Response to Comments on the 2018 Draft Wisconsin Consolidated Assessment and Listing Methodology (WisCALM)

March 2017

Water Evaluation Section, Water Quality Bureau
Environmental Management Division

A public comment period was held from December 20, 2016 to January 27, 2017. Comments were received from five separate entities.

Response to US EPA Region 5
Submitted comments in Appendix A

I. General Comments
   1. DNR thanks EPA for their comments on the draft 2018 WisCALM and understands that EPA may review the final 2018 WisCALM as part of their review of the 2018 draft impaired waters list.

   2. The "Wisconsin's Water Quality Restoration and Protection Prioritization Framework" document has not been updated since it's completion in March 2016. Updates to the document will be incorporated into the state's biennial Integrated Report of Water Quality rather than be attached as an appendix to WisCALM.

   3. WDNR looks forward to working with EPA once guidance is developed related to the 10% rule for assessing attainment of the acute temperature criteria.

II. General Condition Assessment section 3.1
   1. WisCALM guidance states when waters are assessed as poor under general condition assessments they are not considered impaired unless "the limited dataset includes overwhelming evidence of impairment (e.g. large magnitude of exceedance)" (page 11). With limited Tier 1 data an assessment of poor does not result in an impairment listing because more weight of evidence is required, which is why further monitoring is done. If there is sufficient data for an impairment assessment and the result is still poor then the water is listed.

   2. Threshold levels used to make impairment decisions are part of WDNR's current scope statement WY-23-13. Once these changes have been codified and accepted by EPA they will be added to WisCALM.

III. Lake Impairment Assessment Section 4.4 – Dissolved Oxygen page 28
   1. The following address concerns about language for Dissolved Oxygen Calculations and Exceedance Frequencies:

a. The following sentence was added to the 'Calculations' section to clarify determination of exceedance based on the 10% rule for lakes that are not two-story lakes: "DO values at each depth on a single day are considered in the 10% exceedance rate."
b. Currently samples collected on the same day at different depths in a Two-Story Fishery lake are treated the same as all other lakes.
c. DO profiles for a Two-Story Fishery lake will be accepted if sampled at intervals greater than 1 meter increments, however for future analysis needs (2020) an impairment decision many not be reached. The following language was added to the 'Sampling Depth' section for clarification. "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."
d. DNR recognizes that coldwater fish species also inhabit the hypolimnion in a Two-Story Fishery lake which is why the language "where coldwater species can be found" is included. The term 'hypolimnion' was not used because coldwater fish species are not necessarily always in this part of the lake. The following clarification was made in WisCALM language: "For Two-Story Lakes the threshold is 5 mg/L for the epilimnion and metalimnion, or where coldwater species may be found." [underlined word was inserted for clarification]. A Two-Story Fishery lake DO criterion is currently part of the administrative code designated use rule update, scope statement # WY-25-13. WisCALM language will be modified when the rule updates are codified.

2. An additional footnote was added to table 5 referring to Two-Story Fishery lakes: "Minimum data requirements and assessment methods slightly different for Two-Story Fishery lakes. Refer to pages 28 – 29 for details."

IV. Lake Impairment Assessment Recreational Use
1. There is no corresponding text for the * symbol and it has been removed. It was a remnant from an older version of WisCALM.

V. Stream and River Impairment Assessment: Fish & Aquatic Life
1. The following language was added under the FAL section of lakes (page 30): "Chloride is a concern for Wisconsin waters in part because of road salt used in the winter months. In surface waters chloride can be toxic to many forms of aquatic life. The chloride standards are set to protect aquatic life from chronic (long-term) and acute (short-term) toxicity. The criterion for chronic toxicity is 395 mg/L and for acute toxicity it is 757 mg/L. These criteria apply to FAL use of streams, rivers, lakes, reservoirs, and impoundments. Chloride levels may be assessed at any time during the year because the aquatic community may be detrimentally impacted regardless of season; however, levels tend to be highest after snow melts.

   For lakes, reservoirs, and impoundments samples can come from any depth and are not averaged across depths if a profile is taken. The highest chloride value at any depth is considered the daily maximum. A waterbody is considered impaired for chronic toxicity if a 4-day average of the daily maximum values taken from 4 consecutive days exceeds the chronic criterion more than once in a three year period. For acute toxicity, a waterbody is considered impaired if the daily maximum exceeds the acute criterion more than once in a three year period (Table 15). Chloride has been assessed on a systematic statewide basis since

the 2014 assessment cycle. New in the 2018 cycle is an automated assessment package (Appendix D)."

2. EPA's suggested edits were incorporated into footnote 23 (now 24) for clarification: "A chronic value determination for a water can be made if a single data point is available. To assess whether the chronic criterion is being attained, 2 values would need to exceed the chronic criterion within a 3-year period, as identified in table 15." [underlined words were inserted or replaced existing text for clarification]

3. Selenium was added to Table 15, "Fish and Aquatic Life Use Aquatic Toxicity Impairment Thresholds for Rivers/Streams" on page 49) as recommended.

Responses to The Courte Oreilles Lakes Association (COLA)
Submitted comments in Appendix B

Comments are in regards to Two-Story Fishery lake dissolved oxygen (DO) criteria, section 4.4.

I. As in previous comments COLA recommends a DO of 6 mg/L for Two-Story Fishery lakes.
   a. The value of 6 mg/L for Two-Story Fishery lakes is not yet codified in Wisconsin Administrative Code. Without codification the use of this value would be implementing water quality standards that have not gone through a public review. A Two-Story Fishery lake DO criterion is currently part of the administrative code designated use rule update, scope statement # WY-25-13. WisCALM language will be modified when the rule updates are codified.

II. New methods for assessing Two-Story Fishery lake DO, including habitat quantity determined by temperature and DO, should be added to WisCALM (specific language in Appendix B).
   a. Oxythermal habitat quantity assessment methodology is being drafted in anticipation of passage of the aforementioned rule package. In the interim Two-Story Fishery lakes will be assessed on a case-by-case basis.

Responses to Frank Pratt
Retired WDNR Fisheries Biologist; Submitted comments in Appendix C

Comments are in regards to Two-Story Fishery lake classification and the corresponding DO and temperature criteria, section 4.4.

I. Mr. Pratt agrees with the COLA comments on dissolved oxygen for Two-Story Fishery lakes.
   a. Two-Story Fishery lake DO criteria is currently part of the administrative code rule update scope statement # WY-25-13. WisCALM language will be modified when the rule updates are codified.

II. Classification of Two-Story Fishery lakes should not be based on a maximum temperature of 23 C. Many lakes that cannot support any coldwater fish species could qualify as Two-Story Fishery lakes based on this temperature – the number could rise to as high as 2000.
    a. DNR classifies Two-Story Fishery lakes based on the coldwater fish species present, rather than on temperature and dissolved oxygen alone. In February 2017 John Lyons, after working with many of the fishery biologists in the state, finalized a verified list of Two-Story Fishery lakes in the state; there are 202.

III. For Two-Story Fishery lakes the maximum temperature should be either 17 C, based on criteria used in Minnesota, or 20 C, a value broadly protective of coldwater fish species.
    a. Maximum temperatures will be determined with the rule package update and will be available for public comment in the future. These values will be considered.

IV. The term "hypolimnion" is not well defined and there is little chance of 20 – 23 degree C water being part of the hypolimnion.
    a. Use of the term "hypolimnion" in regards to assessing Two-Story Fishery lakes for DO was removed for the 2018 draft. The focus for Two-Story Fishery lakes is "where coldwater fish species are present".

Response to Christine Gritzmacher

"As a citizen of Wisconsin, I am writing to comment on the Wisconsin Consolidated Assessment and Listing Methodology document for the 2018 cycle, which is publicly available and for which comments were requested. After reviewing the document, I thank all DNR personnel who participated in the work that is described in it.

I was particularly interested in the processes that allow citizens to participate with the DNR to assist in monitoring, e.g., the Citizen Based Monitoring Programs described in sections 2.2 and 2.4. I believe that having citizen volunteers participate in and assist the DNR staff with collecting samples and data expands the monitoring that can be conducted in a cost effective manner. Furthermore, I believe that it increases the public's awareness and involvement in maintaining water quality in the state.

I urge the DNR to continue to use these types of citizen based programs and expand them as resources allow."

Thank you for taking the time to review our 2018 WisCALM guidance. With citizen based data more waters have been assessed than ever before.

Response to Sharon Clark Gaskill

"Though I am not able to comment upon the specifics of the proposed WisCalm standards for water quality assessment related to the Clean Water Act, I want to add my thoughts as a citizen.

Wisconsin's water quality is one of the keys to our success or failure economically and from a health standpoint. Therefore I stand firmly in favor of the most rigorous standards and methods of measurement possible. Protections and accurate information are key."

Thank you for your support of Wisconsin's water quality standards and assessment methods.

APPENDIX A:

US EPA Region 5 Comments

Comments on Wisconsin's Draft 2018 WisCalm document Public Notice date December 2016

EPA comments dated February 13, 2017

I. General Comments

1. EPA Region 5 appreciates the opportunity to review and comment on Wisconsin's Draft 2018 WisCalm. The Region may review and comment on subsequent versions of the 2018 WisCALM methodology in conjunction with its review of the draft and final 2016 303(d) lists.

2. EPA recommends that updates to the state's TMDL vision document be added to the appendices, identifying the status of the progress made in the last two years. Redevelopment of the vision document is not needed unless the state is planning changes of waters or priorities.

3. In previous comments EPA raised concerns regarding the state's use of a 10% exceedance frequency for assessing attainment of the acute temperature criteria, which is inconsistent with the state's water quality standards for water temperature. EPA recognizes that guidance is needed with regards to the 10% rule and will be working with the state once the guidance is developed related to this issue.

II. General Condition Assessment section 3.1

1. Page 11 states "Waters assigned the condition category of excellent are considered to be attaining applicable WQS and fully supporting their assessed designated uses. Waters assigned the condition category of good or fair are also considered to be attaining applicable WQS and supporting their assessed designated uses. Waters assigned the poor condition category may not be attaining WQS or assessed designated use(s)." It appears that the state is using the tier 1 and general condition assessment to make a determination when a water is attaining standards. However, if the water is determined to be in the poor level the state may not list the water as impaired. The methodology should clarify situations, if any, under which waters assessed as poor would not be listed as impaired.

   This issue is also identified in section 4.3, Lake Assessment section on page 20 which states "Not all waters categorized as Poor in the General Condition Assessment should be considered Impaired or warrant 303(d) listing."

2. Region 5 has been working with the state on the issues of the threshold levels used by the state to make impairment decisions within the general condition assessments. These new threshold levels should be incorporated in the WisCalm once the values have been accepted by both EPA and the state.

III. Lake Impairment Assessment Section 4.4 – Dissolved Oxygen page 28

1. Minimum Data requirements. This section states that "A minimum of 10 discrete values over a period of 5 years, collected on separate calendar days . . ." On page 29 under

Calculations and Exceedance Frequencies, the state discusses the need for 10% exceedance of the criteria for a water to be listed as impaired. The WisCalm should be revised to address the following questions:

a. How would the state use samples that may be collected on the same day at different depths in a lake that is not a two story lake? Is each sample point considered in the 10% exceedance rate, or is the state looking only at the days in which there was an exceedance at any depth in its determination of the status of the lake?
b. How is the state using samples that may be collected on the same day at different depths in a Two-Story lake?
c. Will the state accept data that is based on sampling at greater than 1 meter increments?
d. The state indicates the exceedance frequency for a Two-Story lake is less than 5mg/l in the epilimnion and metalimnion less than 10% of the time. EPA has concerns with only looking at these areas of such a lake, because the suitable habitat for the coldwater species could be in the hypolimnion as well as the other levels depending on the season and the variability of the stratification for a given year. The state should be looking where 'suitable habitat' or 'where cold species can be found,' as stated in the current standard at Wis. Admin. Code NR § 102.04(4)(a). WDNR is working to revise its DO standard, which may specifically address applicable criteria for two story lakes.

2. Table 5 page should also include page 29 for the two story lakes.

IV. Lake Impairment Assessment Recreational Use

1. Table 6, first column box with the Aquatic plant metrics. There is an * after metrics- is there a foot note or other information missing that correlates to the *?

V. Stream and River Impairment Assessment: Fish & Aquatic Life

1. EPA appreciates the addition of the Chloride discussion in the WisCalm for rivers (page 46). This section states ". . . criteria also apply to FAL use of streams, rivers, lakes, reservoirs, and impoundments. There is no discussion under the lake section on listing for chlorides. A section should be added which discusses chlorides for lakes

2. Clarification should be made to Footnote 23 (page 47). EPA's interpretation of the chronic value is that there does not need to be four consecutive days of sampling to evaluate against the chronic criterion. Rather, a single sample can represent the four days of sampling if that is all that is available. Within a four-day time period, if only one sample was taken this would represent the data used to determine the status of a water against the chronic value. Footnote 23 on page 47 states "A water can still be assessed for chronic toxicity if only a single value is available." As written this appears to contradict the statement in table 15 (page 49) under the Minimum Data Requirement column, which states "2 values within a 3-year period" which is used to list. As written, the foot note seems to state that one value is used and in table 15 2 values are used.

Clarification should be made to footnote 23 to indicate that a chronic value determination for a water can be made if a single **data point** is available **over a 4-day period**. **To assess whether the chronic criterion is being attained, 2 values would need to exceed the chronic criterion within a 3-year period, as identified in table 15.** [Bold added to show changes]

3. Table 15, "Fish and Aquatic Life Use Aquatic Toxicity Impairment Thresholds for Rivers/Streams" (page 49)- This table should also include Selenium. Please include this as one of the parameters measured.

APPENDIX B:

The Courte Oreilles Lakes Association (COLA) Comments

January 9, 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: COLA Comments on the Wisconsin 2018 Consolidated Assessment and Listing Methodology (WisCALM 2018)

Dear Ms. Beranek

The Courte Oreilles Lakes Association (COLA) is providing the following comments regarding the draft 2018 version of WisCALM.

Comments on Draft 2018 WisCALM

The draft 2018 WisCALM includes Dissolved Oxygen and Habitat Quantity Criteria Appendix E, but makes no reference to it and does not apply these criteria as thresholds for an impairment indicator. Previous comments submitted by COLA on the draft Dissolved Oxygen and Habitat Quantity Criteria documented the need for a higher DO threshold value (include as an attachment). The Dissolved Oxygen threshold discussion for two-story lakes on pages 28 and 29 of the draft 2018 WisCALM should be replaced with the following:

Dissolved Oxygen (DO)

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). For all lakes other than two-story lakes, the minimum data requirements, calculations and exceedance frequencies are described below.

Minimum Data Requirements

a) *Seasonal Range and Sampling Frequency.* A minimum of 10 discrete values over a period of 5 years, collected on separate calendar days during the ice-free period are required from each assessment station. If more samples than the minimum are available, they will also be used in calculations unless excluded due to professional judgment.
b) *Sampling Depth.* Samples should be taken from the epilimnion. ~~In the case of two-story lakes, samples should be taken from the entire water column, preferably in increments of 1 meter or less.~~
c) *Units.* DO values should be expressed in mg/L.
d) *Data Quality.* If data quality for any values is questionable, they should not be used for the calculations. Data should only be used from DO meters where calibration records are available, or from titration methods. (However, this information is all field-entered, so the data points are not automatically flags to indicate suspect data.)

Calculations and Exceedance Frequencies

a) *Calculations.* Data from the most recent 5-year period may be lumped together for this calculation (however, the data should all be from a single station). If 10% of values exceed DO criteria, the lake is not meeting criteria, for all lake types but Two-Story Fisheries (DO assessments for these lakes is outlined below). Because low DO most commonly occurs in shallower portions of a lake, individual station data should be assessed separately to determine whether DO problems exist.
b) *Exceedance Frequency.* Compare data to the impairment threshold for DO listed in Table 5 on page 31. For all lakes the threshold is 5 mg/L. ~~For Two-Story Lakes the threshold is less than 5 mg/L for the epilimnion and metalimnion, where coldwater species may be found.~~ If 10% or more of all DO values at a site (cumulatively over the most recent five year period) are below the applicable thresholds, the impairment threshold is exceeded.

Two-Story Lakes Dissolved Oxygen and Habitat Quantity

For two-story lakes, a DO concentration alone is not the best way to measure the habitat characteristics needed to support the fishery. Cisco, 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, a measure that represents the overall quantity of suitable habitat by combining both DO and temperature is a more useful metric for assessing support of the two-story fishery.

To assess a two-story lake's available volume of cold-water habitat quantity, vertical temperature and DO profiles should be measured in the deepest location of the lake while the lake is stratified. If the lake has multiple lobes, profiles should be measured in the deepest location in each lobe of the lake. For two-story lakes the habitat quantity threshold is at least 1 meter of depth being maintained both above a dissolved oxygen concentration of 6 mg/L and below the temperatures listed below at all times throughout the year and at all profile locations:

a) For lakes with lake trout, 57 °F or less.
b) For lakes with whitefish but not lake trout, 66°F or less.
c) For lakes with cisco but not whitefish or lake trout, 73°F or less.
d) For two-story lakes the Department manages for brook, brown or rainbow trout, 73°F or less.

For two-story lakes, the minimum data requirements, calculations and exceedance frequencies are described below.

Minimum Data Requirements

a) *Seasonal Range and Sampling Frequency*. Multiple profiles should be taken during the critical periods for cold-water habitat, typically late summer and early fall. There is no minimum requirement for number of profiles measured.
b) *Sampling Depth*. Dissolved oxygen and temperature vertical profiles should be measured through the entire water column, preferably in increments of 1 meter or less.
c) *Units*. DO values should be expressed in mg/L. Temperature values should be expressed in degrees Fahrenheit.
d) *Data Quality.* If data quality for any values is questionable, they should not be used for the assessment. Data should only be used from DO meters where calibration records are available, or from titration methods. (However, this information is all field-entered, so the data points are not automatically flags to indicate suspect data.)

Calculations and Exceedance Frequency

a) *Calculations*. To analyze, plot temperature vs depth and DO vs depth, and then determine the vertical extent of the depth profile at which the DO is 6 mg/L or above and the temperature is at the specified threshold or below. Compare the available habitat quantity to the minimum threshold of 1 meter at each profile location.
b) *Exceedance Frequency*. If a single measurement of the habitat quantity at any profile location does not meet the 1 meter threshold, the impairment threshold is exceeded.

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

Sincerely

Kris Sivertson

COLA, President

Enclosure

Previous COLA comments re TDO dated July 29, 2016

July 29, 2016

Brian Weigel
Wisconsin DNR, Water Evaluation Section Chief
Brian.Weigel@wisconsin.gov

RE: Initial Comments on Two Story Criteria.

Dear Mr. Weigel:

The Courte Oreilles Lakes Association (COLA) appreciates the opportunity to review and comment on the draft Dissolved Oxygen and Habitat Quantity Criteria for Two-Story Fishery Lakes that you provided in your email on July 8, 2016. We support the WDNR's efforts to develop criteria to appropriately protect Wisconsin's coldwater two-story fisheries. We also support the general approach presented in the draft document that recognizes the need to have a minimum quantity of habitat for lake trout, whitefish, cisco, and stocked trout in two-story lakes. We also support WDNR's approach of defining acceptable habitat for these coldwater fishes by a layer that combines sufficient dissolved oxygen and cool enough temperatures. However, through consultation with LimnoTech and Frank Pratt, we have identified questions, concerns and recommendations related to the draft criteria. We have summarized these items below and very much appreciate WDNR's offer to have further technical discussions related to the draft criteria and these items.

1) The draft criteria are set at the threshold of acute mortality of the individual species. This, by itself, is not protective of a coldwater fishery use. Should the draft criteria be violated for even a short timeframe, the entire coldwater fish population could be wiped out. Coldwater fishes in a two-story lake do not have the opportunity to escape low-dissolved oxygen or high temperature conditions in the same way trout do in a stream. Stream trout are able to find refuge in cooler deep pools, highly oxygenated riffles, or shaded areas. Additionally, coldwater fishes in streams need only tolerate short periods of low dissolved or high temperatures that are caused by diurnal swings. Coldwater habitat in two-story lakes does not vary significantly day-to-day during the critical periods. Rather, it is sustained for days. One meter of water at a dissolved oxygen concentration of 3 mg/L at the proposed temperatures, sustained for days, will not support these coldwater fishes.
2) The criteria need to be set so as to be protective of a sustainable fishery. An analogy is the 5 mg/L dissolved oxygen criterion for warmwater fishes. What is the basis for making the coldwater two-story criterion less protective than the general dissolved oxygen criterion? Or less than the 6.0 mg/L dissolved oxygen criterion for trout streams?
3) A minimum of 1 meter of habitat at a TDO3 at the proposed temperatures is not protective. A minimum of 1 meter at a TDO6 at the proposed temperatures would be protective. This would be consistent with the dissolved oxygen criterion for trout streams which provides "shall not be artificially lowered to less than 6.0 mg/L at any time."
4) The proposed language reads "at least 1 meter…at all times in the summer." The reference to "in the summer" should be deleted. The critical habitat quantity could occur in late September, after the official end of summer.
5) The reference to "at all times" in the "Assessing attainment of TDO3" paragraph should be clarified. Does one measurement of habitat quantity less than 1 meter result in an impairment determination? Again, if this were the case, there is a risk of losing a significant portion of the coldwater fishery, or completely eliminating it. If the criteria were changed to a TDO6 at the temperatures proposed, it could allow for some frequency of having a measurement less than 1 meter, along the lines of a chronic criterion.

6) The draft document states: “Multiple profiles may need to be taken to account for variability, both during the summer season and across years” in the “Assessing attainment of TDO3” paragraph. This statement should be reworded. We recommend something along the lines of “Multiple profiles should be taken to identify the critical period of habitat quantity, typically occurring in late summer. Monitoring across years will be needed to account for annual variability.”

Please feel free to contact me with any questions pertaining to our comments. We would be happy to work with WDNR to further develop the draft criteria such that Wisconsin’s two-story coldwater fisheries will receive adequate protection.

Sincerely

Kris W. Sivertson

COLA President

APPENDIX C:

Frank Pratt Comments

RECEIVED

JAN 23 2017

WT/3 - WY/3 - OGL/3

January 16, 2017

From: Frank Pratt (WDNR Fisheries Retired), Fisheries Bio-Technology Prescriptions

10783 Minnie Avenue Hayward , Wi. 54843

To: Ashley Beranek, WDNR Bureau Water Quality

101 South Webster Street

Madison, Wi. 53707

Subject: My comments on 2018 WisCALM draft

Dear Ashley:

Thank you for the opportunity to comment on the constantly evolving and improving WisCALM. I appreciate the hard word you and your staff are putting in on this extremely arduous and complex task. Under current WisCALM , rivers and streams appear well protected. Lakes? Sorry: You are getting there, but still have a very long way to go. In the past, I have repeatedly commented on WisCALM's most- fatal flaw: Burden of proof on the resource instead of the polluter. Until WDNR Water Quality looks at statistical significance for nutrients in the manner which Fisheries handles Safe Treaty Harvest, all the others details are minor. The burden of proof concern is still tantamount and I see zero progress in the right direction. Addressing individual specific issues like temperature or oxygen, almost feels like rearranging deck chairs on the Titanic.

Here are two deck chairs which can be put in more favorable positions: Deck Chair 1-Oxygen (O2) and Deck Chair 2- Temperature. I fully concur with COLA's filed comment on O2 and will leave will that chair right where they put it.

Deck Chair 2-As a fisheries person with over 40 years of hands-on experience with cold-water ecosystems, your suggested Tmax = 23C (73 F), for the purpose of environmental protection, rattles me. What? Really? No! At Tmax 23 C many lakes in Wisconsin which can't now support any cold-water species , could still qualify for Two-Story Lakes (TSL) based on temp/O2. Currently Wi WDNR lists about 200 TSL. But, under T Max23 , what would that number rise to? 2000? Please tell me. With 23C the number of TSL will now be way more than 200, for sure.

Two-Story lakes with the stroke of a pen? I wish it was that easy! When I was an Agency fish manager we tried doing it with a stocking truck. It often worked for put-grow-take with stream trout species. But rarely where all the , so-called , "two-story habitat" was a warm, 20-23 C. Not unless the treatment was deliberately designed as a very short-term, seasonal put and take fishery, a bio-manipulation (aka "bass-feeding") program, or there are undetected thermal refuges. WDNR and USFWS even

successfully field transferred cisco from LCO to Ashegon Lake, which suggests that this strategy may have promise to preserve rare genetic stock. I doubt if that would have worked if the only "cold-water" habitat available was 20-23 C. Ashegon continues to display a thin layer of well oxygenated 17-20 C water. It is that layer is the critical habitat which allows the cisco to sustain themselves, and the lake to carry a very good put-grow-take fishery for stocked trout, too. When that habitat declines to just 20-23 C, the cisco and the trout will be gone.

Sand Lake and Sissabagama Lakes upstream from Lac Courte Oreilles, historically once held cisco. Both are no longer capable and are not listed as TSL. Yet, under Tmax23, they probably would still qualify for a TSL listing. Would that then mean that they are impaired due to TP? Since the TSL standard for TP is defined as a ridiculously high (and wrong) 15 ppb, and the lower confidence interval for their TP lies well above? Did you ever consider this?(It might be a good thing, since then several hundred pseudo-TSL lakes would be by definition biologically impaired due to lack of cisco, as well as nutrient- impaired due to high phosphorus, correct? Interesting.) If you are going to define an acceptable Tmax. It needs to be lower than 23 C. **I suggest either 17 C (based on the Mn. Cisco tier system which identifies 17C as the threshold for threatened cisco lakes), or at worst 20C** (a commonly used and broad- based trout-salmon catch-all for cold-water habitat in lakes.) Certainly, a fisheries person would not commonly treat 20-23 C as viable habitat, for cold-water, lake species.- Not for management and especially not as a standard for environmental protection.

To test my hypothesis, (that 20-23C is NOT cold-water habitat) please use, what must be a very impressive data set, from the ongoing statewide cisco study. If capture depth of cisco in all study lakes is correlated to water temperature what does it show? If the % captured (of the total cisco sampled) in 20+C water is > 5%, then I retract my hypothesis, as invalid. (Here, I am confidant to fight even with WisCALM's burden of proof on the resource, rules). If the number is <5% then acceptance as valid theory is warranted, and the the 23 C should be put in "cool water-warm-water" habitat category, where it belongs.

A well-adapted population of brown trout in the Namekagon River can withstand short term daily exposures to 23C, yes. However, it is unrealistic to expect more sensitive lake species like cisco, whitefish, and lake trout to do so. More importantly the exposure time is constant and an order of magnitude higher in lake than in a stream. The daily four hour exposure for brown trout in the Namekagon might be a three week, constant, exposure for cisco and whitefish in Lac Courte Oreilles. There is proof in the form of real-world observations and empirical data from Aug., 2016 in LCO. Cisco and whitefish DIED in significant numbers when exposed to water temperatures 20-23C in LCO. A dead fish in the hand should trump the projected- live one, on-paper.

As a limnologist I am also perplexed by your use of the term "hypolimnion". I think I know what you mean, by its usage in WisCALM. But...I never see a clear definition of the term, specifically quoted. The part about the delta-T in the thermocline or metalimnion and whether the thermocline even is included in the definition of "hypolimnion" is ambiguous. It look like the thermocline IS included in the term

"hypolimnion" and that would definitely be in compliance with typical and understood usage. I have no quarrel with that part. But what rate of temperature change is associated with thermo-cline or metalimnion? At the standard 1 degree F per foot of depth, I am hard pressed to envision a common circumstance where 20-23 C water would actually BE part of the hypolimnion. Without going into volumes of dissertation regarding the thermodynamics and physics of water, I ask you this: When, if ever, is 20-23C truly part of the hypolimnion of a typical lake ? I can find references to it occurring in semi-tropical marine circumstances . (My guess, for north-temperate, freshwater lakes- near zero) . The Birge-Juday limnology legacy at U. Wi., Madison, is on my side, here.

This has bearing on the calculation of the critical statistic "Percentage of Hypolimnion which is cold-water habitat" . Even if you do use TMax23 to define the upper limits of cold-water habitat , the lake volume at 20-23C, would still need to be TAKEN OUT of the denominator of the % volume calculation. **20-23C is surface water- Not hypolimnion**It makes no sense to use TMax23, because all it amounts to is an extra step in the calculation- One which you need to subtract out, in the end , anyway.

Otherwise , the calculation is bogus, a severe over-estimate of cold-water habitat. A voodoo-accounting tool to make lakes no cold-water habitat or fishery, look like they are unimpaired TSL. As some might say : "Deny! Deny! Deny!" I prefer April Pulley Sayre's "Trout!Trout!Trout!" which would exclude 20-23 C.* Or as Cicero might have said " I need not mention Cataline, BUT, using the verboten: "...Climate Change! Climate Change! Climate Change!". (I won't go on for 17 hours more like Cicero did, though. Everyone in the Roman Senate already knew that Cataline was a roque)

In Summary: Please use Tmax20, and not Tmax23.

Even that probably is too warm, but at least it is a start. WisCALM has so little safety margin , to begin with, that 3 degrees C, seems like a major improvement.

Please keep trying. No one knows or appreciates how hard your job is , as I do. Thank you for considering my comments.

Sincerely,

Frank B. Pratt

Fisheries Bio-Technology Prescriptions, ret. WDNR Fisheries, Watershed Educator and Advocate

*Interesting side-light: rainbow smelt are a cold-water species considered AIS in Wisconsin. It is commonly knowledged that are typically a little less sensitive temperature sensitive than cisco and more tolerant of slightly higher water temperatures- more like Namekagon River brown trout. The de-stratification experiment at Sparkling Lake did not go as planned. Smelt were supposed to be eliminated. Instead they thrived in the warmer water. This further supports my hypothesis. So, realize that by introducing 20-23 C into the realm of acceptable cold-water lake habitat, is a closet endorsement of rainbow smelt. Get ready to examine the concept of deliberately using an AIS to sustain a coldwater lake ecosystem, bottom-up in a system where cisco are terminally threatened by thermal stress? For all the talk of consistency in WisCALM, this opens up the mother of all inconsistencies. The Wi Lake grant program is spending 75% of its total budget to eradicate AIS, while on the other hand Bureau of Water Quality , is endorsing habitat standards for two story lakes which appear to grant preferential treatment for an AIS species? Which way are you going to go? Either way, endorses the reality of that verboten, "C-C" word.