Public Comments Received on the 2018 Draft Impaired Waters List

A public comment period on the Draft 2018 Impaired Waters List was held from November 15, 2017 to January 8, 2018.

WISCONSIN
DEPT. OF NATURAL RESOURCES

Beranek, Ashley E - DNR

From: Abby Badanes <abbybadanes@gmail.com>
Sent: Tuesday, December 12, 2017 3:07 PM
To: DNR Impaired Waters
Subject: Lac Courte Orielles

Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Orielles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). I love LCO like my own and it is one of the only lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. While the WDNR listing indicates the cause of the impairment is "unknown", a significant deal of independent research has indicated that the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment at Lac Courte Orielles.

Respectfully yours,
Abby Badanes

Beranek, Ashley E - DNR

From: Adam Faitek <adam.faitek@googlemail.com>
Sent: Friday, December 01, 2017 9:43 AM
To: DNR Impaired Waters
Subject: 2018 Impaired Waters List

December 01, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek, I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is the only water on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Adam Faitek
6895 Victory Heights Circle
Stone Lake, WI 54876

Beranek, Ashley E - DNR

From: Amy Lutzke <alutzke@uwalumni.com>
Sent: Sunday, December 03, 2017 8:34 PM
To: DNR Impaired Waters
Subject: Rock River Recovery - December Newsletter 12/01/2017

Greetings:

I received this email newsletter today and was reading through it. I clicked on the link to the Draft 2018 Impaired Waters list. When I did it opened a page that said redirecting in the upper left of the screen but then it downloaded an Excel file to my computer. First of all, that was a little creepy having it download this file without giving it the permission to do so. But then when I clicked on it I got a security warning and an error message.

I thought you might like to know so you can provide a link to the information in a safer and more accessible format. Thanks!

Sincerely,

Amy Lutzke

Beranek, Ashley E - DNR

From: Amy Rients <arients@jurosmedical.com>
Sent: Monday, December 11, 2017 2:42 PM
To: DNR Impaired Waters
Subject: 2018 Impaired Waters List-Lac Courte Oreilles

December 11th, 2017

Ms. Ashley Beranek DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Amy Rients
6810 Fleur De Lane
Stone Lake, WI 54876

Beranek, Ashley E - DNR

From: Anne Badanes <anne.badanes@gmail.com>
Sent: Thursday, December 14, 2017 6:16 AM
To: DNR Impaired Waters
Subject: Lac Courte Oreilles - Impaired Water List

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St WQ/3
Madison, Wisconsin 53707

Re: Impaired Water List for 2018 December 14, 2017

Dear Ashley,

My family and has vacationed in Wisconsin for over 100 years, enjoying summers in Lac Courte Oreilles (LCO). I've come to Wisconsin every summer since 1955. Through the years, we've noticed the water quality worsen. Yes, this impacts swimming and boating. But even more worrisome is that there are very few people fishing on the lake anymore. LCO used to be a destination for fishing. Clearly something is wrong with the ecology of the lake. We learned this is because of the low dissolved oxygen causing LCO to be designated as an Impaired Water.

We support being upfront and naming the "cause" of the impairment to be the Phosphorus in the lake. It was named as the cause in Musky Bay in 2014. The entire lake should have this designation so that we can begin to address the underlying issue.

I recall my elderly aunts warning about caring for the resources in the North Woods. Now they are gone and I am the elderly aunt in the family. I do not want to see the loss of habitat for fish in LCO…or the continued invasion of algae. I want my children and grandchildren to enjoy a pristine northern lake and to know that the government and individuals cared about these resources.

Please amend the WDNR 2018 Impaired Waters listing to SHOW that total Phosphorous is the cause of the impairment of Lac Courte Oreilles.

Many thanks Ashley,

Anne Badanes
14590 West Schoolhouse Lane
Stone Lake WI 54876

Beranek, Ashley E - DNR

From: Ann Girres <anngirres@gmail.com>
Sent: Sunday, December 17, 2017 8:28 PM
To: DNR Impaired Waters
Subject: Status of Lac Court O'Reilles
Attachments: WDNR Letter.docx

Please see the attached letter expressing my concern

regarding the water quality at Lac Court Oreilles.

Thank you.

Ann Girres

December 18, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of only a few waters on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Ann Girres
4026 Deerwood Trail
Eagan, MN 55122

Beranek, Ashley E - DNR

From: Art Malin <outlook_0233F9287ED4EC28@outlook.com>
Sent: Sunday, December 03, 2017 12:37 PM
To: DNR Impaired Waters
Subject: Impaired water update

I have lived on Lac Courte Oreilles for about 30 years. I am a fishing guide and do a radio show emanating from Hayward with another guide every Sunday.

I have observed the tremendous growth of weeds in the Summer and the lack of oxygen in Musky Bay in the Winter that has killed thousands of fish.

I have read the information you have sent out and I agree with the DNR's proposed designation of all of LCO as "impaired water due to low dissolved oxygen".

I find it very strange, however, that the DNR then says it is caused by an "unknown" reason. One does not need to be a scientist to know that Phosphorus is the cause. This lake has been studied by professional firms, the LCO Conservation Department, for years. The information has been given to the DNR and yet the cause is for "unknown" reasons.

240 lakes were added to the 1,533 that currently exceed the phosphorus criteria. Many had not been assessed prior to 2018./

I would like to encourage you to find that it is Phosphorus that is the reason unless you have data that shows otherwise.

Thank you for your response

Art Malin
15538 W. Victory Hghts. Cir.
Stone Lake WI 54876
Ph 715 865 2336
Dosmalins2@charter.net

Sent from Mail for Windows 10

Beranek, Ashley E - DNR

From: Barbara Hise <barbarahise@gmail.com>
Sent: Saturday, December 02, 2017 1:58 PM
To: DNR Impaired Waters
Subject: Attn: Ms. Ashley Beranek

Re: 2018 Impaired Waters List

We fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO).LCO is a rare, Outstanding Resource Water and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "unknown." We strongly disagree. A great deal of the independent research over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is the only water on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully yours,

Barbara and Bill Hise
8133N Pine Crest Rd.
Hayward, WI 54843

Beranek, Ashley E - DNR

From: Bernard Bouquet <bjbouquet@gmail.com>
Sent: Monday, December 11, 2017 8:00 PM
To: DNR Impaired Waters
Subject: COLA lac Courte Oreilles lake association

To whom it may concern,
Thank you for designating the entirety of Lac Courte Oreilles as endangered. I would ask that you look at making the cause of this designation being the phosphorous levels in the lake. Thank you got you consideration.
Bernard Bouquet

Sent from my iPhone

Beranek, Ashley E - DNR

From: Smith, Alex R - DNR
Sent: Thursday, December 07, 2017 7:36 AM
To: DNR Impaired Waters
Subject: FW: Long Lake WISCALM status with alum treatment

Hi Ashley,
Can you address Bill's comment below about WisCALM?

Thanks,
Alex

We are committed to service excellence.
Visit our survey at http://dnr.wi.gov/customersurvey to evaluate how I did.

Alex Smith
Phone: (715) 635-4124
Alex.Smith@wisconsin.gov

From: James, William [mailto:jamesw@uwstout.edu]
Sent: Wednesday, December 6, 2017 3:18 PM
To: Cheryl Clemens <harmonyenv@amerytel.net>
Cc: Smith, Alex R - DNR <Alex.Smith@wisconsin.gov>
Subject: RE: Long Lake WISCALM status with alum treatment

I'll work on this.

Alex – maybe WISCALM needs to address this better? Usually empirical modeling uses a longer averaging mean.

Cheers,

Bill

William F. James
University of Wisconsin - Stout
Sustainability Sciences Institute - Discovery Center
Center for Limnological Research and Rehabilitation
Department of Biology
123E Jarvis Hall
Menomonie, WI 54751

715-338-4395
jamesw@uwstout.edu

From: Cheryl Clemens [mailto:harmonyenv@amerytel.net]
Sent: Wednesday, December 6, 2017 2:58 PM
To: James, William <jamesw@uwstout.edu>
Cc: Smith, Alex R - DNR <Alex.Smith@wisconsin.gov>
Subject: Long Lake WISCALM status with alum treatment

TSI = Trophic Status Index
SD = Secchi depth (meters)
CHL= Chlorophyll *a* concentration (µg/L)
ln = natural log

Calculations

a) For each year with sufficient data, first all values are converted to TSI below (calculate TSI *separately* for chl *a*, Secchi, and satellite data)[9]. (N are automatically converted to clarity values (equivalent to Secchi depth)

$TSI_{CHL} = 9.81 \ln(CHL) + 30.6$
$TSI_{SD} = 60 - 14.41 \ln(SD)$ (satellite inferred clarity data can also be in this equation)

Where:

- For chl *a* and Secchi data, the TSI Package requires 2 samples per year in different years. Samples should be collected between July 15 – Septembe

Bill,
I am working on the lake protection grant for the alum treatment for Long Lake. One of the scoring criteria evaluates whether or not lake status under WISCALM would change based on TSI as calculated above. I can calculate TSI values based on current and predicted summer Chla and Secchi values that you provided in your report. However, WISCALM status is based on July 15 to September 15 data and your predictions where described as June to September values.

With secchi going from 1.8 to 3.3 m, I get TSI changing from 42.8 (good) to 51.5 (excellent)
With Chla going from 44 to 17, I get TSI changing from 68 (fair) to 58 (fair)
Ratings are for a shallow seepage lake.

Now, my math might not be correct (you can check it), but I am not meeting grant criteria.
Can you provide a prediction for the July 15 to September 15 period?
Thanks,
Cheryl Clemens

Beranek, Ashley E - DNR

From: Bridget Grigsby <bridgetgrigsby2005@gmail.com>
Sent: Monday, December 11, 2017 10:00 AM
To: DNR Impaired Waters
Cc: Chad Grigsby
Subject: Lac Court Oreilles and the 2018 Impaired Waters list

December 11, 2017

Dear Ms. Beranek,

I, along with my spouse, 3 siblings and 3 in-laws, are homeowners on Lac Courte Oreilles (LCO). We own a cabin that was originally purchased by my grandparents in 1967. My siblings and I have gone up to the lake our entire lives as our children (9 in all) are doing now.

I fully support the proposed designation of the entire LCO lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters. Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Bridget and Chad Grigsby

Beranek, Ashley E - DNR

From: Carrie Badanes <carriebadanes@gmail.com>
Sent: Monday, December 11, 2017 7:59 PM
To: DNR Impaired Waters
Subject: Lac Courte Oreilles

Dear Ms. Beranek,

I have spent every summer for the past 30+ years on Lac Courte Oreilles. The increased algae is a concern for me and my family.

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." I strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills. Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014.

LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Thank you,
Carrie

Beranek, Ashley E - DNR

From: Smith, Alex R - DNR
Sent: Thursday, December 07, 2017 7:31 AM
To: DNR Impaired Waters
Subject: FW: Big Lake Impaired waters listing

We are committed to service excellence.
Visit our survey at http://dnr.wi.gov/customersurvey to evaluate how I did.

Alex Smith
Phone: (715) 635-4124
Alex.Smith@wisconsin.gov

From: Cheryl Clemens [mailto:harmonyenv@amerytel.net]
Sent: Wednesday, December 6, 2017 1:58 PM
To: Smith, Alex R - DNR <Alex.Smith@wisconsin.gov>
Cc: Mike Reiter <mikereiter@centurylink.net>
Subject: Big Lake Impaired waters listing

This water was assessed during the 2018 listing cycle; new chlorophyll sample data exceeded 2018 WisCALM listing thresholds for the Recreation use. Total phosphorus data were clearly below Recreation use and Fish and Aquatic Life use listing thresholds.
Date
7/12/2017

Hi Alex,
See above. Can you please clarify Chlorophyll listing standards? How many samples are used?
Big Lake 2017 results
6/21/17: 4.08
7/24/17: 2.95
8/28/17: 1.92

These seem low to me.
Just one reading above 20 9/5/16

6/17/16: 8.72
7/21/16: 10.5
9/5/16: 24.1

Cheryl Clemens

Beranek, Ashley E - DNR

From: Cheryl Nenn <Cheryl_nenn@milwaukeeriverkeeper.org>
Sent: Friday, December 22, 2017 3:11 PM
To: DNR Impaired Waters
Cc: Zac Driscoll; Helker, Craig D - DNR
Subject: Comments on 2018 303d List
Attachments: MRK Raw Impaired Steams Data.xlsx; MRK Cleaned Chloride Impaired Streams.xlsx

On behalf of Milwaukee Riverkeeper, we submit the following comments on the WDNR's proposed 2018 303d Impaired Waters List.

We support the listing of the following creeks, which we monitored in 2015-2017, for inclusion on the impaired waters list for chloride:

-Honey Creek
-South Branch Creek
-Indian Creek
-Brown Deer Creek
-North Branch Oak Creek
-Main Branch of the Oak Creek

However, we believe that 3 other creeks that we monitored should also be included on the 2018 list based on our chloride data:

-Beaver Creek (we observed 3 acutes and 2 chronic exceedances in 2017)
-Crestwood Creek (we observed 2 acute exceedances in 2017)
-Noyes Creek (we observed 3 acute exceedances in 2017).

We are not sure why these creeks were not included unless the data was too recent for the DNR's calculations. For your consideration, we are attaching two spreadsheets with data for these creeks—a clean version with the impairments listed and the raw data. We also support the listing of several of our creeks and rivers in the Milwaukee River Basin for phosphorus impairment as well as Noyes Creek for high water temperature.

As far as delistings, we question the removal of the Menomonee River (from river mile 24.82 to 30.14) for a phosphorus impairment. We have several sites for the Menomonee River in Washington County and they are all pretty patchy as far as complying with state standards for phosphorus. Also, we have questions on the proposed delisting for Underwood Creek (from mile 2.84 to 8.54) for an "unknown pollutant" causing biological impairment. Is this due to new biological data or new WisCALM guidance? This section of the Creek is also listed for several other impairments, so maybe this is an artifact of the old listing methodology?

Thank you for your consideration of these comments and let us know if you have any questions.

Best,

Cheryl

Cheryl Nenn
Riverkeeper

Milwaukee Riverkeeper
1845 N Farwell Avenue, Suite 100
Milwaukee, WI 53202

Direct: 414-287-0207 ext. 2
Main: 414-287-0207

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Beranek, Ashley E - DNR

From: Chris Bedwell <chris@chrisbedwell.com>
Sent: Monday, December 04, 2017 4:14 PM
To: DNR Impaired Waters
Cc: Chris Bedwell
Subject: 2018 impaired waters list

Dated 12/4/2017

Ms. Beranek,
My husband and I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO. However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." **We strongly disagree.** A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills. Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is the only water on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Regards,
Christine & Todd Bedwell
14703 W Highland Rd
Hayward, WI 54843

Chris Bedwell
chris@chrisbedwell.com
Mobile - 612.810.1949

Beranek, Ashley E - DNR

From: Chuck and Cindy <chalstenson@msn.com>
Sent: Thursday, December 07, 2017 12:18 PM
To: DNR Impaired Waters
Cc: 'David Benson <dlbens@yahoo.com> (dlbens@yahoo.com)'
Subject: Slim Lake

Hi,
I am the President of the Slim Lake Association and we have been very active with lake monitoring and education of our lake owners to help preserve SLIM lake over the last 20 years. We are surprised to see Slim lake added to the impaired lake listing this year.

We have noticed an increase in weeds and algae. Any information you can supply to us on the data you have collected on SLIM Lake would be appreciated.

Also any ideas on what we can and cannot do to help rid the weeds and preserve the Lake would be helpful.

We have an annual meeting the Saturday morning at 10AM of Memorial Day weekend and would love to have someone from your group come and discuss these issues with us. Please let me know your availability.

Thanks,

Chuck

Chuck Halstenson
Slim Lake Association
651-271-7259
1451 18th St NW New Brighton, MN 55112

Beranek, Ashley E - DNR

From: cynthia rost <rostcynthia@yahoo.com>
Sent: Wednesday, December 13, 2017 10:57 AM
To: DNR Impaired Waters
Subject: LCO

I am writing to reflect my full support of the proposed designation of the ENTIRE Lac Courte Oreillles lake by the WDNR as an Impaired Water due to low dissolved oxygen. I have owned property on LCO for 15 years and rented on the lake for another 61/2 years. I have seen such a change in the lake. The worst I saw was August of 2016 into Sept when so many fish were bloated and floating dead, even on my part of the lake. I live on the east side of Winters point and white fish were even dead and floating on my shore. We need to reflect the low dissolved oxygen as the cause so we can help the two-story fishery that LCO is.

Please amend the WDNR 2018 Impaired Waters listing to clarify the Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Thank you for your help.

Sincerely,

Cynthia Rost
14425 W LCO Dr

DALEIDEN & TREMAINE, LTD.
ATTORNEYS AT LAW
2815 NORTH DOUGLAS AVENUE
ARLINGTON HEIGHTS, ILLINOIS 60004
(847) 577-7438
FACSIMILE (847) 577-7458

CHICAGO OFFICE

130 WEST CANAL STREET
CHICAGO, ILLINOIS 60606

January 8, 2018

Via E-Mail
DNRImpairedWaters@wisconsin.gov
Ms. Ashley Beranek
DNR, Water Evaluation Section (WY/3)
Box 7921
Madison, Wisconsin 53707

Dear Ms. Beranek:

Recently, the Wisconsin Department of Natural Resources ("WDNR") included Lac Court Oreilles ("LCO") in its 2018 draft impaired waters list. Edmond C. Packee, Ph.D. is transmitting to you under separate cover comments upon such listing and a comprehensive report concerning LCO. The undersigned and others support Dr. Packee's comments and are most appreciative of his work concerning LCO. The Packee and Daleiden families have owned real estate in Bass Lake, Sawyer County, Wisconsin and have used and enjoyed LCO since the 1930's.

By way of overview, our position is that, although LCO is not impaired, it has been impacted by a combination of naturally-caused agents and human elements. Dr. Packee suggests that, in addition to other causes, LCO's issues are likely attributable to high water levels, lawn fertilization, blockage of drainage routes, and artificially smoothing seasonable water levels. He, also, questions the validity of samples that have been collected. Furthermore, according to Dr. Packee, neither the amounts of total phosphorous or dissolved oxygen nor temperature indicate that LCO is impaired.

At this stage, the listing of LCO as impaired is based upon various assertions, some of which may be valid and some of which probably are invalid. If, in fact, the lake is declared to be impaired, it is likely that, at least in the short run, property and business values will negatively be impacted. The worst case would be if LCO were declared to be impaired and property and business values (and taxation bases) decreased and nothing could be done to cure the lake and remove LCO from the impaired list. This would be the result, if for instance, lake impairment were attributable to something like climatic change as is suggested by a 2015 NASA/National Science Foundation study. Weather neither is a pollutant nor can it be controlled.

If lake impairment due to low dissolved oxygen ("DO") primarily were caused by climatic change, current LCO (exclusive of Musky Bay) phosphorous levels as a causal element might be immaterial. This may be the reason the WDNR referred to low DO in LCO as not being traceable to known pollutants. Simply, there are no pollutants present that cause low DO in LCO. The NASA/National Science Foundation study pointed out that "[a]s warming rates increase over the next century, algal blooms, which can rob water of oxygen, are projected to increase 20 percent in lakes."

If the proposal to list all of LCO as impaired is based on DO below 5mg/L, one is at a loss to determine the legal basis for the proposed listing. The Wisconsin Administrative Code, at s. NR 102.04(a), sets forth criteria for fish and aquatic life and sets the standard for surface waters to be 5mg/L, but additionally states that this criterion is not applicable for naturally caused conditions. "Natural conditions" are defined at s. NR 102.03(3) as "normal daily and seasonal variations in climate and atmospheric conditions, and the existing physical and chemical characteristics of a water or the course in which it flows." As pointed out above, if it is assumed that low DO exists in LCO as a whole, the reason would be climatic conditions, which are natural conditions within the meaning of the Administrative Code. Thus, it appears that neither the 5mg./L standard, nor any other standard, is contained in the Administrative Code that would be applicable to all of LCO at this time.

Lastly, it is noted that, in order to be statistically valid, relevant samples should be collected over the entire ice-free period, at random locations, and for a number of years. This does not seem to have been done.

Thank you for giving us the opportunity to comment on the proposed listing of LCO. Dr. Packee has indicated that he would be pleased to continue a dialogue with the WDNR and you should feel free to contact him.

Very truly yours,

Norbert A. Daleiden

Norbert A. Daleiden

Enclosures

DALEIDEN & TREMAINE, LTD.
ATTORNEYS AT LAW
2815 NORTH DOUGLAS AVENUE
ARLINGTON HEIGHTS, ILLINOIS 60004
(847) 577-7438
FACSIMILE (847) 577-7458

CHICAGO OFFICE
130 WEST CANAL STREET
CHICAGO, ILLINOIS 60606

March 21, 2018

Via E-Mail
DNRImpairedWaters@wisconsin.gov
Ms. Ashley Beranek
DNR, Water Evaluation Section (WY/3)
Box 7921
Madison, Wisconsin 53707

Dear Ms. Beranek:

The Wisconsin Department of Natural Resources ("WDNR") recently issued a document entitled "Lac Courte Oreilles, Sawyer County, Phosphorus Site-Specific Criteria Analysis, WDNR Technical Support Document. At Page 65, the WDNR states that it will submit to the U.S. EPA its draft list of impaired waters indicating that the main basins of Lac Courte Oreilles ("LCO") are impaired because of insufficient dissolved oxygen ("DO").

On January 8, 2018, we wrote to you and stated our agreement with Edmond C. Packee, Ph.D. (1) questioning the sampling underpinning the draft list and (2) suggesting that LCO is not impaired based on DO levels. We considered Dr. Packee's investigation and analysis and a NASA/National Science Foundation study and concluded that, if in fact LCO has low DO, it would be attributable to climatic change or, simply, weather. Weather, of course, cannot be controlled and it would be pointless to base any impairment listing on weather.

Furthermore, there is no legal basis for listing the main basins of LCO as impaired. The Wisconsin Administrative Code, at s. NR 102.04(a), sets forth criteria for fish and aquatic life and **sets the standard for surface waters to be 5mg/L, but additionally states that this criterion is not applicable for naturally caused conditions.** "Natural conditions" are defined at s. NR 102.03(3) as "normal daily and seasonal variations in climate and atmospheric conditions, and the existing physical and chemical characteristics of a water or the course in which it flows." As pointed out above, if low DO exists in LCO, the reason would be climatic conditions, which are natural conditions within the meaning of the Administrative Code. Thus, it appears that neither the 5mg./L standard, nor any other standard, is contained in the Administrative Code that would be applicable to the main basins of LCO. The proposed submission of the draft listing showing the main basins of LCO as impaired, therefore, is not sustainable as a matter of fact or law.

We would be please to further discuss this matter with the WDNR.

Very truly yours,

Norbert A. Daleiden

Norbert A. Daleiden

Beranek, Ashley E - DNR

From: Diebel, Matthew W - DNR
Sent: Tuesday, January 16, 2018 4:31 PM
To: David Neuswanger
Cc: Jason Neuswanger; Beranek, Ashley E - DNR
Subject: RE: Why is Teal Lake on Section 303(d) List of Impaired Waters?
Attachments: Teal_Lake_CHL.XLSX; Teal_Lake_CHL_contour_plots_gam1.pdf; Teal_Lake_CHL_contour_plots_gam2.pdf

Dave,

To address your suggestion that drought influenced the 2010-14 chlorophyll assessment, I conducted a new analysis of the drivers of chlorophyll concentration in Teal Lake. I have attached the dataset and some model plots for your reference.

First, I downloaded precipitation estimates for the coordinates of Teal Lake from the NLDAS model, which is basically interpolated from weather stations (see https://disc.gsfc.nasa.gov/information/tools/5792db848234e53e821073fd/hydrology-data-rods for details). I then calculated a running 1-year mean annual precipitation (which I called PRCP365 in the model). I chose a 1-year lag because this is approximately the hydraulic residence time of Teal Lake. A plot of PRCP365 shows a similar pattern to the Palmer Index, but is more specific to the location of Teal Lake and tailored to the appropriate lag period.

Next, I merged the CHL data from the deep hole station with potential driver data, including:

- TP – total phosphorus, primary limiting nutrient for algal production
- PRCP365 – running 1-year mean annual precipitation, to model effects of hydrologic conditions
- DOY – day of year, to model seasonal patterns
- DY – decimal year, to model long-term trends

I then fit two generalized additive models (GAMs, https://cran.r-project.org/web/packages/mgcv/mgcv.pdf) to the data. GAMs are a type of regression model that can represent non-linear relationships and interactions. There were not enough data points to include all four potential drivers in one model. Based on data plots, TP and DOY have strong effects on CHL, so I included those variables in both models and then added PRCP365 to model 1 and DY to model 2. Here are the model formulas:
gam1 = gam(log(CHL) ~ te(log(TP), DOY, PRCP365, k=3), data=data)
gam2 = gam(log(CHL) ~ te(log(TP), DOY, DY, k=3), data=data)

The best way to visualize the GAM models is through contour plots, which show the expected value of CHL as contour lines across ranges of two of the predictor variables, and holding other predictors constant at their median values. The circles are samples, where the size is proportional to log(CHL). The top plot in gam1 shows that CHL is highest at high values of TP and around day 240 (end of August), which is not surprising. The key result in gam1 is shown in the next two plots, which show that PRCP365 has essentially no effect on CHL after controlling for TP and DOY. If anything, CHL actually decreases during drought in late summer into fall after controlling for TP. The gam2 plots suggest that there may have been a modest increase in CHL over the last 23 years, when controlling for TP and DOY.

The bottom line of this analysis is that precipitation doesn't appear to have a strong enough effect on CHL to warrant excluding data from drought years in the assessment. I know my interpretation conflicts with your personal observations and familiarity with the lake. There are certainly other ways that this analysis could be done, but to be honest, I can't afford to spend more time on this given other priorities.

One more thing – Teal Lake is actually classified as a shallow drainage lake based on the Lathrop/Lillie equation in WisCALM, so the TP criterion is 40 ug/L. The CHL criterion that was used for both recent assessments applies to all shallow lakes.

Best regards,
Matt

Matthew Diebel
Phone: (608) 266-1494
Matthew.Diebel@Wisconsin.gov

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From: David Neuswanger [mailto:dneuswanger@gmail.com]
Sent: Tuesday, January 09, 2018 7:03 AM
To: Diebel, Matthew W - DNR <Matthew.Diebel@wisconsin.gov>
Cc: Jason Neuswanger <jasonneuswanger@gmail.com>; Beranek, Ashley E - DNR <Ashley.Beranek@wisconsin.gov>
Subject: Re: Why is Teal Lake on Section 303(d) List of Impaired Waters?

Matt,

Thanks so much for your patient and clear explanation of the statistical methods and other decision criteria used to classify Teal Lake as impaired for the 2018 assessment cycle using 2012-2016 data. Previously I was unaware that the "burden of proof" so to speak, from an hypothesis-testing standpoint, would be to establish 90% confidence that the lake was no longer impaired. (Actually, I was unaware that Teal Lake had ever been listed as impaired prior to the recent announcement.) I can see how this would alter the statistical outcome slightly, leading to the conclusion that Teal Lake not be removed from the list. We won't re-run the statistical analysis to confirm; I trust that you applied the test correctly to the data selected for use.

I think we now both agree that the only remaining question is whether data from the drought year of 2012 should have been used or excluded from analysis. The attachment to this message includes a graph of the Palmer Drought Severity Index over time, clearly showing that 2012 was a year of moderate to severe drought. I submit that 2012 is not representative of current conditions, and therefore should be excluded from the dataset used to determine impairment status. Furthermore, you will see from the graph that we had many severe drought years in the time period leading up to 2012, which would have biased the phosphorus and Chorophyll-*a* data higher during the 2010-2014 assessment cycle that you stated was the basis for initial determination of impairment. I remember that time period vividly, because all the small wetlands viewable from commonly traveled roadways in northeastern Sawyer County were dried up. Teal Lake was uncharacteristically clear (Secchi disk visibility of 10 feet during a spring 2010 electrofishing survey in a lake with typical spring readings of 4 feet or less due to tannin stain). Even the fish community was showing signs of change in thermal-optical habitat -- favoring largemouth bass survival over walleye recruitment. I think it can be argued that most of the 2010-2014 assessment period was uncharacteristic due to years of cumulative drought impact on inflows and nutrient dynamics. It took years for our local wetlands and the groundwater table to recharge and return to normal. Based on these observations and documented weather data, I think it would be reasonable and appropriate to assess Teal Lake's impairment status using only data from the four-year, stand-alone period of 2013-2016, with the null hypothesis being "no impairment" because the entire assessment cycle of 2010-2014 was not representative.

Finally, please read the last paragraph in the attachment to see why I think Teal Lake often functions more like a shallow seepage lake than a drainage lake, which would make quite a difference in the assessment process.

That's my final argument (I think!). Thanks again for your patience in bringing me up to speed on the process, and for considering my case for not listing Teal Lake as an impaired water for recreational use. I'll look forward to your final reply.

Dave

On Mon, Jan 8, 2018 at 5:04 PM, Diebel, Matthew W - DNR <Matthew.Diebel@wisconsin.gov> wrote:

David,

Thank you for the detailed analysis and explanation. Your (and Jason's) stats look good, so any disagreements I make below are based on interpretation. Please see my responses below in red.

Matt

Matthew Diebel
Phone: (608) 266-1494
Matthew.Diebel@Wisconsin.gov

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From: David Neuswanger [mailto:dneuswanger@gmail.com]
Sent: Friday, January 05, 2018 7:47 AM
To: Diebel, Matthew W - DNR <Matthew.Diebel@wisconsin.gov>
Cc: DNR Impaired Waters <DNRImpairedWaters@wisconsin.gov>; Jason Neuswanger <jasonneuswanger@gmail.com>
Subject: Re: Why is Teal Lake on Section 303(d) List of Impaired Waters?

Hello Matt,

Thanks for your thoughtful and helpful reply. I have no doubt that you have given careful and competent consideration to the assessment of trophic state in Wisconsin lakes. With the information you provided (including the Gibbons paper and T-distribution table), we were able to duplicate your statistical analysis and determine the basis for our conflicting conclusions regarding the impairment of Teal Lake under WDNR criteria. I had advanced statistical training in graduate school, but I am a little rusty, so I enlisted the aid of my son, Dr. Jason Neuswanger, who currently works as

a quantitative fish ecologist with South Fork Research near Seattle, Washington (full CV). We used Wolfram Mathematica 11.0 instead of R, but I think you'll agree that both packages produce credible results.

First, a point of clarification... In the 3rd paragraph of your response, you wrote, "the mean TP for 2012-16 assessment periods (July 15 – Sept 15) was 19 ug/L, with a SD of 8 ug/L." I have assumed you were referring to Chlorophyll-*a* here, and not Total Phosphorus (TP). Yes, I meant chlorophyll-a there. But this statement was helpful, as was a later statement about your low sample size of 10, because it revealed you were using only data from July and August during the 2012-2016 assessment period. Previous correspondence with Ashley indicated her belief that WDNR was using all available data, including data collected in late June during all five years. I do not understand why these data would be excluded from such an analysis, because late June is clearly within the phytoplankton production and human recreation seasons. The assessment period for chlorophyll is July 15-Sept 15. This period was selected because many lakes have a clear-water phase in June (see footnote 13 on page 24 of 2018 WisCALM). Regardless, we calculated the likelihood of impairment both ways -- with and without data from late June.

With both sets of data, we tested the null hypothesis that the true 30th percentile of the estimated population distribution of Chlorophyll-*a* concentration was at or below the 20 ug/L threshold level for impairment (see attached PDF for detailed analysis and graphics). Using July-August data only, it was a close call; but the lower bound of the 90% confidence interval was slightly lower than the threshold level, making it impossible to reject the null hypothesis and declare the lake impaired. This is the correct conclusion based on 2012-16 data only. However, the previous assessment, which was based on 2010-14 data, found clear impairment (see Ashley's email below). The way our listing/delisting works is that a waterbody is listed when the null hypothesis of "no impairment" is rejected at a 90% confidence level. Once a waterbody is listed as impaired, the null hypothesis becomes "impairment", and it can only be delisted when this hypothesis is rejected at the 90% confidence level. So the original impairment listing for Teal Lake was based on the 2010-14 data, and the subsequent assessment, though more ambiguous, did not allow for delisting. Adding late-June data to the analysis, the decision was not close. The lower bound of the 90% confidence limit on the 30th percentile was 15.45 ug/L -- far below the impairment threshold.

For the sake of argument, let's assume that omitting data from late June can be justified, and that differences in statistical packages or rounding errors could have resulted in a slightly different lower bound for the 90% confidence interval, resulting in a conclusion of impairment. Even with these allowances, I would use several other facts, as encouraged by WisCALM guidance, to arrive at a conclusion of no impairment:

1) Among the 15,000 lakes and impoundments in Wisconsin, Teal Lake is one of only 103 to have "Outstanding Resource Water" (ORW) status under NR 102.10, Wisconsin Administrative Code. As you know, ORWs are lakes, streams, or flowages having excellent water quality, high recreational and aesthetic value, high quality fishing (naturally reproducing populations of walleye and muskellunge in this case), and are free from point-source pollution. Between 1992 and 2016, Carlson's Trophic State Index (TSI; Carlson 1977) has ranged between 45 and 60, allowing us to classify Teal Lake as slightly eutrophic. There has been no detectable upward or downward trend in TSI regardless of the metric used to calculate it during the past 24 years at Teal Lake (http://dnr.wi.gov/lakes/clmn/reports/tsigraph.aspx?stationid=583055)." As I mentioned below, the listing in 2016 was not based on a change in water quality in Teal Lake, but rather the implementation of a new assessment procedure for chlorophyll a.

2) Our 2016 aquatic plant survey revealed that Teal Lake has one of the highest Floristic Quality Indexes (FQI = 35.3) of any lake in northern Wisconsin (FQI average = 28.3). Such a healthy macrophyte community would not likely exist in a lake plagued by nuisance algae blooms during the summer season.

3) We seem to agree that Total Phosphorus concentrations in Teal Lake have been well below a level that would raise concerns about recreational impairment. With June data included, mean [Total P] = 27.8 ug/L with 90% confidence interval bounds at 24.8 and 30.7 ug/L. I'm sure you're aware that phosphorus is the primary limiting nutrient to phytoplankton production in most lakes, and that [Total P] is highly correlated with [CHL-*A*] in most lakes, making excessive Chlorophyll-*a* highly unlikely and contradictory to other metrics. Most lakes would probably not exhibit nuisance algal conditions with TP in that range, but there is variability in chlorophyll production per unit phosphorus among lakes. The attached plot shows the TP:CHL relationship for all Wisconsin lakes for which we have at least 2 years of summer data. At ~30 ug/L TP, the range of mean chlorophyll is <5 to >20 ug/L, which would put Teal Lake near the upper edge of the data cloud. While the TP criterion of 40 ug/L is sufficient to prevent nuisance algal conditions in many shallow lakes, there are some lakes where a site-specific criterion might be needed. As with the TP criteria, the chlorophyll recreational impairment threshold was determined by evaluating relationships between user perception of water quality and chlorophyll across many lakes and identifying a level that should prevent perception of water quality problems by most people. In some lakes, this may be "too protective". In these cases, a higher site-specific criterion for chlorophyll may be proposed that documents that recreational uses are supported at current chlorophyll levels. The Department is currently developing administrative rules that will outline this process.

4) Finally, 2012 was a year of moderate to severe drought based on the Palmer Drought Severity Index, following several years of severe drought. That year, Teal Lake was functioning more like a seepage lake than a drainage lake. Secchi disk transparency was twice the usual depth because there was so little inflow from the wetland watershed that normally contributes tannins to stain the water a light brown color. WisCALM (page 8) states the following: "Best professional judgment may be used to determine whether data were collected from an extreme weather year and are considered unrepresentative of normal conditions. Information that is not considered representative of current conditions or was not collected according to WDNR's Quality Management Plan cannot be used in preparation of the Impaired Waters List." Therefore, under WDNR guidelines for assessment, it can be reasonably argued that 2012 data be excluded from this analysis, in which case even your July-August dataset would not come close to yielding a conclusion of impairment based on Chlorophyll-a concentration. You make a good point here. I will look into the implications of excluding the 2012 data and get back to you.

Matt, I am attaching a table (PDF) produced in Word that shows all the 2012-2016 data, some basic statistical analyses using the threshold concentration method (not the method you used to determine impairment based on Chlorophyll-*a*), and the Palmer Drought Severity Index from each year of data collection. I have checked and re-checked the numbers, so I think you can rely upon their accuracy as you consider my arguments.

Please mull this over, discuss with Ashley, and let me know if there is any way WDNR can withdraw Teal Lake from the List of Impaired Waters based on the information and rationale I have presented here. I know how busy you are, and how difficult it is to painstakingly analyze data from individual waters in a state like Wisconsin with thousands of waters to classify. But I know it will mean a lot to the people I serve that Teal Lake not be listed without good cause as an impaired water. Real estate values, tourism, and general peace of mind are all at stake here. Thanks in advance for any attention/resolution you can provide.

Dave Neuswanger

President, Quiet Lakes Improvement Association

715-462-4485

On Tue, Jan 2, 2018 at 5:17 PM, Diebel, Matthew W - DNR <Matthew.Diebel@wisconsin.gov> wrote:

Dave,

Ashley asked me to respond to your stats questions since I selected the method that is described in WisCALM.

The attached paper describes the method. Figure 1 sums it up, except that we are estimating the 30th percentile of chlorophyll a concentration, and using a 90% confidence interval.

In the case of Teal Lake, the mean TP for 2012-16 assessment periods (July 15 – Sept 15) was 19 ug/L, with a SD of 8 ug/L. Since the mean is only a fraction of 1 SD below the "nuisance" level (20 ug/L), the best estimate of the nuisance frequency is near 50% (45%). This is just a quantile of the T distribution.

To estimate the confidence interval around this value, we need to include K, the one-sided normal tolerance limit factor, in equation 1 in the Gibbons paper. K is a function of sample size, confidence level, and the desired quantile of the normal distribution, which makes for a large lookup table that I generated in R for this purpose (attached). Given that the best estimate of the nuisance frequency is 45% and the sample size is fairly low (10), it seems reasonable that the 90% confidence interval is 26-66% in the 2018 assessment.

I am confident in this quantitative assessment of chlorophyll in Teal Lake – whether or not this trophic state is viewed as a problem by users of Teal Lake is another question. I can imagine that that the recent listing might be alarming given that the long monitoring record shows no significant changes, but this is just because the assessment methods changed. User perception of primary production in lakes depends not just on the amount of chlorophyll, but also macrophyte composition and spatial distribution, the presence/ absence of algal scums, and other visual aspects of water quality. As you suggest, the experience of change over time (or lack of change) probably contributes to the perception of whether or not water quality is impaired. It would be great if we could account for all of those factors in assessing each lake, but that would involve a lot of subjectivity, and probably could not be justified.

QLIA should feel welcome to comment on these assessment methods when the next draft is released for public comment.

Best regards,

Matt

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From: David Neuswanger [mailto:dneuswanger@gmail.com]
Sent: Wednesday, December 27, 2017 11:49 AM
To: DNR Impaired Waters
Subject: Fwd: Why is Teal Lake on Section 303(d) List of Impaired Waters?

Ashley.... my apologies! I inadvertently hit the SEND key before completing my message! Please see where I have resumed my question below...

Dave

---------- Forwarded message ----------
From: **David Neuswanger** <dneuswanger@gmail.com>
Date: Wed, Dec 27, 2017 at 11:18 AM

Subject: Re: Why is Teal Lake on Section 303(d) List of Impaired Waters?
To: DNR Impaired Waters <DNRImpairedWaters@wisconsin.gov>

Hello Ashley,

Thanks for sharing the Department's rationale for listing Teal Lake as an impaired water for recreational use purposes. I do, however, have a follow-up question regarding the statistical analysis. (I have quite a bit of grad school training in limnology and advanced statistical methods, so please feel free to use technical jargon in your response for the sake of efficiency.)

I went online and read the incredible document that you apparently coordinated, entitled "Wisconsin 2014 Consolidated Assessment and Listing Methodology (WisCALM) -- Clean Water Act Section 305(b), 314, and 303(d) Integrated Reporting." Production of that document had to be a herculean effort by you and several former colleagues of mine who were involved in the process. In general, WisCALM helped me to understand the scope, complexity, and detailed processes for listing Wisconsin waters for one reason or another in compliance with provisions of the Clean Water Act.

However, I remain confused about the process for calculating mean (or median?) Chlorophyll *a* concentration, and the 90% CI on that test statistic (mean or median). Please refer to Section 4.5 on Lake Impairment Assessment for Recreational Use purposes (starting on page 33 of document or 39 of PDF). I will copy/paste the relevant paragraphs in bold-font text below:

Calculating percent days with nuisance algal blooms and confidence intervals for Chl a

The assessment protocol for determining if Chl a is exceeding a recreational use threshold is significantly different in 2014 than it was in 2012. In 2012, the threshold was a concentration threshold, similar to that used for TP. For 2014, the protocol has been changed to better reflect actual impairments of recreational uses, and to better capture the variability of chlorophyll in lakes. The protocol now uses the percent of days during the sampling season that a lake experiences nuisance algal blooms as its benchmark for assessments. Nuisance algal blooms are defined as exceeding 20 ug/L Chl a. This was defined based on user perception surveys conducted in Minnesota. For deep lakes, the impairment threshold is 5% of days of nuisance algal blooms during the sampling season. For shallow lakes, the impairment threshold is 30% of days of nuisance algal blooms during the sampling season.

For Chl a recreational use assessments, the same protocols apply for data selection and calculating a grand mean as those described for chlorophyll in Chapter 4.4 Lakes Fish & Aquatic Life. However, the following statistical formula replaces that found under the subheader "Calculate confidence intervals for TP REC & FAL, & Chl FAL.

The statistical formula for Chl a recreational assessments determines the frequency that a lake exceeds a specific chlorophyll threshold, and also calculates the 90% confidence interval. This formula is difficult to run manually but can be done through use of a programming package such as "R" (http://www.rproject.org/). Use the following procedure to calculate the percent of days a lake is exceeding 20 ug/L chl a (P):

1. Using the chlorophyll sample values, calculate 20 - mean/standard deviation (*formula format did not copy precisely from document)*, where is the sample mean and σ is the sample standard deviation.

2. Using the T table provided by the department21, for each confidence level (lower 90%, Tlow; median, Tmed; and upper 90%, Thigh), and for the appropriate value of n (number of samples), find the value of T that is closest to the one calculated in step 1.

3. Report the value of P that is associated with the value of T that was selected in step 2.

In the absence of meeting minimum data requirements (for instance, nearshore data are available but not from the deep station), the professional judgment of the Regional Biologist should be used to consider listing any waterbody that experiences frequent and severe algal blooms where there is strong reason to believe that designated uses are impaired and nutrient levels may be contributing to such blooms. Information such as taste and odor complaints, documentation of toxin-producing blue-green algae genera, and algal cell counts can be used as justification for impairment determinations based on best

professional judgment.

Now for my question: In the first paragraph, it is clear that in 2014 you stopped using a concentration threshold for CHL *a* (20 ug/L in this case) and started using an exceedance-frequency threshold (30% of days during which CHL *a* exceeded 20 ug/L). However, the text that follows (from WisCALM above) seems to describe the former procedure for determining whether a concentration threshold was exceeded by using a simple one-tailed t-test. Did the actual procedure for calculating a 90% CI for this single-ratio statistic (which I assume is a far more complex statistical procedure involving bootstrap re-sampling, etc.) get omitted during document revision when your analytical protocol for CHL *a* changed in 2014? If so, could you share the actual statistical procedure with me for calculating a mean (or median?) exceedance frequency and the 90% CI on that mean (or median)? I tried to imagine how this was done, but I kept getting different (and lower) numbers than presented in your original reply.

For the 2018 assessment cycle, I have assumed you used volunteer water quality monitoring data collected by Past-President Jack Wellauer as it appears in the SWIMS database (June, July, and August samples during each summer for the five-year period from 2012 through 2016 -- a total of 15 samples. If I am not using the same data as you, please let me know.

Thanks in advance for any clarification you can provide. Before I even consider challenging the listing, I need to know that we are applying clearly understood statistical procedures to the same set of data.

Dave Neuswanger

President, Quiet Lakes Improvement Association

On Fri, Dec 8, 2017 at 2:39 PM, DNR Impaired Waters <DNRImpairedWaters@wisconsin.gov> wrote:

Hi David,

Teal Lake was listed in 2016 for Excess Algal Growth based on our criteria for chlorophyll-*a* (algae) under Recreational Use. Recreational Use covers swimming, fishing, and boating – uses where people will come in contact with the water. The algal criteria for recreation is that the lake does not exceed 20 ug/L chlorophyll-*a* (moderate algal levels) more than 30% of days. This criteria is an indicator of aesthetic suitability for swimming in the summer and is an approximate measure of safety.

To measure against the criteria of 30% of days a confidence interval (CI) around the mean is used. This is so that we're 90% sure that the mean is above or below the criteria. These are the Teal Lake values derived for 2016 and 2018:

Assessment Cycle	Data Used	Lower 90th CI	Mean	Upper 90th CI
2016	Jul 2010 – Aug 2014	40%	60%	79%
2018	Jun 2012 – Aug 2016	26%	45%	66%

In 2016 all three values were above the criteria of 30% so an impairment listing of 'Excess Algal Growth' with ' Unknown Pollutant' was added. In 2018 the lower 90th CI was below the criteria, but the mean and Upper 90th CI were still above. The lake isn't eligible for delisting until all three values are under 30%. The listing has an 'Unknown' pollutant because phosphorus levels in Teal Lake are clearly below the listing threshold of 40 ug/L of phosphorus.

Even though the lake is now listed as impaired it is still okay to use and enjoy. As people have done on the lake before, follow common-sense precautions for safety when recreating. For a good rule of thumb, if you can wade knee-deep into water (without disturbing the sediment) and cannot see your feet because the water is green and opaque, you should stay out, and small children and dogs should be kept away from the water. If knee-deep water has good clarity, it's safer for swimming, but if there is a light dusting of blue-green algae on the surface it's more of a judgment call for you, since dogs won't hesitate to swallow water while retrieving.

- Choose locations without noticeably green water for swimming, because wind can concentrate blue-green algal blooms into near-shore areas. Do not swim in water that looks like "pea soup", green or blue paint, or that has a scum layer or puffy blobs floating on the surface.

- Do not boat, water ski, etc. over that looks like "pea soup", green or blue paint, or that has a scum layer or puffy blobs floating on the surface (people can be exposed through inhalation).

- Do not let children play with scum layers, even from shore.

- Always offer fresh, clean water for pets to drink. Do not let pets swim in, or drink, waters experiencing blue-green algae blooms or noticeably green water.

- Always take a shower after coming into contact with any surface water (whether or not a blue-green algae bloom appears to be present; surface waters may contain other species of potentially harmful bacteria and viruses).

- Pets should be washed off immediately after swimming, before they groom.

- Always avoid swallowing untreated surface water – it may contain pathogens other than blue-green algae which could make you ill.

Thank you for letting us know about your concerns and please let me know if there is any other information I can provide.

Best wishes,

Ashley

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Ashley Beranek
Integrated Report Coordinator

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From: Smith, Alex R - DNR
Sent: Thursday, December 07, 2017 7:33 AM
To: DNR Impaired Waters
Subject: FW: Why is Teal Lake on Section 303(d) List of Impaired Waters?

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Alex Smith

Phone: (715) 635-4124

Alex.Smith@wisconsin.gov

From: David Neuswanger [mailto:dneuswanger@gmail.com]
Sent: Thursday, December 7, 2017 6:11 AM
To: Hagen, Cherie L - DNR <Cherie.Hagen@wisconsin.gov>
Cc: Smith, Alex R - DNR <Alex.Smith@wisconsin.gov>; Gail Nicholson <gailnicholsonjd@gmail.com>; Gayle Little <glittle_dtp@yahoo.com>; Norm Bratteig <bratteig@centurylink.net>; Steve Fiala <stevefialasf@gmail.com>
Subject: Why is Teal Lake on Section 303(d) List of Impaired Waters?

Hello Cherie,

It has been more than three years since our paths last crossed when I was still working at the Hayward Service Center, so I hope all is well for you and your family. After I retired in July of 2014, my family purchased a cabin on Lost Land Lake (connected to Teal Lake by navigable channel) east of Hayward. I became involved with the Teal, Lost Land, and Ghost Lakes Improvement Association, Inc. (a.k.a. the Quiet Lakes Improvement Association, or QLIA). Currently I serve as President of QLIA and technical editor for our new website at www.quietlakes.org. Others copied on this message include Alex Smith (who has helped us with APM planning and HEWM control efforts) and other members of QLIA's Executive Committee.

Recently our Treasurer, Gayle Little, forwarded to me the attached newspaper clipping from the Sawyer County Record, which stated that Teal Lake is on the list of Impaired Waters submitted by WDNR to EPA in compliance with reporting procedures under Section 303(d) of the Clean Water Act. Until now, I was unaware that Teal Lake appeared on this list. Gayle and others were alarmed to see it in the newspaper, which did not specify the reason for the Impaired Waters listing. I initially speculated it was because of methyl mercury concentrations in sport fish -- similar to nearby Ghost Lake, which is part of our association. But after reviewing the attached detailed listing downloaded from WDNR's website, I see that Teal Lake is listed because of an "Unknown Pollutant" from an unknown source or sources that has resulted in "Excess Algal Growth."

The "Excess Algal Growth" rationale for listing is perplexing to me. We have over 20 years of volunteer water quality monitoring data (facilitated by WDNR) showing that nothing has changed in Teal Lake's meso-eutrophic state for more than two decades. Furthermore, our 2016 aquatic plant survey revealed Teal Lake has one of the highest Floristic Quality Indexes (FQI = 35.3) of any lake in northern Wisconsin (FQI average = 28.3). These are contra-indicators of "Excess Algal Growth," and I have seen no evidence (science-based or anecdotal) to suggest that Teal Lake is "impaired" in any way. In fact, I believe it is one of the healthiest aquatic ecosystems I have seen in northwestern Wisconsin. Below are two paragraphs that appear in the background section of our updated and approved 2017 Aquatic Plant Management Plan:

"Among the 15,000 lakes and impoundments in Wisconsin, Teal Lake is one of only 103 to have “Outstanding Resource Water” (ORW) status under NR 102.10, Wisconsin Administrative Code. An ORW is a lake, stream, or flowage having excellent water quality, high recreational and aesthetic value, and high quality fishing. ORWs are free from point-source pollution. As a citizen volunteer working in cooperation with WDNR, QLA Past-President Jack Wellauer has recorded observations and collected surface water samples for laboratory analysis from the “deep hole” on Teal Lake since 2002 when he assumed the volunteer duties begun by Mary Witt in 1992. Between 1992 and 2016, Carlson’s Trophic State Index (TSI; Carlson 1977) has ranged between 45 and 60, allowing us to classify Teal Lake as slightly eutrophic. (A “mesotrophic” lake of mid-range productivity would exhibit a TSI ranging between 40 and 50.) There has been no detectable upward or downward trend in TSI regardless of the metric used to calculate it during the past 24 years at Teal Lake (http://dnr.wi.gov/lakes/clmn/reports/tsigraph.aspx?stationid=583055)."

"The slightly eutrophic status of Teal Lake was consistently predicted by all three metrics used to calculate TSI. Over the past 10 years (2007 through 2016), the average annual July-August ranges for these metrics were 4.7 to 8.6 feet for Secchi disk transparency (depth at which a black-and-white disk disappears from view at the surface), 26.4 to 34.2 micrograms per liter for total phosphorus concentration (the limiting nutrient for planktonic algae production), and 12.7 to 21.5 micrograms per liter for chlorophyll *a* concentration (direct indicator of ongoing production by planktonic algae)."

In light of existing data, I am asking that WDNR examine Teal Lake's 303(d) listing to determine if it is appropriate. If there is more to this story than meets the eye, please share the rationale for listing so I can explain it to our Executive Committee and members. People are understandably concerned about their health and property values when an official document classifies their lake as "impaired," so we need to be able to either justify the listing, or suggest that an error be corrected. Thanks in advance for whatever you can do to help us resolve the status of this Outstanding Resource Water.

Dave Neuswanger

President, QLIA

715-462-4485

DNR lists county lakes that are impaired by pollution

BY **TERRELL BOETTCHER**
NEWS EDITOR

Two new Sawyer County lakes are among those included in an updated list of "impaired" lakes and streams published by the Wisconsin Department of Natural Resources (DNR), due to excess phosphorus, algae growth, mercury or other contaminants.

The two Sawyer County lakes included are the entire 5,139-acre Lac Courte Oreilles (previously only Musky Bay was listed as impaired) and Lake of the Pines in the Town of Winter.

Sawyer County lakes that continue to be included on the impaired list are Upper Holly, Loretta, Teal, Two Axe, Mud (connected to Callahan Lake), Moose Lake, Nelson Lake, Black Lake, Lake Chetac, Lake Loretta, Big Sissabagama and Windigo.

Washburn County impaired waters include Slim Creek and Slim Lake south of Stone Lake and Trego Lake.

Bayfield County impaired waters include Upper and Middle Eau Claire Lakes. Also listed is Lower Eau Claire Lake in Douglas County.

One area lake was removed from the impaired list: Lake Namekagon in Bayfield County.

The DNR is seeking comments from the public on the impaired waters, stating it is working to identify new waterways to target for pollution reduction plans.

"Long-term trend and satellite monitoring show that we are making progress with good overall water quality," said Sharon Gayan, director of the DNR Water Quality Bureau. "Wisconsin waters stay healthy through combined efforts, including strong partnerships with citizens, lake associations, local government, permit holders and others implementing practices that protect and restore waters of the state. "However, through expanded monitoring, we've identified lakes and rivers where more work is needed to improve water quality for fish to thrive and for people to enjoy them recreationally."

Over the past five years, Gayan said the DNR has completed assessments on more than 6,000 additional waterways. The vast majority, more than 80 percent of assessed waters, are in good condition, she said.

The impaired list identifies waters that need additional management attention, Gayan said. A majority of these new listings are for lakes or river stretches that exceed new, more restrictive phosphorus standards that took effect in December 2010.

Many of these new phosphorus listings are in areas with restoration plans already in development and were waters that previously had never been assessed for phosphorus, Gayan said.

"The listing does not necessarily mean that phosphorus levels in these waters got worse," she said. "Phosphorus levels may be improving in some, but not enough yet to meet these new standards."

Gayan added that listing waters as "impaired" requires the state to develop restoration plans for them and also may make them eligible for state and federal cleanup funds, which can help speed improvements.

Public comments may be submitted by Dec. 29, and can be emailed to the DNR at DNRImpairedWaters@wisconsin.gov, or sent by U.S. mail to Ashley Beranek, DNR Water Evaluation Section (WY/3), Box 7921, Madison, WI 53707. Comments postmarked or received by Dec. 29 will be considered before submitting the final draft list to the U.S. Environmental Protection Agency for approval.

The Impaired Waters List is submitted to the U.S. Environmental Protection Agency every even-numbered year under Section 303(d) of the Clean Water Act. The department follows standard procedures to assess water bodies against water quality standards, these are known as Wisconsin Consolidated Assessment and Listings Methods (WisCALM).

The 2018 list and other materials can be found by searching the DNR website, dnr.wi.gov, for keywords "impaired waters" and clicking on the link for the "2018 impaired waters list."

Solar group buying meeting set in Cable

A group buying meet- accessible in Ashland and

Teal Lake chlorophyll data, 2012-2016

Calculations done in Wolfram Mathematica 11.0.

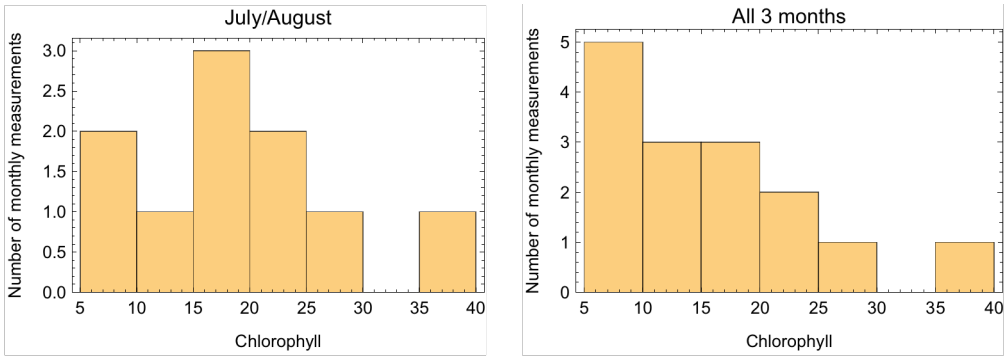
In[42]:=
```
data = {8.57, 19.5, 9.97, 5.95, 6.07, 25.4, 5.02, 17.7, 18.5,
    12.3, 12.1, 23.9, 10.4, 21.0, 35.4}; (* June, July, and August *)
```

In[43]:=
```
jaData = {19.5, 9.97, 6.07, 25.4, 17.7, 18.5, 12.1, 23.9, 21.0, 35.4};
(* July and August only *)
```

The histograms below shows that the July/August distribution is not too far from normality. However, if we include June, the distribution is nonnormal and skewed low.

In[69]:=
```
juneHist = Histogram[jaData, 6, Axes → False, Frame → True,
    FrameLabel → {"Chlorophyll", "Number of monthly measurements"},
    PlotLabel → "July/August", ImageSize → 250];
all3Hist = Histogram[data, 6, Axes → False, Frame → True,
    FrameLabel → {"Chlorophyll", "Number of monthly measurements"},
    PlotLabel → "All 3 months", ImageSize → 250];
Row[{juneHist, Spacer[20], all3Hist}]
```

Out[71]=



Analysis of Teal Lake Chlorophyll-a data relative to impairment standard

Table values were provided by Matt Diebel for equation (1) of Gibbons 2003. The Tlow/Tmed/Thigh values are plugged into the equation as K, and "p" in this case represents the percentile of interest (30th, as measured from the upper end of the distribution). These values were calculated with alpha=0.10 to generate 90 % confidence intervals.

N,	p,	Tlow,	Tmed,	Thigh
10,	0.3,	0.004368896,	0.539878723,	1.256779108

July/August sample mean and SD:

In[45]:=
```
jaMean = Mean@jaData
```
Out[45]=
```
18.954
```

In[46]:=
```
jaSD = StandardDeviation@jaData
```
Out[46]=
```
8.40922
```

Sample mean and SD for all 3 months:

In[47]:=
```
overallMean = Mean@data
```
Out[47]=
```
15.452
```

In[48]:=
```
overallSD = StandardDeviation@data
```
Out[48]=
```
8.6231
```

Plotting function to use below:

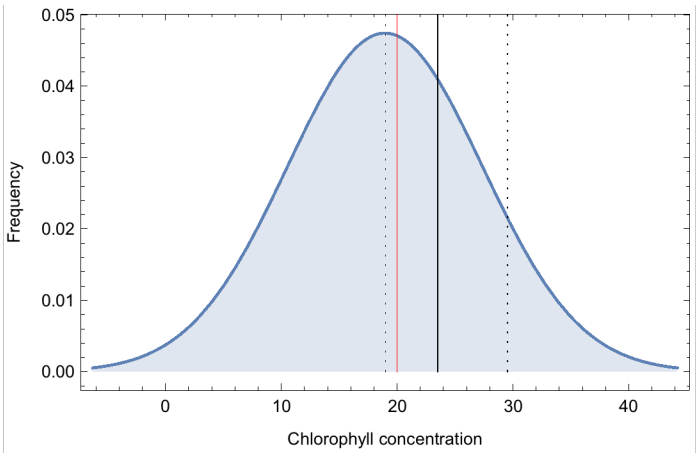
In[52]:=
```
PlotDistribution[tlow_, tmed_, thigh_, u_, sd_] := Module[{plow, pmed, phigh},
  plow = u + sd * tlow;
  pmed = u + sd * tmed;
  phigh = u + sd * thigh;
  Plot[PDF[NormalDistribution[u, sd], x], {x, u - 3 * sd, u + 3 * sd},
   Epilog →
    {Red, Line[{{20, 0}, {20, 0.05}}], Black, Line[{{pmed, 0}, {pmed, 0.05}}],
     Dotted, Line[{{plow, 0}, {plow, 0.05}}], Line[{{phigh, 0}, {phigh, 0.05}}]},
   Filling → Axis, Axes → False, Frame → True,
   FrameLabel → {"Chlorophyll concentration", "Frequency"}]
 ];
```

Testing the July/August data

In an attempt to duplicate your analytical methods, we tested the null hypothesis that the true 30th percentile of the estimated population distribution (black vertical line in the graphs below, as estimated from the sample distribution) of Chlorophyll-a concentration is at or below the nuisance level of 20 μg/L (red line below). If we reject the null hypothesis (i.e., if the red line falls below the dotted confidence limits of the 30th percentile), then the lake would be deemed impaired.

Because the red line actually falls within the 90% confidence limits of the 30th percentile, we cannot reject the null hypothesis; and therefore Teal Lake should not be considered impaired based on WDNR criteria and methodology. Perhaps minor rounding errors or use of a different statistical package led you to a different conclusion, because the impairment level is fairly close to the lower end of the 90% CI. In this case, WDNR has the authority to exercise judgement (as encouraged in several paragraphs in WisCALM) by looking at other factors that either would, or would not, support a conclusion of impairment. Numerous other factors suggest that Teal Lake water quality is not impaired (see cover message that accompanies this attachment).

```
PlotDistribution[0.004368896, 0.539878723, 1.256779108, jaMean, jaSD]
```



What if we included June data?

If we include June data, the lower bound of the 90 % confidence limit on the 30th percentile is 15.5 μg/L, far below the nuisance threshold, meaning we very clearly cannot reject the null hypothesis that the lake is not impaired at the 90 % confidence level.

The assumption of normality behind this analysis is not valid in this case (because the histograms above show the data to be skewed low when June is included), but accounting for this would only make the lake even less likely to meet the impairment standard.

In[53]:=
```
PlotDistribution[0.004368896, 0.539878723, 1.256779108, overallMean, overallSD]
```

Out[53]=

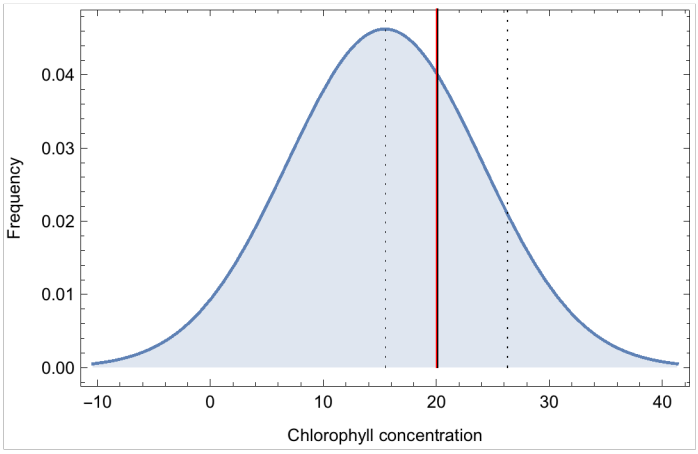


Table 1. Concentrations (micrograms per liter, or parts per billion) of Chlorophyll-*a* and Total Phosphorus at the "deep hole" station in Teal Lake (a shallow drainage lake) in Sawyer County, Wisconsin from June 2012 through August 2016 – WDNR's 2018 assessment cycle for Section 303(d) listing. Water samples were collected monthly during the summer monitoring season by citizen volunteer Jack Wellauer (Past-President of the Quiet Lakes Improvement Association). Results are transcribed from Wisconsin DNR's SWIMS database at https://dnrx.wisconsin.gov/swims/public/reporting.do?type=10&action=post&stationNo=583055&year1=2016&format=html.

Sample Dates within Wisconsin DNR's 2018 Assessment Cycle for Section 303(d) Listing	**Chlorophyll-*a* (µg/L)**	**Total Phosphorus (µg/L)**	**Palmer Drought Severity Index (Approximate Annual Mean Visualized from Graph)**
2016:			**+3.6 (Unusually Moist)**
June 19, 2016	8.57	23.3	
July 24, 2016	19.5	27.2	
August 21, 2016	9.97	28.5	
Summer 2016 Mean (N=3)	**12.7**	**26.3**	
2015:			**+1.0 (Near Normal)**
June 22, 2015	5.95	28.8	
July 20, 2015	6.07	29.4	
August 30, 2015	25.4	34.3	
Summer 2015 Mean (N=3)	**12.5**	**30.8**	
2014:			**+3.8 (Unusually Moist)**
June 23, 2014	5.02	16.1	
July 27, 2014	17.7	32.8	
August 25, 2014	18.5	35.0	
Summer 2014 Mean (N=3)	**13.7**	**28.0**	
2013:			**0.0 (Near Normal)**
June 23, 2013	12.3	16.8	
July 13, 2013	12.1	23.1	
August 26, 2013	23.9	34.3	
Summer 2013 Mean (N=3)	**16.1**	**24.7**	
2012:			**-2.0 to -3.0 (Moderate to Severe Drought)**
June 18, 2012	10.4	23.0	
July 22, 2012	21.0	28.0	
August 21, 2012	35.4	36.0	
Summer 2012 Mean (N=3)	**22.3**	**29.0**	
Grand Sample Mean 2012-2016 (N=15)	**15.452**	**27.773**	
Sample Standard Deviation	s = 8.623	s = 6.304	
90% Confidence Interval on Population Mean (µ)***** (N-1 degrees of freedom)	11.4 ≤ µ ≤ 19.5	24.8 ≤ µ ≤ 30.7	
One-tailed T-Test** of Null Hypothesis that µ ≤ 20 µg/L CHL-*A* at .05 level of significance	NOT Rejected (*P* = .9698) Therefore, µ ≤ 20	--	

***** Calculations were based on Student's *t* distribution, assuming a normal distribution (though data appear skewed to low side), from page 549 of Snedecor and Cochran (1976), Statistical Methods, 6th edition.

** Wolfram Mathematica 11.0 was used to confirm the 90% confidence interval for Chlorophyll-*a* is 11.53 ≤ µ ≤ 19.37 (rounding errors account for minor difference with hand-held calculation), and to perform a one-tailed t-test that failed to reject the null hypothesis that Teal Lake was not impaired (CHL-*A* ≤ 20 µg/L). Conclusion: Teal Lake is not impaired based on the former, threshold concentration method for determining whether June-August Chlorophyll *a* data exceed the impairment limit of 20 µg/L.

Beranek, Ashley E - DNR

From: Dean Shawbold <shawbold@gmail.com>
Sent: Saturday, December 02, 2017 7:54 AM
To: DNR Impaired Waters
Subject: Impaired waters LCO

Please rethink your determination of LCO reason for impairment needs to be from Phosphorus. Plea se review your findings.
Dean and Mary Shawbold LCO owners

Beranek, Ashley E - DNR

From: Deborah Tamondong <romdeb@comcast.net>
Sent: Wednesday, December 13, 2017 4:12 PM
To: DNR Impaired Waters
Subject: Cause of Impaired Water in LCO

Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Orielles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). I love LCO and want it preserved for future generations. It is one of the only lakes in Wisconsin with a two-story fishery supporting both Cisco and lake Whitefish. While the WDNR listing indicates the cause of the impairment as "unknown", a significant deal of independent research points to the increase in Total Phosphorus as the cause of low dissolved oxygen. The lake has suffered significant fish kills and it is important that the cause of the impairment be documented.

Please amend the WDNR 2018 Impaired Waters listing to clarify that **Total Phosphorus is the cause of the impairment in Lac Courte Orielles**.

Respectfully yours,

Deb Tamondong
14590W School House Lane
Stone Lake, WI 54876

Beranek, Ashley E - DNR

From: Diane Fallon <fall6@sbcglobal.net>
Sent: Friday, December 15, 2017 11:26 AM
To: DNR Impaired Waters
Subject: Lake Wisconsin as an impaired water body

Please give higher priority to cleaning up Lake Wisconsin. We have been on the lake for almost 30 years, and the water quality has deteriorated considerably. There is green scum floating on the top of the water at least half of the time. It is not safe for swimming. It is probably not safe to eat the fish caught in it, although there have been no studies on that. Please devote some of your precious resources to cleanIng up Lake Wisconsin.

Respectfully submitted,
Diane and John and Fallon

Sent from my iPad

Beranek, Ashley E - DNR

From: Earl Emerick <ee_safari@yahoo.com>
Sent: Monday, December 11, 2017 1:36 PM
To: DNR Impaired Waters
Cc: Nemerick1@yahoo.com
Subject: 2018 impaired waters list

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO. However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.
Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name Earl Emerick
Address 2478 Superior ln NW, Rochester, MN 55902

From:	Edmond Packee
To:	DNR Impaired Waters; Beranek, Ashley E - DNR
Subject:	proposed listing of LCO as impaired
Date:	Monday, January 08, 2018 5:32:08 PM
Attachments:	Letter to DNR Re impirment Listing.docx Lac Courte Oreilles, an Impaired Lake final.docx

---

Attached please find copy of cover letter and report.

Thank you for consideration.

14225W Court Oreilles Lake Drive
Hayward, WI 54843

8 January 2018

Ms. Ashley Beranek,
Water Evaluation Section (WY/3)
Wisconsin Department of Natural Resources
Box 7921,
Madison, WI 53707

Via e-mail DNRImpairedWaters@wisconsin.gov,

RE: Lac Courte Oreilles proposed list as impaired due to Low Dissolved Oxygen

Dear Ms. Beranek:

I and my family strongly oppose the listing of Lac Courte Oreilles as Impaired because Of Low Dissolved Oxygen. If indeed the lake is impaired it is due to natural causes which are exempt from impairment listings. Please find and include in my full response to the proposed listing in the attached report, in draft form, LAC COURTE OREILLES, AN IMPAIRED LAKE? NOTE THE QUESTION MARK!

I have lived seasonally and permanently on Lac Courte Oreilles for 77 years. My memory goes back to 1945/1946—I remember my first deer on County K at Mullaly Hill and I remember the end celebrations of World War II. I am a forester and soil scientist, specializing in silviculture and forest ecology. I have both industrial and academic experience—I was instrumental in initiating the Carnation Creek Study on Vancouver Island (salmon) while in industry and academically (U. Alaska Fairbanks) where I taught dendrology, silviculture, forest health, and ecosystem management.

I oppose listing Lac Courte Oreilles as impaired due to Low Dissolved Oxygen levels for a number of reasons including:

- Whitefish kills being not uncommon in the past,
- High water levels may be a major factor involving the ails of the lake,
- Low Dissolved Oxygen cannot be addressed by itself—Minnesota, for example, is looking at a combined standard that includes water temperature,
- Genetic adaptation of the fish to warmer waters,
- Climate change including warming and precipitation patterns.

I submit this statement and the report as my own ideas; the report was initially done for an attorney. He has not changed the report and that is why we are keeping it separate. I am more than willing to work with the Water Evaluation Section Lac Courte Oreilles problems as well as other waters. Please feel free to contact me by e-Mail or telephone (715-634-3760) if you have any questions about the report or concepts that I have raised

Thank you for your efforts.

Sincerely,

Edmond C. Packee
Edmond C. Packee, Sr., Ph.D.
Certified Forester #568; Certified Professional Soil Scientist #1709

Attachment LAC COURTE OREILLES, AN IMPAIRED LAKE?

LAC COURTE OREILLES, AN IMPAIRED LAKE?

Edmond C. Packee, Sr. Ph.D.
Certified Forester #568, Certified Professional Soil Scientist #1709
22 December 2017

HIGHLIGHTS

Lac Courte Oreilles (LCO) is negatively impacted by a combination of natural agents and human interferences.

No valid human activity exists for listing LCO as impaired due to Low Dissolved Oxygen. Therefore, LCO must be removed from the proposal for listing list.

Lac Courte Oreilles is not an "impaired lake" due to:

- Total Phosphorus—Wisconsin DNR Standards and background levels.
- Temperature—ambient temperatures related to climate change.
- Dissolved Oxygen—historical ambient D.O. levels and fish kills make these nothing out of the ordinary.
- Statistics (questionable sampling procedure): possible lack of randomness means values including averages applicable only to the selected sites sampled; summary listing of all data used in analyzing stations/data used; challenges by COLA re: P and inclusion/non-inclusion of Musky Bay as part of LCO—what do statistics support

Lac Courte Oreilles' likely problems also include:

- high water levels coupled with power boat wake that cause soil/parent material particle erosion,
- high water levels flooding old sanitary systems (septic tank fields, pit toilets) especially on sandy lowlands,
- lawn fertilization with N especially on slopes, lowlands, sandy materials (soils/parent materials),
- partial blockage of drainage routes (Grindstone Channel County K bridge, Thoroughfare bridge, County Highway E bridge across outlet from Little LCO,
- maintaining minimum seasonal water level fluctuations (P.S.C. directive) rather than natural seasonal fluctuation (high after spring snowmelt and low in late fall),
- Misinformation.

INTRODUCTORY COMMENTS

Recently, the Wisconsin Department of Natural Resources (WisDNR) declared Lac Courte Oreilles (LCO) an "impaired water" (Boettcher 2017b). Boettcher (2017b), in the newspaper article, states, "Two new Sawyer County lakes are among those included in an updated list of 'impaired' lakes and streams published by the [WDNR], due to excess phosphorus, algae growth, mercury, or other contaminants. …included are the entire 5,139-acre Lac Courte Oreilles (previously only Musky Bay was listed as impaired)…" This is incorrect! The two waterbodies are only proposed for listing and public comments are requested. Other lakes within the Couderay River ecosystem above Billy Boy dam that "continue to be included on the impaired list are Upper Holly, …, Big Sissabagama and Windigo." With reference to LCO, the newspaper article suggests the listing is "due to excess phosphorus, algae growth, mercury, or other contaminants" which is also incorrect.

LCO is not proposed for impairment listing due to a contaminant (substance), but due to low Dissolved Oxygen (D.O.). The WisDNR states that the low D.O. Level is due to a Non-Point Source (NPS) and an "unknown pollutant". Rather than a causal pollutant or contaminant, the low D.O. level is environmentally controlled with a mix of air and water temperatures being the controlling agents. Critical periods for fish survival can be in summer or winter and with global climate change, lakes experience an increase in surface water temperature in summer and a decrease in dissolved oxygen (D.O.) at greater depths. Near the surface, as water temperatures increase, phytoplankton and macrophytes produce more oxygen by photosynthesis; but below the photic (sunlight receiving) zone where this occurs, light is insufficient, and decaying plant mass consumes the D.O. in the water. As decaying plants take up more of the D.O., less is available for fish (St. Anthony Falls Laboratory 2012). Lakes are naturally warming (climate change) an average of 0.61°F(0.34°C)

each decade; and the warming is greater than the warming rate of either the ocean or the atmosphere (Cole et al. 2015). Water temperature influences a host of water's properties critical to the health and viability of lake ecosystems and thus Cole et al. (2015) state "The pervasive and rapid warming observed here signals the urgent need to incorporate climate impacts into vulnerability assessments and adaptation efforts for lakes." Large changes in our lakes are unavoidable (Cole et al. 2015) and also natural. In proposing the listing of LCO as impaired, has the WisDNR considered climate change being the natural agent of change?

On 01 December 2017, the Courte Oreilles Lakes Association (COLA) (2017) sent out a letter to COLA members and the Board of Supervisors of the Town of Bass Lake, Sawyer County, requesting written support for listing LCO as impaired. The Town of Bass Lake was essentially requested to write a letter to the Wisconsin Department of Natural Resources (WisDNR) supporting the listing of LCO as impaired. The request was placed on the 11 December 2017 monthly meeting agenda of the Town of Bass Lake Board of Supervisors; the request failed for lack of a motion. In the COLA letter, they stated the WisDNR "are proposing to list 'low dissolved oxygen' as an indicator of that impairment without citing Total Phosphorus as the cause of the impairment." The letter further stated that WisDNR has designated LCO as a deep (stratified) two-story coldwater fishery lake with a Total Phosphorus criterion of 15 µg/L (parts per billion). The WisDNR (n.d.) lists LCO as a "Drainage Lake" and also recognizes it as two-story lake (Lyons 2017). Cold water fish in LCO include: cisco (*Coregonus artedi*), lake whitefish (*Coregonus clupeaformis*), and mottled sculpin (*Cottus bairdii*). LCO is both a drainage and stratified lake and has both inlet streams and an outlet stream with a WisDNR (2010) Total Phosphorus criterion of 30 µg/L if it were not for the cold water fishery status. COLA and the LCO Band of Lake Superior Indians have proposed a site specific Total Phosphorus criterion be set at 10 µg/L (COLA 2017)— the mean annual Total Phosphorus level range for the three LCO open-water locations (exclusive of Musky Bay) of 9.73 to 33.42 µg/L (one year and location below 10 µg/L and one year and location above 30 µg/L with the latter having an anomalous value of 250 µg/L on 7 June 2013 (WisDNR 2017). Such a suggestion is absurd and not likely attainable.

OBJECTIVES

Objectives of this review/analysis/critique include:

- utilize an ecosystem approach that links the atmospheric, terrestrial, and aquatic portions of the ecosystem upstream from Billy Boy dam at the head of the Couderay River;
- review nutrient data supporting the declaring all of LCO as impaired with particular reference to phosphorus (COLA demand);
- review temperature variation/trends;
- review Dissolved Oxygen levels supporting the declaring all of LCO as impaired
- sampling validity to declare LCO as impaired.non-impaired;
- sources of or causes of high levels of phosphorus in LCO;
- trends in nutrient dynamics in LCO.

INTRODUCTION

The Lake Courte Oreilles area has been inhabited by humans for about 2,500 years (Lakelubbers LLC 2016). Radisson and Grosseillers were the first Europeans to visit area in 1659 and found Ottawa Indians occupying the area which "was a favorite habitat of many tribes because of the abundant game and fish, wild berries, and wild rice"; the Sioux where present before the Ottawa who were present before Ojibwe who arrived after 1745. The Indians and early English and Americans referred to the area as "Ottawa sagaigan" meaning "Ottawa Lake"(Gard 2015).. One of the earliest maps of the area, the Index map to Canada and the United States of the Society for the Diffusion of Useful Knowledge (1834), identifies Lac Courteoreille by name.

Prior to the logging era, the Upper Couderay River was forested with stands of pine (Norway and white), hemlock and hardwoods, and hardwoods. From before Billy Boy Dam was constructed

WATER QUALITY

Water quality, like beauty, is "in the eye of the beholder." "Beauty cannot be judged objectively, for what one person finds beautiful or admirable may not appeal to another" (Google. n.d.). "Water quality is the ability of a water body to support all appropriate beneficial uses" (APEC WATER. n.d.). There are multiple beneficial uses for which water is used by humans, wildlife (terrestrial and aquatic), and plants (terrestrial and aquatic), and microorganisms. What benefits one may not benefit other users/uses. Water quality consists of three basic characteristics: Physical, chemical, and biological. Physical and chemical characteristics vary along a continuum from zero to a maximum but organisms can only tolerate a certain range of physical and chemical values. WisDNR (2017) states, "One measure of a lakes health is the trophic state, which relates to the amount of algae in the water. The average summer trophic state for the last 5 years was 40 (Oligotrophic) and was determined using chlorophyll data. For a Two-Story lake, this is considered **Excellent**." In addressing water quality, the waterbody cannot be addressed in isolation from the surrounding non aquatic terrain and atmosphere—thus an ecosystem approach is essential.

The following table provides information on available water quality data:

Table. Data available for Lac Courte Oreilles for the period 1975 through 2017 from WisDNR (2018). (Note: period of years may have some years with no data; an X does not mean data available for every year). (Information not checked/verified)

Station/Site Name	Station No,	Max yr	Min yr	SD	Chl	TP	TSI SD	TSI Chl	TSI TP	Lake Level		Lake Clarity		D.O.	
Nearshore N Central Bay	583078	1996			X			X							
Nearshore Ring Creek	583079	1996			X			X							
Nearshore Nr Sec 32 Trb	583082	1996			X			X							
Nearshore Nr Whitefish Creek	583081	1996			X			X							
Nearshore SE Musky Bay	583080	1996			X			X							
Musky Bay	583068	1996				X			X						
Musky Bay	583068	2009		X	X			X	X					X	
Outlet	583077	1996			X			X							
Outlet	583077	2016	2012		X			X		X				X	
Anchor Bay (LCO5)	583071	2017	1996	X	X	X	X	X	X	X				X	
Barbertown Bay/NE Bay (LCO6)	10033392	2016	1997	X*	X	X	X	X	X					X	
Center (P9)	10033394	2010	2009	X	X		X	X						X	
Center Basin Site C (LCO3)	583067	2017	1991	X	X		X	X		X		X		X	
Center Northeast Bay	583072	2017	1996	X	X	X	X	X	X	X		X			
Central West (P1)	10)33387	2010	2009	X			X								
Central South (P4)	10033390	2010	2009	X			X								
Chicago Bay	10039052	2007	1997	X	X		X	X						X	
Deep Hole (LCO4)	583046	2017	1975	X	X	X	X	X	X	X		X		X	
East (P5)	10033391	2010	2009	X			X								
East North (P8)	10033393	2010	2009	X			X								
East South (P6)	10033442`	010	2009	X			X								
Musky Bay (MB1)	10033577	2017	1997	X	X		X	X		X		X		X	
Musky Bay East Cran Outlet (MB2A)	10038981	2016	2000	X	X	X	X	X	X					X	
Musky Bay North Shoreline (MB4)	10038983	2016	2000	X	X	X	X	X	X					X	
Musky Bay West Cran Outlet (MB2A)	10038982	2016	2000	X	X	X	X	X	X					X	
Musky Bay West of Deep Hole (MBA)	10038984	2013	2010											X	
Musky Bay Entrance 12 Feet (MBB)	10038854	2017	2010	X			X							X	
Musky Bay Entrance 30 Feet (MBC)	10037855	2017	2011		X			X							X
Near KK Bridge	583137	2005	1999	X			X			X		X			
Near Stukey Bay (C2)	583069	2005	1992	X			X			X		X			
North Central Bay	583070	2001	1995	X	X	X	X	X	X	X	X		X		
Stukey Bay Deep Hole (LCO1)	583097	2017	1979	X	X	X	X	X	X	X	X		X		X
West – North (P2)	10033388	2010	2009	X			X								
West – West (P3)	10033389	2010	2009	X			X								
West Basin (LCO2B)	10044724	2016	2013	X	X		X	X						X	
West Basin Deep Hole (Site B/LCO2)	583066	2017	1991	X	X	X	X	X	X	X	X		X		X
Stukey Bay Cranberry Outlet (LCO1A)	10038985	2016	2000	X	X			X	X						X
Trib – Sec 32 [Stream]	583076	1996					X			X					

ECOSYSTEM APPROACH

An ecosystem approach is a strategy for integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way (Convention on Biological Diversity n.d.b). Ecosystem "means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit" (Convention on Biological Diversity n.d.a). Note the reference to "sustainable use in an equitable way"—this not only implies but recognizes human use.

To be successful, the ecosystem approach requires knowledge of the ecosystem components that include the non-living and living components and their interactions. Non-living components include the atmosphere (climate, air-borne substances, geology (surficial and bedrock), soils, water (natural nutrient status, temperature regimes, productivity and human-caused changes), and land use (historical and current). Living components include and fauna, plants (aquatic and terrestrial micro-flora and macrophytes), animals (aquatic and terrestrial micro-fauna, snails, mollusks, crayfish, insects, reptiles, salamanders, fish, mammals, and birds). Just knowing the species and habitat requirements is insufficient as is simply knowing the non-living features, but their interactions and the ecosystem processes must be taken into account. For example:

- What has been the impact on mosquito control (insecticide) on the monarch butterfly, the yellow-swallowtail butterfly, sphinx moth, luna moth?
- What has been the impact on soils and soil processes of the earthworm introduction (invasive species) by fishermen for decades?
- What is the impact of lawn nitrogen fertilizer on the lake with an unnatural load of phosphorus—this is particularly a concern on shallow sandy soils such as around Barbertown Bay, Grindstone Bay, the isthmus to Victory Heights—this is a non-point source contaminant/pollutant?
- What is the impact of high water on nutrient leaching from long abandoned pit toilets and septic systems and is the current owner responsible for things of the past?
- What is the impact of maintaining a steady water level for boat traffic on a system that naturally had high water levels in spring and low levels in late fall ecosystem processes including wild rice, mortality (bleaching) of near-shore algae, nutrient cycling?
- What is impact of high-water level exacerbated by the wake action of large power boats on shoreline erosion of soils including parent materials and nutrients?
  Is it equitable to target legitimate agricultural activities where there is improvement in practices as more knowledge becomes available and ignore the above and similar practices?

For ecosystem management to be successful

- correct knowledge of the ecosystem must be available and utilized;
- knowledge of the problems and solutions must be had or sought (some problems may have no solution such as climate change);
- rumors, innuendo and undocumented information must be checked/documented or be put aside;
- reasonable/realistic targets or desired conditions must be clearly stated.

Climate: No 30-year normal temperature averages were found for Wisconsin or Minnesota. Time did not permit detailed searching nor construction of such data sets. 30-year normal temperature averages permit time comparisons with the highs and lows average comparison.

Geology: No comprehensive geological map exists for Sawyer County, WI. There are no bedrock exposures on the shores of LCO. Northeast of Barbertown Bay, east of County Highway K ,and north of County Highway B on the road into Cristner Lake is a bedrock outcrop. Hotchkiss et al. (1915) refer to sandstone outcrops on the northeast side of Grindstone Lake. This could be a Precambrian quartzite referred to by Weidman and Schultz (1915).

The watershed was heavily glaciated during the Pleistocene by two glaciations, Illinoian and Wiscosninan age with evidence of the latter throughout the area. Glacial ice may have occupied the area less than 10,000 years ago. Two glacial lobes occupied the area, the Superior lobe from the north and the Chippewa lobe from the northeast. To the west and northwest is a large terminal moraine that separates the LCO drainage system from the Namekagon/St Croix system. Scattered along the north shore of LCO are remnants of terminalor recessional moraines and ground moraines

(laid down under the moving ice. Similar remnants occur along the south shore. Victory Heights is possibly a kame. Much of the area, however, consists of pitted outwash or outwash plains, especially the area between Grindstone Lake and LCO. The Couderay River, here considered to be downstream from the outlet of LCO, may be the remnants of tunnel valley that formed by flowing water underneath the glacial ice.

Glacial meltwater that slowed or became impounded produced glacial lakes. These proglacial likes could have supported northern pike and lake whitefish (Pielou Some of the depressions that filled with glacial meltwater are still lakes today, but many drained over time (Voigtlander 2006).

The outwash material is somewhat-to well drained, rich in sand, and typically quite porous, and drains readily to the groundwater level. The glacial till ranges from boulder to pebbly and may be compacted (personal observations in gravel pits); the till commonly is moderately well drained. Drainage can be in veins.

Soils: A U.S. D.A. NRCS Soil Survey with map exists for Sawyer County (Voigtlander 2006). Time did not permit extraction of soils information for the landscape surrounding LCO.

Vegetation

Aquatic plant species potentially occurring within the lakes indicate a biodiverse ecosystem. Species should be verified and rareness noted for each.

Aquatic plant species likely found in LCO, Little LCO, Billy Boy Flowage, and Grindstone Lakes

Species Names			C	DU						
Scientific	Common	Code	value	L	LCO	GRL	OSP	LRL	RL08	RL14
	filamentous algae		***		x	x		x	x	x
	freshwater sponge						x			
	aquatic moss		***				x	x		
Asclepias incarnata L.	swamp milkweed	ASIN	***							x
Bidens beckii Torr. ex Spreng	Beck's water marigold	BIBE2	8			x	x	x	x	x
Brasenia schreberi J.F. Gmel.	watershield	BRSC	7			x	x	x	x	x
Butomus umbellatus L. *	flowering rush	BUUM								x
Calla palustris L.	water arum, wild calla	CAPA	9							x
Ceratophyllum demersum L.	coon's tail, coontail	CEDE4	3		x	x	x	x	x	x
Ceratophyllum echinatum A. Gray	spineless hornwort, spiny hornwort	CEEC2	10							x
Chara sp. (algae)	muskgrass	***			x	x	x	x	x	x
Comarum palustre L.	purple marshlocks, marsh cinquefoil	COPA28	***							x
Cyperus strigosus L.	strawcolored flat sedge, false nut sedge	CYST	***						x	
Dulichium arundinaceum (L.) Britton	three-way sedge	DUAR3	9					x		
Elatine minima (Nutt.) Fisch. & C.A. Mey.	small waterwort, waterwort	ELMI	9						x	
Eleocharis acicularis (L.) Roem. & Schult.	needle spikerush	ELAC	5		x		x	x	x	x
Eleocharis palustris (L.) Roem. & Schult.	common spikerush, creeping spikerush	ELPA3	6				x	x		x
Eleocharis robbinsii Oakes	Robbins' spikerush	ELRO	10				x			
Elodea canadensis Michx.	Canadian waterweed, common waterweed	ELCA7	3		x	x	x	x	x	x
Eriocaulon aquaticum (Hill) Druce	sevenangle pipewort	ERAQ2	9		x	x	x		x	
Equisetum fluviatile L.	water horsetail	EQFL	7					x		
Heteranthera dubia (Jacq.) MacMill.	grassleaf mudplantain, water star-grass	HEDU2	6		x	x	x	x	x	x
Iris versicolor	harlequin blueflag, blue flag	IREV2	***							x
Isoetes lacustris L.	lake quillwort	ISAL	8						x	
Isoetes	quillwort	***	8		x	x				

Juncus pelocarpus E. Mey.	brown fruited rush	JUPE	8						x
Lemna minor L.	common duckweed	LEMI3	5	x					x
Lemna trisulca L.	star duckweed	LETR	6	x					
Lobelia dortmanna L.	water lobellia	LODO	10	x					
Lythrum salicaria L.*	purple loosestrife	LYSA2	***	x			x		
Megalodonta beckii	see *Bidens beckii*	MEBE2	8						
Myriophyllum alterniflorum DC.	alternateflower milfoil	MYAL3	10			x		x	x
Myriophyllum sibiricum Kom	shortspike milfoil, northern water-milfoil	MYSI	7	x	x		x	x	
Myriophyllum spicatum L. *	Euraisan watermilfoil	MYSP2	***				x	x	x
Myriophyllum tenellum Bigelow	slender watermilfoil, dwarf milfoil	MYTE	10	x	x	x	x	x	
Najas flexilis (Willd.) Rostk. & Schmidt	nodding waternymph	NAFL	6	x	x	x	x	x	x
Nitella sp. (algae)		***	7	x	x	x		x	x
Nuphar lutea (L) Sm. ssp. *variegata* (Durrand) E.O. Beal	varigated yellow pond-lily, spatterdock	NULUV	6	x	x	x	x	x	x
Nuphar variegata Durand	see *Nuphar lutea*	NUVA2	6						
Nymphaea odorata Alton	largeleaf pondweed	NYOD	6	x	x	x	x	x	x
Phragmites australis (Cav.) Trin. ex Steud.	common reed	PHAU7	1	x	x				
Polygonum amphibium L.	water smartweed	POAM8	5			x	x	x	x
Pontederia cordata L.	pickerelweed	POCO14	9	x	x	x	x	x	x
Potamogeton alpinus	alpine pondweed	POAL8	9					x	x
Potamogeton amplifolius Tuck.		POAM5	7	x	x	x	x	x	x
*Potamogeton crispus L.**	curly leaf pondweed	POCR3	***	x	x				
Potamogeton epihydrus Raf.	ribbonleaf pondweed	POEP2	8			x		x	
Potamogeton foliosus Raf.	leafy pondweed	POFO3	6				x	x	x
Potamogeton friesii Rupr.	Fries' pondweed	POFR3	8				x	x	x
Potamogeton gramineus L.	variableleaf pondweed	POGR8	7	x	x	x	x	x	x
Potamogeton illinoensis Morong.	Illinois pondweed	POIL	6	x	x			x	
Potamogeton natans L.	floating pondweed	PONA4	5	x	x	x	x	x	x
Potamogeton perfoliatus L.	claspingleaf pondweed	POPE7	***				x	x	x
Potamogeton praelongus Wulfen	western pondweed	POPR5	8	x	x	x	x	x	x
Potamogeton pusillus L.	small pondweed	POPU7	7	x	x	x	x	x	x
Potamogeton richardsonii (Benn.) Rydb.	clasping-leaf pondweed, Richardson's pondweed	PORI2	5	x	x	x	x	x	x
Potamogeton robbinsii Oakes	fern pondweed, Robbin's pondweed	PORO2	8	x	x	x	x		x

Potamogeton strictifolius Benn.	narrowleaf pondweed, stiff pondweed	POST2	8				x	x	x
Potamogeton vaseyi J.W. Robbins	Vasey's pondweed	POVA3	10					x	
Potamogeton zosteriformis Fernald	flatstem pondweed	POZO	6	x	x	x	x	x	x
Ranunculus aquatilis L.,	white water crowfoot, water buttercup	RAAQ	***	?	?		?	?	?
Ranunculus longirostris Godr.	longbeak buttercup	RALO2	6						
Ranunculus trichophyllus Chaix	threadleaf crowfoot	RATR	8						
Ranunculus flammula L.	greater creeping spearwort	RAFL2	9		x			x	x
Sagitaria sp.	arrowhead	***	***	x	x	x	x		x
Schoenoplectus acutus (Muhl. ex Bigelow) Á. Löve & D. Löve	hardstem bulrush	SCAC3	5	x	x				
Sagittaria cristata Engelm	crested arrowhead	SACR4	9					x	
Schoenoplectus pungens (Vahl) Palla	threadleaf crowfoot	SCPU10	5		x				
Schoenoplectus subterminalis (Torr.) Soják	swaying bulrush, water bulrush	SCSU10	9			x	x		
Schoenoplectus tabernaemontani (C.C. Gmel.) Palla	softstem bulrush	SCTA2	4			x	x	x	x
Sparganium angustifolium Michx.	narrowleaf bur-reed	SPAN2	9						x
Sparganium americanum Nutt.	Americn bur-weed	SPAM	8				x		
Sparganium eurycarpum Engelm.	common bur-reed	SPEU	5	x					
Sparganium fluctuans (Engelm. ex Morong) B.L. Rob.	floating bur-reed, floating leaved bur-reed	SPFL	10					x	
Sparganium sp.	bur-reed					x	x		x
Spirodela polyrhiza (L..) Schleid.	common duckmeat, large duckweed	SPPO	5	x	x				
Stukenia pectinatus (L.) Börner	sago pondweed	STPE15			x			x	
Typha latifolia L.	broad-leaved cattail	TYLA	1	x	x		x	x	x
Typha sp.	cattail	***	1			x			
Utricularia intermdia Hayne	flatleaf bladderwort	UTIN2	9			x	x		
Utricularia macrorhiza Leconte	common bladderwort	UTMA	7				x		x
Utricularia minor	lesser bladderwort, small bladderwort	UTMI	10				x		
Utricularia vulgaris L. p.p.	see *Urticularia macrorhiza*	UTVA	7						
Vallisneria americana Michx.	American eelgrass, wild celery, water celery	VAAM3	6	x	x	x	x	x	x
Zosterella dubia (Jacq.) Small	see *Heteranthera dubia*	ZODU	6						

**indicates non-native*

Fish Species

Potential fish specesies found in LCO:

Ambloplites rupestris	rock bass
Ameiurus melas	black bullhead
Ameiurus natalis	yellow bullhead
Ameiurus nebulosus	brown bullhead
Catostomus commersonii	white sucker
Coregonus artedi	cisco
Coregonus clupeaformis	lake whitefish
Cottus bairdii	mottled sculpin
Cottus cognatus	slimy sculpin
Culaea inconstans	brook stickleback
Esox lucius L.	northern pike
Esox masquinongy	musskelunge
Esox lucius X Esox masquinony	hybrid
Etheostoma caeruleum	rainbow darter
Etheostoma exile	Iowa darter
Etheostoma microperca	Least darter
Etheostoma nigrum	johnny darter
Hybognathus hankinsoni	brassy minnow
Ictalurus punctatus	channel catfish
Labidesthes sicculus	brook silverside
Lepisosteus osseus	Longnose gar
Lepomis cyanellus	Green sunfish
Lepomis gibbosus	pumpkinseed
Lepomis gulosus	warmouth
Lepomis macrochirus	bluegill
Lepomis megalotis	longear sunfish
Lota lota	burbot
Luxilus cornutus	common shiner
Margariscus margarita	pearl dace
Micropterus dolomieu	smallmouth bass
Micropterus salmoides	largemouth bass
Moxostoma erythrurum	golden redhorse
Moxostoma macrolepidotum)	shorthead redhorse
Moxostoma valenciennesi	greater redhorse

Nocomis biguttatus	hornyhead chub
Notemigonus crysoleucas	golden shiner
Notropis atherinoides	emerald shiner
Notropis heterodon	blackchin shiner
Notropis heterolepis	blacknose shiner
Notropis hudsonius	spottail shiner
Notropis rubellus/procumbens	rosyface shiner/carmine shiner
Notropis volucellus	mimic shiner
Noturus gyrinus	tadpole madtom
Oncorhynchus mykiss	rainbow trout
Osmerus mordax(1)	rainbow smelt
Perca flavescens	yellow perch
Percina caprodes	logperch
Percopsis_omiscomaycus	trout perch
Phoxinus eos	northern redbelly dace
Phoxinus neogaeus	finescale dace
Pimephales notatus	bluntnose minnow
Pimephales promelas	fathead minnow
Pomoxis nigromaculatus	black crappie
Pungitius pungitius	ninespine stickleback
Rhinichthys cataractae	longnose dace
Rhinichthys obtusus	western blacknose dace
Salvelinus fontinalis	brook trout
Sander vitreus	Walleve
Semotilus atromaculatus	creek chub
Umbra limi	central mud minnow

LAKE SYSTEM

Lac Courte Oreilles (LCO), a northwest Wisconsin lake, is the receiving waterbody at the head of the Couderay River Watershed, a major tributary of the Chippewa River which flows into the Mississippi River. To the north and northwest is the Namekagon River which flows into the St. Croix River, to the west is the Red Cedar River which flows into the Chippewa River, and to the south and east is the West Fork of the Chippewa River.

Lac Courte Oreilles (LCO) drains southward via Little Lac Courte Oreilles and Billy Boy Flowage into the Couderay River at Billy Boy Dam. Proper management of the Billy Dam effectively blocks upstream movement of fish (native and exotic). Lake systems draining via surface waters into Lac Courte Oreilles include Grindstone (Grindstone, Little Grindstone, Upper Grindstone, Grindstone, Graveyard, and Lower Grindstone Springs), Round, (Little Round, Osprey) Whitefish (Whitefish, Sand, Sissabagama), and Ring lakes. Numerous seepage lakes surround LCO, Little LCO, and Grindstone Lake that include Gurno, Christner, Windigo, Lake-27, Hub, Williams, Adina, Tripp, Colbroth, Murry, Island, Johnson, Durphee, Schoolhouse, Minnemac as well as wetlands. LCO, Grindstone, Whitefish Lake and Round Lake are also spring fed thus receiving groundwater (seepage) water from the ground water table.

Pratt and Neuswanger (2006) state that LCO receives waters from Whitefish Lake via Whitefish Creek and Grindstone Lake via Grindstone Creek, but make no mention of Round Lake/Osprey Lake, and Osprey Creek. The entire system has a normal flow to the Couderay outlet of 26 ft^3/sec.

Pratt and Neuswanger (2006) provide limnologic characteristics of Lac Courte Oreilles, exclusive of Musky Bay,

Parameter	Absolute or Mean Value (range if known
Surface area (acres)	5039 (5353 with Little LCO and Billy Boy)
Volume (acre-feet)	169,000
Water level (ft. a.s.l.)	1286.5
Maximum depth (ft.)	90
Mean depth (ft.)	34
Littoral zone (% <20 ft. deep)	28%
Shoreline distance (mi.)	25.4 (34.2 with Little LCO and Billy Boy)
Watershed area (direct drainage) (acres)	16.9
Watershed area (indirect drainage) (acres)	65.8
Methyl purple alkalinity (ppm)	50 (range = 43-79)
pH	7.5 (range = 6.9-7.9)
Specific conductance (micromhos/cm)	107 (range = 99-156)
Total phosphorus (ppb)	13 (range = 4-26)
Chlorophyll *a* (ppb)	4 (range = 2-6)
Secchi disk visibility (ft.) 1	1.5 (range = 9.5-15.8)
Trophic State Index	41 (classed as mid-trophic [Note: mesotrophic range = 40-50—Carlson's Trophic Index (Wikipedia 2016)]).

Note that WisDNR (n.d.) gives a total area of 5139 acres.

Pratt and Neuswanger (2006) describe the substrate bottom in the littoral zone as being comprised mostly of sand, gravel, and rock; exceptions include Musky Bay and Stukey Bay where soft muck, detritus rich organics predominate (Musky Bay = 225 acres, has a mean depth of 6 ft., maximum depth of 18 ft) with Musky Bay having a high phosphorus content that has caused dense plant growth in recent decades and decaying plant material reduces amount of dissolved oxygen at the mud/water interface that is too low for musky egg survival). WisDNR (n.d.) describes the lake bottom as 55% sand, 20% gravel, 5% rock, 20% muck.

With reference to Musky Bay, Winton (1980) refers to

- 3 conical mounds on shore of Mud Bay,
- 9 conical, oval mounds on shore of Aiken Bay—mutilated and neglected 1925,
- 6 conical and oval mounds on Peninsula between Mud Bay and lake proper (isthmus and Victory Heights.

LAKE STRATIFICATION

LCO is considered a two-story lake, one of 5 in Sawyer County of the 220 in the state. Of the five lakes in Sawyer County four are within the Couderay River watershed above the Billy Boy Dam (Grindstone Lake, Lac Courte Oreilles, Round Lake, and Whitefish Lake. The fifth lake, Ashegon Lake. is a seepage lake (WisDNR n.d.),

INVASIVE SPECIES

"Aquatic invasive species have been introduced unintentionally by international shipping, garden and aquarium hobbyists or when unused bait is discarded. Other species have been introduced intentionally for various reasons and become invasive, displacing the native plants and animals where they were introduced. After being introduced, non-native species can be inadvertently transported to new sites via recreational users. This process multiplies the number of infested sites over a wide geographic area. The spread of invasive species also occurs by natural processes such as seed dispersal and migration into adjacent waters."

Twelve invasive species are known to occur within the watershed above the Billy Boy Dam—5 animal and 7 plant. No particular invasive species occurs in all lakes. Presence of animal species has been verified. The occurrence of plant species (indicated by "?" in the table below have not been verified as occurring in the particular lake.

	GRIN	LCO	LLCO	LRND	LSIS	OSPR	RND	SAND	SISS	WFIS	
Animals (WisDNR n.d.)											
▪ Banded Mystery Snail *Viviparus georgianus* I. Lea	X						X	X	X	X	
▪ Chinese Mystery Snail: *Cipangopaludina chinensis* Gray			X						X	X	X
▪ Fresh water jellyfish *Craspedacusta sowerbyi* Lankester						X	X				
▪ Japanese Mystery Snail *Cipangopaludina japonica* (von Martens)									X		
▪ Rusty Crayfish: *Orconectes rusticus* Girard		X	X					X	X		
Plants (WisDNR n.d.)											
▪ Aquatic for-get-me-not *Myosotis scorpioides* L.		?						?		?	
▪ Curly leaf pondweed *Potamogeton crispus* L.)	X	X								X	
▪ Eurasian Water-Milfoil *Myriophyllum spicatum* L.			X	X		X	X			X	
▪ Flowering Rush *Butomus umbellatus* L.								X			
▪ Hybrid cattail *Typha x glauca* Godr.									?		
▪ Narrow-leaf Cattail *Typha angustifolia* L.							?		?		
▪ Purple Loosestrife *Lythrum salicaria* L.	?					X			?		

Tyrolt (2011) reports curly leaf pondweed from the channel between Grindstone Lake and LCO above and below Little Grindstone Lake and at two locations in the extreme north of Barbertown Bay.

Northern Pike

Note that northern pike (*Esox lucius* L.) are not listed as "invasive" in any of the lakes. However, Wolter and Crystal (2017) state, "Northern pike are not known to be native to LCO and are believed to have entered the system sometime between 1945 and 1950 through illegal introduction" and also state , "In the early 60's, shortly after pike introduction,,,". Earlier in 2017, a WisDNR fishery biologist stated that northerns are likely not native to LCO (Boettcher 2017a). Wolter in 2016 suggested strongly that the northern pike first appeared in LCO in the mid 1950s and that pike density increased from 1 adult/acre during the 1960s to 2-3 adults per acre during the 1970s. He added that **these fish "are not considered to be native to LCO**! [emphasis mine] (also referenced by Hanson 2016). I caught my first northern in late summer of 1949 in Anchor Bay (Schramm's Bay, Grindstone Bay) when I was nine years-old and to this day it is the largest fish I have caught in LCO. My cousin also caught one that day. Wilson (2011) states that northern pike were introduced into LCO. Pratt and Neuswanger (2006) state in the Fishery Management Plan for Lac Courte Oreilles that records suggest musky, native to LCO, had a self-sustaining population in **the absence of northern pike** [emphasis mine] and that northern pike first appeared in LCO in mid 1950 Becker (1983) states that the northern pike is widely distributed in Wisconsin except in the "unglaciated" Driftless Area "where it is sparsely dispersed except in large river systems and impounded areas;" "It is is reportedly absent from the Chippewa River and its lakes above Radisson (Sawyer County). Historically, the lakes and rivers of the highlands of northern Wisconsin have been devoid of northern pike, but man-connected activities in recent years have promoted the expansion of northern pike into most of these lakes." Becker also points out that northern pike habitat is created when a small stream is converted into a lake (impoundment) since impoundments always have extensive shallows and marshy spawning habitat. Johnson (1981) refers to "(t)he **invasion of northern pike** and subsequent establishment of large populations in Lac Courte Oreilles" but provides no source for invasion statement. He further comments that population estimates of muskellunge decreased over the years that northern pike estimates were steadily rising. He adds .\"… the correlation between northern pike and muskellunge populations is still somewhat convincing." Remember correlation does not establish a cause-and-effect relationship. Threinen and Oehmcke published a paper in 1950 entitled The northern invades the musky's domain {original not seen].

Northern pike is a circumpolar species of northern latitudes (Scott and Crossman 1973). Pielou (1992) refers to northern pike in proglacial lakes—which suggests that northern pike could have been in LCO or forerunners nearly 10,000 or more years ago. Colby (2013) refers to an ad for Signor's Resort (July 1909) on Lake Couderay: "Bass, Pike, Pickerel, and Muskalonge." Referring to Lac Courte and Little Lac Courte Oreilles, Brown (1915) states**,** "The fishing in these lakes is of an excellent character. Bass, pike and muskalonge are abundant." Northern pike habitat created when a small stream converted into a lake (impoundment), since impoundments always have extensive shallows and marshy spawning habitat (Becker 1983). According to various WisDNR reports, northern pike occur the following lakes draining into LCO: Round Lake, Little Round Lake, Osprey Lake, Sissabagama, Sand Lake, Whitefish, Grindstone including Grindstone Spring, and Little Grindstone Lake and the following seepage lakes without surface drainage into the LCO system: Gurno, Upper Holly, Lower Holly, Windigo, Lake Twenty-seven, Schoolhouse, Durphee, Johnson—the question begs, how did northern pike get into these lakes if they first arrived in LCO in the mid 1940s? Were northern pike here shortly after the last glacial retreat when the landscape was quite different? During wet periods in Recent Time? During periods of high water were the lakes connected?

Based on the data and hypothetical geological past, I hypothesize that northern pike have been in the Couderay River system well before the construction of Billy Boy dam! Were northern pike here in a proglacial lake during Wisconsinan times? Shortly after the last glacial retreat when the landscape was quite different? During wet periods in Recent Time? During periods of high water were the lakes connected?

THE ISSUES

STATISTICS: I am concerned about the analysis or calculations of averages for phosphorus, chlorophyll*a*, Dissolved Oxygen, currently used, presented, and developed in the future by the WisDNR. I am not a statistician by training, but I am most familiar with the sampling of forest trees

and I have been involved in the design of timber cruises (USFS), measurement/sampling of trees as individuals and in stands on the west coast of British Columbia (industry), and developed a Forest Growth Yield program for interior and southcentral Alaska (University of Alaska Fairbanks), all of which required a knowledge of basic sample design.

The table, Data available for Lac Courte Oreilles for the period 1975 through 2017 from WisDNR (2018) provides a summary of data obtained for LCO. Perusal of the table suggests that of the 36 sample sites, 9 (25%) are from Musky Bay which is 225 acres in size (Pratt and Neuswanger 2016) compared to the 5,139 acres for all of LCO which is less than 4.5% of the total lake area. Perusal of the original data sets by years suggests the following additional problems:

(1) Data sets differ by year in number of samples for each factor (secchi depth, chlorophyll*a*, and total phosphorus.
(2) Data sets within a year vary in number of samples for each factor and often for date with one factor sampled on a different date and conditions than the others.
(3) The data sets do not represent the majority of LCO with a preponderance of the samples 38.9% being tied to potential sources of contaminants (particularly phosphorus) and/or near shore and extreme depths.
(4) Some entire sample years consist of one sample for one factor.

It almost appears that sample sites were deliberately biased to prove a point. There does not appear to be any randomness involved.

The questions beg:

(1) What sample locations were/are used in determining average values for LCO?
(2) How were the period of record and varying number of samples between locations and within a year addressed?
(3) Did WisDNR ignore data of the past (pre 15 years ago) (ambient) which suggest current levels of phosphorus, low Dissolved Oxygen levels, and temperature are not that unusual and may not be the basis for listing (, as basis for consideration of listing (I recognize P is not considered as cause for listing but one vociferous group insists it is and distracts from the other real problems); where are the comparisons between now and then?
(4) Can WisDNR provide clear data sets used in making decisions to list or not list in order to reduce

MUSKY BAY AS A SEPARATE ENTITY FROM LAC COURTE OREILLES: Musky Bay is treated separately from LCO by Wis DNR. Musky Bay was listed in April 2012 as an impaired "bay/harbor" due to total phosphorus and as recently as 2016 (WisDNR 2016). The area of Musky Bay is given as 302 acres which is 34% larger than the 225 acres of Pratt and Neuswanger (2006). LCO is not mentioned as impaired. WisDNR (2018) does state, however, "'Water bodies' or 'waters' in impaired waters list summaries refer to **waterbody segments**. Rivers and streams are most often segmented." "Lakes are less often segmented but sometimes will have a bay counted as a seperate water."

> "That a bay is part of a lake would seem to be a given. But, in a surprising move, the WDNR has declared Musky Bay a separate body of water from the rest of the lake, even though a bay, by definition, only exists as part of a larger body of water. In making this declaration the WDNR has devised a way to allow much higher levels of phosphorus-40 ppb-in Musky Bay and in this way allow phosphorus from various known sources to continue to be discharged into Musky Bay unchecked. The problem remains, however, that what happens in Musky Bay happens to the lake as a whole" (Sivertson and Isham 2016).

I agree that Musky Bay is part of LCO, just like Green Bay is part of Lake Michigan and the Dulutth-Superior harbor behind the barrier sand bar (Minnesota and Wisconsin Points) is part of Lake Superior. I disagree , however with their assertion that Musky Bay should <u>not</u> be treated as a separate entity—I look at Musky Bay as if it were a forest stand, one of many, in a forested landscape—each stand to be treated separately.

In response to Siverston and Isham,

- Firstly, the statement re "in a surprising move" is in a document dated 2016 and Musky Bay, per se, was listed four years (2012) earlier—how can it be surprising in 2016? Have the writers been paying attention? This is patently false and designed to be inflammatory.
- Secondly, segments of lakes, just like streams or rivers, can be dealt with as separate entity (WisDNR 2018). Gordon (2017) states that "For the purposes of an "impaired" list and other environmental regulations, bodies of water are often broken up into distinct segments—an area of a lake, a specific stretch of a river—unless they're small. A given body of water can show up more than once on the list if multiple segments are included, or if any one segment exceeds regulatory limits for more than one pollutant given body of water can show up more than once on the list if multiple segments are included, or if any one segment exceeds regulatory limits for more than one pollutant." "…the agency uses a mix of ecological and geographic factors to determine what section of water is relevant to the list."
- Thirdly, the DNR has not "devised" a way to deliberately "allow much higher levels of phosphorus in Musky Bay…"
- Fourthly, this is a standard method and not some special device for the cranberry growers—it is applicable statewide.
- Fifthly, where is the proof that "…that what happens in Musky Bay happens to the lake as a whole." Where is the evidence for an irregularly shaped, large lake, such as LCO that this could or will happen—Musky Bay is relatively isolated from the main basins and bays of LCO and is fed by three streams from upstream lakes.

I concur with the WisDNR in treating Musky Bay as separate from the rest of LCO. Unique features supporting treating Musky Bay as a separate entity include:

- Geographically, it is largely isolated from the rest of LCO;
- Geographically. It is largely protected from wind action into the main part of LCO;
- Main part of LCO has a mean depth of 34 feet and maximum depth of Musky Bay is 18 feet.
- Substrate (extent and thickness) of Musky Bay historically and currently differs from most of main part of LCO;
- Fish species and populations of Musky Bay differ compared to the rest of LCO.
- Ecosystem processes and functions involving shallow, organic material substrates.

WATER LEVEL: Despite the official definition of impoundment, the WisDNR (2014) refers to LCO as an impoundment. "Drainage lakes owing one-half of their maximum depth to a dam are considered artificial lakes or impoundments" (WisDNR 2009). Artificial lakes or impoundments held at a steady can profoundly impact water quality. For example, for wild rice "...depths close to the ideal range for wild rice of 1–3 feet, appropriate low flow velocities (slow, but not stagnant), good water quality with a minimum of turbidity, moderate or sometimes low fertility, and a silty to mucky bottom" (WisDNR 2014).

The Wisconsin State Senate and Assembly in 1878 enacted legislation "to erect and maintain a dam or dams across Court Oreille river in the county of Chippewa, state of Wisconsin. … for the purpose of facilitating the running and driving of logs and timber to and down the Chippewa river." A dam was constructed shortly thereafter that rose the depth of Lac Courte Oreilles and most likely, but to a smaller amount, to facilitate the booming of logs across Lac Courte Oreilles and through Little Lac Courte Oreilles and down the flowage. The logs that were cut around Big Lac Courte Oreilles were pulled across the lake in booms by a side-wheeler steamboat. At that time there was a lift bridge over the thoroughfare between Big and Little Court Oreilles lakes (Winton and Winton 1980). The side-wheeler tug had a minimum draft of 2.5 feet. Thus, the Thoroughfare channel needed to be a minimum of about 4 feet deep at low water. Logs were towed to the outlet of Little Lac Courte Oreilles where they were then floated down to the mill at Signor, on the east side of Billy Boy Dam. That mill shut down about 1911 and was dismantled in or by about 1915 (Colby 2013). .

The last log drive on the Chippewa River was in 1917 (Town of Round Lake n.d.). There was a log pond at Reserve in 2016 where logs were loaded on to rail cars of the Blueberry Line (Wundrock 2008). The Blueberry Line owned by the Soo Line, completed to Reserve in 1903 and shut down in May 1931, replaced the need to drive logs on the river until trucking became more economical (Colby 2013). The early Billy Boy dam was no longer needed and fell into disrepair until the WPA began reconstructing it in the mid 1930s.

Goetz (1955) provides information on Billy Boy dam in the following (some my abridgement other direct quotation:

1. Billy Boy Dam some 3¼ miles below outlet of Court Oreilles Lake. Little Court Oreilles Lake below Lake Court Oreilles and much smaller.
2. Billy Boy Dam authorized by permit by Public Service Commission (PSC) docket 2-WP-232 of 3 Feb 1936 to hold the normal pool level at 97.47 ft. PSC datum, "which was expected to hold Little Court Oreilles Lake, Court Oreilles Lake, and Grindstone Lake at the same elevation"; in the past old logging dam at present dam site which fell into disrepair and was holding little head; present Billy Boy Dam constructed by WPA and owned by Sawyer County;
3. "The dam as constructed had a spillway 28 feet long with its crest at elevation 96.75 feet and a stop-log gate section 5.7 feet wide with its sill at elevation 92.75 feet."
4. Since dam in operation, numerous complaints of high water levels in the lakes; to alleviate high water, Sawyer County in 1939 widened bridge at Court Oreilles outlet and further widened the bridge and that at Little Court Oreilles Lake outlet in 1942.
5. Because of continuing high water levels in 1953 and 1954, PSC ordered that the upper 2 feet of spillway be lowered and that moveable gates be installed to replace that part of the spillway; "The combined effect of the channel improvement program and the lowering of the crest of the dam resulted in a gradual recession of water levels in the lake."
6. "The operation of the Billy Boy Dam as now equipped will affect water levels in the Billy Boy flowage. Little Court Oreilles Lake, Court Oreilles Lake, and Grindstone Lake. Other factors affecting the levels are:
    a. Sand and gravel ledge located about 3 miles upstream from the dam known as Belliles fishway;
    b. Bridge obstructions at the outlets of Court Oreilles and Little Court Oreilles Lakes.
    c. Profuse summer weed growth in the Billy Boy Dam impoundment.
7. May 4, 1935, before Billy Boy Dam reconstructed, Court Oreilles Lake water elevation = 96.99 ft.—probably at time of high relatively high high flow; since dam in operation minimum recorded elevation = 96.5 ft and occurred in early spring 1944; maximum recorded elevation = 98.9 (10 Sep 1942) following a "maximum storm"; before crest lowered in 1954, lake was at 98.3 ft;
8. "In 1942 the highway engineer for Sawyer County made a detailed study of water levels at Court Oreilles Lake and of factors influencing the levels and recommended that the normal level was at elevation 97.0 feet instead of 97.47 feet as originally determined. Investigations of the past 2 years have lent support to the lower figure."
9. "The interest of public rights in Court Oreilles Lake and the promotion of life, health, and property requires that the minimum level of said lake be established at 96.8 feet, Public Service Commission datum, and that the maximum of said lake be established at elevation 97.3 feet, same datum, in so far as the same can be effected by the proper elevation of the Billy Boy Dam; that both said minimum and maximum elevations are reasonable levels and will keep the level of said lake within a range which has been normal for said lake in the past."
10. "Public Service Commission datum is referred to its benchmark marked Public Service Commission of Wisconsin set on top of the right abutment wall of the dam. It elevation is 101.47 feet."
11. "Whitefish Lake lies south of and drains into Court Oreilles Lake. It is perched at a higher level…"
12. "Grindstone Lake levels are slightly higher than those in Court Oreilles Lake and fluctuate more or less with Court Oreilles Lake levels. The establishment of minimum and maximum water levels for Court Oreilles Lake will control Grindstone Lake levels."

The Commission concludes: "That it has the authority under section 31.02, Statutes, to establish the minimum level of Court Oreilles Lake at 96.8 feet, Public Service Commission datum, and the maximum level of said lake at elevation 97.3 feet, same datum, and to order the operation of Billy Boy dam to effect these levels."

"THE COMMISSION THEREFORE ORDERS:

1. "That the minimum level of Court Oreilles Lake be and is hereby established at 96.8 feet, Public Service Commission datum."
2. "That the maximum level of Court Oreilles Lake be and is hereby established at 97.3 feet, same datum."
3. "That the operation of the Billy Boy Dam shall be as follows:
    a. Whenever the level of Court Oreilles Lake is above elevation 97.3 feet, all of the gates in the Billy Boy Dam shall be fully opened and not closed until the water level in Court Oreilles Lake has declined to a point lower than elevation 97.3 feet.

b. Whenever the level of Court Oreilles Lake is below elevation 96.8 feet, all of the gates in the Billy Boy Dam shall be fully closed and not opened until the water level in Court Oreilles Lake has raised to a point above elevation 96.8 feet."

4. "That Sawyer County shall establish a permanent gauge of Public Service Commission at the premises of the George Hess Resort on Court Oreilles Lake."
5. "That no obstruction shall be placed in the outlet channel of Whitefish Lake nor shall the channel be deepened or widened to change the conditions represented by profile and cross sections in Exhibit 33 herein."

Currently, the acreage of Billy Boy flowage is listed as 71 by the U.S. Geological Survey (Anonymous 2016); this is after the reduction of the dam's height by 2 feet. Prior to the 2-foot reduction, the flowage was 845 acres in area (Conservation Commission of Wisconsin 1937).

Burgess and Burgess (2002) referring to the distant past mention long sandy beaches and tall, green bluffs along shores of LCO and the same for Little Lac Courte Oreilles. They also refer to the drought of the 1930s (especially 1936) "causing lake levels to fall dangerously low for its fish habitat and resulting in no small inconvenience to boaters. … a group of men even threw rocks under the Thoroughfare bridge, creating a small coffer dam in an effort to slow water movement from Lac Courte Oreilles." Then on 28 August rain began "and continued Aug 29. … As a result of the intense rainfall, 'lake levels rose to heights never before known.'" This demonstrates the fluctuating water levels in LCO; and within a 5 year period.

With respect to more recent water levels, T. Burgess (2006), the president of COLA at the time, referring to the low water level in 2006 stated,

> "According to county conservationist Dale Olson, the overriding cause is persistent drought, not overuse of well water, the gate setting on the Billy Boy Dam or the blockage of Osprey Creek at the northeast end. Olson says, even if the Billy Boy Dam was torn down, Big Couderay would experience very little change in water level while Little Couderay would drop only a small amount. While Big Couderay has many sources from several lakes, it drains only in one place, that being the Little Couderay inlet."

Burgess further states,

> Some of you will remember the same low water levels in the late 1950s to mid-60s, when precipitation trends were also downward. The last time we saw high water was in the early 1990s. The ups and downs are a natural process and actually don't hurt the lake in the long run, according to Scott Provost, water resources management specialist for the DNR. 'The natural flux has been happening for millennia and we know that many species of plants and animals have evolved to adapt to changing water levels,' he wrote in a recent issue of "Lake Tides."

LCO drainage is reduced (based on my personal observations along with that of others)

a) channel and floodplain of Grindstone Lake by the approaches to the County Highway K bridge which
extends the high flow periods into LCO,
b) LCO (Thoroughfare) by the western approach of the Thoroughfare Road bridge and the western channel by artificial fill,
c) Little LCO by the approaches to County Highway E bridge, and
d) Couderay River at the Billy Boy Flowage Dam. The Billy Boy Dam was authorized by the Wisconsin legislature in 1878 (Wisconsin State Senate and Assembly 1878) "for the purpose of facilitating the running and driving of logs and timber to and down the Chippewa river." This is not a problem, if the dam gates are operated in an ecologically responsible manner.

The impacts of high water on LCO include

(1) Bank erosion,
(2) Sedimentation,
(3) Contaminated groundwater flowing into lake,
(4) Increased nutrient flow from terrestrial shore line (in solution, attached to particles,
(5) Change aquatic vegetation communities,
(6) Increased/improved spawning habitat for northern pike,
(7) Damage to wild rice,
(8) Improved navigation for large power boats,
(9) Improved navigation from Billy Boy Flowage to Little LCO to LCO to Grindstone.

Does the improved navigation justify the long term ecological damage?

The questions:

(1) By holding water (seasonal and annual) at a standard high level year-round, DNR is upsetting the natural ecosystem processes including: system flushing, increased lakeshore erosion and sedimentation of adjacent water, increased northern pike spawning habitat—Why has WisDNR not looked into the negative effects of high, seasonal more-or-less non-fluctuating water level?
(2) How does power boat wave action and prop wash affect sediments and water clarity in shallow water due to access provided by high water?
(3) High water levels on LCO are flooding septic fields and pit toilets of the past that occupy sandy lowlands; nutrients (N,P) and bacteria (including fecal) are transported by this ground water how does DNR propose to address this input in determining N and P in nearshore waters? I am especially concerned about Grindstone (Anchor) Bay, Barbertown Bay, Musky Bay, the west shore of Lac Courte Oreilles, and other lowland areas.
(4) How do high water levels affect the growth of curly-leaf pondweed and impact the decaying of stems on D.O. and nutrient loading?
(5) How do high, end of season water levels impact shoreline filamentous algal growth?
(6) How do high water levels affect the spawning success of northern pike in LCO, Little LCO, and Billy Boy Flowage? And other fish?
(7) The partial blockage of the Lac Courte Oreilles system including the input channel from Grindstone Lake at County Highway K bridge and outlet bridges from LCO at Thoroughfare (one channel blocked by artificial fill) and outlet from Little LCO at the County Highway E bridge, all of which affect high water and flushing and Grindstone Channel by delaying high water inflow and P input needs attention—what will/can WisDNR do about high water level.? [Note: I do not want to see the Billy Boy dam removed but that it be regulated on ecological principles.]
(8) By adding to the height of the water column, how does impact plant biomass production in shallow waters?
(9) Does the improved navigation due to higher water justify the long term ecological damage?

NORTHERN PIKE: Northern pike have been in the Lac Courte Oreilles ecosystem above Billy Boy Dam for more than the alleged "introduction" in the mid 1940s. They could have been in the ecosystem for thousands of years. By suggesting that northern pike are invasive or non-native draws the attention away from having to deal with habitat change, natural and human caused. There is no question that there has been a northern pike population explosion during the last few decades. What has changed? Could it be spawning success? ted activities in recent years have promoted the expansion of northern pike into most of these lakes." Becker (1983) also pointed out that northern pike habitat is created when a small stream is converted into a lake (impoundment) since impoundments always have extensive shallows and marshy spawning habitat. I now quote from Crane et al. (2015):

> "Northern Pike commonly migrate at ice-out to shallow wetlands and littoral zones in lakes and river systems to spawn, often in waters <0.5 m deep (Clark 1950; Casselman and Lewis 1996), but spawning in water >3 m has also been documented (Farrell 2001). Since spawning occurs so early in the year, Northern Pike often disperse eggs over decaying vegetation from the previous summer. Northern Pike have adhesive eggs, and larvae have an adhesive gland on their head (Cooper et al. 2008), which maintains their location in the water column when attached to vegetation, thus avoiding anoxic substrates that are common in wetlands (Scott and Crossman 1973; Bry 1996). Seasonally-flooded terrestrial vegetation, such as grasses and sedges (*Carex* spp.), are believed to provide the highest-quality incubation habitat (Casselman and Lewis 1996). Seasonal flooding of these habitats releases terrestrial nutrients, creating a productive environment with ample food sources for recently-hatched larvae (Casselman and Lewis 1996). Aeration of seasonally-flooded habitats may also prevent micro-stratification and low dissolved oxygen levels at the substrate-water interface. Permanently submerged habitats dominated by macroalgae and vegetation, such as *Chara* spp., *Potamogeton* spp., and *Myriophyllum* spp., are also used but probably provide poorer-quality habitat compared with flooded terrestrial vegetation (Casselman and Lewis 1996)."

High water levels have certainly occurred in the past especially with reference to the operation of Billy Boy dam. Similarly, low water levels have occurred. Seasonal precipitation also impacts the water level, as elucidated by Burgess and Burgess (2002).

The questions beg:

(1) How will WisDNR eliminate within WisDNR the fallacy that northern pike are not native to LCO in order to determine/address the real issues?
(2) Can WisDNR identify/monitor throughout LCO, Little LCO, Billy Boy Flowage northern pike spawning areas?
(3) What can WisDNR do to lower spring high water levels (i.e., adjust Billy Boy operating levels) to minimize northern pike spawning areas?
(4) How has the fish habitat changed in LCO? And what are the specific changes and causes?

pH: State of Wisconsin standards for pH state that the pH of lake waters shall be within the range of 6.0 to 9.0, with no change greater than 0.5 units outside the estimated natural seasonal maximum and minimum (WisDNR 2017). Pratt and Neuswanger (2009) state the pH of LCO is 7.5 with a range of 6.9 to 7.9). The WisCALM minimum pH data requirement for lakes and reservoirs is 10 values from separate calendar days (year round) from the epilimnion (upper) layer (Beranek and Smith 2017).

Wilson and Tyrolt (2009) provide pH data for Musky Bay MB-1 site for the summer of 2003. Inspection of their Figure 13, indicates an approximate pH range from 8.2 to 10.2 for June, 7.8 to 10.2 for July, 7.8 to 9.4 to 10.2 for September. They state, that the plotted data "show pH excursions in excess of 10 pH units during the 2003 growing season (LCO Conservation, 2004, graph from LCOCD report…" The scientific range of pH values is 0-14; their statement regarding "10 pH units" is wrong and misleading. Inspection of the figure show an approximate range of 2.6-2.7 with a distinct variation with depth with the higher pH values closer to the surface. Wilson and Tyrolt (2009) state, "The range of pH values strongly suggests the need for further examination and warrants consideration for impairment."

The WisCALM minimum pH data requirement for lakes and reservoirs is 10 values from separate calendar days (year round) from the epilimnion layer

I concur with the need for further examination/review with respect to pH values and their effects on lacustrine physical processes and biota. pH is a key factor in shaping the structure of bacterial communities. Bacterioplankton are a crucial component of aquatic ecosystems that play a role in the ecological processes of freshwater lakes (for example, the breakdown of organic carbon and the species composition of the bacterioplankton community are strongly influenced by water pH (Ren et al. 2015). Unclear is the impact of increasing pH on the bacterioplankton community. Mercury concentrations were greatest in fish from Wisconsin lakes with pH values <7.0 with concentrations in sampled fish equaling or exceeding 0.5 mμg/g in 88% of the samples and 1.0 mμg/g in 44%. In lakes with pH of >7.0, concentrations exceeded 0.5 mug/g in only 1 of 21 walleyes (Wiener et al. 1990).

If, as COLA suggests that pH may be grounds for listing a waterbody as impaired, the questions beg:

(1) What depth should the pH sample be taken?
(2) What is basis for pH range of 6.9 to 9.0 in non-industry contaminated waters (i.e., natural waters)?
(3) What is the daily, monthly, annual pH profile tied to depth and what is the significance
(4) Before considering for listing based on pH, will WisDNR commission a review study on the effects of pH on freshwater ecosystem processes and biotic communities?

CLIMATE CHANGE: Climate change due to natural processes and human caused activities has long been recognized. In proposing the listing of LCO as impaired due to Low D.O., has the WisDNR considered climate change as being a natural agent of change? How does climate change affect the productivity of aquatic vegetation? How does climate change, specifically warming, impact lake vegetation productivity and decay? water temperatures? How does climate change affect the productivity of aquatic vegetation? How does climate change, specifically warming, impact lake a two-story lake.

Sivertson (2016) notes, "The impact of a changing climate threatens to further exacerbate algal productivity and reduce habitat." The statement is incorrect, it should read, "The impact of increased algal productivity further exacerbates the changing climate effects on desirable fish species and habitat."

PHOSPHORUS: Revisions to Wisconsin's Phosphorus Water Quality Standards became effective on December 1, 2010. These revisions are reflected in two separate chapters of the Wisconsin Administrative Code. Chapter NR 102 (Wis. Adm. Code) includes water quality criteria for the protection of fish and aquatic life as well as human health. Chapter NR 217 (Wis. Adm. Code) includes regulations on how the water quality criteria for phosphorus will be used to establish water quality based effluent limitations for point source discharges subject to permits under the Wisconsin Pollution Discharge Elimination System (WPDES) (WisDNR 2017).

Applicable statewide P criteria pursuant to NR102.06, Wis. Adm. Code (Wisconsin State Legislature 2010; .

Waterbody type	P Criteria (µg/L)
Rivers	100
Streams	75
Reservoirs:	
▪ Stratified	40
Lakes:	
▪ Stratified, two-story fishery	15
▪ Stratified, seepage	20
▪ Stratified, drainage	30
▪ Non-stratified, drainage	40
▪ Non-stratified, seepage	40

Lac Courte Oreilles is a Stratified, two-story fishery, drainage lake that also receives seepage water from the adjacent terrestrial landscape such as the morainal hills, outwash gravels and sands, wetlands, and lakes including Grindstone, Gurno, Whitefish, Minnemac, Schoolhouse, Durphee, Johnson and possibly others. Brown (1915) refers to the Courte Oreilles lakes as "being spring fed"

The P criteria for Lac Courte Oreilles, a Stratified, two-story fishery Drainage Lake, is 15 µg/L. I support the WisDNR decision not to list LCO as impaired due to the phosphorus levels.

DISSOLVED OXYGEN: Revisions to Wisconsin's Dissolved Oxygen Standards became effective on December 1, 2010. The revisions provided in Chapter NR 102 Wisconsin Administrative Code. includes water quality criteria for the protection of fish and aquatic life as well as human health. **Except for natural conditions the dissolved oxygen content in surface waters may not be lowered to less than 5 mg/L at any time**. Similarly, with reference to cold waters (trout waters, or specific cold water communities), the dissolved oxygen content "may not be altered from natural background dissolved oxygen levels to such an extent that trout populations are adversely affected."

Low Dissolved Oxygen levels, levels below the minimum for fish survival naturally occur in LCO. Evidence includes fish kills of the past 50+ years and records dating back to 1975 (WisDNR Water Quality Bureau 2018)—see the table, "Annual number days sampled for Dissolved Oxygen and number of days for which D.O. samples were <5.0 µg/L (from Water Quality Bureau (WisDNR 2018))." The tables provide D.O. values for samples from the surface to depths of 85 feet including samples from well within the hypolimnion.

The data used in attempting to get LCO listed as impaired due to Low Dissolved Oxygen was provided to the WisDNR by COLA with supplemental from the WisDNR and the LCO Tribe for the years 2012-2016 for three sampling sites: West Basin (LCO-2), Center Basin (LCO-3), and East Basin (LCO-4) (Beranek and Weigel 2017). Beranek and Weigel (2017) describe their terms of reference for determining if the body of water is impaired; they start:

> "A layer of water that is cold enough but with high enough dissolved oxygen for coldwater fish species.

- ≤ 66 F temperature (protective of whitefish)
- ≥ 5 mg/L DO (Wis. Admin. Code NR 102.04(4)(a))
- 3.3 feet (1 meter) habitable water layer for coldwater fish;

If any date within a year has a habitable layer less than 3.3 feet then that year is considered "impaired." If more than 1 of 3 years is impaired then the lake is determined to be impaired;. "While these methods are not yet in the state's WisCALM guidance for assessing DO in lakes, these methods are more accurate for assessing whether or not this lake is meeting fish and aquatic life use."

The above causes concerns

(1) This is not in the Wisconsin 2018 Consolidated assessment and listing methodology (WisCALM) for CWA Section 303(d) and 305(b) Integrated Reporting. Guidance# 3200-2017-02 April 17, 2017 (WisDNR 2017). Would the result be any different?
(2) How does water temperature interact with D.O. in terms of whitefish survival?
(3) How did the WisDNR arrive at a thickness depth of 1 m for the thermocline (metalimnion) and does it vary with depth?

"Low DO can be used as an impairment indicator. This standard implies an activity that causes a change in DO above and beyond natural variability, or some uncontrollable factor (such as drought)." What human activity has caused the Low D.O. level at times in Lac Courte Oreilles proper? "The cause of Low DO is not yet determined so the pollutant is proposed to be 'Unknown Pollutant'" (Beranek and Weigel 2017).

Low D.O. has been recorded on the lake for many years, the following table supports that statement:, Two columns are provided for each station/sample site. The left column is the number of days thath sampling was done in a particular year; the right column (DO.) indicates the number of days samples had a Dissolved Oxygen level of less than 5 µg/L. Sample depth varied by site and year and sample depth ranged from the surface to 85 feet. The result of this variability prohibits usin this Table for anything other than its intent—showing the long term existence of Low Dissolved Oxygen levels in LCO. and the variability in sampling. Note that sample the earliest sample is dated 1975.

Table. Annual number days sampled for Dissolved Oxygen and number of days for which Disssolved Oxygen samples were <5.0 µg/L (from Water Quality Bureau (WisDNR 2018).

Year	583068		583077		583071		100392		100394		583067		1039052		583046		10033577		10038981	
	No. Days	D.O. < 5.0	No. Days	D.O. < 5.0	No. Days	D.O. < 5.0	No. Days	D.O. < 5.0	No. Days	D.O. < 5.0	No. Days	D.O. < 5.0	No. Days	D.O. < 5.0	No. Days	D.O. < 5.0	No. Days	D.O. < 5.0	No. Days	D.O. < 5.0
1975															2	1				
1976															2	1				
1977															3	1				
1978															2	1				
1979															2	2				
1980																				
1981																				
1982																				
1983																				
1984																				
1985																				
1986															3	2				
1987															3	2				
1988															3	2				
1989															6	6				
1990															5	5				
1991															5	4				
1992															5	4				
1993															5	4				
1994															5	4				
1995															5	4				
1996															5	4				
1997					1		1	1			1		1		6	4	1			
1998					4	1	4	2			5	2	6		4	3	6	4		
1999																				
2000					2		2				2	2	2		2	2	8	2	6	
2001					3	1	3	1			4	4	4		3	2	13	3	16	
2002					4		4				4	4	4		5	3	8	4	8	1
2003					4	1	4	1			4	3	4		6	3	13	7	13	4
2004															1		8		13	1
2005															4	3				
2006															3	2				
2007					2	1					2	2			4	4	6	4	6	
2008					1		1	1	1		1	1			4	4	13	8	16	1
2009	1				1						3	1			3	3	16	11	15	6
2010					4		4				6	6			6	5	16	12	9	2
2011					4		6	2			3	3			10	7	18	13	14	5
2012			17		18	1	18	3			18	16			18	16	18	10	17	3
2013			18		15		18				18	15			18	13	13	3	18	5
2014			5		7	1		4			8	4			10	7			12	5
2015					8	3		8	3		10	6			11	8				
2016			8		8	3		8	3		11	8			11	8				
2017															3	3				

Table (cont.). Annual number days sampled for Dissolved Oxygen and number of days for which Disssolved Oxygen samples were <5.0 µg/L (from Water Quality Bureau (WisDNR 2018).

10038983		10038982		10038984		10038854		10038855		583097		10044724		583066		10038985	
No. Days	D.O. < 5.0	No. Days	D.O. < 5.0	No. Days	D.O. < 5.0	No. Days	D.O. < 5.0	No. Days	D.O. < 5.0	No. Days	D.O. < 5.0	No. Days	D.O. < 5.0	No. Days	D.O. < 5.0	No. Days	D.O. < 5.0
										1							
														9	8		
1		6												2	2		
15		16												1	1	4	1
8		7	1							4				4	3	12	
10		13	1							6				4	3	18	
10	3	10														18	
																9	
6		7								2				2	2		
10		13	1							1	1			2	2		
12		14								1				1			
13		9	2	7	1	7		7		18	2			3	3	12	5
14		14	5	9	4	9		10		18	3			3	3	18	5
14		17	1	4		4		5		18	3			6	6	18	
15	1	18	3	3		4		3		18	14	18	14	18	14	9	5
		13	3							8	1	6	5	7	5	12	5
														10	7		
										8	7			14	12	11	8

WisDNR (2017) requires "[a] minimum of 10 discrete samples D.O. over a period of five years that were collected on separate calendar, ice-free days from each assessment station. Since LCO is a two-story lake samples should be taken preferably at 1 meter or less intervals from the surface. "Two-story lake profiles with increments larger than 1 meter will be accepted but may not be useable for determining where cold water fish species are present in the water column."

Based on the above, no valid human cause exists for listing LCO as impaired due to Low Dissolved Oxygen. Therefore, LCO must be removed from the proposal for listing list.

SUMMATION

An ecosystem approach to managing the waters of Lac Courte Oreilles involves the integration of all biotic abiotic factors. An ecosystem approach recognizes the interaction of all factors. In challenging the proposed listing of Lac Courte Oreilles as impaired, within the limited resources and time available, I attempted to show that Dissolved Oxygen cannot be taken by itself without involving other factors; two examples climate change and water levels. Climate change can increase water temperatures which in turn can influence aquatic plant growth which in turn can influence the amount of organic detritus to the accumulating on the lake bottom which on decay releases plant nutrients (nitrogen and phosphorus to the water. Climate change can favor one species (e.g., plants, animals, plankton) and disfavor another, for example warming water will disfavor coldwater fish species and favor warm water species such as largemouth bass. High, non-fluctuating water levels can change species and aquatic communities, can result in shoreline erosion, sediment in the water column and deposition on a lake's bottom, can change biomass productivity of aquatic plants, Ecosystem management must involve factual knowledge and not be swayed by unfounded rumors, speculations, and opinions which are rife in northern Wisconsin; information must be vetted in positive way. This report challenges the proposed listing of Lac Courte Oreilles as impaired due to low Dissolved Oxygen levels. The listing should be delayed, primarily due to it being environmental (climate change) for which there is no "fix" and historical.

CONCLUSION

At 77 years of age with memories of Lac Courte Oreilles area dating back to the mid 1940s, I am still concerned about the condition of Lac Courte Oreilles now and into the future. With or without the inclusion of Musky Bay, Lac Courte Oreilles **should not be listed as impaired** due to low Dissolved Oxygen, temperature, or phosphorus, pH, and questionable statistics. Lac Courte Oreilles should not listed as "Impaired" as currently proposed due to Low Dissolved Oxygen Levels documented as naturally and historically occurring for more-more-less 40 or more years.

Questions and challenges summary follows.

QUESTIONS/CHALLENGES TO LISTING LAC COURTE OREILLES (LCO) AS IMPAIRED

STATISTICS:

(1) What sample locations were/are used in determining average values for LCO.
(2) How were the period of record and varying number of samples between locations and within a year addressed?
(3) Did WisDNR ignore data of the past (pre 15 years ago) (ambient) which suggest current levels of phosphorus, low Dissolved Oxygen levels, and temperature are not that unusual and may not be basis for listing (, as basis for consideration of listing (I recognize P is not considered as cause for listing but one vociferous group insists it is and distracts from the other real problems); where are the comparisons between now and then?
(4) A better distribution of sampling sites is needed that is representative of the entire lake.

MUSKY BAY AS SEPARATE ENTITY FROM LAC COURTE OREILLES

I concur with and support WisDNR maintaining Musky Bay as a separate entity; however,

(1) WisDNR must elucidate the rationale for treating Musky Bay separate from LCO.;WisDNR must resist any attemps by COLA or others to include Little LCO as part of LCO (see COLA 2017) reference to Eurasian milfoil in LCO);
(2) Soils map (USNRCS) (large composite, not piecemeal) be provided to each Town partially within the LCO watershed for planning purposes;
(3) Vegetation communities (including farm land and type of farm, lawns) surrounding minimally both Musky Bay and Stukey Bay must be mapped;
(4) Homes and cottages surrounding both Musky Bay and Stukey Bay must be mapped;
(5) All point sources of contaminants discharging into waters of the LCO watershed should be mapped and sampled.

WATER LEVEL:

(1) By holding water (seasonal and annual) at a standard high level year-round, DNR is upsetting the natural ecosystem processes including: system flushing, increased lakeshore erosion and sedimentation of adjacent water, increased northern pike spawning habitat—Why has WisDNR not looked into the negative effects of high, seasonal more-or-less non-fluctuating water level?
(2) How does power boat wave action and prop wash affect sediments and water clarity in shallow water due to access provided by high water?
(3) High water levels on LCO are flooding septic fields and pit toilets of the past that occupy sandy lowlands; nutrients (N,P) and bacteria (including fecal) are transported by this ground water how does DNR propose to address this input in determining N and P in nearshore waters? I am especially concerned about Grindstone (Anchor) Bay, Barbertown Bay, Musky Bay, the west shore of Lac Courte Oreilles, and other lowland areas.
(4) How do high water levels affect the growth of curly-leaf pondweed and impact the decaying of stems on D.O. and nutrient loading?
(5) How do high, end of season water levels impact shoreline filamentous algal growth?
(6) How do high water levels affect the spawning success of northern pike in LCO, Little LCO, and Billy Boy Flowage? And other fish?
(7) The partial blockage of the Lac Courte Oreilles system including the input channel from Grindstone Lake at County Highway K bridge and outlet bridges from LCO at Thoroughfare (one channel blocked by artificial fill) and outlet from Little LCO at the County Highway E bridge, all of which affect high water and flushing and Grindstone Channel by delaying high water inflow and P input needs attention—what will/can WisDNR do about high water level.? [Note: I do not want to see the Billy Boy dam removed but that it be regulated on ecological principles.]
(8) By adding to the height of the water column, how does impact plant biomass production in shallow waters?

NORTHERN PIKE:

(1) Will WisDNR eliminate within WisDNR the fallacy that northern pike are not native to LCO in order to determine/address the real issues? Alternatively, what is evidence that northern pike are not native?
(2) Can WisDNR identify/monitor throughout LCO, Little LCO, Billy Boy Flowage northern pike spawning areas?
(3) What can WisDNR do to lower spring high water levels (i.e., adjust Billy Boy operating levels) to minimize northern pike spawning areas?
(4) How has the fish (all species) habitat changed in LCO and what are the specific changes and causes?

pH:

If as COLA suggests that pH may be grounds for listing a waterbody as impaired, the questions beg:

(1) What depth should the pH sample be taken?
(2) What is basis for pH range of 6.9 to 9.0 in non-industry contaminated waters (i.e., natural waters)?
(3) What is the daily, monthly, annual pH profile tied to depth and what is the significance

(4) Before considering for listing based on pH, will WisDNR commission a review study on the effects of pH on freshwater ecosystem processes and biotic communities?

CLIMATE CHANGE

(1) How does WisDNR factor in climate change into the impairment process?
(2) How does WisDNR factor climate change into lake management planning beyond the modelling stage?
(3) Does climatic change suggest that some species should not be managed for in some Lakes?

PHOSPHORUS:

I concur with the WisDNR not listing LCO as impaired due to phosphorus; I also concur with WisDNR listing Musky Bay as impaired.

DISSOLVED OXYGEN

(1) The D.O. minimum "standard implies an activity that causes a change in DO above and beyond natural variability, or some uncontrollable factor (such as drought)." What human activity has caused the Low D.O. level at times in Lac Courte Oreilles proper?
(2) If there is no documentable human activity/cause for the Low D.O. level, it is natural and cannot be considered as a basis for listing LCO as impaired; which begs the question "Why was the proposed impairment listing even made in the first place?
(3) How does one remove an impairment listing due to climate change or does the LCO remain impaired forever?
(4) Fish (whitefish) summer kills have happened numerous times in the past 50 plus years in Wisconsin and Minnesota. With a history of fish kills; how does WisDNR (and COLA) consider the 2015 and 2016 summer kills to be an indicator of an impairment? Could the kills be due to marginal habitat conditions?
(5) What human activity has caused the Low D.O. level at times in Lac Courte Oreilles proper?
(6) Procedure for determining impairment is not in the Wisconsin 2018 Consolidated assessment and listing methodology (WisCALM) for CWA Section 303(d) and 305(b) Integrated Reporting. Guidance# 3200-2017-02 April 17, 2017 (WisDNR 2017). Would the result be any different?
(7) How does water temperature interact with D.O. in terms of whitefish survival?
(8) How did the WisDNR arrive at a thickness depth of 1 m for the metalimnion and does it vary with depth?

(9) Action required: WisDNR remove LCO from the proposed impaired list!

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Edmond C. Packee
Edmond C. Packee, Sr., Ph.D.
Certified Forester #568; Certified Professional Soil Scientist #1709

14225w Courte Oreilles Lake Drive
Hayward, WI 54843
24 March 2018

Ms. Ashley Beranek
Water Resources Management Specialist
Wisconsin Department of Natural Resources
PO Box 7921
Madison, WI 53707-7921

VIA e-Mail: Ashley.Beranek@Wisconsin.gov

Dear Ms. Beranek:

I am concerned about the water quality and health of Lac Courte Oreilles, Sawyer County, Wisconsin, but I am opposed to the listing of Lac Courte Oreilles, Sawyer County, Wisconsin as impaired due to oxygen-depletion during the summer months. My opposition is due to the fact that I have seen summer lake whitefish (*Coregonus clupeaformis*) kills on Lac Courte Oreilles frequently over seven decades; this suggests strongly that the fish kills due to summer oxygen depletion are natural and should be exempt from impairment listing. I reiterate, **I oppose listing Lac Courte Oreilles as impaired due to naturally caused oxygen-depletion during the summer months**.

Introduction

With that said, allow me to introduce myself. I am Edmond C. Packee, Sr. I hold a Ph.D. from the University of Minnesota (1976), a M. Forestry from Yale University (1963) and a B.Sc. Forestry from the University of Montana. I am 77 years old and have visited/lived on the shore of Lac Courte Oreilles (Northwoods Beach) from nearly the time I was one year old. I remember my first deer (two) on County K on Mullally Hill with my mother en route to pick up my dad at the railroad station in Stone Lake, Wisconsin. I was/am a voting resident in the Town of Bass Lake, Sawyer County, Wisconsin from 1966 through 1982 and again since 2007. Except for my college years 1959 through 1965, I visited Lac Courte Oreilles annually until I retired to the property of my grandparents and parents which I now own. I was professionally employed by the U.S. Forest Service in northwestern WI on the Hayward District of Chequamegon National Forest, Mac Millan Bloedel Limited, Nanaimo, British Columbia, Canada (the largest forest products company in Canada) on the entire west coast of Canada, and the University of Alaska Fairbanks in interior and southcentral Alaska. I am a Certified Forester and a Certified Professional Soil Scientist. Currently, I am semi-retired but do free-lance consulting (AK, ID, WI).

Naturally occurring environmental events, are not directly human caused. As such they are exempt from being listed as impaired. I quote from the Cleveland State Law Review of 2008 (Balanson 2008), "On June 8, 2007, the Eleventh Circuit Court of Appeals, in Sierra Club v. Leavitt, rendered a decision that placed its judicial imprimatur on U.S. Environmental Protection Agency ('EPA') policies providing states with the ability to exclude water bodies from their impaired waters list when their condition fails to meet water quality standards due solely to naturally occurring conditions.[1] For example, in 2002 the Florida Department of Environmental Protection ('FDEP') claimed that several streams had low dissolved oxygen[2] levels due to 'a natural condition,'[3] likely stemming from hypoxic waters draining into the streams from surrounding wetland and swamps.[4]" Foot note 4 states, "Extreme examples of the effect of low dissolved oxygen include the 'dead zones' in Lake Erie. off the coast of Cape Perpetua, Oregon and the Gulf of Mexico, as well as fish die-offs in ponds and lakes during summer months."

Summer oxygen-deficiencies have occurred in Lac Courte Oreilles for decades. Lac Courte Oreilles, being on the southwest edge of the range of whitefish in the Great Lakes region, is marginally suitable, climatically, for whitefish and probably cisco. Long term climatic change, both natural and human caused, is most likely the primary cause, in some years, of fish die offs due to the warming of the water. The frequency of such conditions resulting in fish kills is most likely increasing.

If currently in effect, as stated by Balanson (2008), "Wis. ADMIN. CODE NR § 104.01 (2007) ('Surface waters which because of natural conditions are not conducive to the establishment and support of the

complete hierarchy of aquatic organisms shall not be degraded below present levels, but shall be upgraded as necessary to support assigned uses'" raises several issues which need to be specifically addressed before listing:

- How does one realistically offset climatic change (warming), i.e., cool the water?
- Other than whitefish and possibly cisco, how significant is the impact on the hierarchy of organisms?
- What effect does intermittent periods of oxygen-deficiency have on Lac Courte Oreilles' ecosystem processes and functions? How does the lake adjust or recover?
- What and how are assigned uses significantly impacted by oxygen-depletion?
- The extinction of whitefish and/or cisco in Lac Courte Oreilles is not the extinction of the species, so what is the real concern? Will other species substitute for cisco as forage fish?
- Similarly, what is the concern of losing a two-story lake? a) suitable to support whitefish and cisco and b) simply for saving that particular lake environmental setting?—there are many more similar lakes in existence in Wisconsin and elsewhere!
- Can we have a healthy lake without whitefish? Without cisco?

Other than climatic change (warming) and the reality that Lac Courte Oreilles is in a tension zone between acceptable conditions and unacceptable conditions for whitefish and possibly cisco, there is no clear evidence that there is any other significant cause for the oxygen-depletion. Because there are some correlation does not mean cause and effect. Where is the scientific evidence showing a significant impact? The Courte Oreilles Lake Association (COLA) is convinced that phosphorus is the cause of many of the problems in Lac Courte Oreilles. Science challenges that. Their efforts in 2017 to get Lac Courte Oreilles declared as impaired due to phosphorus (COLA 2017) failed (WisDNR 2018) due, in part, to COLA's errors in methodology and interpretations as well as supporting science.

Whitefish kills have occurred in Lac Courte Oreilles numerous times in the past. I remember kills from my days in grade school (prior to 1954) and high school and thought the whitefish were suckers because of their mouth characteristics. Becker's 1983 range map does not show lake whitefish in western Wisconsin and notes the only records in the Mississippi River drainage are from Vilas County.

I have eaten whitefish from Lac Courte Oreilles; I picked them up when they were belly up but still barely moving their tails. I remember one major kill in the early 1980s (prior to my dad's passing in fall of 1985) when there were more than a hundred floating belly up in the east basin. I picked two of those out of the water and we had them for dinner—knew what they were because of my experience (since 1963) with salmon spawning efforts in British Columbia and Alaska.

Lac Courte Oreilles is two-story lake that supports both lake whitefish and cisco. It is located near the southern limit of two-story lakes in Wisconsin and Minnesota. It is north of Driftless Area. It is in the Couderay River system, a tributary of the West Fork of the Chippewa River. Lakes draining into Lac Courte Oreilles include Grindstone Lake and Whitefish Lake, both two story lakes, and Round Lake; the Lake Sissabagama-Sand Lake system drains into Whitefish Lake. Table 1 provides lake characteristics. Note that in Sawyer County, for lakes supporting lake white fish range in depth from 60 to 105 feet.

In Sawyer County, Lac Courte Oreilles, Grindstone Lake, and Whitefish Lake support both lake whitefish and cisco, three of the five lakes in Wisconsin known to support both species; only four additional Wisconsin lakes are known to support whitefish (Lyons et al. 2015). Many more lakes in Wisconsin support cisco than whitefish (Lyons et al. 2015). This suggests the ecological amplitude of cisco in Wisconsin is greater than for whitefish; cisco are present across southern Wisconsin (Lyons et al 2015, Fuller and Nielson 2018a).

It appears that whitefish within Sawyer County are on the southwestern edge of their Wisconsin range (Lyons et al. 2015) and their native range in the U.S. west of the Lake Michigan drainage (Scott and Crossman 1973, Fuller and Nielson 2018b). Wisconsin is similar to the lake whitefish being near the southwest range limit of the cisco (Scott and Crossman 1973, Fuller and Nielson 2018a).

Table 1. Characteristics of Couderay River headwater lakes (various WisDNR sites)

Lake	Acres	Max. Depth	Clarity	Trophic Status	Fish sp.

		Feet		(Sum)	WF C M NW
Ashegon	75	56	Mod	Meso	X X X X
Grindstone	3176	60	Very	Oligo	X X X X X
Lac Courte Oreilles*	5279	90	Very	Oligo	X X X X X
Little Round	229	38	Very	---	X X X X
Round	3294	74	Very	Oligo	X X X X
Sand	949	50	Low	Eutro	X X X
Sissabagama	805	48	Low	Eutro	X X X
Whitefish	800	105	Mod	Meso	X X X X X
Windigo	503	51	Low	Eutro	X X

Possible causes for low oxygen (hypoxia) content in the waters of Lac Courte Oreilles

Aquatic hypoxia, although commonly considered to be caused by pollution and eutrophication, has been a common problem on Lac Courte Oreilles (exclusive of Musky Bay) for decades, if not centuries which suggests that the resulting summer whitefish kills are not something new. So, what has changed? Climate is one factor that has been changing and warming since the end of the Ice Age. Two questions concerning climate beg:

1) What has been the past aquatic climate been?
2) What affect has been the long term (natural) and short term (human) climate change impact been?

The first two sentences in the abstract of Read et al. (2014) state, "Changes in water temperatures resulting from climate warming can alter the structure and function of aquatic ecosystems. Lake-specific physical characteristics may play a role in mediating individual lake responses to climate." Temperature is a controlling factor for many ecosystem processes in the air, in water, in organic and mineral materials. It is a "master" factor for many aquatic ecosystems. Lake temperature affects lake stratification, ice-cover and snow-cover duration, aquatic vegetation growth, senescence, decay which affect aquatic oxygen levels, and fish movement and spawning.

The most likely causes of summer hypoxia are climate-related and include:

- Pre-existing climate conditions: Current environmental and hence ecological conditions, including summer hypoxia.
- Climatic warming (natural): Current Lac Courte Oreilles conditions relict of the past; there is a lag time for lake temperature changes, especially deep-water.
- Storm and normal wind wave action disturbs sediments (mineral and organic) placing them in suspension, reducing water clarity and in the case of organic sediments increasing organic decay and release of nutrients,
- Natural highwater level (seasonal [spring high and decreasing thereafter except after heavy, short term rainfall which results in an increase in water level] increases wave related erosion.
- Terrestrial vegetation litter (pollen, flowers, leaves, fruits/ seeds) that fall directly into the water, are blown into the water, or picked up from the shore during periods of high water transfer organic and mineral components from the land to the water. Within a species, different parts have different quantities of nutrients, Different species have different amounts of nutrients, for example, in the laboratory, percent soluble phosphorus leached from the leaves of poplar is more than double that of oak (Cowen and Lee 1973).

Human caused high water (long term) can exacerbate (increase and duration) summer hypoxia

- ✓ Increased water column height prolonged through the growing season provides more growing space for increased biomass production,
- ✓ Increased bank erosion resulting in increased organic and mineral soil particles and soluble and insoluble nutrients to enter the lake,
- ✓ Increased leaching of nutrients from the soil (pit toilets, NPK fertilizer from the past, current NK fertilizer to compliment available/surplus P in the lake),
- ✓ Wave action exacerbates bank erosion
- ✓ Allows boat access where not possible in the past especially in shallow water which increases area available for propeller disturbance of the sediments

Boat traffic (human) (see Asplund 2000 for detailed analysis and summary of potential effects)

- ✓ Wave action of boats especially near shore and disturbance of sediments and shoreline erosion; this is particularly a problem near shore with sudden reduction in boat speed or sudden acceleration in boat speed and sharp turns create larger than normal waves;
- ✓ Prop disturbance of sediments down to depth of 20 or more feet;
- ✓ Phosphorus and other elements from outboard and inboard motor exhaust (as in vehicle exhaust) impacts aquatic plant growth;
- ✓ Breaking up aquatic vegetation (weeds and algae) unnaturally adds to the organic sediments.

Recommendations

- Since there is little or no scientific evidence to demonstrate a specific pollutant or human activity is creating or increasing summer hypoxic conditions in Lac Courte Oreilles (exclusive of Musky Bay),
- Since Wisconsin DNR denied the Impairment Listing of Lac Courte Oreilles Due to Phosphorus levels not being a threat,
- Since there is evidence to suggest that whitefish kills, are the results of natural hypoxic events have been occurring for decades and probably centuries,

I encourage/recommend that Wisconsin DNR not list Lac Courte Oreilles as impaired to the U.S. EPA.

- The following questions, previously raised, need to be addressed:
  - ✓ How does one realistically offset climatic change (warming), i.e., cool the water?
  - ✓ Other than whitefish and possibly cisco, how significant is the impact on the hierarchy of organisms?
  - ✓ What effect does intermittent periods of oxygen-deficiency have on Lac Courte Oreilles' ecosystem processes and functions? How does the lake adjust or recover?
  - ✓ What and how are assigned uses significantly impacted by oxygen-depletion?
  - ✓ The extinction of whitefish and/or cisco in Lac Courte Oreilles is not the extinction of the species, so what is the real concern? Will other species substitute for cisco as forage fish?
  - ✓ Similarly, what is the concern of losing a two-story lake? a) suitable to support whitefish and cisco and b) simply for saving that particular lake environmental setting?—there are many more similar lakes in existence in Wisconsin and elsewhere!
  - ✓ Can we have a healthy lake without whitefish? Without cisco?

I encourage/recommend that Wisconsin DNR not list Lac Courte Oreilles as impaired to the U.S. EPA until
these questions are answered.

- Since there is no monthly climatic (atmospheric or aquatic) summary of climatic conditions over the past decades (century?) and no anecdotal information (e.g., ice out, drought years, flooding), is readily available for the headwater lakes of the Couderay River,
- Since there is no historic annual or monthly water level summary for Lac Courte Oreilles, Lake Grindstone, and Whitefish Lake,

I encourage/recommend that the Wisconsin DNR summarize monthly climatic and water level data (both measured and anecdotal) because such data are critical for understanding current and past biotic processes/changes/causations and for predicting future biotic change. See Read et al. (2014) for lake ecosystem modeling.

- Since the published record of the presence of whitefish and whitefish kills in Lac Courte Oreilles is incomplete,

I encourage/recommend that the Wisconsin DNR develop and conduct a survey asking current and former long term residents (seasonal and full time) and regular visitors of the past about historic fish kills that they remember.

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From: Keclik, Donna
To: Beranek, Ashley E - DNR
Subject: questions on the 2018 public notice version of the Wisconsin 303(d) list.
Date: Monday, January 22, 2018 2:48:11 PM

Ashley,

After my review of the waters on the proposed 2018 list I have a few questions.

1. Some of the waters you have identified on the 2018 list I did not find on the 2016 list. Please confirm that these are new waters or new pollutants

Official Waterbody Name	Local Waterbody Name	Counties	Water Type	WATERS ID	WBIC	Segment	Start Mile	End Mile	Length/ Size	Measurement Unit	DNR Category	Date Listed	Source Category	Pollutant	Impairment Indicator	Status	TMDL Priority	Listing Detail
Dell Creek	Dell Creek	Juneau, Sauk	RIVER	6897810	1295200	5	15.82	19.25	3.43	MILES	Category 5P	4/1/2014	NPS	Total Phosphorus	Impairment Unknown	TMDL Development	High	Phosphorus Listed (5P)
Grant River	Grant River	Grant	RIVER	6901615	956000	5	18.87	25.94	7.07	MILES	Category 5P	4/1/2014	NPS	Total Phosphorus	Impairment Unknown	303d Listed	Low	Phosphorus Listed (5P)
North Fork Juda Br	N. Fork Juda Branch	Green	RIVER	6876678	877700	2	1.68	3.8	2.12	MILES	Category 5A	4/1/1998	PS/NPS	BOD	Low DO	303d Listed	Low	TMDL Needed (5A)
North Fork Juda Br	N. Fork Juda Branch	Green	RIVER	6876678	877700	2	1.68	3.8	2.12	MILES	Category 5A	4/1/1998	PS/NPS	Total Phosphorus	Low DO, Degraded Biological Community	303d Listed	Medium	TMDL Needed (5A)
Rubicon River	Rubicon River	Dodge, Washington	RIVER	6977678	856500	4	11.43	29	17.57	MILES	Category 5A	4/1/2012	NPS	Total Phosphorus	Water Quality Use Restrictions	303d Listed	Low	TMDL Needed (5A)
Tenmile Creek	Tenmile Creek	Rusk, Barron	RIVER	6977820	2089400	2	3.24	21.12	17.88	MILES	Category 5A	4/1/2014	NPS	Total Phosphorus	Water Quality Use Restrictions	303d Listed	Low	TMDL Needed (5A)

2. Mendota County Park Beach is listed in 2018 having a WATERS ID as 6980949, however my records indicate the in 2016 the WATERS ID is 5475513. Please confirm which is correct

3. Two waters appear to be delisted by they are not on the delisting tab. Please confirm they should be delisted and if so please provide the rational for the delisting.

Local Waterbody Name 2016	WATERS ID (AU)	WBIC	Water Type	County	Start Mile	End Mile	Size (Miles or Acres)	Date Listed	Source Category	Pollutant	Impairment Indicator	Impaired Water Status	TMDL Creation Priority	Listing/Delisting Details
Wolf Valley Creek	14451	1811200	RIVER	Buffalo	0	3	3	4/1/1998	NPS	Sediment/Total Suspended Solids	Degraded Habitat	303d Listed	Low	TMDL Needed (5A)
Yeager Valley Creek	14445	1810200	RIVER	Buffalo	0	4	4	4/1/1998	NPS	Sediment/Total Suspended Solids	Degraded Habitat	303d Listed	Low	TMDL Needed (5A)

4. Was Lake Winnebago assessed for Public Water Supply use for the 2018 cycle. If yes, what was the result of the assessment.

Donna Keclik
U.S. EPA Region 5 (WW-16J)
77 W Jackson Blvd.
Chicago, Illinois 60604
312-886-6766 phone
312-692-2999 Fax

Beranek, Ashley E - DNR

From: Erica Faitek <edfaitek@hotmail.com>
Sent: Sunday, December 03, 2017 8:20 AM
To: DNR Impaired Waters
Subject: 2018 Impaired Waters List - Lac Courte Oreilles (LCO)

December 3, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St.
WQ/3 Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is the only water on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Erica Faitek
6895N Victory Heights Circle
Stone Lake, WI 54876

Beranek, Ashley E - DNR

From: Gary Pulford <garylindapulford@charter.net>
Sent: Thursday, November 30, 2017 3:13 PM
To: DNR Impaired Waters
Cc: Kevin Horrocks; Dan Tyrolt; Hans Holmberg
Subject: COLA/LCO Tribe comments regarding the proposed draft 2018 Wisconsin Impaired Water list
Attachments: WisCALM-2018 303d Impaired Waters List comment letter.pdf; SSC Proposal Final 2016 _0309 (1).pdf; Fishkill-Report on 2016 fishkill on LCO 10_06 16_Compiled Files.pdf; WisCALM -LCO 2018 Assessment with TDO5.pdf

Ms. Beranek

Pursuant to the notice dated November 15, 2017 wherein WDNR solicits public comment on the proposed draft 2018 Wisconsin impaired water list, please find attached the Courte Oreilles Lakes Association (COLA) and the Lac Courte Oreilles Conservation Department (LCOCD) comments regarding the proposed listing of Lac Courte Oreilles, Sawyer County.

Also attached are the three documents referenced in the COLA/LCOCD comment letter.

Thank you for this opportunity to provide public comment, if there are any questions please do not hesitate to contact me.

Gary Pulford
COLA, Vice President

November 30, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

SUBMITTED VIA EMAIL TO: dnrimpairedwaters@wisconsin.gov

RE: Courte Oreilles Lakes Association and Lac Courte Oreilles Tribal Conservation Department comments regarding the Wisconsin Department of Natural Resources proposed draft 2018 impaired waters list.

Dear Ms. Beranek

The Courte Oreilles Lakes Association (COLA) and the Lac Courte Oreilles Tribal Conservation Department (LCOCD) are providing the following comments regarding the proposed draft Wisconsin 2018 impaired waters list. Specifically, these comments pertain to the listing of Lake Lac Courte Oreilles (LCO), (AUID 15368, WBIC 2390800), for impairment due to low dissolved oxygen (DO) that results in insufficient oxythermal habitat to support the cisco and lake whitefish cold-water fishery in LCO. LCO is designated as a deep (stratified) two-story cold-water fishery lake by the Wisconsin Department of Natural Resources (WDNR), as well as an Outstanding Resource Water (ORW).

We applaud the WDNR on the proposed listing of LCO, in its entirety, as impaired for low DO. As described in the 2018 WisCALM Assessment for Lac Courte Oreilles (May 24, 2017) (attached) provided to WDNR by COLA and the LCOCD and prepared by LimnoTech, LCO is clearly not supporting its designated beneficial use as a two-story cold-water fishery for the resident populations of cisco and lake whitefish. The evidence is overwhelming:

- Insufficient oxythermal habitat as measured by dissolved oxygen in the hypolimnion;
- Insufficient oxythermal habitat as measured by an assessment of TDO5 values;
- Insufficient oxythermal habitat as measured by an assessment of cisco and whitefish habitat quantity;

- Massive fish kill in August of 2016 (attached); and
- Excess total phosphorus concentrations.

However, we take exception to listing the cause of the impairment as "Unknown." For the reasons below, "total phosphorus" should be listed as the cause of the low DO impairment. As LCO and LCOCD have documented in research previously shared with DNR, phosphorus in the water column drives algal growth in LCO. Algae die and settle to the bottom of the lake. Algal decomposition by microbial activity consumes oxygen in the hypolimnion. At the same time, warmer summer temperatures stratify the lake. Warming surface temperatures and decreasing dissolved oxygen levels in the hypolimnion reduce oxythermal habitat for cisco and lake whitefish. As demonstrated by temperature and dissolved oxygen profile measurements in LCO, and further substantiated by the 2016 fish kill, sufficient oxythermal habitat does not exist to consistently support the resident cisco and lake whitefish.

An important aspect of evaluating biologic conditions in LCO relates to changes in DO in response to changes in total phosphorus concentrations. The rate and extent of depletion of dissolved oxygen in the hypolimnion is clearly linked to the amount of algal growth and, therefore, directly linked to phosphorus levels in the lake. Several literature sources support this claim. One such peer-reviewed literature source documents the link between hypolimnetic oxygen demand (HOD) and total phosphorus (TP), expressing the relationship by the following equation:[1]

$$HOD\ \alpha\ TP^{0.478}$$

As total phosphorus in the lake increases, so does HOD. As HOD increases with total phosphorus, DO declines. Clearly, excess phosphorus in LCO causes increased dissolved oxygen depletion in the hypolimnion.[2]

Additionally, as an ORW, LCO deserves special protections. Phosphorus concentrations should not exceed historical concentrations. As shown in the figure below, analysis of sediment cores by the United States Geological Survey (USGS) indicate phosphorus concentrations have increased significantly since the late 1970's and early 1980's, nearly seven-fold.

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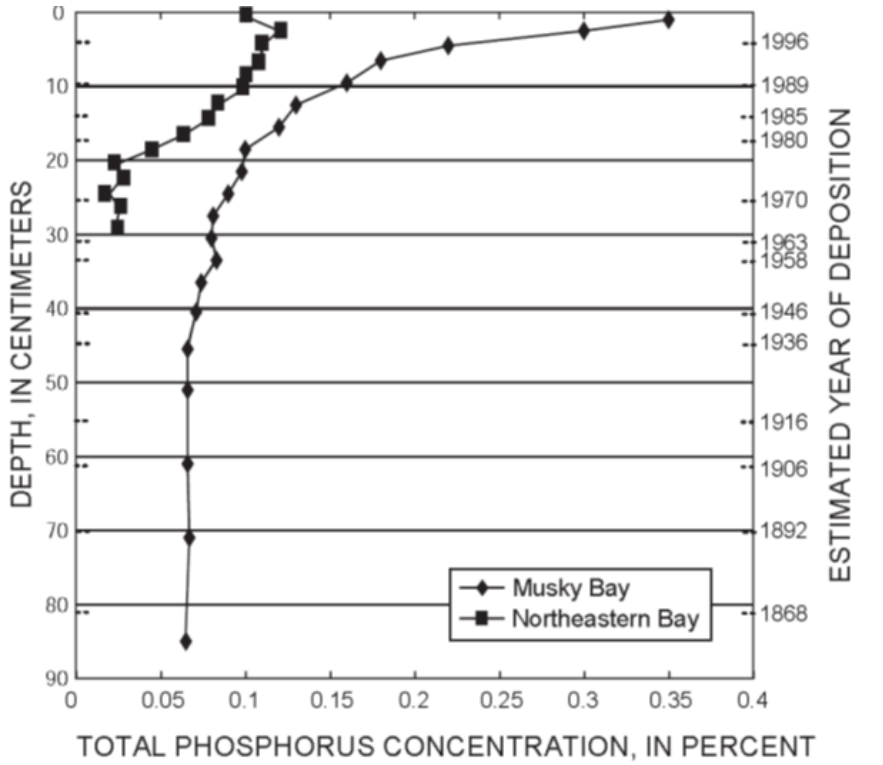
[1] *Chapra. S.C. and R. P. Canale. 1991. Long-Term Phenomenological Model of Phosphorus and Oxygen For Stratified Lakes. Wat. Res. Vol. 25, No. 6, pp. 707-715*

[2] Despite these clear signs of impairment, the total phosphorus concentrations in LCO do not exceed 2018 WisCALM impairment thresholds based on the 15 µg/L total phosphorus criterion for two-story lakes. This situation is a clear indication of the need for a site-specific criterion for total phosphorus to protect LCO. To address this need, COLA and LCOCD prepared and proposed a total phosphorus site-specific criterion (SSC) of 10 µg/L on a lake-wide average basis (attached). WDNR is currently considering this evidence in establishing an SSC for the lake.



Fitzpatrick, F.A., P.J. Garrison, S.A Fitzgerald, and J.F. Elder. 2003. Nutrient, Trace-Element, and Ecological History of Musky Bay, Lac Courte Oreilles, Wisconsin, as Inferred from Sediment Cores. U.S. Geological Survey Water-Resources Investigations Report 02-4225.

As noted above and in agreement with the proposed draft 2018 impaired waters list, LCO is clearly impaired because of low DO resulting in insufficient oxythermal habitat for cisco and whitefish. Furthermore, the cause-and-effect linkage between phosphorus and depleted hypolimnetic dissolved oxygen levels is universally understood within the scientific community and should be acknowledged in the WDNR's analysis.

In summary, we fully support the WDNR on the proposed listing of LCO, in its entirety, as impaired due to low DO that results in insufficient habitat for resident cisco and lake whitefish. But for the reasons above, we take exception to listing the cause of the impairment as "Unknown," and we request that WDNR revise the proposed draft 2018 impaired waters list to include total phosphorus as the cause of the low DO impairment.

We also request that the TMDL Priority be changed to "High" to reflect the urgency for action to preserve the LCO two-story fishery because LCO is one of only five lakes in Wisconsin that currently contain both cisco and lake whitefish.

Finally, we request that "Point Source" (PS) be added to the Source Category to be consistent with the Source Category designation for Musky Bay of Lac Courte Oreilles.

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Thank you for this opportunity to comment on the proposed draft Wisconsin 2018 impaired waters list. If there are any questions, please do not hesitate to call or email.

Sincerely

Kevin Horrocks

COLA, President

Dan Tyrolt

LCO Tribal Conservation Department

Attachments

2018 WisCALM Assessment for Lac Courte Oreilles-May 24, 2017

Report on 2016 Fishkill, Lac Courte Oreilles, Sawyer County-October 6, 2016

Site-Specific Phosphorus Criterion Proposal for Lac Courte Oreilles-March 2016

Report on 2016 Fish Kill, Lac Courte Oreilles, Sawyer County

Prepared by: The Courte Oreilles Lakes Association (COLA)

In association with: The Lac Courte Oreilles Band of Lake Superior Chippewa Indians

October 6, 2016

The 2016 fish kill on Lac Courte Oreilles (LCO) (*Attachment 1*) is the largest cold-water fish kill ever documented in LCO. This Report, in two parts, documents: 1) the duration, extent and magnitude of the fish kill based upon witness reports and photos received from eye witnesses *(Attachment 2 and Attachment 3)* to events as they unfolded; and 2) an assessment of the cause(s) of the fish mortality based upon review of LCO water quality monitoring data collected by the Lac Courte Oreilles Conservation Department (LCOCD) before, during and after the 2016 fish kill event.

Part 1: Duration, Extent, and Magnitude of the 2016 Fish Kill on LCO

Background: COLA became aware of the 2016 fish kill on August 31 thru a phone call from LCOCD notifying COLA that while doing routine water sampling on August 26 in the East Basin, LCOCD personnel observed three (3) dead lake whitefish floating off the Center Bar. COLA immediately contacted the Wisconsin Department of Natural Resources (WDNR) Hayward office to learn what WDNR knew about the situation. WDNR informed COLA that they had received 5 reports of dead or dying whitefish and/or cisco on LCO, the first report coming to WDNR on August 22nd. COLA, on September 9th sent an email to all property owners on LCO requesting that anyone who had witnessed dead or dying fish on LCO in the previous 2/3 weeks, to please contact COLA immediately.

From that email plea to the property owners, COLA received 17 positive responses. COLA then sent a standardized witness report form to the 17 respondents and asked that they complete and return their account of what they had observed. The compiled 17 eye witness reports provide the facts and observations behind the following summary and conclusion relating to duration, extent and magnitude of the 2016 fish kill on LCO.

Duration

A review of the 17 witness reports shows that the first observed fish mortality was on August 12, 2016 in Anchor Bay. On the evening of August 13, a local fisherman reports seeing 60-80 floating dead lake whitefish while trolling between the Center Bar and Striker Bar in the East Basin. With a good degree of certainty, August 12/13 marks the beginning of the 2016 fish kill on LCO.

From August 12 going forward in time there are continuous eye witness reports of dead or dying whitefish and cisco either in the water or washing ashore in the East Basin of LCO. According to the witness reports, the shoreline in Anchor Bay beginning near the Grindstone Creek inlet around to Blue Goose Point and the shoreline by Broken Arrow Road is where the dead fish were being washed ashore.

September 6, 2016 was the date of the last sighting of floating or washed ashore whitefish or cisco. Five other witnesses reported seeing dead whitefish and/or cisco over the 3 day Labor Day (September 5th) weekend. With a good degree of certainty, September 5/6 marks the end of the 2016 fish kill on LCO.

The 2016 cold-water fish kill on LCO lasted from August 12 thru September 6, 2016, some 26 days in duration.

Extent

LCO has a surface area of some 5,039 Acres, with three major basins, the West, Central, and East basins. Each of the three basins has a similar depth profile with the East basin having the deepest point in the lake at 90 feet. All three basins have sufficient cold water habitat necessary to support LCO's resident population of lake whitefish and cisco.

Of the 17 eye witness reports, 16 reported dead or dying fish or fish washing ashore in the **East Basin**. All 16 witness reports place the epicenter of fish mortality in the area of Anchor Bay, Blue Goose Point, the Center Bar and the Broken Arrow Road area of the East Basin.

One eye witness did report two 2 dead fish (8/29 and 9/12) in the West Basin along the western shore of LCO, but was unable to confirm species.

In a discussion with Max Wolter, WDNR Regional Fish Biologist, on September 23, 2016, Mr. Wolter said WDNR **had not** received any reports of fish kill(s) on other Sawyer County area lakes during the duration of the die-off on LCO. Mr. Wolter did indicate that there were reports of cisco die-offs in a number of lakes further to the east in Northeast Wisconsin.

From the eye witness reports it is quite certain the extent of the 2016 LCO fish kill was confined to the East Basin of LCO. In addition, from information provided by WDNR, there were no other reported/recorded lake whitefish or cisco fish kills in other Sawyer County area lakes that are known to harbor these cold water fishes.

Magnitude

In an attempt to quantify the number of lake whitefish and cisco involved in the 2016 LCO fish kill, COLA asked that each eye witness estimate the number of dead or dying fish by species that they observed and record those numbers on the COLA provided witness report.

Whitefish

A review of the 17 reports shows that over the 26 days of the LCO fish kill event, eye witness reporting of numbers of dead whitefish range from 80 dead whitefish to 1 dead whitefish and everything in between. Descriptors of dead whitefish numbers include: >40, 10?, 40, 3, 5, 12-18, 9?, dozens and dozens. Fish size descriptors include: 2 feet long, 18-20 inches, many large fish, and whitefish 18" to 24".

Cisco

A review of the 17 reports shows that over the 26 days of the LCO fish kill event, eye witness reporting of numbers of dead cisco range from: > 40 to 25. Other descriptors of dead cisco numbers include: too numerous to count, dozens and dozens, many dead cisco on our beach. Photos of dead cisco show the fish ranged in size from approximately 3" to 15".

Many of the witness reports put the timeframe for their observation in terms days and weeks as opposed to a single date and time observation. Descriptions of timeframes for observations include: dead fish washing up on our shoreline for a couple of weeks, 2 weeks starting end of August, the weekend of the 26th to 28th was the worst, 3 weekends starting Aug. 27.

A number of witness reports described how quickly and efficiently the gulls, eagles and cranes were at cleaning up dead fish from the water and along the East Basin shoreline.

While it is not possible to place an exact number on the dead whitefish and cisco over the 26 days of the die-off, it is reasonable to say from the COLA witness reports that the number of dead fish reached into the hundreds for each of the two species.

Part 2: Causation of the 2016 Fish Kill on LCO

The monitoring data collected by the LCOCD were reviewed to investigate the cause of the 2016 LCO fish kill (*data included in separate Excel files*). The monitoring data indicate that the ultimate cause of the fish kill was the elimination of suitable habitat for whitefish and cisco survival. Whitefish and cisco require both cool temperatures and sufficient levels of oxygen. Water temperatures higher than 66° F (18.9° C) are sufficient to kill whitefish. Water temperatures higher than 73° F (22.8° C) are sufficient to kill cisco. Dissolved oxygen concentrations less than 3 mg/L are sufficient to kill either species. The band of water that included at least 3 mg/L dissolved oxygen and water temperatures less than 73° F was virtually eliminated throughout LCO at the time of the observed fish kill. Monitoring on July 28th indicated that 3.5 meters (m) of habitat existed in East Basin above 3 mg/L dissolved oxygen and less than 73° F. On August 12th, that habitat band had shrunk to 1 m, and on August 18th had decreased to less than 0.1 m. The timing of the observed fish kill overlaps with the shrinking habitat band. Similarly, in Central Basin the habitat band had shrunk to 0.83 m on July 28th, 0.48 m on August 12th, and 0.12 m on August 18th. In West Basin, the habitat band had shrunk to 0.71 m on August 12th and 0.22 m on August 18th. Whitefish and cisco in the West and Central basins may have moved to the East Basin in late July and early August to avoid the earlier onset of unsustainable habitat conditions.

There does not appear to be one specific reason why the habitat for whitefish and cisco had shrunk to the extent of causing the resultant fish kill. More likely, a combination of circumstances led to the conditions resulting in the fish kill. The following observations were made in assessing the 2016 data:

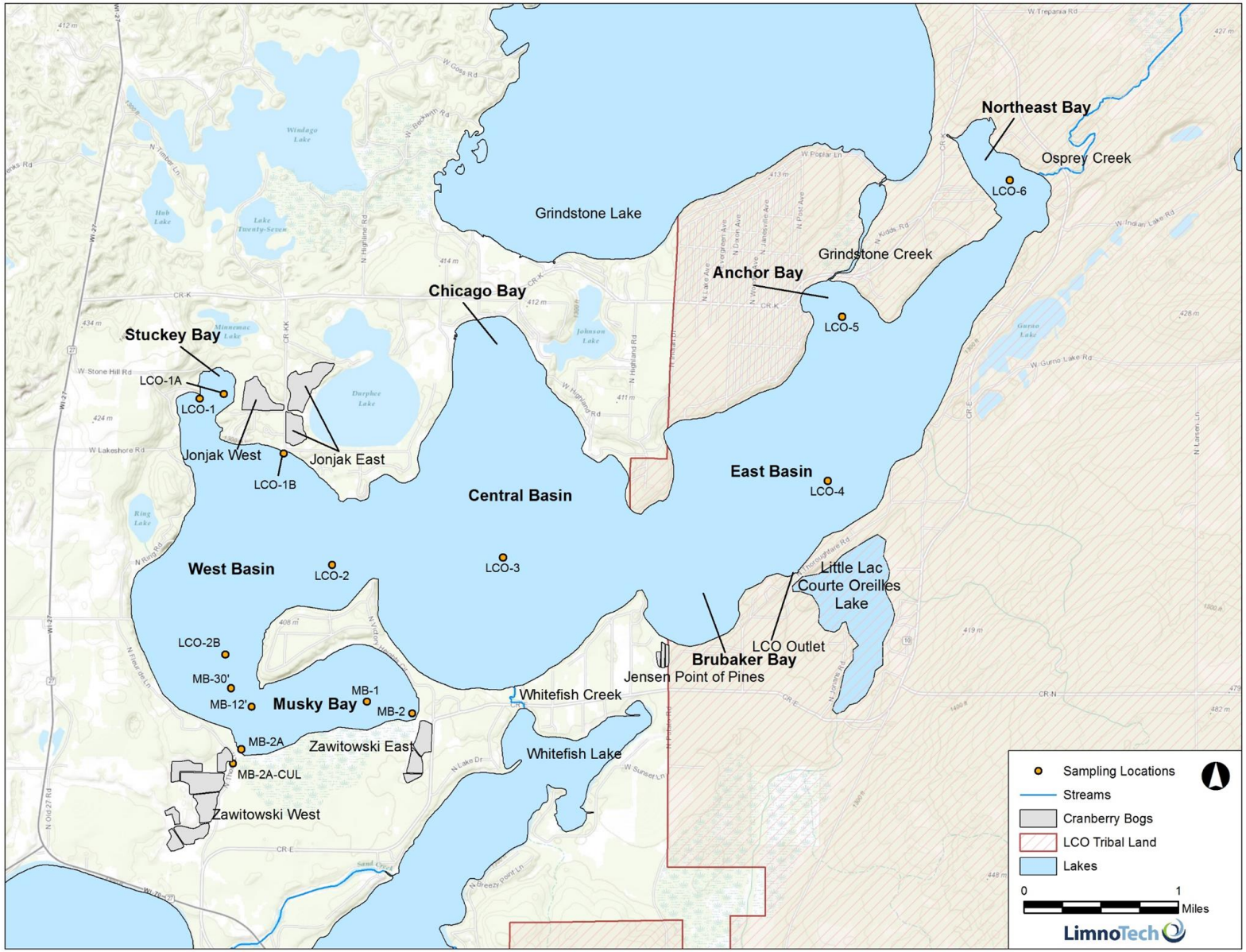
- Average air temperatures for July and August were slightly higher than normal, but not excessively high:
    - Average high temperature for July 2016 = 79.6° F; long term average = 79° F

    - Average low temperature for July 2016 = 57.8° F; long term average = 57° F
    - Average high temperature for August 2016 = 77.7° F; long term average = 77° F
    - Average low temperature for August 2016 = 57.8° F; long term average = 55° F
- Surface water temperatures were higher than normal, but not excessively high:
    - The East basin (LCO-4) increased to 76.6° F on July 28, stayed steady at 76.3° F on August 12th, and then increased to 78.3° F on August 18th before dropping to 72.9° F on August 28th
    - Similar temperature patterns were observed in the Central and West basins
- Precipitation totaled 6.71 inches in July, 168% of the normal of 4 inches. Precipitation in August was again above normal at 3.9 inches compared to a normal of 3.4 inches. Higher inflows to LCO during July likely contributed to the warmer surface water temperatures.
- Total phosphorus concentrations overall were higher than normal:
    - Phosphorus levels in Osprey Creek, which drains to Barbertown Bay, were between 58 and 67 µg/L in August, compared to 14 to 17 µg/L in July. Recent summer averages are typically around 47 µg/L.
    - Phosphorus levels in Barbertown Bay surface water increased to 71 to 77 µg/L in August. Recent summer averages are typically 12.4 µg/L.
    - Phosphorus levels in the East Basin increased to 54 µg/L in surface water on August 12th.
    - Phosphorus levels in the Central Basin increased to 19 µg/L in surface water in August and 67 µg/L in the hypolimnion.
    - Phosphorus levels in the West Basin increased to 67 µg/L in surface water on August 25th and to 290 µg/L in the hypolimnion.
- Chlorophyll-a concentrations overall were generally higher than average:
    - In Barbertown Bay, chlorophyll-a increased to 2.6 to 3.2 µg/L compared to recent summer averages typically around 2.4 µg/L.
    - East Basin chlorophyll-a averaged 2.3 µg/L in July and August, the same as the recent summer average.
    - Central Basin and West Basin chlorophyll-a averaged 2.7 µg/L in July and August, with recent summer averages typically around 2.1 µg/L and 2.6 µg/L, respectively.
- Hypolimnetic dissolved oxygen in the three major basins was lower than normal, but comparable to 2012 values. The hypolimnetic oxygen demand rate was slightly higher than normal in the Central and East basins.
- Maximum TDO3 values in each basin were observed on August 18th: 22.6° C in the East Basin; 22.3° C in the Central Basin; and 22.2° C in the West Basin. These are all the highest recorded TDO3 values from 2011 through the present. The highest previously recorded TDO3 values were in 2012 and were 19.6° C in the East Basin, 20.3° C in the Central Basin, and 20.5° C in the West Basin.
- The maximum depth at which a water temperature of 22° C (71.6° F) was estimated to occur was 32.1 ft in the East Basin. Between 2007 and 2015, the maximum depth of 22° C in the East Basin was 28.6 ft, and the average was 24.4 ft.

Therefore, a combination of high water temperatures along with depressed dissolved oxygen levels led to conditions where there was not sufficient habitat (cool temperatures, sufficient dissolved oxygen) to sustain resident whitefish and cisco. The higher water temperatures observed may have been a result of hot and calm conditions immediately preceding the fish kill, as well as unusually high amounts of watershed runoff to the lake during the warm summer months. Depressed dissolved oxygen levels are caused by the decay of organic matter in the hypolimnion. The rate of oxygen consumption was generally higher in 2016 than previous years. Algae growth, as indicated by chlorophyll-a measurements, was somewhat higher than normal and likely caused by higher than normal phosphorus concentrations and increased temperatures. The fish kill experienced in the summer of 2016 is an example of the impacts of a changing climate (warmer temperatures and increased severity of storm events). With continued trends of warmer temperatures and increased severity of storm events, more frequent and more severe fish kills can be expected unless additional measures are taken to protect the lake.

LCO, an Outstanding Resource Water, requires a higher level of protection than what is currently afforded by the State's existing total phosphorus criterion of 15 µg/L. Existing phosphorus loads to LCO are clearly not supporting the resident whitefish and cisco populations. Therefore, a site-specific total phosphorus criterion is needed. COLA has proposed a 10 µg/L total phosphorus criterion for the lake and an annual phosphorus load reduction goal of nearly 25%, or approximately 1,500 lbs/yr. Phosphorus load reductions need to come from a variety of sources to meet this goal. A temperature and dissolved oxygen habitat criterion for LCO should also be considered recognizing that conditions approaching 73° F and dissolved oxygen levels of 3 mg/L are sufficient to kill cisco, and dissolved oxygen conditions between 3 mg/L and 5 mg/L are considered by DNR to be suboptimal and may reduce growth and survival. Therefore, maintaining minimum habitat conditions closer to a combination of 73° F and 6 mg/L dissolved oxygen is needed for cisco, and 66° F and 6 mg/L dissolved oxygen is needed to protect the resident whitefish in LCO.

Attachment 1 – LCO Lake Map


Northeast Bay
Osprey Creek
LCO-6
Grindstone Lake
Grindstone Creek
Anchor Bay
Chicago Bay
LCO-5
Stuckey Bay
LCO-1A
LCO-1
Jonjak West
Jonjak East
LCO-1B
East Basin
LCO-4
Central Basin
West Basin
LCO-2
LCO-3
Little Lac Courte Oreilles Lake
LCO-2B
MB-30'
MB-12'
Musky Bay
MB-1
MB-2
Whitefish Creek
LCO Outlet
Brubaker Bay
Jensen Point of Pines
MB-2A
Zawitowski East
Whitefish Lake
MB-2A-CUL
Zawitowski West
Sampling Locations
Streams
Cranberry Bogs
LCO Tribal Land
Lakes
0
1
Miles
LimnoTech

Attachment 2 - Witness Reports

2016 Lac Courte Oreilles Fishkill

Witness Report

Contact Information

Name: John Hackemer

Lake Address: 7053N Thoroughfare Rd
Stone Lake, WI 54876

Home Address: 415 West Benton
Naperville, IL 60540

Telephone Number: 715-865-4314 Email Address: _____

Siting Information

Date(s) of observation: Late August

Approximate timeof observation: late afternoon

Location of observation (Use attached map for brief description, e.g., 100yds south of Deep Center Bar):

Area between blue goose bar and strikers bar and headed to thoroughfare bridge.

Please provide a short description of what you observed:

Sighted about nine dead fish -large and white with what appeared to be a sucker mouth

Estimation of number of fish observed by species:

#9? Lake Whitefish #_____Cisco #_____Other (species) _____

Photos: ☐ Yes (If yes, please attach) ☐ No

Date this report was completed: 9/14/16 Your Initials: _____

Thank You!

2016 Lac Courte Oreilles Fishkill

Witness Report

Contact Information

Name: John Janacek

Lake Address: 14431W Courte Oreilles Lakes Drive
Hayward, WI 54876

Home Address: 108 San Clemente Ave
Oxnard, CA

Telephone Number: 213-393-4962 Email Address: _____

Siting Information

Date(s) of observation: Labor Day weekend

Approximate timeof observation: _____

Location of observation (Use attached map for brief description, e.g., 100yds south of Deep Center Bar):

_____

Please provide a short description of what you observed:

Dead whitefish

_____

Estimation of number of fish observed by species:

#_____Lake Whitefish #_____Cisco #_____Other (species) _____

Photos: ☐ Yes (If yes, please attach) ☐ No

Date this report was completed: 9/14/16 Your Initials: _____

Thank You!

2016 Lac Courte Oreilles Fishkill

Witness Report

Contact Information

Name: Gary Larson

Lake Address: 7713N Broken Arrow Rd.
Hayward, 54843

Home Address: 1905 22 3/4 Street
Rice Lake, WI 54868-1433

Telephone Number: 715-651-5115 Email Address: _____

Siting Information

Date(s) of observation: 2 weeks starting with end of August

Approximate timeof observation: various

Location of observation (Use attached map for brief description, e.g., 100yds south of Deep Center Bar):

Shoreline near Broken Arrow Rd. neighborhood

Please provide a short description of what you observed:

Dozens and dozens of fish washing up on our shoreline for a couple of weeks.

Fish from 2 feet long all the way down to 3 inch minnows and everything in between.

Estimation of number of fish observed by species:

#_____Lake Whitefish #_____Cisco #_____Other (species) _____

Photos: ☑ Yes (If yes, please attach) ☐ No

Date this report was completed: 9/14/16 Your Initials: _____

Thank You!

2016 Lac Courte Oreilles Fishkill

Witness Report

Contact Information

Name: Tim Nolde

Lake Address: 7768 Cty Rd K
Hayward, WI 54876

Home Address: PO Box 119
Stillwater, MN

Telephone Number: 55082 Email Address: _____

Siting Information

Date(s) of observation: _____

__ Approximate timeof observation: _____

Location of observation (Use attached map for brief description, e.g., 100yds south of Deep Center Bar):

Right by Grindstone Inlet

Please provide a short description of what you observed:

Many dead Ciscos on our beach

Estimation of number of fish observed by species:

#_____Lake Whitefish #_____Cisco #_____Other (species) _____

Photos: _ ☐ Yes (If yes, please attach) ☐ No

Date this report was completed: 9/14/16 Your Initials: _____

Thank You!

2016 Lac Courte Oreilles Fishkill

Witness Report

Contact Information

Name: Cindy Rost

Lake Address: 14425W Courte Oreilles Drive
Hayward, WI 54843

Home Address: 4505 Drew Ave S
Minneapolis, MN 55410

Telephone Number: 612-598-1428 Email Address: _____

Siting Information

Date(s) of observation: last two weekends in August
during the day while fishing

Approximate timeof observation: _____

Location of observation (Use attached map for brief description, e.g., 100yds south of Deep Center Bar):

I live near frenchmans bar and saw some there and some by the boat launch around the point

Please provide a short description of what you observed:

I don't know the difference between white fish and cisco, but I said to a friend why are

we seeing so many dead white fish. They were upside down and bloated. When I saw them

at my place, the crayfish were eating the remains.

Estimation of number of fish observed by species:

#10-15 Lake Whitefish #_____Cisco #_____Other (species) _____

Photos: ☐ Yes (If yes, please attach) ☐ No

Date this report was completed: _____ Your Initials: ckr

Thank You!

2016 Lac Courte Oreilles Fishkill

Witness Report

Contact Information

Name: Jim Schreiber

Lake Address: 14533W Ojibwa Court
Hayward, WI 54843

Home Address: 14533W Ojibwa Court
Hayward, WI 54843

Telephone Number: 715-634-6993 Email Address: _____

Siting Information

Date(s) of observation: Sept. 4, 2016

Approximate timeof observation: 4pm

Location of observation (Use attached map for brief description, e.g., 100yds south of Deep Center Bar):

Between Anchor Bay and the east end of the lake

Please provide a short description of what you observed:

We saw 5 dead fish floating I open water. Thought it was odd as I have not witnessed this before in my 17 years on the lake.

Estimation of number of fish observed by species:

#_____Lake Whitefish #_____Cisco #_____Other (species) _____

Photos: ☐ Yes (If yes, please attach) ☑ No

Date this report was completed: 9/15/16 Your Initials: _____

Thank You!

2016 Lac Courte Oreilles Fishkill

Witness Report

Contact Information

Name: Kevin Croal

Lake Address: 7721 N Wilkie Rd
Hayward, WI

Home Address: 1911 11St SW
Rochester, MN

Telephone Number: 715-861-4706 Email Address: _____

Siting Information

Date(s) of observation: Various days in Aug

Approximate timeof observation: Throughout the day

Location of observation (Use attached map for brief description, e.g., 100yds south of Deep Center Bar):

Along shore in front of my property off of Wilkie Rd.

Please provide a short description of what you observed:

Floating dead fish. I reported to DNR biologist via phone conversation. I reported to DNR intern in survey boat in front of my property. Dead fish were observed on and off for several weeks.

Estimation of number of fish observed by species:

#5 Lake Whitefish #5-10 Cisco #_____Other (species) _____

Photos: ☐ Yes (If yes, please attach) ☐ No

Date this report was completed: 09/25/16 Your Initials: KFC

Thank You!

2016 Lac Courte Oreilles Fishkill

Witness Report

Contact Information

Name: Rob McMahon

Lake Address: 7985N Bay Shore Lane
Hayward, WI 54843

Home Address: W5845 Carla Court
Stoddard, WI 54658

Telephone Number: 608.788.3246 Email Address: _____

Siting Information

Date(s) of observation: 4 September 2016

Approximate timeof observation: 10 am

Location of observation (Use attached map for brief description, e.g., 100yds south of Deep Center Bar):

150 yds southwest of Little Sweden Bar

Please provide a short description of what you observed:

Dead floating whitefish

Estimation of number of fish observed by species:

#1 Lake Whitefish #_____Cisco #_____Other (species) _____

Photos: ☐ Yes (If yes, please attach) ☑ No

Date this report was completed: 12 September 2016 Your Initials: REM

Thank You!

2016 Lac Courte Oreilles Fishkill

Witness Report

Contact Information

Name: Terry Clark

Lake Address: 7660N Courte Oreilles Drive
Hayward, WI 54843

Home Address: 5705 Whispering Oaks Drive
North Port, FL 34287-2455

Telephone Number: 309 648 3594 Email Address:

Siting Information

Date(s) ofobservation: Aug· 27th

Approximate timeofobservation: 9:00 to 10:00 AM

Location of observation (Use attached map for brief description, e.g., OOyds south of Deep Center Bar):
West of Blue Goose point into Anchor Bay and on west shore line

Please provide a short description of what you observed:
Observed hundreds of sea gulls in the water along Center Bar

Estimation of number offish observed by species:

-1Q? Lake Whitefish # Cisco # Other (species)

Photos: I/'I Yes (If yes, please attach) D No

Date this report was completed: 9/14/16 Your Initials: 'J-C

Thank You!

2016 Lac Courte Oreilles Fishkill

Witness Report

Contact Information

Name: Patrick Eaton

Lake Address: LCO Conservation Department

Home Address: _____

Telephone Number: 715-634-0102 Email Address: pat.eaton@lco-nsn.gov

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Siting Information

Date(s) of observation: 8/26/16

Approximate timeof observation: 9:30 AM

Location of observation (Use attached map for brief description, e.g., 100yds south of Deep Center Bar):

Approx. 200-300 yards South of Blue Goose Point

Please provide a short description of what you observed:

3 dead whitefish-fish were floating, starting to decompose yet fully intact. All fish were between 18" and 24" long

Estimation of number of fish observed by species:

#3 Lake Whitefish #_____Cisco #_____Other (species) _____

Photos: ☑ Yes (If yes, please attach) ☐ No

Date this report was completed: 9/15/16 Your Initials: PE

Thank You!

2016 Lac Courte Oreilles Fishkill

Witness Report

Contact Information

Name: Garry Jensen

Lake Address: 6858N Fleur de Lane
Stone Lake, WI 54876

Home Address: PO Box 324
Stone Lake, WI 54876

Telephone Number: 715-634-9236 **Email Address:** _____

Siting Information

Date(s) of observation: 8/29 - 9/12

Approximate timeof observation: various

Location of observation (Use attached map for brief description, e.g., 100yds south of Deep Center Bar):
West shore of LCO

Please provide a short description of what you observed:
2 dead fish over the last two weeks. Not certain whether they were whitefish

Estimation of number of fish observed by species:

#_____Lake Whitefish #_____Cisco #2 Other (species) _____

Photos: ☐ Yes (If yes, please attach) ☐ No

Date this report was completed: 9/14 Your Initials: gj

Thank You!

2016 Lac Courte Oreilles Fishkill

Witness Report

Contact Information

Name: Brett McConnell

Lake Address: LCO Conservation Department

Home Address: W132 Rainbow Rd. Hayward, WI

Telephone Number: 715-699-0692 Email Address: brettmc@cheqnet.net

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Siting Information

Date(s) of observation: 8/13/16 & 8/20/16

Approximate timeof observation: Evening approx.7 PM

Location of observation (Use attached map for brief description, e.g., 100yds south of Deep Center Bar):

Area from Center Bar east to Striker's Bar

Please provide a short description of what you observed:

Rex Droessler contacted me and said he was fishing on the evenings of 8/13/16 & 8/20/16 and witnessed dead whitefish on the 13th (60-80) and dead cisco (approx. 25) on the 20th.

Estimation of number of fish observed by species:

#60-80 Lake Whitefish #25 Cisco #_____Other (species) _____

Photos: ☐ Yes (If yes, please attach) ☑ No

Date this report was completed: 9/22/16 Your Initials: BMM

Thank You!

2016 Lac Courte Oreilles Fishkill

Witness Report

Contact Information

Name: Chris McMurray

Lake Address: 7776 North Highway K
Hayward, WI 54843

Home Address: 716 - 17 ST
Kenosha, WI 53140

Telephone Number: 414-378-2806 Email Address: _____

Siting Information

Date(s) of observation: Approx. August 22, 2016

Approximate timeof observation: Late afternoon

Location of observation (Use attached map for brief description, e.g., 100yds south of Deep Center Bar):

Near Grindstone Creek, Anchor Bay area

Please provide a short description of what you observed:

Many large and small dead fish floating into shore. They were not fresh, smelled horrible!

Estimation of number of fish observed by species:

#40 Lake Whitefish #_____Cisco #10 Other (species) suckers

Photos: ☐ Yes (If yes, please attach) ☑ No

Date this report was completed: Sept. 12, 2016 Your Initials: cm

Thank You!

2016 Lac Courte Oreilles Fishkill

Witness Report

Contact Information

Name: Michael Muske

Lake Address: 7763N Kidds Rd
Hayward, WI 54876

Home Address: 1080 102nd St E
Inver Grove Heights, MN 55077

Telephone Number: 651-335-8992 Email Address: _____

Siting Information

Date(s) of observation: August 12 - 28, 2016

Approximate timeof observation: various

Location of observation (Use attached map for brief description, e.g., 100yds south of Deep Center Bar):
Anchor Bay

Please provide a short description of what you observed:
The weekend of the 26th to 28th was the worst
>40 dead White fish and a lot more Cisco

Estimation of number of fish observed by species:

#>40 Lake Whitefish #>40 Cisco #_____Other (species) _____

Photos: ☑ Yes (If yes, please attach) ☐ No

Date this report was completed: 9/14/16 Your Initials: MMM

Thank You!

2016 Lac Courte Oreilles Fishkill

Witness Report

Contact Information

Name: Brett Teten

Lake Address: 14748W Sand Beach Lane
Stone Lake, WI 54843

Home Address: 215 10th Ave S, Unit #219
Minneapolis, MN 55415-1753

Telephone Number: 612-991-3860, 612-414-4982 Email Address _____

Siting Information

Date(s) of observation: 3 weekends starting Aug. 27

Approximate timeof observation: _____

Location of observation (Use attached map for brief description, e.g., 100yds south of Deep Center Bar):

East Basin

Please provide a short description of what you observed:

At least two or three of these dead fish each day the past three weekends.

Estimation of number of fish observed by species:

#12-18 Lake Whitefish #_____Cisco #_____Other (species) _____

Photos: ☐ Yes (If yes, please attach) ☐ No

Date this report was completed: 9/14/15 Your Initials: _____

Thank You!

2016 Lac Courte Oreilles Fishkill

Witness Report

Contact Information

Name: Tom Heinrich

Lake Address: 7294N Winters Point Road
Hayward, Wis

Home Address: 14651 W Ct. Road B
Hayward, Wis 54843

Telephone Number: 715 634 3143 Email Address: tcx9canoe@gmail.com

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Siting Information

Date(s) of observation: August 31, 2016

Approximate time of observation: 3 pm.

Location of observation (Use attached map for brief description, e.g., 100yds south of Deep Center Bar):
East side of Winters Point / due West of Frenchman's.

Please provide a short description of what you observed:
Floating white Fish - about 100 Ft from shore.
Scales on path to lake From Eagles Eating.
Sept 1 - Headless white Fish on shore - chewed by Eagle.

Estimation of number of fish observed by species:

#+2 Lake Whitefish #_____ Cisco #_____ Other (species) _____

Photos: ☐ Yes (If yes, please attach) ☒ No

Date this report was completed: Sept 12, 2016 Your Initials: Thomas H. Heinrich.

Thank You!

* Since Early August - Eagles have staked A claim on this shore - lots of scales Fish chunks

Attachment 3 - Photo Documentation

Photograph provided by Terry Clark

Photograph provided by Terry Clark

Photograph provided by Terry Clark: “I observed these fish on Saturday Aug. 27th around 9:00 to 10:00 AM. I immediately called the DNR hot line and reported it. I also sent them several photos. They had the DNR rep. for this lake and area return my call which he did right away. He implied that it was just as you describe in your letter and that several other lakes reported similar findings. I have not noticed any additional kill since that date. I am located on West Shore 3 Cabins south of Anchor Bay boat launch or directly West of Blue Goose Point. Fish I saw were West of Blue Goose point into Anchor Bay and on West shore line. Also observed Hundreds of Sea Gulls n the water along Center Bar. They were not eating and none of fish I observed appeared to have been disturbed by birds or eagles.” Terry Clark

Photographs provided by Gary Larson: “I live up on the NE end of the lake in the broken arrow rd. neighborhood. At The end of August I noticed dozens and dozens of fish washing up on our shoreline for a couple of weeks. The Eagles, gulls and cranes ate well, but there were so many I had to clean up our shoreline several times. I found fish from 2 feet long all the way down to 3 inch minnows and everything in between. I contacted the DNR fish biologist 2 separate times, Max Wolter I believe. Nice guy. He explained it as a combination of factors related to lack of oxygen depletion. Too warm of water, too many weeds, too much algae. Early spring and long summer, high water levels have all taken a toll. I was hoping it wasn't some bacterial thing like out in Yellowstone. Anyway, here are some pics. That is a 5 gallon bucket that I filled a few times and a garbage bag with assorted sizes of baitfish.” Gary Larson

Photograph provided by Michael Muske: “The above picture was taken on August 12th. Fish was floating by my place in Anchor Bay. This was the start of it, over the next two weekends it got progressively worse. The weekend of the 26th to 28th was the worst. I must have seen over 40 dead White fish and a lot more Cisco. The gulls were out in full force eating the Cisco.” Michael Muske

Photograph provided by Pat Eaton

Photograph provided by Pat Eaton.

Photograph provided by Pat Eaton: “The morning of August 26, 2016 approximately 9:30 a.m., during our profiling of Lac Courte Oreilles Lake, we came across 3 dead floating Lake Whitefish. The fish were between 18" and 24". They were floating on Stoney's point, East of Center Bar, and were slightly bloated, yet all firm and intact. Weather conditions of the previous 4 days consisted of sustained winds 15-25 mph out of the west.” Pat Eaton

LimnoTech
Water Environment | Scientists Engineers

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Suite 295
Oakdale, MN 55128
651.330.6038
www.limno.com

Memorandum

From:	Hans Holmberg and Ben Crary	**Date:**	May 24, 2017
		Project:	LCO
To:	Gary Pulford, COLA Dan Tyrolt, LCOCD	**CC:**	

SUBJECT: **2018 WisCALM Assessment for Lac Courte Oreilles**

Background

Lac Courte Oreilles (LCO) is located in Sawyer County, Wisconsin (Figure 1). LCO is a multi-lobed waterbody (AUID 15368, WBIC 2390800), comprised of three basins (West, Central, and East). A number of bays are also commonly recognized by name, including Musky, Stuckey, Chicago, Anchor, Northeast (also known as Barber Town), and Brubaker Bays. LCO has a total surface area of approximately 5,039 acres.

- LCO is designated as a deep (stratified) two-story cold-water fishery lake by the Wisconsin Department of Natural Resources (WDNR). A total phosphorus criterion of 15 µg/L is applied to these lakes in Wisconsin, as defined in the Wisconsin Administrative Code (WAC) for the Department of Natural Resources (NR) 102.06.
- The Courte Oreilles Lake Association (COLA) and the Lac Courte Oreille Band of Lake Superior Chippewa Indians have prepared and proposed a Site-Specific Criterion (SSC) for phosphorus of 10 µg/L as a lake-wide average concentration. (http://cola-wi.org/media/cushycms/SiteSpecificCriteriaforLCO_2_1168096908.pdf).

The Wisconsin 2018 Consolidated Assessment and Listing Methodology (WisCALM) provides protocols for determining impairments of designated beneficial uses in water bodies as required by Section 303(d) of the Clean Water Act. Impairment threshold criteria are dependent on the hydrology and use designation of a particular waterbody. LCO is classified as a two-story fishery lake with both Fish and Aquatic Life (FAL) and recreational (REC) use designations, and must not exceed impairment thresholds for total phosphorus (TP) and chlorophyll a, as shown in Table 1. Additional biological indicator metrics include macrophyte growth, dissolved oxygen, and cold-water habitat quantity.

Table 1: Criteria and thresholds currently applicable to Lac Courte Oreilles

Criteria for two-story fishery lake	Threshold
FAL TP	≥15 µg/L
REC TP	≥15 µg/L
FAL chlorophyll a	≥10 µg/L
REC chlorophyll a	≥5% of days with ≥20 µg/L

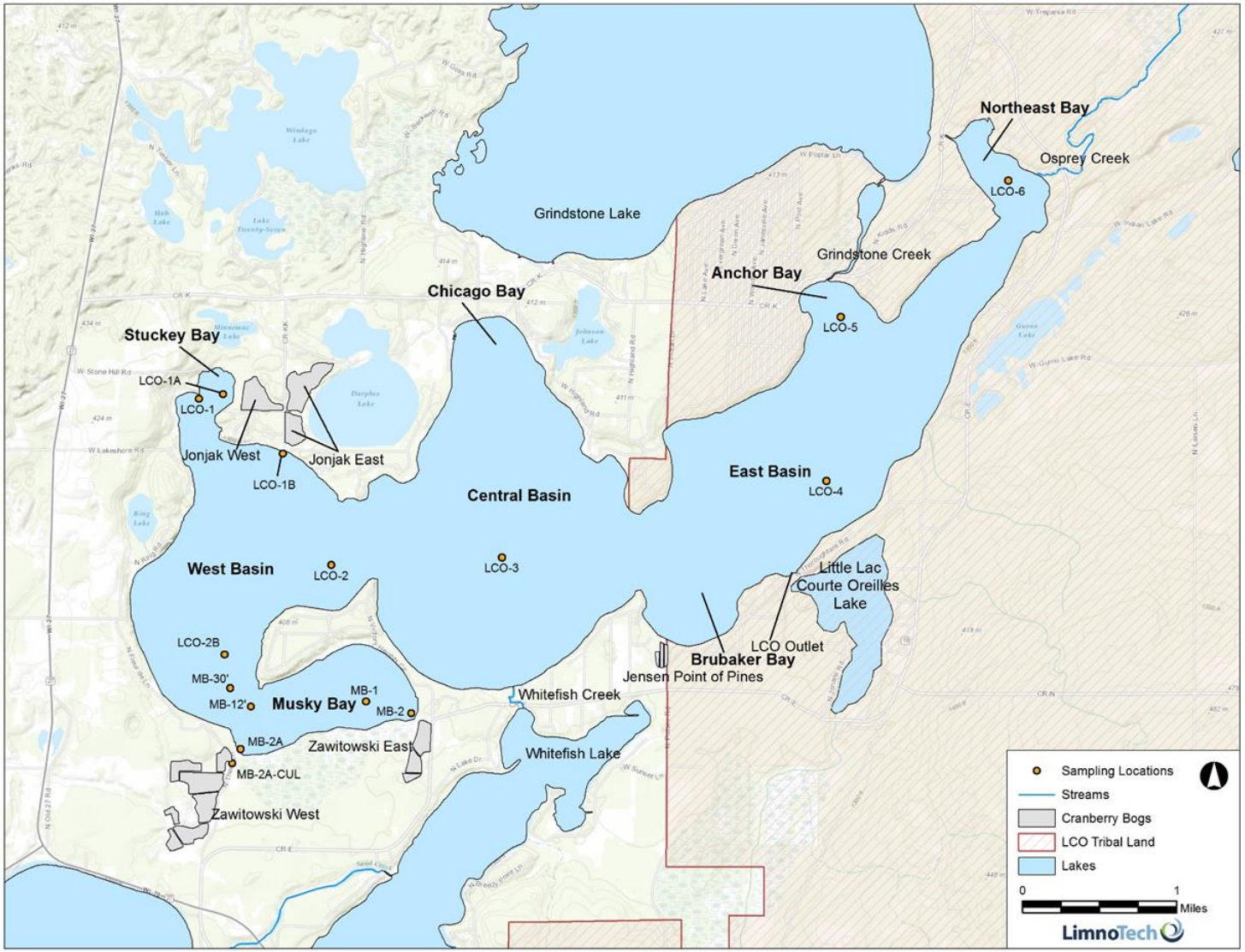


Figure 1: LCO map showing tributaries, sampling stations, and cranberry bog locations.

Due to the statistical nature of the assessment methods, WisCALM provides a characterization methodology to describe the certainty with which a waterbody may or may not be meeting its water quality criteria (Figure 2). While a waterbody is not classified as impaired unless the lower bound of the 90% confidence interval for the mean is above the criteria threshold, the characterization guide offers a narrative for the overall quality and certainty of the classification.

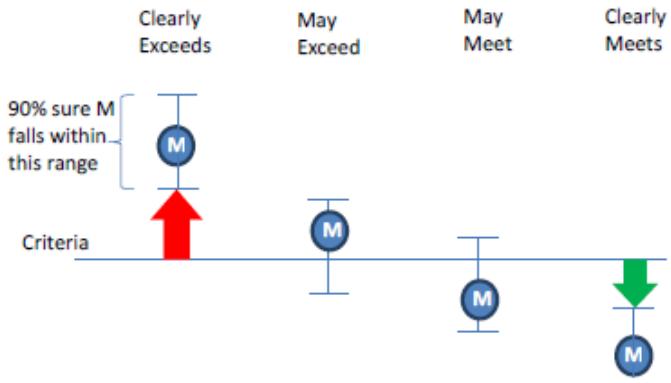


Figure 2: WisCALM decision characterization guide.

Compiled LCO Data

There are eight LCO locations that are sampled routinely throughout the ice-off season by the LCO Conservation Department (LCOCD). These locations are presented in Table 2 and Figure 1. During the most recent five years, between 2012 and 2016, samples were collected weekly or biweekly at these locations. Analysis of surficial TP and surficial chlorophyll a were made on each sample collected.

Table 2: Lac Courte Oreilles Sampling Characteristics (2012-2016)

Location Name	Station Code	Sampling frequency	# of TP samples[1]	# of Chl a samples[2]	# of Qualifying Years
Musky Bay	MB1	weekly-biweekly	77	37	5
Stuckey Bay	LCO1	weekly-biweekly	51	28	5
West Basin near Musky Bay	LCO2B	weekly-biweekly	36	21	4
West Basin	LCO2	weekly-biweekly	49	27	5
Central Basin	LCO3	weekly-biweekly	45	28	5
East Basin	LCO4	weekly-biweekly	53	31	5
Anchor Bay	LCO5	weekly-biweekly	49	28	5
Northeast Bay	LCO6	weekly-biweekly	46	29	5
		Total	406	229	-

[1] samples only counted over allowable range of June 1st – September 15th
[2] samples only counted over the allowable range of July 15th – September 15th

Every year for each location, with the exception 2012 at LCO2B in 2012, was a qualifying year for assessing impairments according to WisCALM. Qualifying years are defined as those with at least two daily means that are in different months of the appropriate date range and that are at least 15 days apart.

TP Assessment

Fish and Aquatic Life and Recreational Usage

The TP impairment threshold for two-story fishery lakes in Wisconsin is 15 µg/L for the fish and aquatic life (FAL) and recreational (REC) use designations. WisCALM states that if the lower bound of the 90% confidence interval of the mean concentration between June 1st and September 15th exceeds this threshold, there is an exceedance; and if it exceeds 1.5 times the threshold there is an overwhelming exceedance.

Mean concentrations and confidence intervals are presented in Figure 3 and Table 3. The mean concentrations at five locations exceed the existing 15 µg/L criterion for two-story lakes. The lower 90% confidence interval of the mean concentration exceeds 22.5 µg/L (1.5 times 15 µg/L) at the Musky Bay location, MB 1, indicating an overwhelming exceedance of the criterion.

The mean concentrations at all locations exceed the proposed SSC of 10 µg/L, including the area-weighted lake-wide average concentration (calculated using MB 1, LCO 1, LCO 2, LCO 3, LCO 4, and LCO 6). The lower 90% confidence interval of the mean exceeds the proposed SSC of 10 µg/L at all locations except Central Basin (9.6 µg/L) and Northeast Bay (10.0 µg/L).

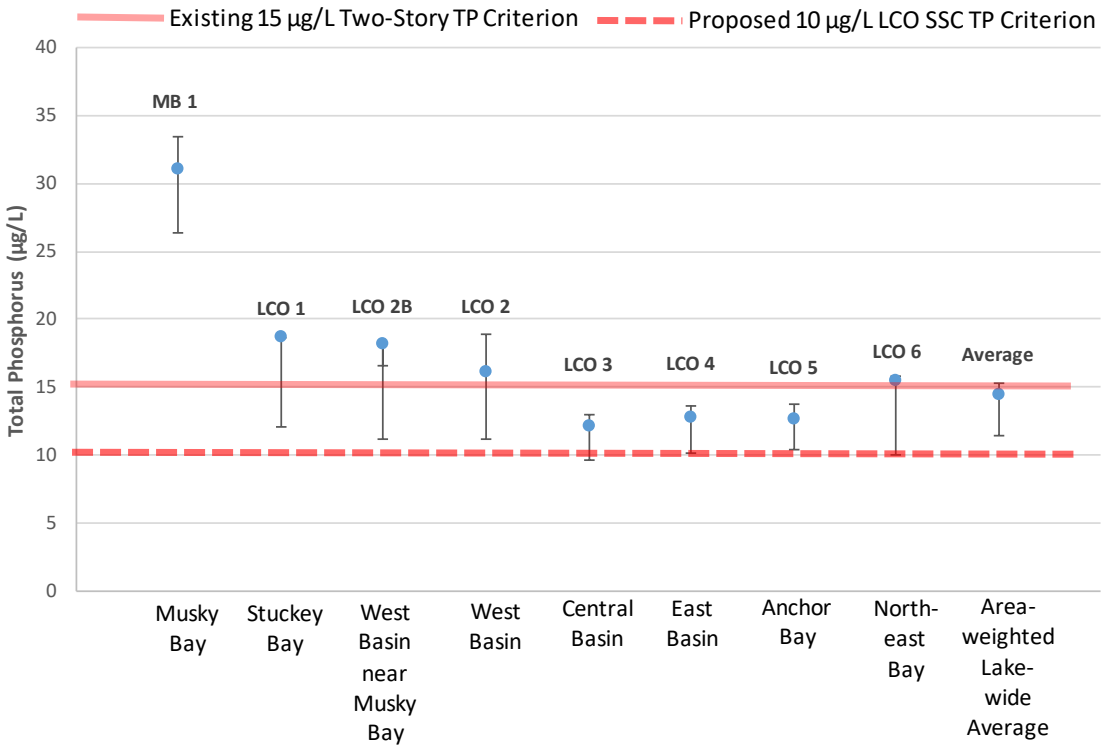


Figure 3: Mean TP concentrations in Lac Courte Oreilles, 2012-2016. Error bars represent 90% confidence interval of grand mean.

Table 3: Mean TP concentrations in Lac Courte Oreilles, 2012-2016 and 90% confidence interval of grand mean.

	2012-2016 Monthly Average Total Phosphorus (µg/L)								
	Musky Bay	Stuckey Bay	West Basin near Musky Bay	West Basin	Central Basin	East Basin	Anchor Bay	Northeast Bay	Area-weighted Lake-wide Average
Metric	MB 1	LCO 1	LCO 2B	LCO 2	LCO 3	LCO 4	LCO 5	LCO 6	
Average	31.1	18.7	18.3	16.2	12.2	12.8	12.7	15.6	14.5
Upper 90%	33.4	18.6	16.6	19.0	13.0	13.6	13.7	15.8	15.3
Lower 90%	26.3	12.1	11.2	11.2	9.6	10.1	10.4	10.0	11.5

Chlorophyll *a* Assessment

Fish and Aquatic Life

The chlorophyll a impairment threshold for two-story fishery lakes in Wisconsin is 10 µg/L for the FAL use designations. WisCALM states that if the lower bound of the 90% confidence interval of the mean concentration between July 15th and September 15th exceeds this threshold, there is an impairment.

The available chlorophyll a data do not demonstrate an impairment at LCO sampling locations using the 2018 WisCALM thresholds for fish and aquatic life use. The concentrations at all sampling locations clearly meet the criteria of 10 µg/L (Figure 4).

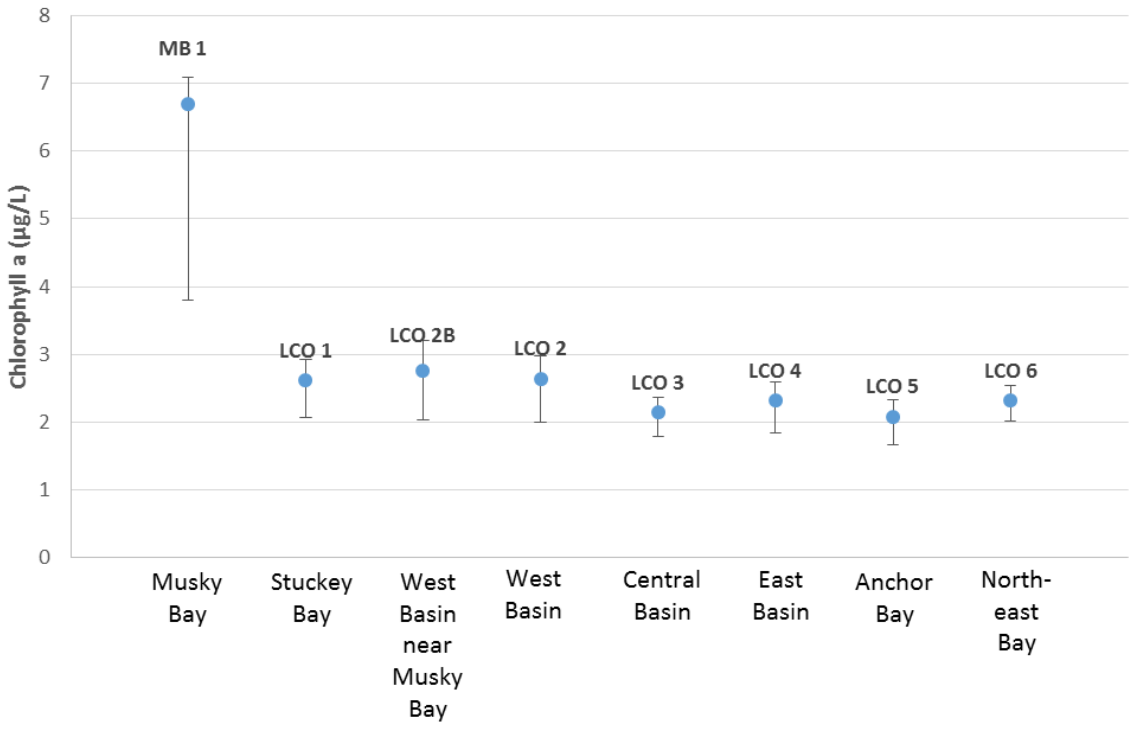


Figure 4: Mean chlorophyll a concentrations in Lac Courte Oreilles. Error bars represent 90% confidence interval of grand mean.

Recreational Usage

The chlorophyll a impairment threshold for two-story fishery lakes in Wisconsin is 5% of days with "nuisance algal blooms." WisCALM states that "nuisance algal blooms" are defined as days exceeding 20 µg/L chlorophyll a during the period between July 15th and September 15th. If more than 5% of days exceed this criteria, the waterbody is impaired.

The only location where any blooms exceeding 20 µg/L were measured was Musky Bay at a frequency of 2 samples out of 37 between 2012 and 2016, or 5.4%. The two samples with measurements exceeding 20 µg/L were in July and August of 2012. Applying the 2018 WisCALM statistics on the data indicate a lower bound confidence interval on the mean of 4.0% exceedance frequency.

Macrophytes

Algal mats, which are a manifestation of the excess phosphorus concentrations in Musky Bay, periodically limit swimming, boating, and fishing in the bay (Figure 5 - Figure 6). Increasing nuisance algal growth is also being observed in Stuckey Bay (Figure 7 - Figure 9). WisCALM acknowledges that WDNR does not currently have a protocol to assess recreational use attainment due to excessive macrophyte growth. However, best professional judgment should be used in the impairment determination by considering the observed macrophyte growth taking place in Musky and Stuckey Bays.

Curly leaf pondweed, first identified in the lake in 2005, is now established throughout Musky Bay. Its presence hinders or completely impairs recreational use of this portion of LCO for much of the year. While WisCALM states that WDNR does not list waters as impaired due to invasive species, such as curly leaf pondweed, its presence contributes to impairment of LCO, including affecting native aquatic plant species and contributing increased nutrient levels during die off, which occurs in mid-summer. The increased nutrient levels subsequently lead to lowering of dissolved oxygen levels.

Figure 5: Algal mats in Musky Bay in July, 2014. (Source: COLA.)

Figure 6: Algal mats in Musky Bay near cranberry bog outlet in July 2014. (Source: COLA)

Figure 7: Algal growth in Stuckey Bay near cranberry bog outlet in June, 2015. (Source: LCOCD)

Figure 8: Algal mat and curly leaf pondweed in Stuckey Bay in June, 2015. (Source: LCOCD)

Figure 9: Algal growth in Stuckey Bay in June, 2015. (Source: LCOCD)

Dissolved Oxygen and Cold Water Habitat

WisCALM includes procedures for the assessment of dissolved oxygen concentrations as a biological indicator of potential impairment due to excess phosphorus in lakes. A two-story lake may be impaired if dissolved oxygen drops below 5 mg/l in 10% of the samples where cold-water species may be found during the ice-free season. However, WDNR also recognizes that, for two-story lakes, a dissolved oxygen (DO) concentration alone is not the best way to measure the habitat characteristics needed to support the fishery. Cisco, lake whitefish and other cold-water fishes need a band of water that has both cold enough temperatures and high enough oxygen for them to survive. Therefore, measures that represents the presence and overall quantity of suitable habitat by combining both DO and temperature is a more useful metric for assessing support of the two-story fishery.

Low DO Indicator

The dissolved oxygen assessment methodology for two-story lakes in the 2018 WisCALM is unclear, thus no assessment could be performed. WDNR needs to provide clear instructions on how to conduct the assessment and why the approach protects cold-water fisheries in two-story lakes. In particular, WDNR does not specify whether best professional judgement or other metrics should be used to evaluate the depths to which cold-water species may be found. The WDNR has also lowered the level of protection for cold-water fisheries in two-story lakes by reducing the DO threshold from 6 mg/L in the 2016 WisCALM to 5 mg/L in 2018. WDNR needs to demonstrate that this lowering of the standard continues to be protective of cold-water species. WDNR also needs to clarify the process that was used to lower this standard. Without clear instructions on

how to conduct the dissolved oxygen assessment for two-story lakes, we recommend proceeding with an assessment of cold-water habitat quantity using both an oxy-thermal approach (TDO5) along with the habitat quantity approach WDNR has been proposing in draft rules and presentations. WDNR can incorporate this assessment into the 2018 WisCALM assessment using best professional judgment. Such an assessment and the documented fish kills demonstrate that the fish and aquatic life use is clearly impaired in LCO.

TDO5

TDO5 is one means of assessing the available cold-water habitat and is defined as a vertical measurement of the water temperature (T) at which the dissolved oxygen (DO) concentration is 5.0 mg/L. An appropriate maximum temperature to support the cisco and lake whitefish in LCO is 66°F. An evaluation of available temperature and dissolved oxygen profile data at the main basin sampling stations in LCO was conducted to determine the maximum TDO5 each year. The results are presented in Table 4. The analysis illustrates that LCO did not maintain a TDO5 of 66°F or less in 4 of 5 years at LCO 2 (West Basin) and LCO 3 (Central Basin), and in 3 of 5 years at LCO 4 (East Basin). This assessment indicates that LCO is not protective of cold-water species due to DO impairments.

Table 4: TDO5 at main basin stations

Year	Station and Max TDO (°F)		
	LCO2	LCO3	LCO4
2012	71.0	70.3	69.5
2013	64.9	63.1	60.3
2014	67.2	67.0	64.0
2015	68.5	67.3	67.4
2016	73.5	73.5	73.6

Habitat Quantity

WDNR has drafted proposed rules to include criteria for cold-water habitat. The most recent information available indicates that WDNR is working towards criteria based on the available volume of cold-water habitat quantity in a two-story lake. These criteria should be considered in assessing LCO's impairment status. The proposed criteria require vertical temperature and DO profiles measured in the deepest location of each lobe of the lake while the lake is stratified. COLA's understanding is that WDNR is proposing to define the criteria for two-story lakes as a habitat quantity threshold that is at least 1 meter of depth being maintained above a DO concentration of 6 mg/L and below a temperature of 66°F to support sustainable cisco and lake whitefish populations in LCO.

An assessment of LCO temperature and DO profile data was performed to evaluate the habitat quantity available for cisco and lake whitefish in LCO. Specially, the critical habitat, or the minimum habitat quantity over the course of a year, was quantified for the years 2012-2016. Available temperature and DO profiles were assessed at the three sampling locations in the main basins: LCO 2 in the West Basin; LCO 3 in the Central Basin; and LCO 4 in the East Basin (Figure 1).

Figure 10 presents the minimum habitat quantity across years and basins. The color of each grid cell represents the minimum bandwidth, or critical habitat quantity, in meters during a year for a

specific combination of temperature and DO thresholds. The grid cells are color-coded by depth increments including 0-0.5 m, >0.5-1.0 m, >1.0-2.0 m, and >2.0 m. The black circles on each grid identify the required temperature and DO thresholds for LCO, 66°F and 6 mg/L DO. The values represented in these black circles are also presented in Table 5. The observed data demonstrate that the critical habitat quantity in each year at each location has been below the minimum threshold of 1 meter. This supports a determination that LCO is impaired due to insufficient cold-water habitat. This impairment determination is also supported by fish kills that have been observed in these years, including severe cisco and lake whitefish mortality in 2016 (documentation available at http://cola-wi.org/media/cushycms/Links_25_522514229.pdf).

Table 5: Critical habitat quantity available to cold-water species at 66° F and 6 mg/L dissolved oxygen.

Location		Minimum Habitat Band (m)				
		2012	2013	2014	2015	2016
West Basin	LCO 2	0	0	0	0	0
Central Basin	LCO 3	0	0.24	0	0	0
East Basin	LCO 4	0	0.21	0	0	0

While the 2016 profiling data had been submitted to WDNR in January 2017, it was not found in the WDNR SWIMS database at the time this assessment was performed. Therefore, it is included as an attachment to this memorandum.

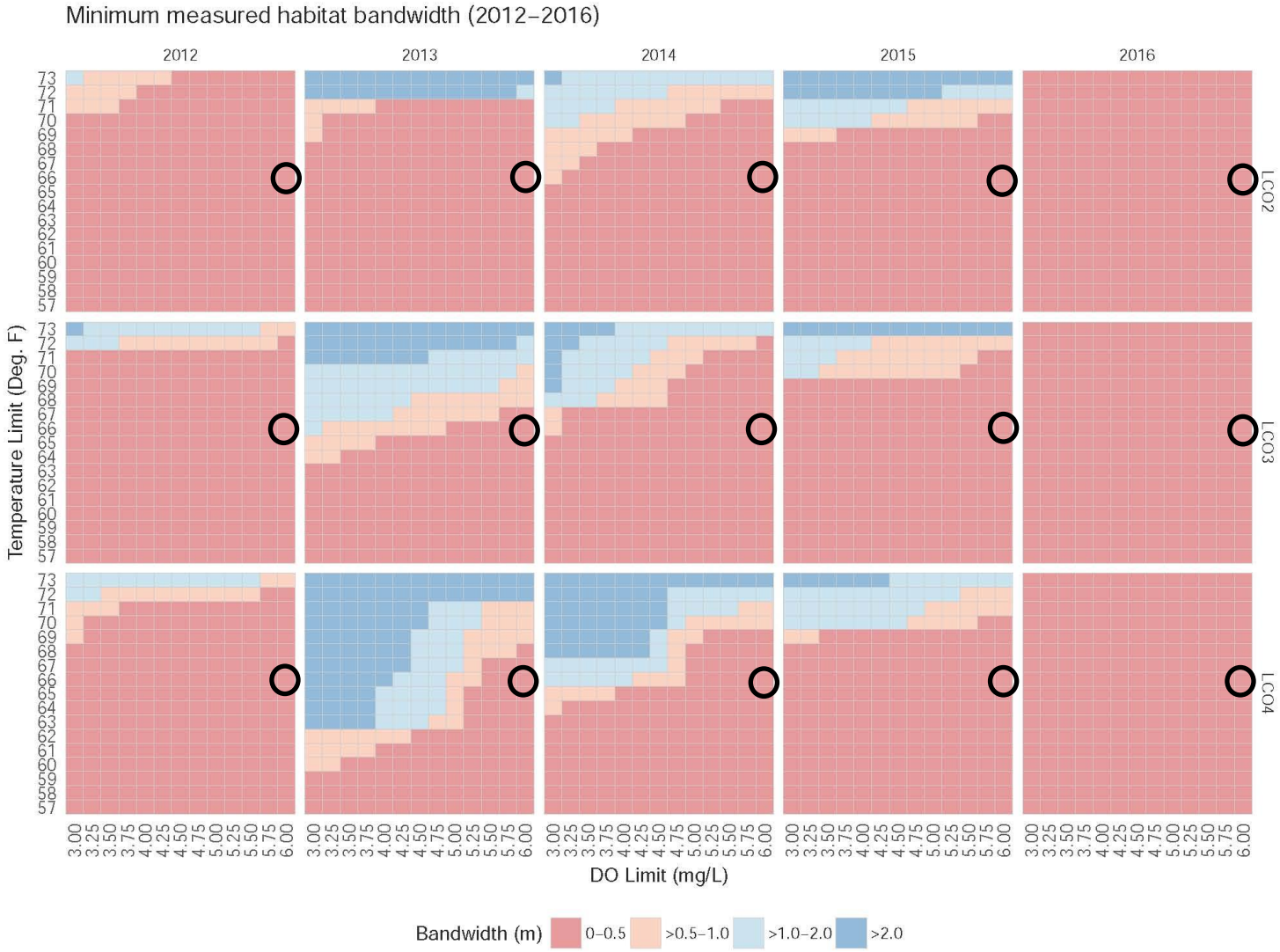


Figure 10: Critical habitat quantity available to cold-water species as a function of suitable temperature and dissolved oxygen.

Conclusion

The assessment presented in this memorandum supports a determination that LCO is impaired by excess phosphorus concentrations, resulting in nuisance levels of algae and macrophytes, as well as depleted dissolved oxygen concentrations insufficient to support the resident cisco and lake whitefish fishery. The following observations support listing LCO as impaired due to excess phosphorus:

- Mean concentrations of TP in Musky Bay overwhelmingly exceed the existing two-story lake criterion of 15 µg/L. Musky Bay maintains significant hydraulic connectivity and mixing with the West Basin.
- TP concentrations at other locations in LCO do not meet the existing WisCALM requirements to demonstrate impairment based on TP concentrations alone (lower 90% confidence interval of the mean exceeds 1.5 times the criterion, or 22.5 µg/L). However, mean TP concentrations are shown to be exceeding the existing criterion and additional biological indicator metrics demonstrate impairment due to excess TP and algal production.
    - Mean concentrations of TP in Musky Bay, Stuckey Bay, West Basin, and Northeast Bay exceed 15 µg/L.
    - Nuisance levels of chlorophyll a have been observed in Musky Bay as well as nuisance levels of macrophyte growth in both Musky Bay and Stuckey Bay.
    - A TDO5 of 66 degrees F and a critical habitat quantity of 1 meter for cisco and lake whitefish are not being maintained throughout the year resulting in fish kills and threatening sustainable populations.
- The observed biological impairment, as well as the Outstanding Resource Water designation for LCO, demonstrate the need for a site-specific criterion (SSC) for phosphorus. COLA and LCOCD have proposed a SSC of 10 µg/L as a lake-wide area-weighted average. The mean concentrations of TP at all sampling locations, as well as the lake-wide area-weighted average, exceed this proposed SSC. Additionally, the lower 90% confidence interval of the mean of the lake-wide area-weighted average also exceeds the proposed SSC of 10 µg/L, as do six of the eight individual sampling locations.

Attachment

2016 Profiling Data for Lac Courte Oreilles Sampling Locations LCO 2 (West Basin), LCO 3 (Central Basin), and LCO 4 (East Basin)

Monitoring Conducted by the LCO Conservation Department

Site: LCO-2 Deep Hole West Basin			
Station ID#: 583066			
Date	Depth (ft.)	Temp (F)	DO (mg/L)
5/26/2016	1	64.1	10.42
	11.5	62.2	10.65
	20.7	56.5	11.47
	32.2	52.2	9.12
	35.6	50.8	8.71
	42.4	50.5	8.36
	47.3	50.2	7.47
	53.8	49.8	6.76
	59	49.7	6.4
	62.1	49.7	6.17
	64	49.7	5.94
6/7/2016	1	61.7	9.5
	11.4	61.4	9.54
	20.3	60.9	9.5
	25.1	54	8.8
	30	52.3	8.18
	36.5	51.8	7.87
	43.9	51.1	6.95
	50.4	50.6	5.48
	55.5	50.3	4.38
	63.9	50	2.07
6/21/2016	1	68.3	9.06
	11.3	68.1	9.05
	20	65.5	9.05
	25.5	56.7	7.79
	33.1	54.3	6.54
	41.8	52.7	5.33
	46.9	51.4	3.38
	53.2	51.2	2.57
	58.2	50.9	1.9
	63.9	50.8	1.15
7/13/2016	1	72	8.29
	11.5	72.1	8.31
	20.5	72	8.33
	25.7	68.4	6.63
	28.2	58	3.81
	33	57.7	3.48
	41.1	55	2.01
	46.2	52.6	0.36
	53.4	51.9	0.03
	59.6	51.6	0.01
	63.1	51.5	0
7/28/2016	1	75.2	8.86
	10.1	75.2	8.84
	18.7	73.6	8.34
	22.1	72.3	7.65
	25.9	71	6.94

Site: LCO-2 Deep Hole West Basin			
Station ID#: 583066			
Date	Depth (ft.)	Temp (F)	DO (mg/L)
	29.1	69.5	5.66
	32	66.7	4.05
	34.6	63.6	2.5
	37.5	60.3	1.4
	39.3	59.8	0.85
	41.8	58.1	0.58
	45.5	54	0.05
	48.7	53.6	0
	52	53.2	0
	58.2	53	0
	63.5	52.1	0
8/12/2016	1	75.6	8.26
	13.1	75.5	8.22
	20.3	75.4	8.1
	23.7	73.1	5.31
	25.3	71.9	3.86
	26.3	70.8	2.88
	27.8	69.3	1.9
	29	68.1	1.32
	30.1	67.6	1.01
	31.3	65.9	0.71
	39.8	59	0.09
	47.7	53.9	0
	54.4	53.3	0
	59.8	53	0
	64	52.8	0
8/18/2016	1	76.8	8.95
	10.7	76.2	9.03
	16.2	74.7	7.54
	20	74.5	6.74
	24.5	73.8	5.53
	25.7	72.8	3.89
	26.8	70.6	1.79
	30.6	64.8	0.28
	36.2	60.5	0.06
	48.1	53.5	0
	56.8	52.9	0
	63.1	52.9	0
8/25/2016	1	72.4	8.05
	2	72.4	8
	3	72.4	8
	4	72.4	8
	5	72.4	7.97
	6	72.4	7.96
	7	72.4	7.99
	8	72.4	7.94
	9	72.4	7.97
	10	72.4	7.96
	11	72.4	7.97
	12	72.4	7.94
	13	72.4	7.95
	14	72.3	7.96
	15	72.3	7.98
	16	72.3	7.96
	17	72.3	7.92

Site: LCO-2 Deep Hole West Basin			
Station ID#: 583066			
Date	Depth (ft.)	Temp (F)	DO (mg/L)
	18	72.3	7.91
	19	72.2	7.86
	20	72.2	7.89
	21	72.2	7.9
	22	72.3	7.92
	23	72.2	7.85
	24	72.2	7.84
	25	72.2	7.85
	26	72.1	7.75
	27	72	7.68
	28	71.8	7.56
	29	66.5	0.075
	35	61.6	0.07
	40	58.4	0.01
	45	55.3	0
	50	53.6	0
	55	53.2	0
	60	53	0
	64	53	0
9/2/2016	1	72	8.63
	3.4	72	8.66
	4.6	71.8	8.62
	5.9	71.7	8.57
	6.9	71.6	8.56
	8	71.6	8.52
	9.1	71.4	8.55
	10.1	71.4	8.52
	11.3	71.3	8.48
	12.5	71.3	8.47
	13.7	71.3	8.32
	14.9	71.2	8.39
	16	71.2	8.31
	17.2	71.2	8.34
	18.2	71.2	8.46
	19.2	71.2	8.46
	20.3	71.2	8.48
	21.3	71.2	8.47
	22.3	71.2	8.45
	23.3	71.1	8.27
	24.4	71.1	8.19
	25.5	71.1	7.55
	26.5	71	7.28
	27.5	70.9	7.76
	28.6	70.8	8.04
	29.6	70.7	7.9
	30.6	70.6	7.51
	31.5	70.2	6.1
	32.6	69.3	3.24
	33.6	66.9	0.22
	43.9	57	0.04
	49.5	54.1	0
	57.8	53.2	0
	63	52.9	0
9/7/2016	1	70.7	7.89
	2	70.8	7.95
	3	70.8	8

Site: LCO-2 Deep Hole West Basin			
Station ID#: 583066			
Date	Depth (ft.)	Temp (F)	DO (mg/L)
	4	70.8	7.98
	5	70.8	7.97
	6	70.8	7.96
	7	70.8	7.96
	8	70.8	7.97
	9	70.8	7.96
	10	70.8	7.97
	11	70.8	7.92
	12	70.8	7.89
	13	70.7	7.86
	14	70.7	7.85
	15	70.7	7.78
	16	70.6	7.67
	17	70.6	7.65
	18	70.6	7.64
	19	70.6	7.6
	20	70.5	7.57
	21	70.5	7.55
	22	70.5	7.52
	23	70.5	7.4
	24	70.4	7.21
	25	70.3	7.09
	26	70.2	6.76
	27	70	6.65
	28	70	6.52
	29	69.8	6.36
	30	69.7	6.07
	31	69.3	5.27
	32	68.3	3.61
	33	67.7	3.23
	34	63.9	0.07
	35	63.8	0.01
	45	56.4	0
	52	53.8	0
	60	53.5	0
9/14/2016	1	68.3	8.06
	3	68.1	8.04
	4	68	8.05
	5	67.9	8
	6.1	67.9	7.95
	7	67.8	7.9
	8.1	67.8	7.87
	9.1	67.8	7.89
	13	67.8	7.84
	16	67.8	7.83
	19.6	67.8	7.82
	22.6	67.8	7.84
	26.3	67.7	7.61
	27.7	67.8	7.36
	28.8	67.6	7.33
	29.8	67.6	7.4
	30.9	67.6	7.4
	32	67.5	7.31
	33	67.5	7.23
	34.2	67.4	7.12
	35.2	66.9	5.85

Site: LCO-2 Deep Hole West Basin			
Station ID#: 583066			
Date	Depth (ft.)	Temp (F)	DO (mg/L)
	36.4	65.6	0.47
	42.9	58.2	0.05
	48.2	54.4	0
	54.4	53.9	0
	60	53.8	0

Site: LCO-3 Center Basin			
Station ID#: 583067			
Date	Depth (ft.)	Temp (F)	DO (mg/L)
5/26/2016	1	64.8	10.09
	11.8	62.9	10.53
	21.4	53.8	10.8
	31	51.6	10.5
	42.1	49.7	9.41
	47.4	49.6	9.05
	52.9	49.4	8.42
	57	49.3	7.54
6/7/2016	1	61.6	9.48
	10.5	61.4	9.48
	19.8	61.3	9.47
	26	60.7	9.46
	28.9	54.4	9.38
	37.1	51.2	8.44
	44	50.4	7.83
	50.2	50.1	7.65
	57	49.7	7.01
6/21/2016	1.5	68.8	9.03
	11.2	68.8	9.03
	20.2	68.6	9.09
	25.5	62.6	8.67
	33.4	52.7	6.85
	40.5	51.4	6.35
	47.1	50.8	6.14
	52.1	50.5	5.47
	54.9	50.3	4.55
7/14/2016	1	71.2	8.19
	10.4	71.2	8.2
	19.5	71.2	8.17
	24.4	71.1	8.14
	28.9	70.9	8.01
	31.4	57.8	5.05
	36.9	54.1	3.65
	41	52.6	2.76
	47.8	52.1	2.23
	50.7	51.9	2.06
	55.1	51.8	1.75
7/28/2016	1	76	8.81
	10.6	76	8.82
	19	75.9	8.75
	24.3	75.5	8.64
	28.2	66.4	2.86
	31.3	63.6	2.76

Site: LCO-3 Center Basin			
Station ID#: 583067			
Date	Depth (ft.)	Temp (F)	DO (mg/L)
	35.5	58.4	1.5
	40.8	54.2	1.23
	43.8	53.4	0.98
	47.3	52.8	0.66
	50.4	52.4	0.35
	55.3	52	0.12
8/12/2016	1.1	75.9	8.36
	10.4	75.9	8.19
	17	75.8	8.18
	21.7	75.8	8.13
	25	75.1	5.95
	26.8	72.9	4.71
	28	71.1	3.33
	29	68.5	2.23
	30.3	66.4	1.2
	31.7	64.2	0.52
	34.5	60	0.42
	36.3	57.8	0.27
	38.2	56.3	0.19
	43.9	53.5	0.01
	55	51.9	0
8/18/2016	1	76.7	8.89
	10.2	76.4	8.94
	16.2	76	8.86
	21.5	75.4	8.49
	24.9	74.5	6.48
	26.5	73.6	5.15
	27.5	71.2	1.82
	30	68.7	0.49
	36.9	59.2	0.13
	46	53.2	0.03
	57.4	51.9	0
8/25/2016	1	72.4	7.85
	2	72.4	7.85
	3	72.4	7.86
	4	72.4	7.83
	5	72.4	7.82
	6	72.5	7.83
	7	72.5	7.86
	8	72.4	7.84
	9	72.4	7.81
	10	72.4	7.79
	11	72.4	7.82
	12	72.3	7.77
	13	72.3	7.8
	14	72.3	7.8
	15	72.2	7.75
	16	72.3	7.76
	17	72.2	7.76
	18	72.2	7.72
	19	72.2	7.72
	20	72.2	7.68
	21	72.2	7.71
	22	72.2	7.71
	23	72.2	7.72

Site: LCO-3 Center Basin			
Station ID#: 583067			
Date	Depth (ft.)	Temp (F)	DO (mg/L)
	24	72.2	7.68
	25	72.2	7.73
	26	72.1	7.68
	27	72.1	7.66
	28	71.9	7.17
	29	71.8	6.75
	30	71.3	4.9
	31	65.9	0.71
	35	58.8	0.17
	40	54.8	0.02
	50	52.4	0
	58	51.7	0
9/2/2016	1.5	71.8	8.37
	3	71.8	8.35
	4	71.8	8.37
	5	71.8	8.35
	6	71.7	8.37
	7.1	71.7	8.35
	8	71.7	8.33
	9	71.6	8.36
	10	71.6	8.35
	11.1	71.6	8.34
	12	71.6	8.33
	13	71.5	8.31
	14	71.5	8.32
	15.1	71.5	8.28
	16.1	71.5	8.3
	17.1	71.4	8.26
	18.1	71.4	8.26
	19.1	71.4	8.27
	20.1	71.4	8.28
	21.1	71.4	8.23
	22.1	71.4	8.24
	23.1	71.4	8.22
	24.1	71.4	8.23
	25.1	71.3	8.16
	26.1	71.3	8.14
	27.2	71.3	8.1
	28.2	71.2	8.02
	29.2	71	7.59
	30.3	69.8	5.24
	31.3	68.6	3.25
	32.4	65.2	0.24
	42.7	53.7	0
	50.3	52.5	0
	55.6	51.9	0
9/7/2016	1	71	8.15
	2	71	8.16
	3	71	8.12
	4	71	8.12
	5	71	8.12
	6	70.9	8.13
	7	70.9	8.1
	8	70.9	8.11
	9	70.9	8.09
	10	70.9	8.08

Site: LCO-3 Center Basin			
Station ID#: 583067			
Date	Depth (ft.)	Temp (F)	DO (mg/L)
	11	70.9	8.05
	12	70.9	8.06
	13	70.9	8.05
	14	70.9	8.06
	15	70.9	8.06
	16	70.9	8.06
	17	70.9	8.07
	18	70.9	8.06
	19	70.9	8.03
	20	70.9	8.02
	21	70.9	8.01
	22	70.9	8.01
	23	70.9	8.02
	24	70.9	8.01
	25	70.9	8
	26	70.9	7.98
	27	70.9	7.97
	28	70.9	7.96
	29	70.8	7.94
	30	70.7	7.8
	31	70.2	7.11
	32	68.7	4.46
	33	67.5	3.49
	34	67.4	2.79
	35	65.1	1.47
	45	54.1	0.08
	50	52.7	0
	55	52.1	0
	60	51.9	0
9/14/2016	1	68.4	8
	5.1	68.1	8.05
	10.1	68	8.06
	13.3	67.9	8.03
	15.4	67.9	8
	17.7	67.8	7.98
	19.4	67.8	7.91
	20.8	67.8	7.86
	22.3	67.8	7.89
	23.9	67.8	7.88
	25.2	67.8	7.86
	26.4	67.8	7.84
	27.5	67.8	7.87
	28.8	67.8	7.86
	29.8	67.8	7.87
	30.8	67.8	7.85
	31.8	67.8	7.84
	32.8	67.8	7.83
	33.9	67.8	7.84
	35	67.8	7.82
	36.1	65.5	1.79
	42.2	54.9	0.39
	46.1	53.4	0.09
	50	52.6	0.01
	56.1	52.1	0

Site: LCO-4 East Basin (Deep Hole)			
Station ID#: 583046			
Date	Depth (ft.)	Temp (F)	DO (mg/L)
5/26/2016	1	63.5	10.31
	10.7	60.4	10.83
	21.5	53.6	11.46
	30.4	51.2	11.07
	41.5	50.2	10.48
	52.3	49	9.91
	62	48.1	9.25
	71.1	47.7	8.96
	78.1	47.5	8.76
	83.1	47.4	8.67
	87.1	47.3	8.5
	92	47.2	7.86
6/7/2016	1	62.9	9.32
	10.3	62.8	9.32
	20.7	62.6	9.33
	30.9	54.1	9.47
	40	51.1	9.02
	50.1	49.9	8.72
	60.5	49.1	8.34
	70.5	48.5	8.04
	80.2	48	7.21
	91.1	47.8	6.17
6/21/2016	1	71.1	8.91
	12.9	71	8.92
	20.6	70.9	8.91
	27.6	68.4	8.5
	31.4	56.5	8.47
	40.4	52	7.05
	50.9	50.8	7.06
	61.1	49.5	6.9
	70.9	48.9	6.37
	80.5	48.6	5.78
	91.7	48.5	5.58
7/14/2016	1.1	71.5	8.32
	12.9	71.5	8.31
	22.4	71.5	8.31
	25.5	71.5	8.31
	29	71.4	8.27
	33.5	70.1	5.96
	37.4	56.5	4.81
	43.5	53	3.65
	50.4	51.4	3.52
	60.4	50.2	3.49
	75.1	49.4	2.58
	84.8	49.2	1.66
	92.5	49.1	1.41
7/28/2016	1.5	76.6	8.58
	12.1	76.5	8.6
	20.1	73.1	7.42
	23.9	68.9	5.91
	28.2	65.5	4.28
	32.4	60.1	2.77
	35.3	58.2	2.63
	38.9	55.4	2.47

Site: LCO-4 East Basin (Deep Hole)			
Station ID#: 583046			
Date	Depth (ft.)	Temp (F)	DO (mg/L)
	43.2	53.6	2.24
	46.8	53	2.15
	50.5	52.1	2.19
	54.9	51.4	2.32
	58.3	51	2.06
	61.9	50.7	1.66
	64.9	50.4	1.28
	68.9	50.3	1.23
	72.3	50	0.71
	75.9	49.8	0.34
	78.8	49.6	0.29
	85.5	49.5	0.07
	92.3	49.5	0
8/12/2016	1	76.3	8.32
	14.3	76.3	8.3
	20.8	75.2	7.07
	23.4	72.8	5.24
	24.8	71.7	4.4
	26.1	70.4	3.4
	27.2	68.7	2.31
	28.1	67.2	1.88
	29.4	66.5	1.7
	30.4	64.8	1.26
	31.4	64.1	1.13
	32.5	62.3	0.86
	33.8	60.7	0.76
	35.4	58.8	0.58
	45.8	53.2	0.8
	53.4	51.7	0.59
	62.9	50.7	0.42
	70.3	50.1	0.04
	80.8	49.6	0
	92.1	49.4	0
8/18/2016	1	78.3	8.81
	17.4	76.2	8.94
	22.5	75.2	7.43
	24.1	73.7	5.35
	25.5	72.7	2.79
	26.6	70	1.43
	27.7	68.7	1.15
	28.7	67.3	0.69
	34.3	60	0.22
	43	54.9	0.98
	45.3	53.6	0.9
	48	52.7	0.76
	54.6	51.5	0.65
	61.6	50.7	0.4
	71	50.1	0.03
	80.2	49.8	0
	86.2	49.4	0
	91.8	49.4	0
8/25/2016	1	72.9	7.91
	2	72.9	7.91
	3	72.9	7.9
	4	72.9	7.89

Site: LCO-4 East Basin (Deep Hole)			
Station ID#: 583046			
Date	Depth (ft.)	Temp (F)	DO (mg/L)
	5	72.9	7.89
	6	72.9	7.89
	7	72.9	7.91
	8	72.9	7.9
	9	72.9	7.92
	10	72.9	7.88
	11	72.9	7.91
	12	72.9	7.92
	13	72.9	7.91
	14	72.9	7.9
	15	72.9	7.85
	16	72.8	7.93
	17	72.8	7.9
	18	72.8	7.86
	19	72.9	7.88
	20	72.8	7.88
	21	72.8	7.87
	22	72.8	7.86
	23	72.8	7.88
	24	72.8	7.88
	25	72.8	7.87
	26	72.8	7.88
	27	72.8	7.83
	28	72.7	7.83
	29	72.7	7.72
	30	72.7	7.75
	31	72.7	7.73
	32	72.6	7.63
	33	64.8	0.96
	40	55.2	0.53
	50	52.2	0.24
	60	50.9	0.01
	70	50.4	0
	80	50.1	0
	90	50.1	0
9/2/2016	1.5	72.1	8.36
	3	72.1	8.37
	4	71.9	8.39
	5	71.8	8.36
	6	71.4	8.36
	7	71.4	8.25
	8	71.3	8.19
	9.1	71.2	8.15
	10	71.2	8.04
	11	71.2	8.01
	12	71.2	8.02
	13	71.1	8.03
	14.1	71.1	8.04
	15.1	71.1	8.05
	16	71.1	8.06
	17	71.1	8.03
	18	71	8.07
	19	71	8.09
	20	71	8.09
	21	71	8.09
	22	71	8.06

Site: LCO-4 East Basin (Deep Hole)			
Station ID#: 583046			
Date	Depth (ft.)	Temp (F)	DO (mg/L)
	23	71	7.97
	24	70.9	7.95
	25	70.9	7.96
	26	70.9	7.96
	27	70.9	7.97
	28	70.7	6.29
	29	70.3	5.33
	30	69.8	4.4
	31	68.5	3.7
	32	67.3	1.72
	42	55.5	0.06
	52.5	52	0.05
	59.8	51	0
	68.7	50.4	0
	77.8	49.9	0
	83.6	49.7	0
	88.2	49.6	0
	91.6	49.6	0
9/7/2016	1	70.9	8.14
	2	70.9	8.13
	3	70.9	8.11
	4	70.9	8.1
	5	70.9	8.12
	6	70.9	8.16
	7	70.9	8.11
	8	70.9	8.15
	9	70.9	8.12
	10	70.9	8.07
	11	70.9	8.08
	12	70.9	8.09
	13	70.9	8.1
	14	70.9	8.09
	15	70.9	8.09
	16	70.9	8.08
	17	70.9	8.06
	18	70.9	8.05
	19	70.9	8.02
	20	70.9	7.94
	21	70.9	7.64
	22	70.6	7.53
	23	70.6	7.38
	24	70.5	6.86
	25	70.2	6.74
	26	70.1	6.65
	27	70	6.55
	28	70	6.46
	29	69.3	5.41
	30	68.7	4.75
	31	67.7	3.42
	32	67.5	2.97
	33	67.3	1.53
	40	56	0.03
	45	54.4	0
	50	52.9	0
	55	51.3	0
	65	50.7	0

Site: LCO-4 East Basin (Deep Hole)			
Station ID#: 583046			
Date	Depth (ft.)	Temp (F)	DO (mg/L)
	70	50.2	0
	85	49.7	0
	90	49.7	0
9/14/2016	1	68.8	8.03
	6.1	68.5	8.01
	11	68.3	7.96
	14.5	68.3	7.85
	18.7	68.3	7.85
	22.5	68.2	7.74
	23.7	68.2	7.77
	24.7	68.2	7.73
	26.2	68.2	7.72
	27.4	68.2	7.75
	28.6	68.2	7.75
	29.9	68.1	7.85
	30.9	68.1	7.84
	32	68	7.82
	33.2	67.9	7.8
	34.5	67.6	7.44
	35.5	66.6	6.27
	36.6	62.9	0.87
	38.9	59.1	0.38
	41.7	56.6	0.04
	44.8	55.3	0.02
	47.9	53.3	0
	54.3	51.8	0
	59.3	51	0
	65.9	50.7	0
	72	50.4	0
	78.7	50.2	0
	84	50	0
	91.9	49.8	0

Beranek, Ashley E - DNR

From: Greg Toogood <toogoods51@gmail.com>
Sent: Monday, December 18, 2017 3:16 AM
To: DNR Impaired Waters
Subject: 2018 Impaired Waters List - LCO "Cause" of the impairment is "Known "

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

We fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish.
The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Greg & Lydia Toogood
16194 W Herman Rd
Hayward WI 54843

Beranek, Ashley E - DNR

From: Holly Piper <hollypiper13@yahoo.com>
Sent: Thursday, December 21, 2017 1:39 PM
To: DNR Impaired Waters
Subject: LCO

Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Orielles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). I love LCO like my own and it is one of the only lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. While the WDNR listing indicates the cause of the impairment is "unknown", a significant deal of independent research has indicated that the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment at Lac Courte Orielles.

Respectfully yours,

Holly G. Piper, MBA

Beranek, Ashley E - DNR

From: Holly Bean <hollyvincentbean@gmail.com>
Sent: Monday, December 11, 2017 2:37 PM
To: DNR Impaired Waters
Subject: 2018 Impaired Waters List

Dear Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Holly Vincent Bean, co-owner

Point O' Pines

14584 W. Schoolhouse Lane

Stone Lake, WI 54876

--
Holly Vincent Bean
phone: 917.941.2878
please use this email address: hollyvincentbean@gmail.com

Beranek, Ashley E - DNR

From: Gauthier, Jeffrey <jeffrey.w.gauthier@medtronic.com>
Sent: Monday, December 11, 2017 9:26 AM
To: DNR Impaired Waters
Cc: Jane Gauthier
Subject: Lac Courte Oreilles
Attachments: XeroxScan.pdf

Thank you for your consideration.

Jeff Gauthier
Sr. Principal Quality Systems Specialist
Medtronic – Neuromodulation Quality Systems
7000 Central Ave NE, RCE480 | Fridley, MN 55432
Phone: 763-526-3783 | jeffrey.w.gauthier@medtronic.com

ASK ME about Quality Begins with Me

dnrimpairedwaters@wisconsin.gov

December 11, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

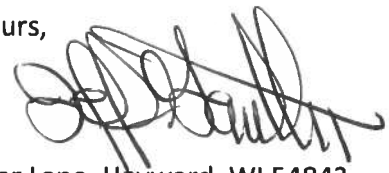
I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." I strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,



Jeff Gauthier

7365 N. Kroehler Lane, Hayward, WI 54843

Beranek, Ashley E - DNR

From: mjjh406@charter.net
Sent: Friday, December 22, 2017 2:03 PM
To: DNR Impaired Waters
Subject: Lac courte Oreiles

DATE, 2017 Ms. Ashley Beranek DNR Bureau of Water Quality 101 South Webster St. WQ/3 Madison, WI 53707 RE: 2018 Impaired Waters List Dear Ms. Beranek, I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO. However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills. Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters. Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles. Respectfully Yours, Name_Jerry Hanson_____ Address—406 S Creek Dr. Elkhorn Wi. 53121----------

Beranek, Ashley E - DNR

From: Jim Porath <jim.porath@gmail.com>
Sent: Monday, December 04, 2017 9:34 PM
To: DNR Impaired Waters
Subject: Lac Courte Oreilles Impaired Water Status

December 4, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

We fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is the only water on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Submitted,

Jim & Karen Porath
14742/5 W Sand Beach Lane
Stone Lake, WI 54876

438 Bucher Ave.
Shoreview, MN %%126

Sent from my iPad

Beranek, Ashley E - DNR

From: JAMES COORS <jgcoors@me.com>
Sent: Saturday, December 09, 2017 2:34 PM
To: DNR Impaired Waters
Subject: Public comments on LCO impaired water listing

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I /we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few water bodies on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown, " while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Jim Coors
PO Box 284
Stone Lake, WI 54876

Beranek, Ashley E - DNR

From: jimshelley Paine <jspaine@gmail.com>
Sent: Friday, December 15, 2017 7:15 AM
To: DNR Impaired Waters
Subject: Lac Courte Oreilles phosphorus problem
Attachments: COLA+members'+e-mail+to+DNR+version+2.pdf; ATT00001.txt

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name_____

Address----------

Beranek, Ashley E - DNR

From: Joe Moelter <joemoelter@icloud.com>
Sent: Monday, December 11, 2017 9:03 AM
To: DNR Impaired Waters
Subject: Impaired waters of LCO lake
Attachments: COLA+members'+e-mail+to+DNR+version+2.pdf; ATT00001.txt

Please last LCR like as impaired waters to do total phosphorus

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name_____

Address----------

Beranek, Ashley E - DNR

From: John Seaberg <seabergjohn@gmail.com>
Sent: Wednesday, December 13, 2017 12:13 PM
To: DNR Impaired Waters
Subject: Lac Courte Oreilles Lake in Hayward Wi
Attachments: Scan 2017-12-13 12.10.47.pdf

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name J Seaberg

Address 7458 N WURSTER, HAYWARD WI

JOHN + BARB SEABERG

Beranek, Ashley E - DNR

From: John Berg <jbergnd@gmail.com>
Sent: Tuesday, December 12, 2017 11:51 AM
To: DNR Impaired Waters

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, Wi 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) Lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare Outstanding Resource Water, and one of only five lakes in Wisconsin with at two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

I strongly disagree with the WDNR listing of the cause of the impairment as unknown. Extensive independent research has documented the increase in total phosphorous and the corresponding incidences of low DO, including significant fish kills.

In 2014 phosphorous was cited at the cause of the listing of Musky Bay (part of LCO) as an Impaired Water. LCO as a whole is impaired and the cause is Phosphorous.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorous is the cause of the impairment of Lac Court Oreilles. Thank you.

Yours truly,

John A. Berg
14960 W County Road E
Stone Lake, Wisconsin 54876

Beranek, Ashley E - DNR

From: John Berglund <johnberglund@berglund-law.net>
Sent: Monday, December 11, 2017 12:20 PM
To: DNR Impaired Waters
Subject: Lac Courte Oreilles and the 2018 Impaired Waters List

December 11, 2017

Dear Ms. Beranek,

My wife, Kathleen and I, obtained my parents' interest in our lake cabin on Lac Courte in 1999. I have enjoyed the lake since 1967. Over that time, I have seen changes in the lake quality in that Musky Bay now almost unusable for fishing and the rest of the lake is not nearly as clear as it was when my parents bought the cabin back in 1967.

With the above in mind, I fully support the proposed designation of the entire LCO lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." I strongly disagree. I understand a great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters. Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

John J. Berglund
2140 Fourth Avenue North
Anoka, MN 55303
(763) 427-5950
Fax: (763) 427-7136

Beranek, Ashley E - DNR

From: jac coverdale <jac.coverdale@gmail.com>
Sent: Friday, December 08, 2017 10:22 AM
To: DNR Impaired Waters
Subject: 2018 Impaired Waters List

Dear Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of professional, independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is the only water on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

John Coverdale
8087 N Co. Rd E
Hayward, WI

Beranek, Ashley E - DNR

From: John Seylar <johndseylar@gmail.com>
Sent: Friday, December 15, 2017 10:56 AM
To: DNR Impaired Waters
Subject: 2018 Impaired Waters List

December 15, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

Dear Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of professional, independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is the only water on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

John Seylar, 2950 Minnehaha Curve, Wayzata MN 55391

Beranek, Ashley E - DNR

From: jobarnes@tds.net
Sent: Sunday, December 17, 2017 9:27 PM
To: DNR Impaired Waters
Subject: impaired waters list

Hello DNR Impaired Waters,
I noticed that you have the Wisconsin River on the list from Grant County, but you do not have the Big Green River or the Little Green River. At the corner of Hwy. 133 and County C near Woodman, WI you would find a feedlot with hundreds of cattle on the banks of the Little Green River, shortly before it flows into the Big Green River, which flows into the Wisconsin river. This feedlot clearly shows up on Google maps. There are many springs and wetlands that are located in the feedlot within 50 to 100 feet of the river. I did notice that someone must have asked the owners to fence the river out of the feedlot, but that you allow this feedlot to exist within the watershed of these rivers is unbelievable. This is surely part of the problem with the contamination of the rivers. I support the DNR looking into cleaning up these rivers. Thank you.
Judie Barnes
Woodman, WI

Beranek, Ashley E - DNR

From: Kurt Schroeder <kschroeder@hsrassociates.com>
Sent: Friday, December 01, 2017 8:42 AM
To: DNR Impaired Waters
Subject: 2018 impaired waters list

Ms Beranek,

We support the proposed designation of the entire Lac Courte Oreilles lake by the DNR as an Impaired Water.

We would like to add that we ask you to reconsider the cause of the impairment from unknown to phosphorus contamination, as that has been documented through independent research.

Thank you,
Julie and Kurt Schroeder
Gundersen Lane
Lake Court Oreilles

Beranek, Ashley E - DNR

From: Kathy Umland <kumland@periscope.com>
Sent: Sunday, December 10, 2017 8:50 PM
To: DNR Impaired Waters
Subject: 2018 Impaired Waters List

December 4, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of professional, independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is the only water on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Kathy Umland

--
KATHY UMLAND Director of Creative Services
PERISCOPE 921 Washington Ave S, Minneapolis MN 55415
T 612 629 2753 **M** 612 310 4533
kumland@periscope.com

Beranek, Ashley E - DNR

From: Kathryn Piper <kitty233@aol.com>
Sent: Saturday, December 16, 2017 6:39 PM
To: DNR Impaired Waters
Subject: Lac Courte Orielles

Dear Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Orielles (LCO) lake by the WDNR as an Impaired Water Due to low dissolved oxygen (DO). I love LCO and have enjoyed it for a period of over 60 years. It is one of the only lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. While the WDNR listing indicates the cause of the impairment is "unknown", a significant deal of independent research has indicated that the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.
Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Court Oreilles.

Sincerely,

Kathryn Piper

Sent from my iPad

Beranek, Ashley E - DNR

From: WLMD <info@wlmd.org>
Sent: Wednesday, November 15, 2017 2:35 PM
To: DNR Impaired Waters
Subject: Wind Lake

Wind Lake, in Racine County, should not be on the list of Impaired waters, or at the least, it should be placed on the Proposed Delistings. Please consult the USGS water quality data for long term (35 years) changes to the water quality of Wind Lake. Wind Lake DOES NOT have Low DO and Excess Algal Growth.

Total Phosphorus concentrations for Wind Lake are now in the Mesotrophic range. We have not had any planktonic algal blooms in 4 years, and have had no HABs in the past 3-4 years.

Kathy Aron
Executive Director
Wind Lake Management District
262-514-3234

Beranek, Ashley E - DNR

From: Kent McDonough <kentmcd454@gmail.com>
Sent: Monday, November 27, 2017 6:19 PM
To: DNR Impaired Waters
Subject: Bad River Odanah WI

Hello,

Saw article in Ironwood Globe looking for comments on impaired waters - is any agency addressing Bad River in Odanah?? This from what I've read and traveled over has to be the most polluted river in the midwest and maybe north America. It's brown as mud and smells - it was rated as one of the most polluted in the area but the gov't gives it a free pass year after year? What gives? Because it's in an Indian reservation?? Left wing leaning judges?? Or the WI DNR gives it a free pass? Can you please explain to me the free pass on pollution year after year??

Concerned citizen

Kent McDonough
N9329 E Shored Rd
Marenisco MI 49947
906 842 3324

Beranek, Ashley E - DNR

From: Kevin & Susan Horrocks <horrocks2015@gmail.com>
Sent: Monday, December 04, 2017 7:10 AM
To: DNR Impaired Waters

DATE, 2017 Ms. Ashley Beranek DNR Bureau of Water Quality 101 South Webster St. WQ/3 Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

We live full time on Lac Courte Oreilles, we've owned our home here for well over 30 years.

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the “Cause” of the impairment is “Unknown.” We strongly disagree. A great deal of professional, independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the “Cause” of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is the only water on the proposed 2018 Impaired Waters list with a “Cause” stated as “Unknown,” while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Kevin Horrocks
7069 Thoroughfare Road
Stone Lake, Wisconsin 54876

Beranek, Ashley E - DNR

From: Kristine Drew <kristinedrew@me.com>
Sent: Friday, December 01, 2017 12:14 PM
To: DNR Impaired Waters
Subject: Lac Courte Oreilles Impaired water casue

Dear Ms. Beranek,

We fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Kristine Drew & Donald LaMagdeleine
6895N Victory Heights Circle
Stone Lake, Wi 54876

Beranek, Ashley E - DNR

From: Laura Evans <laurahushevans@gmail.com>
Sent: Wednesday, December 13, 2017 11:03 AM
To: DNR Impaired Waters
Subject: 2018 Impaired Waters List

Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Orielles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). I love LCO like my own and it is one of the only lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. While the WDNR listing indicates the cause of the impairment is "unknown", a significant deal of independent research has indicated that the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment at Lac Courte Orielles.

Respectfully yours,

Laura Evans
summer resident of Stone Lake, Wisconsin and Lac Courte Oreilles

Beranek, Ashley E - DNR

From: lauriepfiffner <lauriepfiffner@gmail.com>
Sent: Monday, December 11, 2017 8:20 AM
To: DNR Impaired Waters
Subject: RE: 2018 Impaired Waters List

dnrimpairedwaters@wisconsin.gov

December11, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality

101 South Webster St. WQ/3 Madison, WI 53707

Dear Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Laurie Pfiffner
625 Meadowview Lane
Lodi, WI 53555

White Sands Drive
Town of Bass Lake

Beranek, Ashley E - DNR

From: Leanna O'Donnell <leanna.odonnell@yahoo.com>
Sent: Tuesday, December 12, 2017 3:51 PM
To: DNR Impaired Waters
Subject: Lac Courte Orielles - Impaired Water

Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Orielles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). My family has owned property on the lake for generations and we love spending time there.

It is one of the only lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. While the WDNR listing indicates the cause of the impairment is "unknown", a significant deal of independent research has indicated that the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment at Lac Courte Orielles.

Respectfully yours,

Leanna Hush O'Donnell

Property owner (POPCA) on Lac Courte Orielles

703-965-5865
3814 Brandy Station Court
Fairfax, VA 22033

Sent from my iPhone

Beranek, Ashley E - DNR

From: Gary Pulford <garylindapulford@charter.net>
Sent: Wednesday, December 06, 2017 1:27 PM
To: DNR Impaired Waters
Subject: Proposed 2018 Impaired Water List

December 6, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality 101 South
Webster St. WQ/3 Madison, WI 53707

RE: 2018 Impaired Waters List Dear Ms.

Beranek,

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." I strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of a very few waters on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Linda Pulford

15790 W. Victory Heights Circle
Stone Lake, WI. 54876

Beranek, Ashley E - DNR

From: Lorrie Salzl Seylar <salzlseylar@gmail.com>
Sent: Friday, December 15, 2017 11:00 AM
To: DNR Impaired Waters
Subject: Lac Courte Oreilles designation as Impaired Water

December 15, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I am a homeowner living on the shores of Lac Courte Oreilles (LCO) near Stone Lake WI. I've owned the property for over 25 years and have enjoyed the lake and watching the seasons unfold over the water. But I've also noticed other change in the lake, change that is not so pleasant. I fully support the proposed designation of the entire LCO lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO. I wish to do my best to preserve LCO for the future.

The WDNR listing indicates that the "Cause" of the impairment is "Unknown." I strongly disagree. A great deal of professional, independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is the only water on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Lorrie Salzl Seylar
7045 N. Thoroughfare Road
Stone Lake, WI 54876

Mailing address
2950 Minnehaha Curve
Wayzata, MN 55391

Beranek, Ashley E - DNR

From: Margaret Martens <margaretmartens@gmail.com>
Sent: Monday, December 11, 2017 9:02 AM
To: DNR Impaired Waters
Subject: Lac Courte Oreilles
Attachments: 12.11.17 Letter to DNR.pdf

Please see attached.

Margaret Martens

Executive Director
Water Systems Council
1101 30th Street, NW, Suite 500
Washington, DC 20007
ph 202-625-4387
cell 704-658-8730
fax 704-660-1957

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name Margaret Klaustens

Address 15288 Victory Heights Circle
Stone Lake WI 54876

Beranek, Ashley E - DNR

From: Mark Berglund <markberglund@berglund-law.net>
Sent: Monday, December 11, 2017 9:24 AM
To: DNR Impaired Waters
Subject: Lac Courte Oreilles and the 2018 Impaired Waters List

December 11, 2017

Dear Ms. Beranek,

I, along with my family, are homeowners on Lac Courte Oreilles (LCO), owning the cabin that was purchased by my grandparents in 1967. I have literally grown up on the lake and my children are doing the same now.

I fully support the proposed designation of the entire LCO lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters. Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Mark E. Berglund
Berglund & Berglund, Ltd.
2140 Fourth Avenue North
Anoka, MN 55303

(763) 427-5950
Fax: (763) 427-7136

For this reason, we recommend that any highly confidential communications take place in person, via telephone or U.S. Postal Service in order to protect your confidentiality. By choosing to send or receive e-mail, you acknowledge you understand and assume the risks of e-mail. Written advice from our firm relating to Federal tax matters may not, without our express written consent, be used by anyone other than recipient of the written advice.

Beranek, Ashley E - DNR

From: Marty <melonone@gmail.com>
Sent: Saturday, December 02, 2017 10:53 AM
To: DNR Impaired Waters
Subject: LCO impaired status

12/2/ 2017

Ms. Ashley Beranek

DNR Bureau of Water Quality

101 South Webster St. WQ/3

Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO) . LCO is a rare, Outstanding Resource Water , and one of only five lakes in Wisconsin with a two - story fish ery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species . The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicate s that the “Cause” of the impairment is “Unknown.” We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in T otal P hosphorus and the corresponding incidences of low DO, includ ing significant fish kills.

Phosphorus was cited as the “Cause” of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is the only water on the proposed 2018 Impaired Wate r s list with a “Cause” stated as “Unknown , ” while T otal P hosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 I mpaired W ater s listing to clarify that Total Phosphorus is the c ause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Marty Malinowski

14979 W County Rd K
Hayward, WI 54843
813 716 5278

Beranek, Ashley E - DNR

From: Mary Ciresi <ciresi@aol.com>
Sent: Tuesday, December 05, 2017 12:59 PM
To: DNR Impaired Waters
Subject: Lac Courte Oreilles impaired water status

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

We fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Mary and Dave Ciresi

Cabin: 14938 W County Rd E
Stone Lake, WI 54876

Home: 1007 Sussex Drive
Eau Claire, WI 54703

Beranek, Ashley E - DNR

From: Mary Ann Churchill <machu@centurytel.net>
Sent: Thursday, December 14, 2017 7:06 PM
To: DNR Impaired Waters
Subject: LCO Water is Impaired

Ms. Ashley Beranek
DNR Bureau of Water Quality 101 South Webster St. WQ/3 Madison, WI 53707

RE: 2018 Impaired Waters List Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours, Name__Mary Ann Churchill_____ Address 10791 N Mockingbird LN, Hayward, WI 54843---

Beranek, Ashley E - DNR

From: Mary Clayman <emilymaryclayman@gmail.com>
Sent: Tuesday, December 12, 2017 3:43 PM
To: DNR Impaired Waters
Subject: LCO designation

Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Orielles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). I love LCO like my own and it is one of the only lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. While the WDNR listing indicates the cause of the impairment is "unknown", a significant deal of independent research has indicated that the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment at Lac Courte Orielles.

Respectfully yours,

Beranek, Ashley E - DNR

From: Matt Krueger <mkrueger@wisconsinrivers.org>
Sent: Wednesday, December 13, 2017 3:28 PM
To: Beranek, Ashley E - DNR
Cc: Minahan, Kristi L - DNR
Subject: Proposed 303(d) listings - Central Sands trout streams

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Ashley,

Thanks for the webinar today—it was helpful. I still have a question, though, and that is if you can offer any explanation as to why there are a number of Central Sands trout streams that are proposed to be listed for an "Unknown Pollutant," due to "Elevated Water Temperature." Specifically, I'm wondering about: Bear, Bird, Caves, Chaffee, Hartman, S Branch Tenmile, Tagatz, and Willow creeks.

Any help you can give is welcomed.

Thanks,
Matt

Matt Krueger
River Restoration Director
River Alliance of Wisconsin
147 S. Butler St. #2
Madison, WI 53703
608-257-2424 x125
www.wisconsinrivers.org

Follow us on Facebook, Twitter, and Instagram

Beranek, Ashley E - DNR

From: Matt Krueger <mkrueger@wisconsinrivers.org>
Sent: Friday, December 29, 2017 11:27 AM
To: DNR Impaired Waters
Cc: Raj Shukla
Subject: River Alliance Comments on Draft 2018 Impaired Waters List
Attachments: River Alliance of Wisconsin comments_Draft 2018 Impaired Waters.docx

Please find attached comments from the River Alliance of Wisconsin on the 2018 Draft Impaired Waters List.

Thank you for the opportunity to provide comment.

Regards,
Matt Krueger

--

Matt Krueger
River Restoration Program Director
River Alliance of Wisconsin
147 S. Butler St. #2
Madison, WI 53703
(608) 257-2424 x125
www.wisconsinrivers.org

Connect with us on Facebook, Twitter, and Instagram!

December 29, 2017
Ms. Ashley Beranek
Wisconsin Department of Natural Resources
PO Box 7921
Madison, WI 53707-7921

Dear Ms. Beranek,

Thank you for the opportunity to provide the following comments on the Draft 2018 Impaired Waters List.

1. Thermal impacts on Central Sands streams

Several streams in the Central Sands region are on the Draft List due to "elevated water temperature." We suspect that these streams, which are fed by groundwater, are thermally impaired due to the proliferation of groundwater pumping by high-capacity wells in the Central Sands. Are other streams in the region not similarly affected? What about lakes that have been impacted by groundwater pumping—are there not thermal impacts on these waterbodies, as well? Were they considered for the Impaired Waters List?

2. Impaired water listing due to hydrologic alteration of lakes and streams

River Alliance and other organizations have previously submitted information and data to DNR showing that water levels of several Central Sands region lakes and streams were significantly low, some to the point of drying up. Subsequent anecdotal evidence and published scientific literature indicate these low water conditions are largely due to groundwater pumping. At the time of our submission, we were told that DNR did not yet have standards for, nor a tool to help make, determinations due to hydrological impairments, but that such a tool would be developed to make this determination. Seeing no listings for hydrologic impairments on this list, we're compelled to wonder about the status is of this tool's development and implementation for the purposes of Impaired Waters designations.

Thank you, and we appreciate your consideration of these questions and look forward to your responses.

Sincerely,
Matt Krueger
River Restoration Director
River Alliance of Wisconsin

Beranek, Ashley E - DNR

From:	Meg Wise <mwisecsp@gmail.com>
Sent:	Thursday, December 28, 2017 8:04 PM
To:	DNR Impaired Waters
Subject:	Comments for Draft Impaired Waters List
Attachments:	2018 Draft Impaired Waters List Comments Meg Wise.docx; WQM Results Wisconsin River Tributary through 2017.docx

Hello,

Attached are comments in support of a water body being added to the 2018 Impaired Waters List. I have also attached graphs that I have made with our monitoring results at our site on the water body.

Thank you for taking comments.

December 28, 2017

Contact: Meg Wise
Crawford Stewardship Project
P.O. Box 284
Gays Mills, WI 53821

Ashley Beranek, DNR, Water Evaluation Section (WY/3)
Box 7921
Madison, WI 53707
DNRImpairedWaters@wisconsin.gov

Comments: 2018 Draft Impaired Waters List

Thank you for taking comments on the 2018 draft Impaired Waters List. My name is Meg Wise and I am the water quality program coordinator at Crawford Stewardship Project. Our organization has been monitoring water quality for almost ten years and I am writing to agree that the Unnamed Local Water in Crawford County (Waters ID 5727823, WBIC 5035112) be added to the 2018 Impaired Waters List.

We have been monitoring the site above for about 9 seasons. The site is just north of Wauzeka near a feeder pig facility, which makes this a site of specific concern of ours as it is an important part of our mission to protect Crawford County from polluting industries and we have seen some concerning results. We have been conducting the basic Water Actions Volunteers parameters at this site but also have been testing for total phosphorus and E.coli. I have attached graphs that I put together with our phosphorus and E.coli results so you can see the patterns that we have been seeing over the years. There are also additional graphs available through the SWIMS database.

This site feeds right into the Wisconsin River, an already impaired river, where families regularly recreate. Giving more care and attention to the root of pollution in the Wisconsin River is important, which is why I strongly encourage the Unnamed Local Water in Crawford County (Waters ID 5727823, WBIC 5035112) be added to the 2018 Impaired Waters List.

Respectfully,
Meg Wise

Date	e. coli cfu/ 100mL	Total P mg/L
7/6/2009	370	0.07
2/13/2011	64	0.1
3/12/2011	92	0.4

Crawford Stewardship Project

Water Quality Monitoring Results for Total Phosphorus and E. coli 2009-2017

Notes

Total P Standard for Streams= .075 mg/L

Total P Standard for Rivers= 0.100 mg/L

E. coli standard for Beaches= 218 cfu/100 mL in one sample. Advisory posted when a single sample exceeds 235 cfu/100 ml and closure when a single sample exceeds 1000 cfu/100 ml.

E. coli for Rivers (limited full body contact) 400 cfu/100 mL

3/31/2011	33	0.1
8/12/2011	5	0.2
11/16/2011	3	0.2
2/21/2012	2	0.2
3/30/2012	43	0.1
6/29/2012	1,000	0.2
7/30/2012	20	
8/30/2012	24	
9/28/2012	4	0.15
3/12/2013	220	0.9
5/31/2013	2,000	0.4
7/25/2013	500	0.2
9/24/2013	170	0.11
5/27/2014	60	0.2
7/22/2014	6,300	0.11
8/20/2014	10,000	0.2
9/22/2014	700	0.14
5/5/2015	400	0.054
6/2/2015	90	0.106
7/7/2015	1,600	0.152
8/4/2015	1,200	0.166
9/1/2015	850	0.248
10/6/2015	100	0.144
5/10/2016	600	0.1
6/14/2016	238	0.2
7/12/2016	1325	0.2
8/9/2016	2400	0.2
9/13/2016	8100	1.3
10/4/2016	240	0.2
5/7/2017	6,500	0.18
6/12/2017	440	0.2
7/10/2017	2,900	0.19
8/14/2017	390	0.22
9/11/2017	900	0.17
10/8/2017	210	0.16

Station # 10032119

Wisconsin River Tributary, 0.5 mi SE of STH 60 and Knob Ln Intersection (a.k.a. Fred's Site)

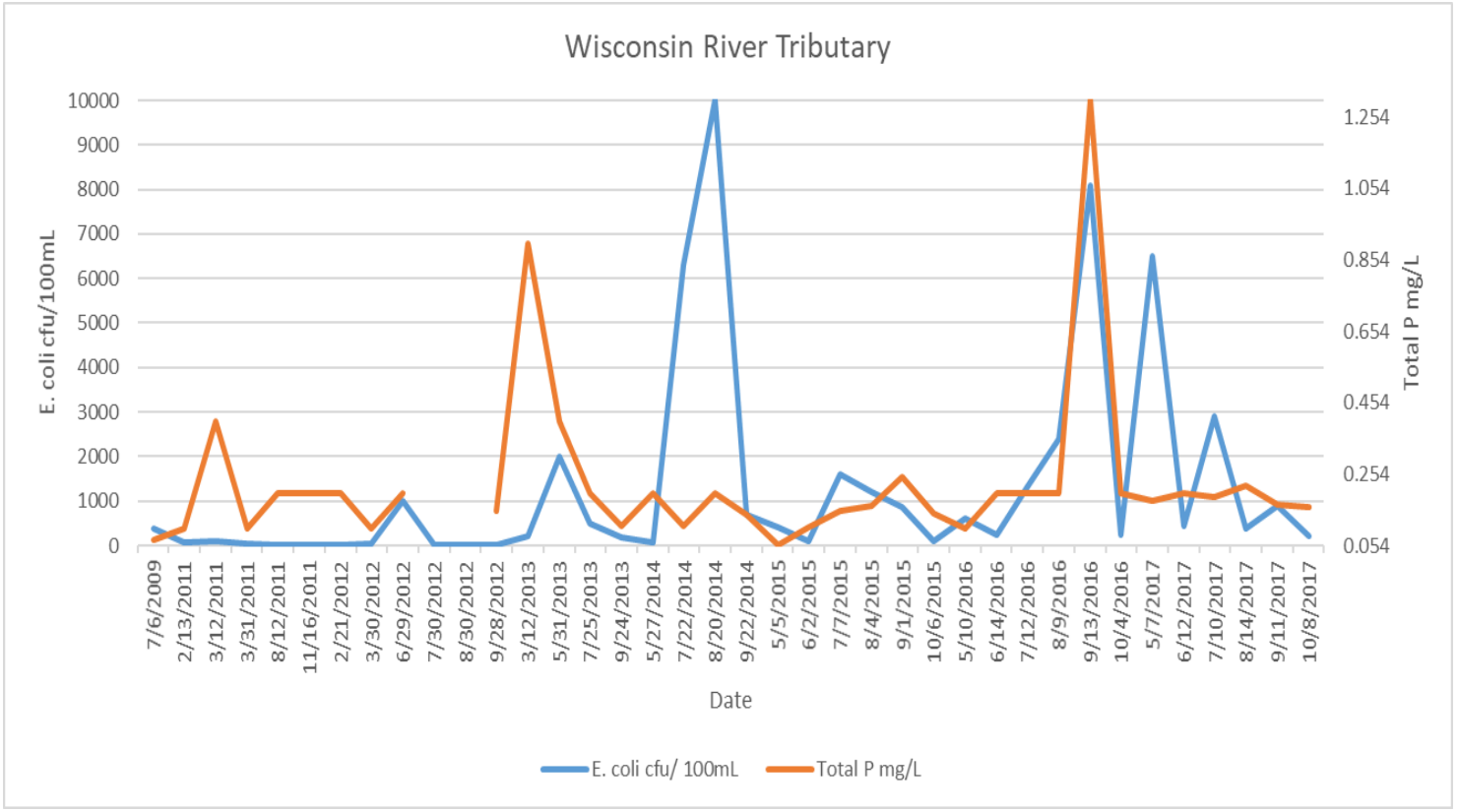

Figure 1: Wisconsin River Tributary

Table 1: Wisconsin River Tributary

Date	E. coli cfu/100mL	Total P mg/L
2/13/2011	100	0.03
3/12/2011	4	0.1
8/12/2011	150	0.05
11/16/2011	3	0.1
2/21/2012	1	0.07
3/30/2012	3	0.04
6/29/2012	72	0.04
9/28/2012	4	0.06
5/31/2013	1,500	0.2
7/25/2013	40	0.1
9/24/2013	300	0.03
5/27/2014	200	0.07
7/22/2014	380	0.01
8/20/2014	780	0.06
9/22/2014	63	0.08
5/5/2015	130	0.0287
6/2/2015	160	0.0314
7/7/2015	120	0.0416
8/4/2015	10	0.0318
9/1/2015	60	0.0359
10/6/2015	100	0.0373
5/10/2016	110	0.0309
6/14/2016	86	0.06
7/12/2016	38	0.0231
8/9/2016	758	0.0406
9/13/2016	650	0.0645
10/4/2016	2,900	0.0459
6/12/2017	240	0.04
7/10/2017	1,700	0.04
8/14/2017	2,000	0.04
9/11/2017	400	0.11
10/8/2017	1,000	0.04

Table 2: Boydtown

Station# 10032123

Boydtown Creek 400 ft. West of Hilldale Rd

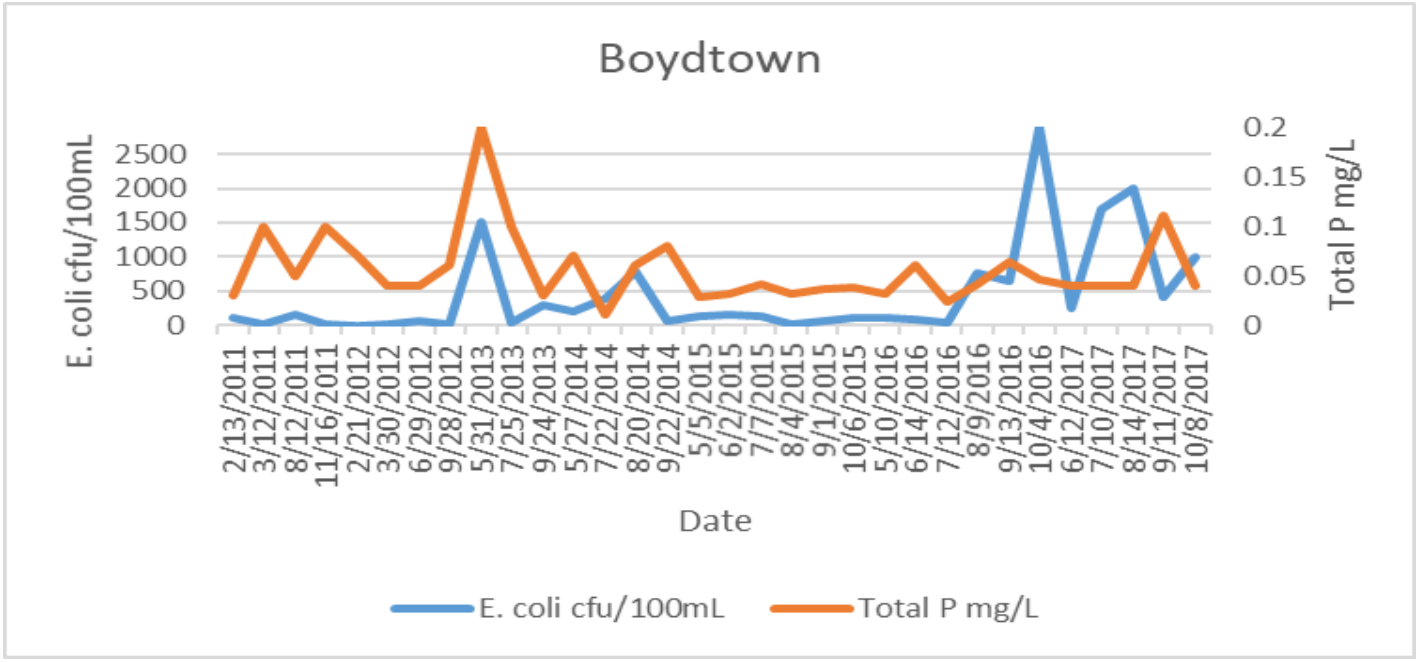

Figure 2: Boydtown

Date	E. coli cfu/ 100mL	Total P mg/L
9/1/2015		0.05
10/6/2015		0.2
5/10/2016	4	0.09
6/14/2016	210	0.12
7/12/2016	16	0.1
8/9/2016	74	0.11
9/13/2016	180	0.2
10/4/2016	95	0.09
5/8/2017	3	0.0737
6/12/2017	130	0.0914
7/10/2017	600	0.0707
8/14/2017	880	0.0726
9/11/2017	240	0.0895
10/8/2017	170	0.0959

Table 3: Richland Creek

Station #10044917

Richland Creek on Byers Road

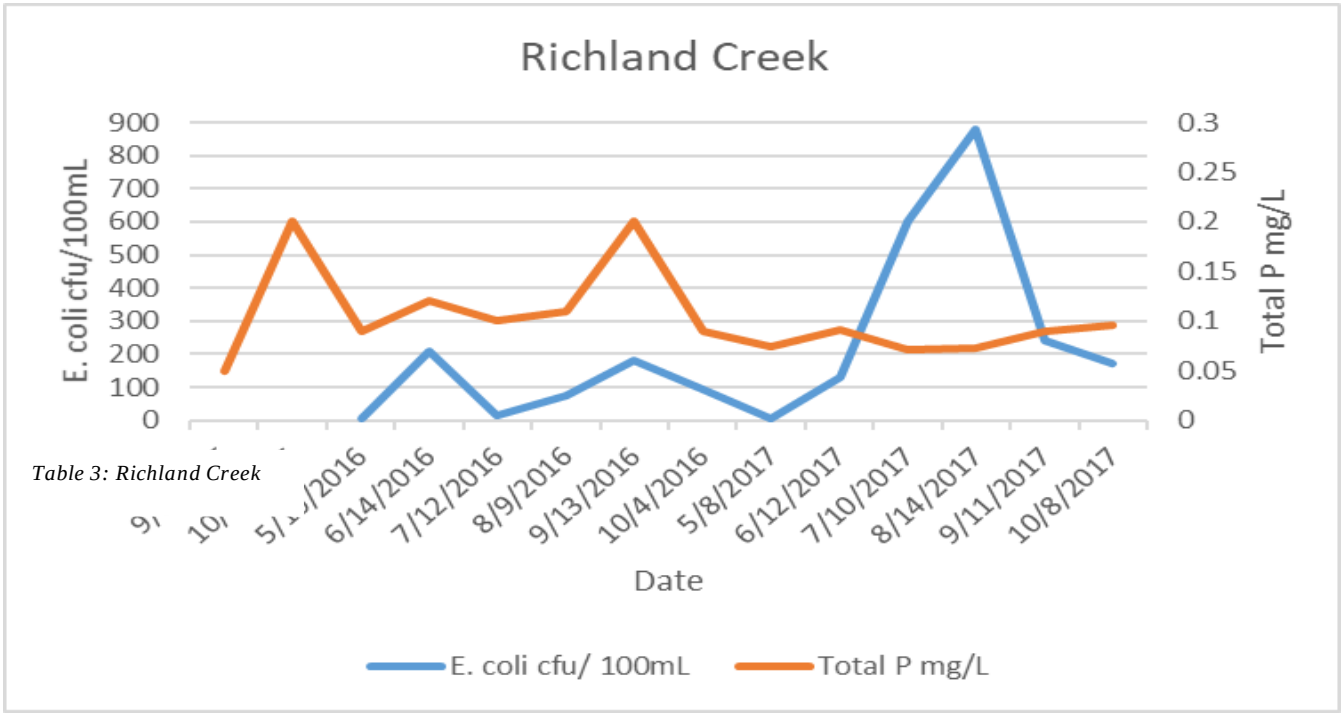

Figure 3: Richland Creek

Beranek, Ashley E - DNR

From: Mike Kuhr <mikek.trout@yahoo.com>
Sent: Friday, December 29, 2017 12:56 PM
To: DNR Impaired Waters
Cc: Linn Beck
Subject: Wisconsin Trout Unlimited comments regarding Impaired Waters List
Attachments: Wisconsin TU comments on impaired waters list.docx

On Behalf of Wisconsin Trout Unlimited's 5,000 members and 21 Chapters, we would like to offer comments (see attached) regarding the Departments proposed 2018 Impaired Waters Listings. We are committed to ensuring that future generations have access to cold, clean, fishable water and thank the Department for the opportunity to provide input.

Respectfully Submitted,
Mike Kuhr
Wisconsin Trout Unlimited
Council Vice Chair
6103 Queens Way
Monona, WI 53716
(414) 588-4281

wicouncil.tu.org

December 29, 2017
Ms. Ashley Beranek
Wisconsin Department of Natural Resources
PO Box 7921
Madison, WI 53707-7921

Dear Ms. Beranek,

Thank you for the opportunity to provide comment on the Draft 2018 Impaired Waters List, which I submit on behalf of the State Council of Wisconsin Trout Unlimited. Wisconsin Trout Unlimited is a non-profit conservation organization comprised of 21 chapters in the state, representing over 5,000 members. We value our years-long partnership with the Department, and appreciate the important and valuable work the Department does to restore coldwater habitat and fisheries in Wisconsin.

The draft 2018 proposed lmpaired Waters List contains a number of trout streams located in the Central Sands region of the state, including Bear, Big Roche-a-Cri, Bird, Caves, Chaffee, Hartman, S Branch Tenmile, Tagatz, and Willow creeks. All of these waterbodies are listed for "elevated water temperature." The listing of these water bodies brings to bear some questions.

1. What is the cause of the elevated water temperatures in these streams? As you well know, brown trout and especially brook trout are very temperature-sensitive fish. Brook trout, as our only native trout and one that relies on cold, clean water, are of particular interest to our organization. Predicted climate change scenarios indicate brook trout will come under increasing stress in future years due to warming weather. Does Department data suggest a cause for the listing of these streams? Is it climate-change related? Or possibly related to the increasing usage of high-capacity wells in the Central Sands that has the effect of drawing down surface water levels in streams and area lakes?

2. Nine Central Sands trout streams are proposed to be listed. Does this indicate that other Central Sands streams the Department has data for are meeting water quality standards, hence their not being included on this list? Or, does the Department have insufficient data on other Central Sands trout streams to know whether they suffer from similar impairments of elevated water temperatures? If the latter, we would strongly encourage the Department to acquire the data on those other streams, to determine if the problem we're witnessing is one occurring on a region-wide basis.

3. If the proposed listing of these streams is approved for the final Impaired Waters list, the Department is then required to perform a Total Maximum Daily Load. As it appears on the list, the Department has assigned a "low" TMDL priority for these streams. We think there must be a considerably greater priority placed on addressing this problem, particularly, as we asked in #2 above, if this is a more regional issue that we're witnessing. Region wide changes could have negative implications on the recreational angling economy. Recent studies show trout

angling in the Driftless Area has an annual impact of $1.6 billion (source: 2016 Economic Impact of Trout Angling in the Driftless Area report). Another recent report by the American Sportfishing Association (ASA) concluded that recreational angling contributes $2.2 billion in economic activity annually in Wisconsin (Source: 2013 ASA Sportfishing in America).

4. What does a TMDL for waterbodies listed on the Impaired Waters List due to elevated water temperatures look like? There is clear precedent for TMDLs that address sedimentation or nutrient pollution, or heavy metals—science and experience have given us a clear (if sometimes difficult) path to progress on those impairments. Has the Department performed a TMDL for elevated water temperatures before? Since we are not aware of one, we're curious what this may look like, or whether there is precedent outside of Wisconsin for how such a TMDL would be orchestrated.

Thank you, again, for the opportunity to submit comments on this important process. We appreciate the Department's efforts on this.

Sincerely,
Linn Beck
Chair, Wisconsin State Council of Trout Unlimited

Beranek, Ashley E - DNR

From: Miki Odawa <odawa@mac.com>
Sent: Saturday, December 02, 2017 10:08 AM
To: DNR Impaired Waters
Subject: 2018 Impaired Waters List

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I am writing in support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water.

However, the WDNR listing indicate s that the “Cause” of the impairment is “Unknown.” We who have been living and working on LCO for many years strongly disagree. A great deal of independent research has been conducted on LCO over many years, and has documented the increase in total Phosphorus and the corresponding incidences of low Dissolved Oxygen, including significant fish kills.

Phosphorus was cited as the “Cause” of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is the only water on the proposed 2018 Impaired Waters list with a “Cause” stated as “Unknown, ” while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 I mpaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Miki Odawa
7307 N Higbee Lane
Stone Lake, WI 54876

Beranek, Ashley E - DNR

From: barnholdt@charter.net
Sent: Thursday, December 14, 2017 2:10 PM
To: DNR Impaired Waters
Subject: Lac courte Oreilles impaired water

DNR, Please add TOTAL PHOSPHORUS along with low dissolved oxygen as the reason for

impairment to Lac Courte Oreilles. Thank you.

From: Reesa Evans
To: Beranek, Ashley E - DNR
Cc: "onie@mqs.net"
Subject: proposed 2018 impaired waters list
Date: Friday, December 01, 2017 9:34:26 AM

I see that Goose Lake in Adams County is again proposed to be placed on the impaired waters list. I am kind of confused, because it was proposed in 2014, but after information I provided, that proposal was withdrawn. When I looked at the reason for the proposal, it said something like 'excess phosphorus'. I work with some diligent volunteers on Goose Lake who have regularly participated in Citizen Lake Monitoring since 2004. Goose Lake is a shallow, 3-lobed lake, two lobes of which are basically very shallow and boggy. As far as I know (having been working with the lake some 15 years), it does not stratify in the winter. Natural sponges are common. It has a number of high quality aquatic/wetland plants, such as Cephalanthus occidentalis, Cladium marisicoides, Dulichium arundinaceum, Lynsimachia quadrifolia, Potamogeton oakesianus, Potamogeton obtusefolious, Schoenoplectus smithii, Schoenoplectus subterminalis, and 5 species of Uricularia.

My understanding is that the phosphorus index for non-stratified lakes is 40 micrograms/liter. I took a look at the averages for total phosphorus since the regular testing started in 2004. The average TP for 2004-2017 for the testing season was 23.1 micrograms/liter. The average for the past 5 years is 21.8 micrograms/liter. Thus the phosphorus readings in Goose Lake don't seem to rise to the 'excess phosphorus' level for impaired listing. Chlorophyll-a, I might note, has remained extremely low by any measurement, with an average fo 4.8 micrograms/liter for 2004-2017 and 4.9 for thelast 5 years.

So I again say that I don't see why there is a proposal to list Goose Lake as 'impaired." Please reconsider this proposal.

Reesa Evans
Certified Lake Manager
Lake Specialist
Adams County Land & Water Conservation Dept.
P.O. Box 287
Friendship, WI 53934
608-339-4275

December 29, 2017
Ms. Ashley Beranek
Wisconsin Department of Natural Resources
PO Box 7921
Madison, WI 53707-7921

Dear Ms. Beranek,

Thank you for the opportunity to provide the following comments on the Draft 2018 Impaired Waters List.

1. Thermal impacts on Central Sands streams

Several streams in the Central Sands region are on the Draft List due to "elevated water temperature." We suspect that these streams, which are fed by groundwater, are thermally impaired due to the proliferation of groundwater pumping by high-capacity wells in the Central Sands. Are other streams in the region not similarly affected? What about lakes that have been impacted by groundwater pumping—are there not thermal impacts on these waterbodies, as well? Were they considered for the Impaired Waters List?

2. Impaired water listing due to hydrologic alteration of lakes and streams

River Alliance and other organizations have previously submitted information and data to DNR showing that water levels of several Central Sands region lakes and streams were significantly low, some to the point of drying up. Subsequent anecdotal evidence and published scientific literature indicate these low water conditions are largely due to groundwater pumping. At the time of our submission, we were told that DNR did not yet have standards for, nor a tool to help make, determinations due to hydrological impairments, but that such a tool would be developed to make this determination. Seeing no listings for hydrologic impairments on this list, we're compelled to wonder about the status is of this tool's development and implementation for the purposes of Impaired Waters designations.

Thank you, and we appreciate your consideration of these questions and look forward to your responses.

Sincerely,
Matt Krueger
River Restoration Director
River Alliance of Wisconsin

Beranek, Ashley E - DNR

From: Robert Janczak <rjanczak@sbcglobal.net>
Sent: Friday, December 15, 2017 2:59 PM
To: DNR Impaired Waters
Subject: Lac Court O'Reilles impairment
Attachments: COLA+members'+e-mail+to+DNR+version+2.pdf

Please read attached.

My name is Robert Janczak
my address is 15805 Stukey Bay Rd
Hayward, WI 54843

Thank you

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name_____

Address----------

Beranek, Ashley E - DNR

From: Rob Gales <roberthgales@gmail.com>
Sent: Monday, December 11, 2017 9:07 PM
To: DNR Impaired Waters
Subject: Impaired Waters List
Attachments: 2017-12-11 20-56-25.pdf; ATT00001.txt

To Whom It May Concern,
Please find attached my letter urging you to amend the Listing to clarify that Total Phosphorus is the Cause.
I have owned my property on the lake since 1991, additionally I have served a number of years on the foundation that funds our lake association, COLA ; I have obviously followed this journey in a significant manner for years. Bottom line is that the amendment is simply the right thing to do. It's not more complicated than that.
Thank you.
Rob Gales

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name [signature] ROB GALES

Address 19025 45TH AV N
PLYMOUTH MN 55446

7392 Indian Pr. N.
Hayward WI 54843
(property owner since 1991)

Beranek, Ashley E - DNR

From: Robin Malinowski <robinmalinowski@aol.com>
Sent: Saturday, December 02, 2017 10:54 AM
To: DNR Impaired Waters
Subject: LCO

12/2/ 2017

Ms. Ashley Beranek

DNR Bureau of Water Quality

101 South Webster St. WQ/3

Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO) . LCO is a rare, Outstanding Resource Water , and one of only five lakes in Wisconsin with a two - story fish ery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species . The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicate s that the “Cause” of the impairment is “Unknown.” We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in T otal P hosphorus and the corresponding incidences of low DO, includ ing significant fish kills.

Phosphorus was cited as the “Cause” of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is the only water on the proposed 2018 Impaired Wate r s list with a “Cause” stated as “Unknown , ” while T otal P hosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Robin Malinowski

14979 W County Rd K
Hayward, WI 54843
813 716 5278

Beranek, Ashley E - DNR

From: Signe Schroeder <signegschroeder@gmail.com>
Sent: Sunday, December 17, 2017 12:27 PM
To: DNR Impaired Waters
Subject: Lac Courte Orellies

To whom it may concern,
Please support proposal to test entire lake as impaired. And, while listing that the main reason of impairment is the total phosphorus count.

Thank you,
Signe G. Schroeder

Beranek, Ashley E - DNR

From: Steve <umlandstudios@centurytel.net>
Sent: Sunday, December 10, 2017 4:47 PM
To: DNR Impaired Waters
Cc: Kevin & Susan Horrocks; Gary Pulford
Subject: LCO Impaired Water designation

December 8, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I live on this beautiful lake and support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO. We had a major whitefish kill last year and the scientific study showed it was from DO depletion. If we loose this important layer of bait fish it will devastate this important Wisconsin fishing lake.

However, the WDNR listing indicates that the “Cause” of the impairment is “Unknown.” Courte Oreilles Lake Association has researched this lake for years and strongly disagrees. A great deal of professional,independent research, over many years, has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills. It is well known from scientific studies that an increase in Phosphorous always decreases dissolved oxygen in the same water.

Phosphorus was cited as the “Cause” of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is the only water on the proposed 2018 Impaired Waters list with a “Cause” stated as “Unknown,” while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please put politics aside and list this impairment correctly for the good of this unique Wisconsin Lake.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Steve Umland
15756w Victory Heights Circle
Stone Lake, WI. 54876
umlandstudios@centurytel.net

Beranek, Ashley E - DNR

From: Susan Benston <sbenston@kieser-associates.com>
Sent: Monday, December 04, 2017 3:42 PM
To: DNR Impaired Waters
Subject: Request for GIS layer of 2018 draft Impaired Waters List

Good Afternoon,

My firm is consulting with Wisconsin dairies related to discharges to local waters. I am wondering if there is a way to obtain a GIS shapefile layer for download of the 2018 draft Impaired Waters (comparable to the existing 2016 layer). I did not find one on the state data site at this time. I can be reached by email or by cell phone at 269-599-8486.

Thank you,

Susie

--
Susan Benston
Kieser & Associates, LLC
536 E. Michigan Ave., Suite 300
Kalamazoo, MI 49007
(269)344-7117
http://secure-web.cisco.com/1puMQk7FPAvcwXZ8jRTrflYYa-RGJYwIav8XEe6m261e1Se1WF7hxnWjFfygoDWSKfamhfdzaZQWE31zBZY32DxEunJtvUJvGkp7U5WsF3vxbFTY2TT1FGEtWjqKdDfbNJmXPxbxvmPQFJ5b-FgwQcZAWingNvk5IJceB4E4Q5Yf3i-kMgtcPxFZgN7388FiI_wskDG4np_AJP5qjNREzwGahLHqQDYeNwb7yajIRm0uDRDjspp1tlD92muEtqA6_TQVlBLTpeskOYMad7dbbHA/http%3A%2F%2Fwww.kieser-associates.com

Beranek, Ashley E - DNR

From: Kevin & Susan Horrocks <horrocks2015@gmail.com>
Sent: Monday, December 04, 2017 7:18 AM
To: DNR Impaired Waters
Subject: Comment on Impaired Water listing

December 4, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

My husband and I live on Lac Courte Oreilles and have seen many of the problems with the water over the past 34 years and have volunteered many times to help with water quality issues here. .

I support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the “Cause” of the impairment is “Unknown.” We strongly disagree. A great deal of professional, independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the “Cause” of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is the only water on the proposed 2018 Impaired Waters list with a “Cause” stated as “Unknown,” while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Susan J. Horrocks

7069 Thoroughfare Road
Stone Lake, Wisconsin 54876

Beranek, Ashley E - DNR

From: Susan Kendrick <susan@writetoyourmarket.com>
Sent: Friday, December 29, 2017 11:26 AM
To: DNR Impaired Waters
Subject: LCO - Public Comment, Impaired Water Listing

Hello, Ashley –

This email is for the Public Comment period deadline today for the 2018 Impaired Water listing, specifically for Lac Court Oreilles (LCO).

First, thank you and the WDNR this time for listing LCO as the entire lake and not just Musky Bay as impaired. LCO was an unusual listing last time because only the bay was listed. But even with that "impaired" designation, the cause was correctly listed as phosphorus. But, now LCO is unusual again in that even though the whole lake is listed as impaired, the existing cause of has been dropped. You need to correct this.

*If the WDNR does not list the correct cause of impairment, it cannot act to correct it.

I can only speculate as to the political and lobbying influences that may be at work here, but the WDNR and its mission is above that reach and it may be a pain point within the WDNR and those committed to that mission that outside influences may be at work, if that is the case. The role of the WDNR is to legitimately protect Wisconsin's natural resources, not its unregulated industries and/or their lobbyists. In so many ways the WDNR does a fantastic job! Why not in this case?

*LCO is a rare, Outstanding Resource Water, the fifth largest natural lake in Wisconsin, and as such is more than eligible for even more protective measures than other bodies of water.

This 2018 listing includes the "Cause" of impairment as "Unknown." This is wrong. A massive amount of independent research using the same water-research firm employed by the WDNR has been conducted on LCO and has documented the increase in Total Phosphorus over the years and the corresponding incidences of low Disolved Oxygen. This degradation has resulted in significant fish kills and loss of recreation for this important economic driver in the state of Wisconsin.

*****Call to Action:** Please amend the WDNR 2018 Impaired Waters listing to correctly include the **cause of impairment for LCO as Total Phosphorus.**

Respectfully Yours,
Susan Kendrick
Hayward, WI – (Sawyer County)

Beranek, Ashley E - DNR

From: Susan Thomas <svthomas2@gmail.com>
Sent: Monday, December 11, 2017 8:20 AM
To: DNR Impaired Waters
Subject: Lac Courte Orieilles designation

DATE, 2017

Ms. Ashley Beranek DNR Bureau of Water Quality

101 South Webster St. WQ/3 Madison, WI 53707

RE: 2018 Impaired Waters List Dear Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO. However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." I strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills. Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Susan V. Thomas

14584 W. Schoolhouse Lane

Stone Lake, WI 54876

Beranek, Ashley E - DNR

From: Terry Clark <tclark533@msn.com>
Sent: Saturday, December 09, 2017 9:09 AM
To: DNR Impaired Waters
Subject: Cause of Low Dissolved Oxygen

I Support COLA and their request to make the Site-Specific Criterion {SSC} for total phosphorus of 10 ppb as a lake-wide average concentration.

I have owned a cabin on the West shore of the East basin directly across from Blue Goose Point for 31 yrs. I have a ring side seat to view what goes on in the East Basin and Anchor Bay. Since 2008 I have spent the entire summer
At the cabin from the End of May thru the First or second Week of October. I Fish a average of three or four days a week While there. Primarily fishing for Walleye in the evenings.

I have witnessed a dramatic decline in successful catches in the East Basin especially of the evening bite in the deeper waters of the East Basin over the past five years. Where it was common to catch a few five years ago and you witnessed 4 or 5 other fishing rigs trolling the deep waters. The past couple years has shown only a few boats fishing and for myself nothing being "marked" on locators or caught. Especially concerning is the lack of bait fish and or "White Fish" in the deep waters . With hours spent looking and nothing showing up on locators. {I have photos of the locator screens and gps},
It was especially poor fishing this past summer. I have commented several times to others that there seems to be NO! whitefish or bait fish schools hanging out in the deeper waters where they used to be common and very noticeable at sunset on the waters surface.

I witnessed the fish Kill in Aug./Sept 2016, I took a lot of the photos and I reported to the DNR and Did get a reply that it was normal and could be expected. You yourselves reported to COLA last spring that your census showed a very low Count of White fish caught in your nets; stating I believe; that only two were netted which was very unusual. This Is very concerning and I believe is causing the decline in Walleye population. It all leads back to "Low Dissolved Oxygen"!!

A Site-Specific Criterion for total phosphorus of 10 ppb as a lake – wide average concentration is Warranted Now. Your tests and samplings seem to support that to the fullest extent. It certaintanly won't hurt and can only improve The water quality on LCO. We have pretty much lost all the Musky in LCO, Will the Walleye be next??

Terry Clark
7660N Lac Courte Oreilles Lake Dr.
Hayward Wis. 54843
TClark533@msn.com
309 648 3594

Beranek, Ashley E - DNR

From: TERRY HALBLEIB <terryhalbleib52@gmail.com>
Sent: Monday, December 11, 2017 3:52 PM
To: DNR Impaired Waters
Subject: 2018 Impaired Waters List
Attachments: WDNR.pdf

Please see the attached letter.

Terry Halbleib
4522 Village Oaks Circle
Eau Claire, WI 54701

dnrimpairedwaters@wisconsin.gov

December 11, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name Terry M Hall

Address 4522 VILLAGE OAKS CIRCLE
EAU CLAIRE, WI 54701

Beranek, Ashley E - DNR

From: Timm P. Speerschneider <tps@dewittross.com>
Sent: Wednesday, December 27, 2017 10:05 AM
To: DNR Impaired Waters
Subject: wisconsin state cranberry growers comments on draft 303(d) list
Attachments: 01661227.pdf

Attached are the Wisconsin State Cranberry Growers Association's comments—thank you for your consideration

Timm P. Speerschneider
Attorney
Ph: 608.252.9319
F: 608.252.9243
tps@dewittross.com
2 E. Mifflin Street, Suite 600
Madison, Wisconsin 53703

DeWitt Ross & Stevens Law Firm

www.dewittross.com

DeWitt
Ross & Stevens s.c. Law Firm

Please respond to: Capitol Square Office
Direct line: 608-252-9319
Email: tps@dewittross.com

December 27, 2017

Via Email – DNRImpairedWaters@wisconsin.gov
And U. S. Mail

Ashley Beranek
Wisconsin Dept. of Natural Resources
Water Evaluation Section (WY/3)
P.O. Box 7921
Madison, WI 53707

RE: Comments on Draft 2018 303(d) List of Impaired Waters

Dear Ms. Beranek:

I am providing the following written comments on behalf of the Wisconsin State Cranberry Growers Association ("WSCGA") regarding the draft 2018 303(d) list of impaired waters.

WSCGA represents approximately 160 of Wisconsin's cranberry growers who grow more than 85% of the state's cranberry crop. Cranberries are Wisconsin's largest fruit crop and Wisconsin leads the nation in cranberry production. It is estimated that the state's cranberry industry provides more then 3,400 jobs for Wisconsin residents and has a $1 billion impact on the state's economy.

WSCGA objects to the listing of the entirety of Lac Courte Oreilles for low dissolved oxygen ("DO") due to the lack of and quality of data for the entire lake.

To the extent that WDNR lists Lac Courte Oreilles for low DO, WSCGA agrees that (1) the source category is appropriately identified as non-point; (2) the pollutant is unknown; and (3) the TMDL priority is low.

If you have any questions regarding these comments, please contact me directly at 608-252-9319 or tps@dewittross.com.

Very truly yours,

DeWitt Ross & Stevens s.c.

Timm P. Speerschneider

TPS:mso

Beranek, Ashley E - DNR

From: Jeri Mace <jerilee90@gmail.com>
Sent: Tuesday, December 19, 2017 12:19 PM
To: DNR Impaired Waters
Cc: T J Johnsrud; Jeri Mace
Subject: RE: 2018 Impaired Waters Lis

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

Dear Ms. Beranek,

We fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

We own property on LCO and want to keep this lake as clean and healthy as possible for us and for generations to come.

Respectfully Yours,

T J Johnsrud
Jeri Mace
8048 North Highway K
Hayward, WI

Beranek, Ashley E - DNR

From: Todd Brennan <TBrennan@greatlakes.org>
Sent: Wednesday, December 13, 2017 1:06 PM
To: DNR Impaired Waters
Subject: RE: Listing question

Also the new format is easier to follow, so thanks. If you could make the Integrated Report (IR) Listing Categories on page 67 in PDF of WisCALM and the explanation for Placing Assessment Units in Categories, etc more prominent somewhere or explanatory, that would also help.

Todd

Todd Brennan | Watershed Project Manager | tbrennan@greatlakes.org
Alliance for the Great Lakes | www.greatlakes.org | 414.559.0317
1845 N Farwell, Suite 100 | Milwaukee, WI 53202| 312.939.2708 fax

Protect Your Lakes at http://takeaction.greatlakes.org/subscribe

---

From: Smith, Amanda S - DNR [mailto:Amanda.Smith@wisconsin.gov] **On Behalf Of** DNR Impaired Waters
Sent: Wednesday, December 13, 2017 12:33 PM
To: Todd Brennan
Subject: RE: Listing question

Your welcome!

We are committed to service excellence.
Visit our survey at http://dnr.wi.gov/customersurvey to evaluate how I did.

Amanda Smith
Phone: (608) 267-7656
Amanda.Smith@wisconsin.gov

From: Todd Brennan [mailto:TBrennan@greatlakes.org]
Sent: Wednesday, December 13, 2017 12:31 PM
To: DNR Impaired Waters
Subject: RE: Listing question

Ahh thanks!

Todd Brennan | Watershed Project Manager | tbrennan@greatlakes.org
Alliance for the Great Lakes | www.greatlakes.org | 414.559.0317
1845 N Farwell, Suite 100 | Milwaukee, WI 53202| 312.939.2708 fax

Protect Your Lakes at http://takeaction.greatlakes.org/subscribe

From: Smith, Amanda S - DNR [mailto:Amanda.Smith@wisconsin.gov] **On Behalf Of** DNR Impaired Waters
Sent: Wednesday, December 13, 2017 12:28 PM
To: Todd Brennan
Cc: DNR Impaired Waters
Subject: RE: Listing question

Hi Todd,

This water is being delisted because it is actually being "retired" from the DNR's database. The only water in Lyons Park is the Kinnickinnic River, which is also listed for fecal coliform and recreational restrictions. When I was deriving some maps for the 2018 Impaired Waters List I discovered this error.

Thanks for the great questions!

Sincerely,
We are committed to service excellence.
Visit our survey at http://dnr.wi.gov/customersurvey to evaluate how I did.

Amanda Smith
Phone: (608) 267-7656
Amanda.Smith@wisconsin.gov

From: Todd Brennan [mailto:TBrennan@greatlakes.org]
Sent: Wednesday, December 13, 2017 12:12 PM
To: DNR Impaired Waters
Subject: Listing question

HI Ashley,

For the water below the location and county is not included, why is that?

Unnamed	Lyons Park Creek	RIVER	9982	15950	1	0	1.5	1.5	MILES	Category 3	4/1/2010	Other	Fecal Coliform	Recreational Restrictions - Pathogens

Thanks
Todd

Todd Brennan | Watershed Project Manager | tbrennan@greatlakes.org
Alliance for the Great Lakes | www.greatlakes.org | 414.559.0317
1845 N Farwell, Suite 100 | Milwaukee, WI 53202| 312.939.2708 fax

Protect Your Lakes at http://takeaction.greatlakes.org/subscribe

Beranek, Ashley E - DNR

From: Todd Brennan <TBrennan@greatlakes.org>
Sent: Wednesday, December 13, 2017 12:12 PM
To: DNR Impaired Waters
Subject: Listing question

HI Ashley,

For the water below the location and county is not included, why is that?

Unnamed	Lyons Park Creek	RIVER	9982	15950	1	0	1.5	1.5	MILES	Category 3	4/1/2010	Other	Fecal Coliform	Recreational Restrictions - Pathogens

Thanks
Todd

Todd Brennan | Watershed Project Manager | tbrennan@greatlakes.org
Alliance for the Great Lakes | www.greatlakes.org | 414.559.0317
1845 N Farwell, Suite 100 | Milwaukee, WI 53202| 312.939.2708 fax

Protect Your Lakes at http://takeaction.greatlakes.org/subscribe

Beranek, Ashley E - DNR

From: Todd Ciresi <todd@resultatisales.com>
Sent: Monday, December 11, 2017 4:13 PM
To: DNR Impaired Waters
Subject: 2018 Impaired Waters List

Dear Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills. Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few water bodies on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown, " while Total Phosphorus is stated as the cause of impairment for many of the other waters.
Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Todd Ciresi

Todd Ciresi, President/Owner
P: 651.492.8136 | todd@resultatisales.com
www.resultatisales.com
2285 Waters Drive | Mendota Heights, MN 55120

Beranek, Ashley E - DNR

From: Thomas <taorszulak01@charter.net>
Sent: Saturday, December 16, 2017 7:51 AM
To: DNR Impaired Waters
Subject: Impaired LCO

We have read the report regarding the impaired waters of LCO and want to express our disagreement with the conclusion of the study. The lack or loss of oxygen is due to the high phosphorus content of the lake due to the grandfathered ruling allowing cranberry growers to extract water to flood the bogs for phosphorus treatment and then returning said water to the lake also causing increased growth of plants in the lake. With ice over this plant increase decays causing oxygen reduction and fish kill. Your report is incomplete in that it does not address the root cause of the low oxygen being extreme increases of phosphates in the lake. Until this cause is dealt with, the waters of LCO will continue to worsen.

Tom Orszulak
6821 N Norway Shores Ln
Stone Lake, WI 54876

Brenda Landgrebe
6821 N Norway Shores Ln
Stone Lake, WI 54876

Sent from my iPad

Beranek, Ashley E - DNR

From: Tom and Jeannette Roberts <rthomasnet@hotmail.com>
Sent: Sunday, November 19, 2017 4:23 PM
To: DNR Impaired Waters
Subject: Lafayette County

Much greater attention needs to be paid to the water quality of the Pecatonica River watershed including Yellowstone Lake. These are certainly deserving of impaired status. I believe that there has been an over-riding sense in Lafayette County and surrounding areas that the only stake holder worth paying attention to is the short-term view of what might be best/easiest on the agricultural sector. These waters have great economic and recreational value that can really only be realized by cleaning them up so that their potential as quality fisheries and sources of recreation as well as sustainable agriculture can be achieved over time.

Attention is needed in the areas of education, regulation and enforcement so that farmers don't cultivate to the water's edge, apply fertilizers without soil testing to determine need, and follow regulations governing pesticide application to prevent drift and runoff.

Tom Roberts
South Wayne, WI

Beranek, Ashley E - DNR

From: Vicky Hush <vhush@yahoo.com>
Sent: Wednesday, December 20, 2017 9:04 PM
To: DNR Impaired Waters
Subject: LCO Lake - Impaired Water with clear cause

Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Orielles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). I love LCO like my own and have known those waters my entire life.

While the WDNR listing indicates the cause of the impairment is "unknown", a significant deal of independent research has indicated that the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

It's not enough to only list LCO lake as Impaired. Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment at Lac Courte Orielles.

Respectfully yours,

Vicky Hush
Property owner (POPCA) on Lac Courte Orielles

307 N Barton Street
Arlington, VA 22201

Beranek, Ashley E - DNR

From: Vito Paine <vitopn@gmail.com>
Sent: Saturday, December 16, 2017 12:43 PM
To: DNR Impaired Waters
Subject: Fwd: 2018 Impaired Water s List - Lac Courte Oreilles
Attachments: COLA+members'+e-mail+to+DNR+version+2.pdf

Please see the attached PDF.

Vito Paine
15783 W STUKEY BAY LN
HAYWARD, WI 54843-2592

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name_____

Address----------

December 27, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I am a property owner on Lac Courte Oreilles.

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Joseph Felz (and family)
6810 N. Victory Heights Circle - Unit 1
Stone Lake, WI 54876

dnrimpairedwaters@wisconsin.gov

~~DATE, 2017~~ 12-19-2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name Cynthia Hannek

Address 14431 W Courte Oreilles Lake Dr.
Hayward WI 54843

dnrimpairedwaters@wisconsin.gov

~~DATE, 2017~~ 12-19-2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name [signature]

Address 14431 W Lac Courte Oreilles Dr.
Hayward WI 54843

DeWitt
Ross & Stevens s.c. Law Firm

Please respond to: Capitol Square Office
Direct line: 608-252-9319
Email: tps@dewittross.com

December 27, 2017

Via Email – DNRImpairedWaters@wisconsin.gov
And U. S. Mail

Ashley Beranek
Wisconsin Dept. of Natural Resources
Water Evaluation Section (WY/3)
P.O. Box 7921
Madison, WI 53707

RE: Comments on Draft 2018 303(d) List of Impaired Waters

Dear Ms. Beranek:

I am providing the following written comments on behalf of the Wisconsin State Cranberry Growers Association ("WSCGA") regarding the draft 2018 303(d) list of impaired waters.

WSCGA represents approximately 160 of Wisconsin's cranberry growers who grow more than 85% of the state's cranberry crop. Cranberries are Wisconsin's largest fruit crop and Wisconsin leads the nation in cranberry production. It is estimated that the state's cranberry industry provides more then 3,400 jobs for Wisconsin residents and has a $1 billion impact on the state's economy.

WSCGA objects to the listing of the entirety of Lac Courte Oreilles for low dissolved oxygen ("DO") due to the lack of and quality of data for the entire lake.

To the extent that WDNR lists Lac Courte Oreilles for low DO, WSCGA agrees that (1) the source category is appropriately identified as non-point; (2) the pollutant is unknown; and (3) the TMDL priority is low.

If you have any questions regarding these comments, please contact me directly at 608-252-9319 or tps@dewittross.com.

Very truly yours,

DeWitt Ross & Stevens s.c.

Timm P. Speerschneider

TPS:mso

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name Andrew J Roberts

Address 603 31st St. NW
Rochester, MN 55901

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name Mona Mary Roberts

Address 15436 W Victory Heights Circle
Stone Lake, WI 54876

MUSKIES INC.
Youth Fisheries Research

HAYWARD LAKES CHAPTER
Box 609 • Hayward, Wisconsin 54843

December 3, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek:

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Please note that there is no longer natural reproduction of muskies in Musky Bay. This is due to the high phosphorous content of the water which has caused rampant weed growth. This has caused a huge amount of dead plant material to accumulate on the bottom. The musky eggs fall into the dead plant material where there is no oxygen and they perish.

Respectfully Yours,

Name Robert J. Reinert
Address W10219 Deer Ln Rd
Hayward WI 54843
715-634-5336

dnrimpairedwaters@wisconsin.gov

Let's get read

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is one of the few on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for most of the other 240 waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name

Address 7580 N LANDGRAF Rd
HAYWARD, WI 54843

HAYWARD LAKES CHAPTER
Box 609 • Hayward, Wisconsin 54843

December 3, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek:

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Please note that there is no longer natural reproduction of muskies in Musky Bay. This is due to the high phosphorous content of the water which has caused rampant weed growth. This has caused a huge amount of dead plant material to accumulate on the bottom. The musky eggs fall into the dead plant material where there is no oxygen and they perish.

Respectfully Yours,

Name Mark Laustrup
Address--- 15244 W Circle Rd.
Hayward, WI 54843

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name Steven + Carol Broback

Address 14539 Ojibwa Court
Hayward, Wisconsin 54843

Mailing Address: Steven + Carol Broback
9860 Arkansas Path
Inver Grove Heights, MN 55077

e-mail ssbroback@hotmail.com

Steven Scott Broback

Steven Scott Broback

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name STEPHEN LILLYBLAD Stephen Lillyblad

LAKE Address 6813 N NORWAY SH. LANE
STONE LAKE, WI 54876

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St WQ/3
Madison, Wisconsin 53707

Re: Impaired Water List for 2018 December 14, 2017

Dear Ashley,

My family and has vacationed in Wisconsin for over 100 years, enjoying summers in Lac Courte Oreilles (LCO). I've come to Wisconsin every summer since 1955. Through the years, we've noticed the water quality worsen. Yes, this impacts swimming and boating. But even more worrisome is that there are very few people fishing on the lake anymore. LCO used to be a destination for fishing. Clearly something is wrong with the ecology of the lake. We learned this is because of the low dissolved oxygen causing LCO to be designated as an Impaired Water.

We support being upfront and naming the "cause" of the impairment to be the Phosphorus in the lake. It was named as the cause in Musky Bay in 2014. The entire lake should have this designation so that we can begin to address the underlying issue.

I recall my elderly aunts warning about caring for the resources in the North Woods. Now they are gone and I am the elderly aunt in the family. I do not want to see the loss of habitat for fish in LCO...or the continued invasion of algae. I want my children and grandchildren to enjoy a pristine northern lake and to know that the government and individuals cared about these resources.

Please amend the WDNR 2018 Impaired Waters listing to SHOW that total Phosphorous is the cause of the impairment of Lac Courte Oreilles.

Many thanks Ashley,

Anne

Anne Badanes
14590 West Schoolhouse Lane
Stone Lake WI 54876

HAYWARD LAKES CHAPTER
Box 609 • Hayward, Wisconsin 54843

December 3, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek:

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Please note that there is no longer natural reproduction of muskies in Musky Bay. This is due to the high phosphorous content of the water which has caused rampant weed growth. This has caused a huge amount of dead plant material to accumulate on the bottom. The musky eggs fall into the dead plant material where there is no oxygen and they perish.

Respectfully Yours,

Name Emmett A. Brown Jr
Address--- 15551 W Hwy. 27
Hayward, WI 54843

Ashley Beranek
DNR, Water Evaluation Section (WY/3)
Box 7921
Madison, WI 53707

RE: Lac Courte d'Oreilles
Sawyer County, Wisconsin

Dear Ms. Beranek:

My family has owned a home on Lac Courte d'Oreilles since 1950 and I've been coming to the lake myself for over 50 years. During that time, but especially over the last several decades, I have witnessed the degradation of its once clear and pristine waters. I have been an active supporter and contributor to its Lake Association, which has campaigned long and hard for remediation of the pollutants which have invaded our lake.

Through the volunteer and financial contributions of many, discharge from faulty sanitary sewage septic tanks has been virtually eliminated, and education of "best practices" has been made available to neighboring farms. The remaining major source of controllable pollution to our lake is phosphorus, and its major source is from cranberry bogs lying adjacent to our shoreline. This fact has been demonstrated to Wisconsin DNR by valid water tests.

It is my understanding that Wisconsin DNR is prepared to list our lake as an "impaired water", and I applaud your agency for this needed but long overdue designation. However, **I urge Wisconsin DNR to go further and designate excess phosphorus load as the principal cause of this impairment**.

Our lake is too valuable a resource to all of Wisconsin to fail to take this additional step.

Sincerely,

KOChiles

Katherine Orr Chiles
12008 Miccosukee Road
Tallahassee, Fl. 32309

Ashley Beranek
DNR, Water Evaluation Section (WY/3)
Box 7921
Madison, WI 53707

RE: Lac Courte d'Oreilles
Sawyer County, Wisconsin

Dear Ms. Beranek:

My family has owned a home on Lac Courte d'Oreilles since 1950 and I've been coming to the lake myself for over 50 years. During that time, but especially over the last several decades, I have witnessed the degradation of its once clear and pristine waters. I have been an active supporter and contributor to its Lake Association, which has campaigned long and hard for remediation of the pollutants which have invaded our lake.

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Our lake is too valuable a resource to all of Wisconsin to fail to take this additional step.

Sincerely,

Douglas B. Orr
15288 W. Victory Heights Circle
Stone Lake, WI 54876

December 14, 2017

Ms. Ashley Beranek
DNR, Water Evaluation Section (WY/3)
Box 7921
Madison, WI 53707

RE: Lac Courte d'Oreilles
Sawyer County, Wisconsin

Dear Ms. Beranek:

I have summered on Lac Courte d'Oreilles at the Wismo Club for 58 years. I have never missed a summer nor has my 82 year old mother or adult children. In fact, my grandfather was an original founding member of the Club. Needless to say, the lake and our home there are deeply ingrained and at the core of our family. Over my lifetime, I have experienced a lot of changes in the lake some for the good and some for the bad. When I was a teenager, I remember DRINKING the lake water when swimming and brushing our teeth and bathing in water that was not purified by a well. Now, I am witnessing the total loss of fishing, thriving weed beds and perimeter shore scum which can be attributed to the unmonitored cranberry farming along the banks of the lake, not to mention this new phenomenon of pontoon boat partying on the sand bar resulting in beer cans, diapers and NOISE pollution as well.

I urge you to take notice of the deterioration of our beautiful lake and to intervene STRONGLY AND QUICKLY before it is too late. Please, designate our lake as impaired and take the steps necessary to restore its beauty and peacefulness to its residents. Take a strong position and stand up to the cranberry farmers and those that place partying as a higher priority than beauty.

It is my understanding that the Wisconsin DNR is prepared to list our lake as an impaired water, and I applaud your agency for this needed but long overdue designation. However, I urge Wisconsin DNR to go further and designate excess phosphorus load as the principal cause of this impairment. Our lake is too valuable a resource to all of Wisconsin to fail to take this additional step. Thank you for your immediate and ongoing attention to this very important matter.

Sincerely,

Ellen Darling

Ellen Darling
Wimso Club
816-506-0626

December 13, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

Re: 2018 Impaired Waters List

Dear Ms Beranek,

I live on Lac Courte Oreilles (LCO) and want you to know that I *strongly* support the proposed designation of the entire LCO lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO).

LCO is a rare and very special Outstanding Resource Water - and **one of only five lakes in all of Wisconsin** with a two-story fishery supporting both cisco and lake whitefish. The low DO has - and will continue to - result in the loss of habitat for these two fish species if we don't do something to change it.

It has been proven that low DO is the cause, yet the WDNR listing indicated that the "cause" of the impairment is "unknown". We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has clearly documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

I have personally seen dead cisco and lake white fish floating in LCO and know that the loss of these species will lead to a wholesale change in the ecology of LCO. That would be an irreversibly negative change.

Phosphorus was cited as the "cause" of the listing of Musky Bay, part of LCO, as an Impaired Water in 2014. LCO *as a whole* is impaired, and the cause is clearly Total Phosphorus. LCO is the only water on the proposed 2018 Impaired Waters list with a "cause" stated as "unknown" - yet it is known! And Total Phosphorus is stated as the cause of impairment for many of the other waters. Why not LCO?

PLEASE amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of the precious Lac Courte Oreilles.

Thank you for you time and help.

Respectfully,

William "Bill" Wawak
14443 W Court Oreilles Lake Drive
Hayward, WI 54843

December 13, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

Re: 2018 Impaired Waters List

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PLEASE amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of the precious Lac Courte Oreilles.

Thank you for you time and help.

Respectfully,

Trudianne Temple

Trudianne Temple
14443 W Court Oreilles Lake Drive
Hayward, WI 54843

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

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However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name Jan Bates

Address 12625 Royal Gorge Ct
Mokena, IL 60448

Brubaker's / Petersons
6894 N. Brubaker Lane
Stone Lake
WI 54876

December 12 ,2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

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However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown". I strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

I am a property owner on Victory Heights on Lac Courte Oreilles and have been going to this wonderful lake for 75 years. Please do all you can to keep it clean for generations to come.

Respectfully Yours,

Sara Terwilliger Cyr

Sara Terwilliger Cyr
4 Russ Farm Way
Delanco, NJ 08075

6790 N Victory Heights Circle
Stone Lake, WI 54876

Daniel E.J. Mackin
Attorney at Law
1717 W. Henderson St.
Chicago, Il 60657

December 17th 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707
RE: 2018 Impaired Waters List

dnrimpairedwaters@wisconsin.gov

Dear Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). My family has enjoyed our cabin on Musky Bay for nearly 90 years and we have seen the dramatic decline of the water quality. LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

Oddly, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. It is well known. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is elevated Total Phosphorus levels. LCO is the only water on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

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Respectfully Yours,

Name John Terhune Andrea Terhune

Address 6978N Ring Road
Stone Lake, WI 54876

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name Barbara Harrison & Richard Hassinger

Address 10 Church St., Newton, MA 02458

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name_____

Address----------

Douglas L Seylar
7045 North Thoroughfare Road
Stone Lake, WI 54876

December 15, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

The purpose of this letter to express my full support to the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

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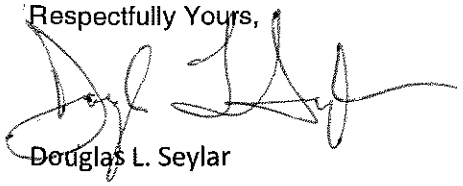

Douglas L. Seylar

December 3, 2017

HAYWARD LAKES CHAPTER
Box 609 • Hayward, Wisconsin 54843

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Please note that there is no longer natural reproduction of muskies in Musky Bay. This is due to the high phosphorous content of the water which has caused rampant weed growth. This has caused a huge amount of dead plant material to accumulate on the bottom. The musky eggs fall into the dead plant material where there is no oxygen and they perish.

Respectfully Yours,

Name Keith Thompson
Address--- P.O. Box 337
STONE LAKE, WI 54876

KEITH THOMPSON

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name Jan Bates

Address 12625 Royal Gorge
Mokena IL 60448

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name Dennis W. Raytora M.D.

Address 7386 N. Park Lane
Hayward, WI 54843

December 14, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

My grandparents bought a cabin on Lac Courte Oreilles in the 1930s and generations of my family has spent summers there until the present, when my wife and I now spend all summer at the cabin as part of our retirement. I have seen the effect of the degradation to the lake quality over the last decades and because of that I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles and help us correct the present condition of the lake.

Respectfully Yours,

Gregory Barabas

Gregory Barabas
10204 Co. Rd 213.
Forney, Texas 75126

Hayward Address
7608 N. Lawrence
Hayward WI 54843

PlanMember Financial Corporation
Planning your future...today®
6187 Carpinteria Ave
Carpinteria, California
93013
(805) 684-1199 | (800) 874-6910 | (800) 614-8522 fax

December 13, 2017

Ashley Beranek
DNR
Water Evaluation Section (WY/3)
Box 7921
Madison, WI 53707

RE: Lac Courte Oreilles (Sawyer County, Wisconsin)

Dear Ms. Beranek:

Our four family generations have maintained a summer home on Lac Courte Oreilles in Sawyer County, Wisconsin since 1918. My grandfather owned the cabin jointly with Walter Cronkite's father at one point in the early 20's. Over my 66 years I have witnessed the steady decline of its 20-25 feet visibility, clear and pristine spring feed waters to a murky 3-4 feet visibility. I have also paid witness to a steady decline in the fish population of northern, musky and walleye.

I have been a supporter and contributor to the Lac Courte Oreilles Foundation and Victory Heights Association.

The remaining major source of controllable pollution to our lake is phosphorus, and its concentration levels come from cranberry bogs lying adjacent to our shoreline. This fact has been demonstrated to Wisconsin DNR by valid water tests. Phosphorus, as you probably know, is an essential element for plant life, but when there is too much of it in water, as a result of the non-closed cranberry bog outflow systems, it can speed up eutrophication (a reduction in dissolved oxygen in water bodies caused by an increase of mineral and organic nutrients. A big sign of this is excess algae in the lake which impacts clarity and the fish population.

I understand that Wisconsin DNR is prepared to list Lac Courte Oreilles as an "impaired waterway." **I acknowledge your agency for this essential and long overdue designation. I write you to urge Wisconsin DNR to go further and designate excess phosphorus load as the principal cause of this impairment.**

Our lake is too valuable a resource to all of Wisconsin to fail to take this additional step.

Sincerely,

Richard H. Ford
Chief Marketing Officer

LAW OFFICES
R.A. BROWN, JR. LAW OFFICE
2501 FREDERICK AVENUE
ST. JOSEPH, MO 64506
TELEPHONE: 816/232-7748
FACSIMILE: 816/279-5586
EMAIL: bobbrown1829@gmail.com

December 13, 2017

Ashley Beranek
DNR, Water Evaluation Section (WY/3)
Box 7921
Madison, WI 53707

In re: Lac Courte d'Oreilles
Sawyer County, Wisconsin

Dear Ms. Beranek:

My family has been present on the shores of Lac Courte d'Oreilles since 1909! We currently have two cottages there. I personally have visited this lake every summer since 1942, with a couple of exceptions. My daughters and my grandchildren have been there every summer of their lives! Lac Courte d'Oreilles is like a second home to all of us.

The pollution of our lake's formerly pristine waters has not only been sad, but very alarming. I am sure you are aware of the continuing fight to cure this situation. Through education, volunteer work, and financial contributions, harmful runoff from lakeshore properties as well as discharge from faulty sewage septic tanks has been virtually eliminated. However, the major source of controllable pollution to our lake, phosphorous, remains a real threat. The major source of the polluting phosphorous is from the cranberry bogs that surround the lake, especially towards the west end. Proof of that statement has been demonstrated to the DNR by valid water tests in the recent past.

My family and I understand that the DNR is now going to list Lac Courte d'Oreilles as an "impaired water". This is long overdue. However, to put some teeth in that designation, the Wisconsin DNR needs to designate excess phosphorous load as the principal cause of the pollution of Lac Courte d'Oreilles. The Wisconsin DNR owes it to the people of Wisconsin to do just that!

Thank you for your consideration.

Yours very truly,

R. A. Brown, Jr.

Robert A. Brown, Jr.

RABJr/kl

Zimmer
COMPANIES, INC.

1220 Washington Street, Suite 300
Kansas City, Missouri

Mailing Address:
P.O. Box 411299
Kansas City, Missouri 64141-1299

TEL: 816.474.2000
FAX: 816.421.6666

December 11, 2017

Ms. Ashley Beranek
DNR, Water Evaluation Section (WY/3)
Box 7921
Madison, WI 53707

Re: Lac Courte d'Oreilles
Sawyer County, Wisconsin

Dear Ms. Baranek:

I have been visiting Lac Courte d'Oreilles in Sawyer County on a regular basis since 1956. I have owned a home there since 1972. In the early days of our visits to Lac Courte d'Oreilles, we always found the lake to be delightful from an aesthetic standpoint, as well as a fishing standpoint. Musky Bay was almost totally free of weeds and there were few, if any, weeds anywhere else on the lake. Fishing in Musky Bay was almost always productive for Musky and Bass, and we also enjoyed catching Walleye and Northern Pike, as well as Pan Fish, throughout the rest of the lake.

Unfortunately, over the years, the quality of Lac Courte d'Oreilles has deteriorated due to the adjacent cranberry bogs and the discharge of phosphorus into the lake. Unfortunately, today, Musky Bay is full of weeds to an extent that it is very difficult to even run an outboard motor through the bay, and fishing is pretty much non-existent. We have seen the weed growth migrate out of Musky Bay, coming around into the main body of the lake as time goes by.

It is my understanding that the Wisconsin DNR is prepared to list Lac Courte d'Oreilles as an "impaired water" and we greatly appreciate your action in this regard. I strongly urge Wisconsin DNR to also designate Lac Courte d'Oreilles as having an excess phosphorus load comprising the principal cause of the impairment of the lake.

Lake Courte d'Oreilles has been one of the most important lakes in the state of Wisconsin for many, many years. The state must act wisely to protect this important investment of the state and this important recreational location for residents and visitors to the state of Wisconsin.

Sincerely,

Hugh J. Zimmer
Chairman

hzimmer@ngzimmer.com
T 816-512-1000

HJZ:cb

cc: The Lac Courte Oreilles Foundation, Inc.
6756 N. Victory Heights Circle
Stone Lake, SI 54876-3054

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name John & Ruth Rebarcak

Address 15013W White Sand Road
Hayward, WI 54843

Clifford J Boxleitner
CPA,CFP,IAR
(retired)

104 N Drew Ct Palatine IL 60067
847-776-0403

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name Clifford J Boxleitner 12/11/17
Lake
Address 6787 Norway Shore Ln.
Stone Lake WI 54876

December 5, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Debra Lozoff Swaden
7057N Thoroughfare Road
Stone Lake, WI 54876

December 5, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Mitchell Swaden
7057N Thoroughfare Road
Stone Lake, WI 54876

December 11, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: Impaired Waters List

Dear Ms. Beranek,

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Respectfully Yours,

Dean R Peltonen

Dean R. Peltonen
15712 W. Victory Heights Circle
Stone Lake, WI 54876

Newmark Grubb
Zimmer

December 11, 2017

Ashley Beranek
DNR, Water Evaluation Section (WY/3)
Box 7921
Madison, WI 53707

RE: Lac Courte Oreilles
Sawyer County, Wisconsin

Dear Ms. Beranek:

I have vacationed for over 60 years and maintained a home on Lac Courte Oreilles in Sawyer County, Wisconsin since 2002, over which period of time I have witnessed the degradation of its once clear and pristine waters. I am an active supporter and contributor to our Lake Association (COLA), which has campaigned long and hard for remediation of the pollutants which have invaded our treasured lake.

Through the volunteer and financial contributions of many, discharge from faulty sanitary sewage septic tanks has been virtually eliminated, and education of "best practices" has been made available to neighboring farms both in and out of our lake's watershed. The remaining major source of controllable pollution to our lake is phosphorus, and its major source is from the cranberry bogs which are located adjacent to our shoreline. This fact has been demonstrated to Wisconsin DNR by valid water tests.

It is my understanding that Wisconsin DNR has now declared the entire Lac Courte Oreilles as an "impaired water", and I applaud your agency for this needed but long overdue designation. However, **I urge Wisconsin DNR to go further and designate excess phosphorus load as the principal cause of this impairment**.

Once we stop the principal cause of our lake's pollution, we can begin to address its cleanup and restoration. Our lake is too valuable a resource to all of Wisconsin to fail to take this additional step.

Sincerely,

David J. Zimmer
dzimmer@ngzimmer.com
T: 816.512.1001
C: 816.223.4555

dnrimpairedwaters@wisconsin.gov

December 12, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name John and Ranee' Bihun

Address 6962N Ring Road Stone Lake, WI 54876

dnrimpairedwaters@wisconsin.gov

December 11, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

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Name John and Ranee' Bihun

Address 6962N Ring Road Stone Lake, WI 54876

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name Thomas Bruggeman

Address 14778 W Highland Rd.
Hayward WI 54843

Happy Holidays!

December 3, 2017

HAYWARD LAKES CHAPTER
Box 609 • Hayward, Wisconsin 54843

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek:

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

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Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Please note that there is no longer natural reproduction of muskies in Musky Bay. This is due to the high phosphorous content of the water which has caused rampant weed growth. This has caused a huge amount of dead plant material to accumulate on the bottom. The musky eggs fall into the dead plant material where there is no oxygen and they perish.

Respectfully Yours,

Name Bart Stanley
Address---8792 W Brahchford Dr.
Hayward, Wi. 54843

Aliber
6432 Aberdeen Street
Mission Hills, Kansas 66208

December 11, 2017

Ashley Beranek
DNR, Water Evaluation Section (WY/3)
Box 7921
Madison, WI 53707

Re: Lac Courte d'Oreilles, Sawyer County, Wisconsin

Dear Ms. Beranek:

We have maintained a home on Lac Courte d'Oreilles in Sawyer County, Wisconsin for over ten years and during this time we have witnessed the degradation of the lakes once clear and magnificent waters. We are active supporters and contributors to the Lake Association, which has campaigned diligently in attempts to remediate pollutants to our lake.

Through the tireless volunteer work and financial contributions of many, as well as "best practices" education to neighboring farms, the discharge from faulty sanitary sewage septic tanks has been virtually eliminated. The major source of controllable pollution which remains, is phosphorus primarily from cranberry bogs lying adjacent to our shoreline. This fact has been demonstrated to Wisconsin DNR by valid water tests.

We are of the understanding that Wisconsin DNR is prepared to list our lake as an "impaired water" and we applaud your agency for this needed, but long overdue designation. However; we urge Wisconsin DNR to go further and designate excess phosphorus load as the principal cause of this impairment.

Our lake, and all of Wisconsin's 15,000 lakes, are too valuable of a resource to fail to take this additional step.

Sincerely,

William J. Aliber and Kimberly K. Aliber

December 3, 2017

HAYWARD LAKES CHAPTER
Box 609 • Hayward, Wisconsin 54843

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek:

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Respectfully Yours,

Name Jann Nelson
Address--- Stone Lake WI

December 3, 2017

HAYWARD LAKES CHAPTER
Box 609 • Hayward, Wisconsin 54843

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek:

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

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Respectfully Yours,

Name Tom & Claudette Kersten
Address--- 10245 N Spuds Rd.
Hayward, WI 54843

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

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Respectfully Yours,

Name Chuck Buth

Address 6714 N. Victory Heights Circle
Stone Lake, WI
54876

dnrimpairedwaters@wisconsin.gov

DATE, 2017

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DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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Respectfully Yours,

Name Janice B. Buth

Address 6214 N Ventura Lights Circle
Stone Lake, WI 54876

RECEIVED

dnrimpairedwaters@wisconsin.gov

DATE, 2017

DEC 11 2017

WT/3 - WY/3 - OGL/3

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

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Respectfully Yours,

Name Ann C Hokeness

Address 7789 Witkei Road Hayward

21456 650th Ave
Elkton, Mn
55933

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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Respectfully Yours,

Name Bryant Hohenes

Address 21456 650 ave,
Echlon, Mn 55933

HAYWARD LAKES CHAPTER
Box 609 • Hayward, Wisconsin 54843

December 3, 2017

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DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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Respectfully Yours,

Name Steve Tauver
Address--- 12441 W Heather Dr.
Hayward, Wi. 54843

December 3, 2017

HAYWARD LAKES CHAPTER
Box 609 • Hayward, Wisconsin 54843

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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Respectfully Yours,

Name Allan Hoeft

Address--- P.O. Box 5 Stone Lake WI. 54876

dnrimpairedwaters@wisconsin.gov

DATE, 2017

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DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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Respectfully Yours,

Name Robert & Susan Edmunds

Address 6814N Victory Heights Cir
Stone Lake, WI 54876

(612) 386-7346

HAYWARD LAKES CHAPTER
Box 609 • Hayward, Wisconsin 54843

December 3, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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Respectfully Yours,

Name Mike Persson - President - Hayward Lakes Chapter Muskies Inc
Address 15760 W Lakeshore - on LCO
Hayward WI 54843

Robert E. McMahon, Jr.
W5845 Carla Court
Stoddard, WI 54658-9706

December 1, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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101 South Webster St. WQ/3
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Respectfully Yours,

Jim Haugen
15703W Goosens Road
Hayward WI 54843

December 3, 2017

HAYWARD LAKES CHAPTER
Box 609 • Hayward, Wisconsin 54843

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DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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Respectfully Yours,

Name Larry Ramsell
Address--- 9607 N Highland Rd
Hayward, WI 54843

dnrimpairedwaters@wisconsin.gov

DATE, 2017

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DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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Respectfully Yours,

Name Russell Erffmeyer

Address 7994N COUNTY RD. K
HAYWARD, WI

Molly McMahon
7985 N Bayshore Lane
Hayward, WI 54658

December 1, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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Respectfully Yours,

Molly McMahon

dnrimpairedwaters@wisconsin.gov

DATE, 2017

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DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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Respectfully Yours,

Name James L. Kaley

Address 6785 N Norway Shore
STONE LAKE, WI 54876

HAYWARD LAKES CHAPTER
Box 609 • Hayward, Wisconsin 54843

December 3, 2017

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DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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Respectfully Yours,

Name [signature]
Address--- 7633 N Wurster Rd
Hayward, WI 54843

MUSKIES INC
Youth Fisheries Research

HAYWARD LAKES CHAPTER
Box 609 • Hayward, Wisconsin 54843

December 3, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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Respectfully Yours,

Name Allen B. McEvoy
Address--- 8562 N River Rd.
Hayward, WI
54843

December 3, 2017

HAYWARD LAKES CHAPTER
Box 609 • Hayward, Wisconsin 54843

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DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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Respectfully Yours,

Name Michael Ostrowski
Address--- 7633N Webster Rd
Hayward, WI 54843

RECEIVED

DEC 7 2017

WT/3 - WY/3 - OGL/3

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

RE: 2018 Impaired Waters List

Dear Ms. Beranek,

I/we fully support the proposed designation of the entire Lac Courte Oreilles (LCO) lake by the WDNR as an Impaired Water due to low dissolved oxygen (DO). LCO is a rare, Outstanding Resource Water, and one of only five lakes in Wisconsin with a two-story fishery supporting both cisco and lake whitefish. The low DO has and will continue to result in the loss of habitat for these two fish species. The loss of these species will lead to a wholesale change in the ecology of LCO.

However, the WDNR listing indicates that the "Cause" of the impairment is "Unknown." We strongly disagree. A great deal of independent research, over many years, has been conducted on LCO and has documented the increase in Total Phosphorus and the corresponding incidences of low DO, including significant fish kills.

Phosphorus was cited as the "Cause" of the listing of Musky Bay, part of LCO, as an impaired water in 2014. LCO as a whole is impaired, and the cause is Total Phosphorus. LCO is the only water on the proposed 2018 Impaired Waters list with a "Cause" stated as "Unknown," while Total Phosphorus is stated as the cause of impairment for many of the other waters.

Please amend the WDNR 2018 Impaired Waters listing to clarify that Total Phosphorus is the cause of the impairment of Lac Courte Oreilles.

Respectfully Yours,

Name Andrew & Vicky Dunn

Address 1636 S State Rd. 140
Janesville, WI 53546

Additional note: I have been coming to this lake property since the 50's and since the 80's have owned that same property with my sister's family. We are very concerned about the health of the the lake. Please review the research and list the cause of impairment as phosphorus.

dnrimpairedwaters@wisconsin.gov

DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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Respectfully Yours,

Name: Kenneth Vesel

Address: 11267 Murphy Blvd.
Hayward, WI

Kristin E. McMahon
W5845 Carla Court
Stoddard, WI 54658-9706

December 1, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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Respectfully Yours,

Kristin E. McMahon

Zimmer Realty Company

7301 Mission Rd., Ste 338, Prairie Village, KS 66208

Julianna A. Zimmer, President
Albert W. Zimmer III, Vice-President

Telephone (816) 896-7108
Email: juliezimmer@kc.rr.com
azimmeriii@kc.rr.com

December 3, 2017

Ashley Beranek
DNR, Water Evaluation Section (WY/3)
Box 7921
Madison, WI 53707

Re: Lac Courte d'Oreilles
Sawyer County, Wisconsin

Dear Ms. Beranek:

I have maintained a home on Lac Courte d'Oreilles in Sawyer County, Wisconsin since 1973, over which period of time I have witnessed the degradation of its once clear and pristine waters. I have been an active supporter and contributor to its Lake Association, which has campaigned long and hard for remediation of the pollutants which have invaded our lake.

Through the volunteer and financial contributions of many, discharge from faulty sanitary sewage septic tanks has been virtually eliminated, and education of "best practices" has been made available to neighboring farms. The remaining major source of controllable pollution to our lake is phosphorus, and its major source is from cranberry bogs lying adjacent to our shoreline. This fact has been demonstrated to Wisconsin DNR by valid water tests.

It is my understanding that Wisconsin DNR is prepared to list our lake as an "impaired water, and I applaud your agency for this needed, but long overdue" designation. However, ***I urge Wisconsin DNR to go further and designate excess phosphorus load as the principal cause of this impairment.***

Our lake is too valuable a resource to all of Wisconsin to fail to take this additional step.

Sincerely,

Albert W. Zimmer, III

dnrimpairedwaters@wisconsin.gov

12/5/17 DATE, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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Respectfully Yours,

Name Billy O'Brien - Bill O'B

Address 15934 N 2nd St
Hayward, WI 54843

dnrimpairedwaters@wisconsin.gov

DATE, 2017 Dec 2, 2017

Ms. Ashley Beranek
DNR Bureau of Water Quality
101 South Webster St. WQ/3
Madison, WI 53707

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Respectfully Yours,

Name Laura Kaiser

Address 335 Highland Ave Naperville, IL
8053 N County Rd E, Hayward, WI

P.S. My home is at the opposite end of the lake from Musky Bay. I have noticed in the last 5 years (I have been there 22 years) a very significant increase in aquatic plant growth.