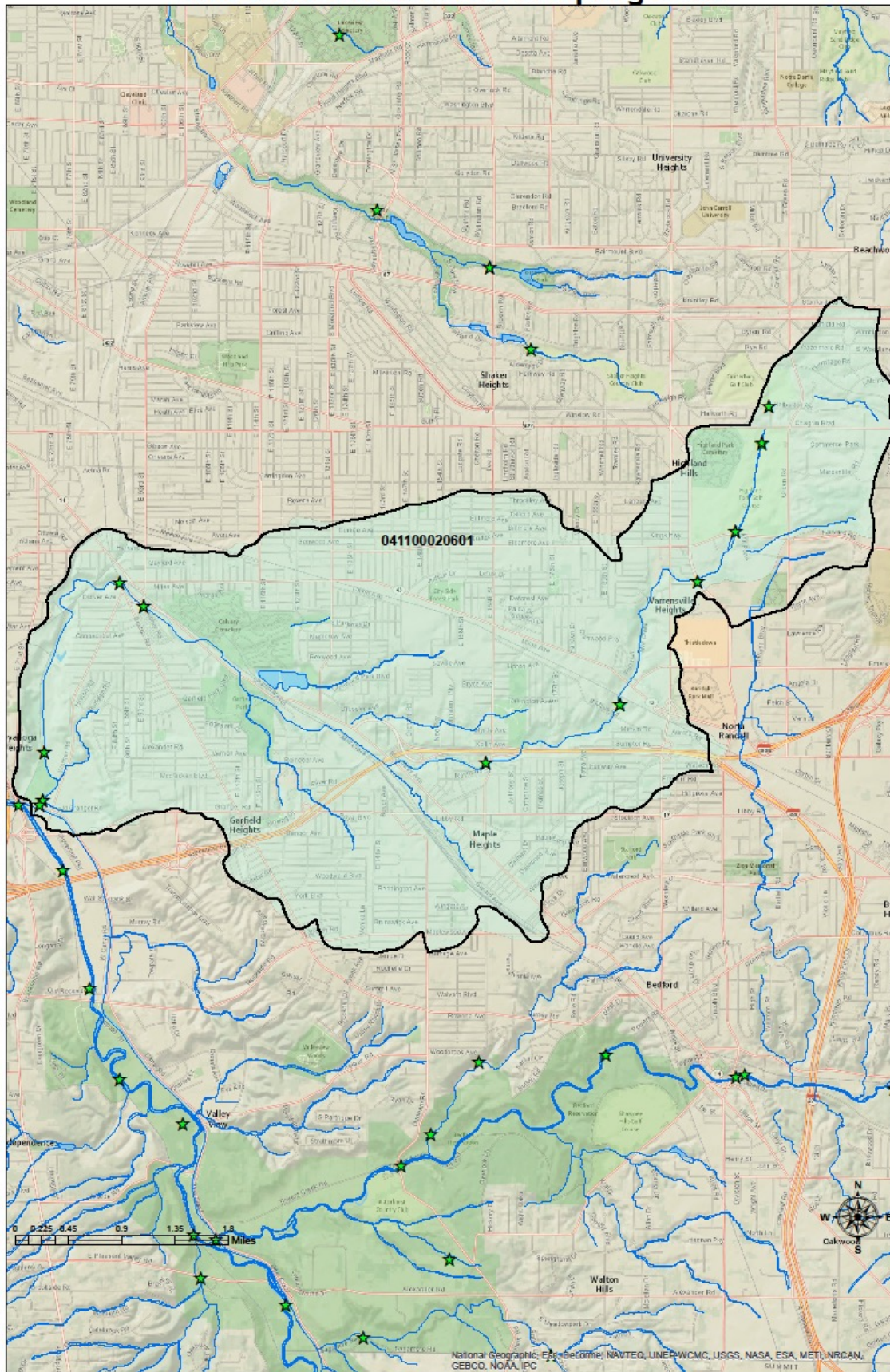


**BUIs applicable to Mill Creek are: 3a, 4, 6, 8, 11, and 14a**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (Recreation Contact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Mill Creek	041100020601	N/A	DOES NOT Meet Target	Meets Target	Meets Target	N/A	Meets Target	N/A	N/A	Meets criteria to begin process for removal	Meets Target



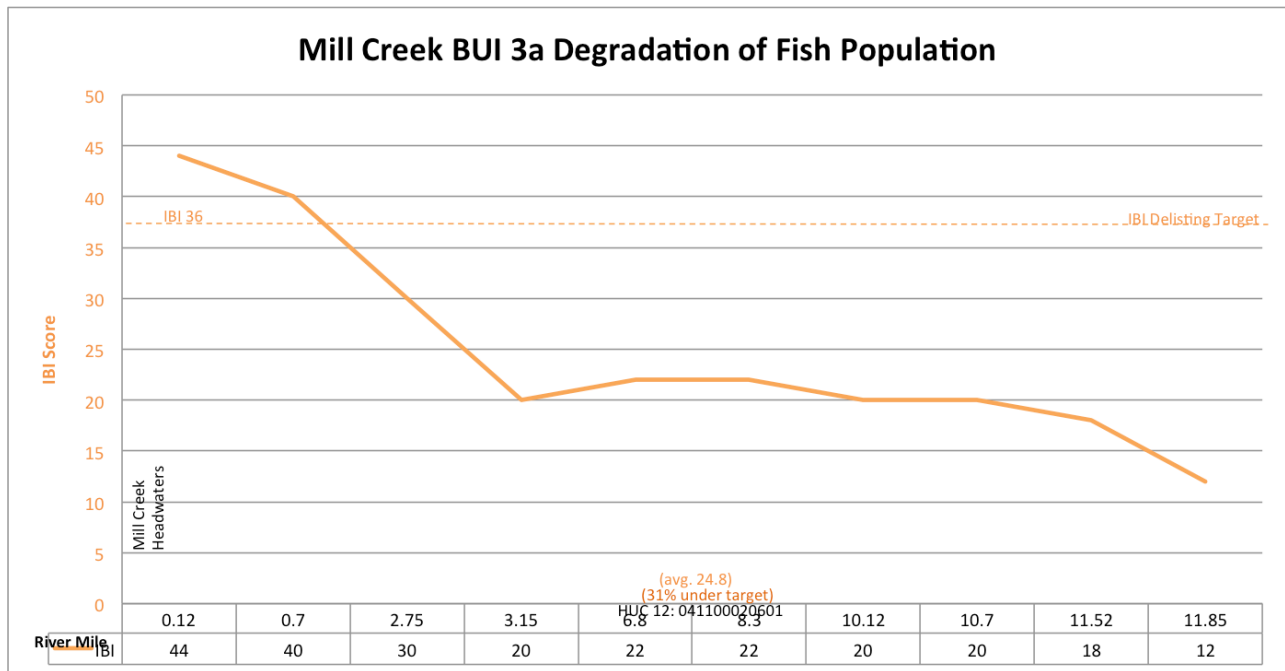
# Mill Creek's HUC12 BUI Sampling Sites



**Specific BUI Statuses for Mill Creek:**

**BUI 3a - Degradation of Fish Populations:**

The delisting target for this HUC 12 is an IBI score of 36 for Headwaters, which is the sole sampling type for IBI in this subwatershed (no MIwb score is necessary for headwaters below 20sq miles of drainage.) The average IBI score for this HUC12 is 25, or 31% below the target.



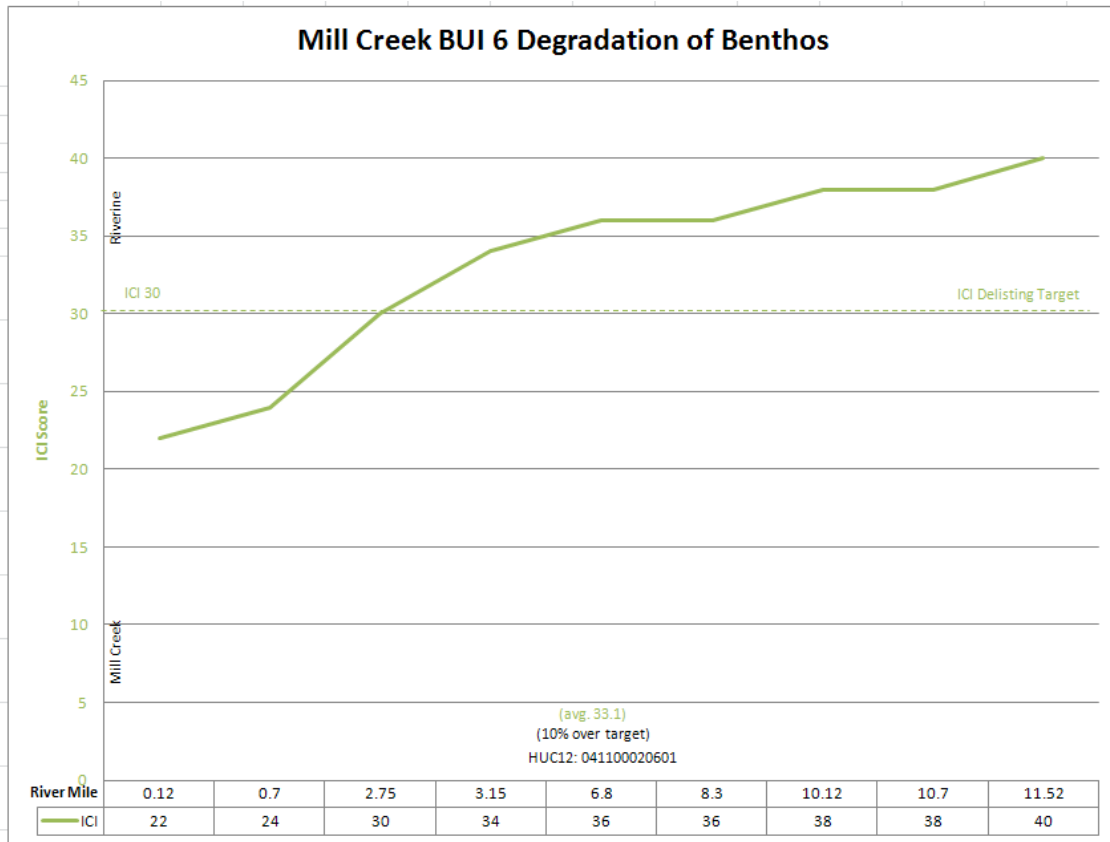
**BUI 4 - Fish Tumors and Other Deformities:**

The delisting target for this BUI is a DELT value of 3% or below for the sites sampled. The average DELT value for this HUC is close to .0007%, derived from DELT sampling data from 2013-14. This subwatershed is within attainment for BUI 4.

**BUI 6 - Degradation of Benthos:**

The delisting target for this BUI is an ICI score of 30. The average of all ICI scores in this HUC is 33, 10% above the delisting target. This HUC is in attainment for removing BUI 6.





**BUI 8 - Eutrophication or Undesirable Algae:**

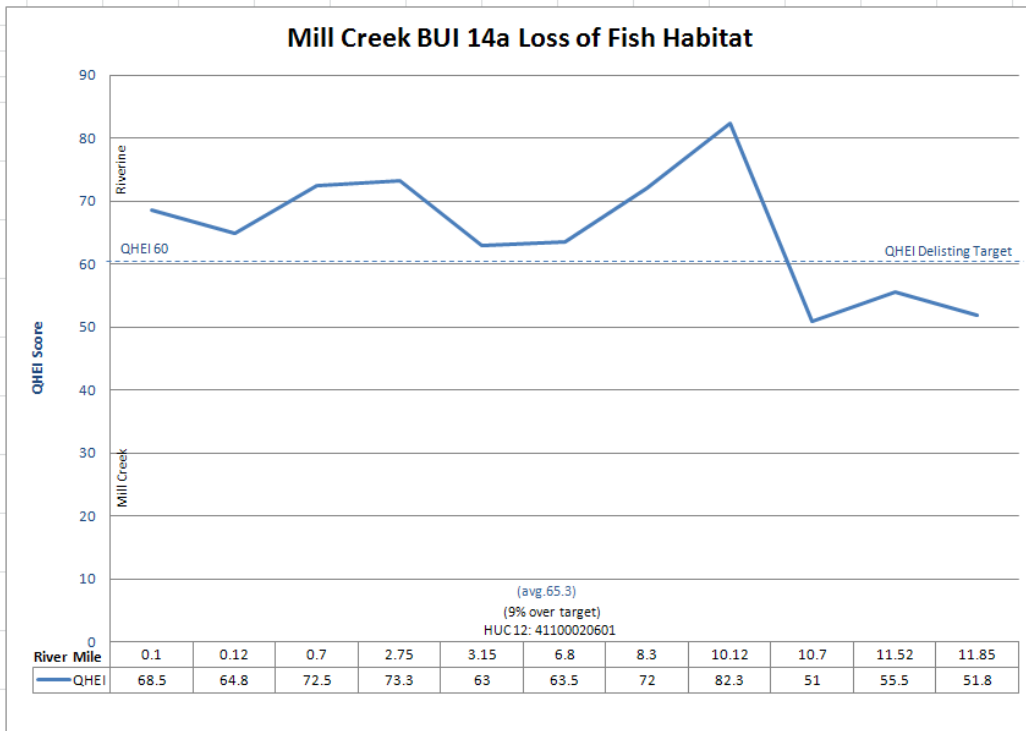
No persistent nuisance growths algae reported. This HUC meets delisting criteria.

**BUI 11 - Degradation of Aesthetics:**

The Aesthetics BUI in this HUC12 is in large part affected by the NEORS D's CSOs. NEORS D is taking measures to reduce CSO discharges. No persistent noxious substances have been reported, and a protocol for validating the presence or absence of aesthetic impairments is being developed. We expect removal of this BUI in the near future.

**BUI 14a - Loss of Fish Habitat:**

The delisting target for this BUI is a QHEI score of 60 for headwaters, the sole sampling type in this HUC. The average score of 65 is 9% above the delisting target. This Cuyahoga River tributary's fish habitat is in attainment for BUI 14a.



**Overview BUI Status for Mill Creek:**

High levels of urbanization in this subwatershed have made it difficult to reach fish population targets. Otherwise, BUIs either reach or are expected to reach delisting targets.

Reviewing the BUI graphs presented in this section you will notice some apparent areas needing attention. Looking at the graph for BUI 3a, Degradation of Fish Population, there is a significant drop in IBI scores upstream of river mile 2.75, ostensibly affected by the fish passage barrier that is Mill Creek Falls. The health of the benthic community is stable throughout the watershed. The only poor conditions for benthos are near the confluence of Mill Creek and the Cuyahoga River. BUI 14a, Loss of Fish Habitat, shows good form throughout the watershed until it reaches river mile 10.7. This is directly downstream from the Highland Park Golf Course and is an incised stream. There are current restoration efforts in this area to remedy the issue of degradation at this particular site. This restoration will help improve the scores at our sampling site at RM 11.52 as well, as it is the northernmost point of Mill Creek on the Highland Park Golf Course. The final site in this graph at river mile 11.82 is located directly downstream from the Canterbury Golf Club. This has also been degraded by the development and management of this area.

**Future actions needed to improve Mill Creek and remove BUIs:**

We will investigate the possibility of obtaining an exemption to the fish population target upstream of the falls due to this natural barrier to fish passage.

Ongoing sampling is needed to ensure the attainment of the targets outlined in this section. A proper number of sites with credible data per BUI, as necessary, should be up to date and scores calculated yearly to show progress of the HUC12.

## Projects

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15				
Mill Creek Stream Restoration	041100020601	Mill Creek	CCBH/Mill Creek Partnership							3	
Restoration of 250 feet of stream corridor.											
Kerruish Park Restoration	041100020601	Mill Creek	CCBH/Mill Creek Partnership							3	
Restoration of 2,000 linear feet of stream corridor of main channel of Mill Creek through public park.											
Mill Creek Quarries Restoration	041100020601	Mill Creek	CCBH/Mill Creek Partnership							3	
Restoration of 30 acres of surface area and 1,500 linear feet of stream channel on main stem of Mill Creek											
Wolf Creek Stream Restoration	041100020601	Mill Creek	Cleveland Metro parks							3	
Stream Restoration at Garfield Reservation Metroparks											

## Headwaters- Chippewa Creek 041100020503

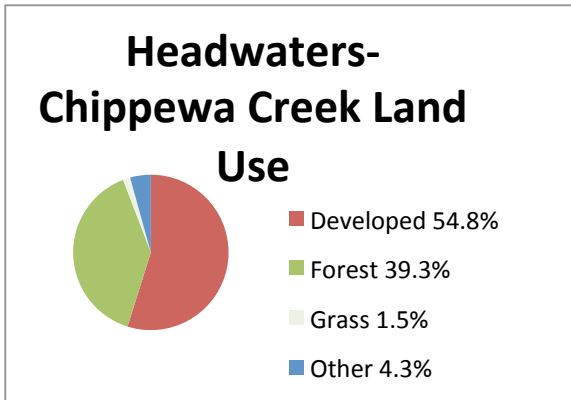
### Associated Tributaries:

- Chippewa Creek

### Overview:

Headwaters-Chippewa Creek, with an area of 17.82 square miles, is the 18<sup>th</sup> largest HUC12 in the AOC (4<sup>th</sup> smallest). The legally designated tributary within this HUC12 is Chippewa Creek. A little over half of the land in this subwatershed is developed (54.8%). The 39.3% forest allows for significant protection of riparian areas in the subwatershed despite increasing development pressures. Much of the watershed and its forested areas are either along steep, undevelopable slopes, or are protected within the Metroparks Brecksville Reservation and Cuyahoga Valley National Park.

It should be noted that this data is quite limited due to the lack of sampling for anything but fish habitat, and that more data is needed in order to complete a realistic analysis of the potential to remove this HUC from the AOC or to remove specific BUIs from the AOC in general.

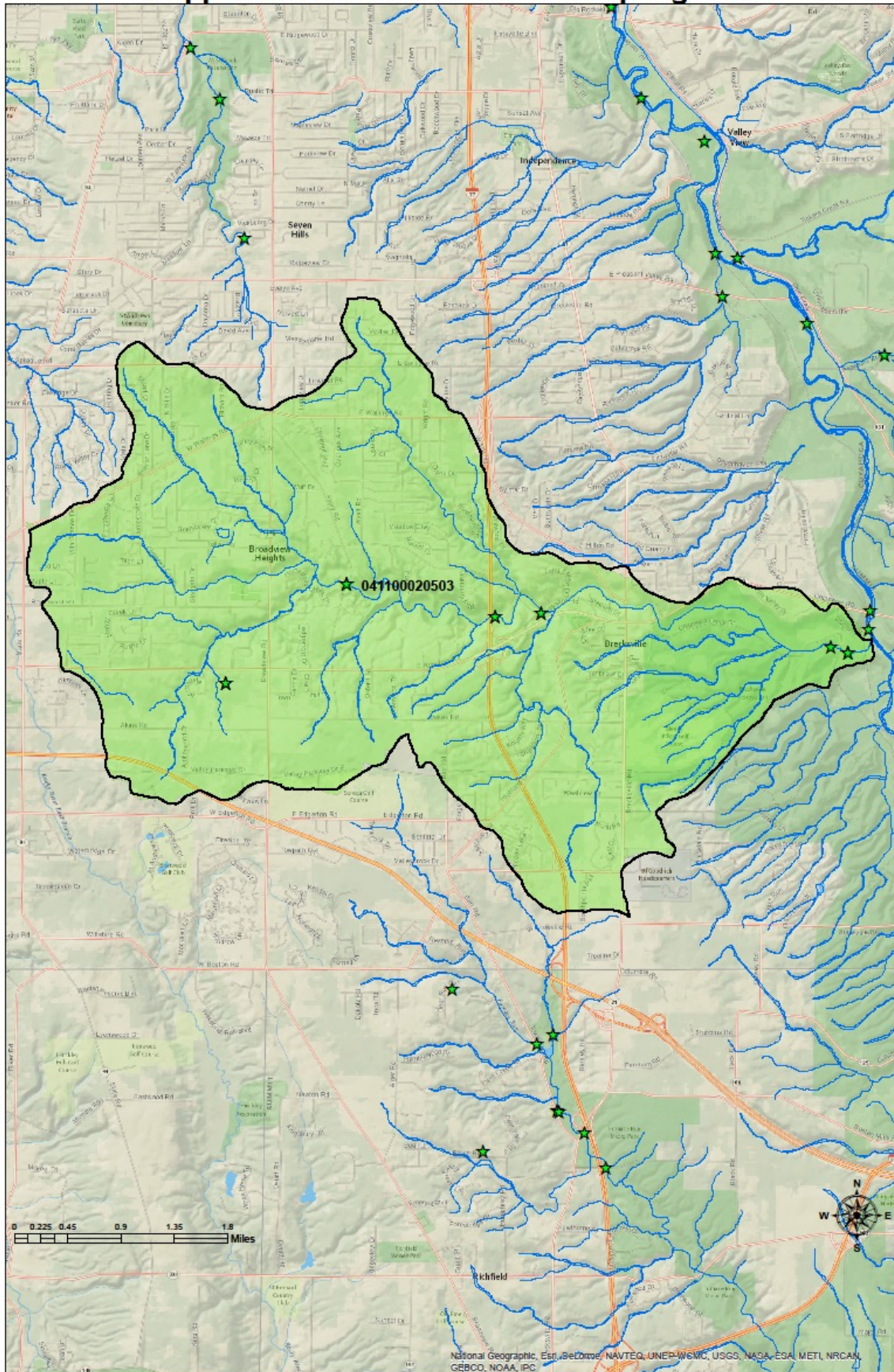


**BUIs applicable to Headwaters- Chippewa Creek are: 3a, 4, 6, 8, 11, and 14a**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (RecreationContact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Headwaters-Chippewa Creek	041100020503	N/A	Needs More Data	Meets Target	No Data Available	N/A	Meets Target	N/A	N/A	Meets criteria to begin process for removal	Meets Target



# Chippewa Creek's HUC12 BUI Sampling Sites



## Specific BUI Statuses for Chippewa Creek:

### BUI 3a - Degradation of Fish Populations:

There were no sampling sites available for analysis at this time in Chippewa Creek. This HUC12 needs at least 4 sites for a solid representative sample for this BUI.

### BUI 4 - Fish Tumors and Other Deformities:

This HUC was not sampled for DELTs in the 2013-2014 schedule.

### BUI 6 - Degradation of Benthos:

There were no sampling sites available for analysis in Chippewa Creek. This HUC12 needs at least 4 sites for a good representation of the benthic community.

### BUI 8 - Eutrophication or Undesirable Algae:

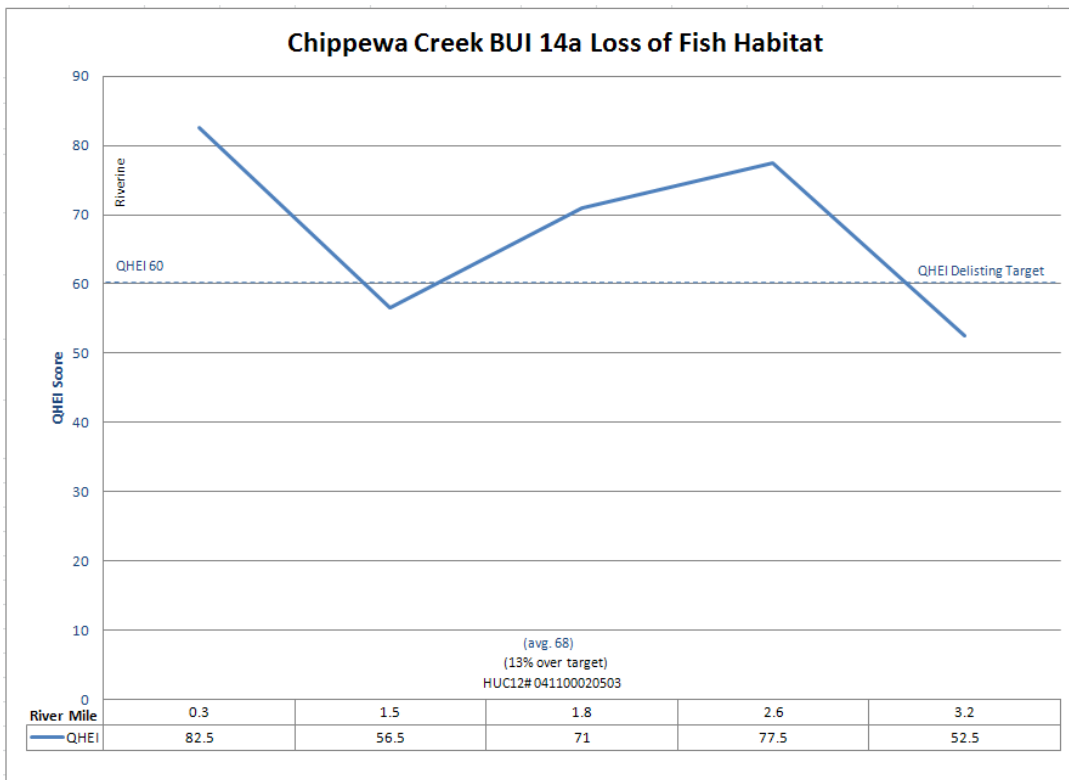
No persistent nuisance growths algae reported. This HUC meets delisting criteria.

### BUI 11 - Degradation of Aesthetics:

The Aesthetics BUI in this HUC12 is assumed to be consistent with other similar HUCs, and no reported persistent instances of impairment have been reported.

### BUI 14a - Loss of Fish Habitat:

The delisting target for this BUI is a QHEI score of 60. The average of the riverine sample site scores is 68, or 13% over the target, putting this HUC in attainment for BUI 14a.



**Overview BUI Status for Chippewa Creek:**

This HUC lacks enough credible data for fish populations, benthos, and DELTs. In order to assess its delisting status, these gaps must be filled.

Reviewing the graph for BUI 14a, Loss of Fish Habitat, this subwatershed shows a good structure to its streams as a whole. There are a couple of scores that don't meet the delisting target, but since this is a heavily developed subwatershed not far from the target, these are not high priority restoration sites.

**Future actions needed to improve Chippewa Creek and remove BUIs:**

We are seeking funding to carry out sampling more stretches of Chippewa Creek for IBI and ICI so we can analyze the status of this subwatershed. Without more data we cannot state the current status.

Ongoing sampling is needed to ensure the attainment of the targets outlined in this section. A proper number of sites with credible data per BUI, as necessary, should be up to date and scores calculated yearly to show progress of the HUC12.

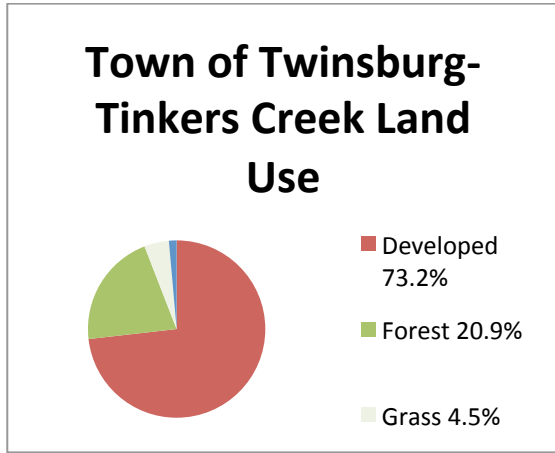


**Town of Twinsburg- Tinker's Creek  
041100020504**

**Associated Tributaries:**  
▪ Tinker's Creek

**Overview:**

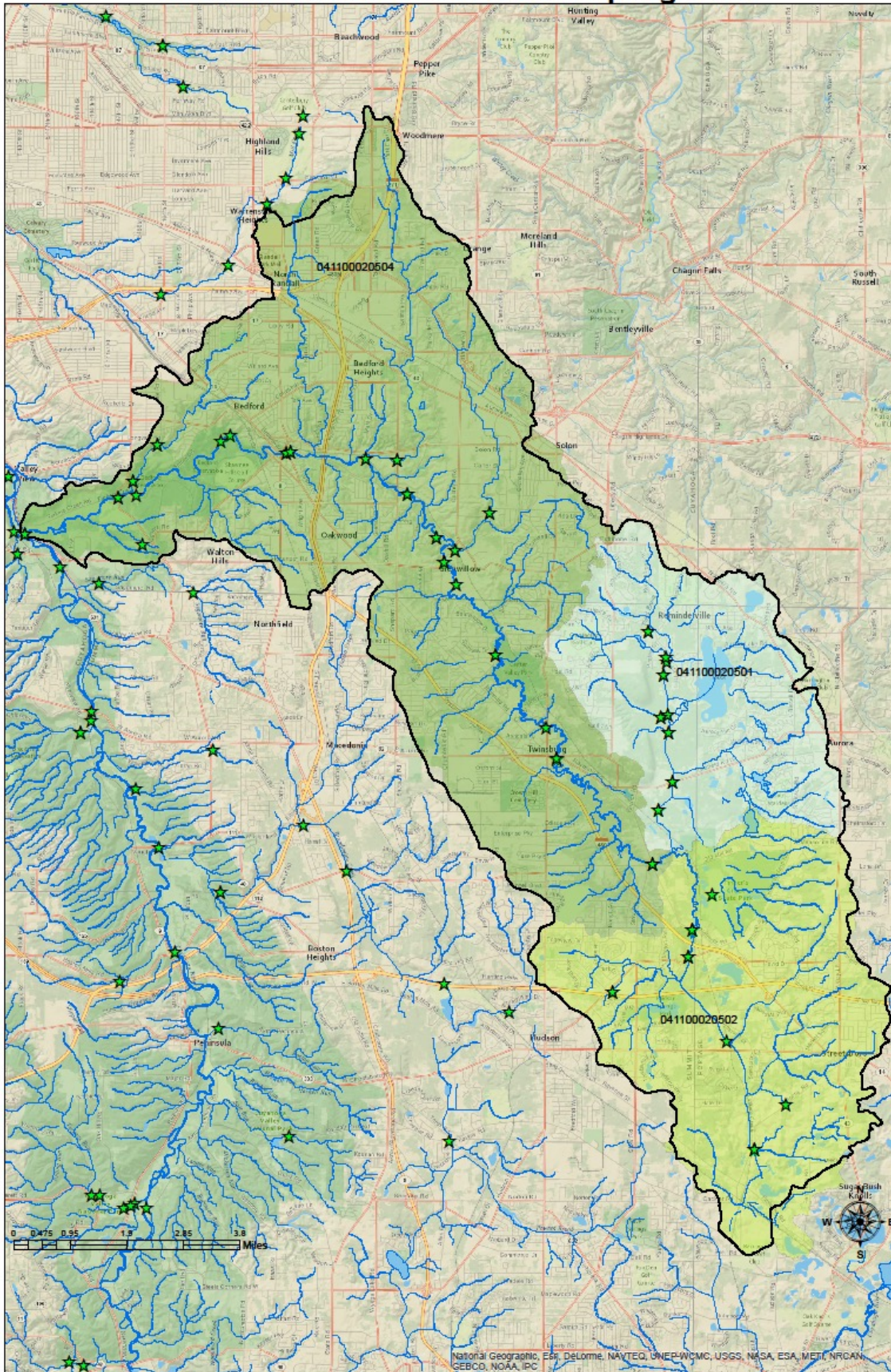
Town of Twinsburg- Tinker's Creek, with an area of 55.53 square miles, is the largest HUC12 in the AOC. Three quarters of the land in this subwatershed is fully developed (73.2%). The AOC legally designated tributary within this HUC12 is Tinker's Creek and includes the main channel of Tinkers Creek as well as the confluence with the Cuyahoga River.



**BUIs applicable to Town of Twinsburg-Tinker's Creek are 3a, 4, 6, 8, 11, and 14a**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (Recreation/Contact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Town of Twinsburg – Tinker's Creek	041100020504	N/A	DOES NOT meet target	Meets Target	No Data Available	N/A	Meets Target	N/A	N/A	Meets criteria to begin process for removal	Meets Target

# Tinker's Creek's HUC12 BUI Sampling Sites

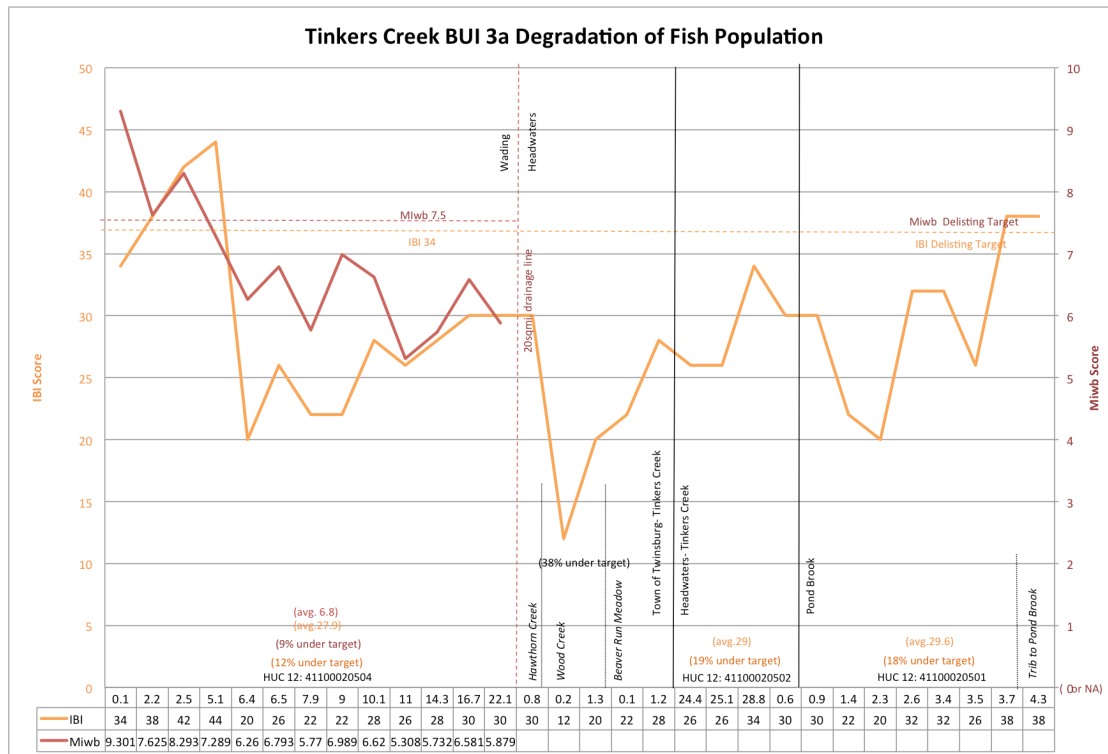




## Specific BUI Statuses for Town of Twinsburg- Tinkers Creek:

### BUI 3a - Degradation of Fish Populations

The delisting target for this HUC 12 is an IBI score of 34 and MIwb score of 7.5 for wading, and an IBI score of 36 for Headwaters (no MIwb score is necessary for headwaters below 20sq miles of drainage.) The average wading site IBI score of 30, taken along the mainstem of Tinker’s Creek, is 13% below the target. In the headwaters sampling sites in tributaries to the main creek, the average IBI of 22.4 is 38% below the target.



### BUI 4 - Fish Tumors and Other Deformities:

The delisting target for this BUI is a DELT value of 3% or under outlined in the Ohio EPA Delisting Guidance (1.3% in wading sites). The DELT value is close to .0015% on average for the subwatershed as derived from DELT sampling data from 2013-14. This subwatershed is within attainment numbers for delisting BUI 4.

### BUI 6 - Degradation of Benthos:

The delisting target for this BUI is an ICI score of 30 . There were no sampling sites and no data available for analysis at this time in Tinkers Creek. This HUC12 needs at least 10 sites for a good representation of the benthic community.

### BUI 8 – Eutrophication or Undesirable Algae:

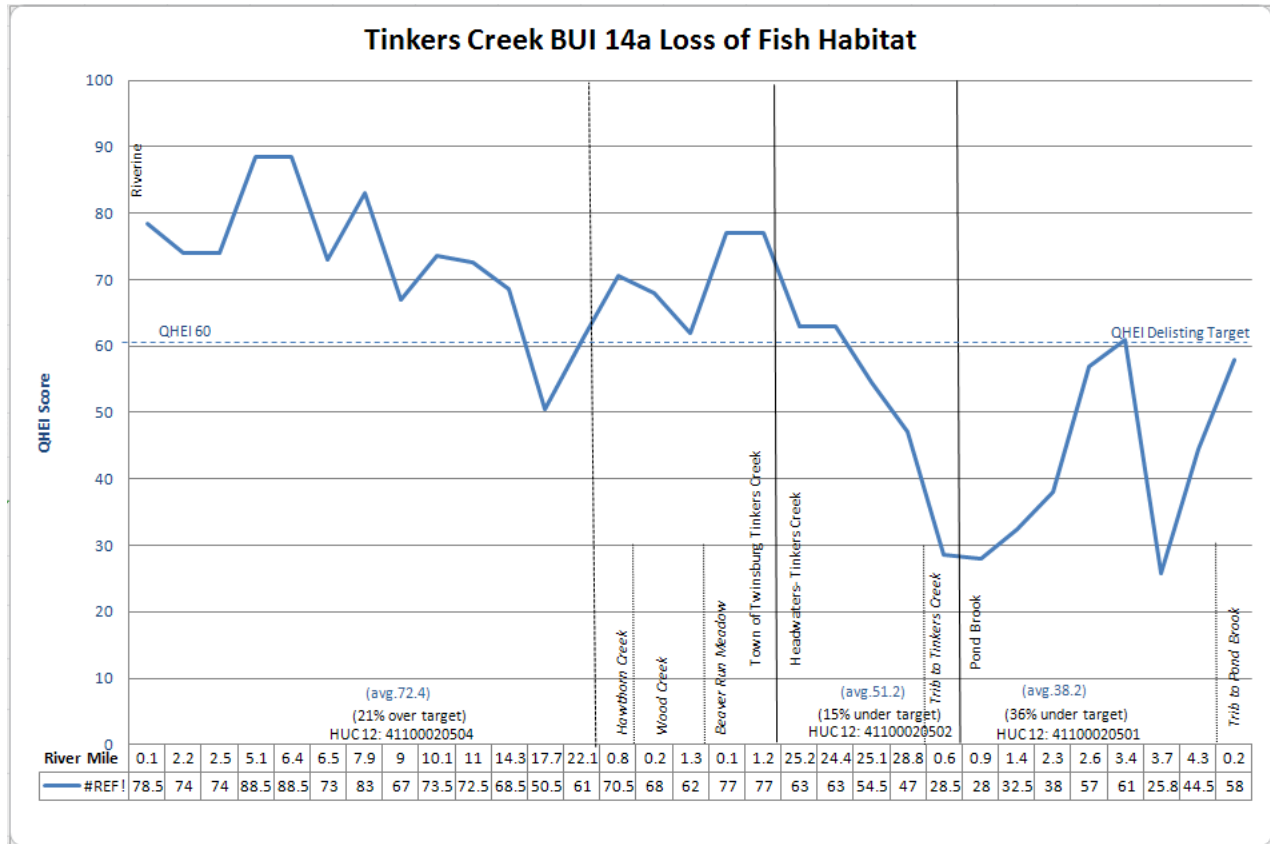
No persistent nuisance growths algae reported. This HUC meets delisting criteria.

### BUI 11- Degradation of Aesthetics:

There have been no known persistent instances of aesthetic impairments. Verification will take place once new protocols are issued. It is expected that this impairment may be removed in the near future.

**BUI 14a- Loss of Fish Habitat:**

The delisting target for this BUI is a QHEI score of 60 for wading and headwaters sites. The average score in the HUC12 is 73, 22% above the target. This HUC12 is in attainment for BUI 14a.



**Overview BUI Status for Town of Twinsburg- Tinkers Creek:**

The fish habitat numbers for this HUC12 are in attainment, but Fish Populations (IBI) are not. There were no credible data sampling sites for benthos in this HUC, so we cannot know how benthic health fits into the equation. Seeing that the fish population numbers do not correlate with the habitat, we are looking into other factors that may be degrading this metric. We will have a better idea as to the current status of this Tinkers Creek HUC when the full representative sample is completed.

Reviewing the BUI graphs presented in this section you will notice some apparent areas needing attention. Looking at the graph for BUI 3a, Degradation of Fish Population, there is a significant drop in IBI scores upstream from river mile 6.4. This is a naturally occurring impairment to migration at the Great Falls at river mile 5.5. We will look into a possible exemption regarding the possibility of ever reaching the target scores upstream from this naturally occurring migratory barrier. BUI 14a, Loss of Fish Habitat, is above target scores for QHEI in general. The only trouble

site in this subwatershed is at river mile 17.7, where the creek is degraded as it runs next to a ball field and near downtown Twinsburg.

**Future actions needed to improve Tinkers Creek and remove BUIs:**

Sampling is needed at an appropriate number of sites in order to have credible data for ICI (benthos) in so as to gauge the status of BUI 6. Analysis of the impact of the falls on fish populations below and above the site is needed, and a determination needs to be made regarding either seeking an exemption for this section of the HUC for BUI 3a or implementing a stocking program should benthos in this stretch prove to support resulting fish populations.

**Projects**

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15	FFY16			
Glenwillow Stream Restoration	041100020504	Tinkers Creek	Tinkers Creek Watershed Partners				NA			3-6-14	
Restoration of 600 linear feet of stream.											
Oakwood Riparian Restoration	041100020504	Tinkers Creek	Tinkers Creek Watershed Partners				\$800,000			3-6-14	
Stream Restoration of 3,000 linear feet.											
Wood Creek Stream Stabilization	041100020504	Tinkers Creek	Tinkers Creek Watershed Partners				NA			3-6-14	
Stream Restoration of 2,000 linear feet.											

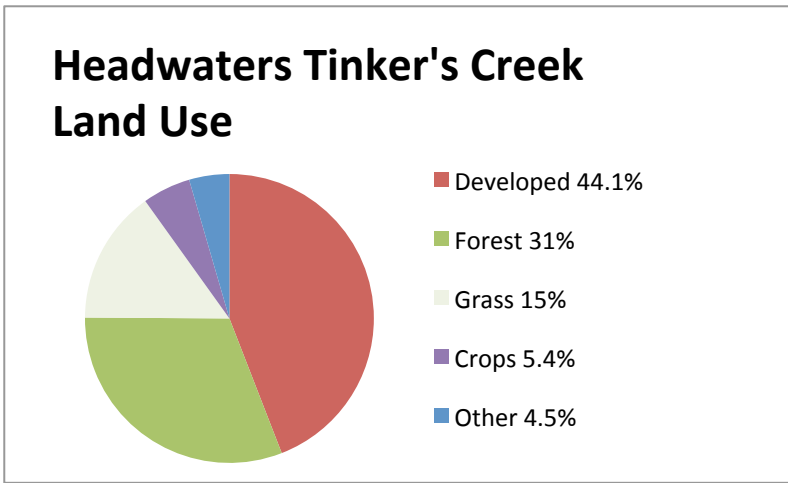
## Headwaters- Tinker's Creek 041100020502

### Associated Tributaries:

- Tinkers Creek

### Overview:

Headwaters- Tinker's Creek, with an area of 25.25 square miles, is the 10<sup>th</sup> largest HUC12 in the AOC. It contains the southernmost headwater streams to Tinkers Creek. Less than half of the land in this subwatershed is developed (44.1%). The 31% forest cover and 15% grass makes this a prime candidate for restoration. Many of the headwater streams through this subwatershed are protected. This gives this headwater HUC12 a high ecological value in the AOC.

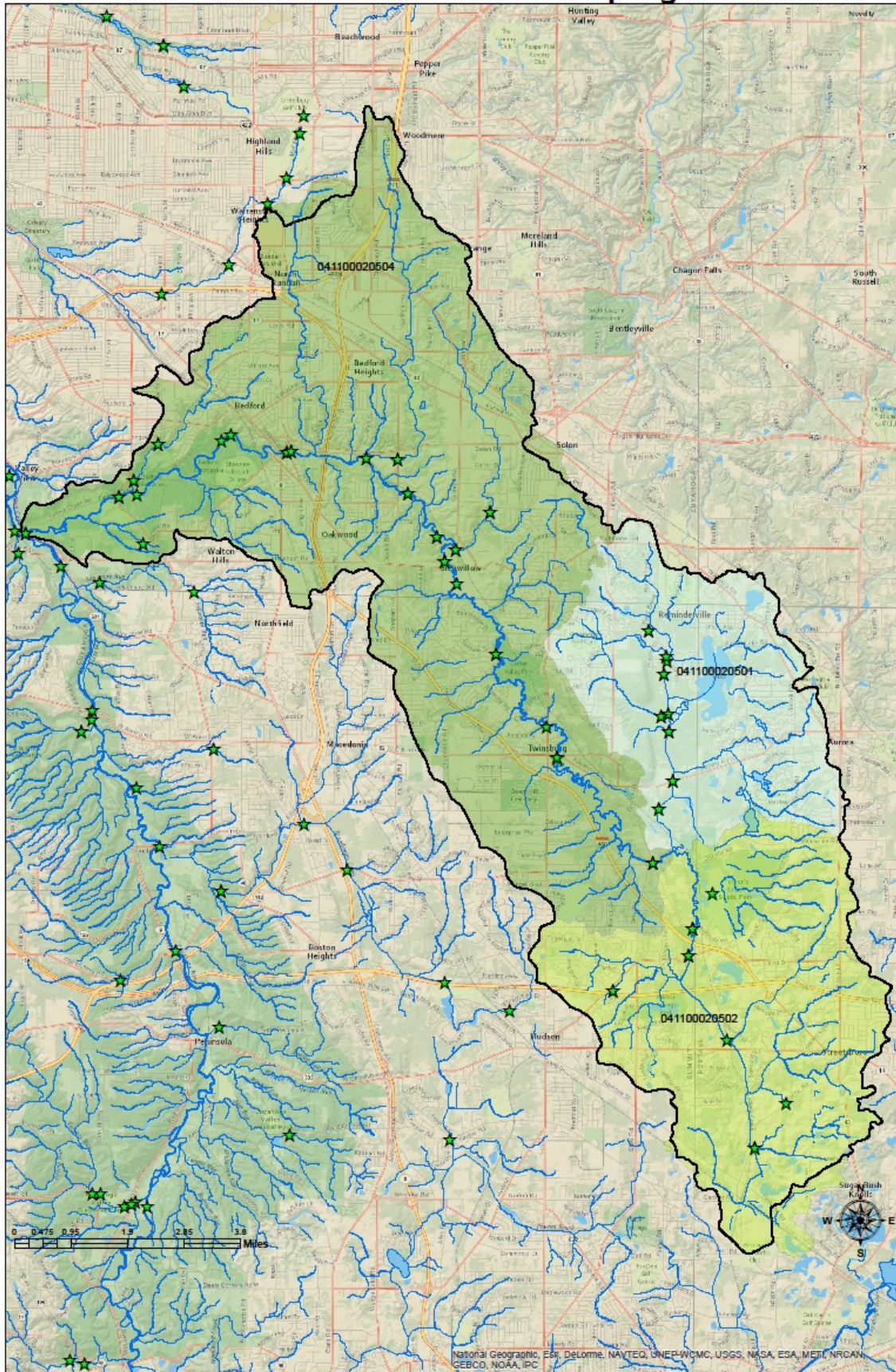


**BUIs applicable to Headwaters- Tinkers Creek are: 3a, 4, 6, 8, 11, and 14a**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (RecreationContact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Headwaters – Tinker's Creek	041100020502	N/A	Needs More Data	Meets Target	No Data Available	N/A	Meets Target	N/A	N/A	Meets Target	DOES NOT meet target



# Tinker's Creek's HUC12 BUI Sampling Sites

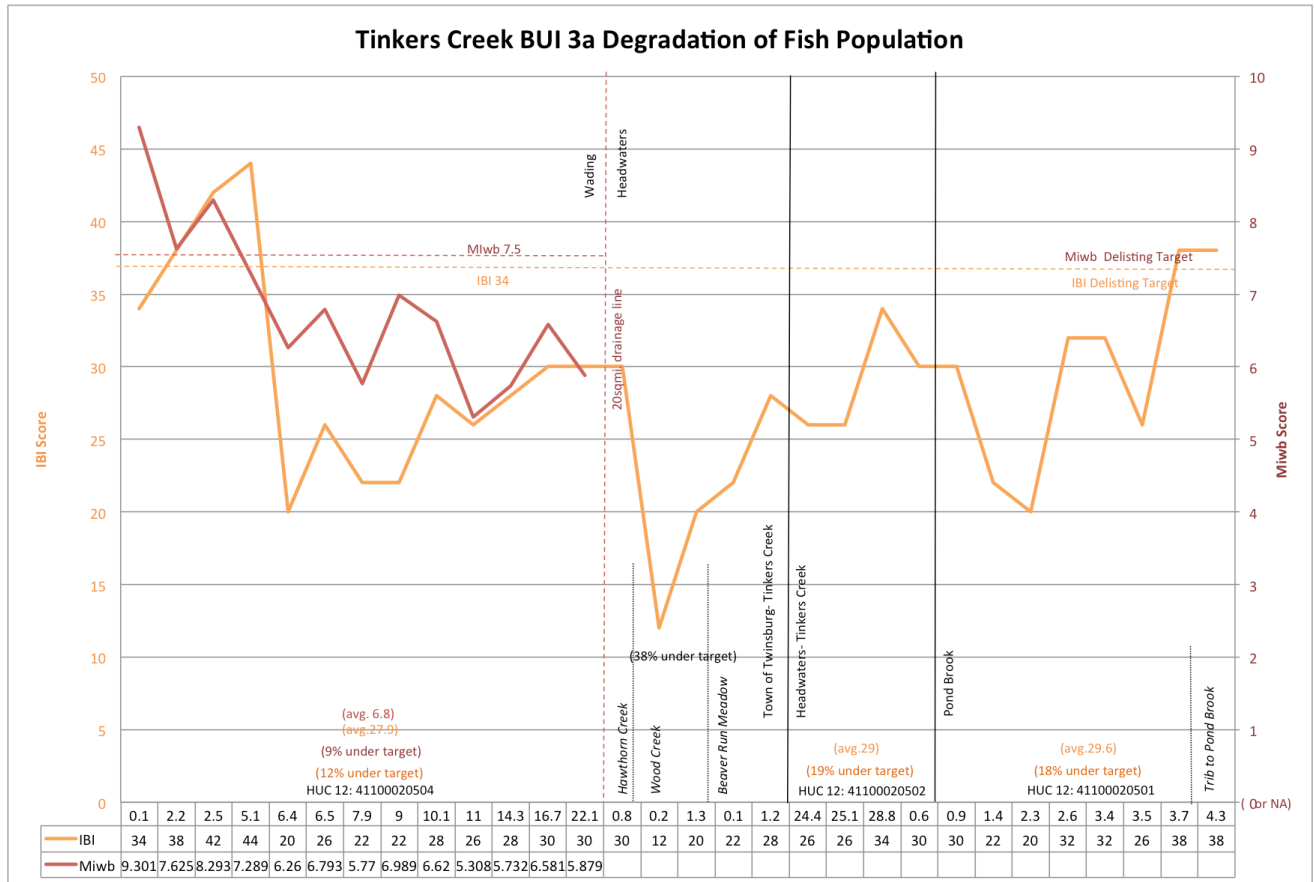




**Specific BUI Statuses for Headwaters- Tinkers Creek:**

**BUI 3a- Degradation of Fish Populations:**

The delisting target for this HUC 12 is an IBI score of 36 for Headwaters (no MIwb score is necessary for headwaters below 20sq miles of drainage.) This HUC12’s average IBI of 29 is 15% below the delisting target, well below attainment for removing BUI 3a.



**BUI 4- Fish Tumors and Other Deformities:**

The delisting target for this BUI is a DELT value of 3% or under (1.3% in wading sites.) The DELT value here is close to .0031% on average for the subwatershed. This subwatershed is within attainment for delisting BUI 4. This number was derived from the DELT sampling data from 2013-14.

**BUI 6- Degradation of Benthos:**

There were no credible data sampling sites available for analysis at this time in Tinkers Creek. This HUC12 needs at least 7 sites for a good representation of the benthic community.

**BUI 8- Eutrophication or Undesirable Algae:**

No persistent nuisance growths algae reported. This HUC meets delisting criteria.

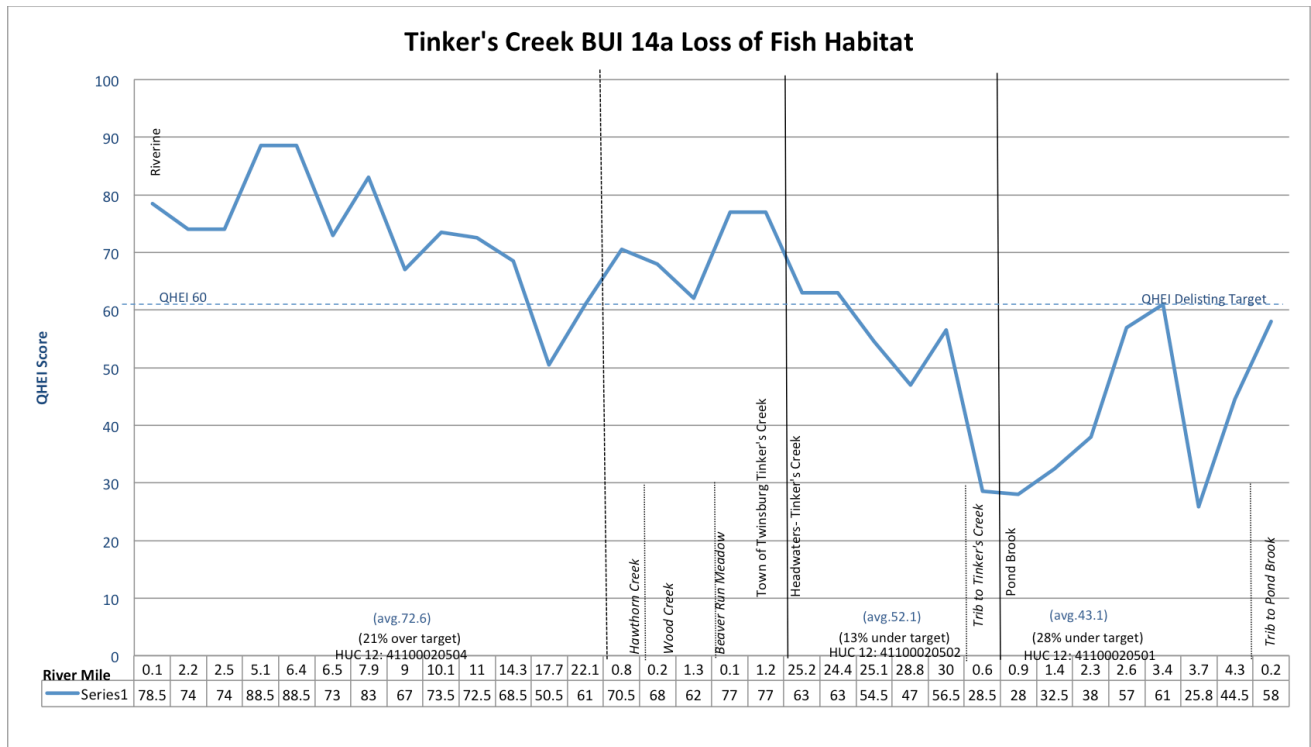
**BUI 11- Degradation of Aesthetics:**

Both municipalities here have MS4 permits, and with some of the watershed being in the Akron Wastewater Treatment Sewershed, the long term management of this HUC12’s CSO

outfalls are under control. With this criteria, and no reported persistent aesthetic impairments, this BUI is under consideration for removal.

**BUI 14a- Loss of Fish Habitat:**

The delisting target for this BUI is a QHEI score of 60 for Riverine (wading/headwaters) sites. The average QHEI here is 52, or 13% below target. Most of the sampling here is 5 – 8 years old, however, indicating that it is worth updating the QHEI sampling to gain a more recent analysis.



**Overview BUI Status for Headwaters- Tinker’s Creek:**

All of the BUI metrics relating to fish population, habitat, and benthos in this HUC12 are below attainment. The QHEI and IBI are well below the targets and there is insufficient credible data currently available for ICI. We will have a better idea as to the current status of this Tinkers Creek HUC when the full representative sample is completed.

Reviewing the BUI graphs presented in this section you will notice some areas needing attention. For BUI 3a, Degradation of Fish Population, scores may be low as a result of the waterfall in HUC12 041100020504 hindering movement of fish into the headwaters for reproduction, which would show this subwatershed as impaired for fish population. We will look into a possible exemption, or a way to remedy this that might allow this area to reach the target scores upstream from this naturally occurring migratory barrier. For BUI 14a, Loss of Fish Habitat, the site at river mile 25.5 is located between I-480 and I-80 where the stream is heavily incised. The site upstream at river mile 28.8 is at a confluence point that is receiving run-off from an agricultural field, a major factor in the degradation of habitat in this stretch of stream. The final sampling point in this subwatershed, on the tributary to Tinkers Creek at river mile 0.6 showing poor habitat, is directly north of the

ballfields at Hudson High School. This location has recently undergone a restoration project that may remedy this situation.

**Future actions needed to improve Headwaters- Tinkers Creek and remove BUIs:**

Full credible data sampling of benthos at seven sites is needed in order to present a score to compare with targets.

Stream restoration projects are needed in areas where degradation has reduced fish habitat.

A solution to reduced fish populations is needed, either as an exemption recognizing the barrier to fish migration into the headwaters or as a repopulation plan for resident fish in the upper reaches.

**Projects**

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15	FFY16			
Streetsboro Stream Restoration	041100020502	Headwaters Tinkers Creek	Tinkers Creek Watershed Partners				NA			3-6-14	
Restoration of 2,000 linear feet of stream											
Herrick Fen Dam Removal	041100020502	Headwaters Tinkers Creek	Tinkers Creek Watershed Partners				NA			3-6-14	
Dam removal											

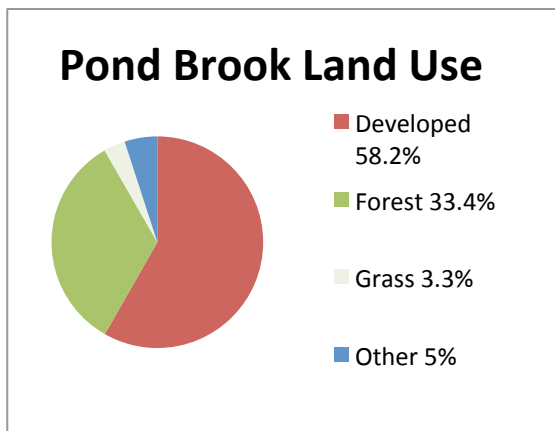
**Pond Brook  
041100020501**

**Associated Tributaries:**

- Tinker’s Creek

**Overview:**

Pond Brook, with an area of 16.62 square miles, is the 20<sup>th</sup> largest HUC12 in the AOC (2<sup>nd</sup> smallest). It is a headwater HUC12 to Tinker’s Creek and houses a unique set of “ponds” which allows for significant inland water retention in the area. More than half the land in this subwatershed is fully developed (58.2%). The 33.4% forest cover offsets some of the development ecologically and will allow for restoration and re-naturalization of the area.

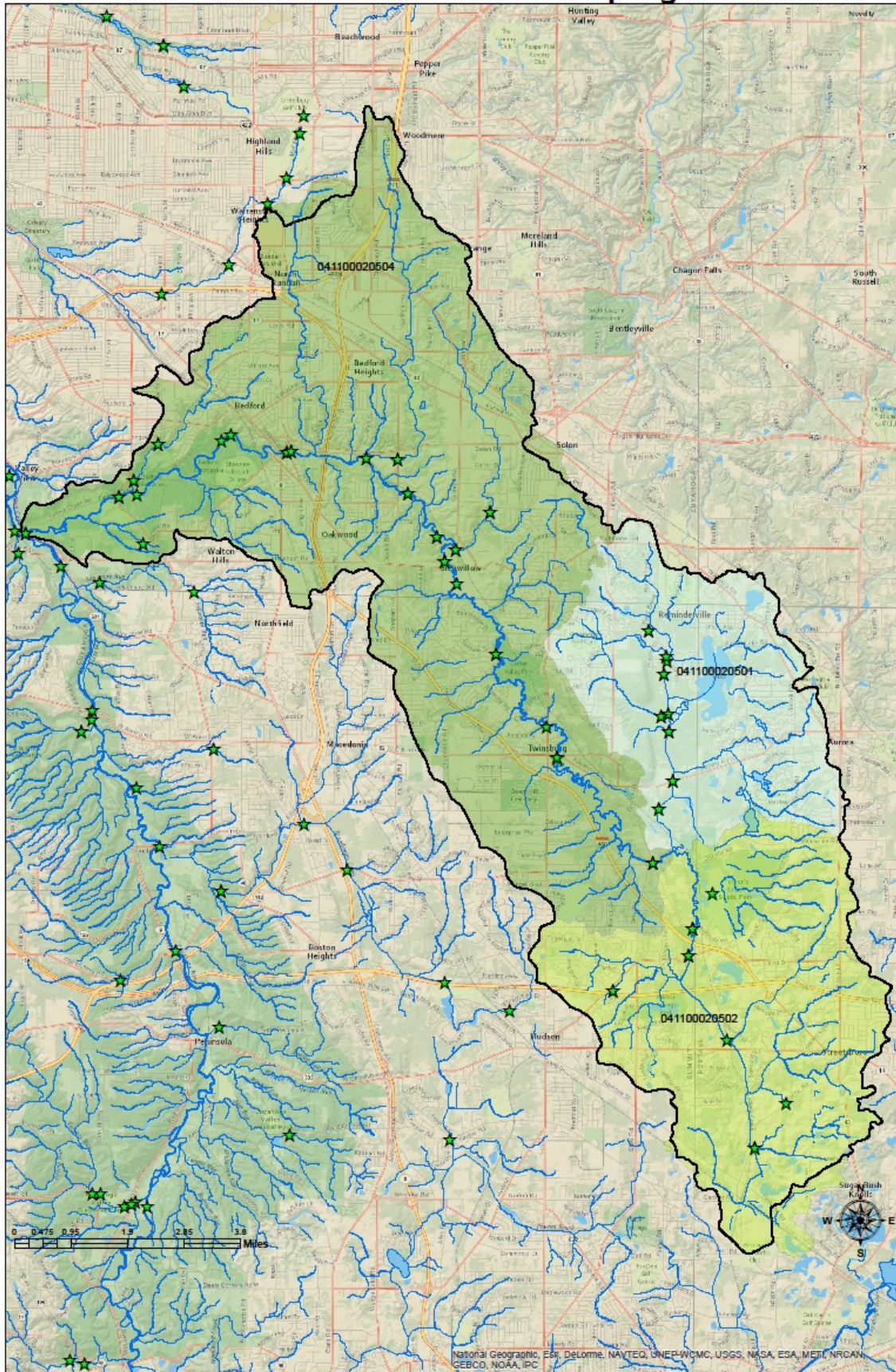


**BUIs applicable to Pond Brook are: 3a, 4, 6, 8, 11, and 14a**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (RecreationContact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Pond Brook – Tinker’s Creek	041100020501	N/A	DOES NOT meet target	Meets Target	No Data Available	N/A	Meets Target	N/A	N/A	Meets Target	DOES NOT meet target



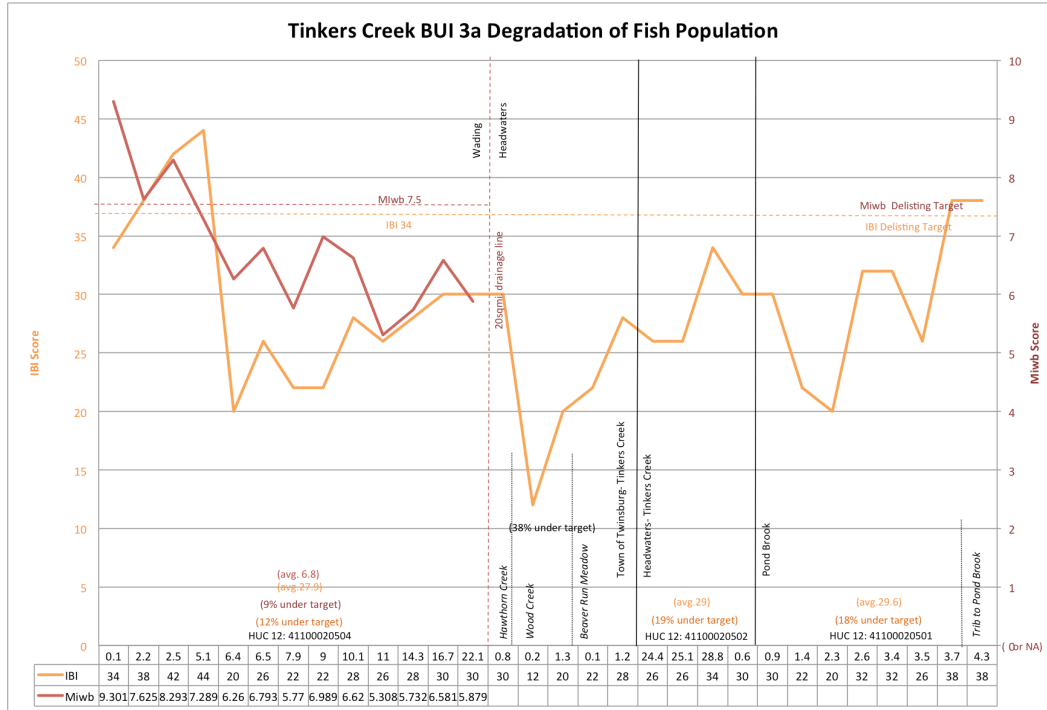
# Tinker's Creek's HUC12 BUI Sampling Sites



**Specific BUI Statuses for Pond Brook:**

**BUI 3a- Degradation of Fish Populations:**

The delisting target for this HUC 12 is an IBI score of 36 for Headwaters (no MIwb score is necessary for headwaters below 20sq miles of drainage.) The average score for his HUC12, where all sampling sites are headwaters type, is 29.5, or 17% below the delisting target, well below attainment for BUI 3a.



**BUI 4- Fish Tumors and Other Deformities:**

The delisting target for this BUI is a DELT value of 3% or below. Here the DELT value is close to .0007% on average for the subwatershed. This subwatershed is within attainment for BUI 4. This number was derived from the DELT sampling data from 2013-14.

**BUI 6- Degradation of Benthos:**

There were no credible data sampling sites for analysis at this time in Tinker’s Creek. This HUC12 needs at least 4 sites for a good representation of the benthic community.

**BUI 8- Eutrophication or Undesirable Algae:**

No persistent nuisance growths algae reported. This HUC meets delisting criteria.

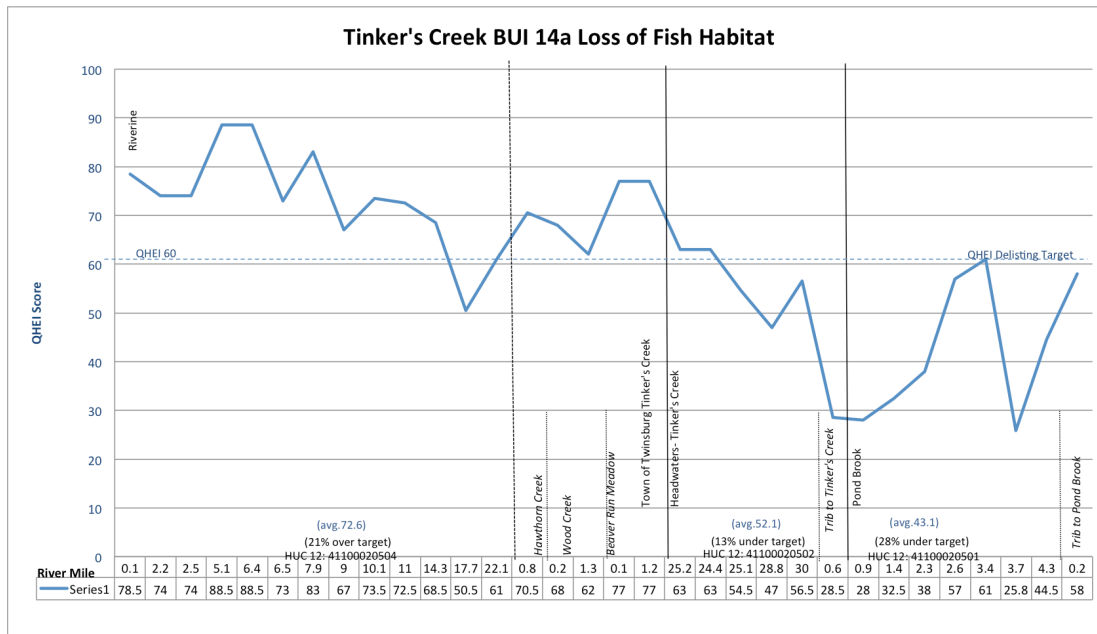
**BUI 11- Degradation of Aesthetics:**

With all communities having MS4 permits, as well as some area of the watershed being in the Akron Wastewater Treatment Sewershed, the long term management of this HUC12’s CSO outfalls are under control and meet the criteria for removing this BUI.

**BUI 14a- Loss of Fish Habitat:**

The delisting target for this BUI is a QHEI score of 60. This HUC12 is 28% below the delisting target with an average score of 43.





### Overview BUI Status for Pond Brook:

The BUI metrics related to fish and habitat in this HUC12 are below targets for removal of this BUI. The lack of credible data sampling sites for ICI prevents a status analysis for benthos. We will have a better idea as to the current status of Tinker’s Creek when the full representative sample is completed.

For BUI 3a, Degradation of Fish Population, the scores may be low as a result of the waterfall downstream in HUC12 041100020504 hindering movement of fish into the headwaters. We will look into the possibility of seeking an exemption to the targets, a modification thereof, or a way to remedy the effects of this naturally occurring migratory barrier. There are 2 sites that do reach attainment targets for IBI, both of which are directly upstream from Aurora Lake where a natural population exists. This is a unique location that does not have either positive or negative implications on the rest of the subwatershed.

Recently completed restoration projects by Summit Metroparks may raise fish habitat scores, so ongoing monitoring of these areas is in order.

### Future actions needed to improve Pond Brook and remove BUIs:

Full credible data sampling of benthos at at least four sites is needed in order to present a realistic score to compare with targets.

Stream restoration projects are needed in areas where degradation has reduced fish habitat.

A solution to reduced fish populations is needed, either as an exemption recognizing the barrier to fish migration into the headwaters or as a repopulation plan for resident fish in the upper reaches.

## Brandywine Creek 041100020404

### Associated Tributaries:

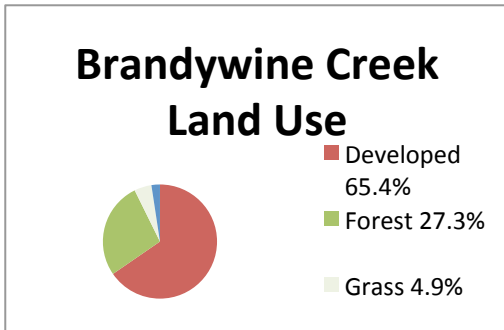
- Brandywine Creek

### Overview:

Brandywine Creek, with an area of 27.06 square miles, is the 9<sup>th</sup> largest HUC12 in the AOC. A significant portion of the subwatershed is controlled by CVNP, the rest is designated for residential and development. Over half of the land in this subwatershed is developed (65.4%). The 27.3% forest cover is located mainly near the waterways, which allows for some restoration.

Development pressure is a major concern for Brandywine Creek. It contains some of the fastest-growing communities, and major freeways that connect Cleveland and Akron metropolitan areas, which means that managing stormwater is an increasing problem especially as it impacts the national park. Although much effort has been made to conserve wetlands, loss of these amenities is an ongoing challenge.

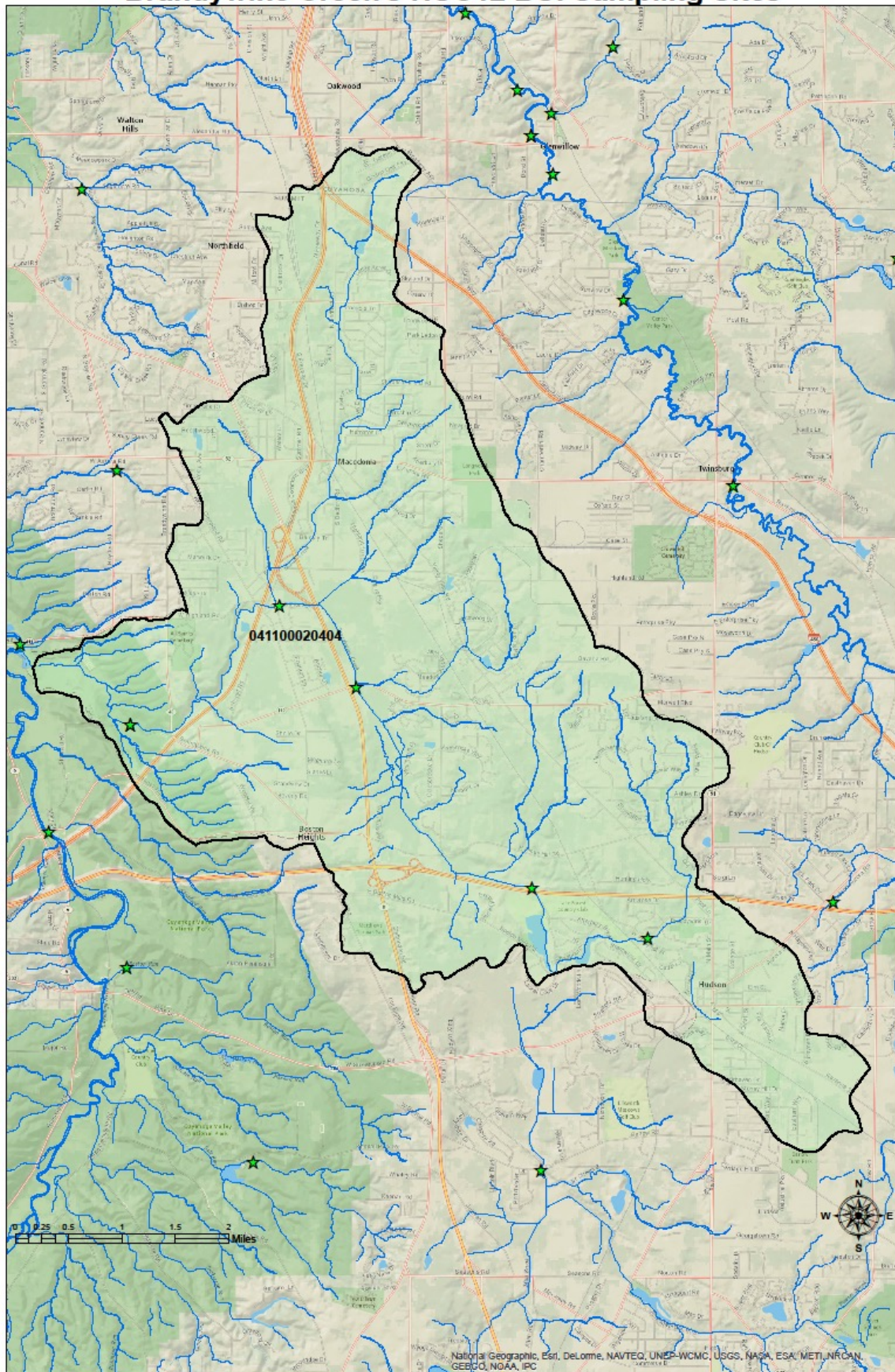
There has been very little credible data collected in this HUC that would allow for a reasonable analysis of the status of this watershed.



**BUIs applicable to Brandywine Creek are: 3a, 4, 6, 8, 11, and 14a**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (RecreationContact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Brandywine Creek	041100020404	N/A	Needs More Data	Meets Target	No data available	N/A	Meets Target	N/A	N/A	Meets criteria to begin process for removal	Meets Target

# Brandywine Creek's HUC12 BUI Sampling Sites





**Specific BUI Statuses for Brandywine Creek:**

**BUI 3a- Degradation of Fish Populations:**

The delisting target for this HUC 12 is an IBI score of 36 for Headwaters and an MIwb score of 7.5 for wading. There were no credible data sampling sites available for analysis at this time. This HUC12 needs at least 7 sites for a solid representative sample for this BUI.

**BUI 4- Fish Tumors and Other Deformities:**

The delisting target for this BUI is a DELT value of 3% or below. The DELT value is 0000% on average for the subwatershed. This subwatershed is within attainment numbers for delisting BUI 4. This number was derived from the DELT sampling data from 2013-14.

**BUI 6- Degradation of Benthos:**

There were no credible data sampling sites available for analysis at this time in Brandywine Creek. This HUC12 needs at least 7 sites for a good representation of the benthic community.

**BUI 8- Eutrophication or Undesirable Algae:**

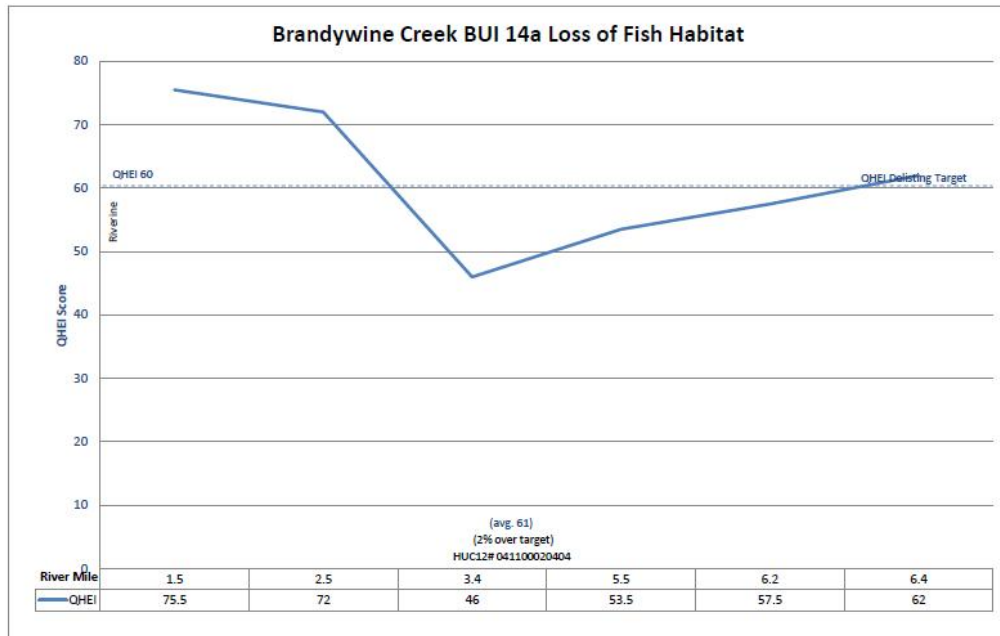
No persistent nuisance growths algae reported. This HUC meets delisting criteria.

**BUI 11- Degradation of Aesthetics:**

With no persistent instances of aesthetic impairments reported, it is reasonable to include this HUC in a request for removal of this BUI, pending a new sampling protocol being developed by Ohio EPA.

**BUI 14a- Loss of Fish Habitat:**

The delisting target for this BUI is a QHEI score of 60 for wading/ headwaters sites. The average score of 61 is 2% over the target. Such a large subwatershed, with a score barely above the target, and with so many communities developing large areas of undeveloped land, needs constant observation and frequently updated data to confirm that this assessment is valid.



## Overview BUI Status for Brandywine Creek:

We are seeking sources to sample stretches of Brandywine Creek so we can analyze the status of this subwatershed for IBI (BUI3a) and ICI (BUI 6). Without more data we cannot accurately report the current status of fish populations and benthos.

The Brandywine Balanced Growth Plan and Watershed Partnership have identified areas for conservation, where updated data should be collected.

## Future actions needed to improve Brandywine Creek and remove BUIs:

Reviewing the graph for BUI 14a, Loss of Fish Habitat, the site at river mile 3.4 scored lowest. This has to do with industrial development directly adjacent to the creek. This area, along with sites at RM5.5 and RM6.2 need restoration and protection from further degradation.

The gaps in credible data must be filled in order to gain a worthwhile picture of the state of the watershed.

## Projects

Project	HUC-12	Watershed	Managin g Project	Fundin g Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15	FFY16			
Stanford Run Stream Restoration	041100020404	Brandywin e Creek	Cuyahog a Valley National Park	GLRI-NPS?			NA			3-6-14	Planning completed
Stream Restoration of 2,000 linear feet.											
Former Cuyahoga County Youth Developmt Ctr.	041100020404	Brandywin e Creek	NEFCO	Reques ting GLRI	Nov. 2014 / Dec. 2015	\$15,000	\$485,000		2015	3 - 14	
This project in the City of Hudson is along Brandywine Creek at RM 7.0 to 8.05. The project has three potential stream restoration areas totaling over 6,000 lf of stream with poor QHEI scores. Two sites are located at the former Cuyahoga County Youth Development Center purchased by Summit County and the City of Akron. The third site is adjacent to the Development Center and is owned by the Ohio Turnpike Commission. The project includes grading the stream to reconnect it with habitat features and an active floodplain.											

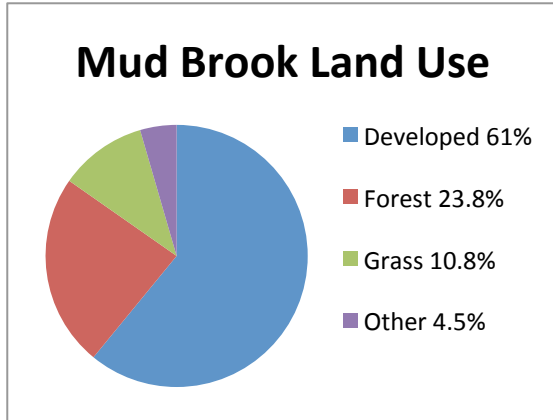
## Mud Brook 041100020401

### Associated Tributaries:

- Mud Brook

### Overview:

Mud Brook, with an area of 29.77 square miles, is the 8<sup>th</sup> largest HUC12 in the AOC. Over half of the land in this subwatershed is fully developed (61%). Much of the 23.8% forest cover and 10.8% grasslands are within the control of the CVNP or the Summit County Metroparks. The AOC legally designated tributaries within this HUC12 include the tributary of Mud Brook. In this section, the applicable BUIs will be analyzed as well as statements on what is being done to remedy these impairments, known sources, and what still needs to be done.

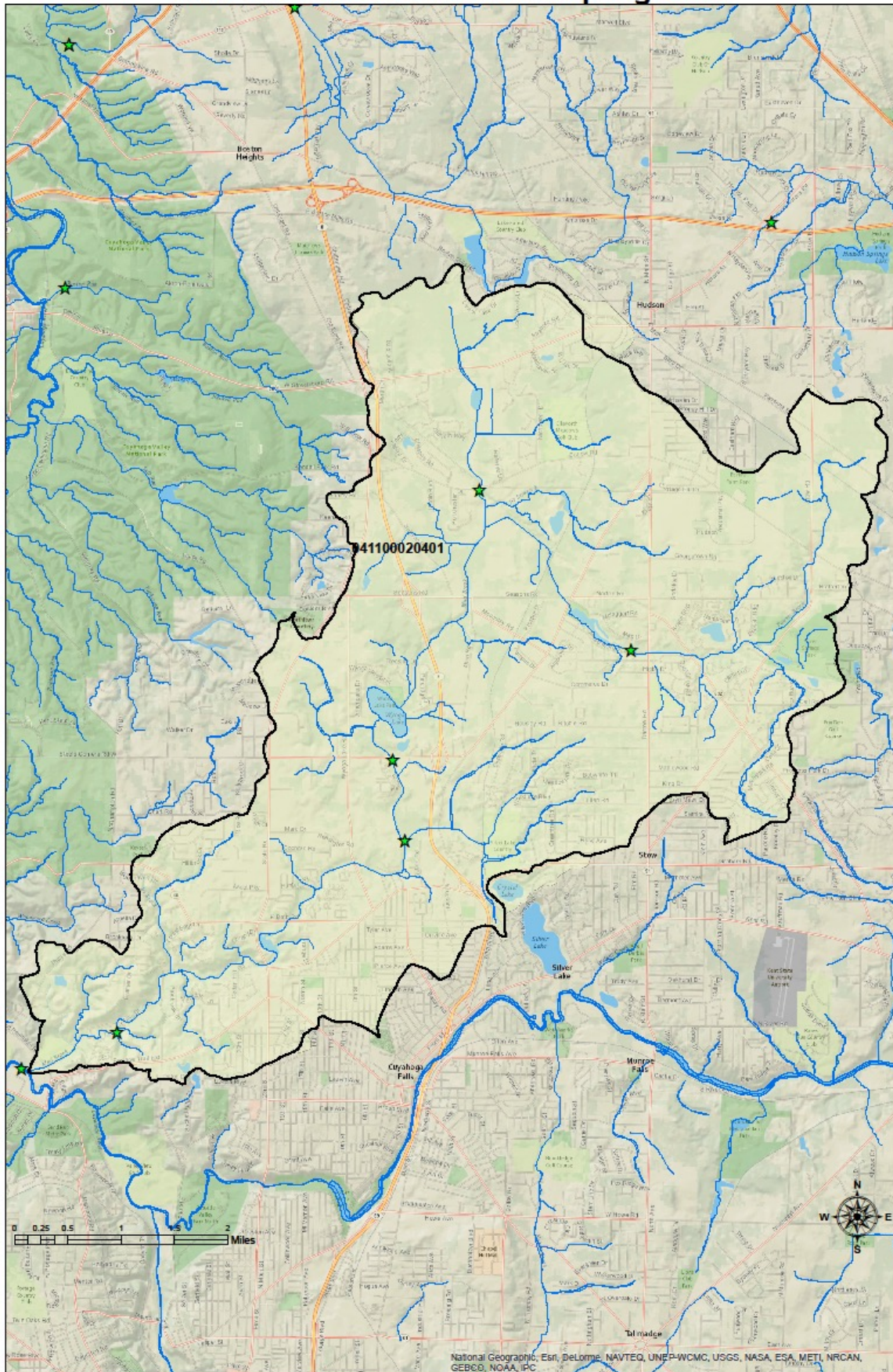


**BUIs applicable to Mud Brook are: 3a, 4, 6, 8, 11, and 14a**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (RecreationContact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Mud Brook	041100020401	N/A	No Data Available	Meets Target	No Data Available	N/A	Meets Target	N/A	N/A	Meets criteria to begin process for removal	Meeds More Data



# Mud Brook's HUC12 BUI Sampling Sites



**Specific BUI Statuses for Mud Brook:**

**BUI 3a- Degradation of Fish Populations:**

There were no sampling sites available for analysis at this time. This HUC12 needs at least 7 sites for a solid representative sample for this BUI.

**BUI 4- Fish Tumors and Other Deformities:**

This HUC has not been sampled for DELTs.

**BUI 6- Degradation of Benthos:**

There were no sampling sites available for analysis. This HUC12 needs at least 7 sites for a good representation of the benthic community.

**BUI 8- Eutrophication or Undesirable Algae:**

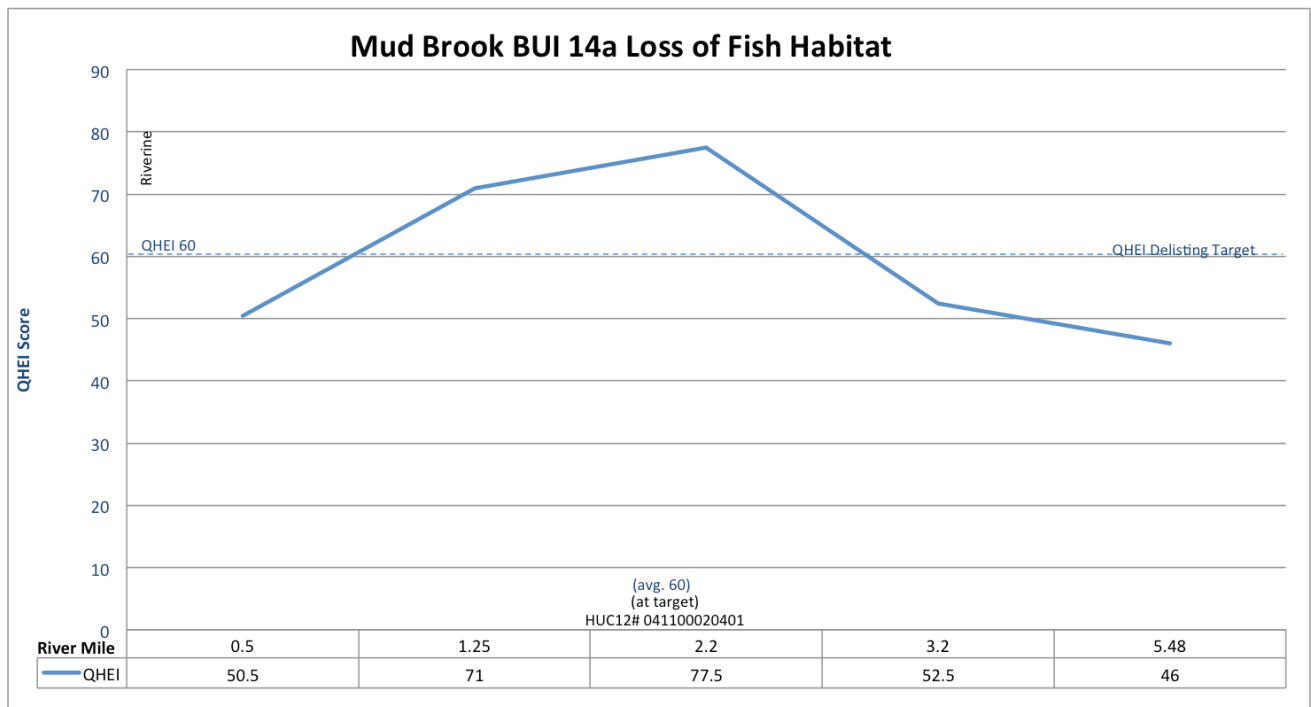
No persistent nuisance growths algae reported. This HUC meets delisting criteria.

**BUI 11- Degradation of Aesthetics:**

No persistent aesthetic impairments reported. Communities have MS4 permits, and some of of the watershed being in the Akron Wastewater Treatment Sewershed with a long term control plan, this will allow for removal of this BUI.

**BUI 14a- Loss of Fish Habitat:**

The delisting target for this BUI is a QHEI score of 60. All sampling sites were taken as Headwaters data. The average QHEI here is 59.5, a mere half a point from the target. We are classifying this as having met the target at this time, although in order to show a full representative sample of Mud Brook this HUC needs at least 7 sampling sites.



**Overview BUI Status for Mud Brook:**

We are seeking resources to sample stretches of Mud Brook so we can analyze the status of fish populations and benthos in this subwatershed. Without more data we cannot state the current status.

**Future actions needed to improve Mud Brook and remove BUIs:**

Set up a sampling plan and complete credible data collection for QHEI, IBI, and ICI, followed by a restoration plan where necessary.

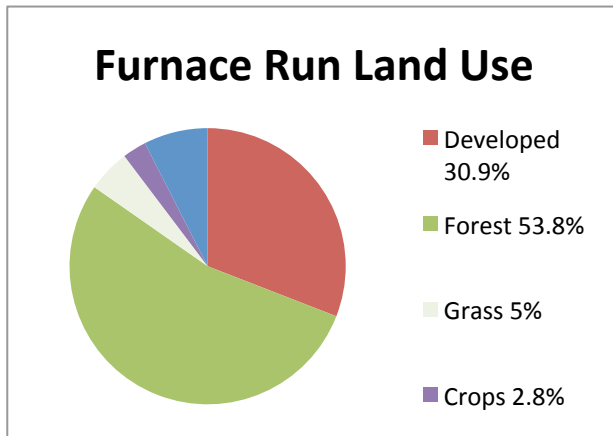
## Furnace Run 041100020403

### Associated Tributaries:

- Furnace Run

### Overview:

Furnace Run, with an area of 20.3 square miles, is the 14<sup>th</sup> largest HUC12 in the AOC. The eastern half is controlled by CVNP. Only about a 3rd of the land in this subwatershed is fully developed (30.9%). The overwhelming 53.8% forest cover and 7.8% grassland/crops allows for significant restoration potential throughout. The AOC legally designated tributaries within this HUC12 include the tributary of Furnace Run. In this section, the applicable BUIs will be analyzed as well as statements on what is being done to remedy these impairments, known sources, and what still needs to be done.

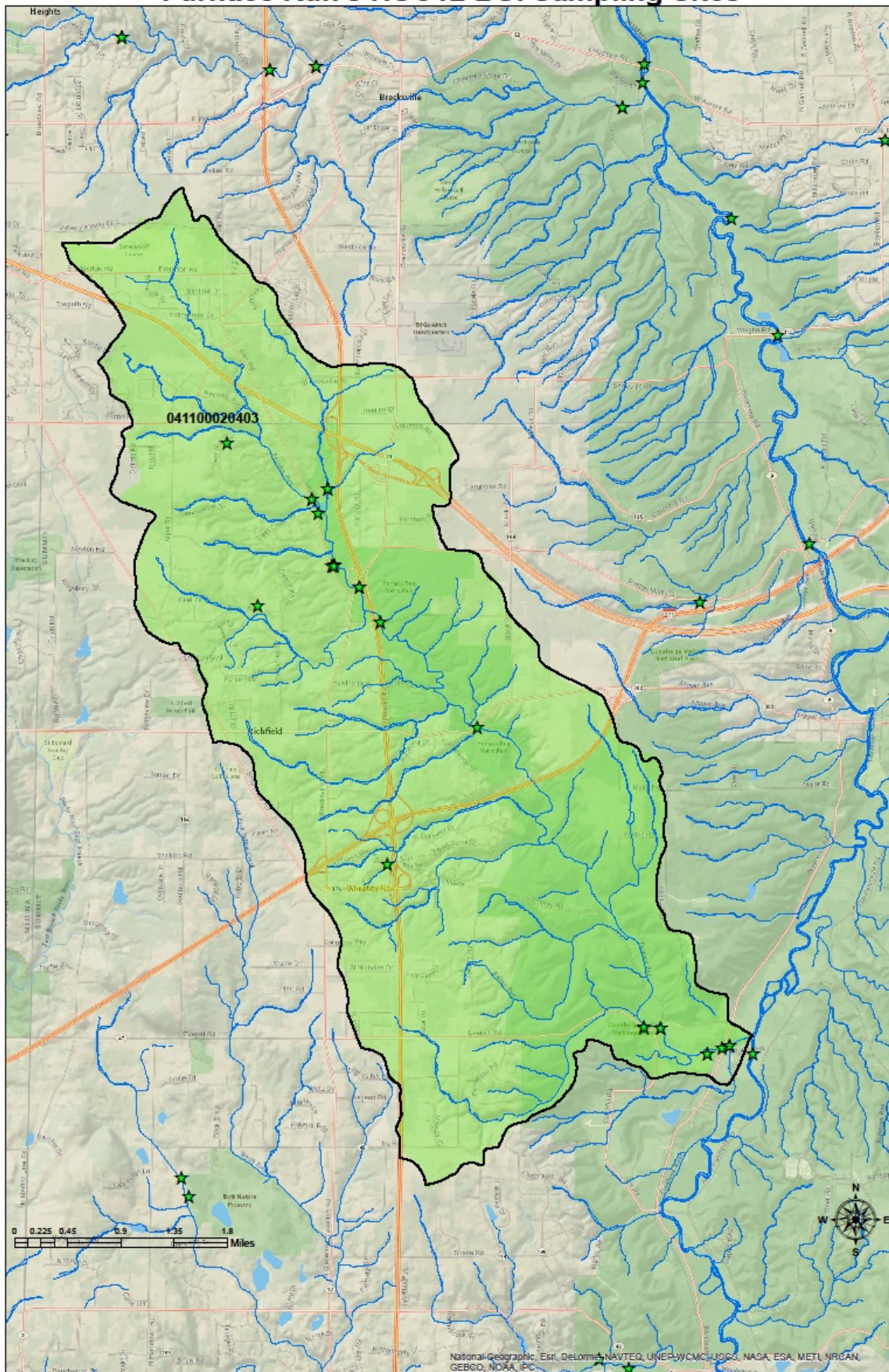


**BUIs applicable to Furnace Run are: 3a, 4, 6, 8, 11, and 14a**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (Recreation/Contact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Furnace Run	041100020403	N/A	Meets Target	Meets Target	Meets Target	N/A	Meets Target	N/A	N/A	Meets criteria to begin process for removal	Meets Target



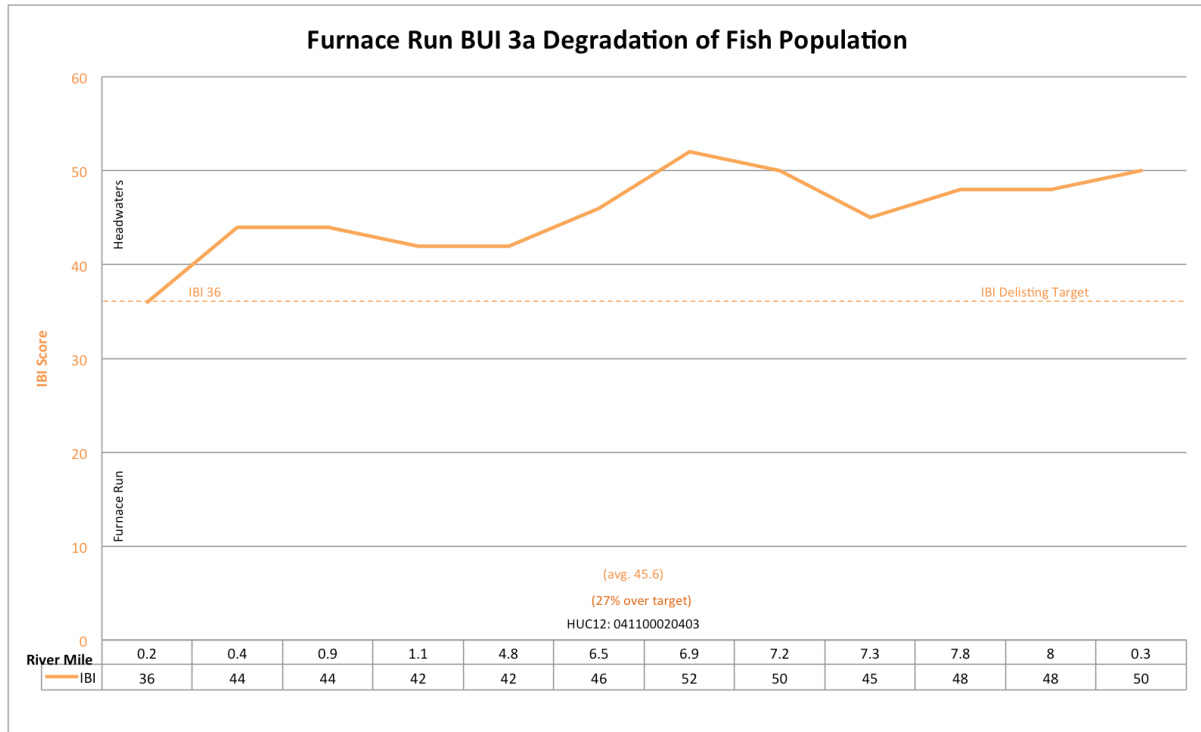
# Furnace Run's HUC12 BUI Sampling Sites



**Specific BUI Statuses for Furnace Run:**

**BUI 3a- Degradation of Fish Populations:**

The delisting target for this HUC 12 is an IBI score of 36 for Headwaters (no MIwb score is necessary for headwaters below 20sq miles of drainage.) The average score in this HUC12 is 45.5, 27% above the delisting target. This subwatershed is in attainment for BUI 3a.



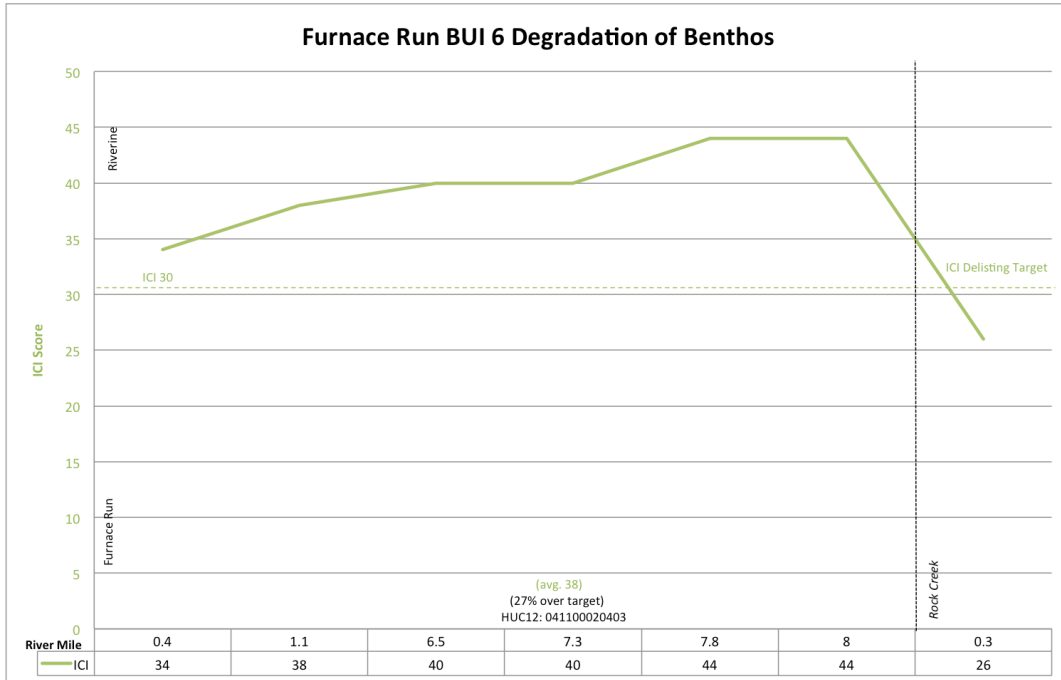
**BUI 4- Fish Tumors and Other Deformities:**

The delisting target for this BUI is a DELT value of 3% or under. The DELT value here is 0000% on average for the subwatershed. This subwatershed is in attainment for delisting BUI 4. This number was derived from the DELT sampling data from 2013-14.

**BUI 6- Degradation of Benthos:**

The delisting target for this BUI is an ICI score of 30 where all sites are headwaters sampling types. The average score for this HUC is 38, or 27% above the target, and therefore in attainment for removal.





**BUI 8- Eutrophication or Undesirable Algae:**

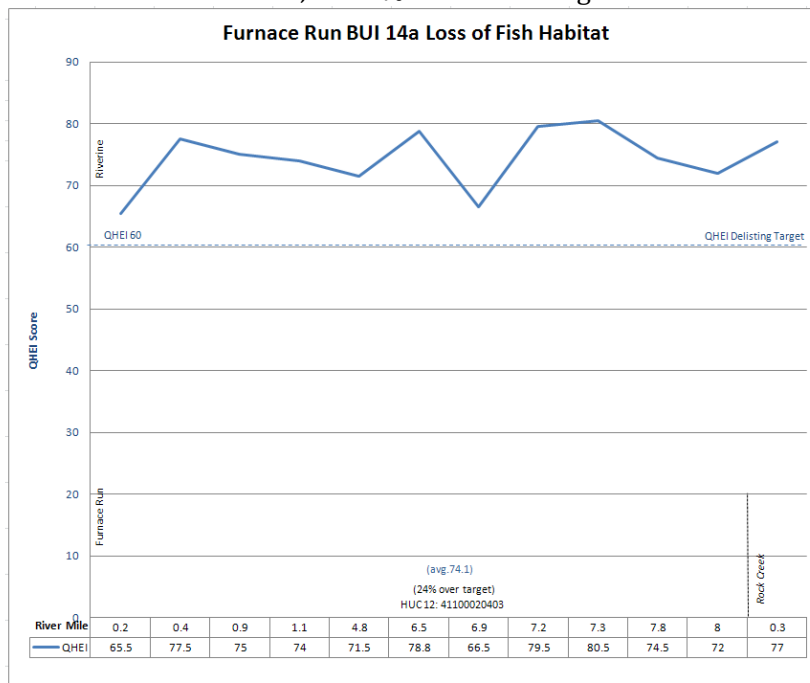
No persistent nuisance growths algae reported. This HUC meets delisting criteria.

**BUI 11- Degradation of Aesthetics:**

With no reported persistent aesthetic impairments, this BUI may soon be removed.

**BUI 14a- Loss of Fish Habitat:**

The delisting target for this BUI is a QHEI score of 60 for headwaters. The average score in this HUC is 74, or 23% above the target. This HUC is in attainment for BUI 14a.



### **Overview BUI Status for Furnace Run:**

All applicable BUIs with credible data in Furnace Run are within attainment levels. The status of BUI 8, Eutrophication or Undesirable Algae, remains to be verified.

Reviewing the BUI graphs presented in this section, BUI 3a, Degradation of Fish Population, scores are all above our target for delisting. Habitat scores are high throughout the HUC. The same can be said for BUI 6, Degradation of Benthos, with the exception of the Rock Creek sampling site. This may be the result of a naturally fast flowing creek with bedrock that has little to no benthic community present.

If sampling shows BUI 8 numbers are in attainment, it may be appropriate to request removal of this HUC from the Area of Concern. Should that be the case, an issue to consider is that Furnace Run is a prime contributor of sediment to the Cuyahoga. It may be appropriate for the HUC to remain in the AOC until sediment control measures are in place.

### **Future actions needed to improve Furnace Run and remove BUIs:**

Complete sampling with accepted protocols to verify BUI 8, Eutrophication, status.

Consider sediment control or capture measures to reduce sediment impact on BUI 7.

## Yellow Creek 041100020402

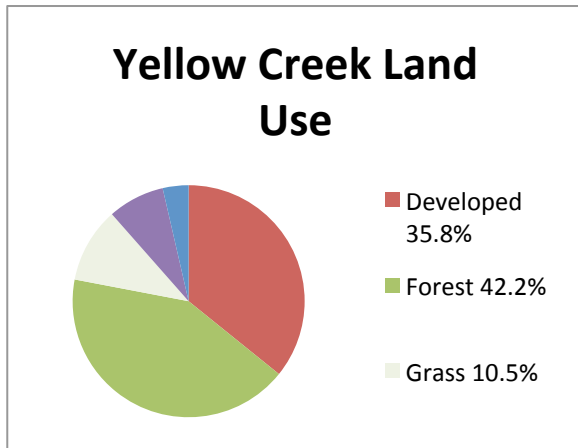
### Associated Tributaries:

- Yellow Creek

### Overview:

Yellow Creek, with an area of 31.21 square miles, is the 6<sup>th</sup> largest HUC12 in the AOC. Only about a third of the land in this subwatershed is fully developed (35.8%). The rest, 42.2% forest cover and 18.4% grassland/crops, allows for restoration of these waterways and headwater streams.

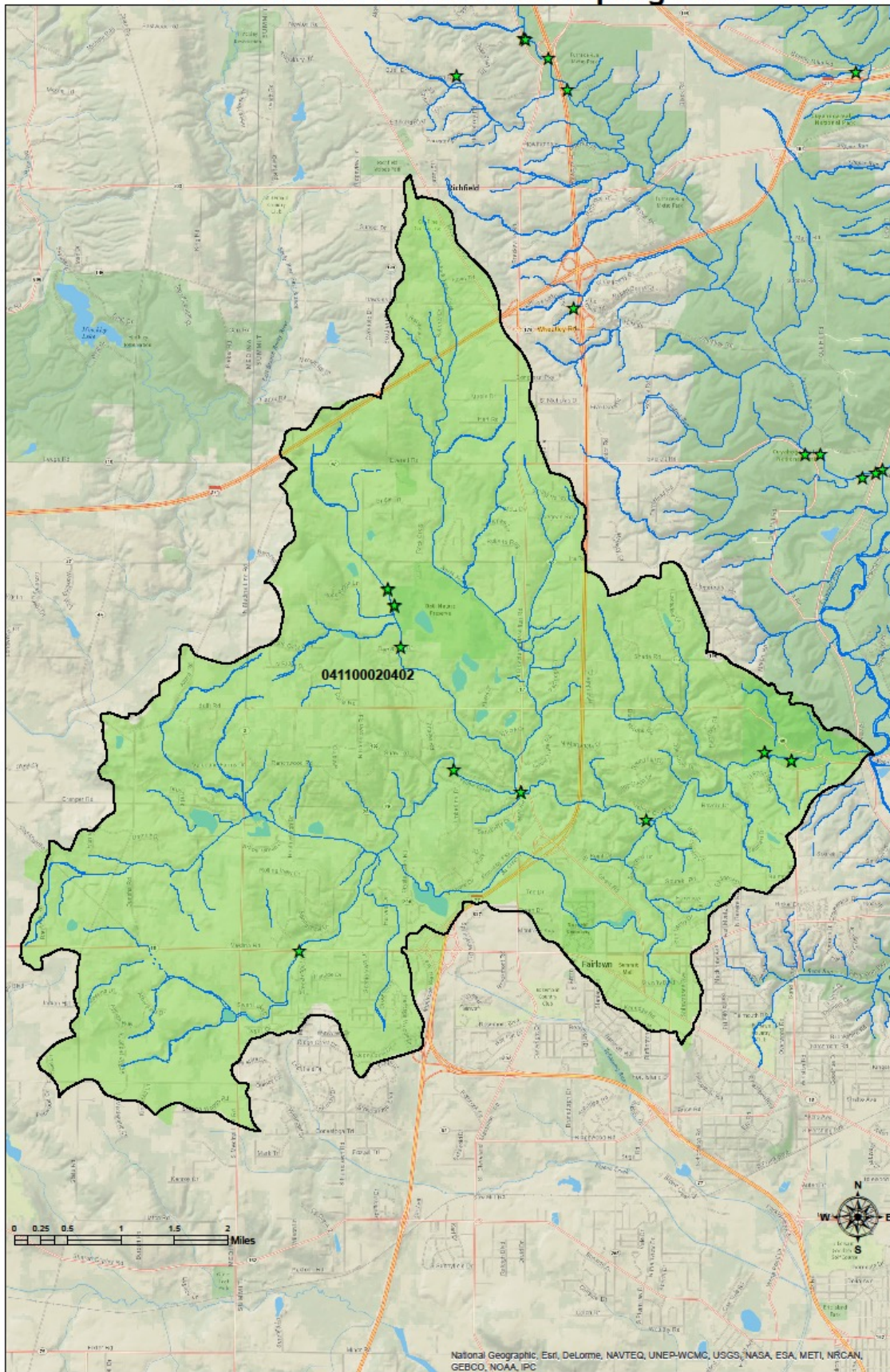
Increasing urbanization in the headwaters, however, creates energy and flow problems with sandy soils eroding quickly in the lower reaches as the creek creates wider meanders. Yellow Creek may be the primary sediment contributor to the Cuyahoga.



**BUIs applicable to Yellow Creek are: 3a, 4, 6, 8, 11, and 14a**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (RecreationContact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Yellow Creek	041100020402	N/A	DOES NOT Meet target	Meets Target	No Data Available	N/A	Meets Target	N/A	N/A	Meets criteria to begin process for removal	Meets Target

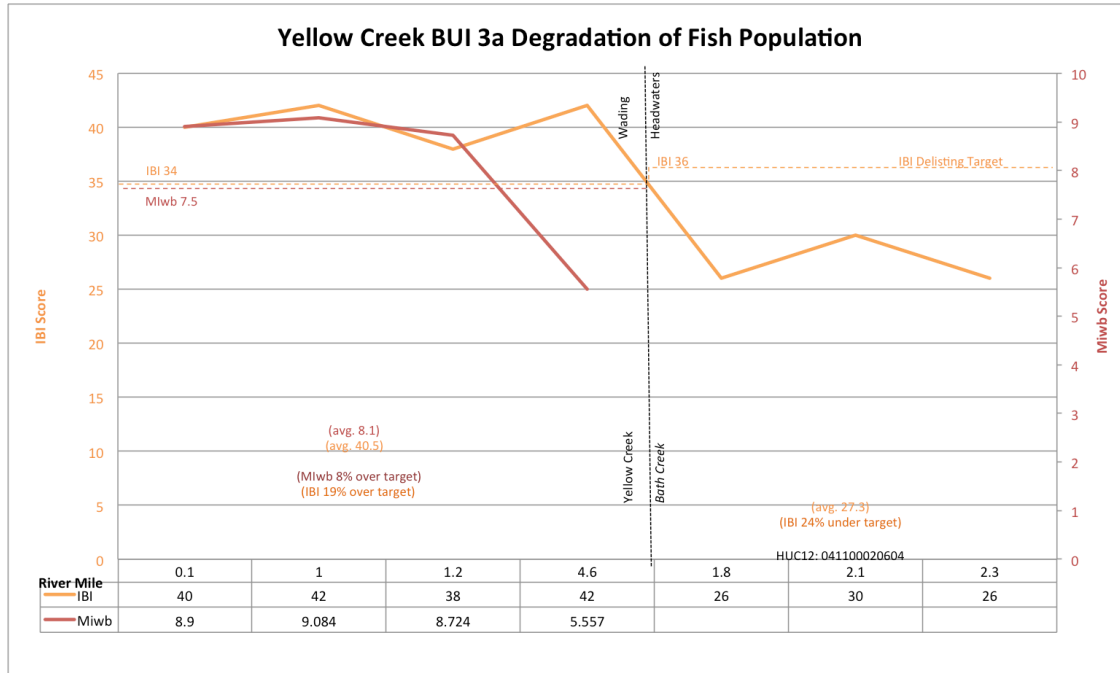
# Yellow Creek's HUC12 BUI Sampling Sites



**Specific BUI Statuses for Yellow Creek:**

**BUI 3a- Degradation of Fish Populations:**

The delisting target for this HUC 12 is an IBI score of 34 and MIwb score of 7.5 for wading areas. The average wading IBI score of 40.5 is well above target, as is the MIwb average score of 8. In headwaters sites in the Bath Creek tributary, however, where the target is an IBI score of 36, this HUC12 average score of 27 is 24% below the delisting target.



**BUI 4- Fish Tumors and Other Deformities:**

The delisting target for this BUI is a DELT value of 3% or below. The DELT value here is 0000% on average for the subwatershed. This subwatershed is in attainment =for delisting BUI 4. This number was derived from the DELT sampling data from 2013-14.

**BUI 6- Degradation of Benthos:**

The delisting target for this BUI is an ICI score of 30. There were no credible data sampling sites available for analysis at this time in Yellow Creek. This HUC12 needs at least 7 sites for a good representation of the benthic community.

**BUI 8- Eutrophication or Undesirable Algae:**

No persistent nuisance growths algae reported. This HUC meets delisting criteria.

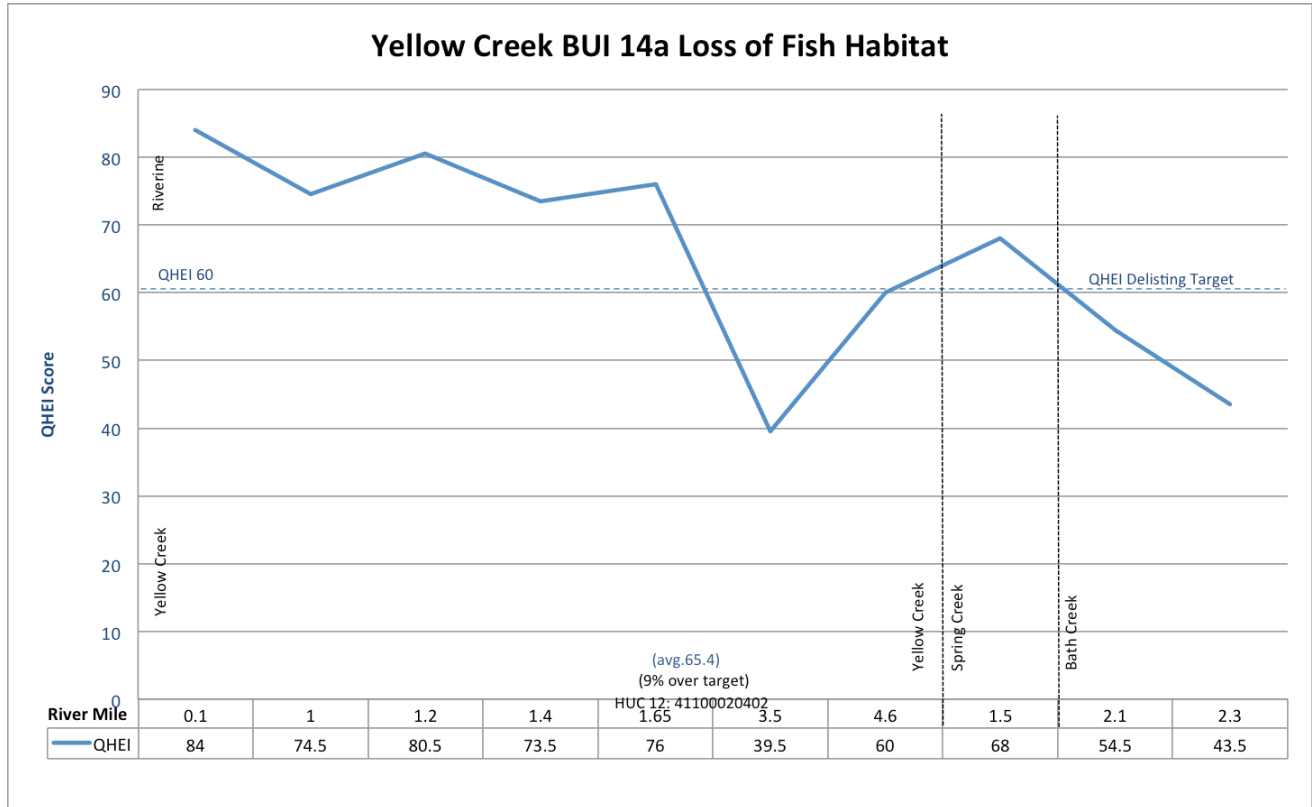
**BUI 11- Degradation of Aesthetics:**

There have been no reports of persistent aesthetic impairments. Pending new survey protocols to verify this, confirm that all communities adhere to MS4 obligations, and consider the City of Akron’s long term control plan for CSO outfalls, this BUI may be considered for removal.



**BUI 14a- Loss of Fish Habitat:**

The delisting target for this BUI is a QHEI score of 60 for wading and headwaters sites. The average score is 65.4, or 10% over the target level.



**Overview BUI Status for Yellow Creek:**

BUI removal is only possible when the average score in each sampling type – wading, headwaters, boat, etc. – meets or exceeds the target. In the case of BUI 3a for fish population, although the scores in Yellow Creek’s mainstem are in attainment, those in the Bath Creek tributary are not. These Bath Creek sites are directly affected by agricultural runoff and a lack of riparian buffer.

There have been no credible data sampling sites for benthos (ICI) in this HUC, so further sampling is needed. This would also help in analyzing the potential for raising fish community health to target levels overall.

**Future actions needed to improve Yellow Creek and remove BUIs:**

Complete sampling for benthos is needed in both Yellow Creek and Bath Creek.

We need to identify the circumstances and the conditions leading to low scores at Yellow Creek RM 3.5 and Bath Creek RM 2.3, and then attend to them.



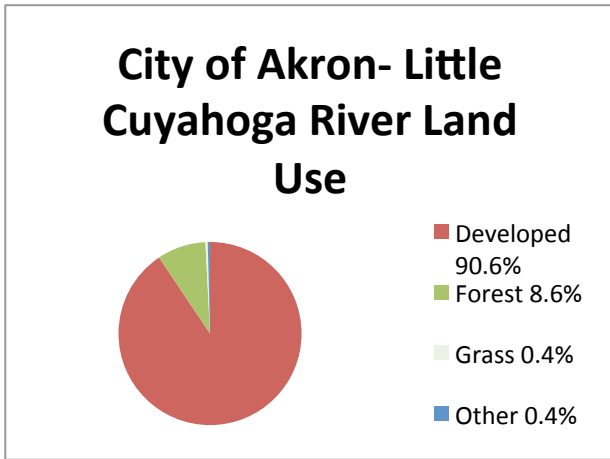
**City of Akron- Little Cuyahoga River  
041100020304**

**Associated Tributaries:**

- Little Cuyahoga River

**Overview:**

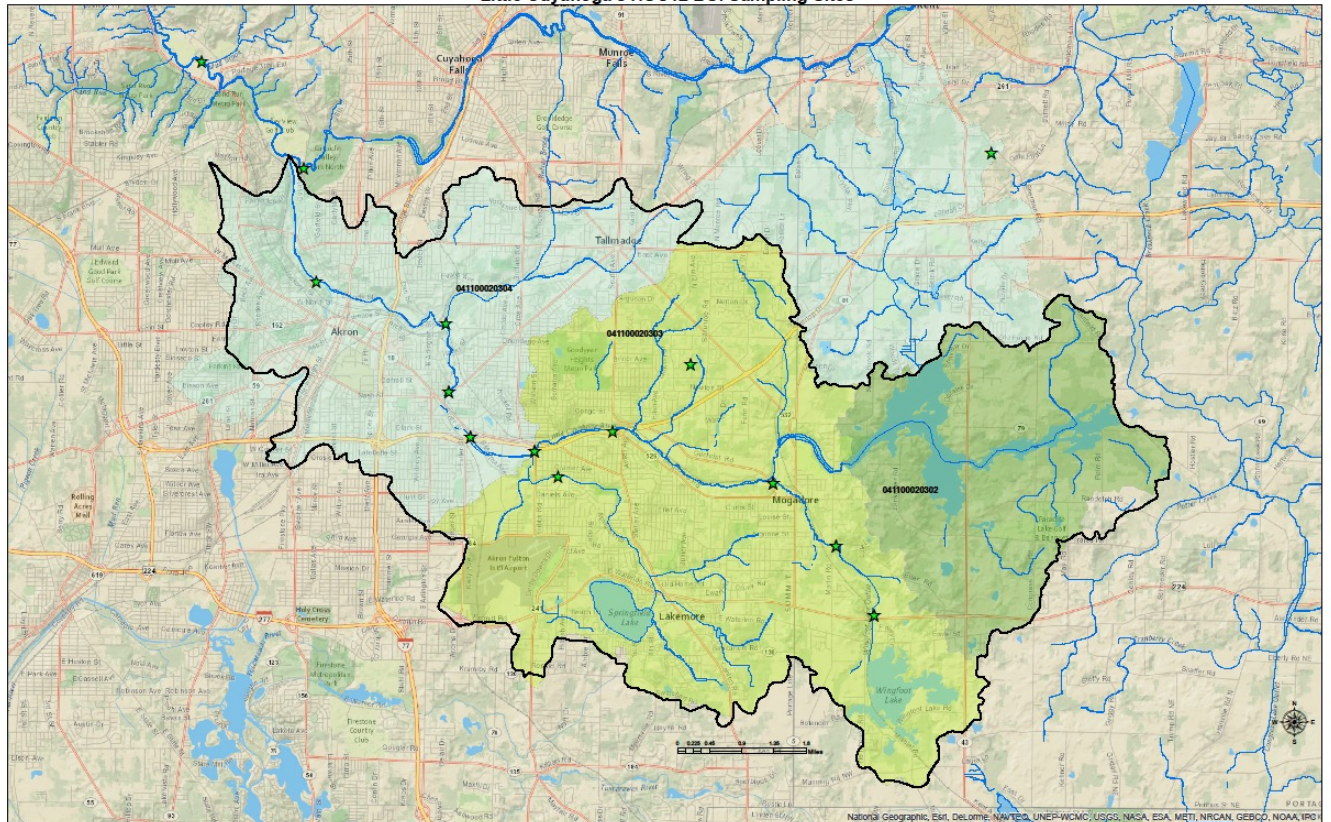
City of Akron-Little Cuyahoga River, with an area of 19.66 square miles, is the 15<sup>th</sup> largest HUC12 in the AOC. It contains the mainstem of the Little Cuyahoga as well as the confluence to the Cuyahoga River. The majority of the land in this subwatershed is fully developed (90.6%). The 8.6% forest cover is located mainly near the waterways, which allows for some restoration potential.



**BUIs applicable to City of Akron- Little Cuyahoga River are: 3a, 4, 6, 8, 11, and 14a)**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (Recreation/Contact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
City of Akron – Little Cuyahoga River	041100020304	N/A	Needs More Data	Meets Target	Needs More Data	N/A	Meets Target	N/A	N/A	Meets Target	DOES NOT Meet target

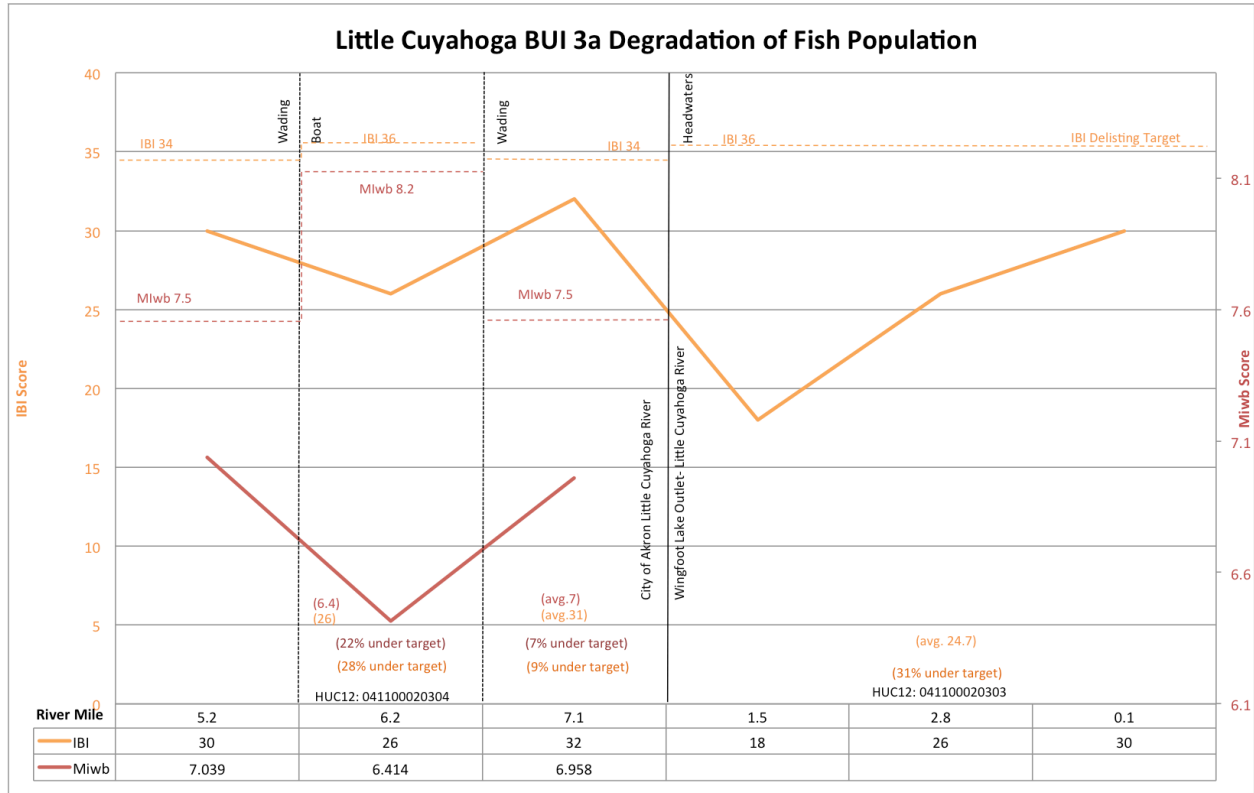
Little Cuyahoga's HUC12 BUI Sampling Sites



**Specific BUI Statuses for City of Akron- Little Cuyahoga River:**

**BUI 3a- Degradation of Fish Populations:**

The delisting target for this HUC 12 is an IBI score of 34 for Wading sampling. This HUC12’s average score for its two wading type sites is 31, or 8% below the delisting target. The single Boat sample site scored an IBI of 26, 27% below the target score of 36. There need to be at least 4 credible data sites for a full representative sample of this HUC12. However, it is safe to say that this HUC does not meet the targets for BUI 3a.

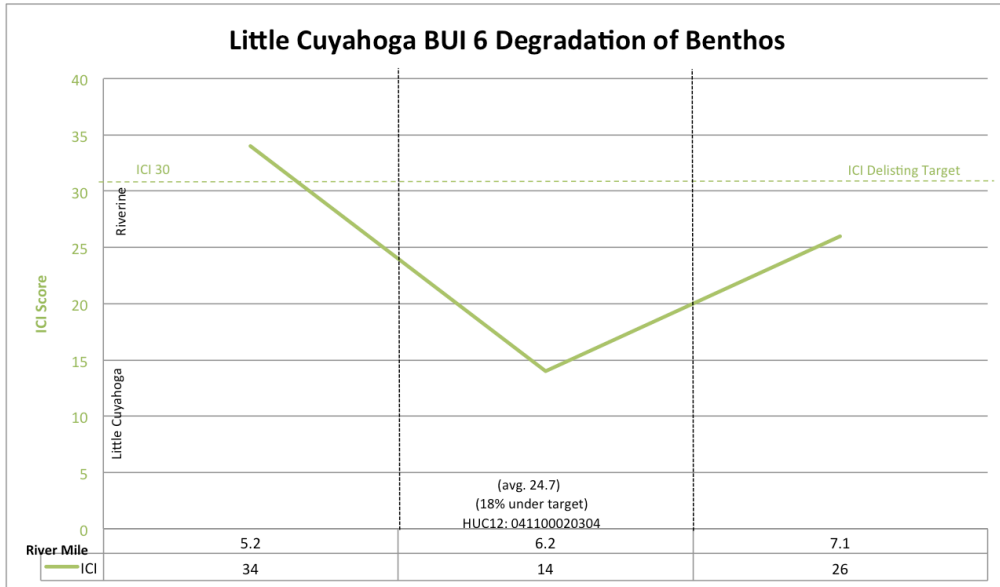


**BUI 4- Fish Tumors and Other Deformities:**

The delisting target for this BUI is a DELT value of 3% or below. The DELT value here is 0000% on average for the subwatershed. This subwatershed is within attainment for delisting BUI 4. This number was derived from the DELT sampling data from 2013-14.

**BUI 6- Degradation of Benthos:**

The delisting target for this BUI is an ICI score of 30 for both Wading and Boat sample types. The average of the sample sites is 25, or 18% under the target. It should be noted that there are only 3 credible sites of any sample type with data for analysis. This HUC12 needs at least 4 sites for a good representation of the benthic community.



**BUI 8- Eutrophication or Undesirable Algae:**

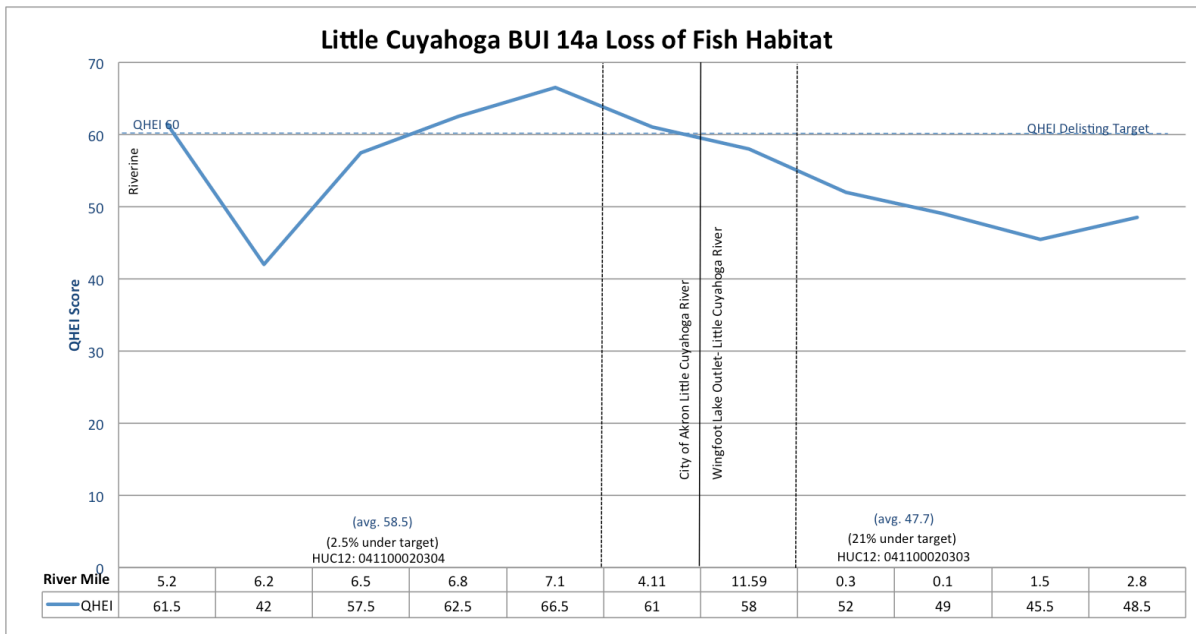
No persistent nuisance growths algae reported. This HUC meets delisting criteria.

**BUI 11- Degradation of Aesthetics:**

With communities in this HUC operating under MS4 permits, as well as the watershed being in the Akron Wastewater Treatment Sewershed with a long term control plan, and there being no reports of persistent aesthetic impairments, this BUI is under consideration for removal.

**BUI 14a- Loss of Fish Habitat:**

The delisting target for this BUI is a QHEI score of 60 for both wading and boat sampling types. The average score here is 58.5, only 2.5% below the target.



## Overview BUI Status for City of Akron - Little Cuyahoga River:

Most of the sampled BUIs in this HUC12 are below targets for removal. There is still sampling that needs to be done to show a full representation of the HUC12's status. We will have a better idea as to the state of the Little Cuyahoga when this is completed.

Reviewing the BUI graphs presented in this section, the graph for BUI 3a, Degradation of Fish Population, the scores are all below our target scores for delisting. These sites are directly affected by industrial and urban development that can be a major hindrance to fish communities. For BUI 6, Degradation of Benthos, with only one of three sites in attainment, the BUI is still impaired. BUI14a, Loss of Fish Habitat, shows that there are sections of the Little Cuyahoga with decent structure. Yet the effects of these harsh urban conditions on the biota, and the loss of habitat from industrial use and channelization keeps this subwatershed on the impaired list.

River mile 6.2, where the lowest scores were obtained, is adjacent to a freeway and bounded by roads, but is part of a stretch that has seen some stream and riparian restoration in the five years since the last sampling was done. It is also upstream of an in-stream industrial collection installation, so physical barriers play a part in keeping scores low.

## Future actions needed to improve City of Akron- Little Cuyahoga River and remove BUIs:

Additional sampling sites are needed to provide a complete assessment of fish populations, benthos, and habitat. Resampling of sites where restoration has been done is appropriate as well.

### Projects

Project	HUC-12	Watershed	Managing Project	Funding Source	Start Date / Complete Date	Federal Fiscal Year			Shovel Ready	BUI	Status
						FFY 14	FFY 15	FFY16			
Adams Run Restoration	041100020304	Little Cuyahoga River	NEFCO/WRLC							3-6-14	
Stream Restoration of 1,800 linear feet on tributary to Little Cuyahoga											
LCR Sewer Crossing	041100020304	Little Cuyahoga River	City of Akron	Requesting GLRI	Oct. 2014 / June 2015	\$201,420			Yes	3-6-11-14	
Dam removal and stream restoration. This project is located near the intersection of Otto St. and Boder St. in Akron. Currently there is a low head dam with an active sewer pipe crossing the Little Cuyahoga River impeding fish passage, benthos habitat, causing erosion issues, and degrading fish habitat. Prior to removing the sewer crossing from the river, the sewer will be redirected as part of a pump station project paid by the city. Upon removal of the structure, the area will be restored to natural conditions.											

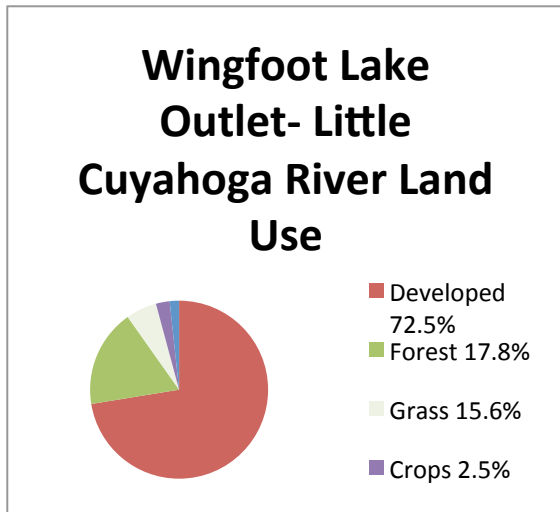
## Wingfoot Lake- Little Cuyahoga River 041100020303

### Associated Tributaries:

- Little Cuyahoga River

### Overview:

Wingfoot Lake, with an area of 30.79 square miles, is the 7<sup>th</sup> largest HUC12 in the AOC. It contains the mainstem of the Little Cuyahoga and headwater streams, as well as the Wingfoot Lake outlet on its southern end. The majority of the land in this subwatershed is fully developed (72.5%). The 17.8% forest cover is located mainly near the waterways, which allows for some restoration potential. On the other hand, 17% of the watershed is impervious surfaces.



**BUIs applicable to Wingfoot Lake- Little Cuyahoga River are: 3a, 4, 6, 8, 11, and 14a**

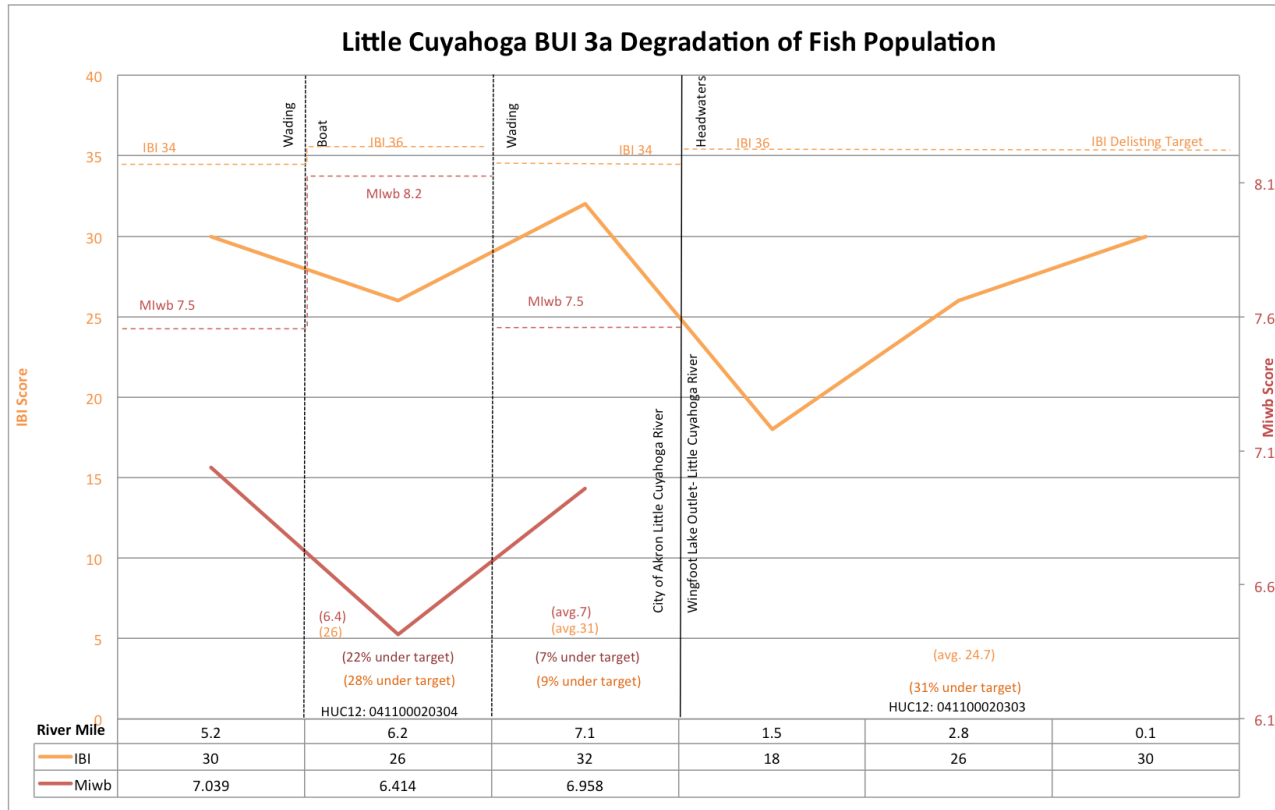
HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (Recreation/Contact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Wingfoot Lake – Little Cuyahoga River	041100020303	N/A	Needs More Data	Meets Target	No Data Available	N/A	Meets Target	N/A	N/A	Meets criteria to begin process for removal	Needs More Data



**Specific BUI Statuses for Wingfoot Lake- Little Cuyahoga River:**

**BUI 3a- Degradation of Fish Populations:**

The delisting target for this HUC 12 is an IBI score of 36 for Headwaters (no MIwb score is necessary for headwaters below 20sq miles of drainage.) The average score in this HUC12 is 25, or 30% below the delisting target. This subwatershed is well below attainment for BUI 3a. It should be noted that there are only 3 sites with credible data for analysis, and they are all along only the Wingfoot Lake Outlet, which is not necessarily representative of the HUC as a whole. There need to be at least 7 sites for a full representative sample of this HUC12.



**BUI 4- Fish Tumors and Other Deformities:**

The delisting target for this BUI is a DELT value of 3% or below. The DELT value here is 0000% on average for the subwatershed. This subwatershed is in attainment for BUI 4. This number was derived from the DELT sampling data from 2013-14.

**BUI 6- Degradation of Benthos:**

There were no sampling sites at this time in Wingfoot Lake. This HUC12 needs at least 7 sites for a good representation of the benthic community.

**BUI 8- Eutrophication or Undesirable Algae:**

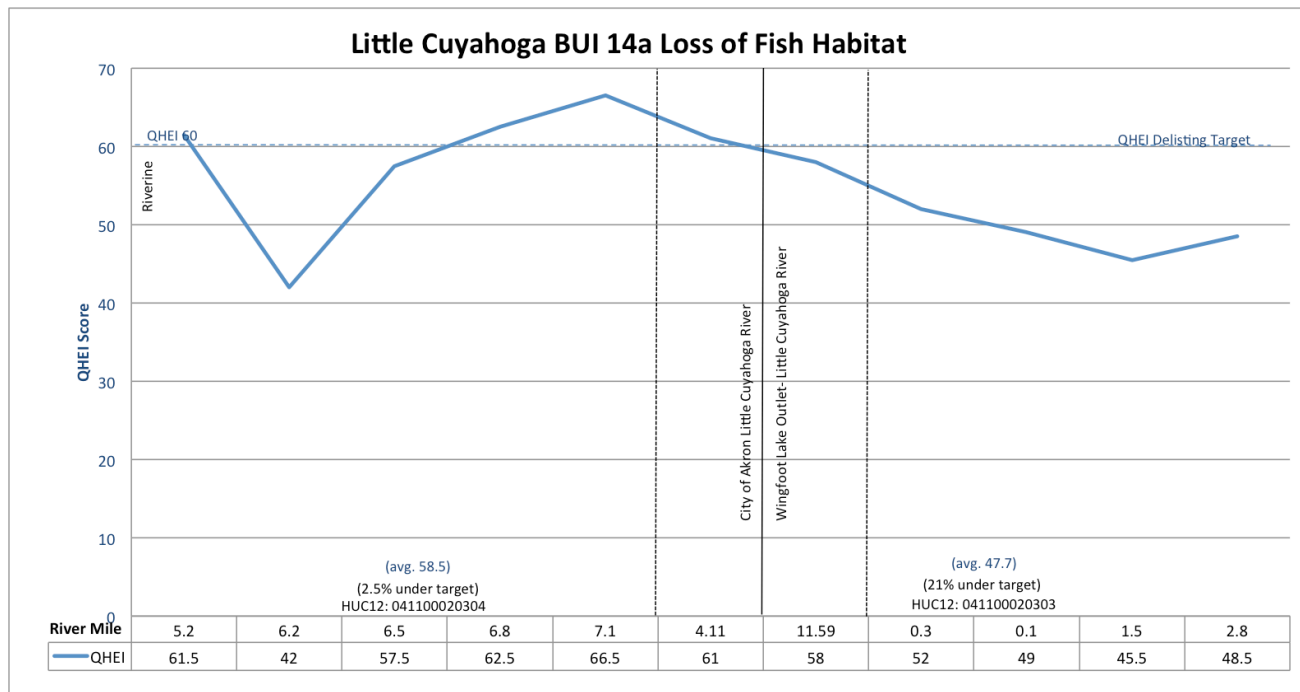
No persistent nuisance growths algae reported. This HUC meets delisting criteria.

**BUI 11- Degradation of Aesthetics:**

There are no recorded persistent instances of aesthetic impairments.

**BUI 14a- Loss of Fish Habitat:**

The delisting target for this BUI is a QHEI score of 60 for wading, boat, and headwaters sample types. The average score of the three headwaters sample sites, all in the Wingfoot Lake Outlet, are 48, or 20% below target. This HUC’s fish habitat is not in attainment for BUI 14a.



**Overview BUI Status for Wingfoot Lake- Little Cuyahoga River:**

All of the sampled BUIs in this HUC12 are below targets. The only IBI sampling sites are on the Wingfoot Lake Outlet, one of the least-developed areas in the HUC. It is likely that IBI sampling in other parts of the HUC may yield even worse numbers. More sampling at other sites in the subwatershed needs to be done in order to show a realistic representation of the HUC12’s status. We will have a better idea as to the state of the Wingfoot Lake HUC when this is completed.

Dams may keep population numbers low in this subwatershed, as can agricultural runoff and other non point sources. The same can be said for BUI 6, Degradation of Benthos. BUI14a, Loss of Fish Habitat, shows that this area between Wingfoot Lake and Mogadore needs attention. The fact that Wingfoot Lake itself is an ODNR-protected recreation area may offer opportunities for collaboration to open passage from the lake to the Little Cuyahoga.

**Future actions needed to improve Wingfoot Lake- Little Cuyahoga River and remove BUIs:**

More credible data is needed at more sites in the HUC12 for all fish-related BUIs, especially benthic conditions and communities. Once those numbers are collected, a detailed survey and analysis of the reasons for poor fish habitat and populations along Wingfoot Lake Outlet itself, and other problem sites identified in further sampling, is called for.

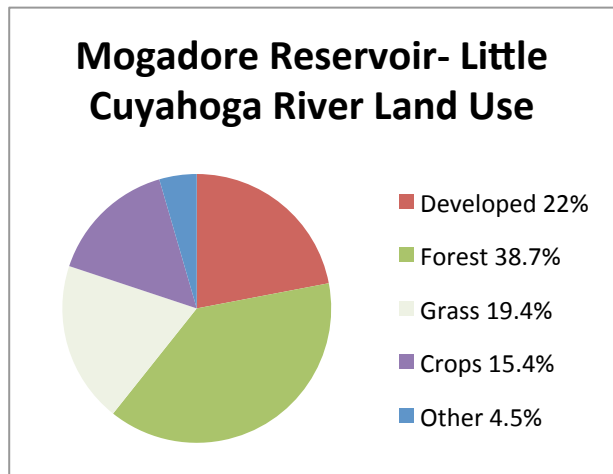
## Mogadore Reservoir 041100020302

### Associated Tributaries:

- Little Cuyahoga

### Overview:

Mogadore Reservoir, with an area of 12.91 square miles, is the smallest HUC12 in the AOC. Its designation as a HUC12 of concern in the Cuyahoga AOC is primarily due to the Eutrophication BUI for the reservoir. Only a small portion of the land in this subwatershed is developed (22%). Much of the land is protected around the reservoir itself. This accounts for the 38.7% forest cover and 19.4% grassland.



**BUIs applicable to Mogadore Reservoir are: 1a, 8, 11**

HUC 12 Subwatershed	HUC #	BUI 1a Restrictions on Fish Consumption	BUI 3A Degradation of Fish Populations	BUI 4 Fish Tumors and Other Deformities	BUI 6 Degradation of Benthos	BUI 7 Restrictions on Navigational Dredging	BUI 8 Eutrophication or Undesirable Algae	BUI 10a Beach Closings (RecreationContact)	BUI 10b Public Access (Recreation Use)	BUI 11 Degradation of Aesthetics	BUI 14a Loss of Fish Habitat
Mogadore Reservoir – Little Cuyahoga River	041100020302	N/A	N/A	Meets Target	N/A	N/A	Meets Target	N/A	N/A	Meets criteria to begin process for removal	N/A

**Specific BUI Statuses for Mogadore Reservoir:**

**BUI 8- Eutrophication or Undesirable Algae:**

No persistent nuisance growths algae reported. This HUC meets delisting criteria.

**Overview BUI Status for Mogadore Reservoir:**

With the main reason being included that it is a tributary into the Little Cuyahoga River, and with negligible streams to sample, the Mogadore reservoir's main BUI that is applicable is that of Eutrophication and Undesirable Algae.

**Future actions needed to improve Mogadore Reservoir and remove BUIs:**

Ongoing observation is needed to ensure the attainment of the eutrophication BUI.