



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5

77 WEST JACKSON BOULEVARD

CHICAGO, IL 60604-3590

SEP 26 2011

REPLY TO THE ATTENTION OF:

Mr. Dan Wyant
Director
Michigan Department of Natural Resources
P.O. Box 30473
Lansing, Michigan 48909-7973

Dear Mr. Wyant:

Thank you for your September 13, 2011 request to remove the "Bird or Animal Deformities or Reproduction Problems" Beneficial Use Impairment in the Deer Lake Area of Concern (AOC), Marquette County, Michigan.

The U.S. Environmental Protection Agency approves your removal request based upon a review of your submittal and the supporting data. We share your desire to restore all of the Great Lakes AOCs and to formally delist them. EPA will notify the International Joint Commission of this significant positive change in the environmental health of the Deer Lake AOC.

We congratulate all of the parties involved in this federal/state/local partnership. They have been instrumental in achieving this important environmental improvement, which will benefit people who work and live near the Deer Lake AOC, the State of Michigan, and the Great Lakes basin. We look forward to the continuation of this important and productive relationship with your agency and local coordinating committees as we work together to fully restore all of Michigan's AOCs.

If you have further questions, please contact me at (312) 353-4891 or your staff may contact John Perrecone, Great Lakes National Program Office, at (312) 353-1149.

Sincerely,

A handwritten signature in blue ink, which appears to read "Chris Korleski", is positioned above the typed name.

Chris Korleski, Director
Great Lakes National Program Office

Cc: Patricia Birkholz, MDEQ, Office of Great Lakes
Frank Ruswick, MDEQ, Office of Great Lakes
Stephanie Swart, MDEQ, Office of Great Lakes
Dr. Saad Jasmin, IJC
Chris Korleski, EPA, GLNPO
Wendy Carney, EPA, GLNPO
John Perrecone, EPA, GLNPO
Marc Tuchman, EPA, GLNPO



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
OFFICE OF THE GREAT LAKES
LANSING



PATRICIA BIRKHOLZ
DIRECTOR

September 13, 2011

Mr. Chris Korleski, Director
Great Lakes National Program Office
United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard (G-17J)
Chicago, Illinois 60604-3507

Dear Mr. Korleski:

The purpose of this letter is to request the United States Environmental Protection Agency (USEPA), Great Lakes National Program Office's (GLNPO) concurrence with the removal of the Bird or Animal Deformities or Reproduction Problems Beneficial Use Impairment (BUI) for the Deer Lake Area of Concern (AOC). The Michigan Department of Environmental Quality (MDEQ) has assessed the status of this BUI in accordance with the state's *Guidance for Delisting Michigan's Great Lakes Areas of Concern* and recommends that the BUI be removed from the list of impairments in the Deer Lake AOC.

Enclosed please find documentation to support this recommendation, including the BUI removal Briefing Paper prepared by the MDEQ's technical staff. The Deer Lake AOC Public Advisory Council submitted a letter of support for the removal recommendations on August 15, 2011.

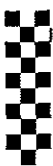
We value our continuing partnership in the AOC Program and look forward to working with the GLNPO, in the removal of BUIs and the delisting of AOCs. If you need further information concerning this request, please contact Ms. Stephanie Swart, Office of the Great Lakes, MDEQ, at 517-335-6721, or you may contact me.

Sincerely,

Patricia Birkholz
Director
517-335-4056

Enclosures

cc/enc: Mr. Mark Loomis, USEPA
Mr. John Perrecone, USEPA
Mr. Richard Hobrle, MDEQ
Ms. Sharon Baker, MDEQ
Ms. Stephanie Swart, MDEQ



Deer Lake Area of Concern
Public Advisory Council
490 Deer Lake Road
Ishpeming, Michigan 49849

August 15, 2011

Ms. Stephanie Swart, AOC Coordinator
Office of the Great Lakes
Michigan Department of Environmental Quality
525 West Allegan Street
Lansing, Michigan 48909

Re: Support for BUI Removals – Eutrophication or Undesirable Algae and Bird or Animal
Deformities or Reproduction Problems

Dear Ms. Swart:

The purpose of this letter is to indicate the continued support of the Deer Lake Public Advisory Council (PAC) for the removal of the Eutrophication or Undesirable Algae and the Bird or Animal Deformities or Reproduction Problems Beneficial Use Impairments (BUIs) for the Deer Lake Area of Concern (AOC). At a meeting on August 11, 2011 the PAC unanimously passed a motion supporting the removal of these BUIs. The Deer Lake PAC has been involved in the review of the available information for both BUIs and is in agreement with the July 18, 2011 Bird or Animal Deformities or Reproduction Problems BUI document and the August 2, 2011 Eutrophication or Undesirable Algae BUI document.

If you have any questions regarding our support of the removal of these BUIs please do not hesitate to contact us. We value our partnership with the AOC Program and look forward to continuing good work at Deer Lake and hearing the good news on the BUI removals.

Sincerely,

Diane Feller, PAC Chair
Deer Lake Area of Concern
(906) 486-9967

cc: Mr. Pete Nault, Vice Chair, Deer Lake PAC
Ms. Michelle Jarvie, Secretary, Deer Lake PAC

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: Patty Birkholz, Director, Office of the Great Lakes

FROM: Rick Hobrla, Chief, Great Lakes Management Unit RMH

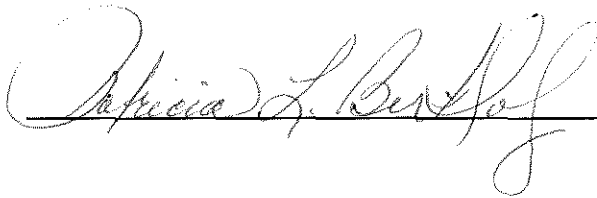
DATE: September 7, 2011

SUBJECT: Removal of the Bird or Animal Deformities or Reproduction Problems Beneficial Use Impairment (BUI) for the Deer Lake Area of Concern (AOC)

The Department of Environmental Quality, Great Lakes Management Unit, AOC Program staff request concurrence with the recommendation to remove the Bird or Animal Deformities or Reproduction Problems BUI in the Deer Lake AOC. This request is made in accordance with the process outlined in the *Guidance for Delisting Michigan's Great Lakes Areas of Concern*.

Attached is a Briefing Paper documenting restoration and justifying removal of this BUI. Also attached is a draft letter to Chris Korleski, Director, Great Lakes National Program Office, United States Environmental Protection Agency, and requesting removal of the BUI. The re-designation was discussed by the Deer Lake AOC Public Advisory Council (PAC) at their regular meeting in September of 2007. A public meeting was held in 2007 to discuss the removal of this BUI with the Deer Lake AOC community. Both the PAC and the local community expressed their support for removal of the BUI. As part of their continued support for this BUI removal recommendation, the PAC submitted a letter on August 15, 2011. Please indicate your approval of this recommendation and we will provide a final letter to Mr. Korleski for your signature.

Approved:



Date:

09/13/11

Attachments

cc: Stephanie Swart, Office of the Great Lakes
Sharon Baker, Office of the Great Lakes

**BRIEFING PAPER
REMOVAL RECOMMENDATION
BIRD OR ANIMAL DEFORMITIES OR REPRODUCTION PROBLEMS
BENEFICIAL USE IMPAIRMENT
DEER LAKE AREA OF CONCERN**

Issue

The Deer Lake Area of Concern (AOC) Technical Committee recommends the removal of the Bird or Animal Deformities or Reproduction Problems Beneficial Use Impairment (BUI) based on the collective review of the related documentation per the process outlined in the *Guidance for Delisting Michigan's Great Lakes Areas of Concern* (Guidance) (MDEQ, 2008). This recommendation is made by the Deer Lake Technical Committee, comprised of staff from the United States Environmental Protection Agency (USEPA), United States Fish and Wildlife Service (USFWS), Clemson University's Institute of Environmental Toxicology, Department of Environmental Quality (DEQ) staff, and members of the Deer Lake Public Advisory Council (PAC).

Background

Deer Lake is a 1,010-acre impoundment located in central Marquette County near the center of Michigan's Upper Peninsula. The Deer Lake AOC includes a portion of Carp Creek, Deer Lake, and the Carp River (Figure 1). The upstream boundary of the AOC corresponds with the furthest upstream location where a municipal sanitary sewer discharge, Ishpeming Township wastewater treatment plant "A", entered Carp Creek (at the end of Southwood Drive). Carp Creek flows into Deer Lake at the middle of the South Basin. Deer Lake flows into the Carp River via the dam at the North Basin impoundment. The AOC terminates as the Carp River flows into Lake Superior near the City of Marquette, Michigan.

Historic mining practices resulted in mercury contamination to the Deer Lake basin from Ropes Creek and Carp Creek. Three impoundments have been built on the lake since 1887. Three BUIs have been identified for the Deer Lake AOC: Restrictions on Fish and Wildlife Consumption, Eutrophication or Undesirable Algae, and Bird or Animal Deformities or Reproduction Problems (MDEQ, 2008).

The original 1987 Remedial Action Plan (RAP) identified bald eagle (*Haliaeetus leucocephalus*) reproduction problems as a concern Michigan Department of Natural Resources, (MDNR, 1987). Since bald eagles are piscivorous, it was suggested that the elevated concentration of mercury in the fish was the cause of the reproductive failure in the bald eagles. A fish sample taken from Deer Lake at the same time, indicated traces of DDT and PCBs as well as high levels of mercury (MDNR, 1987).

Removal Criteria

According to the Guidance the restoration criteria for the Bird or Animal Deformities or Reproduction Problems BUI in the Deer Lake AOC requires that:

Approach 1 – Observational Data and Direct Measurements of Birds and Other Wildlife

- Evaluate observational data of bird and other animal deformities for a minimum of 2 successive monitoring cycles in species identified in the RAP as exhibiting these problems. If deformity or reproductive problem rates are not statistically different than inland background levels (at a 95% confidence interval), or no reproductive or deformity problems are identified during the two successive monitoring cycles, then the BUI is

restored. If the rates are statistically different, it may indicate a source from either within or from outside the AOC. Therefore, if the rates are statistically different or the amount of

data is insufficient for analysis, then:

- Evaluate tissue contaminant levels in egg, young, and/or adult wildlife. If contaminant levels are lower than Lowest Observable Effect Level (LOEL) for that species or are not statistically different than inland control populations (at a 99% confidence interval), then the BUI is restored.

Where direct observation of wildlife and wildlife tissue data is not available, the following approach will be used:

Approach 2: Fish Tissue Contaminant Levels as an Indicator of Deformities or Reproductive Problems

- If fish tissue concentrations of PCBs, dioxins, DDT, or mercury (as determined in the RAP) contaminants of concern in the AOC are at or lower than the LOEL known to cause reproductive or developmental problems in fish-eating birds and mammals the use impairment is restored.

OR

- If fish tissue concentrations of PCBs, dioxins, DDT, or mercury in the AOC are not statistically different than the associated Great Lake (at 95% confidence interval), then the BUI is restored. In the connecting channel AOCs, either the upstream or downstream Great Lake may be used for comparison.

The attached excerpt from the Guidance (pages 23-28) includes the rationale for the delisting criteria (Attachment A).

Analysis

Elevated levels of mercury in fish were discovered in 1980 as part of an investigation by the Callahan Mining Company related to reopening the Ropes Gold Mine. The elevated levels of mercury in the fish at that time were believed to have been primarily caused by discharges of mercury originating from the Cleveland Cliffs Iron Company assay labs. These labs discharged wastewater through the old Ishpeming Wastewater Treatment Plant (MDNR, 1987).

The 1987 RAP indicated that the elevated concentration of mercury in fish was the cause of the reproductive failure in the bald eagles. Neither direct organochloride nor mercury data from the nesting pair of eagles at Deer Lake were collected. However, mercury may not have been the cause of the reproductive failures since there were elevated levels of other chemicals present in fish collected at the site. A sample of fish from Deer Lake found traces of DDT and PCB contamination (MDNR, 1987). The information in the RAP regarding the reasons for reproductive failure in the pair at Deer Lake is limited and mostly observational. Dr. William Bowerman, ecotoxicologist and eagle specialist indicated that as bald eagles molt, mercury is shed through their feathers, and a direct connection has not been made between mercury in fish and bald eagle reproductive failures (Bowerman, 2006). Additionally, bald eagles have a large range and are migratory and thus could have ingested contaminants anywhere in their range or migration route. On a national level, bald eagle populations in the United States were at very low levels in the 1960s. The United States Fish and Wildlife Service (USFWS) census data from that time

indicated that only 417 pairs of bald eagles were present in the United States in 1963. Habitat destruction, disturbance, and contaminants, specifically persistent organochlorine compounds such as DDT were identified as the likely causes of the low bald eagles numbers during that time. DDT thins the shells of the eggs causing the adult birds to crush their eggs leading to reproductive failures. The chemical was banned in 1972. Since then, bald eagles have recovered enough to be listed as 'threatened' rather than 'endangered' by the USFWS.

The USFWS goal for bald eagle recovery in the Northern States was 1200 occupied breeding areas distributed over a minimum of 16 states with an average annual productivity of 1.0 young per occupied nest. The USFWS goal was achieved in 1991 with 1,349 occupied breeding areas distributed over 20 States. In 1998, The Lake Superior Binational Program (LSBP) recommended a five-year productivity average of greater than 1.0 young bald eagle per occupied territory as the target indicator of ecosystem health. The rationale for this indicator is that bald eagle populations in north central Wisconsin, the Superior and Chippewa National Forests in Minnesota, and the inland areas of Michigan retained the core of the bald eagle population during the "DDT years" and continue to have healthy-appearing and stable populations. The productivity rates in these areas range from 1.0 to 1.3 young/occupied territory. The success of the breeding pairs in Deer Lake can be favorably compared to USFWS regional goals.

The USFWS began observing the bald eagles at Deer Lake in 1963, and from 1964-1996 no eaglets were observed (Best, 2011). According to USFWS Wildlife Biologist David Best, the eagle pair has now been successfully reproducing since 1997. The eagles have been using two primary nesting sites (Figures 2 and 3), but there may be other nests surrounding Deer Lake. Documentation by the USFWS indicates that bald eagles have successfully fledged an average of 1.73 young per year for the period 1997 through 2011 (Attachment B). The Deer Lake pair has produced 25 fledglings during the past 14 breeding seasons (six in the last four) which is well above the suggested target of 1.0 by the USFWS and greater than 1.0 by the LSBP as an indicator of ecosystem health. Furthermore, USFWS information has not indicated deformities in the bald eagles nesting at Deer Lake.

Since field data exists, the first approach in the Guidance for assessing BUI restoration will be used (Attachment A). Based on multiple years of observation of the nesting pair at Deer Lake and the lack of reproductive problems, the Guidance BUI removal criteria has been met. The complete nest survey information going back to 1963 can be found in Attachment B.

Figure 2. Deer Lake AOC 2011 nest site. Photo courtesy of Matt Schroderus, Ishpeming, Michigan.



Figure 3. Deer Lake AOC 2007 breeding season fledglings. Photo courtesy of Matt Schroderus, Ishpeming, Michigan.



The removal of the Bird or Animal Deformities or Reproduction Problems BUI was also discussed with the Deer Lake PAC at their regular meeting in September 2007. The PAC passed a motion supporting the removal of the Bird or Animal Deformities or Reproduction Problems BUI at the meeting. A public meeting was held in September 2007 to discuss the removal of this BUI with the community. The community expressed their support for removal of this BUI. In recognition of their continued support for this BUI removal, the PAC unanimously passed a motion at their August 11, 2011 meeting and also submitted a letter (Attachment D).

Recommendation

Based upon review of the data and input from the MDEQ, USEPA staff, and the PAC, including the Technical Committee members, we recommend removal of the Bird or Animal Deformities or Reproduction Problems BUI in the Deer Lake AOC.

Prepared by: Stephanie Swart, Deer Lake AOC Coordinator
Great Lakes Management Unit
Office of the Great Lakes
Michigan Department of Environmental Quality

Sharon Baker, AOC Coordinator
Great Lakes Management Unit
Office of the Great Lakes
Michigan Department of Environmental Quality

Attachments

- A – Bird or Animal Deformities or Reproduction Problems; pages 23-28 of the Guidance for Delisting Michigan's Great Lakes AOCs
- B – USFWS Bald Eagle Survey Data 1963-2011
- C – Deer Lake AOC Historical Background
- D – Deer Lake PAC letter supporting BUI removal

Bibliography

Best, D. 2011. Bald eagle nesting data. United States Fish and Wildlife Service, East Lansing, Michigan.

Bowerman, W. Personal communication with Sharon Baker. Dr. Bowerman is an ecotoxicologist at Clemson University specializing in eagles and eagle behavior throughout the world.

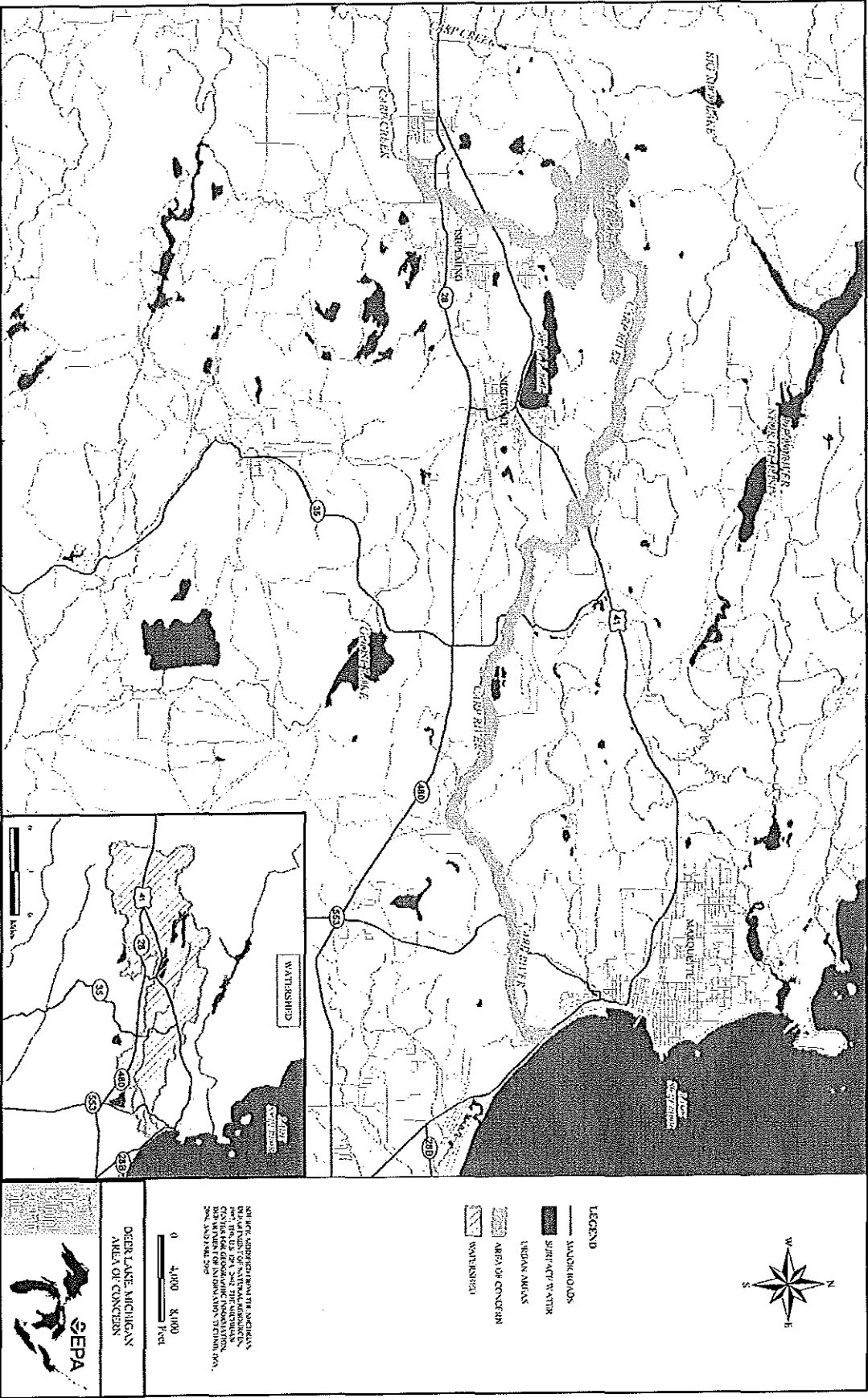
International Joint Commission. 1987. Revised Great Lakes Water Quality Agreement of 1978.

Lake Superior Binational Program. 1998. Ecosystem Principles and Objectives, Indicators and Targets for Lake Superior. Lake Superior Work Group of the Lake Superior Binational Program, Thunder Bay, Ontario. 110 pp.

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. Michigan Department of Natural Resources Remedial Action Plan for Deer Lake Area of Concern. Surface Water Quality Division, Great Lakes and Environmental Assessment Division, Lansing, Michigan.

Figure 1. The Deer Lake Area of Concern



Attachment A

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

Bird or Animal Deformities or Reproduction Problems

Significance in Michigan's Areas of Concern (AOC)

Seven of Michigan's AOCs are listed as either impaired or unknown status for bird and animal deformities (e.g., crossed bills) or reproductive problems (e.g., egg shell thinning), including: River Raisin, St. Clair River, Detroit River, Saginaw River/Bay, St. Marys River, Deer Lake, and Kalamazoo River.

In Saginaw River/Bay, Deer Lake, and Kalamazoo River, past studies have indicated elevated toxic chemical concentrations (e.g., mercury or PCBs) and/or some deformities in birds and other animals. In the other AOCs which list this BUI, the status is either unknown or inconclusive. In most cases, studies on bird and animal deformities have not been done. The species historically impacted are fish eating birds or animals such as bald eagles, herring gulls, common terns, mink, or otter. The contaminants associated with these impacts are primarily the persistent bioaccumulative toxics: PCBs, dioxins, DDT, and mercury.

Michigan Restoration Criteria and Assessment

Restoration of this BUI will be demonstrated using two approaches, depending on availability of data in a particular AOC. The first approach evaluates restoration based on field assessment of birds and/or other wildlife in those AOCs where Michigan Department of Environmental Quality (MDEQ) or other State-approved bird and wildlife data are available.

The second approach will be applied in those AOCs where bird and other wildlife data are not available, and uses levels of contaminants in fish tissue known to cause reproductive or developmental problems as an indicator of the likelihood that deformities or reproductive problems may exist in the AOC.

Approach 1 – Observational Data and Direct Measurements of Birds and Other Wildlife

- Evaluate observational data of bird and other animal deformities for a minimum of 2 successive monitoring cycles in species identified in the RAP as exhibiting these problems. If deformity or reproductive problem rates are not statistically different than inland background levels (at a 95% confidence interval), or no reproductive or deformity problems are identified during the two successive monitoring cycles, then the BUI is restored. If the rates are statistically different, it may indicate a source from either within or from outside the AOC. Therefore, if the rates are statistically different or the amount of data is insufficient for analysis, then:
- Evaluate tissue contaminant levels in egg, young, and/or adult wildlife. If contaminant levels are lower than the Lowest Observable Effect Level (LOEL) for that species or are not statistically different than inland control populations (at a 95% confidence interval), then the BUI is restored.

Data for a comparison study must come from a control site which is agreed to by the MDEQ, in consultation with Michigan Department of Natural Resources (MDNR). It will be chosen based on physical, chemical, and biological similarity to the AOC and the 2 sites must be within the same USEPA Level III Ecoregions for the Conterminous U.S.

Where direct observation of wildlife and wildlife tissue data is not available, the following approach will be used:

Approach 2: Fish Tissue Contaminant Levels as an Indicator of Deformities or Reproduction Problems

- If fish tissue concentrations of PCBs, dioxins, DDT, or mercury (as determined in the RAP) contaminants of concern in the AOC are at or lower than the LOEL known to cause reproductive or developmental problems in fish-eating birds and mammals the use impairment is restored.

OR

- If fish tissue concentrations of PCBs, dioxins, DDT, or mercury in the AOC are not statistically different than the associated Great Lake (at 95% confidence interval), then the BUI is restored. In the connecting channel AOCs, either the upstream or downstream Great Lake may be used for comparison.

Fish of a size and species to be prey for the wildlife species under consideration must be used for the tissue data.

Rationale

Practical Application in Michigan

Bird and other animal deformities and reproductive problems have a particular challenge related to criteria for restoration:

- Most of the species involved are only part year residents in an AOC, or have a home range that may include locations outside an AOC. This makes it difficult to attribute deformities or reproductive problems to a specific location. The 2 approaches of the criteria address this.
- There is also a wide variation in how this use impairment was originally determined in Michigan's AOCs. Some AOCs had empirical data and some had anecdotal information.
- Many fish-eating birds and animals such as eagles are long-lived birds. Long after remedial actions have occurred and a site is restored, it is possible for reproductive effects to remain apparent.
- It is very difficult to determine actual prevalence of deformities and reproductive problems. Fox and Bowerman (in press), provide examples of this last point and detail issues with assessments of this BUI.
- In some AOCs with this BUI, the species monitored under MDEQ's wildlife monitoring program do not reside there, so no direct wildlife data are available.

Given the above practical considerations, the statewide criteria for this BUI uses two approaches – one for AOCs where wildlife data are available, and a second approach where direct wildlife information is not available. In the latter case, contaminant levels in fish tissues are used as an indicator of potential deformities or reproductive problems in the fish-eating species which have historically been impacted by contaminants (e.g., eagles, herring gulls, mink, and otter). Even in the absence of direct wildlife data, if contaminant levels in fish tissue are high, it indicates that the

possibility for deformities or reproductive problems in fish-eating wildlife may be higher.

The contaminants of concern are PCBs, dioxins, DDT, and mercury and each AOC with this BUI may have one or more contaminants present. Assessment in each AOC will be based on the relevant contaminant(s).

The State will consider restoration of this BUI on a case-by-case basis for AOCs with circumstances that may not fit exactly into the process outlined above.

1991 International Joint Commission (IJC) General Delisting Guideline

When the incidence rate of deformities or reproductive problems in sentinel wildlife species do not exceed background levels in inland control populations.

The IJC general delisting guideline for the BUI is presented here for reference. The Practical Application in Michigan subsection above describes application of 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 "Michigan Water Quality Strategy Update" (MDEQ, 2005). Each year, a set of targeted watersheds is 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 maps of the basin rotations). One element of the strategy is wildlife contaminant monitoring.

Wildlife plays an important role in monitoring water quality and ecosystem health and can be used to monitor for spatial and temporal trends in contaminant concentrations. Specific life stages may be sampled to provide discrete time units for determination of temporal trends. Specific geographic regions or watersheds may be targeted for the determination of spatial trends.

The specific objectives of the wildlife contaminant monitoring are to:

1. Determine contaminant levels in wildlife that may be exposed to contaminants from surface waters of the state.
2. Assess whether contaminant levels in fish are changing with time.
3. Evaluate the overall effectiveness of MDEQ programs in protecting wildlife from toxic contaminants.
4. Determine whether new chemicals are bioaccumulation in wildlife.

The wildlife contaminant monitoring element currently consists of two components that, in combination, provide data necessary to achieve these objectives. These components include bald eagle and herring gull egg monitoring. The bald eagle project began in 1999 and has continued each year since then. Sample collection and analysis of herring gull eggs began in 2002. Wildlife is analyzed for bioaccumulative contaminants of concern, including mercury, PCBs, and chlorinated pesticides (e.g., DDT/DDE/DDD).

Data are reviewed each year to determine whether there are additional new parameters of concern for which wildlife should be analyzed.

Another element of the State's monitoring strategy applicable to this BUI is enhanced and improved FCMP. 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).

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.

Attachment B

United States Fish and Wildlife Service Bald Eagle Survey Data 1963-2011

Year	Nest Occupied?	Eaglets Fledged
1963	N	0
1964	Y	0
1965	Y	0
1966	Y	0
1967	Y	0
1968	Y	0
1969	Y	0
1970	N	-
1971	Y	-
1972	N	-
1973	Y	0
1974	Y	0
1975	Y	0
1976	Y	-
1977	Y	-
1978	Y	-
1979	Y	-
1980	Y	0
1981	N	-
1982	N	-
1983	N	-
1984	Y	0
1985	N	-
1986	N	-
1987	-	-
1988	N	-
1989	-	-
1990	-	-
1991	N	-
1992	-	-
1993	-	-
1994	-	-
1995	-	-
1996	-	-
1997	Y	1
1998	Y	2

1999	Y	2
2000	Y	1
2001	Y	2
2002	Y	2
2003	Y	1
2004	Y	2
2005	Y	2
2006	Y	2
2007	Y	2
2008	Y	0
2009	Y	2
2010	Y	2
2011	Y	2

*This data is comprised of surveys of multiple nesting locations. Not all nesting locations were necessarily sampled each year.

Attachment C

Deer Lake AOC Historical Background

Historic mining practices resulted in mercury contamination to Deer Lake basin from Ropes Creek, and Carp Creek. The "Ropes" Goldmine operated at various times from 1882 through 1991 along Ropes Creek. Gold recovery in the Ropes Mine from 1882-1897 used a mercury amalgamation process to concentrate the gold mined there. Gold processed from the Ropes Mine from 1900-1901 used a cyanide leaching process and additional gold was recovered from scraps of mercury amalgam recovered throughout the Ropes Mill buildings. Mining activity resumed from 1983-1991, but the ore was trucked off site and out of the basin, to the Humboldt Iron Mine for extraction. Throughout the earlier activities, the gold mine tailings from the Ropes Mine were deposited into Ropes Creek watershed. The mine closed in 1979. During the course of investigations by Ecological Research Services, Inc. for the Callahan Mining Company pursuant to the reopening of the Ropes Gold Mine in 1983, high levels of mercury were discovered in fish tissue, sediments, and the water column in Deer Lake (MDNR, 1987).

Investigations by the Michigan Department of Natural Resources (MDNR) determined that Cleveland-Cliffs Iron Company, now Cliffs Natural Resources (Cliffs) assay labs practiced disposal, down the lab drains, of mercury reagent laden wastewater. These wastewaters drained through the Ishpeming Wastewater Treatment Plant (WWTP) to Carp Creek. Cliffs immediately stopped the practice in 1981 when it was determined that their labs were the major continuing mercury source. The 1984 Consent Judgment (CJ) committed both the State of Michigan and Cliffs to a restoration plan which included drawing down the level of the Deer Lake Reservoir, eliminating the contaminated fish, slowly refilling the reservoir, and monitored recovery. The 1984 CJ is Appendix B of in the *1987 Remedial Action Plan for Deer Lake Area of Concern* (MDNR, 1987). The 2006 amendments to the 1984 CJ are intended to facilitate the long term maintenance of the completed remedial measures, provide funding for any additional remedial measures, and minimize discharges from Cliffs Shaft Mine to Carp Creek.

The natural Deer Lake basin covered approximately 90 acres. The original impoundment was formed in 1887 to provide a steady source of water for the Ropes Goldmine operations and did little to change the size of the lake. The second higher dam was built in 1912 by the Cliffs Electric Services Company (CESC) as a hydropower storage reservoir increasing the reservoir to approximately 602 acres to provide energy and to augment winter water flows to the Cliffs iron ore processing operations in Marquette. A third, higher dam was built just below the second in 1942 by the CESC, inundating the second dam, creating the current reservoir to enhance the reservoir's operational capacity. This dam remains in place and is the operating outlet for the Deer Lake reservoir. A large butterfly valve was installed for water flow control at the base of this dam. This valve now helps to control anoxic conditions in the north basin by operating as a bottom draw on the dam. Opening the valve as the lake begins to thermally stratify allows anoxic waters in the north basin flow out the lake bottom keeping dissolved oxygen levels in the hypolimnion higher, instead of allowing all of the flow to exit through the notch at the top of the dam. The notch at the top of the dam is set to maintain the water level in the lake at 1,385 feet above sea level. The water level was agreed to between the state and the Cliffs in the 2006 amendments to the CJ. This level was agreed to be the optimal level needed to minimize the mercury methylation from the contaminated sediments remaining within the lake.

AOC Designation

In 1985, the Great Lakes Water Quality Board recommended an AOC designation for Deer Lake to the International Joint Commission. This recommendation was based on the fish consumption advisory issued by the Michigan Department of Community Health (MDCM) in 1981 for the Deer Lake reservoir that was expanded in 1982 to include Carp Creek and the Carp River. The fish consumption advisory was driven by

high levels of mercury in fish tissues, water and sediment as described in the 1987 Deer Lake RAP (MDNR, 1987).

Elevated levels of mercury in fish were discovered by Ecological Research Services, Inc. through work for the Callahan Mining Company as part of the investigation into the feasibility of reopening of the Ropes Gold Mine. The elevated levels of mercury in the fish were believed to have been primarily caused by discharges of mercury originating from the Cliffs assay labs. These labs discharged wastewater through the old Ishpeming WWTP (MDNR, 1987). Mercury discharges were curtailed in 1981 when the problem was identified (MDNR, 1987).

Deer Lake Area of Concern
Public Advisory Council
490 Deer Lake Road
Ishpeming, Michigan 49849

August 15, 2011

Ms. Stephanie Swart, AOC Coordinator
Office of the Great Lakes
Michigan Department of Environmental Quality
525 West Allegan Street
Lansing, Michigan 48909

Re: Support for BUI Removals – Eutrophication or Undesirable Algae and Bird or Animal
Deformities or Reproduction Problems

Dear Ms. Swart:

The purpose of this letter is to indicate the continued support of the Deer Lake Public Advisory Council (PAC) for the removal of the Eutrophication or Undesirable Algae and the Bird or Animal Deformities or Reproduction Problems Beneficial Use Impairments (BUIs) for the Deer Lake Area of Concern (AOC). At a meeting on August 11, 2011 the PAC unanimously passed a motion supporting the removal of these BUIs. The Deer Lake PAC has been involved in the review of the available information for both BUIs and is in agreement with the July 18, 2011 Bird or Animal Deformities or Reproduction Problems BUI document and the August 2, 2011 Eutrophication or Undesirable Algae BUI document.

If you have any questions regarding our support of the removal of these BUIs please do not hesitate to contact us. We value our partnership with the AOC Program and look forward to continuing good work at Deer Lake and hearing the good news on the BUI removals.

Sincerely,



Diane Feller, PAC Chair
Deer Lake Area of Concern
(906) 486-9967

cc: Mr. Pete Nault, Vice Chair, Deer Lake PAC
Ms. Michelle Jarvie, Secretary, Deer Lake PAC