2009 Annual Report

Black River Remedial Action Plan

Shale Cliffs along the Black River Main Stem at Lorain Metroparks Bridgeway Trail

The purpose of this Annual Report is to inform the watershed community of the progress made by the Black River Remedial Action Plan (RAP) in its efforts to restore impairments to beneficial uses in the Black River watershed Area of Concern (AOC).

The Annual Report provides background information on many of the projects undertaken by the RAP and its members.

If you would like more information on any of the topics covered in this Annual Report or would like to join the effort to restore the Black River, please contact any of the RAP Coordinating Committee members referenced at the end of this report or go to www.blackriverrap.com.

The Black River's East Branch

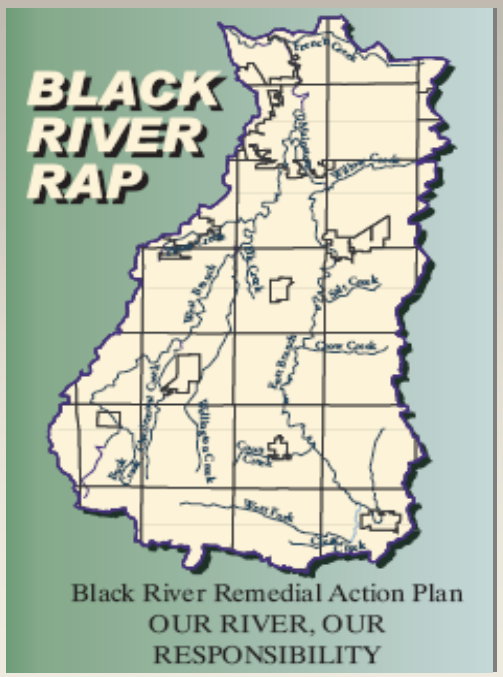
The Main Stem

Beneficial Use Impairments (BUIs)

The Great Lakes Water Quality Agreement, as amended, calls for remedial action plans (RAPs) to be developed to restore and protect any of 14 beneficial uses in Areas of Concern (AOC). An impaired beneficial use means a change in the chemical, physical or biological integrity of the AOC sufficient to cause any of the following:

1. **Restrictions on fish and wildlife consumption**
   (*Impaired for fish consumption criteria only*)
2. Tainting of fish and wildlife flavor
3. **Degradation of fish or wildlife populations**
   (*Impaired for fish population criteria only*)
4. Fish tumors or other deformities
5. Bird or animal deformities or reproductive problems
6. **Degradation of benthos**
   (*Not Impaired in the East Branch sub-watershed*)
7. **Restrictions on dredging activities**
8. **Eutrophication or undesirable algae**
9. Restrictions of drinking water consumption or taste and odor problems
10. **Beach closings (recreational use)**
11. **Degradation of aesthetics**
12. Added costs to agriculture or industry
13. Degradation of phytoplankton or zooplankton populations
14. **Loss of fish and wildlife habitat**

Bold	Impaired in the Black River AOC
Underlined	Impaired but In Recovery Phase



Prepared by:

Black River Remedial Action Plan
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Terms and Acronyms

As major restoration efforts are beginning in the AOC, unfamiliar scientific terms and acronyms will be used that may be unfamiliar. This will help you decipher the language being used.

- **Benthos or Benthic Macroinvertebrates:** *Benthic macroinvertebrates (or Benthos) are insect larvae, mollusks, worms and crayfish that live on the bottoms of streams and rivers. They are important bellwethers for environmental degradation as they spend all or part of their lives in the water and are on the first rung of the food chain for the ecosystem*
- **BUI:** Beneficial Use Impairment
- **DELTs:** Deformities, Eroded fins, Lesions and Tumors: *An evaluation method used by Ohio EPA to assess fish health by documenting external abnormalities*
- **Fish Habitat Shelf**: *A man-made shallow water shelf designed for fish habitat, spawning and refuge*
- **GLRI:** Great Lakes Restoration Initiative: *The new federal funding authority designed to restore the Great Lakes*
- **IBI:** Index of Biological Integrity: *One evaluation method used by Ohio EPA to assess aquatic resource quality by assessing the populations of fish species*
- **ICI:** Invertebrate Community Index: *An evaluation method used by Ohio EPA to assess aquatic resource quality by assessing the populations of benthic macroinvertebrate species*
- **Lacustuary:** *Pertaining to the Lake Erie estuary (lake affected portion of the river), for the Black River, that is about six miles of the main stem*
- **LQHEI:** Lacustuary Quantitative Habitat Evaluation Index: *An evaluation method used by Ohio EPA to assess fish habitat quality in Lake Erie, Lake Erie nearshore areas and lacustuaries*
- **MIwb:** Modified Index of well-being: *Another evaluation method used by Ohio EPA to assess aquatic resource quality by assessing the populations of fish species. MIwb factors out some pollution tolerant species to avoid false high readings*
- **Non-Significant Departure**: *A value for some assessment methods that recognizes that a lower reading may be statistically not significantly different than the state's attainment value. The lower value is set as the delisting target for some BUIs*
- **QHEI:** Quantitative Habitat Evaluation Index: *An evaluation method used by Ohio EPA to assess fish habitat quality in free-flowing river sections*

MESSAGE FROM THE CHAIR

By Ken Pearce, Chairman of the Black River RAP Coordinating Committee and Commissioner of the Lorain County General Health District

Last year, I wrote of 2008 being a year of set-ups and starts. In 2009, set-ups and starts continued but I am happy to report that some initiatives have been coming to fruition. As the AOC starts to move closer to restoration, please see the Beneficial Use Impairment Status section in this 2009 Annual Report that explains each of the nine beneficial use impairments listed as impaired. The section will describe the current condition of each impairment and outline what is needed to get the beneficial use to a restored state in the Black River AOC. We have also supplied a section that will help explain the confusing terms and acronyms commonly used by environmentalists.

For the first time in decades, sediments from most of the Black River and Outer Harbor were found to be clean enough that they could be open-lake disposed without posing a threat to human health or the environment. The announcement of this improvement has been a long time coming, considering the remedial dredging of contaminated sediments occurred between 1989 and 1990. This could be the greatest success story for the river and has shown other AOCs in the Great Lakes that properly done, remedial dredging works.

In 2009, the Black River RAP secretariat office was set up in the Lorain County General Health District, and the staff has organized RAP business in a more local manner and has developed and maintained a highly successful and informative web site that deals with watershed and Area of Concern issues. The web site includes all the video efforts of the RAP Committee as well as other information. The web site is located at www.blackriverrap.com.

The Lower Black River Ecological Restoration Master Plan was completed in December. This plan attempts to join needed economic development in the City of Lorain with the environmental needs of the Black River main stem. It is a report that city planners and other stakeholders can use to benefit both the city's economic situation while improving and protecting important natural resources. While the master plan was nearing completion, some efforts were being funded. In December, the City of Lorain learned it would receive up to $5 million to restore about three miles of riverbank in the Black River main stem. The restoration effort will remove slag from the riverbank, plant native vegetation and construct a fish habitat shelf. Almost immediately, these actions promise to raise in-stream habitat scores along the three-mile stretch 15% or more. This improvement will bring the stretch from below attainment to near attainment, according to the Lower Black River Ecological Restoration Master Plan.

The Watershed Action Plans for the French Creek and West Branch sub-watersheds are nearing completion. Unfortunately, Dan Gouch, the Watershed Coordinator, left his post in 2009. I would like to express my and the RAP Committee's gratitude for all the effort Dan has put into his work. We will surely miss Dan although his successor, Christina Znidarsic, is highly qualified to complete what Dan has started and to move on with watershed restoration efforts.

The City of Elyria has been busy in trying to improve the Black River as it flows through the city. Elyria has developed a Greenway and Trail Master Plan that has identified parcels along the Black River and associated wetlands as Priority Conservation Areas. I commend the City in taking these steps to protect and preserve the natural resources in community.

I am encouraged by these efforts and thank all who were involved. I look forward to the celebration of future improvements in our Black River.

2009 WATERSHED COORDINATOR'S REPORT

Once again, the Black River watershed AOC welcomed a new local Watershed Coordinator. Dan Gouch accepted a graduate teaching assistant position with Cleveland State University, but before he left, he recommended his own replacement, Christina Znidarsic. We wish Dan well in his new life pursuits and welcome Christina into our Black River RAP family. Christina has a B.S. in geology from the College of William and Mary and will be receiving her M.S. in Environmental Science degree from Cleveland State University in 2010. Christina's current and most pressing duty will be completing the watershed action plan for the French Creek and the West Branch watersheds.

While Dan was here, he was able to secure a grant from the Ohio Water Pollution Control Loan Fund through the American Recovery and Reinvestment Act of 2009 to work on home sewage issues in Lorain County. Old, under-maintained or failing home sewage treatment systems (HSTS) have been identified by the Black River RAP Coordinating Committee as one of the sources of contamination leading to the impairment of a few beneficial uses in the AOC.

The new program was developed to assist low to moderate income homeowners in repairing or replacing their existing and failing HSTS systems. The program was set up in cooperation with the Lorain County General Health District and pays 75% of the cost for either repairing or replacing a septic system. Individual homeowners were responsible for the remaining 25%. These funds were available to households falling at or below 200 percent of the Federal poverty guideline. All work under this program was to be completed and inspected by the Lorain County General Health District by the end of the year.

THE LOWER BLACK RIVER ECOLOGICAL RESTORATION MASTER PLAN

An important plan to help restore the Black River main stem has been developed by funding provided by the U.S. EPA's Great Lakes National Program Office and through the efforts of a team of local, state and federal representatives, many of which are members of the Black River RAP Coordinating Committee.

The overall goal of the Lower Black River Ecological Restoration Master Plan was to improve, preserve and restore fishery health, aquatic and riparian habitat, and adjacent terrestrial habitats in a way that was consistent with the City of Lorain's vision for the area, including social and cultural interaction, recreational access and use, and development and public infrastructure.

Three groups of actions were proposed in the plan. They include restoration actions, enhancement actions and protection actions. The completion of actions outlined in the plan will help eliminate several Beneficial Use Impairments, including Degradation of Fish Populations, Degradation of Benthos, Degradation of Aesthetics and Degradation of Fish Habitat. In an effort to protect the best and eliminate the rest, the protection of higher quality areas was given a higher priority by the plan.

The plan is intended to serve as a tool to help guide decisions made within the river corridor and includes an appendix of suggested Best Management Practices (BMPs) to ensure that new development along the river, which is not only acknowledged but actually encouraged by participants in the planning process, does not contribute to further degradation of water quality.

The Lower Black River Ecological Restoration Master Plan can be seen on the RAP's web page at: www.blackriverrap.com/announcements?f=12288..

The Lower Black River in Lorain

DREDGING AND CLEANER SEDIMENTS

Improvements continue in the Black River AOC. The U.S. Army Corps of Engineers routinely conducts sampling and analysis of Black River navigation channel sediments. In a May 2009 Finding of No Significant Impact and Environmental Assessment Report, the Corps determined that the sediments of the Outer Harbor as well as sediments from the lower 2.25 miles of the navigation channel met federal guidelines for unconfined open-lake placement. In June 2009, Ohio EPA agreed with the Corps findings and issued a Section 401 water quality certification for the dredging operation that included open-lake placement of the sediments from the Outer Harbor and the lower 2.25 miles of the Black River channel.

This is the first time since the late 1970s that sediment from any part of the river channel met applicable federal and state guidelines for open-lake placement. The 2.25 mile length of the federal channel represents an improvement of about 80% of the federally maintained channel in the Black River.

Based on Corps and Ohio EPA findings, the Black River RAP Coordinating Committee has determined that the main stem sediments may have recovered sufficiently for change in status for the Restrictions on Dredging Activities beneficial use. The RAP Committee has contacted U.S. EPA about submitting an application for a re-designation of the beneficial use impairment from *Impaired* to *In Recovery Phase*.

ELYRIA'S NEW GREENWAY & TRAIL MASTER PLAN

In 2008, the Kent State University's Urban Design Center and Youngstown State University's Center for Urban and Regional Studies finalized the Elyria Plan 2015. Through the planning process for this document, sentiment revealed a need for a more in-depth study of the quality of life issues – trails and green space.

Supplementing other Elyria development and planning documents with the Greenway and Trail Master Plan will address the current and future needs of the city for recreational trails, trails as alternative transportation, the health of the Black River resources found in Elyria, the conveyance of stormwater into the river and the potential eco-tourism connection opportunities to the region.

The new plan is available at the RAP's web page: www.blackriverrap.com/announcements?f=12244.

A BLACK RIVER SPORTFISHING REPORT

Photo by Laurie Longworth, Courtesy of ODNR

A 2009 Black River Sportfish Survey report was released by the Fisheries Management Section of the Ohio Division of Wildlife. This survey suggests that the highest diversity of sportfish species can be found in the lower (downstream) sections of the Black River main stem. This diversity in the lower river can probably be explained by its close association with and species migrating to and from Lake Erie.

Here are some specific fishing tips from the report. Anglers pursuing largemouth bass should focus, via boat, on the lower six river miles whereas smallmouth bass anglers should focus on the 10 river miles above the East 31st Street bridge. Catfish anglers can find bullheads and channel catfish throughout the surveyed area. Lastly, although the sportfish survey

was not designed to document and quantify seasonal fisheries, anglers should note that seasonal fishing opportunities also exist for Lake Erie-run steelhead trout (upriver to the two waterfalls in Cascade Park/Elywoods Park complex) and Lake Erie-run smallmouth bass (predominantly in the lower 6 river miles of the Black River).

Public access for anglers was found to be abundant along much of the main stem of the Black River. Boat anglers can launch at the Black River Wharf in downtown Lorain and motor upstream or downstream to gain fishing access to the sample sites surveyed in 2009 Sportfish Survey. Paddling and wading anglers have access to nearly 10 river miles within and between the Metroparks' Black River Reservation and Elyria's Cascade Park.

A word of caution from the report is for anglers to be familiar with current fish consumption advisories published by the Ohio EPA and ODH.
http://www.epa.state.oh.us/dsw/fishadvisory/index.aspx

SUSTAINABLE LANDSCAPE PRACTICES IN LORAIN COUNTY: Using Nature as an Ally for Positive Change

Submitted by Craig Limpach

Introduction
The purpose of the study was not to condemn but to offer realistic ecological design alternatives that create jobs, strengthen a sustainable economy and inform us on how we can begin to truly inhabit Lorain County and the Black River watershed AOC as good stewards by beginning to become ecologically literate and consciously moving away from a failed paradigm of senseless, short term gain and costly long term failure. Ecology teaches us that everything is connected and nothing in reality stands alone. What affects one component of the system affects the entirety. The basic tenet of ecological design is to base all activities on a natural model. In doing so, we can engage nature as an ally and engage in long-term sustainable growth while supporting and enhancing ecological function.

Understanding our history and opportunities for positive change
Lorain County was once a part of a larger, diverse and thriving wilderness ecosystem consisting of broad-leaved deciduous forest, various wetland types, and tall grass prairies. The ecosystem provided inherent sustainable economic functions such as water and air purification, food and fuel production, storm water management, climate influences and topsoil creation.

Our forebearers had little understanding of ecological function and lived with a paradigm of conquest, imposing a cultural construct of exploitation, destruction and short term economic gain. This approach is an ecological failure but remains enshrined in cultural mythology.

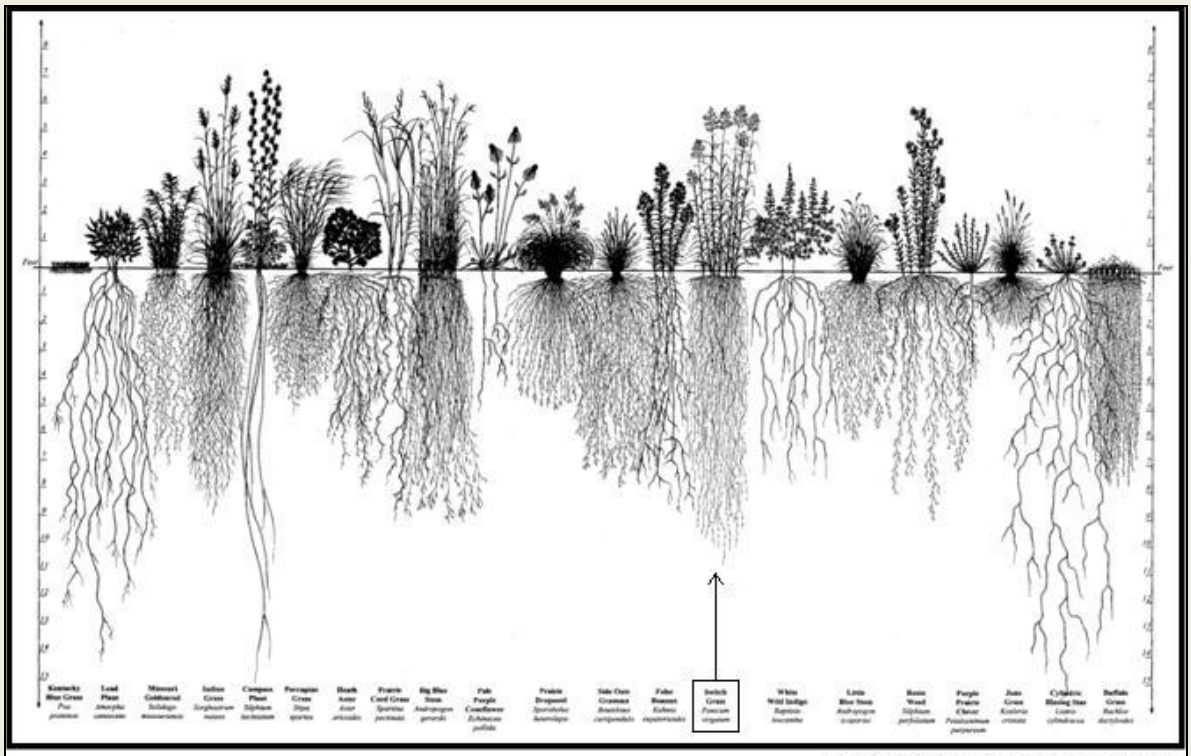
We have created a despoiled landscape with generic features that does little to inspire or attract eco-tourism dollars, foster ecologically appropriate sustainable industries and largely ignores the inherent capability of our land. A lack of understanding of basic ecological processes forces us to attempt to recreate lost ecological functions at great cost to the taxpayer, the environment and society.

The Black River RAP has stated that 64% of the non-point pollution in the river is due to current agricultural practices. Changes in these practices will save money and create opportunities for sustainable development in fisheries, ecotourism, new agricultural products, lessen air and water pollution and enhance the quality of life.

Switchgrass: One Viable Example of Ecologically Appropriate Economic Growth
Switchgrass (Panicum virgatum) is a prairie grass native to Lorain County. Switchgrass is a perennial species unlike corn and soybeans that require yearly plowing and chemical application regimes. A field of switchgrass can produce as many as two harvests a year and continue to do so for perhaps 15 years or more.

Harvested grass can be pelletized and transported to local power plants and burned as fuel with coal. Burning switchgrass in coal fired power plants reduces air-borne mercury pollution, creates a local sustainable market and positively impacts other areas of the country involved in coal production. Switchgrass is currently being grown as an alternative fuel source in many areas of the country, but nowhere

in Ohio. Switchgrass is also an excellent sink for atmospheric carbon and therefore a positive response to issues of climate change. The root system of switchgrass is very deep, up to ten feet, and creates topsoil throughout its profile thus rejuvenating highly eroded lands.



Root Systems of Common Prairie Grasses
From *Native Plant Guide*, USDA-NRCS and CMUCA

In addition, the use of switchgrass in the list of cap and trade carbon credit alternatives will add an additional income source for the growers. Utilizing the ecological design model of the tall grass prairie we can target highly erodable slopes for switchgrass production and combined with linear detention and retention basins designed on a wetland model, we can dramatically reduce soil erosion and chemical inputs into our waterways fostering positive growth in related industries and save taxpayer dollars. Local water treatment plants are currently forced to remove eroded soil from the water and dispose of it in landfills. Dredging of the Lorain Harbor also adds to the tax payer supported costs associated with erosion.

The steelhead fishery in the Rocky River pumps $20 million annually into the watersheds economy. The Black River steelhead fishery is currently almost entirely lost due to the heavy silt load caused by erosion from agriculture.

Municipalities can also engage in the process of switchgrass production on vacant lands reducing the taxpayer costs associated with the maintenance of turf grass. Lorain County has an opportunity to become a leader in this industry, and others, and provide a new direction for ecologically based sustainable growth and redefining itself as a progressive place to live.

BENEFICIAL USE IMPAIRMENT STATUS

With the completion of the Black River Total Maximum Daily Load study and report in 2008, this year's completion of the Lower Black River Ecological Restoration Master Plan and the near completion of Watershed Action Plans for the West Branch and French Creek sub-watersheds, the Black River AOC is poised to benefit from the implementation of numerous projects and actions. As the Coordinating Committee begins work on these initiatives, now is a good time to review the current status of the beneficial use impairments.

Some of the following discussions on the beneficial uses may utilize terms and acronyms that may be unfamiliar to you. To help decipher the language of restoration, please see the Terms and Acronyms section on page 3 of this report.

The Black River watershed AOC has eight beneficial uses listed as impaired and one listed as being in a phase of natural recovery (see listing on Page 2). The following section will discuss how, why and where in the watershed each beneficial use has been listed as impaired, how the condition of each impairment is typically assessed, who typically performs the assessment and finally, what actions and data are needed to restore the beneficial use in the AOC. For more complete information on delisting Areas of Concern in Ohio can be found at: http://www.epa.state.oh.us/portals/35/rap/DelistingTargetsOhioAOC_2008Revision.pdf

BUI # 1: Restrictions on Fish Consumption

Ohio AOC Listing Criteria

This beneficial use shall be impaired if any advisory or restriction to fish consumption of one meal per month (or more stringent) is imposed by the Ohio Department of Health and Ohio EPA and is due to sources of contamination within the AOC.

NOTE: The wildlife consumption portion of the Restrictions on Fish and Wildlife Consumption BUI is not considered to be impaired.

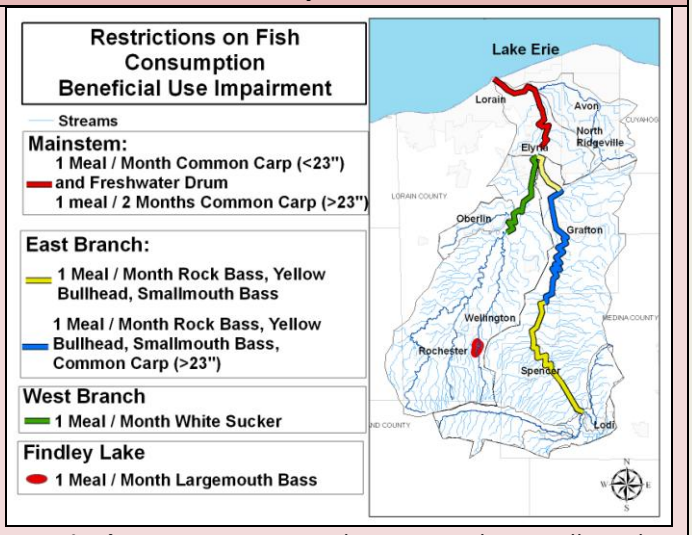
Ohio AOC Fish Consumption Delisting Target Condition

No fish consumption advisories of one meal per month (or more stringent) have been issued by Ohio Department of Health that are attributed to contaminants within the AOC.

Method Used for Assessment of Impairment

Tissues from AOC sport fish are typically analyzed by Ohio EPA and ODH and the results are compared to human health standards for fish consumption. If contaminant concentrations are high, consumption advisories will be posted by Ohio EPA and ODH.

Areas of Impairment in AOC



Impaired: Main Stem, East and West Branches, Findley Lake

For the fish consumption assessment, fish tissue samples are collected and analyzed for contaminant concentrations. The concentrations are compared to human health limits for fish consumption. A state-wide advisory was posted in 2003 for all waters recommending that all persons limit consumption of Ohio sport fish to only one meal per week (52 meals per year). This state-wide advisory was posted due to mercury contamination.

For fish consumption to be considered impaired in an AOC, consumption advisories must be of one meal per month or more stringent. For the Black River AOC, there are five advisories that are at this level, (see graphic above).

In 2007, PCBs were noted to be seeping from the Ford Road landfill by U.S. EPA. Remedial actions were proposed in 2009 and these actions are expected to begin in 2010. The RAP Committee will continue to monitor developments at the landfill to evaluate a potential source of PCB contamination.

This BUI is impaired for certain stretches of streams in the Black River AOC and the impairment will likely remain in effect for the next few years. Ohio EPA is planning to re-monitor fish tissue starting in 2011. Wanting to err on the side of human safety, the state typically uses two 'clean' monitoring episodes before removing a consumption advisory or restriction. Follow-up monitoring should occur in 2013.

For more information, the State of Ohio's fish consumption advisory web page is at www.epa.state.oh.us/dsw/fishadvisory/index.aspx.

BUI # 3: Degradation of Fish Populations

Ohio AOC Listing Criteria

Shall be listed as impaired if Ohio EPA reports a significant departure from fish community criteria or guidelines due to sources of contaminants within the AOC.

Ohio AOC Fish Population Delisting Target

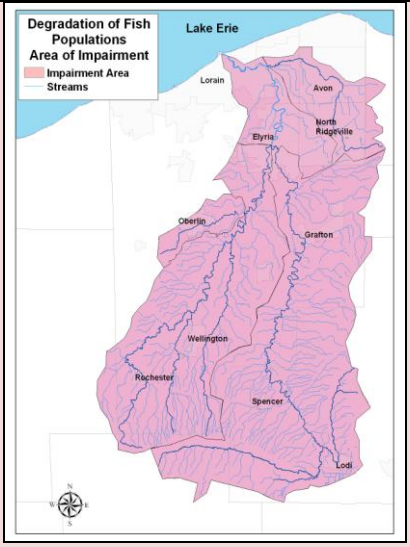
The fish community assessments of Index of Biotic Integrity (IBI) and Modified Index of Well Being (MIwb) reveal numeric scores that do not significantly diverge from state-applicable ecoregional biocritera in free-flowing river segments or from guidelines based on Thoma 1999 for lacustuaries and nearshore areas.
NOTE: The wildlife habitat portion of the Degradation of Fish and Wildlife Populations BUI is not considered to be impaired.

Methods Used for Assessment of Impairment

Fish Community studies (IBI and MIwb) typically conducted by Ohio EPA

- IBI Score needed for delisting: Average of IBI scores in AOC $\geq$ 34 to 36 depending upon the size of the stream (State attainment value of 38 to 40 with a non-significant departure allowance of 4 points)
- MIwb Score needed for delisting: Average of MIwb scores in AOC $\geq$ 7.4 to 8.2 depending upon the size of the stream (State attainment value of 8.7 with a non-significant departure allowance of 0.5 points)

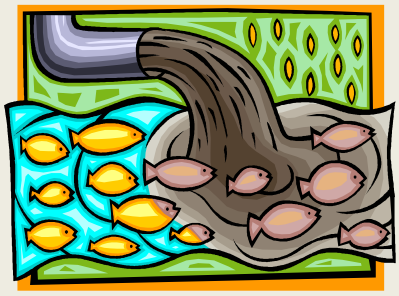
Areas of Impairment in AOC



Impaired: Throughout the AOC

For the assessment of the Degradation of Fish Populations beneficial use, the Coordinating Committee will use two fish community indices developed by Ohio EPA. The two indices are the Modified Index of Well-Being and the Index of Biological Integrity. In addition, the state's delisting guidance document allows for an important measure in the delisting large streams or sub-watersheds. Every site does not need to attain delisting criteria. The averaging of the index scores is allowed for a stream stretch or whole sub-watershed.

The *Modified Index of Well-Being* (MIwb) is a calculation of fish mass and density and factors out 13 pollutant tolerant species of fish from certain calculations. This prevents false high readings on polluted streams which have large populations of pollutant tolerant fish. The higher the MIwb score, the better.



The *Index of Biological Integrity* (IBI) is a measure of fish species diversity and species populations. The index is a numerical value that reflects total native species composition, indicator species composition, pollutant intolerant and tolerant species composition, and fish condition. Combined, the higher the calculation, the healthier the aquatic ecosystem; conversely, the lower the index, the poorer the health of the aquatic ecosystem.

Unfortunately, fish community data from most areas of the AOC are old. Ohio EPA is planning to monitor the fish communities in the next couple of years. For the lower Black River, help is on the way. In 2009, a lower Black River Ecological Restoration Master Plan was completed. This master plan will help guide development and re-development activities in the lower river while addressing the protection and restoration of aquatic habitat in Lorain. See the article presented later in this Black River RAP 2009 Annual Report.

BUI # 4: Fish Tumors and Other Deformities

Ohio AOC Listing Criteria

This beneficial use shall be impaired if external tumors and abnormality percentages exceed 0.5% in a fish population or liver tumor prevalence in brown bullheads exceed state guidelines.

Ohio AOC Delisting Target

- Deformities, Eroded Fins, Lesions and Tumors (DELT) levels in fish populations do not exceed 0.5% of the population

AND

- Where brown bullheads are present, low tumor prevalence in the population 3 years and older. Lake Erie regional targets are being developed but are expected to be below 5% liver tumors.

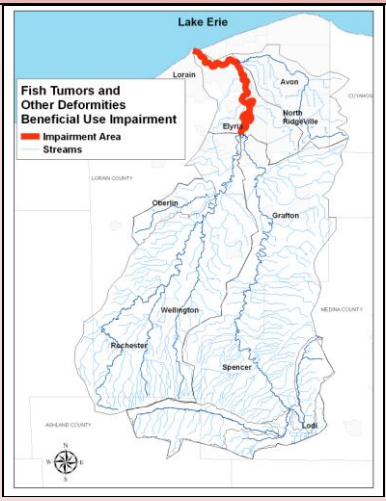
Methods Used for Assessment of BUI

- DELT observations for external abnormalities and tumors of fish communities typically assessed by Ohio EPA during fish community studies (IBI and MIwb)

AND

- Liver tumor prevalence studies of brown bullheads, are conducted by special study

Areas of Impairment in AOC

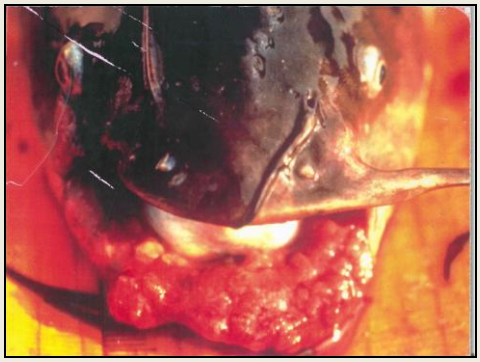


Impaired, but In Recovery Phase:
Main Stem only

Higher percentages of both external and internal fish tumors have long been associated with polluted water and sediments. This is especially true for the lower Black River main stem which had been known around the Great Lakes as the "river of fish tumors." In the Black River, the main contaminant causing fish tumors and deformities was polynuclear aromatic hydrocarbons (PAH) from an old steel mill coking plant. The coking plant has been closed since 1983, and the PAH contaminated sediments were dredged from the lower river between 1989 and 1990.

By 2004, sufficient improvement had been documented to change the status of this use impairment to In Recovery Phase. The In Recovery Phase designation means that remedial actions have been completed, improvements have been documented and natural processes are expected to complete the restoration.

For the tumors and other deformities assessments, both external tumors/deformities of the river's fish population as well as liver tumors from brown bullheads (over the age of three years) are documented. Regional targets for liver tumors are currently under development but the target value is expected to be below 5% liver tumors in brown bullheads. External abnormalities (DELTs) are routinely noted by Ohio EPA field personnel when conducting fish community studies (IBI and MIwb) and over decades of monitoring, the agency has determined that the incidence of DELTs should not exceed 0.5% of the fish population of healthy rivers. Ohio EPA is planning to monitor the health of the Black River fish populations in the next few years.



Black River Brown Bullhead with Lip Tumors

BUI # 6: Degradation of Benthos

Ohio AOC Listing Criteria

Shall be listed as impaired if Ohio EPA reports a significant departure from benthic macroinvertebrate community criteria or guidelines due to sources of contaminants within the AOC.

Ohio AOC Delisting Target

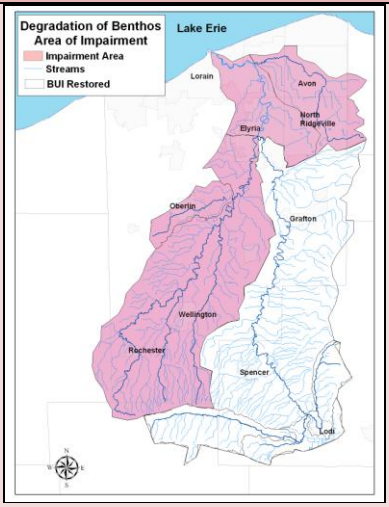
Average of ICI scores in AOC $\geq$ 30 for free-flowing segments or $\geq$ 38 in lacustuaries and lake nearshore areas. (State attainment value with a non-significant departure allowance of 4 points).

NOTE: This beneficial use was designated as Restored in the East Branch sub-watershed in 2005

Methods Used for Assessment of BUI

Benthic Community study (ICI) typically conducted by Ohio EPA

Areas of Impairment in AOC



Impaired: Main Stem, West Branch, French Creek

The *Invertebrate Community Index* (ICI), as develop by Ohio EPA, is a monitoring method that is based on measurements of the community structures of benthic macroinvertebrates living in a stream or river. Some benthic organisms are known to be pollutant intolerant and some are known to be pollutant tolerant. A community system with higher populations of pollution intolerant organisms is indicative more biologically diverse communities and a healthier system. Higher ICI scores indicate healthier systems.

For attainment of state water quality standards in warm-water rivers and streams, the ICI score must be 34 or more but allowing for an insignificant departure from the state's criteria would allow for an ICI score of 30 to be used as a BUI delisting target. Even with this significant departure allowance, it will be difficult for the Black River AOC to achieve this goal in and along the maintained shipping channel due to the depth of and the numerous modifications to the river for shipping, industrial and urban needs. It is likely that the RAP Coordinating Committee will need to determine what specific level of quality is attainable in the lower main stem, hence the numeric target for delisting the impairment for benthic macroinvertebrate communities.

Unfortunately, very little data are available for ICI in the main stem and throughout the Black River AOC. Ohio EPA is looking to secure additional funding to allow for additional monitoring in the next couple of years.

Remedial projects outlined in the Lower Black River Restoration Master Plan can help restore the benthic communities in the main stem.

Stonefly Nymph

BUI # 7: Restrictions on Navigational Dredging Activities

Ohio AOC Listing Criteria

Shall be listed as impaired if contaminants in sediment exceed sediment quality guidelines used by the State such that there are restrictions on dredging or disposal activities.

Ohio AOC Delisting Target

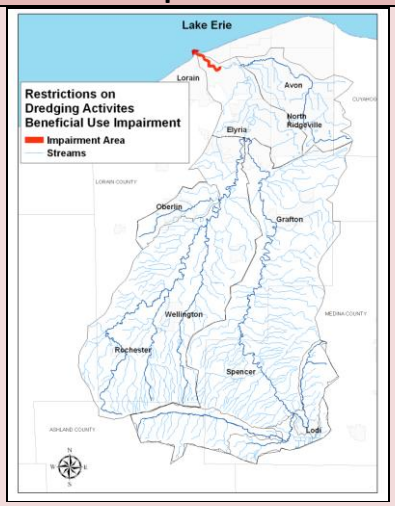
No restrictions on navigational dredging activities due to contaminants in sediments

NOTE: The RAP has approached U.S. EPA about re-designating this beneficial use from Impaired to In Recovery Phase

Methods Used for Assessment of BUI

Analysis of sediment samples from the federal navigational channel are conducted by U.S. Army Corps of Engineers. Results of these studies are compared to sediment quality guidelines for open lake disposal or upland re-use by the Corps and Ohio EPA.

Areas of Impairment in AOC



Impaired: Main Stem and Outer Harbor

This use impairment concerns only areas that are dredged for navigational purposes. For an assessment of sediment quality in the federally maintained stretch of the Black River ship channel, the Black River RAP Coordinating Committee relies on data supplied by the U.S. Army Corps of Engineers.

Typically, the Corps of Engineers conducts an extensive sediment assessment of federal navigation channels about every five years. The last sampling was conducted a few years ago, and the sample results were included in a 2009 Corps report that led the RAP Coordinating Committee to look into a re-designation of this use impairment. (Please see the Dredging and Cleaner Sediments article on page 6.)

Dredge Cutter Head

BUI #8: Eutrophication or Undesirable Algae

Ohio AOC Listing Criteria

Shall be listed as impaired if:

- Dissolved oxygen levels do not meet minimum state criteria established in Ohio water quality standards and the cause is due to excessive nutrient loading or high biochemical oxygen demand (BOD)

AND

- Nutrients entering the waters as a result of human activity create nuisance growths of aquatic weeds and/or algae

Ohio AOC Delisting Target

- Waters of the AOC meet the minimum dissolved oxygen criteria listed in Ohio Water Quality Standards

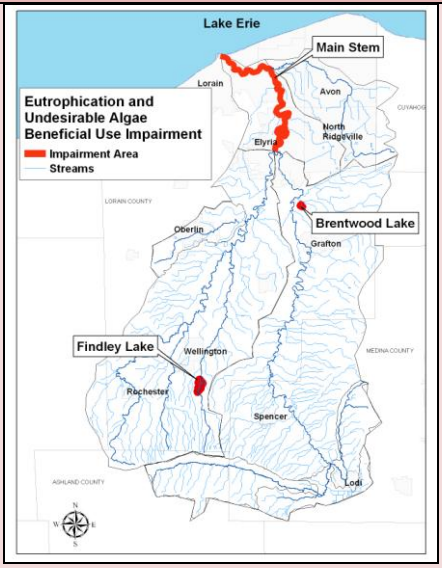
AND

- No nuisance growths of algae, such as filametous Cladophora, or blooms of blue-green algae exist and no nuisance growths of aquatic weeds that hinder recreational use or human contact with the water body

Methods Used for Assessment of BUI

- Dissolved oxygen and nutrient levels, typically assessed by Ohio EPA
- Frequency, extent and length of time for nuisance algae growths, typically noted by complaints to Ohio EPA and local agencies
- Percentage of omnivorous fish species, from fish community studies (IBI and MIwb), typically assessed by Ohio EPA

Areas of Impairment in AOC



Impaired: Low Dissolved Oxygen in Main Stem; Nuisance algae growths in Findley Lake.

According to the RAP's Stage 1 Document, the Eutrophication or Undesirable Algae Beneficial use was listed Impaired for the Black River AOC due to pronounced algal blooms in Findley and Brentwood Lakes. In 2009, the earthen dam at Brentwood Lake was removed, so the impairment only remains for Findley Lake, where surrounding agriculture and the ODNR wastewater treatment facility at Findley Lake State Park load nutrients, especially phosphorus, into the lake. In the past, Ohio EPA recommended a phosphorus reduction for the treatment plant. Ohio EPA plans to resurvey Findley Lake in 2010 or 2011. The Black River RAP Coordinating Committee will re-evaluate the impairment at Findley Lake when the new data become available.

The RAP's Stage 1 Report also stated that there is the potential for Eutrophication impairment in the lower main stem and in some small slow-moving upper watershed tributaries.

An earlier dissolved oxygen study for the main stem revealed that while dissolved oxygen sags are evident in the lower main stem, little can be done to improve the situation due to the maintained depth of the navigation channel.

The flat topography of the upper watershed areas is the primary cause of the slow, almost stagnant flow regimes through much of the summer. A lack of riparian canopy exacerbates the condition by allowing sunlight to warm the slow-moving waters. This is likely no different than many non-AOC tributary systems located in primarily flat agricultural areas. The potential for restoration in the upper areas will have to be assessed by the RAP Coordinating Committee.

Nuisance Algal Blooms

BUI # 10: Beach Closings (Recreational Use)

Ohio AOC Bacteria Listing Criteria

Shall be listed as impaired if the applicable E. coliform bacteria criteria are exceeded during the recreational season (May 1 to Oct. 15):

Ohio AOC Bacteria Delisting Target

Total Body Contact for Bathing Waters:
No more than 10 posted advisory days, due to high bacteria levels, per year for five consecutive years

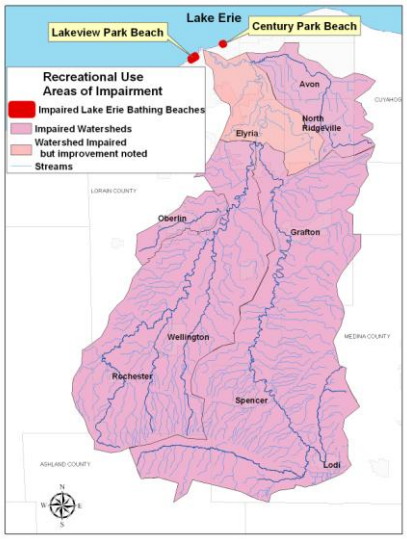
Total Body Contact in areas designated as Primary Contact Waters, for five consecutive years:
75th percentile for all samples collected in one year does not exceed 1000 CFU per 100 ml fecal coliform;
OR
90th percentile of all samples collected in on year does not exceed 298 CFU per 100 ml

Partial Body Contact in areas designated as Secondary Contact Waters: 90th percentile of samples collected over a five year period does not exceed 5000 CFU per 100 ml for fecal coliform;
OR
90th percentile of samples collected over a five year period does not exceed 576 CFU per 100 ml for E. coliform

Bacteriological Methods Used for Assessment of BUI

ODH Bathing Beach Monitoring Reports and Coliform bacteria monitoring as monitored by and reported to Ohio EPA

Areas of Impairment in AOC



Impaired: Throughout portions of the AOC, including Lakeview Park and Century Park bathing beaches.

Improvements documented in Main Stem

Ohio AOC Chemical Criteria Listing Criteria

Chemical Contaminant Contact Criteria:
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.

Status in AOC

Not Impaired

NOTE: A contact advisory for the lower main stem due to chemical contamination was lifted in 2004

This beneficial use was developed to be protective of human health from chemical or bacteriological contaminants in the waters or sediment. The Black River main stem's contact advisory due to PAH contaminated sediments was lifted by the Ohio Department of Health in 2004 so this AOC impairment and the following discussion is for bacterial contamination only.

A myriad of viruses and bacteria can be present in surface waters from human activities. To analyze for all potential pathogens would be very expensive. It could also be so time consuming that by the time an analysis is completed, the result would no longer be representative of current conditions of the waters. For these reasons, it is widely recognized that coliform bacteria can indicate the potential for the presence of other pathogens. The higher the coliform content, the greater the risk for other pathogens.

In the *Delisting Targets for Ohio Areas of Concern* guidance document, the Beach Closings impairment listing has been expanded and includes the words "Recreational Use." Not all sections of each Ohio AOC may have a beach, but most have sites where citizens recreate. The Beach Closings BUI was designed to protect citizens from contact with contaminated water and sediment. In developing the guidance document, it was determined that by expanding the BUI beyond the scope of just beach areas would be more accurate and protective of human health. The expanded scope of the BUI aligns this impairment with Ohio water quality standards (WQS).

In the WQS, one of the state's designations is for the protection of recreational uses of the water resource. This designation breaks up water systems into three categories: bathing waters, primary contact recreation waters and secondary contact recreation waters. This classification system was developed by the state to regulate the degree of disinfection

required by wastewater discharges near the site. In developing the state's guidance document, it was recognized that weather patterns can greatly affect the bacteria levels of an aquatic system. For this reason, it is recommended to not swim in lakes, rivers or streams after a substantial rain event.

Bathing waters are defined as recreation areas having a bathing beach with lifeguards and/or bath houses and these are offered the greatest disinfection of any wastewater being discharged nearby. Primary and secondary contact recreation waters are designated according to the depth of the waters and the proximity to residential areas. Primary contact waters are of a depth sufficient for full body immersion and are nearer residential areas. These areas are required to have a baseline level of disinfection of wastewater that is discharged nearby. Secondary contact waters are not of a depth where full body immersion is possible and are sometimes called wading waters. They are also not near residential areas and so a slightly lower level of disinfection of wastewater discharges is required.

Bathing Waters or Designated Beach Areas

There are three bathing water beaches in the Black River AOC (Lakeview Park Beach, Century Park Beach (both located on the Lake Erie shore) and the Findlay Lake State Park beach). As part of their Bathing Beach monitoring program, the Ohio Department of Health (ODH) routinely monitors the bacteria levels at these beaches. The delisting target for any bathing waters beach is no more than 10 ODH posted swimming advisory days, due to high bacteria levels, per year for five consecutive years. The Findley Lake beach does not have history of bacteriological contamination and is not considered impaired for the recreational beneficial use, but both Lake Erie beaches are considered impaired for this beneficial use. As you can see from the table below, the number of advisory days posted for these Lake Erie beaches for the last two years exceed the target number.

Beach	2008 Season		2009 Season	
	Days of Posted Advisories	Average E. coli level	Days of Posted Advisories	Average E. coli level
Lakeview Park Beach	44	249.1	12	106.0
Century Park Beach	52	330.2	26	227.8

Data from ODH 2008 and 2009 Bathing Beach Monitoring Reports

Non-Beach Areas

Ohio EPA's Integrated Reports are the initial source of bacteria monitoring results for the Black River RAP. The Integrated Reports are required to be issued every two years by the U.S. EPA. The reports describe conditions for all of Ohio's surface waters. One of the conditions reported is on the suitability of the water resource for recreational use. The upstream sub-basins of the West and East Branches are impaired for this BUI as they have consistently shown levels of bacteria exceeded the delisting criteria. An improvement has been noted in the main stem watershed. The 2008 Integrated Report revealed significant improvements to bacteria levels in the Black River main stem. Ohio EPA does not consider the river to be impaired for recreational use. Although this is good news for the Black River RAP, the Coordinating Committee will continue to monitor future Integrated Reports to determine if the improved levels continue or were due to favorable meteorological conditions.

Lakeview Park Beach from www.loraincounty.us
Photograph by Robert Algarin

BUI # 11: Degradation of Aesthetics

Ohio AOC Listing Criteria

Shall be listed as impaired if any of the "free froms" designated in the Ohio Administrative Code (OAC) section 3745-1-04 are not being met to the extent practical and possible:

Ohio AOC Delisting Target

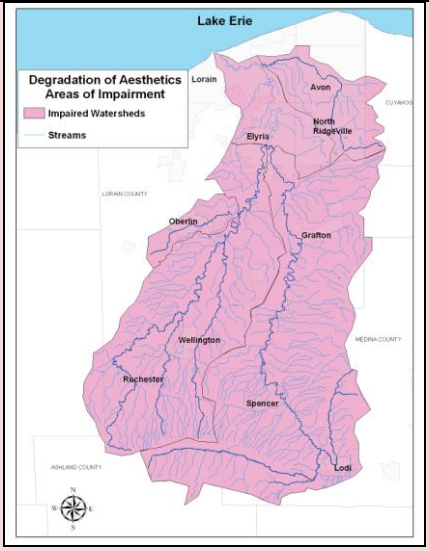
General surface water quality meets applicable OAC water quality criteria and is free from the following:

- Suspended solids of other substances that will settle to form putrescent or otherwise objectionable sludge deposits, or that will adversely affect aquatic life,
- Floating debris, oil, scum and other floating material in amounts sufficient to be unsightly or cause degradation,
- Materials producing color, odor or other conditions in such a degree to create a nuisance,
- Public health nuisances associated with raw or poorly treated sewage

Methods Used for Assessment of BUI

Monitor problem stream segments or locations within AOC for solids, debris, scum, etc., typically noted by complaints to Ohio EPA and local agencies

Areas of Impairment in AOC



Impaired: Throughout the AOC

The 'free-froms' noted in the Listing/Delisting Criteria and Targets apply to all waters in the state. There are two additional 'free-froms' noted in the Administrative Code. One deals with toxic or harmful substances but that is more closely associated with other beneficial use impairments like recreational use, drinking water or fish or benthos populations. The other 'free from' that is not listed above deals with excessive nutrients that lead to nuisance growth of aquatic weeds or algae but that is associated with the eutrophication and undesirable algae use impairment.

The Degradation of Aesthetics use impairment is listed throughout the Black River AOC. Excessive loadings of sediment from upstream areas, failed or failing home sewage treatment systems, combined sewer overflows and trash still impact the water system.

Past and new programs (TMDL and watershed actions plans) seek to help lessen the impact from sediment loads. Extensive efforts have been offered by the City of Elyria to control impacts from their combined sewer overflows.

Additional efforts, especially in controlling trash, will need to be offered if this beneficial use is to be restored.

Litter along a stream

Litter and log jam

BUI # 14: Loss of Fish Habitat

Ohio AOC Fish Habitat Listing Criteria

Shall be listed as impaired if Ohio EPA reports that an assessment of the aquatic habitat as applicable and measured by QHEI or LQHEI methodologies indicates impairment.

Ohio AOC Fish Habitat Delisting Target

For free-flowing segment of AOC, Quantitative Habitat Evaluation Index (QHEI) scores must average $\geq$ 60

For Lake Erie and lacustuarine areas, Lacustuary Quantitative Habitat Evaluation Index (LQHEI) must average $\geq$ 55

Methods Used for Assessment of Fish Habitat

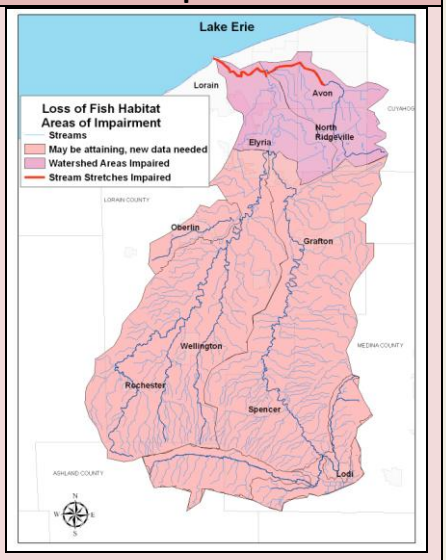
- QHEI for free-flowing segments of AOC,

AND/OR

- LQHEI for lacustuarine and Lake Erie shoreline and near shore areas

Note: QHEI and LQHEI are typically assessed by Ohio EPA and other persons trained for fish habitat assessments (local watershed groups, special studies, etc.)

Areas of Impairment in AOC



Impaired: Throughout the AOC

For Fish Habitat assessments, the RAP Coordinating Committee will rely on the *Lacustuary Quantitative Habitat Evaluation Index* (LQHEI) for Lake Erie, Lake Erie nearshore and lacustuarine areas and *Quantitative Habitat Evaluation Index* (QHEI) for free-flowing areas of the AOC. Although not formally adopted by Ohio EPA, the LQHEI index is useful in assessing fish habitat conditions along the Lake Erie shoreline and in the lower stretches of river that drain to the lake.

Both habitat methodologies are intended to provide a quantitative evaluation of the physical characteristics for amount and quality of fish habitat in a given stream reach and Lake Erie shoreline. Both methods are composed of six metrics which take in account variables such as substrate, cover, morphology, riparian cover and erosion, aquatic vegetation and other modifications. The maximum score for each method is 100.

For Ohio AOCs, an LQHEI score of 55 or greater or a QHEI score of 60 or greater are needed for delisting the fish habitat BUI. Not every site needs to achieve these levels. The averaging of LQHEI or QHEI scores for the entire stretch is permissible for delisting.

Most of the downstream areas of the lower Black River AOC have hard-armored or sheet-piled river banks which do not provide sufficient fish habitat and do not score well using LQHEI. In the lower Black River, the new master plan promises to help restore and protect aquatic and nearshore habitats in Lorain. As part of the master plan process, new LQHEI values were obtained for the lower six miles of the main stem. The master plan document reported that the average LQHEI for the lower river study area is 39.4 or only 71 % of the delisting target.

In upstream areas of the AOC, the unprecedented degree of recent development, a lack of quality riparian habitat and other land use practices have led to eroding stream banks, excessive sediment loads and a smothering of aquatic habitat. Data available from Ohio EPA have not been inclusive of all segments in a tributary sub-watershed, and new habitat studies need to be conducted before the RAP Coordinating Committee is able to delist fish habitat in the AOC. Ohio EPA is seeking funds to conduct these habitat evaluation studies.

The data that are available may be old, but they are promising:

Tributary Basin	Average QHEI	Data Source	Age of Data
French Creek	53.5	US Army Corps of Engineers (USACE)	2002 *
East Branch	64.1	USACE & Ohio EPA	2001 & 2003 *
- East Fork	66.5	Ohio EPA	2006
- West Fork	65.0	Ohio EPA	2006
West Branch	63.1	Ohio EPA	2001 & 2006 **
- Plum Creek	62.5	Ohio EPA	2001 & 2006 **
- Wellington Creek	72.3	Ohio EPA	2001 & 2006 **
- Charlemont Creek	69.3	Ohio EPA	2001 & 2006 **
* Data is too old for use in assessing BUI, new data is needed			
** One year of the dataset is too old for use in assessing BUI, new data is needed			

Please be aware that some of the data presented in the table above are beyond the 5-year time limit for the state's Credible Data Bill, so its use in determining an accurate current state of fish habitat in the upper watersheds should be suspect and cannot be used in a formal delisting application to Ohio EPA and U.S. EPA. The data are being presented here to demonstrate how close fish habitats in the upper watersheds are toward the delisting target value.

According to the state's delisting guidance, not every site in a watershed needs to be at the target value as long as the target value is met by an average of values for the stream stretch or basin. This is good news for the upper watershed areas of the Black River AOC. Hopefully new data will be available soon and the new data will show that fish habitat in the upper basins continue to meet the AOC delisting target value set by the state.

BUI # 14: Loss of Wildlife Habitat

Ohio AOC Wildlife Habitat Listing Criteria

Shall be listed as impaired if wildlife officials identify loss of or poor quality habitat as cause for non-attainment with wildlife goals

Ohio AOC Delisting Target

- Buffers
  - Forested buffers on 50% of residential waterways
  - Forested Buffers on 25% of urban waterways
- Headwater Habitat Evaluation Index (HHEI) average $\geq$ 30 for warm water habitat streams and $\geq$ 70 for cold water habitat streams

OR

- Wildlife officials do not identify loss of or poor quality habitat as cause for non-attainment with wildlife goals

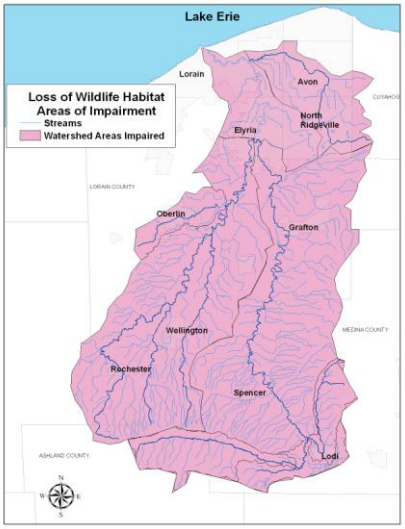
Methods Used for Assessment of BUI

- Percentages of forested buffers on residential and urban tributaries

OR

- Wildlife goals

Status in AOC



Impaired: Throughout the AOC

The RAP Coordinating Committee has done little work on assessing wildlife habitat conditions in the AOC. RAP organizations have always been encouraged to develop locally derived delisting targets as long as they are consistent with applicable federal and state regulations, objectives, guidelines, standards and policies and must support the principles and objectives of applicable parts of the Great Lakes Water Quality Agreement.

The Black River RAP Coordinating Committee feels the Ohio delisting guidelines, which were adopted from Canadian AOCs, are nearly unattainable in most U.S. AOCs and likely all Ohio AOCs. When the Black River AOC nears delisting, the Coordinating Committee will need to devise wildlife habitat delisting targets and milestones that are more applicable and present their proposed targets and milestones to Ohio EPA and U.S. EPA for consideration and approval before proceeding with any re-designation or delisting action for the wildlife habitat portion of this beneficial use.

The Black River

The West Branch Falls at Cascade Park in Elyria

It is our river. It is our responsibility.

Black River RAP Coordinating Committee Members

Local Jurisdictions

Lorain County General Health District
Ken Pearce, Chairman, Black River RAP

Lorain County Board of Commissioners
Commissioner Betty Blair

Lorain County Community Development Dept.
Dan Gouch, Watershed Coordinator (to 2009)
Christina M. Znidarsic, Watershed Coordinator (from January 2010)

City of North Ridgeville
Cathy Becker

Lorain County Metro Parks
Dan Martin

NOACA
Mary Wells
Andy Vidra

Lorain Soil & Water Conservation District
Nancy Funni

Medina Soil & Water Conservation District
Jeff VanLoon

City of Elyria
Terry Korzan

City of Lorain
Hon. Tony Krasienko, Mayor

Citizen Representatives

Cheryl Wolfe-Cragin

Charles "Eddie" Herdendorf

Brad Masi

Jennifer Scott-Wasilk

State/Federal Agencies

USDA/Natural Resources Conservation District
Karl Schneider

U.S. EPA
Anne Marie Vincent, RAP Liaison

Ohio EPA
Ted Conlin, RAP Coordinator

OSU Sea Grant
David Kelch

Industry/Commercial Representatives

Lorain County Office of Sustainability
GLIDE / Lorain County Growth Partnership
Michael Challender

Lorain County Port Authority
Rick Novak

Lorain County Farm Bureau

Lorain County Community Alliance
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Columbia Gas Transmission
Tim Keslar

National Gypsum
Matt May

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Northeast Ohio Areawide Coordinating Agency
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