UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
GREAT LAKES NATIONAL PROGRAM OFFICE
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

11 OCT 2016

Mr. Craig Butler
Director
Ohio Environmental Protection Agency
50 West Town Street, Suite 700
P.O. Box 1049
Columbus, OH 43216-1049

Dear Mr. Butler:

Thank you for your July 15, 2016, request to remove the "Restrictions on Fish and Wildlife Consumption" and "Eutrophication or Undesirable Algae" Beneficial Use Impairments (BUIs) from the Black River Area of Concern (AOC) in Ohio. As you know, we share your desire to restore all of the Great Lakes AOCs and to formally delist them.

Based upon a review of your submittal and the supporting data, the U.S. Environmental Protection Agency hereby approves your two BUI removal requests for the Black River AOC. In addition, EPA will notify the International Joint Commission of this significant positive environmental change at this AOC.

We congratulate you and your staff, as well as the many federal, state, and local partners who have worked so hard and been instrumental in achieving these important environmental improvements. Removal of these BUIs will benefit not only the people who live and work in the Black River AOC, but all the residents of Ohio and the Great Lakes basin as well.

We look forward to the continuation of this important and productive relationship with your agency and the local coordinating committee as we work together to fully restore all of Ohio's AOCs. If you have any further questions, please contact me at (312) 353-4891, or your staff may contact John Perrecone, at (312) 353-1149.

Sincerely,

Chris Korleski, Director
Great Lakes National Program Office

cc: Russ Gibson, Ohio EPA-DSW Manager
Tiffani Kavalec, Ohio EPA-DSW Chief
Ted Conlin, Ohio EPA
Donald C. Romancak, Black River AOC Advisory Committee Chair
Raj Bejankiwar, IJC
Wendy Carney, EPA, GLNPO
Kristen Isom, EPA, GLNPO

Ohio Environmental Protection Agency

John R. Kasich, Governor
Mary Taylor, Lt. Governor
Craig W. Butler, Director

July 15, 2016

Chris Korleski, Director
U.S. Environmental Protection Agency
Great Lakes National Program Office
77 West Jackson Blvd. (G-17J)
Chicago, Illinois 60604-3511

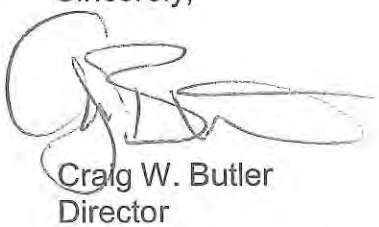
Dear Mr. Korleski:

Ohio EPA and the Black River AOC Advisory Committee are requesting concurrence with the recommendation to remove two beneficial use impairments, Fish & Wildlife Consumption and Eutrophication & Undesirable Algae, in the Black River AOC. The enclosed removal recommendations provide detailed assessments for both BUIs and outline the rationales for the BUI removals. The package also contains a letter of support from the Black River AOC Advisory Committee.

Ohio EPA worked with the local AOC Advisory Committee to develop the removal recommendations and conducted a public meeting on May 25, 2016, to inform the public about the recommendation and to solicit comment. No formal comments/ concerns were brought to our attention.

The resources provided by the Great Lakes National Program Office and the Great Lakes Restoration Initiative have been vital in the restoration of Ohio's AOCs and have led us to this historic milestone in the Black River. We look forward to working with the U.S. EPA and the AOC Advisory Committee to remove the six remaining BUIs and ultimately delist the Black River AOC.

Sincerely,



Craig W. Butler
Director

Enclosure

cc: Tiffani Kavalec, Division of Surface Water Chief

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

MEMORANDUM

REPLY TO THE ATTENTION OF

SUBJECT: Great Lakes National Program Office Technical Review and Removal Recommendation for the Black River Area of Concern (AOC) Fish and Wildlife Consumption Beneficial Use Impairment (BUI) Removal Recommendation - **INFORMATION MEMORANDUM**

FROM: Elizabeth Murphy
Great Lakes National Program Office
Environmental Scientist
Fish and Wildlife Consumption Beneficial Use Impairment Expert – Lead

TO: Kristen Isom
Great Lakes National Program Office
Environmental Scientist
Task Force Lead, Black River Area of Concern

The purpose of this memorandum is to document technical approval of Ohio EPA's report entitled: *Removal Recommendation for the Restrictions on Fish and Wildlife Consumption Beneficial Use Impairment (BUI) in the Black River Area of Concern (AOC)*, "BUI Removal Report", and to provide concurrence with the Black River Remedial Action Plan Advisory Committee and Ohio EPA's recommendation to remove the restrictions on Fish and Wildlife Consumption (BUI) from the Black River. This memo is provided in response to a request for review by the GLNPO Fish and Wildlife Consumption Beneficial Use Impairment Experts of the BUI Removal Report submitted to the Great Lakes National Program Office (GLNPO) Task Force Lead (TFL).

BUI removal is achieved when it is demonstrated that the guidelines stated in the United States Policy Committee's (USPC) 2001 Delisting Principles and Guidelines document have been met. In accordance with these Principals and Guidelines, the State of Ohio; BUI Removal Report has shown that the restoration targets have been met and follow up monitoring or other evaluations confirm that the beneficial use has been restored and that the impairment is caused by sources outside the AOC.

After a thorough review for content, completeness, scientific support and an evaluation of the conclusions in reference to the stated Restoration Targets, U.S. EPA, GLNPO Fish and Wildlife Consumption Beneficial Use Impairment Experts concur with the findings of the of the BUI Removal Report and support the request for removal of the BUI by the State of Ohio and the Black River AOC Advisory Committee in their letter to GLNPO dated July 15, 2016.

The concurrence is based on the following:

- The BUI Removal Report provides evidence that both the Riverine and Lacustuarine targets have been met for the Black River;
- The State of Ohio presented a study on mercury concentrations of fish species in the Black River that show that:
  1. Source of the contamination originates outside of the AOC for freshwater drum and
  2. Fish tissue concentrations within the AOC are not statistically different than non-AOC areas, reference sites or region-wide, and or background concentrations for common carp.

As such, with the information presented to USEPA at this time, there no is evidence of impairments to wildlife consumption in the Black River AOC.

CC: Marc Tuchman
Great Lakes National Program Office
Branch Chief Great Lakes Remediation and Restoration Branch

John Perrecone
Great Lakes National Program Office
AOC Coordinator

Jackie Fisher
Great Lakes National Program Office
Environmental Health Coordinator/Human Subjects Officer
Fish and Wildlife Consumption Beneficial Use Impairment Expert

Removal Recommendation for the Restrictions on Fish and Wildlife Consumption Beneficial Use Impairment (BUI) in the Black River Area of Concern (AOC)

Background

The Black River lies in northeast Ohio, flowing into Lake Erie's central basin at the city of Lorain. Its drainage basin covers an area of 467 square miles. Major tributaries include French Creek, East Branch and West Branch. Native American inhabitants referred to the river as the Canesadooharie or "river of black pearls." The city of Lorain, with an estimated population of 64,097, and the city of Elyria, with an estimated population of 54,533 (2010 Census, http://censusviewer.com/) are the significant urban centers in the watershed. The remainder of the drainage basin ranges from rural and agricultural to developing suburban.

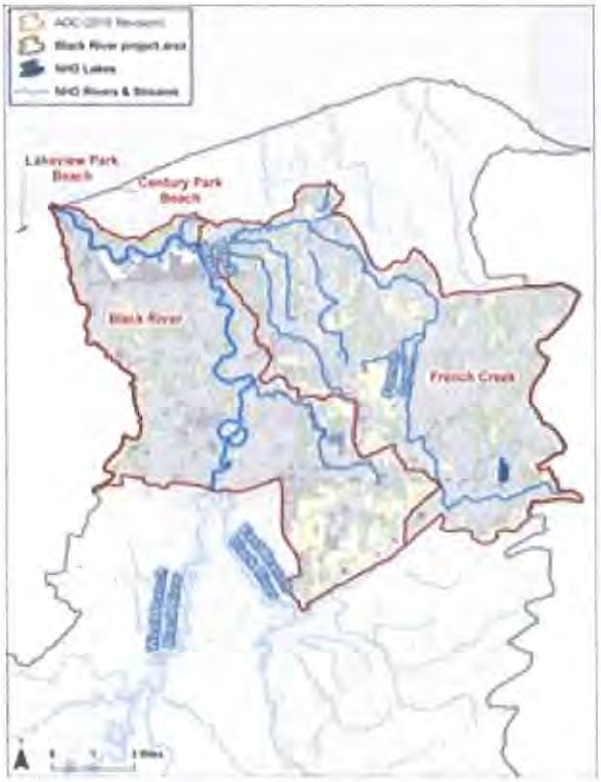


Figure 1. Black River AOC

Primarily due to the prevalence of internal and external tumors and other anomalies in resident fish communities, the lower 6.5 miles of the Black River mainstem was originally designated as a Great Lakes Area of Concern (AOC). In their 1994 Stage 1 Report, the newly formed Coordinating Committee stated that although, ". . . the primary portion of the AOC is defined to be the lower 6.5 miles of the river, significant sources of pollutants that contribute to the degradation of the AOC occur upstream." (Black River AOC Coordinating Committee 1994) The Coordinating Committee therefore decided to include the entire Black River watershed as the AOC and any remedial measures proposed in the Stage 1 Report "will focus on sources of pollution throughout the river basin." (Black River AOC Coordinating Committee 1994) The AOC Coordinating Committee determined in 2015 that the upper basins of the East and West Branches were no longer contributing to the degradation of the Black River mainstem. In light of this decision, the Coordinating Committee has resized the AOC to include only the mainstem, from the confluence of the branches, the Outer Harbor, the French Creek watershed and the near Lake Erie shoreline. (US EPA 2015)

The mainstem consists of two reaches, a lacustrine reach and a riverine reach (Figure 2). A lacustuary is a fresh water estuary or a place where river flow is affected by wind patterns and lake levels, sometimes halting or reversing river flow, pushing lake water into the lacustuary, and causing the lake-affected portion of the river system to act more

as a component or bay of the larger lake system. With unrestricted access between the lake and lacustuary, fish species can and do readily move between Lake Erie, the Outer Harbor and the Black River lacustuary. Upstream of the lacustuary, is the riverine or free-flowing reach which is unaffected by lake levels.

Figure 2. Extent of Lacustrine and Riverine Reaches of the Black River Mainstem

Nine beneficial uses are listed as impaired across the newly aligned AOC, including Restrictions on Fish and Wildlife Consumption Beneficial Use Impairment (BUI).

Wildlife Consumption
This BUI contains two components, restrictions on the consumption of fish and restrictions on the consumption of wildlife.
Snapping turtles are the only wildlife species in Ohio with consumption advisory. Currently, snapping turtles caught from the Black River have a one meal per week advisory, due to mercury contamination. (Ohio EPA Sport Fish website)
Ohio does not consider this advisory as an impairment for the wildlife component of this BUI as its frequency, at one meal per week, is at the same frequency as the statewide blanket advisory for fish. (Ohio EPA 2016)
Therefore, since wildlife consumption is not impaired in any area of the Black River AOC, this removal recommendation deals only with the fish consumption component of this BUI.

Purpose

The purpose of this document is to recommend the removal of the Restrictions on Fish and Wildlife Consumption beneficial use impairment from the Black River Area of Concern as well as providing information supporting the removal. The Black River Remedial Action Plan Advisory Committee and Ohio EPA request concurrence with this recommendation which is made in accordance with the process and criteria set forth in the Delisting Targets for Ohio Areas of Concern (Ohio EPA, 2016). The

recommendation is made with the support of staff from the Ohio EPA Division of Surface Water (including the Sport Fish Consumption Advisory Program).

Around the Great Lakes, each state develops fish and wildlife consumption advisories designed to protect the health of its residents. The State of Ohio has a long history of operating a fish tissue consumption monitoring program as a cooperative effort between the Ohio Department of Health (ODH), the Ohio Department of Natural Resources (ODNR) and the Ohio Environmental Protection Agency (Ohio EPA). Agency technical staffs meet periodically to coordinate fish consumption advisories and other issues related to fish contaminants.

In an effort to standardize the issuance of sport fish consumption advisories, The Great Lakes Sport Fish Advisory Task Force developed a uniform sport fish advisory protocol (Great Lakes Sport Fish Advisory Task Force 1993). Ohio uses a 2006 addendum of that protocol to issue to establish fish consumption advisories (Great Lakes Sport Fish Advisory Task Force. 2006). Ohio relies on the experience and expertise of the state's Sport Fish Consumption Advisory program to determine if current fish advisories present in the BUI meet the criteria of the fish and wildlife consumption restoration targets.

Restrictions on Fish or Wildlife Consumption Impairment Listing Guideline

The State of Ohio BUI listing guideline, specific to this BUI (Appendix 6), states that the Restrictions on Fish or Wildlife Consumption beneficial use shall be listed as impaired if "an advisory or restriction to fish or wildlife consumption issued by the Ohio Department of Health in the AOC is more stringent than meal per month or Lake Erie advisory."

As previously stated, the Black River AOC consists of the Black River mainstem, the French Creek sub-basin, the Outer Harbor and the near Lake Erie shoreline but the Black River mainstem is the only area of the Black River AOC that is impaired for the fish consumption component of this BUI.

- The French Creek sub-basin of the AOC has never had any posted fish consumption advisories specific to that basin; therefore the French Creek sub-basin is not impaired for the fish consumption component of this BUI.
- The Outer Harbor and the near Lake Erie shoreline, being areas of Lake Erie, have no specifically posted sport fish consumption advisories and are also not designated as impaired for the fish consumption component.

In 1983, an advisory was issued and remained in effect until 1998 that recommended that no fish caught in the lower 6.2 miles of the Black River (the lacustuary) should be eaten. The 1983-1998 Do Not Eat advisory was precautionary and not based on tissue contaminant concentrations but was based on a high incidence of fish tumors in the lacustrine reach of the mainstem. Elevated sediment PAH levels were suspected as the causes of the tumors and were noted as the contaminant for the precautionary consumption advisory. Because of the 1983-1998 Do Not Eat advisory for any fish caught from the waters of the Black River, the AOC Committee's original impaired listing for the fish consumption component of this BUI was warranted.

State of Ohio Restoration Targets

Both the United States Policy Committee's (USPC) 2001 Delisting Principles and Guidelines (USPC, 2001) for Areas of Concern and Ohio's Delisting Guidance and Restoration Targets for Ohio Areas of Concern (Ohio EPA 2016) state that beneficial use impairments can be removed under any of these general scenarios:

1. Restoration targets have been met and follow up monitoring or other evaluations confirm that the beneficial use has been restored;
2. It can be demonstrated that the BUI is due to natural rather than human causes;
3. It can be demonstrated that the impairment is not limited to the local geographic extent of the AOC, but rather is typical of lake-wide, region-wide, or area-wide conditions (under this situation, the beneficial use may be incorrectly recognized as impaired); or
4. The impairment is caused by sources outside the AOC. The impairment is not restored, but the impairment classification can be removed or changed to "impaired-not due to local sources." Responsibility for addressing "out of AOC" sources is assigned to another party or program (e.g., Lakewide Management Plan (LaMP), TMDLs, health department).

It is the intent of this removal recommendation to demonstrate that the removal of this BUI is warranted as either the restoration targets have been met or, in some specific instances, the impairment is not limited to the Black River AOC but is typical of lake-wide, region-wide or area-wide conditions (target options 3 & 4 above). The restoration targets that are specific to this BUI, listed in Appendix 6, state that the removal of the fish consumption component of this BUI can occur when the fish consumption advisories meet the criteria for specific areas (riverine or lacustrine) as listed in Table 2.

Table 2. State of Ohio Restoration Targets

For Riverine Areas (upstream of lacustuaries)		For Lacustuaries
When fish consumption advisories, issued by Ohio Department of Health, are the same as or less frequent than 1 meal per month	**AND**	When fish consumption advisories, issued by Ohio Department of Health, are the same as or less frequent than current Lake Erie advisories of the same species
OR		
Note: 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, the fish consumption component of this BUI can be removed.		

Starting in 1997, the ODH began advising that everyone limit consumption of sport fish caught from all water bodies in Ohio to one meal per week due to mercury, unless there is a more restrictive advisory. Although this general, state-wide advisory was originally intended for sensitive populations (children and women of child-bearing age); ODH has recommended this advisory for everyone since 2003.

All waters of the State of Ohio are affected by a one meal per week fish consumption advisory frequency. As this frequency represents a region-wide condition, Ohio, in its BUI removal guidance document, has determined that this frequency level represents a

region-wide condition and that the next restrictive frequency level (one meal per month) would be the riverine restoration target for the fish consumption component of this BUI.

Sport Fish Consumption Advisories in the Black River AOC

Since 1983, subsequent consumption advisories, specific to the mainstem and more frequent than the general, state-wide advisory, have been issued. Therefore, the impaired listing for fish consumption component of this BUI in the Black River mainstem has remained warranted. The following table displays the sport fish consumption advisories in the Black River AOC from 1983 to present.

Table 2. Black River AOC Fish Consumption Advisories (1983 - Present)

Year(s)	Extent of Advisory	Species	Contaminant(s)	Advisory Frequency
1983-1998	31st Street Bridge (RM 6.2) to Mouth All lacustrine	All	PAH	Do Not Eat Any Fish
1998-2004	31st Street Bridge (RM 6.2) to Mouth All lacustrine	Brown bullhead	PCBs	1 Meal / Week
		Freshwater drum	PCBs	1 Meal / Week
		Common carp	PCBs	1 meal / month
2004-2013	I-80 (RM 14.2) to Mouth Consists of riverine reach (RM 14.2 to RM 6.2) and lacustrine reach (RM 6.2 to mouth)	Common carp ≥ 23"	PCBs, Hg	1 meal / 2 months
		Common carp < 23"	PCBs, Hg	1 meal / month
		Freshwater drum	PCBs, Hg	1 meal / month
2014-Present	I-80 (RM 14.2) to Homewood Park (RM 6.8) All lacustrine	Channel catfish	PCBs	1 meal / month
		Freshwater drum	PCBs, Hg	1 meal / month
	Homewood Park (RM 6.8) to Erie St./US Rte. 6 (RM 0.4) Consists of riverine reach (RM 6.8 to RM 6.2) and lacustrine reach (RM 6.2 to RM 0.4)	Channel catfish	PCBs	1 meal / month
		Common carp	PCBs	1 meal / month
		Freshwater drum	PCBs, Hg	1 meal / month
	Erie St./US Rte. 6 (RM 0.4) to Mouth All lacustrine	Common carp	PCBs	1 meal / 2 months
		Channel catfish	PCBs	1 meal / month
		Freshwater drum	PCBs, Hg	1 meal / month

Historic Advisories (no longer in effect) | Current Advisories

Discussion

Ohio's 2016 guidance document (Ohio EPA 2016) lists separate fish consumption restoration targets for lacustrine and riverine areas. As the Ohio Sport Fish Consumption program does not split fish consumption zones according to

lacustuary/riverine reaches, separate reaches of the Black River mainstem have different current fish consumption advisories that have different restoration targets:

- A riverine reach from River Mile 14.2 to River Mile 6.2
- A lacustrine reach from River Mile 6.2 to River Mile 0.0

The extent of the riverine and lacustuary reaches of the Black River mainstem can be seen in Figure 3. Because the Ohio Sport Fish Consumption Advisory Program does not align its advisory zones along lacustrine/riverine divisions, there is a 0.6 mile misalignment between riverine/lacustrine zones and fish consumption advisory zones. The misalignment is from RM 6.8 to RM 6.2 and within this area, the restoration of the BUI must meet the riverine restoration target.

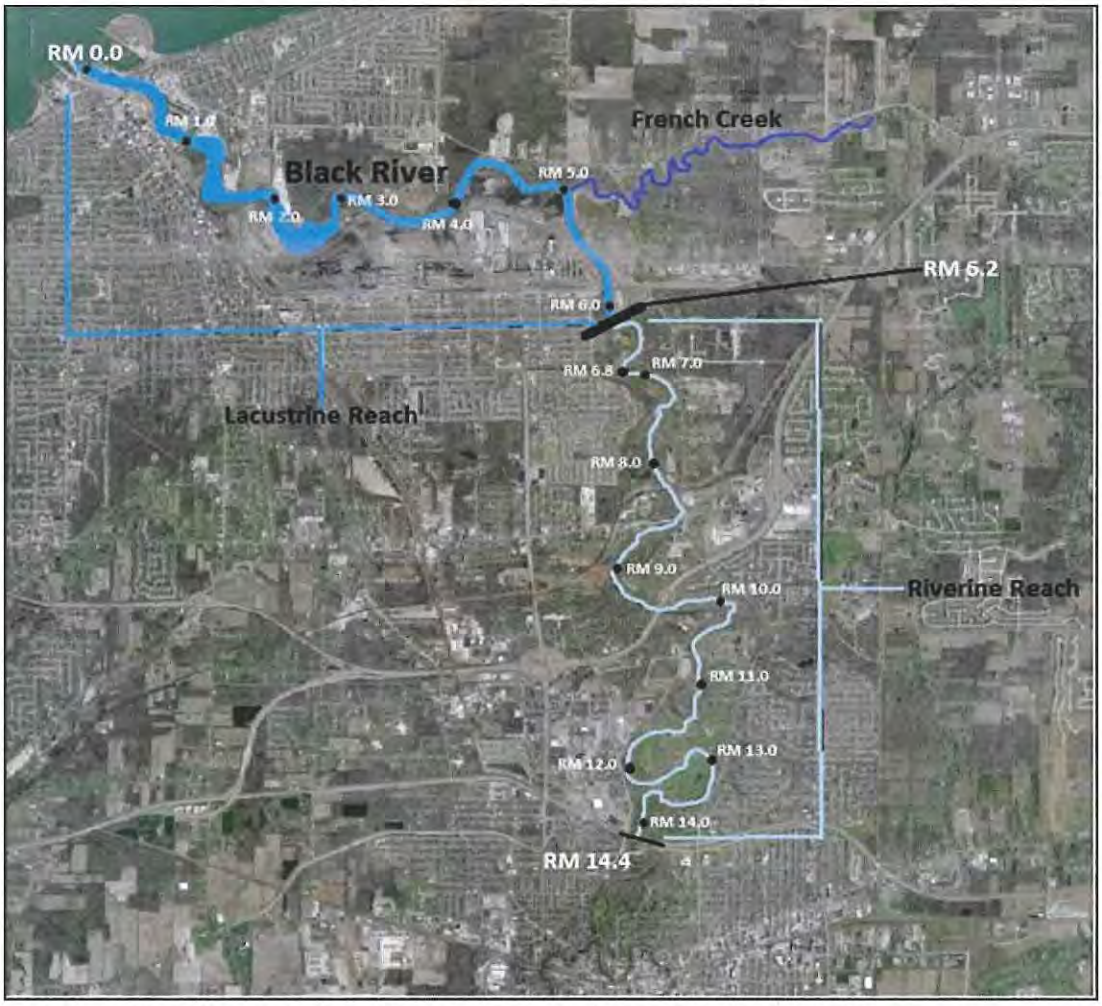


Figure 3. Black River Mainstem with Lacustrine and Riverine Reaches and River Miles

Riverine Reaches

The riverine reach of the Black River mainstem runs from the confluence of the East and West Branches (River Mile 15.55) to the 31st Street Bridge (River Mile 6.2) in the City of Lorain. A majority of this reach has fish consumption advisories for three species, in two separate zones from RM 14.4 to the upstream extent of the lacustrine zone at RM 6.2. (Table 3).

Table 3. Comparison of Consumption Advisory Frequencies for Black Riverine Delineation				
River Miles	Species	Advisory Frequency	Contaminant	Ohio BUI Restoration Target
14.4 – 6.8	Channel Catfish	1 meal / month	PCBs	1 meal / month
	Freshwater Drum	1 meal / month	Mercury, PCBs	
6.8 – 6.2	Common Carp	1 meal / month	PCBs	
	Channel Catfish	1 meal / month		
	Freshwater Drum	1 meal / month	Mercury, PCBs	

The State of Ohio Restoration Target Ohio, Appendix 6, states that, for riverine reaches, the fish component of this BUI can be removed when fish consumption advisories, issued by Ohio Department of Health, are the same as or less frequent than 1 meal per month. All consumption advisories in the riverine reach of the Black River mainstem are at the 1 meal/month frequency and therefore meet the Riverine portion of the restoration criteria, Appendix 6.

Lacustrine Reach

The lacustrine reach of the Black River mainstem runs from River Mile 6.2 to the mouth at Lake Erie (River Mile 0.0) and as shown in Figure 3, this reach has fish consumption advisories for three species in two separate fish consumption advisory zones, Table 4.

Table 4. 2015 Sport Fish Consumption Advisories in the Black River Lacustuary			
River Mile of Advisory	Species	Advisory Frequency	Contaminant(s)
RM 6.2 to RM 0.4	Common Carp, Channel Catfish	1 meal / month	PCBs
	Freshwater Drum	1 meal / month	Mercury, PCBs
RM 0.4 to RM 0.0 (Mouth)	Common Carp	1 meal / 2 months	PCBs
	Channel Catfish	1 meal / month	PCBs
	Freshwater Drum	1 meal / month	Mercury, PCBs

As previously stated, the fish consumption restoration target for lacustuaries depends upon a comparison of the species and frequencies of lacustrine advisories to those of Lake Erie advisories. Although ten Lake Erie fish species have posted consumption advisories (Table 5), only the advisories for channel catfish, common carp and freshwater drum are common to advisory species in the Black River lacustuary and therefore, only these three species and their respective advisory frequencies are used for evaluation against Ohio BUI restoration targets.

Table 5. 2015 Sport Fish Consumption Advisories in Lake Erie		
Species	Advisory Frequency	Contaminant(s)
Common Carp ≥ 27"	1 meal / 2 months	PCBs
Smallmouth Bass	1 meal / month	PCBs, Mercury
Channel Catfish, Common Carp (>27"), Freshwater Drum, Lake Trout, Steelhead Trout, White Bass, Whitefish (≥19"), White Perch	1 meal / month	PCBs
Brown Bullhead	1 meal / month	Mercury

A comparison of the current Black River lacustuary and Lake Erie consumption advisories can be seen in Table 6 below.

Table 6. Comparison of Consumption Advisory Frequencies for Black River Lacustuary to Lake Erie for Same Species

River Miles	Species	Black River Advisory Frequency	Black River Contaminant	Lake Erie Advisory Frequency	Lake Erie Contaminant
6.2 - 0.4	Common Carp	1 meal / month	PCBs	1 meal / month	PCBs
	Channel Catfish	1 meal / month	PCBs		
	Freshwater Drum	1 meal / month	Mercury, PCBs		
0.4 - 0.0	Common Carp (regardless of size)	1 meal / 2 months	PCBs	For individuals ≥ 27" 1 meal / 2 months	
				For individuals <27" 1 meal / month	
	Channel Catfish	1 meal / month	PCBs	1 meal / month	
	Freshwater Drum	1 meal / month	Mercury, PCBs		

For the channel catfish and freshwater drum species, the current consumption advisories in the Black River lacustuary are the same or less stringent than the current Lake Erie Advisories and therefore meet the Lacustuary portion of the Restoration Target, Appendix 6.

Restoration Target Deviations and Discussion

There are two apparent deviations when comparing restoration targets to the current advisory frequencies presented in the Lacustrine Reach which required a study to be completed to meet the restoration criteria:

- Freshwater drum caught from the Black River mainstem have a one meal per month consumption advisory due to mercury that is not shared with freshwater drum caught from Lake Erie,
- Smaller common carp individuals, <27 inches, have differing consumption advisory frequencies between the lower 0.4 mile of the Black River mainstem and Lake Erie.

Freshwater Drum

Freshwater drum mercury concentrations do not allow these fish to meet the lacustuary portion of the restoration criteria. Therefore, a study of this data, Appendix 5, has been completed and it identifies that the sources of mercury to this species originate outside of the AOC and therefore meets the restoration target.

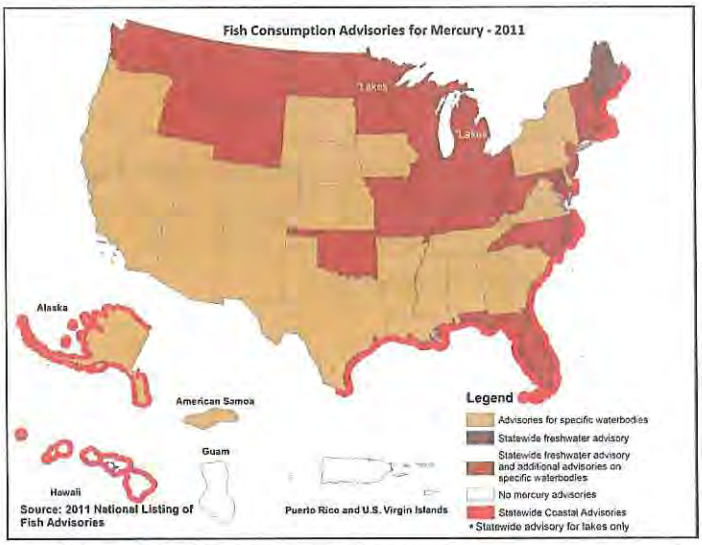


Figure 4. Fish Consumption Advisories for Mercury-2011

Mercury is a ubiquitous contaminant across the Midwest due to aerial deposition from sources such as coal-fired power plants. Mercury-based fish consumption advisories are a regional problem, common in many mid-western states (Figure 4). In fact, a review of the complete 2015 Ohio Sport Fish Consumption Advisory list shows that of the Ohio bodies of water with a sport fish consumption advisory, over 80% have a posted mercury advisory either alone or with another contaminant.

As part of the study of these species, Appendix 5, it was determined that the Black River drum mercury value seen in 2012 (Table 7) was similar to the value calculated for Lake Erie drum for the 2014 advisory (0.166 ppm, 61 samples collected between 2003 and 2012). (Appendix 4) The yearly average mercury concentrations have been decreasing since 1994 but when fish tissue was sampled in the Black River in 2012, there were not enough freshwater drum samples collected for the species' advisory to be reevaluated under Ohio's framework and the advisory for mercury remained. If more freshwater drum individuals were collected in 2012 and the mercury tissue concentrations remained in this range, the mercury advisory would have been flagged for designation to the 1 meal/week frequency (Table 8) as part of the 2014 advisory process, pending a confirmatory round of sampling (the PCB advisory for this species would remain in place).

Table 7. Freshwater Drum Mercury Concentrations in the Black River Lacustuary, by year

Year(s)	River Mile	Mercury, fish tissue, mg/kg	Mercury Average by year, mg/kg
1994	1.05	0.12	0.270
	3.6	0.42	
2002	0.1	0.11	0.230
	1.1	0.35	
2012	0.6	0.16	0.185
	5.4	0.21	

Table 8. Consumption advisory groups based upon fish tissue concentrations, mg/kg (Ohio EPA 1996)

Unrestricted	1 meal/week	1 meal/month	1 meal/6 months	Do Not Eat
0.00 to 0.050	0.051 to 0.200	0.201 to 1.000	1.000 to 2.000	>2.000

As a result of a completed study, Appendix 5, and the best professional judgment of the Ohio EPA Sport Fish Consumption Advisory Coordinator, the State of Ohio has met the

restoration criteria through identification of the sources of mercury to the lacustrine portion of the Black River as originating from outside the AOC. The Sport Fish Consumption Advisory Coordinator supports the removal of the fish consumption component of this BUI in the Black River lacustuary (Appendix 5).

The similarity in mercury tissue concentrations between Black River and Lake Erie drum and the number of advisories in Ohio demonstrate that the mercury problem is a regional problem and not associated solely with the Black River AOC and the 2014 tissue concentrations meet the 1 meal per week restoration target.

Common Carp; Individual Size and Advisory Frequencies

In the lowest reach of the Black River lacustuary (River Mile 0.4 – 0.0), any common carp caught carries a consumption advisory of one meal every 2 months for PCBs, Table 4. In Lake Erie, only common carp greater than 27 inches carries an advisory at this frequency, Table 4. This means that Black River individuals less than 27 inches, caught from the lower 0.4 mile of the lacustuary, have a consumption frequency more stringent than for individuals caught from Lake Erie and therefore they do not meet the restoration target.

Because Black River carp less than 27 inches do not meet the Riverine portion of the restoration criteria, a study was completed by the Ohio EPA Sport Fish Advisory Coordinator. This study identified that fish tissue concentrations within the AOC are not statically different than non-AOC areas, reference sites or region-wide, background concentrations (Appendix 5). The results of this study identify that Black River carp have statistically lower levels of PCBs than Lake Erie carp and therefore meet the restoration target (See Appendix 5).

Recommendation

Based the data and technical input and support from Ohio EPA's Sport Fish Consumption Advisory Coordinator, the Black River AOC Advisory Committee and Ohio EPA have determined that:

- The wildlife consumption component of this BUI is not impaired in any areas of the Black River AOC,
- For the riverine reaches of the Black River mainstem, the fish consumption component restoration target (advisory frequencies are equal to or less frequent than one meal per month) have been met,
- For freshwater drum in the Black River lacustuary, an examination of the scientific literature and the available Black River data reveal that the restoration target (impairment is caused by sources outside the AOC) is being met,
- For common carp in the Black River lacustuary, the tissue concentration of PCBs are statistically lower than common carp caught from Lake Erie and therefore, the restoration target (fish tissue concentrations within the AOC are not statistically different than non-AOC areas, reference sites or region-wide, background concentrations) is being met, and
- For all other species in the lacustuary, the restoration target (fish consumption advisory frequencies are equal to or less frequent than current Lake Erie advisories for the same species) is being met.

Therefore, the removal of the Restrictions on Fish and Wildlife Consumption BUI in the Black River AOC is recommended. This Removal Recommendation was discussed with the Black River AOC Advisory Council at their April 23, 2015 AOC Committee meeting. The Committee voted to proceed with the removal of this impairment at their March 31, 2015 meeting.

References and Bibliography

Black River AOC Coordinating Committee. 1994. Black River Remedial Action Plan Stage One Report

Census Viewer website. 2016. (Available at: http://censusviewer.com/)

Great Lakes Sport Fish Advisory Task Force. 1993. Protocol for a Uniform Great Lakes sport fish consumption advisory. Council of Great Lakes Governors.

Great Lakes Sport Fish Advisory Task Force. 2006. Mercury addendum to the protocol for a uniform Great Lakes sport fish consumption advisory. Council of Great Lakes Governors.

International Joint Commission. 2012. Protocol Amending the Agreement Between Canada and the United States of America on Great Lakes Water Quality, 1978, as Amended on October 16, 1983 and on November 18, 1987. (Available at: www.ijc.org/en_/Great_Lakes_Water_Quality)

IJC. 1991. Commission approves list/delist criteria for Great Lakes Areas of Concern. Focus on IJC Activities, Volume 16, Issue 1. ISSN 0832-6673. (Available at: www.ijc.org/focus/listdelist)

Lambert, L. 1998. Impairment assessment of beneficial uses: Restrictions on Fish and Wildlife Consumption. Lake Erie LaMP Tech. Rept. No. 2. (Available at: www.epa.gov/glnpo/lakeerie/buia/consum.html)

Lake Erie Lakewide Management Plan (LaMP) 2000, 2002, 2004, 2006, 2008. Lake Erie LaMP Work Group. (Available at: www.epa.gov/glnpo/lakeerie)

Minnesota Department of Health. 2007. A Protocol for Mercury-based Fish Consumption Advice An addendum to the 1993 "Protocol for a Uniform Great Lakes Sport Fish Consumption Advisory" (Available at: http://www.health.state.mn.us/divs/eh/fish/consortium/pastprojects/mercuryprot.pdf)

Ohio Department of Health. 1997. Criteria for Establishing Fish Consumption advisories in Ohio for PCBs, Lead, and Mercury.

Ohio Department of Natural Resources. 2001. Gazetteer of Ohio Streams

Ohio EPA. 1996. Ohio Water Resources Inventory, Volume 2 - Ohio Fish Tissue Contaminant Monitoring. (Available at: www.epa.ohio.gov/portals/35/documents/96vol2.pdf)

Ohio EPA. 2006. Integrated Report. Appendix A. Supplemental information on the use of fish tissue data. (Available at: www.epa.ohio.gov/portals/35/tmdl/2006IntReport/IR06_app_A_fish_suppl_info_final.pdf)

Ohio EPA. 2010. State of Ohio cooperative fish tissue monitoring program sport fish tissue consumption advisory program (Available at: http://www.epa.state.oh.us/portals/35/fishadvisory/FishAdvisoryProcedure.pdf)

Ohio EPA. 2015. 2015 Ohio Snapping Turtle Consumption Advisory webpage (Available at: http://epa.ohio.gov/dsw/fishadvisory/turtles.aspx)

Ohio EPA. 2015. Ohio Sport Fish Consumption Advisory, Ohio EPA. (Available at: www.epa.ohio.gov/dsw/fishadvisory/index.aspx)

Ohio EPA. 2016. Delisting Targets for Ohio Areas of Concern. (Available at: http://epa.ohio.gov/Portals/35/lakeerie/FINAL-%20Delist%20Guid%20%20Rest%20Targets%20for%20Ohios%20AOCs_January2016.pdf)

US EPA. 2001. Human Health Criteria - Methylmercury Fish Tissue Criterion. (Available at: http://water.epa.gov/scitech/swguidance/standards/criteria/health/factsheet.cfm)

US EPA. 2011 National Listing of Fish Advisories. (Available at: http://water.epa.gov/scitech/swguidance/fishshellfish/fishadvisories/upload/2011-National-Listing-of-Fish-Advisories-maps-and-graphics.pdf)

US EPA. 2015. Approval letter to re-align Black River AOC. (Available at: http://www.blackriveraoc.com/announcements?f=13229)

USPC. 2001 United States Policy Committee's (USPC) 2001 Delisting Principles and Guidelines. (Available at: http://www.epa.gov/sites/production/files/2015-08/documents/aoc-delisting-principles-guidelines-20011206.pdf)

Appendix 1.

2002 – 2012 Black River PCB Data

Year	Zone R=Riverine L=Lacustrine	Site Name	Species Name	River Mile	Total PCBs, mg/kg	Total PCB Average by Species per year
2002	R	Black R. at Lorain County Metropark Day Dam	CHANNEL CATFISH	9.4	1.01	1.26
		Black R. at Ford Rd. bridge		9.8	1.50	
	L	Black R. - double RR bridge upst. steel plant	COMMON CARP	1.1	0.60	0.78
		Black R. - double RR bridge upst. steel plant		1.1	1.77	
		Black R. at Black River wharf		1.3	0.43	
		Black R. upst. steel plant		2	0.72	
		Black R. dst. steel plant		4.3	0.66	
		Black R. dst. steel plant		4.3	0.73	
	R	Black R. at Ford Rd. bridge		9.8	0.56	
	L	Black R. at mouth	FRESHWATER DRUM	0.1	0.67	0.46
		Black R. at mouth		0.1	0.45	
		Black R. - double RR bridge upst. steel plant		1.1	0.35	
	R	Black R. at Lorain County Metropark Day Dam		9.4	0.40	
		Black R. at Ford Rd. bridge		9.8	0.43	
2012	L	Black R. @ U.S. Rt. 6	CHANNEL CATFISH	0.6	0.24	0.46
		Black R. @ Fish Shelf		3.7	0.98	
		Black R. upst. French Creek		5.4	0.72	
	R	Black R. upst. Elyria WWTP		10.7	0.11	
		Black R. @ Spring Valley Golf Course		11.5	0.24	
	L	Black R. @ U.S. Rt. 6	COMMON CARP	0.6	1.09	0.38
		Black R. @ Fish Shelf		3.7	0.45	
		Black R. upst. French Creek		5.4	0.34	
	R	Black R. @ St. Rt. 254/North Ridge Rd.		8.35	0.08	
		Black R. @ I-90		9.3	0.23	
		Black R. upst. Elyria WWTP		10.7	0.07	
	L	Black R. @ U.S. Rt. 6	FRESHWATER DRUM	0.6	0.31	0.38
		Black R. upst. French Creek		5.4	0.46	

Appendix 2.

2004 – 2012 Lake Erie PCB Data

Year	Site Name	Species Name	Total PCBs, mg/kg	Total PCB Average by Species per year
2004	Lake Erie	FRESHWATER DRUM	0.16	0.22
			0.22	
			0.14	
			0.18	
			0.17	
			0.36	
			0.17	
			0.35	
			0.25	
			0.17	
			0.11	
			0.18	
			0.19	
			0.23	
			0.35	
2005	Lake Erie - Grid 1005	CHANNEL CATFISH	0.30	0.83
	Lake Erie - Grid 1017		0.43	
	Lake Erie - Grid 1031		0.56	
	Lake Erie - Grid 1035		0.59	
	Lake Erie - Grid 896		1.17	
	Lake Erie - Grid 898		0.91	
	Lake Erie - Grid 911		0.65	
	Lake Erie - Grid 953		1.36	
	Lake Erie - Grid 970		1.46	
	Lake Erie - Grid 985		0.81	
	Lake Erie East Harbor	COMMON CARP	3.04	0.85
	Lake Erie Eastlake		0.07	
	Lake Erie off Lakewood		0.89	
	Lake Erie off Wildwood		0.11	
	Lake Erie West Harbor		0.13	
	Lake Erie East Harbor	FRESHWATER DRUM	0.26	0.44
	Lake Erie Eastlake		0.16	
	Lake Erie off Lakewood		0.10	
	Lake Erie off Wildwood		1.00	
	Lake Erie West Harbor		0.66	
2006	Lake Erie - Grid 1005	CHANNEL CATFISH	2.16	0.94
	Lake Erie - Grid 905		1.22	
	Lake Erie - Grid 905		1.30	
	Lake Erie - Grid 905		1.24	
	Lake Erie - Perry Grid 1310 CRN 583		0.87	
	Lake Erie - Perry Grid 1310 CRN 583		1.18	
	Lake Erie - Perry Grid 1310 CRN 583		0.39	
	Lake Erie - Perry Grid 1310 CRN 583		0.36	
	Lake Erie - Grid 1005	COMMON CARP	0.70	1.01
	Lake Erie - Grid 801		1.00	
	Lake Erie - Grid 904		1.50	
	Lake Erie - Grid 905		0.82	
	Lake Erie - Cleveland Grid 1229 CRN 17b	FRESHWATER DRUM	0.30	0.42
	Lake Erie - Cleveland Grid 1229 CRN 32b		0.50	
	Lake Erie - Cleveland Grid 1229 CRN 18a		0.65	
	Lake Erie - Cleveland Grid 1229 CRN 18a, 36a		0.42	
	Lake Erie - Grid 1005		0.26	
	Lake Erie - Grid 804		0.52	
	Lake Erie - Grid 905		0.47	
	Lake Erie - Grid 906		0.22	
2008	Lake Erie, Cleveland Harbor East	COMMON CARP	0.68	0.61
	Lake Erie, Cleveland Harbor West		1.43	
	Lake Erie, Off Eastlake		0.21	
	Lake Erie, Off Lakewood		0.10	

	Lake Erie, Off Lakewood	FRESHWATER DRUM	0.49	0.49
2009	Lake Erie - Grid 890	CHANNEL CATFISH	0.23	0.65
	Lake Erie - Grid 952		0.29	
	Lake Erie - Grid 970		0.67	
	Lake Erie - Grid 980		1.04	
	Lake Erie - Grid 981		1.14	
	Lake Erie - Grid 994		1.11	
	Lake Erie - Nearshore off Lorain Harbor - Grid 1058		0.43	
	Lake Erie - Nearshore off Lorain Harbor - Grid 1073		0.84	
	Lake Erie - Nearshore, NW Ashtabula Harbor - Grid 1395		0.49	
	Lake Erie - NW Ashtabula 1394, nearshore NW Conneaut 1439		0.28	
	Lake Erie - Grid 890	COMMON CARP	0.15	0.52
	Lake Erie - Grid 980		0.58	
	Lake Erie - Grid 981		0.48	
	Lake Erie - Grid 989		0.87	
	Lake Erie - Grid 890	FRESHWATER DRUM	0.63	0.38
	Lake Erie - Grid 918		0.22	
	Lake Erie - Grid 952		0.56	
	Lake Erie - Grid 980		0.40	
	Lake Erie - Grid 981		0.32	
	Lake Erie - Grid 989		0.53	
	Lake Erie - Nearshore off Lorain Harbor - Grid 1073		0.21	
	Lake Erie - Nearshore off Lorain Harbor - Grid 1073		0.22	
	Lake Erie - Nearshore, W of Cleveland Harbor - Grid 1158		0.26	
	Lake Erie - Nearshore, W of Cleveland Harbor - Grid 1158		0.49	
2010	Lake Erie Grid 1097	CHANNEL CATFISH	0.81	0.93
	Lake Erie Grid 1103		0.63	
	Lake Erie Grid 1217		1.17	
	Lake Erie Grid 1280		1.14	
	Lake Erie Grid 1328		0.78	
	Lake Erie Grid 1346	FRESHWATER DRUM	0.28	0.32
	Lake Erie Grid 1346		0.56	
	Lake Erie Grid 1346		0.30	
	Lake Erie Grid 1346		0.15	
2011	Lake Erie Grid 890	CHANNEL CATFISH	0.86	0.91
	Lake Erie Grid 918		1.48	
	Lake Erie Grid 970		0.67	
	Lake Erie Grid 981		0.63	
	Lake Erie Grid 890	COMMON CARP	0.28	1.21
	Lake Erie Grid 918		2.43	
	Lake Erie Grid 953		0.71	
	Lake Erie Grid 970		1.40	
	Lake Erie Grid 890	FRESHWATER DRUM	0.56	0.45
	Lake Erie Grid 918		0.54	
	Lake Erie Grid 980		0.34	
	Lake Erie Grid 981		0.35	
2012	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR	CHANNEL CATFISH	1.51	1.09
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR		1.61	
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR		0.56	
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR		0.67	
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR	COMMON CARP	0.23	2.53
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR		1.21	
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT		0.45	

	HARBOR			
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR		8.23	
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR	FRESHWATER DRUM	0.57	0.38
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR		0.33	
	LAKE ERIE (OPEN LAKE) Central Basin Grid 1280		0.25	
	LAKE ERIE (OPEN LAKE) Central Basin Grid 1280		0.37	

Appendix 3.

2012 Black River Mercury Data

Year	Zone R=Riverine L=Lacustrine	Site Name	Species Name	River Mile	Mercury, mg/kg	Mercury Average by Species
2012	L	Black R. @ U.S. Rt. 6	CHANNEL CATFISH	0.6	0.077	0.102
		Black R. @ Fish Shelf		3.7	0.178	
		Black R. upst. French Creek		5.4	0.115	
	R	Black R. upst. Elyria WWTP		10.7	0.033	
		Black R. @ Spring Valley Golf Course		11.5	0.109	
	L	Black R. @ U.S. Rt. 6	COMMON CARP	0.6	0.139	0.124
		Black R. @ Fish Shelf		3.7	0.09	
		Black R. upst. French Creek		5.4	0.095	
	R	Black R. @ St. Rt. 254/North Ridge Rd.		8.35	0.213	
		Black R. @ I-90		9.3	0.09	
		Black R. upst. Elyria WWTP		10.7	0.117	
	L	Black R. @ U.S. Rt. 6	FRESHWATER DRUM	0.6	0.161	0.188
		Black R. upst. French Creek		5.4	0.214	

Appendix 4.

2004 – 2012 Lake Erie Mercury Data

Year	site name	species name	Mercury	Mercury, Average by Species per year
2004	Lake Erie	FRESHWATER DRUM	0.102	0.149
			0.176	
			0.118	
			0.0594	
			0.175	
			0.21	
			0.182	
			0.0899	
			0.278	
			0.0864	
			0.114	
			0.108	
			0.244	
			0.11	
			0.181	
2005	Lake Erie - Grid 896	CHANNEL CATFISH	0.045	0.051
	Lake Erie - Grid 970		0.065	
	Lake Erie - Grid 985		0.049	
	Lake Erie - Grid 1035		0.066	
	Lake Erie - Grid 1031		0.028	
	Lake Erie - Grid 1017		0.044	
	Lake Erie - Grid 1005		0.036	
	Lake Erie - Grid 898		0.049	
	Lake Erie - Grid 911		0.049	
	Lake Erie - Grid 953		0.077	
	Lake Erie off Lakewood	COMMON CARP	0.121	0.226
	Lake Erie Eastlake		0.29	
	Lake Erie West Harbor		0.258	
	Lake Erie East Harbor		0.294	
	Lake Erie off Wildwood		0.169	
	Lake Erie Eastlake	FRESHWATER DRUM	0.169	0.419
	Lake Erie West Harbor		0.818	
	Lake Erie off Wildwood		0.385	
	Lake Erie off Lakewood		0.118	
	Lake Erie East Harbor		0.353	
2006	Lake Erie - Perry Grid 1310 CRN 583	CHANNEL CATFISH	0.045	0.098
	Lake Erie - Perry Grid 1310 CRN 583		0.13	
	Lake Erie - Grid 1005		0.159	
	Lake Erie - Grid 905		0.106	
	Lake Erie - Perry Grid 1310 CRN 583		0.115	
	Lake Erie - Grid 905		0.061	
	Lake Erie - Perry Grid 1310 CRN 583		0.022	
	Lake Erie - Grid 905		0.147	
	Lake Erie Off Monroe	COMMON CARP	0.463	0.170
	Lake Erie N. Maumee Bay		0.005	
	Lake Erie N. Maumee Bay		0.015	
	Lake Erie N. Maumee Bay		0.019	
	Lake Erie N. Maumee Bay		0.019	
	Lake Erie N. Maumee Bay		0.019	
	Lake Erie N. Maumee Bay		0.041	
	Lake Erie N. Maumee Bay		0.074	
	Lake Erie Off Monroe		0.836	
	Lake Erie N. Maumee Bay		0.041	
	Lake Erie N. Maumee Bay		0.043	
	Lake Erie N. Maumee Bay		0.209	
	Lake Erie - Grid 905		0.106	
	Lake Erie Off Monroe		0.55	
	Lake Erie Off Monroe		0.036	
	Lake Erie Off Monroe		0.031	

	Lake Erie - Grid 904		0.087	
	Lake Erie - Grid 801		0.193	
	Lake Erie Off Monroe		0.026	
	Lake Erie Off Monroe		0.212	
	Lake Erie Off Monroe		0.161	
	Lake Erie - Grid 1005		0.12	
	Lake Erie Off Monroe		0.6	
	Lake Erie - Grid 905	FRESHWATER DRUM	0.086	0.227
	Lake Erie Off Monroe		0.176	
	Lake Erie - Grid 1005		0.184	
	Lake Erie - Grid 906		0.061	
	Lake Erie Off Monroe		0.36	
	Lake Erie - Cleveland Grid 1229 CRN 18a, 36a		0.079	
	Lake Erie - Cleveland Grid 1229 CRN 17b		0.067	
	Lake Erie - Cleveland Grid 1229 CRN 18a		0.124	
	Lake Erie - Grid 804		0.088	
	Lake Erie Off Monroe		0.455	
	Lake Erie Off Monroe		0.269	
	Lake Erie Off Monroe		0.484	
	Lake Erie Off Monroe		0.456	
	Lake Erie Off Monroe		0.402	
	Lake Erie Off Monroe		0.321	
	Lake Erie Off Monroe		0.15	
	Lake Erie - Cleveland Grid 1229 CRN 32b		0.159	
	Lake Erie Off Monroe		0.166	
2008	Lake Erie Off Monroe	CHANNEL CATFISH	0.048	0.116
	Lake Erie Off Monroe		0.265	
	Lake Erie Off Monroe		0.089	
	Lake Erie Off Monroe		0.044	
	Lake Erie Off Monroe		0.06	
	Lake Erie Off Monroe		0.123	
	Lake Erie Off Monroe		0.073	
	Lake Erie Off Monroe		0.15	
	Lake Erie Off Monroe		0.116	
	Lake Erie Off Monroe		0.196	
	Lake Erie, Off Lakewood	COMMON CARP	0.055	0.129
	Lake Erie, Cleveland Harbor West		0.111	
	Lake Erie, Off Eastlake		0.193	
	Lake Erie, Cleveland Harbor East		0.158	
	Lake Erie, Off Lakewood	FRESHWATER DRUM	0.059	0.059
2009	Lake Erie - Grid 981	CHANNEL CATFISH	0.087	0.071
	Lake Erie - Grid 980		0.071	
	Lake Erie - NW Ashtabula 1394, nearshore NW Conneaut 1439		0.045	
	Lake Erie - Grid 970		0.031	
	Lake Erie - Nearshore off Lorain Harbor - Grid 1073		0.141	
	Lake Erie - Grid 890		0.045	
	Lake Erie - Grid 994		0.09	
	Lake Erie - Nearshore off Lorain Harbor - Grid 1058		0.104	
	Lake Erie - Grid 952		0.034	
	Lake Erie - Nearshore, NW Ashtabula Harbor - Grid 1395		0.062	
	Lake Erie - Grid 989	COMMON CARP	0.117	0.104
	Lake Erie - Grid 890		0.055	
	Lake Erie - Grid 981		0.111	
	Lake Erie - Grid 980		0.134	
	Lake Erie - Grid 918	FRESHWATER DRUM	0.12	0.114
	Lake Erie - Grid 981		0.227	
	Lake Erie - Grid 980		0.058	
	Lake Erie - Grid 989		0.072	
	Lake Erie - Grid 890		0.098	
	Lake Erie - Nearshore off Lorain Harbor - Grid 1073		0.216	
	Lake Erie - Nearshore off Lorain Harbor - Grid 1073		0.155	
	Lake Erie - Nearshore, W of Cleveland Harbor - Grid 1158		0.049	
	Lake Erie - Nearshore, W of Cleveland Harbor - Grid 1158		0.041	

	Lake Erie - Grid 952		0.102	
2010	Lake Erie Grid 1217	CHANNEL CATFISH	0.042	0.056
	Lake Erie Grid 1328		0.051	
	Lake Erie Grid 1103		0.048	
	Lake Erie Grid 1097		0.063	
	Lake Erie Grid 1280		0.077	
	Lake Erie Grid 1346	FRESHWATER DRUM	0.071	0.062
	Lake Erie Grid 1346		0.051	
	Lake Erie Grid 1346		0.059	
	Lake Erie Grid 1346		0.068	
2011	Lake Erie Grid 918	CHANNEL CATFISH	0.181	0.089
	Lake Erie Grid 981		0.053	
	Lake Erie Grid 890		0.079	
	Lake Erie Grid 970		0.043	
	Lake Erie Grid 953	COMMON CARP	0.179	0.160
	Lake Erie Grid 918		0.223	
	Lake Erie Grid 970		0.087	
	Lake Erie Grid 890		0.152	
	Lake Erie Grid 890	FRESHWATER DRUM	0.084	0.076
	Lake Erie Grid 981		0.087	
	Lake Erie Grid 980		0.081	
	Lake Erie Grid 918		0.053	
2012	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR	CHANNEL CATFISH	0.097	0.147
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR		0.209	
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR		0.072	
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR		0.209	
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR	COMMON CARP	0.079	0.090
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR		0.174	
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR		0.023	
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR		0.082	
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR	FRESHWATER DRUM	0.121	0.058
	LAKE ERIE (OPEN LAKE) EAST OF FAIRPORT HARBOR		0.053	
	LAKE ERIE (OPEN LAKE) Central Basin Grid 1280		0.028	
	LAKE ERIE (OPEN LAKE) Central Basin Grid 1280		0.028	

Appendix 5

Support Letter from Ohio EPA Sport Fish Consumption Advisory Coordinator

Don Romancak, Director
Lorain County Community Development
County Administration Building - 5th Floor
226 Middle Avenue
Elyria, Ohio 44035

Dear Mr. Romancak,

This letter is to inform the Black River AOC Advisory Committee that, on their behalf, I have analyzed the fish tissue data for the Black River AOC and for Lake Erie and have determined that Ohio's Fish Consumption Advisory program can support the removal of the fish consumption component of the Black River BUI.

In order to reach this conclusion, I provided technical assistance and conducted a detailed evaluation of fish contaminant data, including a study of fresh water drum and common carp data, which demonstrates that BUI removal is warranted at the Black River AOC. To do this, I evaluated the fish contaminant levels and their corresponding consumption advisories for fish species in the Black River and compared these fish advisories to the BUI Restoration Target for Fish Consumption. As part of these efforts, I evaluated fish consumption advisories in the Black River and Lake Erie and compared them to contaminant levels in fish tissues at these locations.

Using the BUI restoration target for fish consumption I evaluated the first component of the criteria which involves the evaluation of riverine fish. After reviewing the data, I was able to determine that all fish species in the riverine area of the Black River had fish consumption advisories that were the same or less frequent than one meal per month. As such, riverine fish in the Black River meet the removal criteria.

Next, I evaluated the second component of fish consumption restoration target which involves the evaluation of fish affected by Lake Erie water. The restoration target for these fish are met when fish consumption advisories are the same as or less frequent than current Lake Erie advisories of the same species. As part of this evaluation most fish species in the Lake affected water of the Black River met the criteria for removal. However, two species in the Black River had more restrictive advisories than same species within the Lake Erie and did not meet that portion of removal criteria. A more detailed study, results are summarized in this letter of support, was conducted for each of these two species under Ohio's restoration target which states that if "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, the fish consumption component of this BUI can be removed."

There is special consideration given for mercury advisories in the AOCs due to the fact that mercury contamination in fish tissue generally originates from distant sources such as coal

power plants, many of which are outside of Ohio altogether. Sources of mercury contamination are generally considered to be outside of the AOC unless there is particular evidence to the contrary. This is evaluated in more detail for the Black River AOC at the end of this document.

Evaluation of Black River advisories

For the Black River AOC, consumption advisories exist for **freshwater drum** ("one meal per month" due to mercury and PCBs), **channel catfish** ("one meal per month" due to PCBs), and **common carp** ("one meal per month" due to PCBs, except "one meal per two months" for the lowest 0.4 river miles). See figure 1 below.

Black River	Interstate 80 to Homewood Park (Lorain) (Lorain County)	Channel Catfish	Month	PCBs
		Freshwater Drum	Month	Mercury, PCBs
	Homewood Park (Lorain) to Erie St./ US Route 6 (Lorain County)	Common Carp, Channel Catfish	Month	PCBs
		Freshwater Drum	Month	Mercury, PCBs
	Erie St./US Route 6 to mouth (Lake Erie) (Lorain County)	Common Carp	Two months	PCBs
		Channel Catfish	Month	PCBs
		Freshwater Drum	Month	Mercury, PCBs

Figure 1: Ohio's fish consumption advisories for the Black River

In all cases, these advisories do not exceed the published advisories for Lake Erie (see figure 2 below), with two exceptions. Common carp in the lower 0.4 miles of the Black River have a "one meal per two months" advisory due to PCBs for carp of all sizes. For Lake Erie, the advisory for common carp under 27" is only "one meal per month," and *therefore the Black River carp exceed the Lake Erie advisory for those carp under 27" in the lower 0.4 miles of the river*. Additionally, while the advisory frequency for freshwater drum in the Black was equivalent to the advisory for drum in Erie, the advisory for the Black was for both mercury and PCBs. Because there was no mercury advisory for drum in Erie, the Black River drum were also further investigated by Ohio.

Lake Erie	All Waters (Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, Sandusky Counties)	Common Carp 27" and over	Two months	PCBs
		Smallmouth Bass	Month	PCBs and Mercury
		Channel Catfish, Common Carp under 27", Freshwater Drum, Lake Trout, Steelhead Trout, White Bass, Whitefish 19" and over, White Perch	Month	PCBs
		Brown Bullhead	Month	Mercury

Figure 2: Ohio's fish consumption advisories for Lake Erie

Further evaluation of Black River carp

While Ohio EPA first considered that the Black River carp's exceedance of the Lake Erie advisory may be a sign of continued impairment of the fish consumption beneficial use, a more thorough study of the underlying data (which drive the posted fish consumption advisories) suggests that

the carp in the Black River show lower levels of PCBs than carp in Lake Erie, and that no such impairment exists. This determination was made under Ohio's removal target which states that, if "a study was conducted that demonstrates... the fish tissue concentrations within the AOC are not statistically different than non-AOC areas, reference sites or region-wide, background concentrations, the fish consumption component of this BUI can be removed."

The data underlying the advisories in question (Ohio's 2014 sport fish consumption advisories for carp in the Black River and Lake Erie) was retrieved from Ohio EPA's tissue database for comparison. This included one year of data for the Black River (2012) and six years of data for Lake Erie (2005 through 2012, with no carp data for 2007 or 2010). See Table 1 for summary statistics of this data. I considered including previous years' data for Black River carp in order to expand the data set, but that would have included data which was not part of the current advisory, and data which was more than 10 years old, so it was decided to proceed with the 2012 data rather than include outdated data in the comparison.

	Carp PCBs (ppm)	
	Black River (2012)	Lake Erie (2004-2012)
Max	1.09	8.23
Mean	0.38	1.11
Std Dev	0.38	1.65

Table 1: Summary statistics for the Black and Lake Erie, using 2012 Black River data

These data show that Black River carp show substantially lower mean levels of PCBs than Lake Erie carp, by a factor of 3. Further, the *most contaminated* carp from the Black in this time frame was cleaner than the *average* carp sampled in Lake Erie. In my professional judgment, I find this data compelling, indicating that the carp in the Black are cleaner in terms of PCB contamination than carp in Lake Erie. However, for the sake of thoroughness, I conducted a statistical study of the data in order to ensure that the Black River carp could meet the letter of Ohio's removal targets.

Under Ohio's removal criteria, the BUI can be removed if Ohio conducts a study that demonstrates that "the fish tissue concentrations within the AOC are not statistically different" than reference areas. In this case, Lake Erie was chosen as the reference area, since Lake Erie is a defined point of comparison elsewhere in the removal criteria. Note that the removal criteria does not require that the Black River fish be statistically cleaner than the Lake Erie fish, but only that the Black River fish "are not statistically different" than Lake Erie fish.

Using a two-sample, one-tailed T-test, these two carp data sets (for the Black and for Erie) were compared to confirm that the PCB concentrations in Black River carp were less than PCB concentrations in Erie carp. This T-test confirmed that the observed difference in PCB concentrations was statistically-significant with a P-value of 0.027, corroborating the observation that the Black River carp were less-contaminated with PCBs than the common carp in Erie. The fact that this statistical difference was observed with a relatively small sample size

in the Black River further underscores the marked difference in PCB levels between the Black and the Lake (once again noting that the maximum concentration observed in the carp in the Black was lower than the mean concentration observed in Erie carp).

A very literal reading of Ohio's removal criteria would actually suggest that the Black River fish (which are statistically cleaner than the non-AOC fish) are *too clean* to meet the State's removal criteria (which requires that the tissue concentrations within the AOC "are *not statistically different* than the non-AOC area" to achieve BUI removal). It appears that the intent of the criteria was that the BUI should not be removed if the AOC fish are statistically more contaminated than the non-AOC fish, but apparently failed to anticipate a situation in which the AOC fish are statistically less contaminated than the non-AOC fish. However, such a literal reading of the target criteria (suggesting that the Black River carp are too clean to delist the BUI) would clearly be inappropriate given the intent of the BUIs. As such, I support moving forward with the BUI removal despite this idiosyncrasy of the criteria language.

Further evaluation of Black River drum

Freshwater drum in the Black River have an advisory frequency of "one meal per month" due to both mercury and PCBs. Because this advisory frequency is equal to the removal criteria of "one meal per month" for the riverine portion of the AOC, the BUI for drum can be delisted from that portion of the river. Because the drum advisory for the Black River has a mercury component which does not exist in the advisory for drum in Lake Erie, we cannot delist the BUI for the lacustuary by solely relying on the advisory frequencies for the species. To study if removal of the BUI for this species is appropriate in the lacustuary, we gave further consideration to the second portion of the removal criteria, specifically the criterion which states that the BUI can be removed if "the source of contamination originates outside of the AOC."

Mercury is an atypical fish contaminant in that much of the mercury contamination in Ohio (and elsewhere) comes from sources which are geographically far removed from the rivers and streams which become contaminated. This is a contaminant which affects broad swaths of the landscape, across the midwestern US and other regions, and as a result due to ubiquitous mercury contamination all of Ohio has a blanket "one meal per week" consumption advisory for all species without site- or species-specific advisories. Mercury contamination in freshwater fish is generally attributed primarily to coal combustion at power plants, which can travel long distances before being deposited with precipitation or dry form. We have conducted a study to review some of the available information on the subject in order to support my belief that the mercury in Black River drum is highly unlikely to be attributable to sources inside of the AOC.

First, it is important to point out that the AOC was originally listed for organic contaminants (primarily PAHs) rather than for mercury or other metals. To date, I haven't seen any information which indicates that the Black River AOC has ever had any particular problem with mercury sources. It is also worth mentioning that during the most recent fish tissue sampling on the Black River, all of the composite tissue samples of freshwater drum taken from the Black River had mercury concentrations below the "one meal per month" advisory threshold. Unfortunately the sample size was limited to two composite samples, making it hard to draw

firm conclusions with these mercury concentrations, but it is a positive sign that both samples were below the advisory threshold and suggests that we may be able to remove the mercury advisory on these drum pending the results of future sampling.

Given that the freshwater drum had a very small sample size in 2012, I expanded my study to review all of the species collected in 2012 from the Black River. A total of 40 composite samples were collected over 12 species. Of these 40 samples, only 3 samples (less than 10%) had mercury concentrations above the "one meal per month" advisory threshold. Each of these three threshold-exceeding samples was on the low end of the contaminant concentration range for that advisory level, and the average mercury concentration overall for the 2012 samples was close to half of the "one meal per month" threshold.[1] Looking at the entire historic record for the Black River (four sampling events from 1974 to 2012), only 12 of 100 (12%) composite tissue samples exceeded the threshold for a "one meal per month" fish advisory, and no sample ever exceeded the midpoint of the contaminant range for that advisory level.[2] Over this same data set (all years), the average mercury value in Black River fish tissue of all species was 0.136 ppm, which is at the low end of the "one meal per week" advisory range, approaching the "two meals per week" range. This data strongly suggests that the Black River has never had any significant issue with mercury in fish tissue of any species, and supports my best professional judgment that there are unlikely to be any significant mercury sources within the AOC.

These two pieces of site-specific information (including a lack of known sources of any considerable mercury discharges in the watershed, and low mercury concentrations in Black River fish tissue over several decades of historical record) corroborate my conclusion that the source of mercury in Black River drum very likely comes from external sources, such as regional coal power plants across the Midwestern U.S. I also conducted a review of various information sources (including documents from USEPA, The Council of Great Lakes Governors' Fish Consumption Advisory Task Force, and the scientific literature) and found repeated confirmation that the prevailing paradigm (backed by empirical evidence) in the fish contaminant monitoring community is that the primary source of mercury in fish tissue is regional in nature, dominated by the atmospheric deposition of mercury. For example, see Hammerschmidt and Fitzgerald (2006)[3], "Methylmercury in Freshwater Fish Linked to Atmospheric Mercury Deposition." This journal article concludes that "when fish and atmospheric mercury results are combined at the state level, wet atmospheric Hg [mercury] deposition accounts for about two-thirds of the variation in bass MeHg [methyl-mercury] among most states.... This suggests the accumulation of MeHg in wild fish populations is linked to atmospheric Hg loadings, two-thirds of which are estimated to be from anthropogenic sources." Other sources which identify atmospheric deposition of mercury as a primary source

[1] An average mercury concentration of 0.130 parts per million (ppm) in the 2012 samples, compared to a threshold value of 0.220.

[2] The "one meal per month" advisory level in Ohio extends from 0.220 to 0.999 ppm mercury in fish tissue. The maximum mercury concentrations seen in a Black River fish tissue sample was 0.418 ppm in a freshwater drum sample in 1994.

[3]Hammerschmidt, Chad R., and William F. Fitzgerald (2006). "Methylmercury in Freshwater Fish Linked to Atmospheric Mercury Deposition." Environmental Science & Technology 2006 40 (24), 7764-7770. DOI: 10.1021/es061480i

of fish tissue contamination include USEPA's "How People Are Exposed to Mercury"[4] web page, USEPA's "Mercury Maps: A Quantitative Spatial Link Between Air Deposition and Fish Tissue"[5] peer reviewed final report, and The Council of Great Lakes Governors' Fish Consumption Advisory Task Force document, "A Protocol for Mercury-based Fish Consumption Advice."[6]

Based on my study reviewing both site-specific information and the general literature, I feel there is a strong weight of evidence that the Black River AOC meets Ohio's removal criterion which states "the source of contamination originates outside of the AOC... [and] the fish consumption component of this BUI can be removed."

Conclusion

As a result of the assessment above, it's my best professional judgment that the Black River fish—including both common carp and freshwater drum—are not impaired when compared to lake-wide conditions, and are therefore suitable for removal under Ohio's formal criteria. I have no reservations in supporting this removal based on the available data and BUI restoration target.

I would be happy to discuss any questions related to this matter.

Regards,

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[4] http://www.epa.gov/mercury/how-people-are-exposed-mercury
[5] USEPA (2001) "Mercury Maps: A Quantitative Spatial Link Between Air Deposition and Fish Tissue." EPA-823-R-01-009.
[6] http://www.health.state.mn.us/divs/eh/fish/consortium/pastprojects/mercuryprot.pdf

Appendix 6

Ohio BUI #1 Removal Guidance

BUI 1: Restrictions on Fish and Wildlife Consumption

IJC Listing Guideline

An impairment will be listed when contaminant levels in fish or wildlife populations exceed current standards, objectives or guidelines, or public health advisories are in effect for human consumption of fish or wildlife. Contaminant levels in fish and wildlife must be due to contaminant input from the watershed.

State of Ohio Listing Guideline

This beneficial use shall be listed as impaired if:
1) An advisory or restriction to fish or wildlife consumption issued by the Ohio Department of Health in the AOC is more stringent than one meal per month or Lake Erie advisory.

State of Ohio Restoration Target

For Fish Consumption:

In the riverine waters upstream from the lake affected waters (lacustuary 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 (lacustuary 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.

For Wildlife Consumption:

Wildlife consumption advisories issued by the Ohio Department of Health in the AOC are the same or less stringent than one meal per month.

Potential Data Sources

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

Rationale

While most Ohio sport fish are of high quality and a good source of protein, levels of chemicals such as PCBs, mercury, lead, and other metals and pesticides have been found in some fish from certain waters. To ensure the continued good health of Ohioans, the Ohio Department of Health, in cooperation with the Ohio Environmental Protection Agency and Ohio Department of Natural Resources, issues fish consumption advisories per Chapter 3701 of the Ohio Revised Code. Ohio uses the *Protocol for a*

Uniform Great Lakes Sport Fish Advisory (1993) and the 2005 addendum to establish fish consumption advisories for PCBs and mercury, respectively. These are the contaminants that drive most of the advisories in Ohio waters.

Ohio EPA refers to the area where river and lake water mix as a lacustuary (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 B for more detail and a description of lacustuaries within Ohio's AOCs.

Snapping turtles are currently the only wildlife species with a consumption advisory in effect as issued by the Ohio Department of Health. This advisory was listed based on the results of a one-time study done in 1997. All turtles had high levels of PCB and mercury in fat and liver tissue and advisories stress not eating those portions of the turtle. Currently, turtles from the Black, Ashtabula and Maumee Rivers have a one meal per week advisory for mercury which is similar to the statewide blanket advisory for fish, and not considered impaired. The Ottawa River has a do not eat advisory due to mercury, and it is the only portion of an Ohio AOC with a wildlife consumption impairment.

Sources of contaminants originating outside an AOC (upstream, long range transport of contaminants released to the air and deposited in the AOC, from open lake waters, etc.) that result in a fish or wildlife consumption advisory should not impinge on the ability to delist an AOC. In order to document that the BUI can be removed due to sources outside the AOC a pollutant source study or other investigation could be conducted. Alternatively, a comparison study of fish tissue contaminant levels can show that the fish tissue concentrations within the AOC are not statistically different than non-AOC areas or selected reference sites. If a trend analysis shows similarity between the sites, then the BUI should be considered restored. Whenever possible, Ohio EPA will attempt to ensure that another responsible party or existing regulatory program is addressing source control outside the AOC boundaries.

Up-to-date comprehensive fish and wildlife consumption advice is available on the Ohio EPA web page at: www.epa.state.oh.us/dsw/fishadvisory/index.html. In 2003, a general state-wide restriction was issued advising not to eat more than one meal per week of fish caught from any waters in Ohio due to widespread low levels of mercury. This blanket statewide advisory is protective of the most sensitive human populations and pre-empted the listing of other one meal per week advisories that were mostly due to PCBs. In order to keep the fish consumption advisory information as simple as possible, the web page now only lists the more restrictive one month or greater advisories. This does not mean the PCBs have gone away. Therefore, when conducting a study to determine if the local advisories are strictly related to sources from outside an AOC, it is important to examine the actual fish tissue data for the area in question and not just whether an advisory is listed on the web page. In the *Ohio Integrated Report*, beginning in 2006, water body impairments were included based on fish tissue concentrations as related to water quality criteria. Information about fish consumption advisories and where to obtain fish tissue data are available from Ohio EPA at: www.epa.ohio.gov/dsw/fishadvisory/index.aspx. Integrated Reports can be found at www.epa.state.oh.us/dsw/tmdl/OhioIntegratedReport.aspx. Please note that the Integrated Report data are somewhat different than the concentrations that trigger fish consumption advisories and are offered here for informational purposes only. For the BUI restoration targets, we will continue to keep the targets focused on the existence of fish consumption advisories rather than fish tissue concentrations.