

Removal Recommendation

Degradation of Aesthetics Beneficial Use Impairment

Muskegon Lake Area of Concern

Issue

The Michigan Department of Environment, Great Lakes, and Energy (EGLE), Water Resources Division (WRD) Areas of Concern (AOCs) Program recommends removal of the Degradation of Aesthetics Beneficial Use Impairment (BUI) for the Muskegon Lake AOC. The recommendation is made with the support of the Muskegon Lake Watershed Partnership (MLWP), which also serves as the Public Advisory Council for the AOC. 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)* (MDNR, 2018).

Background

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. These discharges introduced elevated levels of PCBs, heavy metals, nutrients, oils, and other contaminants into the AOC (Michigan Department of Natural Resources [MDNR], 1987).

Five BUIs remain for the Muskegon Lake AOC: Loss of Fish and Wildlife Habitat, Degradation of Fish and Wildlife Populations, Degradation of Aesthetics, Eutrophication or Undesirable Algae, and Degradation of Benthos. This document pertains only to the Degradation of Aesthetics BUI.

The Degradation of Aesthetics BUI was not originally identified in the 1987 Remedial Action Plan (RAP). The Muskegon Lake Public Advisory Council (PAC) included the BUI as part of a 2002 RAP Update as they felt that “although progress was made to restore impaired uses between 1994 and 2002...four additional BUIs [were identified] during that period” (Muskegon Conservation District). Excessive amounts of metal and concrete were discarded along the shoreline and in the lake from historical industrial activities and the PAC believed that warranted the inclusion of the BUI as part of the Muskegon Lake AOC. As part of the 2008 Muskegon Lake BUI Removal Strategy, “this BUI pertains to the need to improve the aesthetics of the Muskegon Lake shoreline at specific locations and, in the process, achieve a “soft” shore-line with abundant fish habitat and over-hanging trees;...achieve a ‘sense of place’ secured through the identification, enhancement, and maintenance of public access and ‘view-sheds’ for the lake.” (Muskegon Lake Watershed Partnership [MLWP]).

Removal Criteria

According to the *Guidance*, this BUI will be considered restored when monitoring data for two successive monitoring cycles indicates that water bodies in the AOC do not have any of the following physical properties in unnatural quantities which interfere with any designated use:

- turbidity
- foams
- color
- settleable solids
- oil films
- suspended solids
- floating solids
- deposits

For the purposes of this criterion, these eight properties impair aesthetic values if they are unnatural/manmade (e.g., garbage, sewage), or natural properties which are exacerbated by human-induced activities (e.g., excessive algae growth from high nutrient loading). Persistent, high levels are those defined as long enough in duration, or elevated to the point of being injurious, to any designated use listed under Rule 323.1100 of the Michigan Water Quality Standards. Natural physical features which occur in normal ecological cycles (e.g., logjams/woody debris, rooted aquatic plants) are not considered impairments, and in fact serve an ecological role in providing fish and wildlife habitat. And, it should be noted that odors are not considered an impairment.

In 2007, the Michigan Department of Environmental Quality (MDEQ; now EGLE) accepted a locally developed target for the Degradation of Aesthetics BUI that parallels the restoration criteria in the *Guidance*, while remaining within the scope of the AOC program. As part of this local target, the MLWP identified important public locations in Muskegon Lake where aesthetics were degraded. These locations are: Ruddiman Creek (including the Amoco Property), Ryerson Creek, the former Grand Trunk Railroad Car Ferry Dock (southwest shore of Muskegon Lake extending into the lake on a man-made peninsula), Heritage Landing (southeast shore of Muskegon Lake), and Michigan Steel Bay (south central shore of Muskegon Lake). The criteria placed a special emphasis on the removal and restoration of these areas where deposits of submerged rubble and metallic debris impede the safe access and enjoyment of Muskegon Lake.

Analysis

Aesthetics Monitoring Methods

Assessments were conducted in 2011, 2018, 2019, and 2021 in accordance with the MDEQ 2011 Statewide Aesthetics Assessment Workplan and Monitoring Protocol. Five sites were originally chosen based on the supporting documentation (MLWP, 2010). Prior to the site assessments the MLWP asked EGLE to scope out three additional project-specific sites not identified in the Muskegon Lake BUI Removal Strategy, Fenner's Ditch near Bear Lake, Bear Creek (upstream of Bear Lake at Russell Road), and Celery Lane (near the Zephyr Site and the Muskegon River). Each of the Muskegon Lake sites was assessed as described in this section.

The date, time, GPS coordinates, weather conditions and water temperature were recorded at each monitoring site (Attachment A). Three water samples were collected in glass jars from below the water surface to assess water color, clarity, and turbidity. All three sample jars were photographed together against a white backdrop. Any odors from the sample jars, visible debris, and obvious pollution (if any) at the site were recorded. Digital photographs were taken to the left, to the right, across, and directly into the water, along with any other conditions worthy of recording. Evidence of recreational activity, such as empty bait containers or people swimming, was noted along with any other

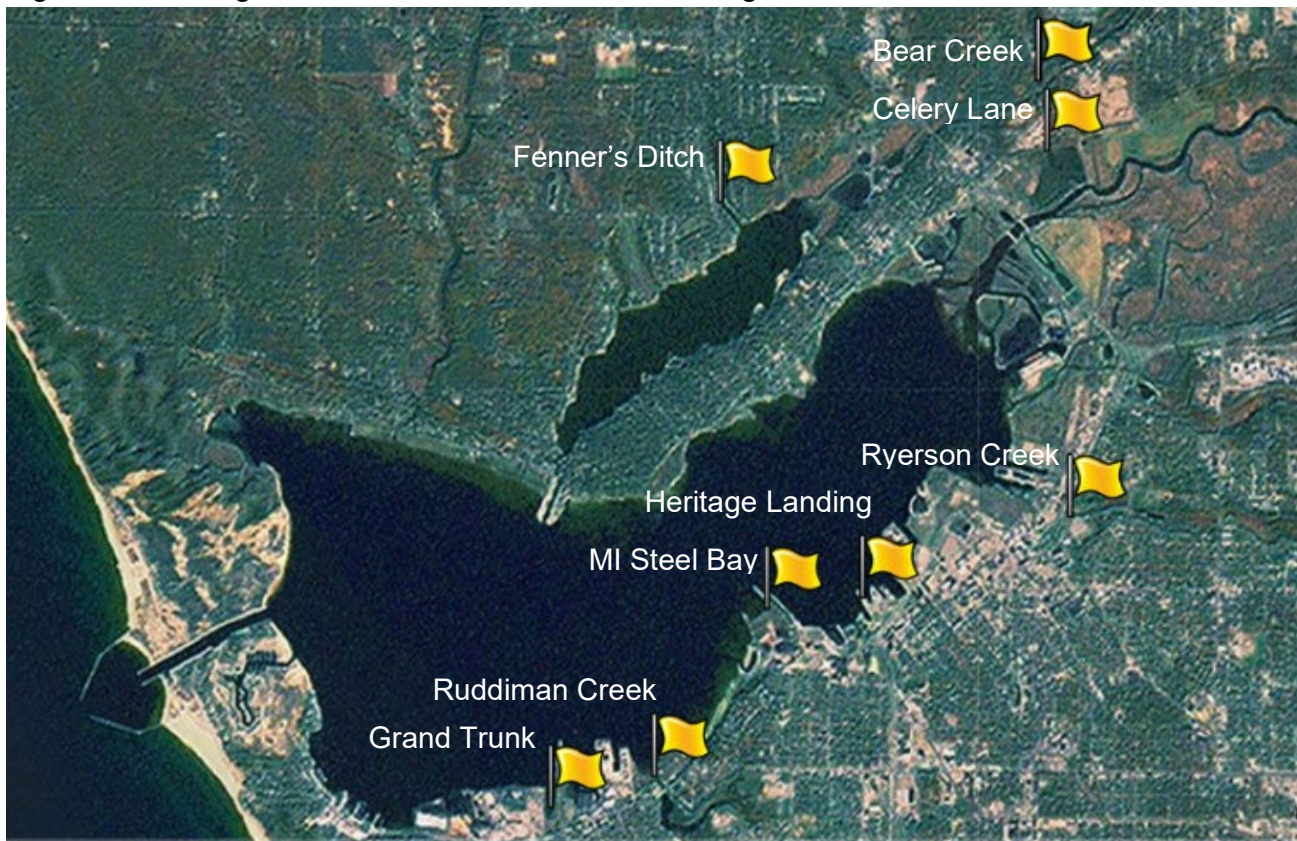
observable conditions that may influence the decision as to the presence of a designated use impairment or a designated use being employed. Based on the total of those observations, each site was assessed as to whether it met the criteria for removing the Degradation of Aesthetics BUI.

At each monitoring location, multiple photographs were taken and are available upon request, as are the individual monitoring data sheets completed at each site. Specific monitoring locations were chosen based on: historical RAP documents, input received from the MLWP, best professional judgment and personal knowledge of the EGLE AOC Coordinator, and physical access to the waterbody.

2011 Aesthetics Monitoring Results and Analysis

The Muskegon Lake AOC was evaluated on July 12, 2011 and November 29, 2011. See Figure 1 for locations. Eight sites were assessed, and these assessments took place prior to the start of remediation work at Zephyr and Fenner's Ditch. Approximately 95 photos were taken, and 50 water samples were viewed through both monitoring cycles.

Figure 1: Muskegon Lake AOC Aesthetics Monitoring Locations



The Heritage Landing, Michigan Steel Bay, Ruddiman Creek, and Grand Trunk locations were chosen due to historic problems with submerged rubble, oil films, and other debris. Habitat restoration and debris removal activities took place at all these sites during 2010-2011. When EGLE staff conducted their review at each site the water samples were clear and free of color or any suspended sediment. There was some evidence of trash at these

sites, but nothing in significant quantities. Swans, ducks, and other shorebirds were observed at these sites and fishermen and evidence of fishing was seen at each location (Figure 2). Designated uses were not considered impaired at these sites.

Figure 2. Heritage Landing facing southeast and Grand Trunk facing north, July 2011 site evaluation.



At the Ryerson Creek site, trash and woody debris were observed and the water had a faint odor of sewage (Figure 3). It was clear the buildup of trash was likely due to a poorly sized culvert which was scheduled to be replaced. Designated uses at this site were considered impaired as there were floating solids in transient conditions.

Figure 3. Ryerson Creek, facing east, November 2011 site evaluation.



Fenner's Ditch was the site of an improperly plugged oil well from the 1930s. It was actively venting into the canal on the north side of Bear Lake, which is part of the AOC. During the site evaluations, booms and pads were being used to contain the oil sheens from entering the main waterway (Figure 4). The water samples had a petroleum odor and there was a visible oil film, some of which was in the main waterway outside of the booms. Designated uses at this site were considered impaired due to persistent oil films

Figure 4. Fenner's Ditch, November 2011 site evaluation.



Both the Bear Creek and Celery Lane were sites impacted by the former Zephyr Oil Refinery on the northeast side of the AOC. Over its lifetime, the company spilled over 700,000 gallons of oil from its bulk storage. The water samples at Bear Creek had no visible issues and water samples could not be taken at Celery Lane as the water was not deep enough. The water samples at Bear Creek smelled of petroleum, as did the air at both sites. Oil sheens were visible in the wetland east of the Bear Creek site, and sheens were seen at Celery Lane, though some of these could have been naturally occurring. Designated uses were considered impaired due to the films at both sites.

2018 Aesthetics Site Monitoring Results and Analysis

Since Ryerson Creek, Fenner's Ditch, Bear Creek, and Celery Lane were impaired during the two rounds of monitoring in 2011, EGLE staff revisited those sites on October 3, 2018 after remediation activities had taken place. The same monitoring protocol used in 2011 was applied during this return visit.

The undersized culvert was replaced at Ryerson Creek, in addition to daylighting of the stream and habitat restoration in the area and downstream of the site. The water samples were clear with a slight fishy odor. There was no visible debris except for some trash along the edge. A fence has been placed around the new culvert and there is good flow underneath the road (Yuba Street). There was evidence of fishing in the area. Designated uses are no longer considered impaired at this site (Figure 5).

Figure 5. Ryerson Creek facing east, October 2018 site evaluation.



The EGLE Remediation and Redevelopment Division (RRD) undertook a significant remedy effort at Fenner's Ditch in 2018. They designed and constructed an oil cap-and-trap system at the site. The remediation was complete in August 2018 and is effectively keeping oil out of the canal. Water samples from the site were clear and there was no visible debris or oil sheen. The water did have a faint petroleum smell, but odor is not considered an impairment. Designated uses are no longer impaired at this site and the community can actively use the natural resource (Figure 6).

Figure 6. Fenner's Ditch facing west, October 2018 site evaluation.



Remediation activities and restoration work at the former Zephyr site are in various stages of completion. The sediment remediation and wetland restoration along the Muskegon River was completed in 2018. The upland soil and groundwater remediation continue with the next phase targeting off-site contamination, which includes the Bear Creek and Celery Lane areas. Water samples at Bear Creek were clear and the water had a faint petroleum odor. No water samples were taken at Celery Lane, but the air smelled of petroleum and the wetlands had natural bacteria sheens which can mimic oil films. The petroleum smell

on Celery Lane was stronger closer to the point source discharge from the Marathon Petroleum Company site. The smell of petroleum in the air is not considered an impairment of any designated use. The continued remediation activities at the Zephyr site are targeting the impacts of off-site contamination, which will help to address the petroleum odors near Bear Creek and Celery Lane (P. Van Heest email communication). The next steps to address potential off-site Zephyr contamination were also presented by RRD at a January 5, 2021 meeting of the MLWP and received support from PAC members.

2021 Aesthetics Site Monitoring Results and Analysis

To meet the requirements of the *Guidance*, which requires two successive rounds of monitoring with no impairment, a second round of sampling was conducted on July 22, 2021 at Ryerson Creek, Fenner's Ditch, Celery Lane, and Bear Creek.

All four sites showed no indication of impairments to designated uses. Ryerson Creek flows smoothly through the culvert, the water was clear, and additional vegetation has grown around the creek edge (Figure 7). There was no petroleum odor or indication of impairment at Celery Lane and the site was covered in cattails (Figure 8). There were small wisps of petroleum in the water at Fenner's Ditch, but this is to be expected with the current cap and trap system (Figure 8). Bear Creek was clear with no indications of impairment. At this point, there are no designated uses that are impaired that are not currently being addressed at these sites.

Figure 7. Ryerson Creek facing east and north, July 2021 site evaluation.



Figure 8. Celery Lane facing south and Fenner's Ditch facing northwest, July 2021 site evaluation.



It appears that aesthetic conditions in the Muskegon Lake AOC have improved considerably when compared with reports of those conditions from years ago (MDNR, 1987). Many of the aesthetic conditions described in early RAPs and other related documents simply no longer exist. This effect may be due to the successful implementation of National Pollutant Discharge Elimination System program permitting, a sense of stewardship by local resource users, improved environmental practices implemented by municipal, commercial and industrial operations in the AOC, and increased advocacy and educational outreach by organizations seeking to enhance and protect the resource.

Conclusion

To assess the standing of this BUI, a Water Resources Division Aquatic Biologist and other EGLE staff visited the sites for two monitoring cycles. A third and fourth assessment for the sites not meeting criteria was conducted by program staff. The aesthetic impairments in the Muskegon Lake AOC were largely the result of historical locations of debris. Additional sites were the result of localized petroleum contamination, by which restoration work has been completed as part of project-specific remedial goals and continues to be assessed by applicable state programs. Based on observations, data, and photographs EGLE program staff recognize that the aesthetic locations in the Muskegon Lake AOC are meeting local criteria.

Recommendation

The EGLE AOC program staff recommends removal of the Degradation of Aesthetics BUI in the Muskegon Lake AOC.

The removal recommendation was discussed with the MLWP at their regular meeting on August 3, 2021 (Attachment B). The MLWP submitted a formal letter of support for removal of the BUI, dated August 5, 2021 (Attachment C). This proposed action was public noticed for 30 days via the EGLE Calendar and postings to the Mich-RAP listserv, and the MLWP email list. No written comments were received.

Prepared by: Stephanie Swart
Great Lakes Management Unit
Water Resources Division
Michigan Department of Environment, Great Lakes, and Energy
August 9, 2021

Attachments

- A – Blank Aesthetics Monitoring datasheet
- B – Muskegon Lake Watershed Partnership August 3rd public meeting announcement
- C – Muskegon Lake Watershed Partnership letter supporting BUI removal, August 5, 2021

References

- Canadian and United States Governments. 2012. Protocol Amending the Agreement between the United States of America and Canada on Great Lakes Water Quality 1978, as amended on October 16, 1983 and November 18, 1987.
- Canadian and United States Governments. 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. Statewide Aesthetics Assessment Workplan and Monitoring Protocol.
- 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.

Muskegon Conservation District. 2002. Muskegon Lake Community Action Plan Remedial Action Plan Update. Prepared for the Muskegon Lake Public Advisory Council and the Muskegon Lake Watershed Community.

Muskegon Lake Watershed Partnership. 2010. Degraded Aesthetics Beneficial Use Impairment Restoration and Removal Strategy for the Muskegon Lake Area of Concern.

Muskegon Lake Watershed Partnership. 2008. Muskegon Lake BUI Removal Strategy.

Riley, J. 2012. Office of the Great Lakes, Areas of Concern Program, Michigan Department of Environmental Quality, Statewide Aesthetics Assessment Findings for Impaired AOCs. Office of the Great Lakes, Michigan Department of Environmental Quality, Lansing, Michigan.

Van Heest, P. 2021. Email communication.

Aesthetics Monitoring Data Sheet

Date: _____	Area of Concern & Site Description _____		
Time: _____	G.P.S. Coordinates _____		
Crew: _____	Water Temp: _____		
Weather:	Rain Today <input type="checkbox"/>	Clear <input type="checkbox"/>	Windy <input type="checkbox"/>
	Rain Yesterday <input type="checkbox"/>	Cloudy <input type="checkbox"/>	Approx Air Temp ____
Other Comments: _____			

WATER CLARITY (pick one)

- Clear
- Slightly Turbid
- Moderately Turbid
- Highly Turbid
- Opaque

ODOR

- None/Natural
- Musty:
 - Faint Strong None
- Sewage/Fishy:
 - Faint Strong None
- Anaerobic/Septic:
 - Faint Strong None

WATER COLOR (pick one color and one qualifier)

- Clear Brown Green Yellow
- Grey Black Milky/White Other: _____
- Light Medium Dark

VISIBLE DEBRIS/OBVIOUS POLLUTION

- None Natural (leaves, limbs, weeds)
- Foam Oil Film None
- Trash:
 - Floating Fixed None
- Solids:
 - Floating Fixed None
 - Floating Scum None
- Deposits:
 - Describe _____

ADDITIONAL COMMENTS/OBSERVATIONS: _____

- 1) Does this AOC have local delisting criteria? _____ If so, how does it differ from the state criteria?

- 2) Are there any designated uses** that may be impaired in your judgment due to aesthetic conditions? _____ If so, which one(s)? _____

- 3) The impairment(s) may be specifically due to which of the following "physical properties in unnatural quantities?" [circle all that apply: turbidity, color, oil films, floating solids, foams, settleable solids, suspended solids, deposits]
- 4) Are these conditions "persistent, high levels" or temporary & transient? _____
- 5) Does this site meet the applicable delisting criteria? _____
- 6) Please make any other notes that are relevant to the answer in #5: _____

**Designated uses are as follows:
 - agriculture - navigation - industrial water supply - public water supply at the point of water intake
 - warmwater fishery - other indigenous aquatic life and wildlife - partial body contact recreation - total body contact recreation between 5/1 and 10/1 - coldwater fishery, depending on location



Web Site: www.muskegonlake.org

Face Book Page: *Muskegon Lake Watershed Partnership*

Tuesday, August 3, 2021

12:00 – 1:30 PM

Join Zoom Meeting

<https://us02web.zoom.us/j/86839985163?pwd=TEJlTU0tIWTQvcINkVGUrdVZvK0hMUT09>

Meeting ID: 868 3998 5163; Passcode: 996778

One tap mobile: +13017158592,,86839985163#,,,,*996778# US (Washington DC)

+13126266799,,86839985163#,,,,*996778# US (Chicago)

Dial by your location: +1 301 715 8592 US (Washington DC); +1 312 626 6799 US (Chicago)

Find your local number: <https://us02web.zoom.us/u/kbTIGI5daF>

Agenda

Welcome

- *Dennis Kirksey, Chair*

Introductions

- *Brief introductions by all in attendance*

A. Meeting Summary

- *Lea Markowski, Secretary*

B. Treasurer's Report

- *Mark Evans, Treasurer*

C. Proposed Removal of Degraded Aesthetics Beneficial Use Impairment (BUI)

1. Overview, Discussion, and MLWP Support for BUI Removal

D. Current AOC Projects and Other Updates by Committee Chairs and MLWP Members

1. Non-Point Source / Stormwater-Green infrastructure Committee
Kathy Evans, Committee Chair
2. Habitat Committee
Greg Mund, Committee Chair
3. Technical Committee
Dusty Tazelaar, Committee Chair
4. Public Access to Natural Resources Committee
Mark Evans, Committee Chair (*Next meeting August 11, 6:00 PM*)

E. Policy & Procedure Input/Discussion: Comments on Public Notice Permit Applications

- o Recent Public Notice Examples: - Bear Lake Aeration, Adelaide Point, Harbor 31, etc.

F. Public Input and Announcements (Round Robin)

G. Adjourn

For Your Calendar: Great Lakes AOC Conference – Muskegon Convention Center, September 28-30

https://www.michigan.gov/egle/0,9429,7-135-3308_3333-547532--,00.html

Muskegon Lake Watershed Partnership
316 Morris Ave., Suite 340
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www.muskegonlake.org

August 5, 2021

Ms. Stephanie Swart
Great Lakes Management Unit
Water Resources Division
Michigan Department of Environment, Great Lakes, and Energy
Lansing, Michigan

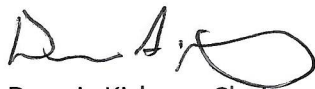
Dear Ms. Swart,

The Muskegon Lake Watershed Partnership (MLWP), as the Public Advisory Council (PAC) for the Muskegon Lake Area of Concern (AOC), has reviewed the attached, Michigan Department of Environment, Great Lakes, and Energy (EGLE) Draft Aesthetics BUI Removal Document during our August 3, 2021, Zoom meeting.

The draft document was emailed to the MLWP's list of interested stakeholders and its voting membership in advance of the meeting, along with the meeting agenda. The MLWP Technical Committee chair presented a summary of the document during the meeting. Mr. Rick Hobrla, EGLE AOC Program, participated in the meeting to answer questions.

The MLWP (Muskegon Lake PAC) is pleased to provide this letter in support of EGLE's recommendation to remove the Degraded Aesthetics BUI. We look forward to the 30-day public notice via the EGLE Calendar and postings to the Mich-RAP listserv.

Sincerely,



Dennis Kirksey, Chair
Muskegon Lake Watershed Partnership

CC: Mark Loomis, U.S. EPA GLNPO
Kathy Evans, PAC Support Staff, WMSRDC