

Removal Recommendation

Restrictions on Fish and Wildlife Consumption Beneficial Use Impairment

Muskegon Lake and White Lake Areas of Concern

Issue

The Michigan Department of Environmental Quality (MDEQ), Office of the Great Lakes, Areas of Concern (AOC) program requests concurrence with this recommendation to remove the Restrictions on Fish and Wildlife Consumption Beneficial Use Impairment (BUI) in 1) the Muskegon Lake AOC, and 2) the White Lake AOC. This recommendation is made with the support of staff from the MDEQ Water Resources Division, Grand Valley State University Annis Water Resources Institute, the Michigan Department of Community Health (MDCH), the Muskegon Lake Watershed Partnership (MLWP), and the White Lake Public Advisory Council (PAC). This request is made in accordance with the process and criteria set forth in the *Guidance for Delisting Michigan's Great Lakes Areas of Concern (Guidance)* (MDEQ, 2008), as well as the local criteria developed by the White Lake PAC (WLPAC, 2008).

Background

Muskegon Lake AOC

Muskegon Lake is a 4,150 acre drowned river mouth located in Muskegon County. The Muskegon Lake AOC includes Muskegon Lake and portions of its tributaries: the Muskegon River, Ruddiman Creek, Ryerson Creek, Green Creek, Four Mile Creek, Little Bear Creek (including the unnamed tributary), and Bear Lake. Muskegon Lake was listed as an AOC primarily due to historic discharges of industrial process wastewater, municipal wastewater treatment plant effluent, combined storm sewer overflows, alterations of shoreline, excessive shoreline filling, and urban runoff. According to the original 1987 Remedial Action Plan (RAP), contamination mainly due to mercury and polychlorinated biphenyls (PCBs) resulted in the MDCH issuing fish consumption advisories for various sizes of carp and walleye (MDNR).

Eight BUIs remain for the Muskegon Lake AOC: Loss of Fish and Wildlife Habitat, Degradation of Fish and Wildlife Populations, Degradation of Aesthetics, Restrictions on Drinking Water Consumption or Taste and Odor Problems, Restrictions on Fish and Wildlife Consumption, Beach Closings, Eutrophication or Undesirable Algae, and Degradation of Benthos.

White Lake AOC

White Lake is a 10.4 km² drowned river mouth lake also located in Muskegon County. The lake was listed as an AOC in 1987 because of severe environmental impairments related to the historic discharge of municipal and industrial wastes. The 1987 RAP indicates that contamination due to non-point source runoff and the discharge of municipal and industrial wastes resulted in the elevated PCBs and chlordane levels found in carp (MDNR, 1987). Chlordane was discontinued for use as a pesticide in 1980 and no source of the compound was found in White Lake, so it is no longer a part of ongoing monitoring.

Five BUIs remain associated with the White Lake AOC: Loss of Fish and Wildlife Habitat, Degradation of Fish and Wildlife Populations, Degradation of Aesthetics, Restrictions on Drinking Water Consumption or Taste and Odor Problems, and Restrictions on Fish and Wildlife Consumption.

Removal Criteria

The *Guidance* has three tiers for the Restrictions on Fish and Wildlife Consumption BUI, the second of which applies to the Muskegon Lake and White Lake AOCs. This BUI is considered restored when:

1. The fish consumption advisories in the AOC are the same or less restrictive than the associated Great Lake or appropriate control site.

OR, if the advisory in the AOC is more stringent than the associated Great Lake or control site:

2. A comparison study of fish tissue contaminant levels demonstrates that there is no statistically significant difference in fish tissue concentrations of contaminants causing fish consumption advisories in the AOC compared to a control site.

OR, if a comparison study is not feasible because of the lack of a suitable control site:

3. Analysis of trend data (if available) for fish with consumption advisories shows similar trends to other appropriate Great Lakes trend sites.

The attached excerpt from the *Guidance* (pages 14-18) includes the rationale for the delisting criteria (Attachment A).

In 2008, the White Lake PAC submitted, and the DEQ approved, locally-developed targets for this BUI, which are functionally equivalent to Tier 2 of the *Guidance* listed above. Those targets focus on the edible portions of largemouth bass and common carp. The target itself is paraphrased as follows: the BUI will be considered restored when contaminant levels in edible portion analyses of key fish species are not significantly different from Pentwater Lake for 2 consecutive 5 year sampling periods. An analysis of covariance will be conducted to determine if there are statistically significant differences between the two lakes. Fish size serves as the covariate. If a significant difference between fish contaminant levels in White Lake and Pentwater Lake is present at the end of the monitoring period, all available fish contaminant monitoring data for White Lake will be evaluated for a decreasing trend in concentration. In this situation, the BUI will be considered restored when edible portion analyses of key fish species in White Lake show a similar decreasing trend as other appropriate Great Lakes trend sites. [The results of both 2006 and 2011 analyses showed no significant difference in contaminant levels between White and Pentwater Lakes, therefore the trend analysis was not required.]

Tier 2 of the *Guidance* is applicable to both Muskegon Lake and White Lake AOCs, as the fish advisories for both lakes are in some cases more stringent than that of Lake Michigan. With the support of the MLWP and the White Lake PAC, the BUI was evaluated based on a comparison of contaminant concentrations in fish from a similar drowned river mouth lake, Pentwater Lake. Pentwater Lake is similar in location, but did not have the industrial operations impacting water quality that Muskegon and White Lakes did, making it suitable as a control site. For purposes of the comparison study, the edible portions of largemouth bass and carp were analyzed for two consecutive five-year periods (Rediske, 2009; 2011). Largemouth bass were selected as an important resident game fish species in White and Muskegon Lakes. Carp are consumed by subsistence fishermen and have a greater exposure to contaminated sediments than most game fish due to their feeding behavior.

MDCH fish consumption advisories remain for Muskegon Lake and White Lake (Attachments D and E). The research supporting the recommendation to remove the Restrictions on Fish Consumption BUI demonstrates that there is no statistically significant difference in fish tissues concentrations of contaminants causing fish consumption advisories in the AOCs compared to a control site, not whether or not fish advisories exist in the AOCs or control site. Please refer to

the MDCH, Eat Safe Fish guide for any fish consumption restrictions at www.michigan.gov/eatsafefish.

Analysis

Dr. Richard Rediske, staff, and students with Grand Valley State University, Annis Water Resources Institute collected and analyzed fish from Muskegon Lake, Pentwater Lake, and White Lake in 2006 and 2011. The assessments were designed to focus specifically on Tier 2 of the *Guidance* and the White Lake target described above, comparing AOC fish tissue to the control site. The full scope and methods can be found in the reports produced by Dr. Rediske (2009; 2011).

2006 Fish Tissue Assessment

Muskegon Lake

During the 2006 sampling event, 9 carp and 11 largemouth bass were analyzed for PCBs and mercury (Figures 1 and 2). Analysis of the edible portion fish fillets indicated that there was no statistically significant difference in concentrations of PCBs and mercury in largemouth bass from Muskegon Lake and Pentwater Lake, although mercury concentrations tended to be lower in Muskegon Lake. Contaminant concentrations varied with fish size; however, there were no statistically significant differences between length, weight, and percent lipids of the sample groups of largemouth bass between Pentwater Lake (control) and Muskegon Lake. There also was no significant difference in PCBs and mercury in carp from the lakes. Contaminant concentrations varied with fish size and there was a statistically significant difference between carp length between Pentwater Lake (57 cm) and Muskegon Lake (41 cm)(Rediske, 2012a).

White Lake

In 2006, 10 carp and 10 largemouth bass were analyzed for PCBs and mercury (Figures 1 and 2). There was no statistically significant difference in concentrations of PCBs and mercury in largemouth bass from White Lake and Pentwater Lake. There was also no significant difference in concentrations of PCBs and mercury in carp from the lakes. Contaminant concentrations varied with fish size; however, there were no statistically significant differences between length, weight, and percent lipids of the sample groups between Pentwater Lake (control) and White Lake (Rediske, 2012b).

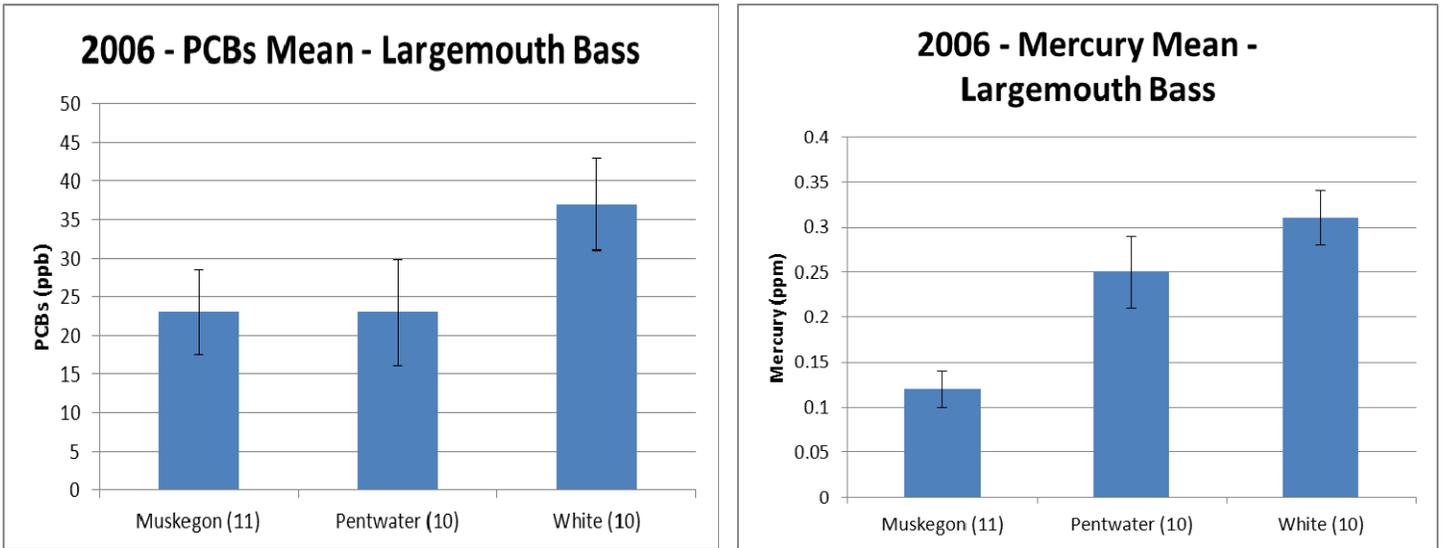


Figure 1: PCB and mercury data from largemouth bass in Muskegon, Pentwater, and White Lakes with the number of fish analyzed in parenthesis after the lake name. Mercury is in parts per million and PCBs in parts per billion. The vertical lines on the graphs represent the standard error.

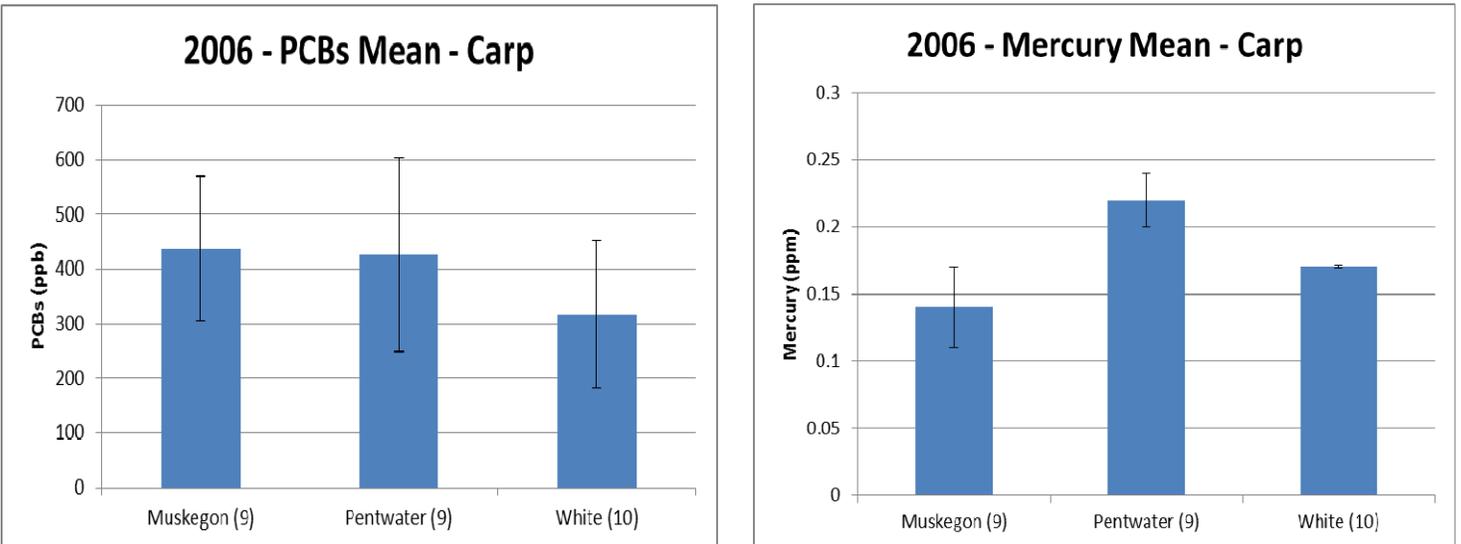


Figure 2: PCB and mercury data from carp in Muskegon, Pentwater, and White Lakes with the number of fish analyzed in parenthesis after the lake name. Mercury is in parts per million and PCBs in parts per billion. The lines on the graphs represent the standard error.

2011 Fish Tissue Assessment

Muskegon Lake

Ten largemouth bass were taken from both Muskegon Lake and Pentwater Lake with a size class of 34-44 centimeters (cm). Twenty carp were taken from the lakes with a size class of 55-71 cm. The sample size of the carp population was increased to raise the confidence level of the results. There was no statistically significant difference between concentrations of PCBs and mercury in largemouth bass from Muskegon Lake and Pentwater Lake (Figure 3). There was also no difference between PCBs and mercury in carp from Muskegon Lake and Pentwater Lake (Figure 4) (Rediske, 2012a).

White Lake

Ten largemouth bass were taken from both White Lake and Pentwater Lake with a size class of 30-42 cm. Twenty carp were taken from each lake with a size class of 49-71 cm. Again, the sample size of the carp population was increased to raise the confidence level of the results. There was no statistically significant difference between PCBs and mercury in largemouth bass from White Lake and Pentwater Lake (Figure 3). There was also no difference between PCBs and mercury in carp from White Lake and Pentwater Lake (Figure 4) (Rediske, 2012b).

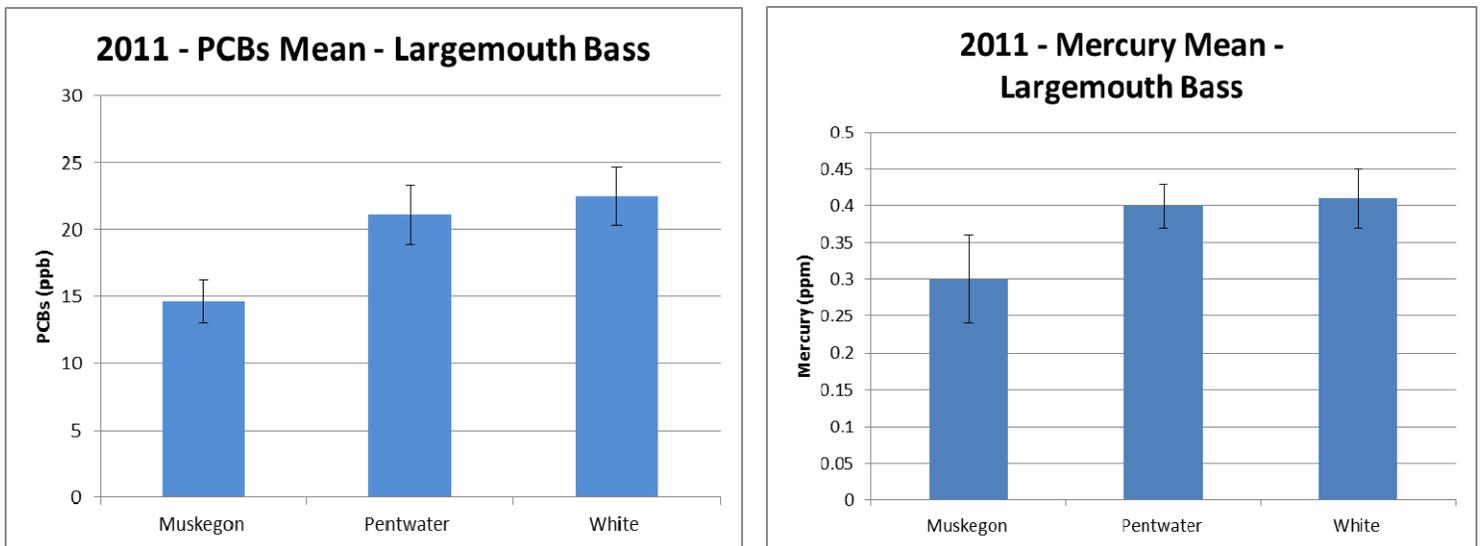


Figure 3: PCB and mercury data from largemouth bass in Muskegon, Pentwater, and White Lakes. Mercury is in parts per million and PCBs in parts per billion. The vertical lines on the graphs represent the standard error.

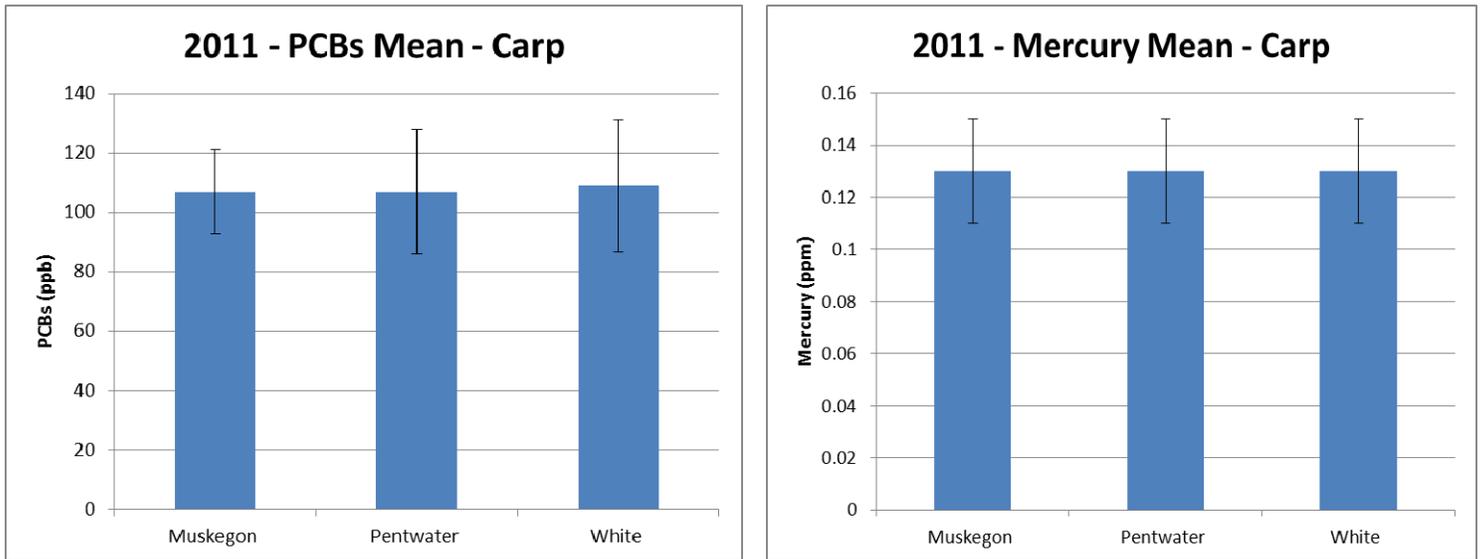


Figure 4: PCB and mercury data from carp in Muskegon, Pentwater, and White Lakes. Mercury is in parts per million and PCBs in parts per billion. The vertical lines on the graphs represent the standard error.

Conclusions

A comparison of the 2006 with the 2011 data indicated that mean concentrations of PCBs in largemouth bass decreased in all three lakes over the five year period, while mercury concentrations rose slightly in all three. The increase in mercury is thought to be the result of a regional phenomenon, such as atmospheric deposition.

From 2006 to 2011 mean concentrations of PCBs in carp decreased by about 75 percent in Muskegon and Pentwater Lakes, while they decreased by about 66 percent in White Lake. Mean concentrations of mercury in carp rose slightly in all three lakes.

The results from the 2006 and 2011 fish tissue sampling found no statistically significant difference between either of the AOCs and the control site. Therefore, according to the *Guidance* restoration criteria outlined above, this BUI can be considered restored for both AOCs.

Recommendation

Based upon review of the data and technical input from Grand Valley State University's Annis Water Resources Institute, MDEQ, and USEPA staff, removal of the Restrictions on Fish and Wildlife Consumption BUI in the Muskegon Lake and White Lake AOCs is recommended. The data and this Removal Recommendation were shared and discussed with the MLWP and the White Lake PAC. The MLWP held a public informational meeting on this proposal on June 14, 2012, and the White Lake PAC discussed the topic on June 7, 2012. The MLWP submitted a formal letter of support for removal of the BUI, dated July 24, 2012 (Attachment B). The White Lake PAC submitted a formal letter of support for removal of the BUI, dated June 15, 2012 (Attachment C).

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Great Lakes Management Unit
Office of the Great Lakes
Michigan Department of Environmental Quality
July 10, 2012

Attachments

- A – Restrictions on Fish and Wildlife Consumption; pages 14-18 of the *Guidance for Delisting Michigan's Great Lakes Areas of Concern*
- B – Muskegon Lake Watershed Partnership letter supporting BUI removal, July 24, 2012
- C – White Lake PAC letter supporting BUI removal, June 15, 2012
- D – MDCH Eat Safe Fish in AOCs Fact Sheet
- E – MDCH email supporting BUI removal, June 27, 2012

References

- International Joint Commission. 1987. Revised Great Lakes Water Quality Agreement of 1978.
- Michigan Department of Environmental Quality. 2011. Stage 2 Remedial Action Plan for the Muskegon Lake Area of Concern. Office of the Great Lakes, Michigan Department of Environmental Quality, Lansing, Michigan.
- Michigan Department of Environmental Quality. 2011. Stage 2 Remedial Action Plan for the White Lake Area of Concern. Office of the Great Lakes, Michigan Department of Environmental Quality, Lansing, Michigan.
- Michigan Department of Environmental Quality. 2008. *Guidance for Delisting Michigan's Great Lakes Areas of Concern*, revised. MI/DEQ/WB-06-001.
- Michigan Department of Natural Resources. 1987. Remedial Action Plan for the Muskegon Lake Area of Concern. Great Lakes and Environmental Assessment Section, Surface Water Quality Division, Michigan Department of Natural Resources, Lansing, Michigan.
- Michigan Department of Natural Resources, 1987. Remedial Action Plan for White Lake Area of Concern. Great Lakes and Environmental Assessment Section, Surface Water Quality Division, Michigan Department of Natural Resources, Lansing, Michigan.

Rediske, R. 2012a. Assessment of PCBs and Mercury in Fish from the Muskegon Lake Area of Concern. Public presentation on June 14, 2012.

Rediske, R. 2012b. Assessment of PCBs and Mercury in Fish from the White Lake Area of Concern. Public presentation on June 7, 2012.

Rediske, R., J.P. O'Keefe, and H. Snyder. 2011. Fish Contaminant Assessment of White, Muskegon, and Pentwater Lakes. Annis Water Resources Institute, Muskegon, Michigan.

Rediske, R., J.P. O'Keefe, and K. Rieger. 2009. Assessment of Persistent Bioaccumulative Toxic Chemicals in Michigan Fish from Several Trophic Levels. Annis Water Resources Institute, Muskegon, Michigan. AWRI Publication #TM-2008-2.

White Lake Public Advisory Council. 2008. Target of Delisting the Restrictions on Fish Consumption Beneficial Use Impairment.

Attachment A

2008 Guidance for Delisting Michigan's Great Lakes Areas of Concern

Restrictions on Fish and Wildlife Consumption

Significance in Michigan's Areas of Concern

Fish and wildlife consumption advisories in Michigan are determined by the Michigan Department of Community Health (MDCH), based on levels of contaminant concentrations in fish or wildlife tissue. Currently, all of Michigan's 14 AOCs have consumption advisories for specific contaminants in certain species of fish. No AOCs have advisories for wildlife consumption. Fish consumption advisories range from no human consumption to restrictions on consumption for specific amounts of fish for certain human populations.

Almost all fish consumption advisories are based on levels of polychlorinated biphenyls (PCBs) or mercury which exceed MDCH guidelines. Excessive levels of dioxin result in fish consumption advisories in the Saginaw River/Bay/River AOC and in the Detroit River AOC. Excessive chlordane is causing fish consumption advisories in the White Lake AOC. Other non-AOC locations in Michigan also have various consumption advisories for these contaminants. There is a statewide consumption advisory for certain fish in all inland lakes due to mercury contamination.

Michigan Restoration Criteria and Assessment

The restoration criteria for this BUI uses a tiered approach for evaluating restoration success. This BUI will be considered restored when:

4. The fish consumption advisories in the AOC are the same or less restrictive than the associated Great Lake or appropriate control site.

OR, if the advisory in the AOC is more stringent than the associate Great Lake or control site:

5. A comparison study of fish tissue contaminant levels demonstrates that there is no statistically significant difference in fish tissue concentrations of contaminants causing fish consumption advisories in the AOC compared to a control site.

OR, if a comparison study is not feasible because of the lack of a suitable control site:

6. Analysis of trend data (if available) for fish with consumption advisories shows similar trends to other appropriate Great Lakes trend sites.

When comparison studies (per #2 above) are used to demonstrate restoration of a BUI, the studies will:

- Be designed to control variables known to influence contaminant concentrations such as species, size, age, sample type, lipids and other relevant variables from the examples in the MDEQ's Fish Contaminant Monitoring Program (FCMP).
- Include a control site which is agreed to by the MDEQ, in consultation with the PAC. It will be chosen based on physical, chemical, and biological similarity to the AOC and the 2 sites must be within the same U.S. EPA Level III Ecoregions for the Conterminous U.S. (see references). When a single control site cannot be found, sites may be pooled for comparisons. Where mercury concentrations in fish tissue cause waterbody specific advisories in lakes, the comparison may be made to the concentrations causing the general inland lake advisory.
- Use fish samples collected from the AOC and control site within the same time frame (ideally 1 year).
- Evaluate contaminant levels in the same species of fish from the AOC and the control site to avoid problems with cross-species comparisons. In addition, fish used for comparison studies should be the same species as the consumption advisory.

If there is no statistically significant difference ($\alpha = 0.05$) in fish tissue concentrations of contaminants causing advisories in the AOC compared to a control site, then the BUI has been restored. If there is a significant difference between the AOC and the control site in the comparison study, then an impairment still exists.

If a comparison study is not practical for the AOC due to the lack of an appropriate control site, then trend monitoring data (if available) can be used to determine restoration success (as per approach #3 above). This is likely to be the approach used to evaluate this BUI in the connecting channel AOCs, where there are not appropriate control sites for a comparison study, and where MDEQ has substantial trend monitoring data. If MDEQ trend analysis of fish with consumption advisories shows similar trends to other appropriate, MDEQ-approved Great Lakes trend sites, this BUI will be considered restored. If trend analysis does not show similarity to other appropriate Great Lakes trends sites, then an impairment exists.

No AOCs have advisories for wildlife consumption. However, if a wildlife restriction is issued at a later time within an AOC with the Fish and Wildlife Consumption BUI, the process for assessing restoration of the wildlife restriction will be similar to the process outlined above for fish consumption.

Rationale

Practical Application in Michigan

Restoration of the fish consumption advisory BUI is based on comparison of fish consumption advisories and tissue concentrations in the AOC with the associated Great Lake or other appropriate control site, not whether or not fish advisories exist in the AOCs or control site.

Comparison of advisories or tissue concentrations to a control site is used because some fish consumption advisories are issued statewide or are due to sources outside an AOC. Because the existence of an advisory may not be due to contaminant sources in an AOC, it should not preclude removal of this BUI. A more stringent advisory in the AOC than the associated Great

Lake is an indication that there may be an ongoing contaminant issue within the AOC. In this case, additional source assessment may be conducted to determine whether there are sources of contamination within the AOC (e.g., caged fish studies).

The MDEQ will consider restoration of this BUI on a case by case basis for AOCs with circumstances that do not fit exactly into the evaluation steps outlined above.

1991 IJC General Delisting Guideline

When contaminant levels in fish and wildlife populations do not exceed current standards, objectives or guidelines, and no public health advisories are in effect for human consumption of fish or wildlife. Contaminant levels in fish and wildlife must not be due to contaminant input from the watershed.

The IJC general delisting guideline for the BUI is presented here for reference. The Practical Application in Michigan subsection above takes the general guideline and applies specific criteria for restoration based on existing Michigan programs and authorities.

State of Michigan Programs/Authorities for Evaluating Restoration

Michigan assesses water bodies throughout the state on a 5-year basin rotation plan according to the MDEQ's "Strategic Environmental Quality Monitoring Program for Michigan's Surface Waters" (MDEQ, 1997) and the "Michigan Water Quality Strategy Update" (MDEQ, 2005). Each year, a set of targeted watersheds are sampled at selected sites defined by the National Pollutant Discharge Elimination System (NPDES) permitting program for conventional and toxic pollutants, and biological and physical habitat/morphology indicators. The set of watersheds sampled rotates each year, with each major watershed in the state revisited every 5 years (see Appendix 1 for basin rotation maps). One element of the State's monitoring strategy is the enhanced and improved FCMP.

The specific objectives of the FCMP are to:

1. Determine whether fish from the waters of the state are safe for human consumption.
2. Measure whole fish contaminant concentrations in the waters of the state.
3. Assess whether contaminant levels in fish are changing with time.
4. Assist in the identification of waters that may exceed standards and target additional monitoring activities.
5. Evaluate the overall effectiveness of MDEQ programs in reducing contaminant levels in fish.
6. Identify waters of the state that are high quality.
7. Determine if new chemicals are bio-accumulating in fish from Michigan waters.

The FCMP element consists of several components that, in combination, provide data necessary to achieve these objectives. These include:

- Edible fish portion monitoring to support the establishment or delisting of fish consumption advisories;
- Native whole fish trend monitoring;
- Periodic evaluations to expand and improve the State's fish trend monitoring network; and
- Caged fish monitoring for source/problem identification.

Fish contaminant data are used to determine whether fish from waters of the state are safe for human and wildlife consumption, and as a surrogate measure of bioaccumulative contaminants in surface water. Fish tissues are analyzed for bioaccumulative contaminants of concern. These include mercury, PCBs, chlorinated pesticides (e.g., DDT/DDE/DDD), dioxins, and furans. More recently, some fish tissues have been analyzed for polybrominated biphenyl ethers (PBDEs) and perfluorooctane sulfonate (PFOS). Data are reviewed each year to determine whether there are additional new parameters of concern for which the fish should be analyzed.

Fish contaminant studies needed for the assessment of this BUI restoration will be arranged by MDEQ as part of the Michigan FCMP. Timing and study design will be determined by the MDEQ based on available resources.

Some local AOC communities also have programs for monitoring water quality and related parameters which may be applicable to this BUI. If an AOC chooses to use local monitoring data for the assessment of BUI restoration, the data can be submitted to the MDEQ for review. If the MDEQ determines that the data appropriately address the restoration criteria and meet quality assurance and control requirements, they may be used to demonstrate restoration success.

Eat Safe Fish

from Michigan's Areas of Concern

Areas of Concern (AOCs)

In the 1980s, the United States and Canadian governments identified 43 places in the Great Lakes region that had severe, long-term environmental problems. These places are called *Areas of Concern*.

Over the years, federal, state, and provincial government environmental remediation programs have worked to address the problems in these areas. Funding and expert guidance are provided to AOCs to help local groups, known as Public Advisory Councils (PACs), work on these environmental problems, as well.

Beneficial Use Impairments (BUIs)

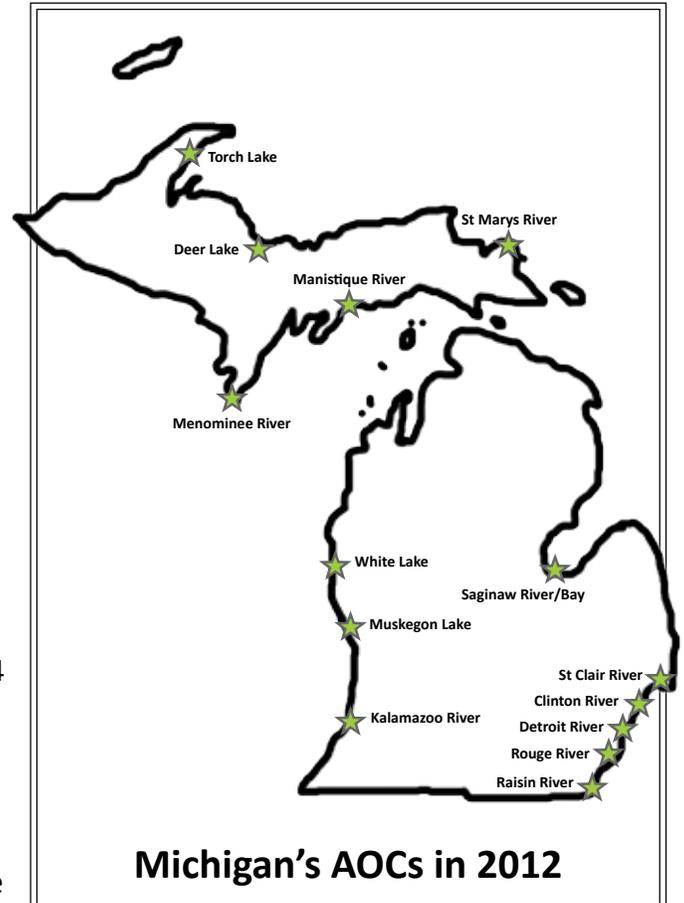
These environmental problems are called *beneficial use impairments*. There are 14 categories of BUIs, originally named in the U.S.-Canadian Great Lakes Water Quality Agreement. However, a place does not have to have all 14 problems to be called an AOC.

Each BUI has goals that need to be met in order to be removed from the AOC's list of problems. Once all BUIs are removed from the list, the AOC is considered to be no longer impaired and can be *delisted*, or removed from the list of AOCs.

The 14 BUIs that an AOC can have are:

- Restrictions on Fish and Wildlife Consumption
- Tainting of Fish and Wildlife Flavor
- Degraded Fish and Wildlife Populations
- Fish Tumors or Other Deformities
- Bird or Animal Deformities or Reproductive Problems
- Degradation of Benthos
- Restrictions on Dredging Activities
- Eutrophication or Undesirable Algae
- Restrictions on Drinking Water Consumption or Taste and Odor Problems
- Beach Closings
- Degradation of Aesthetics
- Added Costs to Agriculture or Industry
- Degradation of Phytoplankton and Zooplankton Populations
- Loss of Fish and Wildlife Habitat

Over the years, several BUIs have been removed from Michigan's AOCs as citizens, industries, and government work together to improve our state's environmental health. In fact, after decades of hard work, some Michigan AOCs only have one or two BUIs remaining and are getting closer to being delisted.



Restrictions on Fish Consumption BUI

If an AOC has a **Restrictions on Fish Consumption BUI**, it means that the fish from the affected lake or river at one time had higher levels of chemicals than fish in similar lakes or rivers in the Great Lakes region.

In most cases, the process to remove the Fish Consumption BUI is fairly direct. Chemical levels in fish from the AOC are compared to levels in fish from outside of the AOC. The BUI can be removed from the AOC's list of problems when:

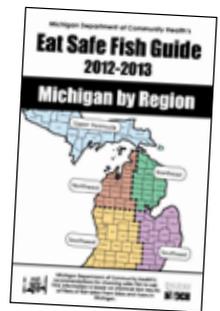
- the levels of chemicals found in fish from the AOC are the same or less than fish from a similar location that is not an AOC, or
- the levels of chemicals in fish from the same lake or river have decreased over time. This process is used if there isn't a similar enough location outside of the AOC to use as a comparison.

Each AOC has their own process for BUI removal in place. The final decision to remove the BUI depends on the process that the PAC and the Michigan Department of Environmental Quality agree upon.

Michigan Department of Community Health *Eat Safe Fish Guide*

The ***Eat Safe Fish Guide*** is put out by the Michigan Department of Community Health (MDCH). This guide lists all of the fish species that have been tested from lakes and rivers throughout Michigan. MDCH tests only the filet of the fish for chemicals like PCBs, dioxins, and mercury. They use this information to develop the safe fish eating guidelines printed in the ***Eat Safe Fish Guide***.

Fish with chemicals in their bodies are not just found in AOCs, but also in the other thousands of lakes and rivers throughout Michigan. If you eat a lot of Michigan fish, are young and/or have health problems, you can use the ***Eat Safe Fish Guide*** to find fish that are lower in chemicals and safer for you to eat. You can get a free copy of the ***Eat Safe Fish Guide*** from MDCH by calling 1-800-648-6942 or visiting www.michigan.gov/eatsafefish.



BUIs and Eat Safe Fish Guidelines are NOT the same.

- ***Fish Consumption BUIs*** compare chemical levels in fish from the AOC to chemical levels in fish that are not in an AOC. When these levels are the similar - meaning it's no worse than other locations in the state - the BUI can be removed.
- The ***MDCH Eat Safe Fish Guide*** helps you find safer fish to eat from Michigan lakes and rivers. MDCH tests filets of fish for chemicals from locations all around the state. The ***Eat Safe Fish Guide*** can help you find safer fish to eat in lakes and rivers throughout Michigan, not just in the AOC.

When the Fish Consumption BUI is removed from an AOC's list of problems, fish from the lake or river will still be tested and listed in the ***MDCH Eat Safe Fish Guide*** for some time after.

Michigan lakes and rivers are improving thanks to federal and state environmental rules and the hard work of the US Environmental Protection Agency, the MDEQ, and the PACs, but it will take many years for these chemicals to leave the ecosystem and the fish.

To learn more about AOCs & BUIs:

MDEQ - Office of the Great Lakes
517-335-3168

<http://www.michigan.gov/deqaocprogram>



To learn more about eating safe fish:

MDCH - Division of Environmental Health
1-800-648-6942

<http://www.michigan.gov/eatsafefish>



Swart, Stephanie (DEQ)

From: Bruneau, Michelle (DCH)
Sent: Wednesday, June 27, 2012 1:39 PM
To: Riley, John (DEQ); Swart, Stephanie (DEQ)
Cc: Bohr, Joseph (DEQ); Dykema, Linda D. (DCH); Groetsch, Kory J. (DCH)
Subject: Fish Consumption BUI Removals - Muskegon Lake

Hi John:

If you need this on MDCH letterhead, please let me know:

The Grand Valley State University Annis Water Resources Institute has provided fish contaminant data to demonstrate that Muskegon Lake meets the second restoration criteria as outlined in the Michigan Department of Environmental Quality's Delisting Michigan's Great Lakes Areas of Concern –

- A comparison study of fish tissue contaminant levels demonstrates that there is no statistically significant difference in fish tissue concentrations of contaminants causing fish consumption advisories in the AOC compared to a control site.

Because the selected referent site, Pentwater Lake, is not included in the 2011-2012 Michigan Fish Advisory, it is not possible to demonstrate that Muskegon Lake meets the first restoration criteria by comparing fish consumption advisories.

The Michigan Department of Community Health (MDCH) supports the Michigan Department of Environmental Quality in their efforts to remove this Beneficial Use Impairment, with the recognition that the removal of the BUI is not sufficient evidence to lift or relax of any of MDCH's fish consumption guidelines in Muskegon Lake AOC in the near future.

- Michelle

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From: Riley, John (DEQ)
Sent: Wednesday, June 20, 2012 1:05 PM
To: Bruneau, Michelle (DCH)
Cc: Swart, Stephanie (DEQ)
Subject: Fish Consumption BUI Removals

Michelle-

As follow up to our conversation this morning, I am attaching GVSU's Fish Contaminant Report for analyses conducted in White, Muskegon and Pentwater Lakes. The results of the data collection demonstrate that the Restrictions on Fish Consumption Beneficial Use Impairment can be removed from both the Muskegon Lake and White Lake AOCs.