

## **APPENDIX N. RESPONSE TO PUBLIC INFORMATIONAL HEARING COMMENTS**

Appendix N provides responses to the comments received during the public informational hearing comment period which extended from November 30, 2018 through January 18, 2019. The comments are followed by a response and have been grouped by category. The commenter is identified in parentheses. Appendix M contains full copies of the actual submitted comments and are not grouped by topic but rather commenter.

1. The White River upstream of the SLSD Publicly Owned Treatment Works (POTW) discharge has a May-to-October total phosphorus (TP) concentration of 0.021 milligrams per liter (mg/L), which is below the 0.075 mg/L criterion. In the Water Quality-Based Effluent Limitations for SLSD Memorandum dated February 23, 2017, the Wisconsin Department of Natural Resources (WDNR) calculated a water quality-based phosphorus effluent limit of 2.11 mg/L for the SLSD POTW and stated this number is far in excess of the technology-based limit of 1 mg/L from Chapter NR 217, which was already in the SLSD POTW discharge permit. This memorandum stated no water quality-based limit for phosphorus was needed at the time.

Compared to the phosphorus loadings from the SLSD POTW and other POTWs, agricultural and background nonpoint sources contribute significantly higher phosphorus loadings to the Wolf River watershed. As the phosphorus loadings from agriculture and background sources far exceeds the phosphorus loadings from the SLSD POTW and other POTWs, we request the 1 mg/L technology-based limit remain in effect until measures are taken by the nonpoint source contributors to reduce their loadings. If this is not acceptable, we request the TMDL-based limits be implemented such that stepwise reductions taken by SLSD POTW and other point source dischargers are matched by nonpoint source reductions. We request the TMDL-based effluent limits for SLSD be implemented with interim limits in a phased approach over several permit terms to reduce the financial burden on SLSD rate payers. *(Strand Associates on behalf of Silver Lake Sanitary District)*

*Response: The DNR summary tables for the TMDL lists that Silver Lake SD has a 6-month concentration limit of 0.22 mg/L TP which is above the local criterion of 0.075 mg/L.*

*The effluent limit calculated in the February 23, 2017 memo did not consider downstream impacts to lakes and reservoirs; it only considered local water quality. This accounts for the discrepancy between the two limits.*

*The technology-based limit cannot remain in effect once a water quality based effluent limit from a TMDL is placed in a permit. Please see comments 95, 96, and 97 which also address "phased implementation of TMDL WLAs".*

2. As indicated in the Wisconsin Department of Natural Resources' (WDNR's) Fiscal Year 2020 environmental loan documentation, the City's median household income (MHI) is \$36,064, or approximately 66% of the statewide MHI. The City recently invested over \$11 million in its Wastewater Treatment Plant (WWTP) to improve effluent quality, including improvements to reduce effluent phosphorus to below 0.5 mg/L to meet a newly-imposed NR217-based water quality based effluent limit (WQBEL). The Draft TMDL Report indicates that we will receive an even lower mass limit (equivalent to 0.2 mg/L) that is not achievable with the existing WWTP alone. We are concerned about the additional cost to our ratepayers given that we just incurred significant costs for plant improvements and have recently had three significant rate increases. *(City of Clintonville)*

*Response: The draft TMDL does indicate that the mass allocation converted to a 6-month average concentration limit based on average effluent flows converts to 0.23 mg/l. In most cases, WPDES*

*permittees get a compliance schedule to identify and implement the most cost-effective option to comply with their permit. In addition, variance options are available to address economic issues.*

3. The City does not have many viable phosphorus compliance options aside from more capital improvements to the WWTP which are anticipated to cost approximately \$3.5 million and increase operation and maintenance costs by about \$150,000 annually (based on published compliance costs from the Wisconsin Department of Administration and the Wisconsin Municipal Environmental Group Wastewater Division). While water quality trading (WQT), adaptive management (AM), and the multi-discharger variance for phosphorus (MDV) are currently available compliance options, none of them will likely be viable for the City.

Because of the TMDL the credit thresholds for WQT will result in almost all trades being good for one permit term only, making the City constantly searching for more trades and resulting in high costs in the long term. In addition, trade ratios, nutrient management plan requirements, and other guidelines for implementing trades are burdensome. Eliminating or relaxing the credit thresholds and making WQT easier to administer would make it a more attractive compliance option and result in non-point source load reductions.

Appendix K of the report indicates an AM target for the Clintonville WWTP of 29 ug/L. It is not clear why this target is even lower than the phosphorus criteria for downstream lakes. We do not believe this is attainable and therefore do not believe AM is a feasible option.

The City is likely eligible for the MDV but it is only approved through 2027, limiting the City's ability to use this relatively low-cost compliance option that would result in the implementation of non-point source best management practices. *(City of Clintonville)*

*Response: There are updates to Wisconsin's water quality trading program being considered that may make water quality trading more attractive. These include adjustments to the credit threshold, the duration of interim credits, and calculation and averaging methods used in modeling to determine credits.*

*The AM targets are expressed for the stream or river reach and represent the concentration needed to meet both local water quality criteria and any more stringent downstream criteria. It is important to note that when looking at the AM targets, that stream and river criteria are expressed differently. Stream and river criteria are expressed as a median of monthly samples collected between May and October. For reservoirs and lakes, the criteria are expressed as a mean of monthly samples collected between June and September. As such, a comparison between concentrations needs to include an expression of the frequency and duration.*

4. The Draft TMDL report indicates that the City's contribution to the "baseline" phosphorus load is only 0.2 percent (based on our calculations) and the combined phosphorus contribution of all point sources is 19%, while agriculture contributes over three times as much at 60%. However, almost all of the cost for implementing this TMDL will be borne by ratepayers for the point sources. The TMDL should focus more on realistic ways to reduce nonpoint source contributions rather than further reducing the relatively small contribution from WWTPs, most of which (including the Clintonville WWTP) already remove over 90% of the phosphorus from their influent. *(City of Clintonville)*

*Response: The TMDL is required by state and federal regulations to set allocations that meet water quality standards by looking at all sources of the pollutant of concern. In addition, federal requirements require reasonable assurance which requires that the allocations be evaluated for achievability. There are multiple ways of looking at baseline contributions and, as indicated, Clintonville may be a small portion of the 19% of the point sources load but the same could be argued by any individual agricultural producer that they are individually a small percentage of the agricultural load and the overall phosphorus load. Most of the needed mass reduction in this TMDL, and thus most of the cost for implementing the TMDL will be borne by nonpoint sources.*

5. The response to comments in Appendix L of the report states that “the confidence interval of the paleoecological study results show that historic Lake Winnebago concentrations may have been below 40 ug/L” and gives an overall confidence interval of 32 to 59 ug/L. It seems that this confidence interval could also be used to conclude that the historic Lake Winnebago concentrations were above 40 ug/L, making the 40 ug/L standard being used for this TMDL lower than the lake concentration prior to development in the area. We do not believe that it is feasible for the Lake Winnebago TP concentration to be reduced to 40 ug/L given the historic concentrations reported. *(City of Clintonville)*

*Response: The department employed multiple lines of evidence in the evaluation of Lake Winnebago. In addition to the paleoecological cores, model runs using the calibrated and validated watershed and lake models were used with stream and river concentrations set to historical levels to evaluate the response of Lake Winnebago. The results indicate that Lake Winnebago was at or below 40 µg/L TP. An additional evaluation compared the phosphorus and chlorophyll-a relationship and showed that the 40 µg/L criteria is appropriate to meet the recreational standards. The modeling conducted in support of the TMDL development process does not support your belief that allocations require phosphorus sources to be lower than naturally occurring sources from the 1300s or before anthropogenic sources.*

*In acknowledgement of the historic changes that have occurred in Lake Winnebago, allocations were adjusted to account for needed lake restoration work through the re-establishment of aquatic vegetation. This analysis allowed for higher allocations.*

6. According to NR 217, TMDL-based limits can be used in WPDES permits for two or three permit terms if nonpoint source loads have been substantially reduced. Since there is no requirement for non-point sources to reduce their loadings, we are concerned that limits on point sources could be reduced further after two or three permit terms. Please provide additional information on how the nonpoint source reductions (including Lake Winnebago vegetation restoration) indicated will be accomplished including who will pay for these reductions. We feel that this TMDL is an unfunded mandate on point sources and do not believe it is fair or appropriate for our ratepayers to have to fund nonpoint source reductions, either directly through watershed compliance options or through more stringent future limits if nonpoint sources do not reduce their loadings. Please provide assurance that point sources will not be imposed with more stringent limits if nonpoint sources do not reduce their loadings. *(City of Clintonville)*

*Response: Clintonville is not required to fund nonpoint reductions. Both water quality trading and adaptive management are available compliance options that are available to point sources and can be selected by point sources if they are economically advantageous. Variance options are also available for facilities that qualify.*

*Chapter NR 217.16(2), WI Admin. Code does have language which indicates that the department may issue a may more stringent limit calculated under NR 217.13. For the Upper Fox TMDL, it is highly unlikely that this will occur or result in a more stringent limit. As pointed out in comment 2, Clintonville is receiving, through the TMDL, a more stringent effluent limit than was calculated under NR 217.13. The TMDL is more stringent than the NR 217.13 limit because the NR 217.13 limit did not account for downstream reservoirs or lakes. The TMDL provides a comprehensive analysis of what is needed to meet downstream water quality.*

*The allocation method employed in the TMDL development process assigns reductions proportional to their mass contribution. Any additional reductions in phosphorus or TSS placed on point sources would represent a disproportional reduction and is not supported by the TMDL analysis.*

7. The Richmond Sanitary District is part-owner of the Wolf Treatment Plant in Shawano, Wisconsin. It is our understanding that the Wisconsin Department of Natural Resources is once again considering lowering the phosphorus limits on effluent for the Treatment Plant. Our concern is that by doing so, this will, in the end, result in higher user fees for all of the sewer users in the District. The treatment plants are only responsible for 8% of the total phosphorus that is flowing into the system. If you made the levels zero, it still would not solve the problem. The costs of the upgrades to the plants is too excessive for the results. The sewer users in our District cannot afford it at this time. Please reconsider your thoughts. Thank you. *(Richmond Sanitary District Commission)*

*Response: The TMDL is required by state and federal regulations to set allocations that meet water quality standards by looking at all sources of the pollutant of concern. In addition, federal requirements require reasonable assurance which requires that the allocations be evaluated for achievability. There are multiple ways of looking at baseline contributions and, as indicated, Richmond's discharge may account for 8% of the total phosphorus load but the same argument can be made by any single entity, either point source or nonpoint source. Each individual agricultural producer could argue that they are individually a small percentage of the agricultural load and the overall phosphorus load. While assigning an individual discharger a zero allocation may not impact water quality, the cumulative impact of reductions from all sources will impact water quality.*

*There are several compliance options as well as variance options available to meet assist in addressing effluent limits in the most cost-effective manner.*

8. The Wisconsin Department of Natural Resources (WDNR) responded to the City's previous comment regarding eligibility for Adaptive Management (AM) as a compliance option, but it is not clear in the WDNR's response if wastewater treatment facility (WWTF) dischargers whose receiving streams are below the water quality criterion would be eligible for AM. The City reiterates its request that AM is made available to all WWTF dischargers that are requiring reductions based on downstream water quality, even if the local receiving stream is below its water quality criterion. *(Strand Associates on behalf of the City of Green Lake)*

*Response: As outlined in Appendix K, adaptive management is available to point sources in reaches that are nonpoint dominated and do not meet the water quality targets listed in Table 1 of Appendix K. These water quality targets are instream targets expressed as a median of monthly samples collected between May and October comparable with the methodology to assess streams and rivers for compliance with the phosphorus water quality criteria. Please note that these water quality targets cannot be directly compared to the numeric lake and reservoir phosphorus criteria as they are expressed as a mean of summer monthly samples. Please see comment 14 for additional details.*

9. The City made a previous comment regarding the unlikely attainability of the 40 micrograms per liter ( $\mu\text{g/L}$ ) standard for Lake Winnebago given the paleoecological study results that suggest that the total phosphorus (TP) concentration in Lake Winnebago was at or above the water quality criterion of 40  $\mu\text{g/L}$  prior to development in the area (1310 to 1725). In its response, the WDNR stated that the model results showing a pre-settlement concentration of 32  $\mu\text{g/L}$  falls within the confidence interval of the paleoecological data. Given the range of the confidence interval stated (32  $\mu\text{g/L}$  to 59  $\mu\text{g/L}$ ), it appears that the paleoecological data would also support a pre-settlement concentration of 59  $\mu\text{g/L}$  just as it is being used to support a concentration of 32  $\mu\text{g/L}$ . While the low end of this confidence interval matches WDNR's pre-settlement lake model prediction, the modeling is based on an assumed pre-settlement tributary stream concentration that could be inaccurate. The City reiterates its previous comment that it does not believe that the 40  $\mu\text{g/L}$  criterion is attainable. The TMDL should be based on attainable targets, especially considering the significant financial burden this TMDL will have on municipalities. *(Strand Associates on behalf of the City of Green Lake)*

*Response: Response: The department employed multiple lines of evidence in the evaluation of Lake Winnebago. In addition to the paleoecological cores, model runs using the calibrated and validated watershed and lake models were run utilizing stream and river concentrations set to historical levels to evaluate the response of Lake Winnebago. These historical stream and river concentrations were determined through separate studies conducted by the USGS. Additional information can be found on the USGS website with modeling specifics about Lake Winnebago found at: [https://www.usgs.gov/centers/umid-water/science/assessment-hydrology-water-quality-and-response?qt-science\\_center\\_objects=0#qt-science\\_center\\_objects](https://www.usgs.gov/centers/umid-water/science/assessment-hydrology-water-quality-and-response?qt-science_center_objects=0#qt-science_center_objects)*

*The results of these studies indicate that Lake Winnebago was near, at, or below 40  $\mu\text{g/L}$  TP. An additional evaluation compared the phosphorus and chlorophyll-a relationship and showed that the 40  $\mu\text{g/L}$  criteria is appropriate to meet the recreational standards.*

*There is currently no indication that the TMDL does not have attainable targets. If after significant efforts in implementation fail to improve water quality, a Use Attainability Analysis (UAA) can be conducted; however, this would involve removing the designated use for the waterbodies. Such a change would require removing the existing recreational use which is prohibited by federal regulations.*

10. The report states that an 83 percent reduction of all controllable sources of phosphorus is required for Lake Winnebago to meet the water quality standards. It also states that point source dischargers currently combine for 19 percent of the TP load while nonpoint sources such as agriculture contribute over 60 percent. The Green Lake WWTF only contributes 0.2 percent of the baseline phosphorus load.

Because the nonpoint sources will not be required to reduce their phosphorus contribution as part of this TMDL, the City is concerned that the nonpoint source reductions indicated will not be realized and that limits on point sources will be reduced further after two or three permits terms. This will put an even larger financial burden on municipalities in the future, many of which will have to spend a significant amount to comply with the limits indicated in this TMDL. The WDNR should develop a plan to require rural nonpoint sources to reduce their loadings and implement that plan before imposing stringent limits on municipalities. *(Strand Associates on behalf of the City of Green Lake)*

The WWTF already removes approximately 90 percent of the influent phosphorus, and the City has been evaluating options for meeting lower NR 217.13 limits. This TMDL would result in even more stringent limits and much higher compliance costs, and we estimate the City contributes well under 1 percent of the phosphorus loading to Lake Winnebago. *(Strand Associates on behalf of the City of Green Lake, resubmission by reference of comment from August 3, 2018)*

*Response: The TMDL is required by state and federal regulations to set allocations that meet water quality standards by looking at all sources of the pollutant of concern. In addition, federal requirements require reasonable assurance which requires that the allocations be evaluated for achievability. There are multiple ways of looking at baseline contributions and, as indicated, Green Lake's discharge may account for less than 1% of the total phosphorus load but the same argument can be made by any single entity, either point source or nonpoint source. Each individual agricultural producer could argue that they are individually a small percentage of the agricultural load and the overall phosphorus load. While assigning an individual discharger a zero allocation may not impact water quality, the cumulative impact of reductions from all sources will impact water quality.*

*There are several compliance options as well as variance options available to meet assist in addressing effluent limits in the most cost-effective manner. Most of the reduction and thus most of the cost for implementing the TMDL will be borne by nonpoint sources. Please see comments 95, 96, and 97 regarding phased TMDLs.*

11. The Draft TMDL Subbasin Map depicts a subdivision of subbasin 25 between South Lawson Drive and the dam at North Lawson Drive that includes areas that drain to Green Lake directly or through the City's storm sewer system. We request that the subdivision of subbasin 25 between South Lawson Drive and the dam at North Lawson Drive be combined with subbasin 20 based on natural drainage area, hydrologic regimes, and land use patterns. The land use upstream of the dam at North Lawson Bridge is similar to that in subbasin 20, while the land use downstream of North Lawson Drive is almost completely agriculture, forest, or wetlands. Including the entire drainage area for Green Lake in subbasin 20 is consistent with the subbasin delineations for the rest of the TMDL. *(Strand Associates on behalf of the City of Green Lake, resubmission by reference of comment from August 3, 2018)*

*Response: Subbasin 20 is intended to delineate the area draining to the Green Lake main pool only (the lake area located south of South Lawson Drive). Drainage analysis completed for subbasin delineation shows that the land area north of South Lawson Drive (within Subbasin 25) does not drain to the Green Lake main pool but instead drains to the Green Lake Millpond and the Puchyan River. Subbasin 25 therefore cannot be grouped with Subbasin 20 for TMDL development. (Note: comment and response also listed under comment 34, Appendix L)*



12. Appendix D of the draft TMDL report indicates that Green Lake has a loading capacity of 9,319 pounds of total phosphorus per year (lbs TP/yr) to achieve its total phosphorus (TP) criterion of 15 micrograms per liter (ug/L). The sum of the total loads from subbasins that are tributary to Green Lake (20, 17, 18,19, 79, 83, and 87) is 6,618 lbs TP/yr. This suggests that Green Lake has excess loading capacity based on the upstream load reductions necessary for local water quality in the respective subbasins. Given the excess loading capacity available in Green Lake, please confirm that the lake outlet TP concentration used in the TMDL modeling is less than 15 ug/L when determining necessary downstream reductions, making this excess loading capacity available to downstream subbasins. *(Strand Associates on behalf of the City of Green Lake, resubmission by reference of comment from August 3, 2018)*

*Response: The TMDL analysis uses the allocated load for Green Lake and its tributary subbasins (not the Green Lake loading capacity) when calculating allocations for downstream subbasins. Note however that the concentration of TP in Green Lake is not considered in the allocation analysis. The analysis assumes that the entire TP load entering Green Lake (from Subbasins 17-20, 79, 83, and 87) is exported to Subbasin 25 (Puchyan River) immediately downstream of Green Lake. Although retention of TP in Green Lake may occur, the assumption of full export represents an additional margin of safety for downstream reaches. Further, the UFWB SWAT model was calibrated to TP and TSS data from monitoring stations located downstream of lakes and reservoirs. Nonpoint source loading estimates from the UFWB SWAT model therefore implicitly account for lake or reservoir retention. (Note: comment and response also listed under comment 35, Appendix L)*

13. The draft TMDL Report indicates that the Green Lake WWTF requires a reduction in effluent TP partially based on local water quality. The TP concentration data presented in Table 6 of the draft TMDL Report indicates that the Puchyan River upstream of the dam at North Lawson Drive meets the water quality criterion. It appears that the current WWTF discharge is protective of the water quality in the river and no reduction based on local water quality should be required. *(Strand Associates on behalf of the City of Green Lake, resubmission by reference of comment from August 3, 2018)*

*Response: The tables and maps displaying sampled TP and TSS data in Section 3.4 of the TMDL report are intended to present a summary of current water quality conditions in the UFWB. These data were not used for TMDL analysis. The allocations and reductions are derived from baseline loading magnitudes, which differ from existing condition loading (see Section 4.2 of the TMDL report), and also consider a reserve capacity. Also, as noted in Response 35, the TMDL analysis assumes that the entire TP load entering Green Lake (from Subbasins 17-20, 79, 83, and 87) is exported to Subbasin 25 (Puchyan River) immediately downstream of Green Lake. Although retention of TP in Green Lake may occur, the assumption of full export represents an additional margin of safety for downstream reaches. Further, the UFWB SWAT model was calibrated to TP and TSS data from monitoring stations located downstream of lakes and reservoirs. Nonpoint source loading estimates from the UFWB SWAT model therefore implicitly account for lake or reservoir retention. (Note: comment and response also listed under comment 36, Appendix L)*

14. Using adaptive management as a compliance alternative requires the receiving stream to be above its water quality criterion. This will not be the case for the Puchyan River. The TMDL results in stringent



phosphorus limits for the Green Lake WWTF, and adaptive management may provide cost relief and environmental benefit. We request that adaptive management is made available as a compliance option for all WWTF dischargers that are requiring reductions based on downstream water quality. Please add appropriate language to the TMDL Report and subsequent Wisconsin Pollutant Discharge Elimination System (WPDES) permits to allow this. *(Strand Associates on behalf of the City of Green Lake, resubmission by reference of comment from August 3, 2018)*

*Response: Adaptive management was envisioned to occur with facilities needing to make reductions to meet water quality criteria in the receiving water and was not designed to protect downstream waterbodies. Appendix K of the TMDL report was drafted to help address this and provides adaptive management targets for local subbasins based on a facility's requirement to meet both local and downstream requirements, in most cases Lake Winnebago. More details can be found in Appendix K. In addition, Lake Winnebago meets adaptive management requirements and is on the impaired waters list for phosphorus; however, an adaptive management plan for the entire drainage basin is not practical and thus was broken down to individual reaches for each of the point source dischargers. The adaptive management targets listed in Appendix K are all lower than the local stream criteria of 75 µg/L. (Note: comment and response also listed under comment 22, Appendix L)*

15. Water quality trading with nonpoint sources as a long-term compliance option is onerous under current rules and guidelines, requiring credit thresholds, trade ratios, nutrient management plans for all land owned by the farmer regardless of location, and more, to provide multiple safety factors. This draft TMDL Report already incorporates implicit margins of safety. Therefore, could the agencies consider language in the TMDL Report that will provide some streamlining and relief from current Wisconsin water quality trading guidance? One example could be to not require a credit threshold for the macrophyte restoration, and to allow the credit in the trade ratio for this management practice, as would normally be allowed for an aquatic habitat improvement action. *(Strand Associates on behalf of the City of Green Lake, resubmission by reference of comment from August 3, 2018)*

*Response: Portions of water quality trading and watershed adaptive management are either codified or in guidance. The portions in guidance have balanced program flexibility against meeting the codified requirements including the Clean Water Act. The credit threshold in water quality trading is used to maintain the integrity of the TMDL allocations such that the overall allowable load is still attained. Sources that are assigned allocations will generally have to have a corresponding credit threshold.*

*The MOS and trade ratios are for separate processes. MOS is for the TMDL and covers the calculation of allocations. The trade ratios cover uncertainty related to implementation and performance of management practices implemented through water quality trading. The trade ratio is comprised of several factors of which the delivery factor is one of the factors. In a TMDL, the delivery factor is based on the modeling methodologies used in the TMDL. Trading between point sources has a minimum trade ratio of 1.1:1 and several nonpoint practices can result in a trade ratio of 1.2:1; both ratios are the minimum allowed.*

16. The paleoecological study results suggest that the TP concentration in Lake Winnebago was at or above the water quality criterion of 40 ug/L prior to development in the area (1310 to 1725). Based on this data, we do not believe that the 40 ug/L criterion is appropriate or attainable, considering that this would require all phosphorus sources to be lower than the naturally occurring "background" sources from the 1300s. The Lower Fox River TMDL report noted that 40 ug/L is not likely attainable in Lake Winnebago. The agencies should use an attainable target for the phosphorus TMDL. (*Strand Associates on behalf of the City of Green Lake, resubmission by reference of comment from August 3, 2018*)

*Response: Please also see responses to comments 4, 5, and 6 (See Appendix L). The TMDL for Lake Winnebago is set to meet the water quality criteria of 40 µg/L for total phosphorus. The modeling conducted in support of the TMDL development process does not support your belief that allocations require phosphorus sources to be lower than naturally occurring sources from the 1300s.*

*The development and modeling process for the Lower Fox TMDL pre-dated the adoption of phosphorus criteria for Lake Winnebago and as such required the establishment of a boundary condition for the Lower Fox TMDL to account for loads from Lake Winnebago entering the Lower Fox River. This is addressed on page 37 and page 126 of the Lower Fox TMDL report and is restated in comment 14 in Appendix H of the Lower Fox TMDL report and likely encompasses the reference to "the note" in the comment. Text from page 37:*

*"As previously discussed, phosphorus loads from Lake Winnebago (and the Upper Fox and Wolf Basins) must also be reduced if the goals established by this TMDL are to be met. As discussed in Appendix C, a 40% reduction goal (286,782 lbs./yr.) has been established for phosphorus loads entering the basin at the outlet of Lake Winnebago. This reduction goal for loads entering the LFR Basin from the outlet of Lake Winnebago represents reasonable expectations for load reductions that may be achievable in the Upper Fox and Wolf Basins given that Lake Winnebago is a eutrophic/hypereutrophic lake. Reducing the amount of phosphorus released from the lake by greater than 40% may not be feasible given that part of the phosphorus input to Lake Winnebago may come from internal sources (D. Robertson, personal communication, June 2010). Further studies by USGS and WDNR are being conducted to determine what measures would be needed to reduce phosphorus loading from Lake Winnebago by 40%. The reduction goal for Lake Winnebago may need to be adjusted following the TMDL analysis for the Upper Fox and Wolf Basins."*

*And page 126:*

*"A 40% reduction goal has been established for phosphorus loads originating from Lake Winnebago. This reduction goal for loads entering the LFR Basin from the outlet of Lake Winnebago represents reasonable expectations for load reductions that may be achievable in the Upper Fox and Wolf Basins. This reduction goal may need to be adjusted if the TMDL analysis for the Upper Fox and Wolf Basins reveals that it is not feasible."*

*The Lower Fox TMDL assumed a conservative boundary condition of a 40% reduction in total phosphorus to satisfy the U.S. EPA reasonable assurance requirements of the Lower Fox TMDL. In this case, conservative means a lower percent reduction to ensure that water quality criteria are attained in the Lower Fox River. As noted on both pages 37 and 126, the reduction goal may need to be adjusted following TMDL analysis for the Upper Fox Wolf Basins. Preliminary analysis provided by Dale Robertson of the USGS was utilized to establish the boundary condition for the Lower Fox TMDL; Dale Robertson also conducted the lake modeling for the Upper Fox Wolf Basin. Without having conducted detailed modeling yet, Dale Robertson assumed that greater than a 40% reduction in the total phosphorus concentration of Lake Winnebago may not be feasible due to phosphorus loads from internal loading. Internal loading involves the recycling of previously deposited phosphorus through various processes making it available for algal growth. Subsequent detailed lake modeling of Lake Winnebago, performed as part of the Upper Fox-Wolf TMDL, confirmed that internal loading does play a significant role with 56% of the total phosphorus load during the growing season coming from internal loading. However, this detailed modeling also showed that internal loading will decrease in proportion to external loading, and additional internal load reductions could be achieved through the re-establishment of rooted aquatic plants. Therefore, contrary to the assumption made in the Lower Fox TMDL, this analysis shows that the water quality criterion of 40 µg/L total phosphorus is attainable and requires a 67% reduction in external loads. (Note: comment and response also listed under comment 07, Appendix L)*

17. NR 217 indicates that TMDL-based limits can be used in WPDES permits for two or three permit terms if nonpoint source loads have been substantially reduced. How does the Wisconsin Department of Natural Resources (WDNR) anticipate that the high nonpoint source reductions identified are realized? Can the WDNR provide assurances to point sources that further reduction will not be demanded of point sources if the nonpoint source reduction is not met in the 20-year planning period used by most publicly owned treatment works (POTWs)? Please provide language in the TMDL or in a revision to NR 217, and in subsequent WPDES permits, clarifying that the TMDL-based limits will not decrease in the future, for at least 20 years. *(Strand Associates on behalf of the City of Green Lake, resubmission by reference of comment from August 3, 2018)*

*Response: DNR agrees that nonpoint reductions will be necessary to meet water quality goals. Nonpoint source programs, requirements, and activities including past Wisconsin priority watersheds and current farmer led-groups have been shown to reduce nonpoint loads. Please refer to the implementation section the of draft TMDL report*

*The TMDL cannot supersede administrative code, in this case s. NR 217, Wis. Admin. Code, either through mandating new requirements or eliminating existing code requirements. The language in NR 217.16 was required by US EPA and reflects their interpretation of a “phased TMDL”. NR 217.16(2) does offer the DNR some flexibility; DNR must first make a determination and then the DNR “may impose” (instead of explicit language requiring) the imposition of more stringent effluent limits. (Note: comment and response also listed under comment 18, Appendix L)*

18. I am a new resident to WI and live on Lake Winnebago (FDL Co). It is clear that a great deal of effort went into the TMDL Draft Report, and as an area resident, it goes without saying how concerned we should all be regarding the health of our water. I read the draft report, didn't comprehend a great deal of the technical part of it, but it's glaringly apparent that the Fox-Wolf Watershed is in trouble.

Despite the monumental effort the WDNR has put into this report, the concern is that the pollution will continue without addressing the phosphorous pollution coming agricultural operations, which includes the willy-nilly spreading of manure without NMPs. Fond du Lac County has over 200,000 acres of agricultural lands; however, they have been lackadaisical in the NMP enforcement and refuse to implement the DATCP Siting Law to protect residents and our water from unnecessary contamination. There is an AFO across from my home that expanded without an NMP and Stormwater Management Plan. Lake residents are told to pick up after their dog, not wash their car in the drive, not burn leaves, but everyone ignores the elephant in the room, big Ag, who is arguably the biggest polluters of them all. The WDNR effort is futile when local municipalities refuse to get on board to become great stewards of clean water. One would think that we would wake up after hearing and witnessing the devastation people have suffered in Kewaunee County, but we'll wait for another catastrophe before we wake up and mobilize. Thank you for your effort. *(Gail Bolden)*

*Response: The TMDL assigns mass reductions to pollutant sources proportional to their contribution. As such, the largest overall mass reduction is assigned to agricultural sources. The responsibility for implementation of nonpoint reductions occurs across multiple federal and state agencies. If additional reductions are needed to meet TMDL allocations beyond those realized through implementation of the nonpoint performance standards contained in ch. NR 151, Wis. Admin. Code, targeted performance standards can be adopted through rule per s. NR 151.004 or s. NR 151.005, Wis. Admin. Code.*

*The TMDL will likely spur additional implementation discussions and serves as a blueprint for the reductions that are needed.*

19. The Town of Oshkosh is required to remove 83 %Total Phosphorus (TP) as documented in Appendix H to comply with the proposed Upper Fox TMDL. Wet stormwater basins remove an average of 50%-75% TP so the TMDL removal rate would appear to be unachievable even with extensive stormwater basin construction throughout our urbanized areas. We are a small town with a highly fractured boundary and grassed swales already lining almost all of our local roads providing stormwater treatment. We are a miniscule contributor to the overall phosphorus loading into Lake Winnebago (a very small fraction of 1% from all MS4s in the watershed including much larger cities and villages according to the TMDL). However, we will be required to build expensive stormwater practices to achieve the much higher level of phosphorus removal mandated by the TMDL through our stormwater permit. We also have very little available land to build these practices in the small areas of the Town not already annexed by our neighboring cities and villages. At the same time, much greater pollutant contributors such as Agricultural facilities and Municipalities without stormwater permits will spend nothing. This is grossly inequitable in terms of reducing pollutant loading into Lake Winnebago since the money we spend will have no effect on the pollutant

reduction loading while money spent elsewhere would have a much greater effect. We feel this money is wasted and would prefer to use it in a beneficial manner on an achievable goal. (*Nahn and Associates on behalf of the Town of Oshkosh*)

*Response: Please see the TMDL requirements for permitted MS4s that can be found at: <https://dnr.wi.gov/topic/stormwater/municipal/> The permit outlines compliance options and goals. Compliance can occur over multiple permit terms and can include alternative compliance strategies such as water quality trading. Most of the mass reduction and associated costs for implementing the nonpoint reductions in the TMDL will be borne by the nonpoint sources and is not shifted to point sources; point sources do not need to fund nonpoint reductions unless a point source chooses to as part of an alternative compliance strategy such as adaptive management or water quality trading.*

20. The water quality standard used to develop the TMDL is 40 mg/l which is the same for all lakes in Wisconsin. Lake Winnebago should have a separate standard developed for an enlarged river system that flushes itself twice annually rather than an inland lake as it had always been green and subject to fish kills well before urbanization occurred. Zebra Mussels have been instrumental in cleaning up Lake Winnebago and are not accounted for in the TMDL. We respectfully request the TMDL be re-calculated with a revised standard and achievable goals based on the current state of Lake Winnebago. (*Nahn and Associates on behalf of the Town of Oshkosh*)

*Response: The P criterion for Lake Winnebago is 40 µg/L, which is the statewide criterion for all shallow lakes. Shallow lakes include drainage lakes and reservoirs with water residence times of at least 14 days, which clearly includes Lake Winnebago. Site-specific P criteria may be adopted where site-specific data and analysis using scientifically defensible methods and sound scientific rationale demonstrate a different criterion is protective of the designated use of the specific surface water segment or waterbody (NR 102.06(7)). Any party may propose a site-specific criterion, but it must satisfy these requirements. Zebra mussels are present in Lake Winnebago, and their effect on water quality was implicitly accounted for in the BATHTUB model.*

21. We do not believe the 40 micrograms per liter (µg/L) Lake Winnebago total phosphorus (TP) criterion is attainable based on the information presented in the modeling, sediment core analysis, draft TMDL report, and previous studies. Point sources like wastewater treatment plants (WWTPs) and municipal separate storm sewer systems (MS4s) represent a very small fraction of the current TP loading in these watersheds. The United States Geological Survey (USGS) pool lake modeling that indicates if all MS4s and WWTPs were eliminated, it would only reduce the TP concentration in Lake Winnebago from 0.096 to 0.093 (Appendix E of Draft TMDL Report). This reduction is so small that it is not reliably measurable. Based on these overarching issues, it is unreasonable to expect point sources to spend tens to hundreds of millions of dollars to make further TP load reductions until there is better assurance regarding criterion attainability and until significant strides are made with nonpoint source load reductions. If nonpoint sources load reductions are not completed on a similar schedule as the point sources, this TMDL will appear to be a failure in the eyes of the municipal

ratepayers, who will bear the majority of the implementation cost. (*Strand Associates on behalf of the City of Fond du Lac*)

*Response: The TMDL wasteload allocations are implemented through ch. NR 217, Wis. Admin. Code. In the absence of the TMDL, Fond du Lac would receive an even lower effluent limit of 40 µg/L. To meet requirements of the Clean Water Act, TMDL allocations must be set to meet promulgated water quality criteria. The suitability of 40 µg/L as the correct criterion for Lake Winnebago is addressed in other comments. To help address expectations, analysis using the Jensen model has been used to illustrate the length of time it will take for Lake Winnebago to respond to reductions in external loadings.*

22. Issues with Agency Responses: The United States Environmental Protection Agency (USEPA) and the Wisconsin Department of Natural Resources (WDNR) completed a responsiveness summary as Appendix L of the TMDL, and the WDNR submitted specific responses to the City as well. In general, the City found the responses disappointing because the responses mainly sought to explain why the agencies were disregarding the City's comments. For example, early on the City made suggestions about using a different allocation method based on cost-effectiveness that would be more equitable. WDNR disregarded this comment without fully evaluating the potential for this type of allocation method. (*Strand Associates on behalf of the City of Fond du Lac*)

*Response: Besides the difference of opinion regarding the allocation methodology, neither Strand Associates or the City of Fond du Lac have offered specific examples of disregarded comments. Regarding allocation methods based on costs, both sides of the argument can not be made that nonpoint reductions are too stringent making water quality trading too costly and that it is less expensive for nonpoint sources to be assigned more of the reductions.*

23. The following are several more examples of areas where the City disagrees with the agencies' responses: In Appendix L of Draft TMDL Report: The 20 µg/L TP concentration for reference streams is discussed as if it is an accepted value. The USGS report in Appendix E suggests it is close to a reference TP concentration for wadeable streams in central Wisconsin. It would be helpful to provide more information to support this value. The Upper Fox and Wolf watersheds are in a different subcoregion than the central Wisconsin area, and according to USEPA the 25th percentile TP concentration in the subject subcoregion is 80 µg/L, almost three times higher than the 25th percentile TP concentration in the central Wisconsin subcoregion (USEPA 822-B-00-018, 2000). This raises additional questions about the assumptions in the modeling and the attainability of the 40 µg/L pool lake criteria. (*Strand Associates on behalf of the City of Fond du Lac*)

*Response: The necessary information to support the 20 µg/L can be found in the referenced and peer reviewed paper "A Regional Classification Scheme for Estimating Reference Water Quality in Streams Using Land-Use-Adjusted Spatial Regression-Tree Analysis" dated February 2006. The paper details a new approach to establish reference conditions using physical characteristics that are not*



*impacted by human activities rather than ecoregion classifications that rely on land use, which is impacted by human activities.*

*In the new approach, land-use-adjusted water quality and environmental characteristics are computed for each site with a regression-tree analysis applied to the residualized data to determine the most statistically significant environmental characteristics describing a specific water-quality constituent, in this case phosphorus. This approach differs from a geographically dependent classification scheme, an example of which is Omernik's ecoregion scheme (Omernick, 1995) which has been used by US EPA (USEPA 1995) to guide the delineation of national nutrient ecoregions. This approach has several inherent problems as discussed in the paper:*

*“Although the boundaries between ecoregions are supposed to represent differences in a suite of related environmental variables (Omernik 1995), specific boundary lines are often based on differences in a single environmental factor, and that factor may not be the primary one affecting a specific water-quality constituent. Therefore, greater variations in water quality may occur within an individual ecoregion than between them. The environmental factors influencing the transport of one water-quality constituent may be quite different from those influencing another constituent. Second, in defining most ecoregions, the relative weighting of each environmental characteristic is not defined and can vary from boundary to boundary in an unknown way. Therefore, the differences in water quality among ecoregions are difficult to attribute to any specific environmental factor. Finally, for many applications, such as establishing reference conditions for nutrient criteria, the environmental characteristics used to delineate regions of similar water quality should be restricted to those that are intrinsic, or natural, and not those that result from human activities (USEPA 2000a).”*

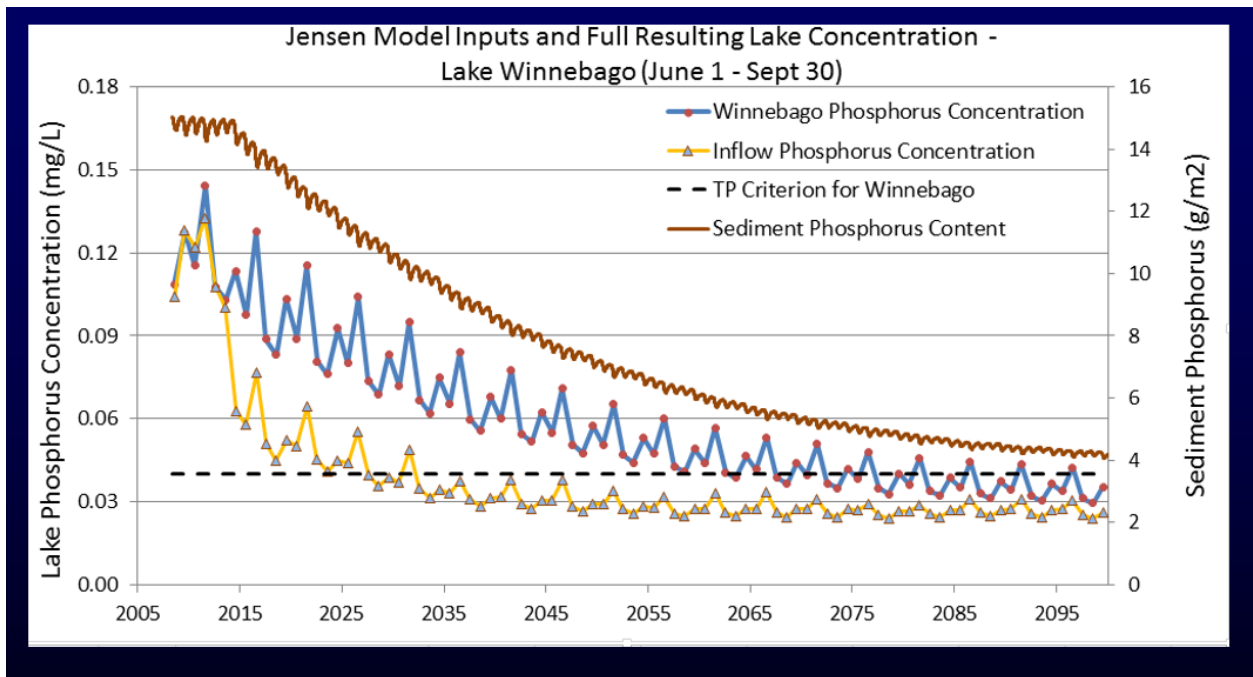
*To overcome these problems, the approach used in the paper defines constituent-specific zones with similar reference water quality (Robertson and Saad 2003) that could be achieved in the absence of anthropogenic sources, including land use modification.*

*Based on the results of the study, the ecoregions were redefined into reference environmental phosphorus zones (REPZs). The median reference concentrations for total phosphorus in the REPZs ranged from 12 to 23 µg/L. The standard errors of the reference concentrations of the REPZs range from 0.2 to 0.4 µg/L compared to the standard errors associated with those of the ecoregions which range from 0.2 to 5.3 µg/L.*

*The smaller geographic area of the REPZs, the small standard errors, and the supporting information provided in the paper should not raise additional questions regarding the use of 20 µg/L but rather provide reassurance that the analysis is sound and accurate.*

24. There are statements that the modeling shows that internal loading decreases by the same percentage as the decrease in external loading. However, it is our understanding that USGS made this simplifying assumption that internal loading decrease as the same rate as external loading as part of their modeling effort, rather than using modeling to predict the reduction in internal loading. This should be clarified. *(Strand Associates on behalf of the City of Fond du Lac)*

*Response: This is not a correct interpretation of the modeling. The figure below plots the results from the Jensen Model showing sediment concentration (internal loading) in brown, the external load or inflow load into Lake Winnebago in yellow, and the resulting lake concentration.*



The figure shows the reduction in the inflow load that occurs over a period of 20 years as a result of implementation of the allocations while the in-lake sediment concentration takes much longer to be reduced. This lag in the sediment loading is what feeds the internal loading and is responsible for the delayed response in ultimately reaching water quality criteria.

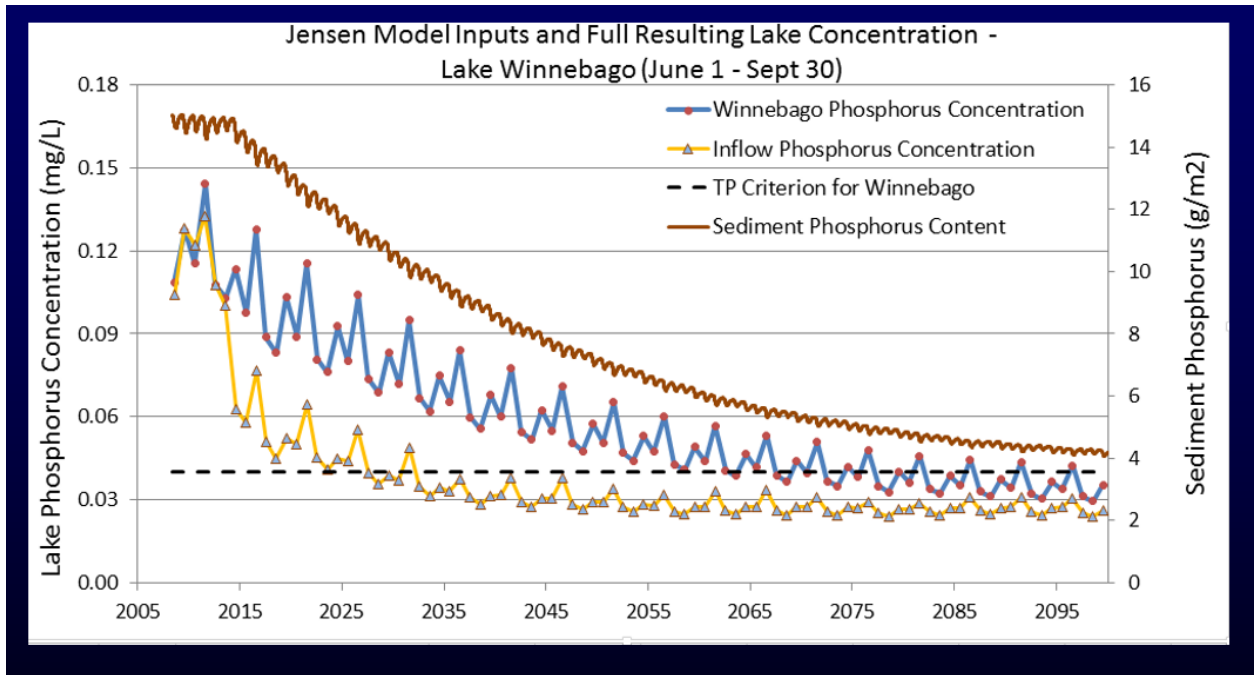
25. There are statements that the modeling shows that the 40 µg/L TP criteria will be met if TP loadings are reduced by the amount indicated. However, the model inputs are based on many assumptions, some of which may be off by a large percentage. Therefore, we do not believe it is appropriate for WDNR to state that the modeling provides evidence that the criteria are achievable. *(Strand Associates on behalf of the City of Fond du Lac)*

*Response: The department has stated that if the allocations and corresponding reductions are implemented, the resulting concentrations will meet both local water quality criteria in the stream*

and rivers but also in the Pool Lakes. The department used multiple lines of evidence to support the 40 µg/L TP criteria including calibrated and validated modeling at multiple scales. For example, SWAT modeling provided a summary of nonpoint loadings at the watershed scale which were translated into field scale targets. The feasibility of these field scale targets was checked using SnapPlus evaluating the types of management practices that need to be utilized to meet the edge of field phosphorus targets.

26. The TMDL notes that it may take more than 70 years to reach the TMDL targets. We understand from previous meetings that this timeline starts when the load reductions are met. Implementation will take decades. The agencies should make this clearer in the final TMDL in order to better manage the public’s expectations. (Strand Associates on behalf of the City of Fond du Lac)

Response: The figure below, which has been shared, provides an estimate on the response time. Additional language will be added to Section 5.1.3 of the TMDL report.



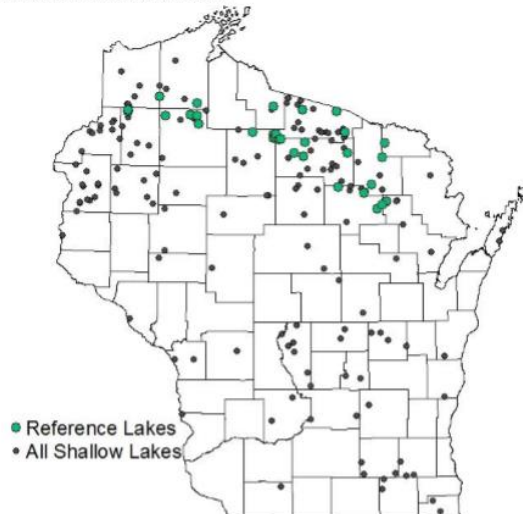
27. The agencies responded to comments related to attainability and the paleoecological study by applying a confidence interval to the results. The confidence interval was not presented in the paleoecological study report (Appendix F) and appears arbitrary and contrived to get the data to better fit the agencies’ conclusions. It seems just as reasonable to conclude that the historical TP was 50 µg/L or higher and that the TP can be 45 µg/L or higher and still meet chlorophyll (CHL) targets. (Strand Associates on behalf of the City of Fond du Lac)

*Response: The department did not arbitrarily create a confidence interval. Multiple lines have evidence have been used to establish that 40 µg/L is the appropriate target to meet the chlorophyll a target.*

28. Because of the attainability question, we continue to question the appropriateness of the 20 µg/L CHL target. The agencies responded that Wisconsin-specific shallow lake user data supports this target. This data should be presented. Data from shallow southern Wisconsin drainage lakes, preferably lakes from the same subcoregion, should be used. *(Strand Associates on behalf of the City of Fond du Lac)*

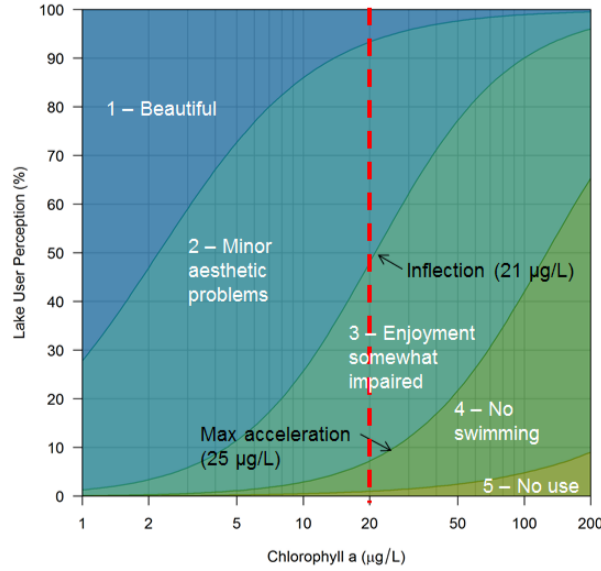
*Response: The Technical Support Documentation for Rule Package WY-23-13 provides supporting information for the 20 µg/L CHL target which is currently being proposed as rule through the above referenced rule package. Only lakes with at least six chlorophyll a and six phosphorus samples were used in the analysis. Below is a figure showing Wisconsin lakes with sufficient data to establish chlorophyll a and a total phosphorus relationship (page 23 of the TSD for Rule Package WY-23-13).*

**Figure 8. Locations of reference and all other shallow lakes with at least 6 chlorophyll a and 6 total phosphorus samples from the deepest station.**



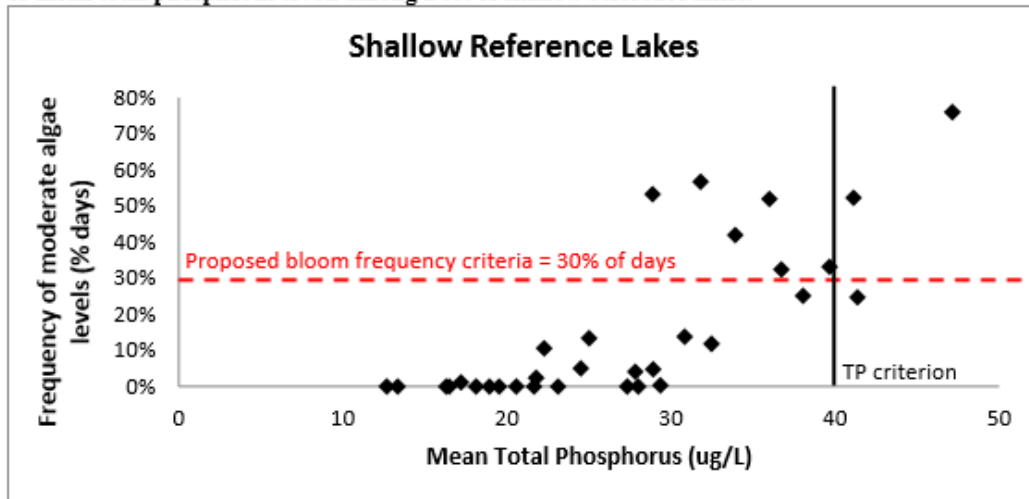
*Data to arrive at the chlorophyll a threshold relied on data from user perceptions of Wisconsin Lakes. A summary graph (page 17 of the TSD for Rule Package WY-23-13) can be found below:*

Figure 3. Plot of fitted relationships between chlorophyll *a* concentration and Wisconsin lake user perception of water quality.



The proposed recreational use criterion for shallow lakes is that shallow lakes shall not experience moderate algae levels (20 µg/L chlorophyll *a*) more than 30% of days during the summer sampling season. This criterion was determined by calculating the 75th percentile of moderate algal frequency in all shallow reference lakes, which was 27%. Stated differently, 75% of shallow reference lakes have moderate algae levels less than 27% of the time. Given the uncertainty in selecting reference lakes, we rounded up to 30% for the shallow lake criterion as shown in the figure below (page 25 of the TSD for Rule Package WY-23-13):

Figure 9. Statistically calculated frequency of summer moderate algae levels (chlorophyll *a* > 20 ug/L) in relation to mean total phosphorus levels among a set of shallow reference lakes.



29. Wisconsin Admin Code § NR 217.16 allows TMDL-based limits to be used in Wisconsin Pollutant Discharge Elimination System (WPDES) permits for two or possibly three permit terms if nonpoint source loads have been substantially reduced. NR 212.76, on the other hand, simply says TMDL-based water quality based effluent limits (WQBELs) may be included in permits in lieu of or in addition to other WQBELs. The WDNR should provide assurances that further reduction will not be demanded of point sources if the nonpoint source reductions are not met within the next 20 years. *(Strand Associates on behalf of the City of Fond du Lac)*

NR 217 indicates that TMDL-based limits can be used in WPDES permits for two or three permit terms if nonpoint source loads have been substantially reduced. How does the DNR anticipate that the high nonpoint source reduction identified are realized? Can the DNR provide assurances to point sources that further reduction will not be demanded of point sources if the nonpoint source reduction is not met in the 20-year planning period used by most POTWs? *(Wolf Treatment Plant, Shawano Lake Sanitary District, City of Shawano, Village of Bonduel, Village of Cecil, and Richmond Sanitary District)*

*Response: Chapter NR 217.16(2), WI Admin. Code does have language which indicates that the department may issue a more stringent limit calculated under NR 217.13 if nonpoint loads have not been substantially reduced. For the Upper Fox TMDL, it is highly unlikely that this will occur given the TMDL provides a more comprehensive analysis than used in the calculation of NR 217.13 derived limits; however, any assurances provided in the TMDL report cannot supersede administrative code. Fond du Lac, unlike many of the other point sources, received relief to its NR 217.13 derived effluent limit which, because Fond du Lac discharges directly to Lake Winnebago which is listed as impaired, was set to water quality criteria. However, the TMDL analysis has provided appropriate allocations to meet water quality standards and additional reductions to point sources beyond what is stipulated in the TMDL, without significant nonpoint reductions, will not provide the necessary reductions to achieve water quality standards.*

30. The City's wastewater treatment and resource recovery facility (WTRRF) is faced with multi-million-dollar compliance costs associated with phosphorus compliance, even with the higher TMDL-based limit. The City is already expending millions of dollars on sidestream treatment and biological phosphorus removal improvements to meet interim phosphorus limits, in addition to approximately \$250,000 a year in multidischarger variance (MDV) payments to counties. The City appreciates that the MDV is available because we see it as a way to reduce overall compliance costs while making phosphorus and TSS load reductions throughout the watershed. However, the MDV is only authorized for approximately eight more years and its future reauthorization is uncertain. Because of the potential for watershed improvements and reduced WWTP compliance costs, the City encourages the WDNR to make the MDV a more permanent option with less stringent economic criteria. *(Strand Associates on behalf of the City of Fond du Lac)*

*Response: Federal requirements are what limits the MDV to ten years at a time. This comment has been forwarded to USEPA and the department's permit program for their consideration.*



31. The City appreciates that the agencies included adaptive management (AM) targets in the TMDL; however, we believe there is an error in AM target calculations. The City's AM target should not be lower than 40 µg/L because the City discharges directly to Lake Winnebago. Table 1 in Appendix K lists the City's AM target as 32 µg/L, 20 percent lower than the lake criterion. If the modeling was used to set these targets, then it calls the model validity into question. The City requests that the agencies check the models and the calculations to be sure there are not too many conservative assumptions. We request the City's AM target be changed to 40 µg/L with the understanding that this would be measured as an in-lake summer mean concentration. *(Strand Associates on behalf of the City of Fond du Lac)*

Table 1 also indicates that the City WTRRF has a TP wasteload allocation of 5,763 pounds per year (lbs/yr) and a "Local Wasteload Allocation" of 33,815 lbs/yr. The City WTRRF discharges directly to Lake Winnebago. The City requests that the agencies explain why the City WTRRF TP wasteload allocation differs from the "Local Wasteload Allocation", and how downstream credits could apply to a discharger in TMDL subbasin 75 (Lake Winnebago). *(Strand Associates on behalf of the City of Fond du Lac)*

*Response: For the purpose of adaptive management compliance and water quality trading, the TMDL placed the discharge compliance point for the City of Fond du Lac and Saputo Cheese at the mouth of the Fond du Lac River instead of Lake Winnebago. This adjustment in the adaptive management and water quality trading compliance point accounts for the breakout between local wasteload allocation and downstream wasteload allocation found in Table 1 of Appendix K. The target of 32 µg/L reflects the target necessary for the mouth of the Fond du Lac River, expressed as the median of monthly samples collected between May and October. Note this is consistent with the adaptive management target at the mouth of the Oshkosh River which is listed as 27 µg/L, also expressed as the median of monthly samples collected between May and October.*

*If the adaptive management target is shifted back to Lake Winnebago, the 40 µg/L, expressed as a summer mean concentration, becomes the adaptive management target concentration; however, this may effectively eliminate adaptive management as a compliance option for the City of Fond du Lac since the Fond du Lac will be required to develop an adaptive management plan that can bring Lake Winnebago into compliance with water quality standards within the 20 year adaptive management time period.*

*In other comments such as 32 and 33, Fond du Lac requested flexibility regarding implementation of their reductions. The approach laid out in Appendix K provides such flexibility. Note that Appendix K, while part of the TMDL submittal package, is not subject to approval in US EPA's decision document.*

32. The City is interested in the concept of water quality trading (WQT) and believes it has the potential to result in observable water quality improvements. However, using current Wisconsin WQT guidance, this TMDL will result in a credit threshold so low that long-term credits will be essentially

impossible to obtain. The administrative and construction costs associated with interim credits make WQT a much less viable option. *(Strand Associates on behalf of the City of Fond du Lac)*

*Response: The credit threshold is set based on the load allocation and the reductions needed to meet the load allocation. SnapPlus modeling has indicated that long-term credits can be attained through whole field management and filter strips (buffers) or perennial covers. This comment also reinforces that shifting additional reductions to agricultural are challenging.*

*Through upcoming proposed modifications to the water quality trading guidance, the department, in consultation with USEPA, is evaluating methods that could make the credit threshold easier to achieve and potentially lengthen the duration of interim credits.*

33. The agencies should understand that by making these watershed compliance options so limited, difficult, and costly, there will be less reduction of phosphorus and TSS loadings throughout the watershed and less water quality improvement overall. *(Strand Associates on behalf of the City of Fond du Lac)*

*Response: The department has added increased flexibility for the watershed adaptive management compliance option by setting target concentrations for each watershed allowing permittees to have smaller and more manageable adaptive management project areas. See comment 31 which reflects directly on Fond du Lac and argues against increased flexibility, counter to this comment.*

34. The City believes the agencies can find a way to phase, stage, or adaptively implement this TMDL and make it more equitable for point source rate payers, who are the smallest sources of TP loading in the watersheds. If the agencies do not believe higher interim wasteload allocations will be acceptable or approvable, then a different allocation method based on cost-effectiveness in lieu of proportional contribution could be used. For example, there are USEPA-approved nutrient TMDLs in Minnesota that do not require any additional load reductions from WWTPs, and instead focus on nonpoint source load reductions, where compliance costs are lower and water quality improvements can be made throughout the watershed, rather than only at the end of an outfall pipe. A phased TMDL would allow more time for additional study and monitoring to help answer stakeholder questions about attainability and appropriate targets. *(Strand Associates on behalf of the City of Fond du Lac)*

The phosphorus load from individual permits in the Wolf River watershed is less than the load from background sources and 1/6 of the load from agricultural sources yet almost all of the financial burden for load reductions will be borne by POTWs such as the Wolf Treatment Plant. We request an implementation approach that requires stepwise point source reductions that are matched by nonpoint source reductions, especially for POTWs that are discharging to streams that are not impaired. *(Wolf Treatment Plant, Shawano Lake Sanitary District, City of Shawano, Village of Bonduel, Village of Cecil, and Richmond Sanitary District)*

*Response: The department had conversations with Minnesota TMDL staff and the characterization provided in the comment above does not reflect the situation in the Upper Fox-Wolf TMDL in which significant reductions are needed and have been already assigned to nonpoint sources. In Minnesota, a couple TMDLs needed relatively minor overall reductions and with point sources already treating their effluent, modest reductions were placed on the nonpoint sources to meet the needed allocations. Minnesota also acknowledged that phasing of the TMDL wasteload allocations is limited in the Clean Water Act because once a TMDL is approved, the wasteload allocation must appear in the next permit reissuance. In Wisconsin, additional requirements beyond those allowed under the Clean Water Act can be found in ch. NR 217, Wis. Admin. Code which requires the placement of wasteload allocations into permits and allows for compliance periods.*

*Alternative compliance strategies such as adaptive management and water quality trading may provide more cost-effective compliance options and can also afford point sources extended compliance periods.*

35. The agencies added a total suspended solids (TSS) target of 12 milligrams per liter (mg/L) to the most recent draft TMDL. We understand the 12 mg/L TSS value is a target meant to support narrative criteria and it is not a numeric criterion. Nevertheless, we have had only a short time to review this change in the TMDL and are concerned about the potential implications of this target. The 12 mg/L target was not developed through a rulemaking process, and it was not publicly vetted in these TMDL watersheds. The City, therefore, requests additional explanation from the agencies regarding the development of the TSS target and reserves the right to review and comment on this target in the future, particularly if it impacts the City's wasteload allocations or WPDES permits for the WTRRF or MS4. *(Strand Associates on behalf of the City of Fond du Lac)*

*Response: The target of 12 mg/L TSS was initially presented in October 2014 (see table below) as part of the material that was made available for review on the website. The target was also discussed during the TMDL development and allocation process. Additional details were added to section 2.5.2 of the Public Hearing Draft of the TMDL report; however, earlier presentations and allocations referred to and utilized the 12 mg/L TSS target. A detailed explanation of the development of the 12 mg/L target can be found in section 2.5.2 of the Public Hearing Draft of the TMDL report. The report, section 2.5.2 also provides a reference to the Milwaukee River Basin TMDL Report ("Total Maximum Daily Loads for Total Phosphorus, Total Suspended Solids, and Fecal Coliform Milwaukee River Basin, Wisconsin", March 19, 2018) which utilized the identical approach to arrive at a TSS target. The text from the Milwaukee TMDL report, section 3.2.2, is included below to provide additional information:*

*There are currently no numeric criteria for TSS in Wisconsin; however, there are narrative criteria in s. NR 102.04, Wis. Adm. Code, which can be applied to TSS as described above. Because a numeric target is needed for TMDL analysis, one was developed for this study area. Although USEPA has not published guidance on setting water quality criteria for TSS in flowing streams and rivers, USEPA's Science Advisory Board guidance for nutrient criteria provides a framework that can be applied to TSS. That guidance emphasizes use of multiple lines of evidence, relating concentrations to biotic impacts, using strong and supportable*

correlations between causal and response parameters. A target concentration of 12 mg/L TSS was derived by WDNR for use in this TMDL to address the sediment impacts, based on the same approach and data used to develop Wisconsin's phosphorus criteria. This numeric target is intended to meet the narrative criteria in s. NR 102.04, Wis. Adm. Code.

U.S. Geological Survey Professional Paper 1754, *Nutrient Concentrations and Their Relations to the Biotic Integrity of Nonwadeable Rivers in Wisconsin* by Dale M. Robertson, Brian M. Weigel, and David J. Graczyk (USGS, 2008) provides data and statistical results that allow identification of TSS targets, as supplemented by unpublished analysis by Dale Robertson. On Tables 11 and 15 of the paper, a strong correlation, based on the Spearman rank correlation coefficients, was noted for a number of indices, including macroinvertebrate species, % of individuals from the order Ephemeroptera, Mean Pollution Tolerance Value, Hilsenhoff Biotic Index, % intolerant fish species, % lithophillic spawners, % suckers, and fish index of biotic integrity. Subsequent breakpoint analysis by Dale Robertson preliminarily showed a weighted breakpoint of between 10 and 15 mg/L.

The TSS target based on Wisconsin non-wadeable streams and river data is preferred over earlier and broader analyses for a variety of reasons, including:

- All data was collected using a defined protocol and during the same year, while other studies are based on available data collected using a variety of protocols over a number of years.
- All of the 42 non-wadeable rivers and streams are of similar size, stream order, etc., while other studies used a wide range of streams and rivers.
- Correlation to biotic impacts is considered as a stronger and more appropriate basis than a calculated pre-settlement reference condition.

Based on weighting strategies similar to what was used in the development of the phosphorus criteria, WDNR arrived at a TSS target value of 12 mg/L, expressed as the median of monthly samples collected during the growing season between May and October. The expression of the TSS target matches how the samples were collected and are intended to be used.

The 12 mg/L target is designed to address both sedimentation and impacts caused by TSS that remains in the water column. In translating the 12 mg/L target, it is important to note that it will be expressed as a monthly median concentration meaning higher than 12 mg/L may occur at times in the receiving waters.

Since standard wastewater treatment processes such as grit removal and primary and secondary clarification, which are necessary to reduce wastewater TSS levels to 12 mg/L, will have removed settleable material that would contribute to sedimentation, wastewater discharges at or below 12 mg/L will not contribute to sediment impairments. Contributions to turbidity, a condition that is related to concentration and not mass, would also be absent at 12 mg/L effluent concentrations. Therefore, wastewater dischargers will not be required

to meet effluent limits lower than 12 mg/L (including equivalent mass limits) in order to comply with the water quality targets developed for this TMDL.

Upper Fox River and Wolf River Basin TMDLs  
List of Impaired Waters and Numeric Targets

October 2014

Official Name	County	Impairment(s) Addressed in TMDL	Pollutant Addressed to TMDL	Numeric Target (mg/L)	Modeling/TMDL Approach
Anderson Creek	Fond du Lac	Degraded Habitat	Total Suspended Solids	12	SWAT
Bear Creek	Outagamie	Water Quality Use Restrictions	Total Phosphorus	0.075	SWAT
Bear Creek	Outagamie	Degraded Habitat	Total Suspended Solids	12	SWAT
Big Twin Lake	Green Lake	Excess Algal Growth	Total Phosphorus	0.03	WLMS
Black Otter Lake	Outagamie	Unknown	Total Phosphorus	0.04	WLMS
Campground Creek	Fond du Lac	Low dissolved oxygen (DO), Degraded Habitat	Total Suspended Solids	12	SWAT
Carpenter Creek	Waushara	Degraded Habitat	Total Suspended Solids	12	SWAT
Collins Lake	Portage	Excess Algal Growth	Total Phosphorus	0.02	WLMS
Crane Lake	Forest	Excess Algal Growth	Total Phosphorus	0.04	WLMS
De Neveu Creek	Fond du Lac	Degraded Habitat	Total Suspended Solids	12	SWAT
E Trib. to Parsons Creek	Fond du Lac	Degraded Habitat	Total Suspended Solids	12	SWAT
E. Branch Fond du Lac River	Fond du Lac	Water Quality Use Restrictions	Total Phosphorus	0.075	SWAT
Fond Du Lac River	Fond du Lac	Water Quality Use Restrictions	Total Phosphorus	0.075	SWAT
Grand River	Green Lake, Marquette	Water Quality Use Restrictions	Total Phosphorus	0.075	SWAT
Green Lake	Green Lake	Water Quality Use Restrictions	Total Phosphorus	0.015	WLMS
Harrington Creek	Green Lake	Degraded Habitat	Total Suspended Solids	12	SWAT
Hill Creek	Green Lake	Degraded Habitat	Total Suspended Solids	12	SWAT
Lake Butte des Morts	Winnebago	Low DO, Eutrophication	Total Phosphorus	0.04	BATHLUS (by USGS)
Lake Butte des Morts	Winnebago	Eutrophication	Total Suspended Solids	NA	Moving to II Category 4A
Lake Emily	Dodge	Excess Algal Growth	Total Phosphorus	0.04	WLMS
Lake Poygan	Winnebago, Waushara	Water Quality Use Restrictions, Excess Algal Growth	Total Phosphorus	0.04	BATHLUS (by USGS)
Lake Poygan	Winnebago, Waushara	Degraded Habitat, Turbidity	Total Suspended Solids	NA	Moving to II Category 4A
Lake Winnebago	Fond du Lac, Winnebago, Calumet	Turbidity	Total Suspended Solids	NA	Moving to II Category 4A
Lake Winnebago	Fond du Lac, Winnebago, Calumet	Low DO, Eutrophication, Water Quality Use Restrictions, Excess Algal Growth	Total Phosphorus	0.04	BATHLUS (by USGS)
Lake Winneconne	Winnebago	Degraded Habitat	Total Suspended Solids	NA	Moving to II Category 4A
Lake Winneconne	Winnebago	Excess Algal Growth	Total Phosphorus	0.04	BATHLUS (by USGS)
Little Green Lake	Green Lake	Low DO, Eutrophication, Degraded Habitat, Water Quality Use Restrictions	Total Phosphorus	0.04	WLMS
Schoenick Creek	Shawano	Water Quality Use Restrictions	Total Phosphorus	0.075	SWAT
Unnamed Trib (West)	Shawano	Water Quality Use Restrictions	Total Phosphorus	0.075	SWAT
Unnamed Trib (East)	Shawano	Water Quality Use Restrictions	Total Phosphorus	0.075	SWAT
Long Lake	Shawano	Excess Algal Growth	Total Phosphorus	0.03	WLMS
Mason Lake	Adams, Marquette	Excess Algal Growth	Total Phosphorus	0.04	WLMS
Mosher Creek	Fond du Lac	Degraded Habitat	Total Suspended Solids	12	SWAT
Old Taylor Lake	Waupaca	Water Quality Use Restrictions	Total Phosphorus	0.02	WLMS

Identical text to the Milwaukee TMDL will also be added to the Upper Fox TMDL, section 6.4.1, regarding implementation of TSS allocations in wastewater permits to ensure facilities will not be required to reduce TSS concentrations below 12 mg/L.

“Since standard wastewater treatment processes such as grit removal and primary and secondary clarification, which are necessary to reduce wastewater TSS levels to 12 mg/L, will have removed settable material that would contribute to sedimentation, wastewater discharges at or below 12 mg/L will not contribute to sediment impairments. Contributions to turbidity, a condition that is related to concentration and not mass, would also be absent at 12 mg/L effluent concentrations. Therefore, wastewater dischargers will not be required to meet effluent limits lower than 12 mg/L (including equivalent mass limits) in order to comply with the water quality targets developed for this TMDL.”

36. On the cover page: Green County is listed instead of Green Lake County. (Green Lake County LCD)

Response: Cover corrected.

37. Page 61: On the List of permitted CAFOs in the Upper Fox-Wolf Basins, MAM Farms is omitted. (Green Lake County LCD)

*Response: The CAFO coverage has been updated to reflect current permits.*

38. Page 62: Pride View Dairy LLC and MAM Farms are both omitted from the map. I also see that some other CAFOs along the border of the watershed are included...you could our other CAFO, Hilltop Dairy, which is in the Rock River Watershed. (Green Lake County LCD)

*Response: The map has been updated to reflect current permits.*

39. As discussed above, the DNR is proposing to require reductions that will bring the Lake Winnebago TP concentration to below the presettlement "background" conditions yet the TMDL states that background loads are not controllable and no reductions in background sources are possible. How can the loads to Lake Winnebago be reduced to below presettlement "background" conditions if background loads cannot be reduced? It appears that this suggests that converting forests and wetlands to urban areas and treating the stormwater and wastewater from these areas would reduce loads from "background" sources. (Wolf Treatment Plant, Shawano Lake Sanitary District, City of Shawano, Village of Bonduel, Village of Cecil, and Richmond Sanitary District)

*Response: The TMDL allocations are not set to bring loads entering Lake Winnebago to below background concentrations or pre-settlement conditions but rather they are set to meet the applicable water quality standards of 40 µg/L. The TMDL does not require reductions to background sources; however, through water quality trading or adaptive management, reductions can be implemented on forested areas or sources considered background that may have active erosion such as gullies or stream bank erosion. Keeping areas currently in wetland, forest, or undeveloped is beneficial to water quality; developing these areas, even with post-construction management practices, will not further reduce pollutant loads and in many cases may increase the overall pollutant load.*

40. Based on the relatively small TP loading from point sources, further reductions from these sources without nonpoint source reductions will not result in significant water quality improvement. We request that the DNR quantify the impact on water quality from the proposed point source reductions without nonpoint source reductions. (Wolf Treatment Plant, Shawano Lake Sanitary District, City of Shawano, Village of Bonduel, Village of Cecil, and Richmond Sanitary District)

*Response: When setting the allocations, the department looked at a 10-year representative period and looked at critical periods with those records. While on an average annual basis, there may be more phosphorus for nonpoint sources when looked at during critical periods such as summer, the point sources can become a significant source. Agricultural nonpoint sources have pollutant loads that tend to be episodic with only a few runoff events a year accounting for most of the pollutant load while point sources tend to have a smaller but continuous discharge that can become significant at lower flows or during summer periods.*

41. The recently published Adaptive Management (AM) target in-stream phosphorus concentration of 29 ug/L for the Wolf Treatment Plant is a very low and likely not attainable. Use of this target



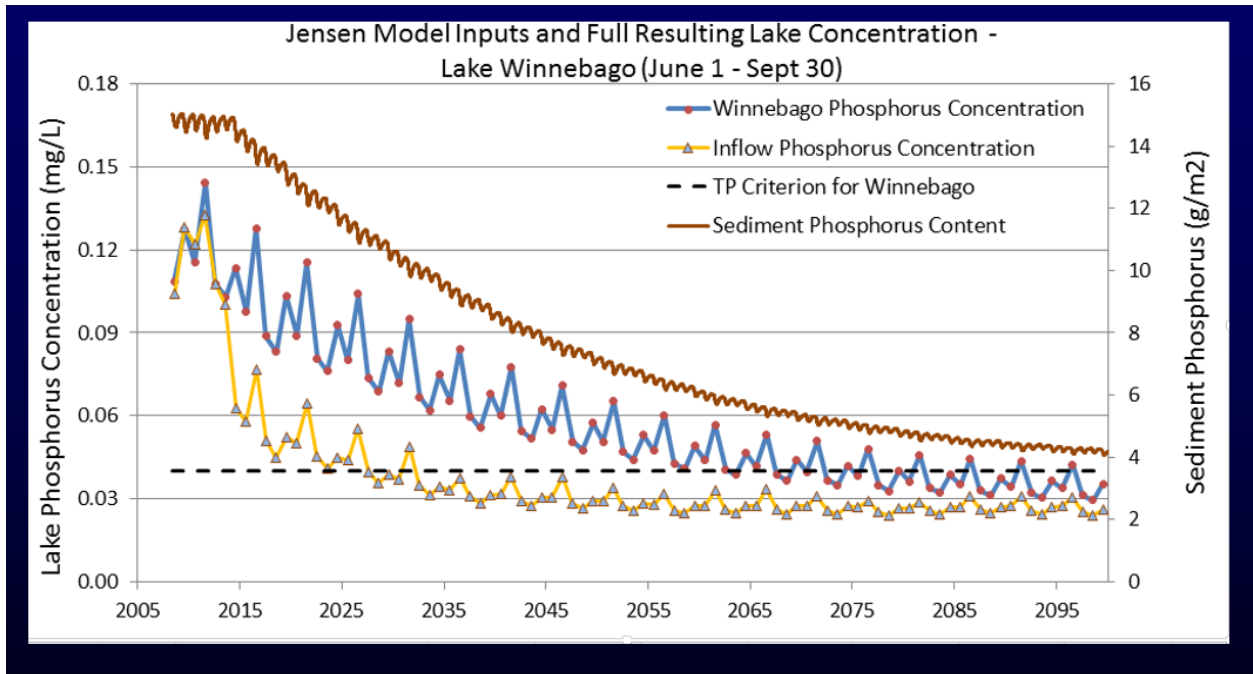
phosphorus concentration will reduce the likelihood that AM could be successfully implemented and as a result it reduces the compliance options available to the Wolf Treatment Plant. (*Wolf Treatment Plant, Shawano Lake Sanitary District, City of Shawano, Village of Bonduel, Village of Cecil, and Richmond Sanitary District*)

*Response: The adaptive management targets contained in Appendix K accounts for water quality requirements for downstream waterbodies; generally, Lake Winnebago. This shifts the adaptive management compliance point from the downstream waterbody, Lake Winnebago, to the local watershed allowing the Wolf Treatment plant to work in a smaller geographic area and local to their facility instead of having an adaptive management plan that is responsible for addressing the entire Lake Winnebago drainage basin.*

*The 29 µg/L water quality target is lower than the 75 µg/L for streams but represents the concentration needed to meet water quality criteria for downstream waterbodies. Please note that the 29 µg/L represents an instream target expressed as the median of monthly samples collected between May and October. These water quality targets can appear lower than the numeric lake and reservoir phosphorus criteria, i.e. 40 µg/L for Lake Winnebago, because the reservoir and lake criteria is expressed as a mean of summer monthly samples while the stream targets are expressed as the median of monthly samples collected between May and October.*

42. The TMDL notes that it may take more than 70 years to reach the TMDL targets. It appears that this assumes that all necessary reductions occur immediately. Please clarify the assumptions that are included in this estimate as we are unaware of any requirements that would hold agriculture and other larger contributors accountable for their share of necessary reductions. Please provide a realistic timeline considering required compliance of all point and non-point sources. (*Wolf Treatment Plant, Shawano Lake Sanitary District, City of Shawano, Village of Bonduel, Village of Cecil, and Richmond Sanitary District*)

*Response: The TMDL did look at the response time for Lake Winnebago and the Pool Lakes to reach water quality standards. The response time in Lake Winnebago is shown below and reflects implementation of TMDL reductions during the first 10 years as shown by the inflow phosphorus concentration line. The inflow concentration line is not linear but rather reflects variability in average annual loadings due to annual variability in weather and precipitation. The response in Lake Winnebago is not linear but rather shows a faster response followed by a longer tail to reach water quality standards; however, with the allocated reduction, a significant improvement in water quality can be observed in the first 40 to 50 years.*



*Compliance timelines for point sources vary but typically can extend to 10 or 20 years; however, most alternative compliance strategies require some sort of interim progress during that period. Reductions for permitted urban stormwater also has extended compliance schedules to allow for pollutant reduction measures to be installed as infrastructure is replaced and allow for re-development to take place. For reductions in nonpoint agricultural loads, many practices such as changes in tillage and soil health initiatives it can take a couple rotations for the nonpoint practices to have their full beneficial impact. Other practices such as cover crops, grassed waterways, and buffers may take longer to implement depending on producer acceptance of such practices and potential availability of cost share resources. In most cases, farmer led organizations are shortening the timeframe to adopt management practices as producers learn from each other, share their experiences, and are presented with the latest research from counties, crop consultants, and UW-Extension.*

43. During the Public Hearing on December 15th, 2018, it was stated that a 73% reduction in phosphorus loadings from all sources in the Fox / Wolf River watershed basin over the course of 75 years will bring the total phosphorus concentration down to 0.040 mg/L in Lake Winnebago and the pool lakes. Using Figure 15 on page 69 in the Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids - Upper Fox and Wolf Basins - Public Hearing Draft, November 30th 2018, only 11% of the total phosphorus loading from the Wolf River basin is from wastewater treatment facilities. A 73% reduction from wastewater treatment facilities would result in 8% removal of the total phosphorus loading. This still leaves 66% of the total phosphorus loadings coming from non-point agricultural contributors. If it is known that two thirds of total phosphorus is coming from

these areas, shouldn't this be the main focus of the TMDL? Other than Concentrated Animal Feed Operations (CAFO), the proposed TMDL outlines reductions in other agricultural activities but appear to only be recommendations of best management practices and not limits for the property owners in which the pollution comes from. Whenever we request fields for sludge application, the DNR provides maps with setbacks and other information in a matter of hours. With today's GIS programs and other technology why isn't the DNR, counties or townships pinpointing and enforcing problem areas in their portion of the watershed? (*New London Wastewater Treatment Facility*)

*Response: Federal rules prevent TMDL from creating new rules; rather, TMDLs utilize existing rules for implementation. Wastewater sources, which are assigned wasteload allocations, are implemented through NR 217, Wis. Admin. Code and the permit program. Nonpoint sources, which are assigned load allocations, are subject to the performance standards contained in NR 151, Wis. Admin. Code. NR 151 also allows for the promulgation of more stringent agricultural performance standards. Appendix J includes a breakdown of the load allocation, expressed as an edge of field targets, consistent with nutrient management modeling techniques, to facilitate implementation of non-point reductions. In addition, the department has developed GIS based tools such as EVAAL (<https://dnr.wi.gov/topic/Nonpoint/evaal.html>) to assist in targeting fields that may be vulnerable to gully formation, erosion, and pollutant runoff.*

*Implementation of nonpoint source reductions involves both federal, state, and local agencies. While the department does have some resources, the biggest sources of funding and assistance for implementation of agricultural reductions comes from NRCS, DATCP, and the county LCD offices.*

44. Section 7.3.10 and 7.3.11 on page 101 of the draft TMDL outline options to which municipalities can pay for and manage the non-point sources in their vicinity to reduce the burden of their permit level. Due to the lower Median Household Income for the City of New London it would be irresponsible to require rate payers to pay more for sewerage services that are not utilized in the community. New London does not have the manpower to implement, oversee and enforce best management practices for farms in the same watershed as the City. If New London were to undertake land management of a farm that does not utilize a nutrient management program, there is no guarantee that the City will receive long term credits for total phosphorus during the course of a 5 year permit. This is especially true if the river or tributary has many farms where no nutrient management program is followed, and nutrient pollution is significant.

The economic impact on the rate payers for having to refurbish the treatment facility to meet lower limits on total phosphorus will total roughly four to five million dollars. This would be an additional \$5.00 - \$7.00 per thousand gallons of water used. A large percentage of our community is already struggling to pay their utility bills. As stated in Section 7.3 on page 105 of the proposed TMDL, there are many avenues in which non-point dischargers can get economic assistance without relying on funding from treatment facilities. These agriculturally based programs would have better phosphorus reduction results per dollar spent than improvements at the treatment facility.

The proposed TMDL could eliminate much needed revenue for the City. Future growth in New London's industrial parks could be stifled if corporations have to pay higher sewerage costs or limit their ability to discharge due to phosphorus loading caps. This exacerbates the Median Household Income issue stated earlier where good paying jobs would not come to the area. (*New London Wastewater Treatment Facility*)

*Response: Alternative compliance strategies such as water quality trading and adaptive management are available to point sources to provide potentially more economical alternatives to facility upgrades. In some cases, a combination of optimization and an alternative compliance option may provide the most economically feasible option. In addition, variance options such as an individual variance and the multi-discharger variance are available to facilities that qualify based economic considerations. Please refer to the department's website for more information on variance programs; individual variance ( <https://dnr.wi.gov/topic/Wastewater/Variations.html> ) or the MDV ( <https://dnr.wi.gov/topic/surfacewater/phosphorus/variance/> ).*

45. In the past the New London Wastewater Treatment Facility has been proactive in taking in contaminated water from environmental issues. In 2017 a farmer spread manure on a field with a significant slope during the winter. A January thaw caused snow to melt and liquid manure flowed into a tributary and up to wells at neighboring houses. We took in thousands of gallons free of charge to help out. After the Blizzard of 2018 we took in almost 4,000,000 gallons of pond waste from a local food processor to prevent them from discharging untreated waste into a river. Does the DNR have a plan to forgive treatment facilities if they violate the permit while rendering aid during an environmental crisis? If not, the proposed TMDL could be restrictive to the point we would have to deny aid rather than pay fines for being a Good Samaritan. (*New London Wastewater Treatment Facility*)

*Response: The department encourages and appreciates the actions outlined above. Note, permit limits are always enforced, with or without the TMDL, and violations to a permit are considered as such regardless of the reason; however, the department does have enforcement discretion and individual situations are considered when working with permittees that have experienced a permit violation.*

46. Lastly a question on how penalties are quantified. The 2022 WPDES Permit will surely outline the penalties regarding excessive discharge for New London's outfall but there is some confusion as to how the Department will determine a violation. In the current monthly Discharge Monitoring Report (DMR) forms there are columns for Daily Maximum, Daily Minimum, Weekly Averages and Monthly Averages. According to Appendix H Total Phosphorus Allocation Table 3, New London will be allocated 2.8 pounds of total phosphorus per day or 1,038 pounds per year. What parameter will the violation be determined? Daily, Monthly or Annual? In 2017 the New London Wastewater Treatment Facility had effluent phosphorus discharges where some months the daily average and monthly average for pounds generated exceeded 2.8 pounds per day. The pounds of phosphorus charged on the NR101 Wastewater Fee for 2017 was 941.3 pounds for the year. This is 96.7 pounds

less than what the proposed allocation is. Would any violations be levied against the Facility? (*New London Wastewater Treatment Facility*)

*Response: Total phosphorus (TP) water quality based effluent limits (WQBELs) for point sources covered by the UFW TMDL will be derived in a similar manner as described in TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs, Edition No. 3 (November 2013; <http://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=86221960>) for discharges in the Lower Fox River TMDL. That is, TP mass limits are expressed as a monthly average when wasteload allocations (WLAs) equate to a TP effluent concentration greater than 0.3 mg/L, and as a six-month average and monthly average equal to 3 times the six-month average mass limit when WLAs equate to a TP effluent concentration equal to or less than 0.3 mg/L.*

*Once the calculated monthly average, or 6-month average and monthly average, limits become effective in the permit, the permittee is required to comply with those limits. Any exceedances of those effluent limits will be permit violations. The monthly average and 6-month average WQBELs are derived from the annual WLAs in the TMDL, but the annual and daily WLAs themselves are not effluent limits and are not used to determine permit violations.*

47. TMDL allocations for POTWs and MS4s as well as the DNR guidance documents for implementing MS4 TMDL allocations are rules within the meaning of Wis. Stat. § 227.01(13) that require DNR to go through the formal rulemaking process. Though DNR has express authority to include TMDLs in WPDES permits, the TMDL allocations for the Upper Fox/Lake Winnebago watershed as well as the DNR TMDL guidance used to implement TMDL allocations to MS4's for P and TSS in the Upper Fox/Wolf River/Lake Winnebago watershed are void because of DNR's failure to follow the rulemaking procedures in Wis. Stat. Chap. 227. A TMDL meets the plain meaning of the definition of "rule" under Wisconsin law because TMDLs are standards that are generally applicable, have the effect of law, and are issued by the DNR to interpret the Clean Water Act and Wisconsin law. TMDLs are not subject to the exclusion contained in Wis. Stat. § 227.10(zp) because the program it refers to (i.e., the nonpoint source water pollution abatement program) is separate from the development of TMDLs for impaired waters. In the absence of adopting a TMDL as a rule, DNR may not place the TMDL limit in a permit. Wis. Stat. § 227.10(2m). The adoption of the TMDL allocation for this watershed without following rule-making procedures cannot be justified as state plans that comply with federal law in the absence of explicit statutory authority to do so. See Wis. Stat. § 227.11(3)(a). (*City of Oshkosh with concurrence from City of Fond du Lac*)

*Response: The authority to develop and implement TMDLs in permits is outlined in subchapter III of NR 212, Wis. Admin. Code and in ch. NR 217, Wis. Admin. Code. In addition, the water quality standards, that the TMDLs are developed to meet, are also codified.*

*In terms of statutory authority to develop and implement TMDLs in permits, Wis. Stats. s. 283.83 authorizes and requires the department to establish a continuing water quality management planning process, which shall result in plans including TMDLs. Wis. Stats. s. 283.31(4) authorizes and requires*

*the department to prescribe conditions for permits to assure compliance with the requirements of s. 283.31(3), which include limitations necessary to avoid exceeding TMDLs established under s. 283.83.*

*Wis. Stats. s. 283.83 Continuing planning process.*

*(1) The department shall establish a continuing water quality management planning process which is consistent with applicable state requirements. The continuing planning process shall result in plans for all waters of the state, which plans shall include:*

*...*

*(c) Total maximum daily load for pollutants;*

*Wis. Stats. s. 283.31 Water pollutant discharge elimination system; permits, terms and conditions.*

*(3) The department may issue a permit under this section for the discharge of any pollutant, or combination of pollutants, other than those prohibited under sub. (2), upon condition that such discharges will meet all the following, whenever applicable, subject to sub. (5m):*

*...*

*(d) Any more stringent limitations, including those:*

*...*

*3. Necessary to avoid exceeding total maximum daily loads established pursuant to a continuing planning process developed under s. 283.83.*

*(4) The department shall prescribe conditions for permits issued under this section to assure compliance with the requirements of sub. (3). . . .*

48. Likewise, the DNR has adopted TMDL Guidance #3800-2014-04 effective October 20, 2014 for the implementation of TMDL allocations in MS4 permits (the "TMDL MS4 Guidance") without proceeding through rule-making. For the same reasons stated above, the DNR's use of the TMDL MS4 Guidance for implementing MS4 TMDL allocations is contrary to Wis. Stat. sec. 227.10(2m) . In addition, the adoption of the TMDL MS4 Guidance and use for implementation of TMDL allocations for MS4 permits is contrary to the prohibition that guidance documents cannot be adopted without the procedural safeguards of notice and opportunity for the public to comment prior to adoption. See Wis. Stat. § 227.112.

Finally, the DNR's position regarding whether Chapter 227 requires it to issue a new rule when promulgating TMDLs and adopting/implementing MS4 TMDL Guidance to the extent it relies on the DNR's interpretation of provision within Chapter 227 or other applicable law, is not entitled to judicial deference. See *Tetra Tech EC, Inc. v. Wisconsin Dep't of Revenue*, 2018 WI 75, ¶ 84, 382 Wis. 2d 496, 564, 914 N.W.2d 21, 54 (statutory interpretations by administrative agencies are reviewed de nova without judicial deference) and AB 1070/Senate Bill 884. (*City of Oshkosh with concurrence from City of Fond du Lac*)



*Response: The TMDL MS4 Guidance referenced in the comment is just guidance and is not the main implementation mechanism for permitted MS4s. Per the Clean Water Act, all permit issued after an approved TMDL must be consistent with the wasteload allocations contained in the TMDL. Implementation of the TMDL occurs through the permit with the guidance providing supplemental information. Copies of MS4 general permit, which covers a significant number of MS4s, can be found on the department's website (<https://dnr.wi.gov/topic/stormwater/municipal/>). MS4s under individual or group permits will have similar requirements as those outlined in the MS4 general permit.*

*As part of the permit issuance process, permits are subject to public comment. The recently issued MS4 general permit, effective May 1, 2019, was issued under the statutory authority granted to the department pursuant to ss. 283.33 (storm water discharge permits) and 283.35 (general permits), Wis. Stats. In addition, the TMDL MS4 Guidance was drafted with the assistance of an external advisory committee and went through the department's public comment process prior to being posted.*

49. Moreover, analogous Wisconsin case law and case law from Ohio and Idaho supreme courts that is directly on point strongly support the legal conclusion that TMDLs are rules within the meaning of Wis. Stat. § 227.01(13) and therefore DNR must go through the formal rulemaking process to validly establish the TMDLs for the Upper Fox/Lake Winnebago watershed. See Wisconsin Electric Power Company v. Department of Natural Resources, 93 Wis. 2d 222 (Wis. 1980); Fairfield Cnty. Bd. of Comm'rs v. Nally, 143 Ohio St. 3d 93 (Ohio 2015); Asarco Inc. v. Idaho, 138 Idaho 719 (Idaho 2003). (*City of Oshkosh with concurrence from City of Fond du Lac*)

*Response: Rulings from the Ohio and Idaho state courts do not apply to Wisconsin. The rulings cited in the comment pertain to and reflect specific elements unique to the codes, statutes, and procedures in those states and do not reflect the Wisconsin administrative codes and statutes.*

*The ruling from Wisconsin Elec Power Co v Department of Natural Resources, 93 Wis.2d 222 (1980) does not apply to TMDL. In Wisconsin Elec Power Co, the department uniformly applied four different chlorine limitations to all the permits based on the characteristics of the receiving water and the type of aquatic organisms therein. Therefore, the chlorine limitations incorporated in the permits satisfy the "general application" requirements of a rule. In contrast, TMDL load reductions do not uniformly apply to all the pollutant sources in a water body but apply differently to each specific pollutant source based on the individual pollutant source's existing load and target load calculated by a computer model using specific information for this pollutant source. As such, TMDLs do not satisfy the "general application" requirement of a rule and therefore do not require rulemaking.*

50. Assuming for purposes of argument only that the DNR is not required to follow rulemaking procedures for adopting the TMDL report, the DNR should nonetheless exercise its legal authority to adopt regulations covering the agricultural sector as a precondition to enforcing the allocation in the TMDL report. (*City of Oshkosh with concurrence from City of Fond du Lac*)

*Response: If directed, the department has the authority to adopt more stringent performance standards for agricultural and nonpoint sources under s. NR 151.004 and s. NR 151.005, Wis. Admin. Code. Under ch. ATCP 50, the Department of Agriculture, Trade, and Consumer Protection (DATCP) is responsible to establish best management practices, conservation practices, or technical standards to assist in meeting the load allocation in a USEPA and state approved TMDL. Current state and federal codes require that once a TMDL is approved by EPA, WPDES permits must be issued consistent with the wasteload allocation.*

51. As reflected in the City's Technical Comments, the modeling used in the draft TMDL report has demonstrated that an application of the existing Wis. Admin. Code Chapter NR 151 regulation for agricultural sources will not result in the attainment of the water quality criteria for the watershed. The DNR has adequate legal authority to propose and adopt more stringent regulations for these agricultural sources under Wis. Adm. Code §§ NR 151.004 and 151.005. The DNR should condition the imposition of any P and TSS allocations for point source discharges based upon the DNR's adoption of more stringent rules for agricultural sources in the TMDL report. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: Per the Clean Water Act and ch. NR 217, Wis. Admin. Code, once a TMDL is approved by USEPA any permit reissuance must be consistent with the wasteload allocations in the TMDL. However, ch. NR 217, Wis. Admin. Code does allow for the more stringent effluent limits calculated through NR 217.13 to be used in place or in combination with the TMDL derived wasteload allocation. The department does not have the authority to phase or predicate the insertion of TMDL derived wasteload allocations into permits based on the adoption of more stringent performance standards for agricultural and other nonpoint sources.*

52. The assumption used by the DNR for zero discharges allocated to CAFOs is subject to legal uncertainty. As is referenced in the technical comments below, the City is challenging the assumption used by the DNR in the TMDL report that CAFOs are not permitted to have a discharge from certain operations.

In a separate action, on July 31, 2017, the Dairy Business Association challenged the DNR's (as well as EPA's) position that the application of NRCS 635 does not reliably ensure no discharge of pollutants to navigable waters for the feed storage practices for CAFOs. On October 19, 2017, the DNR entered into a settlement of that action, and agreed to allow the application of NRCS 635 as valid runoff controls under the WPDES Permit Program for CAFOs.

This settlement is currently being challenged in Milwaukee County Circuit Court by various parties claiming that re-imposition of NRCS 635 does not adequately protect against discharge to navigable waters by CAFOs. See Clean Water Action Council of Northeast Wisconsin v. Wis. Department of Natural Resources, Case No. 2017 CV 012861 (November 17, 2017). This pending litigation has

raised substantial legal issues about the reliability of the DNR's assumption in the TMDL report that no discharges should be allocated to CAFOs in the TMDL report. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: Neither the TMDL nor the department claim that CAFOs are not permitted to have discharges from certain operations. The language in the TMDL report reflects WPDES permit requirements and is summarized as follows:*

*WPDES permits for CAFO facilities cover the production area, ancillary storage areas, storage areas and land application areas. Any runoff from CAFO land application activities is considered a nonpoint source and is covered in the TMDL through the load allocation. CAFOs must comply with all WPDES permit conditions which include the livestock performance standards and prohibitions in ch. NR 151, Wis. Admin. Code. Specific WPDES permit conditions for the production area specify that CAFOs may not discharge manure or process wastewater pollutants to navigable waters from the production area, including approved manure stacking sites, unless all of the following apply:*

- Precipitation causes an overflow of manure or process wastewater from a containment or storage structure.*
- The containment or storage structure is properly designed, constructed and maintained to contain all manure and process wastewater from the operation, including the runoff and the direct precipitation from a 25-year, 24-hour rainfall event for this location.*
- The production area is operated in accordance with the inspection, maintenance and record keeping requirements in s. NR 243.19, Wis. Admin. Code.*
- The discharge complies with surface water quality standards.*

*For ancillary service and storage area, CAFOs may discharge contaminated stormwater to waters of the state provided the discharges comply with groundwater and surface water quality standards. The permittee shall take preventive maintenance actions and conduct periodic visual inspections to minimize the discharge of pollutants from these areas to surface waters. For CAFO outdoor vegetated areas, the permittee shall also implement the following practices:*

- Manage stocking densities, implement management systems and manage feed sources to ensure that sufficient vegetative cover is maintained over the entire area at all times.*
- Prohibit direct access of livestock or poultry to surface waters or wetlands located in or adjacent to the area unless approved by the Department.*

*Discharges to navigable waters from the production area, including approved manure stacking sites, that do not meet the requirements listed above are not permitted and constitute a violation of the permit. Given the conditions listed above, it is unlikely that a permitted discharge could occur; however, any permitted discharges that did occur would be under conditions outside of the average*

*annual flow conditions used in setting wasteload allocations for this TMDL. The TMDL wasteload allocation of zero is not intended to translate into an absolute zero discharge, but rather, reflects continued compliance with WPDES permit requirements. TMDLs cannot assign allocations to discharges that occur in violation of permit conditions whether from CAFOs, SSOs, or WWTP bypass.*

*Regarding the legal cases cited, the challenged settlement has been settled. The settlement concurs with original department guidance regarding the use of vegetated treatment systems (VTAs), which is that VTAs themselves are not intended as a sole runoff control practice; however, VTAs are expected to be deployed as part of a system of overlapping and complementary control measures that could be employed to treat runoff. VTAs are covered under NRCS technical standard 635 which notes in the “conditions where practices applies” section of the technical standard that “a VTA is a component of a planned agricultural waste management system.”*

53. The DNR must allow supplemental comments to be filed to the TMDL report due to inadequate explanations for conclusions contained in the draft report. The DNR has imposed January 18, 2019 as the deadline for all comments to the draft report. For a number of important issues, there is inadequate information contained in the draft report for the City to provide final comments. Some of these issues described more fully in the Technical Comments below, include the following:

- a. There is no adequate explanation for the increased allocation for baseline discharges assigned to point source discharges in the report and the implication of such increases for the final allocation of P and TSS assigned to point source dischargers for future WPDES permits.

*Response: An explanation was provided that as new information was provided by facilities, that their baseline values would be adjusted to reflect the changes.*

- b. There is substantial uncertainty regarding the manner in which the DNR determined the Water Quality Trading examples in Appendix K and Tables 1 and 2 for a specific facility.

*Response: Except as addressed in comments 31, 87, and 89, no additional examples of uncertainty have been provided. The Cities’ misunderstanding seems to stem from not taking into account the different assessment periods and methods applied to rivers/streams and lakes/reservoirs.*

- c. There are numerous questions raised about the manner in which Adaptive Management Targets were referenced in Appendix K and Table 1.

*Response: Similar questions have been already addressed in comments 31, 87, and 89. The questions do not appear to account for the fact that the water quality criteria for rivers and lakes differ both in the actual numeric target but also in how the numeric targets are assessed; the differences between mean and median and the different periods during which lakes and rivers are subject to sampling for verification of the attainment of the criteria.*

- d. There are numerous questions raised about the different approaches for allocations made to MS4s in this TMDL versus the TMDL approaches taken in other watersheds.

*Response: Aside from comments 99 and 103, no additional questions have been provided. Section 6 of the TMDL report provides a summary of how wasteload allocations were calculated. The allocation approach is consistent across all watersheds in this TMDL.*

- e. These are only a few of the many questions raised by the City in the Technical Comments below; answers to which are necessary before the City will be in a position to file final technical comments. Without answers to these questions, the City will be deprived of the opportunity to provide meaningful comments to the draft TMDL report. For all of these reasons, the City respectfully requests that it be afforded an additional 30 days for supplemental comment following the receipt of the DNR responses to the numerous questions raised by the City in these Technical Comments. (City of Oshkosh with concurrence from City of Fond du Lac)

*Response: Both Oshkosh and Fond du Lac have been afforded numerous opportunities to submit comments and have taken full advantage of those opportunities by submitting hundreds of comments. The department has attempted to address every comment either through an explicit response or changes in the TMDL documentation. The department's responses were often accompanied by individual meetings with Oshkosh and Fond du Lac to further discuss comments.*

- 54. The City of Oshkosh incorporates by reference the following: (1) comments provided to the DNR on August 3, 2018 by Oshkosh; (2) the comments submitted by the City of Fond du Lac on August 2, 2018; and (3) all of the previous comments submitted by the two cities as referenced in the August 3, 2018 letter to the DNR, a copy of which is attached to these comments. Please be advised that the City of Oshkosh is incorporating these previously filed comments by reference since many of them were not adequately addressed by the DNR. In addition, the City of Oshkosh joins in the written comments by the City of Fond du lac dated January 18, 2019.

In the WDNR's December 6, 2018 letter to the City of Oshkosh the last sentence at the end of the third paragraph states that the City "..... acknowledged that these previous modeling questions had been addressed." That is not true and the City has repeatedly requested the WDNR respond to detailed modeling questions submitted during the TMDL model development. The WDNR simply stating that comments were "considered" is not consistent with the commitment stated during early TMDL public meetings that comments would be incorporated and responded to. All comments submitted by the City should be included in Appendix L and the concerns raised in prior comments still stand. (City of Oshkosh with concurrence from City of Fond du Lac)

*Response: During the meeting on August 29, 2017 which was convened to address potentially unaddressed the modeling questions, the Cities instead acknowledged that previous comments had been addressed and chose to discuss new questions or comments. Comments have been responded to either through model evaluation conducted by CADMUS, updated text in the TMDL documentation, or explicit responses provided in writing and at the meeting on August 23, 2017. CADMUS and the USGS were under contract by US EPA to perform the modeling analysis and provided US EPA with a summary memo, included under comment 105, to respond to the Cities concerns.*

*The department has honored its commitment to review comments and develop responses; however, we do not believe this requires written responses for every comment submitted.*

55. Drainage Basin Boundaries: We understand from previous meetings that the sub- basins and subwatersheds modeled in the TMDL are not always consistent with the HUC boundaries, such as a HUC 12 or HUC 8 boundary. The HUC boundaries are not shown in the TMDL so it is not possible to see the significance of this inconsistency. Please identify these differences in the TMDL and explain how references to the HUC 12 boundaries, such as in trading and adaptive management discussions, will be impacted. This could be significant and permitted dischargers should have the ability to review this response and update prior to submitting the TMDL to EPA. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: When possible, TMDL watershed boundaries follow HUC 12 boundaries; however, not following the HUC 12 boundaries is not an inconsistency or an error but rather reflects that TMDLs also need to account for individual impaired waterbody segments, changes in land use, differences in water quality criteria, significant changes in flow, and locations of point source outfalls. These differences between TMDL watersheds and HUC 12 watersheds have minimal impact on water quality trading and adaptive management. In water quality trading, the HUC 12 becomes significant for downstream trading and a facility can still trade downstream based on the HUC 12. Adaptive management is based on a facility's compliance point and is not impacted by differences between TMDL watersheds and USGS HUC 12 delineations. Appendix J provides summaries of agricultural reductions by both TMDL subbasin and model subwatershed as well as HUC 12 to allow maximum flexibility for scaling TMDL reductions based on planning purposes.*

56. What percentage of agricultural land, or acreage of agricultural land, is operated by or in contract with a concentrated animal feeding operation (CAFO)? This would include lands owned by CAFOs or affiliates, lands leased by CAFOs or affiliates, or lands that are contracted to either receive manure or that sell product (e.g. feed, bedding, etc.) to a CAFO. These statistics should be reported in the TMDL. *(City of Oshkosh with concurrence from City of Fond du Lac)*



*Response: The amount of land under contract with CAFOs varies from year to year. Instead of focusing on who owns the land, the TMDL analysis emphasizes the types of cropping practices and nutrient applications employed across the landscape to evaluate pollutant loadings. Please refer to Appendix C for additional information on agricultural baseline assumptions.*

57. CAFOs are not permitted to have a discharge from their manure storage, process wastewater or from production areas, but those releases happen. When they do happen, which is more than yearly, the loadings are significant. The TMDL should include these loadings in the baseline conditions for CAFOs, and increase the overall total baseline accordingly, so they are not accounted for in other sectors like municipal wastewater. The CAFOs should also have a reduction so that the loading associated with their operations is properly accounted for in the TMDL. It is not appropriate to simply say those loadings don't exist because the permits don't allow them. The reality is it happens and is a significant event loading, and the contribution should be properly estimated and categorized with the source of the loading. (*City of Oshkosh with concurrence from City of Fond du Lac*)

*Response: The first line to this comment, "CAFOs are not permitted to have discharge..." contradicts the Cities' earlier comment (51) in which the Cities wrote "the City is challenging the assumption used by the DNR in the TMDL report that CAFOs are not permitted to have a discharge from certain operations." Please see the response to comment 51.*

*In a TMDL, the total loading capacity, which is the assimilative capacity of the receiving water under the critical flow conditions evaluated in the TMDL, cannot be exceeded by the allocations. As such, any increase in baseline loads, whether lumped in with or separated from the municipal baseline, still results in a higher overall reduction from the baseline so that the resulting overall allocations do not exceed the assimilative capacity. To clarify, adding loads to account for CAFOs would result in less wasteload allocation available for municipal sources regardless of how the baseline sources are categorized.*

*TMDLs do not provide wasteload allocations for discharges that are not permitted such as SSOs or for bypass events that may occur during flood events at wastewater treatment plants. Such discharge events are either not permitted or occur in flow conditions deemed outside the critical flow conditions evaluated in the TMDL. See the treatment of Milwaukee's CSO as an example (*Total Maximum Daily Loads for Total Phosphorus, Total Suspended Solids, and Fecal Coliform Milwaukee River Basin, Wisconsin; March 19, 2018*).*

58. The agricultural load allocation targets (Appendix J) appear to be in the range of other targets for well-managed agricultural operations. However, the phosphorus loss from agricultural fields in baseline conditions is very low and is not consistent with the fact that the majority of the land use and phosphorus loading is from agricultural sources. For example, 87 of the 89 sub-basins are all less than 6 lbs/ac/yr (Appendix J), where the 87 sub-basins average around 2-3 lbs/ac/yr. While this is

output from SnapPlus, it is not clear if this is the PI, or if different soils or slopes were used than those used for the PI calculation. Regardless of this potential difference in calculating the phosphorus loss, agricultural contribution to baseline conditions, and therefore the reductions needed to achieve allocations, are very much under estimated. The simple fact that nearly all agricultural land is reported far below 6 lbs/ac/yr raises significant questions regarding the accuracy of the information. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: The baseline for the agricultural conditions reflects actual conditions and does not reflect setting all fields to the NR 151 performance standard of 6 pounds/acre/year. Extensive and detailed surveys were conducted to determine the baseline agricultural conditions. Appendix J clearly states that the values expressed as pounds/acre/year are not PI (phosphorus index) values. As required under NR 590, PI values are calculated in SnapPlus based on most erodible soil and steepest slope while the watershed modeling and SnapPlus analysis for the TMDL more accurately reflects actual conditions by using the dominant soil and average field slopes.*

*The fact that the baseline watershed averages are below 6 pounds/acre/year does not dispute the accuracy of the TMDL but rather indicates that agricultural sources have made reductions and that at the watershed scale most agricultural sources are in compliance with regulatory requirements. TMDL reductions are not underestimated; if the TMDL assigned 6 pounds/acre/year to all agricultural land it would not have reflected reality, would not have helped target or identify areas of higher loading potential, and the relative reductions in the TMDL measured from a 6 pound/acre/baseline would have been higher. Such an approach would increase the amount of reductions needed and reduce allocations for all dischargers.*

59. Provide a summary of how SnapPlus output was validated for the baseline conditions. Please include a summary of inspections completed by the TMDL team to ensure nutrient management information reported is accurate and reflective of actual conditions. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: A summary of survey results as been added as Appendix O.*

*The SWAT watershed model used agricultural inputs relating to the management of agricultural fields (cropping, tillage, fertilizer) to estimate phosphorus loss. SWAT used specific land management operations that were mapped across the Upper Fox-Wolf Basins. These agricultural inputs were translated into SnapPlus "fields" in a template database. Each specific land-management operation was spatially overlaid with soil type, subbasin, and county to derive discrete units to run in SnapPlus. Each subbasin contains different soil types defined by the Web Soil Survey (or SSURGO) database. Most SnapPlus parameters were taken directly from SSURGO (e.g., slope, slope length, organic matter), however average soil phosphorus concentration was calculated by using an area-weighted average derived from county-level averages of soil phosphorus samples. SnapPlus was then run for each combination of subbasin, soil type (the critical soil was replaced with the predominant soil to*

*represent average rather than critical conditions), land management combination, which resulted in thousands of SnapPlus fields and model runs. The resulting phosphorus yields were then averaged for each subbasin to calculate baseline pollutant yields. Applying the corresponding percent reduction to the baseline pollutant yield for each subbasin generates the LA, expressed as an edge of field target. SnapPlus itself was not calibrated since it has already undergone an extensive calibration and validation process. Additional information about SnapPlus can be found at: <https://snapplus.wisc.edu/>*

60. For the purposes of the TMDL and allocations to permitted entities, the internal loads within the pool lakes are historic and there is nothing that any of the source categories can do about this historic, or baseline, condition. We agree that reducing external loading can reduce future internal loading, however the TMDL and its allocations look forward to making reductions from the baseline conditions. The internal loading should be its own source category, these reductions should be completed by the State, and the internal loadings should not be coupled with reductions (allocations) required by external sources. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: See Section 5.1.3 of the TMDL Report which includes a discussion on Internal load reduction. Internal loading is coupled to external loading so if the TMDL did not link the two it would be ignoring this fact. In addition, assigning internal loading its own source category reduces the available allocation for external sources as the TMDL equations would become:*

$$\text{TMDL Load Capacity} = \text{wasteload allocation} + \text{load allocation} + \text{internal load} + \text{MOS} + \text{RC}$$

*In addition, the fact that internal load reductions is tied to reductions in external loads, the assignment of internal load as a source category would not allow for this interaction to occur and result, as shown above, in overly conservative allocations.*

61. While lake modeling and TMDL allocations are on an annual basis, the limits translated from the allocations are seasonal. While the annual cycling of internal loading may be zero, the growing season shows the internal loading as a source and should have a reduction associated with them. Consequently, the internal loading should be considered independent of external loading and there should be reductions (allocations) associated with the internal loading. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: The translation of the wasteload allocations into wastewater effluent limits for insertion into permits is part of the permit process and not part of the TMDL development process. Comments about the translation should be made during permit issuance or re-issuance.*

*Section 4.2.9 of the TMDL Report addresses internal loading and for reasons discussed in the report, the internal load was not assigned an explicit allocation; however, the lake modeling accounts for the coupling between internal and external phosphorus loadings with internal loads decreasing as external loads are reduced. This results in internal loads not being a fixed source that can be assigned a fixed allocation but rather a source that diminishes as other allocations are attained. However, to account for the potential of the restoration of aquatic plants, additional reductions in internal loads was made and reflected in the fixed allocations. This is detailed in Section 5.1.3 of the TMDL Report.*

62. Resuspension of lake sediment and its contribution to water column phosphorus concentrations is also from boating and the presence of common carp or other non-target bottom fish. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: The sources mentioned above are implicitly accounted for in the model calibration. There is insufficient monitoring data for the explicit breakout of different sources that contribute to the internal loading.*

63. Nagawicka Lake was used for groundwater phosphorus concentrations to estimate groundwater loadings, but the soils, land use and agricultural activities for Nagawicka Lake are very different than that of the pool lakes. What validation was completed to ensure that the Nagawicka Lake-based information is appropriate for the pool lakes? *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: The USGS modeling and monitoring shows that the groundwater contribution of phosphorus to be approximately 0.1% of the total phosphorus load to the pool lakes. Modeling and monitoring data showed that significant changes in groundwater phosphorus concentration had minimal to no impact on the phosphorus load to the pool lakes. Septic systems were also separated out, so the groundwater number only accounts for background. If this was a seepage lake, groundwater would have a much greater impact; however, the pool lakes are not seepage lakes and most of the water and phosphorus enters the pool lakes via surface water.*

64. The lake modeling presented reductions needed (67-75%) from "existing conditions", and not baseline conditions. If baseline conditions are considered, the reductions would be even greater. This is further justification that a phased TMDL implementation needs to be considered as there is significant time and reductions needed to achieve water quality. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: Please see the discussion on phased TMDLs. Also, the nonpoint loads used in the baseline condition and the allocation process reflect "existing conditions"; however, the baseline condition for many permitted sources, such as Oshkosh and Fond du Lac, reflects conditions in the permits and not*

*actual effluent quality. This allowed Oshkosh and Fond du Lac a more advantageous starting point for the allocation process and allowed credit for any reductions already undertaken by the Cities.*

65. The growing season mean to flow weighted mean (GSM-FWM) ratio was assumed to remain constant within a sub-basin. How was this assumption validated? With 20 locations, there is opportunity for testing this theory. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: The six sites whose GSM-FWM ratios were applied across the basin were the same sites used in the SWAT model calibration. The criteria for selecting those sites are described in Section 4.2 of Appendix C of the TMDL report.*

66. In calculating a GSM-FWM ratio we don't disagree that "hydrologic drivers" can remain constant within a sub-basin, but hydrology is only half of the phosphorus loading equation where phosphorus concentrations could vary greatly when loading is more impacted by land cover (i.e. higher loading when ag fields do not have cover). A high loading event(s) can occur equally with high precipitation and low runoff concentration (e.g. agricultural field with cover), as an event with low precipitation and high runoff concentration (e.g. agricultural field without cover). Because cover on agricultural land can vary significantly between the growing season and outside this season, how was this accommodated in this simplified approach of converting annual to growing season loading capacity? *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: DNR acknowledges that land management changes to reduce non-point source loading could also alter the GSM-FWM ratio. However, there are so many practices that may be used to meet the allocations, many of which differ in their seasonal effectiveness, that we could not predict if and how the ratio would change.*

67. For the six locations used for FWM-GSM ratios, what were the minimum thresholds for flow and phosphorus data? Were there certain number of years of data, number of water quality samples, etc.? Please summarize the available data for the six sites since these six sites were used for all 89 sub-basins. Why weren't all 20 locations used? *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: Please see section 5.1.1 of the TMDL Report. Applicable sites need to have daily flow and daily phosphorus records. Sites that did not meet this threshold could not be used for this analysis. Table 6 of the TMDL report provides a summary of 32 stream and river monitoring sites.*

68. How are county or state transportation corridors included in allocations if they are outside of MS4 boundaries? *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: County and state transportation corridors that are outside of a permitted MS4 area or are otherwise not identified as being covered under the TS4 permit, the WPDES permit developed to*

*cover WisDOT, are considered non-permitted urban sources and are accounted for in the load allocation.*

### **Site-Specific Criteria and Use Attainability Analysis Comments:**

69. The site-specific criteria (SSC) discussion contained in Section 2.4 of the draft report really has no relevance to site specific criteria as described by EPA (Water Quality Standards Handbook, 2017 update):

The EPA's regulation at 40 CFR 131.11(b)(1)(ii) provides that states and authorized tribes may adopt water quality criteria that are "modified to reflect site-specific conditions." Site-specific criteria, as with all criteria, must be based on a sound scientific rationale and protect designated uses and are subject to EPA review and approval or disapproval under Section 303(c) of the CWA. A site-specific criterion is developed to protect aquatic life at a particular site, usually by taking into account a site's physical, chemical, and/or biological conditions (i.e., water quality characteristics or species composition).

The analysis included in the report includes three sources to evaluate whether a SSC is appropriate for Lake Winnebago; the first two are the paleoecological study of diatoms in sediments and a lake modeling analysis to look at reference conditions in the lake prior to extensive anthropogenic development and hydrologic modification. Reference conditions have absolutely no relationship to appropriate criteria to protect designated uses of Lake Winnebago. "Water quality criteria represent the conditions (e.g., concentrations of particular chemicals, levels of certain parameters) sufficient to restore and maintain the chemical, physical, and biological integrity of water bodies and protect applicable designated uses." Further comments will be made on the paleoecological study and lake modeling study.

The third source information related to the SSC discussion was an examination of total phosphorus and Chlorophyll a relationship. This analysis is topically related to designated uses - in that it was using a Wisconsin criterion associated with recreational use in shallow lakes. But by using a general chlorophyll criterion, it has not specifically looked at recreational use issues specific to Lake Winnebago. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: Site-specific criteria (SSC) may be justified through several alternative lines of evidence. One of these is that a criterion may be no lower than the background reference condition. In the case of Lake Winnebago, the reference condition analysis was conducted in part to determine the minimum value of an SSC. Because the lower bounds of the reference condition estimates are below the existing criterion, the reference condition cannot be used to justify a higher criterion. Importantly, this finding does not mean that other lines of evidence may not be used to justify a higher criterion.*



*It is true that the chlorophyll criterion used to assess the recreational use of Lake Winnebago applies to all shallow lakes. It would be possible to develop a site-specific chlorophyll criterion for Lake Winnebago by demonstrating that recreational use is impaired at a higher concentration. However, such a demonstration would have to show that the perceptions of suitability of Lake Winnebago for recreation at a given chlorophyll level are not biased by the long history of poor water quality in this lake. Without controlling for this possible shifting baseline of perceptions of environmental quality, justification could be made for ongoing decreases in environmental standards. A study would also have to incorporate perception data from a broad sample of lake users. Such a study could be conducted in the future by any party who wishes to propose a different chlorophyll and related phosphorus criterion; however, all existing analysis and data points toward 40 µg/L total phosphorus is no more stringent than what is needed to protect the recreational use. The department has seen no scientifically defensible analysis indicating that a different criterion is appropriate to protect the designated uses. Please see s. 281.15(2)(c) Wis. State Statute and s. NR 102.06(7), Wis. Admin. Code. See the response to comment 71 for justification of current chlorophyll a criterion.*

70. Previous comments submitted by the Cities (Fond du Lac and Oshkosh) requested that a use attainability analysis (UAA) be conducted at least concurrently with the TMDL development. WDNR has indicated that a UAA could be conducted after the TMDL is developed.

EPA defines that a UAA "is a structured scientific assessment of the factors affecting the attainment of uses specified in Section 101(a)(2) of the Clean Water Act (the so called "fishable/swimmable" uses). The factors to be considered in such an analysis include the physical, chemical, biological, and economic use removal criteria described in EPA's water quality standards regulation (40 CFR 131.10(g)(1)-(6))."

While EPA requires a UAA for removal of a use based on its water quality standards rules promulgated in the mid-1980s, it really should be done as part of any water quality standard setting effort and especially for consideration of site specific criteria as recommended by many (including a handbook developed by the National Association of Water Agencies and Water Environment Research Foundation in 2005 entitled Collaborative Water Quality Solutions: Exploring Use Attainability Analyses).

The TMDL report includes no confident demonstration that the water quality standard for total phosphorus of 40 µg/L is attainable. In the modeling analysis, the summer total phosphorus balance for Lake Winnebago has 55% contributed from internal loading. Sediments respond to reductions of external loading very slowly and the assumption that internal loading and external loading are directly and immediately related is not proven. The Jenson model demonstrates that a 75% reduction in total phosphorus today will still will not result in meeting the 40 µg/L standard by 2135 (See figure 15 of modeling report) but would meet a 60 µg/L standard by the end of this century. As

cautiously mentioned in the modeling report, in-basin controls may be needed to meet water quality goals.

The reason the attainability of the standard is important to point sources is that point sources will incur significant capital costs within the next few years and operating expenses for the foreseeable future to achieve their required reductions. As demonstrated in the summary of watershed loads in Table 12, point sources contribute about a quarter of the controllable TP baseline load within the watershed. Most WWTPs currently discharge below their respective baseline loadings, and additional reductions will come at a much higher incremental cost. Reductions from other sources will take a much longer time frame and are more difficult to enforce. If the standard is indeed not attainable, point sources dischargers will have incurred substantial costs with little associated benefit. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: Under 40 CFR § 131.10(g) a state can only remove a use that is not an existing use. An existing use is defined under §131.3 as a use that has actually been attained on or after November 28, 1975. A Use Attainability Analysis (UAA) would require that the State of Wisconsin, in concurrence with US EPA, remove the attained recreational use for Lake Winnebago meaning that it would no longer be protected or considered swimmable or appropriate for recreational use.*

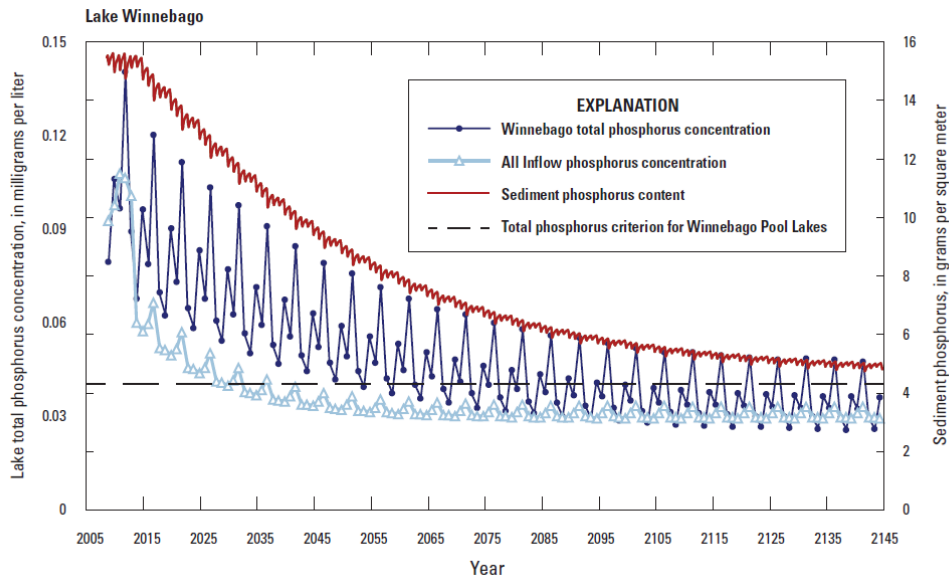
*In addition, Lake Winnebago is a drinking water source and the current criteria of 40 µg/L for total phosphorus significantly reduces the likelihood of any harmful algal blooms.*

*The TMDL modeling shows that the water quality criteria can be obtained. Figure 15, shown below and referenced in the comment, shows attainment of the 40 µg/L standard in some years as early as 2050. It is not clear how the comment arrives at 2135 for attainment of standards from Figure 15. Even the text in the report does not support 2135:*

*“After about 60 years, the recyclable P accumulated in the sediments and the in-lake TP in the Upper Pool Lakes approach a new equilibrium of about 4 g/m<sup>2</sup> and 0.030 mg/L, respectively; however, the recyclable P accumulated in the sediments and the in-lake TP in Lake Winnebago took much longer, over 100 years, to approach a new equilibrium of about 5 g/m<sup>2</sup> and 0.033 mg/L, respectively.” (Page 47)*

*Based on the response curves for Lake Winnebago, a 75-percent reduction in P loading and 75 years are needed for the lake to reach a geometric-mean June 1–September 15 TP concentration of 0.040 mg/L or a 69-percent reduction in P loading and about 100 years. These reductions in P loading to reach the TP criterion are close to the 73-percent reduction estimated with BATHTUB. (Page 51)*

The criterion for Lake Winnebago is 40  $\mu\text{g}/\text{L}$  and the modeling shows that the lake will reach an equilibrium of 33  $\mu\text{g}/\text{L}$  in 100 years and 40  $\mu\text{g}/\text{L}$  in 75 years. While this is a long period of time, 2019 plus 75 years is 2094, not 2135.



The comment contradicts itself, “Sediments respond to reductions of external loading very slowly and the assumption that internal loading and external loading are directly and immediately related is not proven.” As stated in the comment, sediments respond to reductions in external loading very slowly thus indicating that they are related.

The remainder of the comment dealing with the importance of attainability of the standard is not supported by the TMDL analysis which shows that the standard is attainable under the allocations. The fact that reductions from other sources could take longer and are difficult to enforce is an implementation issue and should be addressed outside of the TMDL process, potentially using provisions in ch. NR 151, Wis. Admin. Code. The department concurs that such action could reduce the length of time it will take for Lake Winnebago to reach water quality criteria.

71. MEG recommends that the DNR reconsider appropriate and attainable site-specific criteria (SSC) for the pool lakes, including Lake Winnebago. The sediment core results, TP criteria from Minnesota (on which the Wisconsin lake and reservoir criteria were based), and this TMDL effort all suggest that a higher TP criterion could be justified. In addition, MEG questions the validity of applying a chlorophyll a threshold from Minnesota, which was developed based on public perception of water quality in lakes, to water quality in Lake Winnebago. A phased TMDL as discussed above could be implemented initially to allow time for SSC development that would implement more appropriate

phosphorus criteria. (Stafford Rosenbaum for Municipal Environmental Group – Wastewater Division)

*Response: The TP criteria is linked to the chlorophyll a criterion. Wisconsin's chlorophyll a criterion is supported by studies conducted in both Wisconsin and Minnesota.*

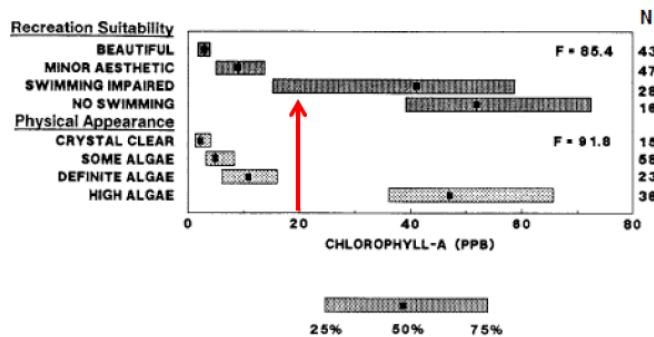
*In Wisconsin, the data used in the analysis were all chlorophyll a samples collected from the top 2 meters of the water column in Wisconsin lakes and reservoirs during the period July 8 – Sept 22 (WisCALM chlorophyll a assessment period) from 2002 to 2016. Multiple values from the same station and date were averaged, and samples without a corresponding user perception rating were excluded.*

*The findings of Wisconsin's user perception survey and resulting selection of a "moderate algae" level of 20 µg/L chlorophyll a is consistent with Wisconsin's previous thresholds and assessment protocols and earlier research done by other parties, as described below. The 2016 analysis of Wisconsin user perception data supported the continued use of this threshold.*

- A chlorophyll a threshold of 20 µg/L chlorophyll a was previously used by WDNR to develop Wisconsin's statewide phosphorus criteria for lakes, promulgated in 2010. During development of the statewide phosphorus criteria, the threshold of 20 µg/L chlorophyll a was based on Minnesota's work, discussed below. WDNR has also used this concentration in assessment protocols since the promulgation of P criteria in 2010.*
- WDNR's definition of a "moderate algae" level directly corresponds with the Minnesota Pollution Control Agency's (MPCA's) definition of a "nuisance" algal bloom. Minnesota conducted an earlier study that surveyed user perceptions of lakes' recreational suitability and physical appearance (Heiskary and Walker, 1988). The study coupled user perceptions with simultaneously collected data on phosphorus, chlorophyll a, and Secchi depth. MPCA defined four algal bloom categories during their development of phosphorus criteria for Minnesota lakes: a "mild bloom" is greater than 10 µg/L; a "nuisance bloom" is greater than 20 µg/L; "severe nuisance bloom" is greater than 30 µg/L; and a "very severe nuisance bloom" is greater than 40 µg/L chl a (Heiskary and Wilson, 2008).*

*As shown in Figure 4, a chlorophyll a concentration of 20 µg/L corresponds with the lower end of perceived swimming impairment, and is between a physical appearance of "definite algae" and "high algae". This study was used by both the Minnesota Pollution Control Agency and the Wisconsin DNR in setting phosphorus criteria for lakes.*

Figure 4. Excerpt from Figure 3 in Heiskary and Walker's 1988 paper showing results of user perception surveys of a range of chlorophyll *a* concentrations. Interquartile ranges of measurements in each response category. Legend: N = number of observations; F = variance ration (among-group mean square/within-group mean square) derived from one-way analysis of variance on logarithmic scales.



- The threshold of 20 µg/L chlorophyll *a* is also consistent with an extensive analysis of Wisconsin lake data by Lillie and Mason, published in 1983. This analysis recommended six categories for chlorophyll *a* in relation to water clarity (Figure 5). As shown in Figure 5, a concentration of 20 µg/L chlorophyll *a* as a moderate algae level corresponds to the lower (better) end of the “Poor” category. The frequency criteria provided here would restrict this poorer level of water quality to a given percentage of the summer.

Figure 5. Excerpted from Lillie and Mason (1983), Table 19. Apparent water quality based on chlorophyll *a* and water clarity as related to the Carlson Trophic State Index.

Chlorophyll <i>a</i> (µg/l)	Apparent Water Quality	Approximate Water Clarity Equivalent (m)	Approximate TSI* Equivalent
< 1	Excellent	> 6	< 34
1-5	Very Good	3.0-6.0	34-44
5-10	Good	2.0-3.0	44-50
10-15	Fair	1.5-2.0	50-54
15-30	Poor	1.0-1.5	54-60
> 30	Very Poor	< 1.0	> 60

\*Based on Carlson (1977).

The assumption regarding the allowance of phased TMDLs is addressed in other comments. See the response to comment 69 regarding the appropriateness of SSC.

### Paleoecological Study and Lake Modeling Comments:

72. The paleoecological survey of sediments cast significant doubt on the appropriateness of the 40 µg/L total phosphorus water quality goal. Top layer diatoms correspond to total phosphorus concentrations of 108 µg/L in the north basin of Lake Winnebago, 94 µg/L in the south basin. The average of these values is within 10% of the observed value of 97 µg/L of water from which the top

layer of diatoms was deposited. These results indicate that high confidence in the paleo data is warranted.

The bottom layer of diatoms when averaged correspond to a TP concentration of 43.5 µg/L. As the bottom layer is at least 150 years old, and may be centuries older, the bottom layer represents water quality under ideal conditions in the ancestral water body of Lake Winnebago (prior to damming).

If baseline historic conditions prior to European settlement were eutrophic, how can a betterment of those conditions be attained today under even the most optimistic scenario? Using the Jensen model, there is no modeling scenario in the TMDL in which 40 µg/L is attainable. Moreover, the 90% confidence interval for paleoecological results are 32-50 µg/L in the north basin and 37-59 µg/L in the south basin. The median value for each basin is 41 and 48 µg/L. There is therefore more than a 50% probability the historical reference condition exceeded the proposed TP water quality standard.

This historic level is a reference but has little or no relationship to an appropriate water quality standard to protect designated use, as mentioned previously. Pre-settlement conditions have not been (and should not be) a focus of the TMDL, they were not a goal of water quality standard development, and they should not be the benchmark for the highly manipulated hydrologic regime of Lake Winnebago. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: The historic references conditions were used to evaluate the suitability of a site-specific criteria; however, the current criteria of 40 µg/L falls within the confidence interval of both the paleoecological results and the USGS modeling of historic conditions.*

*The analysis conducted in support of the development of the criteria and its linkage to chlorophyll a is summarized in the Technical Support Documentation for Rule Package WY-23-13 which provides supporting documentation for the suitability of 40 µg/L as the proper water quality target. The probability of moderate algae levels increases rapidly at 30-40 µg/L total phosphorus and remains high when TP > 40 µg/L. In the study, all shallow lakes meeting the TP criterion experience algal blooms less than 30% of the time.*

*The proposed criterion is not too restrictive. Most shallow lakes with moderate algae more than 30% of the time also exceeded the Aquatic Life chlorophyll a criterion (27 µg/L, Figure 10) and the total phosphorus criterion (40 µg/L). In addition, the likelihood of severe and nuisance algal blooms is substantially reduced at 40 µg/L.*

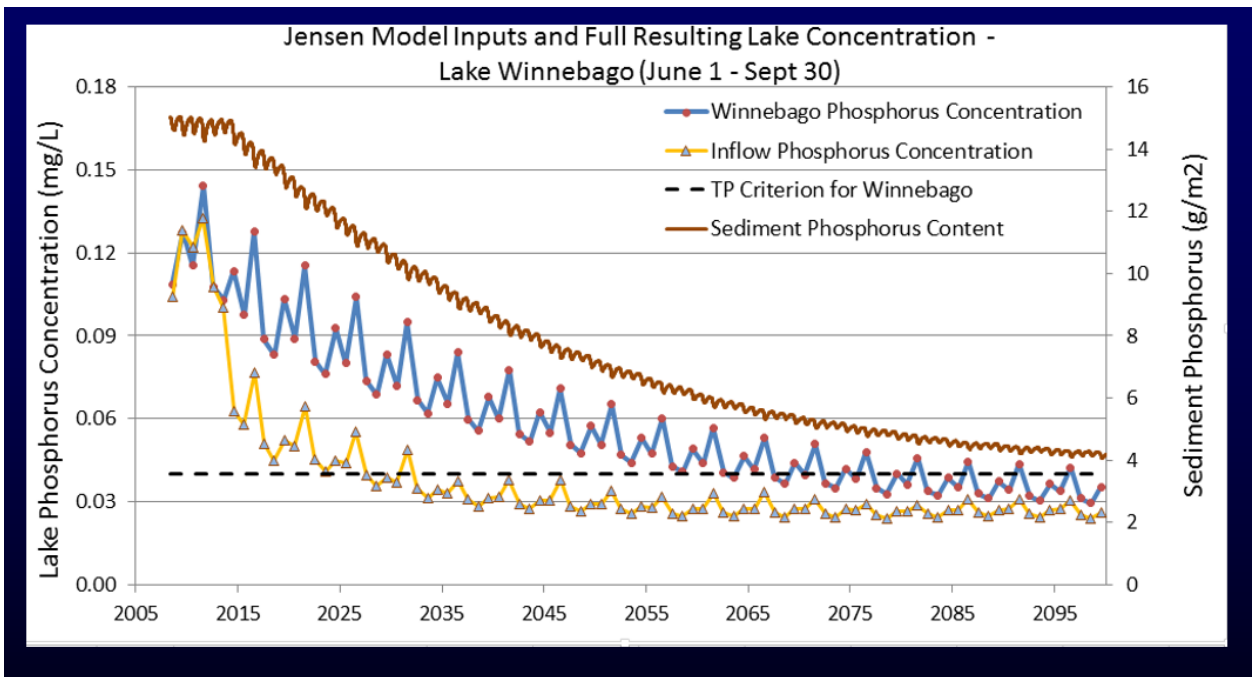
73. The paleoecological study results suggest that the TP concentration in Lake Winnebago was at or above the water quality criterion of 40 µg/L prior to anthropogenic development in the area (1310-1725). The dams at the outlet to Lake Winnebago were constructed after that time, resulting in a



raising of the water level. This caused increased shoreline erosion and lake area and likely reductions in groundwater inputs to the lake. Further, additional agricultural, urban, and other development occurred after that time and prior to the enactment of the Clean Water Act. There is significant in-lake recycling and internal loading of TP occurring now, and modeling indicates it will take the better part of a century to reduce the internal loading to an acceptable level after external loadings are reduced. All of these factors suggest that the 40 µg/L criterion is not attainable. It is unacceptable to require point sources to comply with the proposed stringent TP wasteload allocations now or in the future when the criterion is unattainable. *(Stafford Rosenbaum for Municipal Environmental Group – Wastewater Division)*

*Response: The suitability of 40 µg/L is addressed in other comments. TMDL allocations have accounted for the processes described in the comment such as modification of water levels and increased anthropogenic sources.*

*The modeling shows that water quality criteria is attainable. Based on implementation of the reductions allocations and Jensen model runs, the phosphorus criterion is first reached 50 years after implementation of reductions with significant improvements in water quality occurring already prior to the first attainment of water quality criteria. Within 70 years, Lake Winnebago is consistently meeting water quality criteria. The response is faster for the pool lakes.*



74. Lake models are purported to show reference TP standards of 32 to 33 µg/L in Lake Winnebago. These standards are flatly contradicted by paleoecological evidence. According to the Wisconsin DNR reference conditions are set by from paleoecological studies "to establish the excellent range for TSI conditions, WDNR uses excellent or "reference" conditions inferred from total phosphorus (TP) values based upon preserved diatom communities from pre-settlement times found in lake bottom sediment cores." ( reference: <https://dnr.wi.gov/news/input/documents/guidance/wiscalmguidance.pdf> ) (City of Oshkosh with concurrence from City of Fond du Lac)

*Response: The paleoecological study inferred a pre-settlement total phosphorus concentration of 40 – 47 µg/L . This is slightly higher than the 32-33 µg/L total phosphorus concentration determined by the model, but is not a contradiction. Both approaches show that phosphorus concentrations in Lake Winnebago were historically an order of magnitude lower than they are today. The paleoecological study used their model of the diatom communities to derive a pre-settlement total phosphorus concentration of 40 µg/L for the North Basin and 47 for the South Basin. This model also has error associated with it (RMSEP = 0.255), but the report did not present confidence intervals for the 40 and 47 µg/L TP predictions. Both approaches have associated error and are within 7 – 15 µg/L TP concentrations of one another, which is actually very close. Diatoms analyzed in sediment cores are used by the WDNR for establishing reference conditions but are not the only method that can be used.*

75. In light of the WDNR reference condition policy, how do the Lake Winnebago TMDL study "reference conditions" measure up? For the north basin, 40 µg/L is the 30th percentile value in the 32 - 50 µg/L range. For the south basin, 40 µg/L is 15th percentile. Because the baseline is at the bottom of the north basin range and not within the south basin range, there is a 90% probability that the reference condition is wrong. This causes great concern that the modeling is not sufficiently supported by data. (City of Oshkosh with concurrence from City of Fond du Lac)

*Response: It is unclear by what is meant by "measure up" and it is also unclear how the Cities derived a 90% probability that the reference condition is wrong. Thus, the department cannot substantively address this comment. It is also important to note that the reference conditions fall within the range and the paleoecological study is just one of multiple lines of evidence that were used to support maintaining the existing criteria for Lake Winnebago.*

76. Whereas the BATHTUB model provides interesting conceptual scenarios of watershed budgets, it presents no timelines and thus no means of capturing the temporal dynamics of water quality remediation. The BATHTUB model provides limited insight into the highly dynamic interactions of external loading and internal cycling of nutrients in Lake Winnebago, and therefore provides limited insight for site specific criteria consideration. (City of Oshkosh with concurrence from City of Fond du Lac)

*Response: When the lake modeling approaches were presented by the department and USGS to Fond du Lac and Oshkosh at Strand's office on May 28, 2015, Mr. Austin of CH2M Hill was brought in as a lake modeling expert and commented that the approaches used in the modeling were sound and while he had concerns regarding some aspects of the modeling he acknowledged that he could not think of better ways of conducting the modeling for Lake Winnebago. In addition to the BATHTUB model, the department and USGS utilized statistical regression analysis and the Jensen model to examine the impact of external loadings and internal loadings.*

77. A reduction of 75% of external loading is highly optimistic because most of it comes from nonpoint sources. If attainable, it will not be so for some decades to come. It would be useful to run the Jensen model with a realistic phasing of watershed controls, e.g. 10% reduction by 2020, 40% by 2030, etc. to determine the timeline to meet water quality standards. This should be included in the TMDL to inform the allocations and implementation timeline as the TMDL is the regulatory document. This should not be saved for the Implementation Plan because it will be too late for consideration in applying the TMDL to discharge permits. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: The TMDL is not a regulatory document. The TMDL does not create new regulations nor can it supersede existing regulations rather the TMDL relies on existing regulations such as chs. NR 151 and NR 217, Wis. Admin. Code for implementation. The TMDL can not layout implementation timelines for permits different than what is allowed in code. Please see s. NR 217.16(4) Wis. Admin. Code.*

**Allocation Comments:**

78. Point Source individual permit baseline phosphorus loadings have significantly increased from prior information communicated in stakeholder meeting prior to the draft TMDL (August 23, 2017 stakeholder meeting). The TMDL reports 19% of baseline loading is from point source individual permits for the entire basin, up from 12% reported in the August 2017 meeting. For just the Upper Fox basin, it increased from 18% to 29%. For "non-controllable" sources like forest/wetland, baseline phosphorus loading decreased from the August 2017 stakeholder meeting to the draft TMDL from 28% to 10%. A detailed discussion should be provided on how these baseline loadings have changed and explanation of how this has impacted point source allocations when the proportional allocation approach has "adjusted" point source allocations equal to the sub-basin target. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: The baselines were adjusted based on updated discharge data from point sources occurring between since the August 2017 meeting and as a result of calibration and validation*

*procedures on the SWAT model. This adjustment was clearly articulated during the development process and was the result of stakeholder input.*

*Under the proportional allocation approach, a higher point source baseline affords the point sources a larger overall mass relative to the equal percent reduction applied to all sources.*

79. Only a single allocation approach was utilized even though pool lake modeling shows significant disparity between the impact of municipal and agricultural sources on achieving pool lake water quality. There are significant cost differences between municipal and agricultural source reductions but this is not considered in the TMDL. In response to previous comments, DNR has indicated that the proportional approach provides equal treatment and is cost-effective. The term "cost effective" is commonly used by DNR, such as in facility planning, for alternatives whose costs are within 10% of each other. We request that a cost allocation approach be incorporated in the TMDL to demonstrate this is true. Including this allocation approach will also support a framework for an adaptive implementation of the TMDL. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: The question of more cost-effective allocation scenarios is a matter of perspective and the approach advocated in the comment is valid if one entity is paying for the total reduction; however, that is not the case in the TMDL. Rather reductions are assigned to different sources who are each responsible for implementing the reductions. Each one of these sources could argue that a more economical approach would be to switch reductions from them to another source. Another problem with the approach proposed in the comment is the lumping of sources between permitted sources and nonpoint sources. The reality is that each of these "categories" is made up of individual entities be it industries, CAFOs, family farmers, or wastewater treatment plants. Each of these individual entities has a reduction assigned to it. This is reflected in Appendix N which assigns the load allocation reductions at a field scale thus treating each agricultural source as an individual and unique source. Implementation costs do vary between sources and mechanisms such as water quality trading can be utilized to arrive at a lowest cost compliance option for individual dischargers. This approach is also acknowledged by the cities of Oshkosh and Fond du Lac in comment 82, "so there can be confidence the allocations are equitable".*

*Terms, such as cost effective, can be used in different contexts and are applied in different situations. The Cities have pointed out that under facility planning, cost effective means costs that are within 10% of each other. Such a definition maybe appropriate for facility planning but the term cost effective does not universally mean costs within 10% of each other.*

80. The point source technology limit for total phosphorus is 1 mg/L and was enacted decades ago. It has been fully implemented for many years and is reflected in the TMDL "existing conditions" and baseline source loads. There have also been approved BMPs for municipal storm water and

nonpoint sources. No analysis has been made regarding the degree to which these BMPs have been implemented and are reflected in current and baseline loading. Using an even reduction approach to allocations makes the assumption that all sources have evenly implemented technology-based approaches. For point sources, these technology-based limits have already significantly lowered total phosphorus. This similar reduction has not likely been implemented by nonpoint sources. The TMDL response to comments discussed allocation methodologies that are equitable to all source categories. It is not equitable to point sources to have made significant reductions to meet technology limits, to have a second round of reductions from this TMDL, when it has not been shown or even explored in the analysis whether non-point source loadings have met their performance "requirements" within existing State statute. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: The TMDL baseline condition reflects compliance with regulatory conditions for both permitted wastewater and urban stormwater. These conditions are laid out in either administrative code or permit conditions. For nonpoint sources, current conditions were used. While not every field is in compliance with the agricultural performance standards, modeling indicates that the majority of fields are below the pollutant loading rates allowed under the performance standards. As such, an argument could be made that the nonpoint sources were penalized by being set to existing conditions instead of those required under the performance standards. See Appendix J which shows that the baseline loads for agricultural are below the allowable loads under NR 151.*

81. MEG requests that DNR consider alternative allocation scenarios. For example, DNR should run scenarios to determine whether different allocation methods could be more cost-effective than the proportional approach used in other Wisconsin TMDLs. For this TMDL, where only a small percentage of loadings are from WWTPs and MS4s, DNR should run a scenario where all WWTPs are set at a less restrictive TP limit, such as 0.5 mg/L, at design average flow and all MS4s to the TP-equivalent of a 40% TSS reduction to determine whether this methodology would change the required nonpoint source load allocations significantly. *(Stafford Rosenbaum for Municipal Environmental Group – Wastewater Division)*

*Response: The question of more cost-effective allocation scenarios is a matter of perspective and the approach advocated in the comment is valid if one entity is paying for the total reduction; however, that is not the case in the TMDL. Rather reductions are assigned to different sources who are each responsible for implementing the reductions. Each one of these sources could argue that a more economical approach would be to switch reductions from them to another source. Another problem with the approach proposed in the comment is the lumping of sources between permitted sources and nonpoint sources. The reality is each of these "categories" is made up of individual entities be it industries, CAFOs, family farmers, or wastewater treatment plants. Each of these individual entities has a reduction assigned to it. This is reflected in Appendix N which assigns the load allocation reductions at a field scale thus treating each agricultural source as an individual and unique source.*

*Implementation costs do vary between sources and mechanisms such as water quality trading can be utilized to arrive at a lowest cost compliance option for individual dischargers. This approach is also acknowledged by the cities of Oshkosh and Fond du Lac in comment 82, "so there can be confidence the allocations are equitable".*

82. There is insufficient detail on how allocations were developed and how allocations were "adjusted" and "modified" to consider downstream waters and controllable sources. For example, on Page 84, "adjustments" were made to controllable source allocations to balance the modified facility allocation. There needs to be an appendix that includes details of these "adjustments" and "modifications" so there can be confidence the allocations are equitable, as noted in the justification of using the proportional allocation approach. (*City of Oshkosh with concurrence from City of Fond du Lac*)

*Response: Section 6.2 of the TMDL Report details that allocation approach. The text from page 84 which is referred to in the comment is as follows:*

*"A final check was completed to determine if any of the permitted wastewater facilities received an allocation that requires an effluent concentration below their subbasin's target concentration. If the reduction was due to a downstream waterbody, the following applied (underlines added):*

- If the facility's baseline effluent concentration was greater than its subbasin target concentration, then the facility's allocated load was recalculated so that the final effluent concentration was equal to the subbasin target. Adjustments were made to other controllable source allocations to balance the modified facility allocation. All allocations were then rebalanced so that reserve capacity was 5% of the total allocated load from controllable sources and each source's allocation was proportional to its baseline contribution."*

*As explained in the TMDL Report, the allocations are assigned on a mass basis. A check was conducted for wastewater dischargers to ensure that the resulting effluent concentration, calculated using the mass allocation and facility flow, did not result in an effluent concentration below the subbasin's target concentration. If the facility's effluent concentration was below the target concentration, the facility's mass allocation was increased (the modified facility allocation) until that was no longer the case and the remaining sources were adjusted, one could substitute reduced, until allocations were again achieved.*

83. Installation of drain tile has been significant and experience in the Lower Fox River has shown that contribution from drain tile can be a significant loading to the watershed. The TMDL recognizes that drain tile contributes load but it does not appear to quantify it or require a reduction. SnapPlus also does not model drain tile for agricultural runoff. How is drain tile accounted for in the agricultural



allocations and what will the State require for the agricultural sector to also reduce these sources of runoff within their allocations? *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: While not explicitly called out, the impact of drain tile is implicit in the nonpoint allocations using the loads that were calculated using SWAT. While SnapPlus does not simulate drain tile, ongoing studies continue in both Wisconsin and Minnesota to better quantify the impact of drain tile and to provide enough data to allow modeling of such systems. Ultimately, the load allocation and needed reductions from agriculture need to be met and such reductions need to account for the impact of drain tile and other sources such as gullies and streambank erosion, all of which are implicit in the load allocation.*

### **Margin of Safety and Reserve Capacity Comments:**

84. Including a margin of safety is a good practice for a process that has uncertainty, however understanding how the margin of safety assumptions individually and cumulatively impact the allocations is important to ensure assumptions are not overly conservative. The TMDL currently holds pounds of phosphorus that fall within the categories of margin of safety and reserve capacity that are not available to existing dischargers. These amounts should be specifically quantified in the TMDL. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: The margin of safety is required by USEPA. The margin of safety can be either implicit through conservative assumptions or explicit in which allocations are held in reserve as part of the margin of safety. This TMDL only relies on an implicit margin of safety. A combination of conservative assumptions and the level of detail used in the analysis, as outlined in Section 6.6 of the report, were put forward to USEPA to satisfy the margin of safety requirement. USEPA concurred and no additional or explicit margin of safety was required.*

*The amount of reserve capacity is specifically quantified in Section 6.7 of the TMDL Report: "To calculate the reserve capacity in each TMDL subbasin, the natural background load and general permitted baseline loads were subtracted from the total allowable load, and then the reserve capacity was set as 5% of the remaining controllable load. Reserve capacity allocations are listed in Appendix H for total phosphorus and in Appendix I for sediment."*

85. The TMDL should specify that if a wasteload allocation is retired, for example if a point source stops its discharge, the retired wasteload allocation would be distributed to the remaining point source dischargers. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: The TMDL outlines procedures for the distribution of reserve capacity for new or expanding dischargers. Retired reserve capacity is available to facilities based on a demonstration of need as outlined in the Section 6.7 of the TMDL Report: "Interested dischargers will not be given a*

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*portion of the reserve capacity unless they can demonstrate a need for a new or increased wasteload allocation. Examples of point sources in need of WLA would include those that are a new discharge or those that are significantly expanding their current discharge and would be unable to meet current WLAs despite optimal operation and maintenance of their treatment facility.*

*A demonstration of need should include an evaluation of conservation measures, recycling measures, and other pollution minimization measures. New dischargers must evaluate current available treatment technologies and expanding dischargers should evaluate optimization of their existing treatment system and evaluation of alternative treatment technologies. In addition to evaluation of treatment options, an expanding discharger must demonstrate that the request for reserve capacity is due to increasing production levels or industrial, commercial, or residential growth in the community.”*

### **Compliance Options, Appendix K Downstream vs Local Allocations, and Adaptive Management Targets:**

86. We have a question on the Appendix K Table 1 adaptive management phosphorus targets and we thought it would be best to email you about it. Please don't consider this a formal comment at this point. We understand the point of standards (target) application is the surface water at the outlet of the subbasin. Almost all of the targets are well below associated surface water quality criteria - both the local and the downstream criteria. Can you explain why that would be the case? The appendix K text indicates low targets may reflect the lack of nonpoint sources and other controllable sources in the subbasin; however, the targets are low even where there is significant nonpoint contribution. And in any case, we don't understand why presence or absence of NPS in the subbasin would affect the AM target concentration in the surface water at the outlet of the subbasin. Why would the target concentration be less than 40 ug/L in any subbasin? In particular, Fond du Lac's AM target is 32 ug/L yet the Lake Winnebago criterion is 40 ug/L, and Fond du Lac discharges directly to the lake.

Thanks in advance for explaining this. We do appreciate the inclusion of a table such as this to help dischargers evaluate compliance options. (Strand Associates)

*Response: This comment was received during the public comment period and has been included as part of the record. There are three main reasons for difference observed between the stream adaptive management targets and the reservoir/lake concentration:*

- (1) A simple comparison of concentrations does not illustrate the full picture. The stream concentration is assessed as the median of monthly samples collected over the growing season (May through October) and the lake concentration is assessed as the mean of monthly samples collected over the summer recreational period (June through September). As such, one cannot directly compare the two concentrations without also factoring in the assessment period and method. The median tends to be lower than the mean and the months May and October tend to have lower observed concentrations.*

- (2) *The internal load of Winnebago also factors into the calculation. The internal load drops as external load drops and we did drop internal load an additional 25% but the internal load still does factor into the overall allocations; it is not completely removed or set to zero.*
- (3) *An equal percent reduction was applied to subbasins. In some cases where the controllable load was already low and hence the stream concentration was already likely low, any additional reduction in mass for those subbasins, even though it is a small mass reduction, will result in a lower resulting stream concentration. This is what the text you cite is trying to explain.*

*All three of these reasons factor into the target for the Fond du Lac being 34 µg/L instead of 40 µg/L, each one impacts the result and the impact likely varies by subbasin. Additional text will be added to Appendix K to address this. Also see comment 31.*

87. Within Appendix K, Water Quality Trading, the example of local and downstream wasteload allocation is difficult to follow when comparing against Tables 1 and 2 for a specific facility. The Table headings are not the same as the example provided. Please provide an example using the headings in Tables 1 and 2. Please also explain why the facility's wasteload allocation is simply the subtraction between the "Local WLA" and "Downstream WLA". (*City of Oshkosh with concurrence from City of Fond du Lac*)

*Response: The local wasteload allocation is the wasteload allocation that was calculated to meet local water quality criteria and applies to the HUC 12 or TMDL reach. For example, Artesian Trout Farm has a local wasteload allocation of 104 lbs./year. There are no additional downstream reductions to the HUC 12 that Artesian discharges to so the overall wasteload allocation is also 104 lbs./year.*

*For the City of Oshkosh, the local wasteload allocation calculated to meet local water quality in the Fox River is 60,928 lbs./year; however, to meet water quality criteria for the downstream Lake Winnebago the City of Oshkosh received a final wasteload allocation of 10,384 lbs./year. The difference between these two wasteload allocations 50,544 lbs./year. This represents the amount of additional reduction needed to meet water quality for Lake Winnebago and hence represents the amount of tradable credits that can be obtained from anywhere within the drainage area of Lake Winnebago. So, hypothetically, if Oshkosh is discharging 70,000 lbs./year (again, hypothetically) and Oshkosh has a wasteload allocation of 10,384 lbs./year, they need to reduce their load by 59,616 lbs./year. Of that 59,616 lbs./year reduction, 50,544 lbs./year of trading credits can be obtained from credits generated anywhere within the drainage basin of Lake Winnebago. The remaining 9,072 lbs./year reduction must occur within the Fox River (note: 70,000 – 9,072 = 60,928 which equals the local wasteload allocation). Alternatively, all 59,616 lbs./year of the reduction could occur within or upstream of TMDL subbasin 74 ensuring that both local water quality is met as well as downstream water quality.*

88. With municipal dischargers potentially facing extremely stringent TMDL based limits, it is important that there be a number of viable compliance options available to dischargers. Unfortunately, using current DNR trading guidance, this TMDL will result in a credit threshold so low that long-term credits will be essentially impossible for permittees to obtain. The costs associated with interim credits make trading a much less viable option for permittees. *(Stafford Rosenbaum for Municipal Environmental Group – Wastewater Division)*

DNR should reevaluate restrictions on trading and adaptive management in order to provide more flexible compliance options for point sources. Without such flexibility, municipal dischargers are likely to face substantial costs for facility upgrades well into the future that will not result in meaningful water quality improvement. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: The department is evaluating additional flexibility that can be afforded to the water quality trading program and has proposed updates to the program.*

89. Within Appendix K, Adaptive Management and Table 1, there are only six dischargers in six sub-basins that have an " Adaptive Management Target" above 40 ug/L, with all six being below the receiving water quality criterion of 75 ug/L. *(City of Oshkosh with concurrence from City of Fond du Lac)*

- a. Please provide additional documentation on what these targets mean and why they can be so significantly lower than the receiving water's criterion and why all but six are below Lake Winnebago's criterion.

*Response: As outlined in Appendix K, adaptive management is available to point sources in reaches that are nonpoint dominated and do not meet the water quality targets listed in Table 1 of Appendix K. Please note that these adaptive management targets are instream targets expressed as a median of monthly samples collected between May and October. These targets cannot be directly compared to the numeric lake and reservoir criteria that is expressed as a mean of summer monthly samples. This difference accounts for why the targets appear lower for the streams and rivers than the Lake Winnebago criteria.*

- b. The TMDL concluded that Lake Winnebago is controlling the upstream allocations, why would all but six upstream sub-basins need to reduce to below the Lake Winnebago criterion? There appears to be a bust in the math if 83 of the 89 sub-basins need to be well below the Lake Winnebago criterion.

*Response: There is not a bust in the math; see the response in (a.) above.*

- c. Achieving the "Adaptive Management Targets" within the facilities sub-basins will not be attainable and suggesting that it can be attained questions the validity of the models and modeling approach. These very low Adaptive Management Targets also show that all sub-basins are not opportunities for adaptive management. This does not make sense when nonpoint source loading dominates the TMDL area and heavily dominates most sub-basins.

*Response: The adaptive management targets represent shifting the compliance point for adaptive management from Lake Winnebago to the bottom of each reach allowing point sources to work in a smaller geographic area and with the watersheds they discharge. See the response above for why the adaptive management targets appear to be less than the lake criteria. Per NR 217, adaptive management is only a viable compliance option in watersheds that are nonpoint dominated.*

#### **Nonpoint Implementation Comments:**

90. The TMDL includes a nice summary of current programs that can contribute to reducing nonpoint source nutrient and sediment loading. However, the fact remains that the State is not implementing or enforcing their own regulations. The TMDL must include a summary of how the State, including DATCP and DNR, will implement and enforce existing regulations and how the State will fund and offer cost share so that regulations can be implemented. This summary should include how the implementation is different than current implementation strategies and how the proposed implementation will improve sediment and nutrient reductions more quickly than current efforts. The summary should also include a schedule with mass reductions targets so that those can be compared against timelines applied to point sources. This should not wait until the post-TMDL implementation plan because this information is needed now for point sources to evaluate trading and adaptive management compliance options. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: The information in Appendix K provides the necessary information for point sources to assist in evaluating water quality trading and adaptive management as compliance options. As written in a comment from Strand Associates, "We do appreciate the inclusion of a table such as this to help dischargers evaluate compliance options"; it appears enough information exists for facilities to evaluate compliance options.*

*Regarding the remainder of the comment, a TMDL does not establish compliance timelines and is not self-implementing, but rather relies on existing statutes, administrative codes, and permits for implementation. The Cities' compliance period is set through administrative code and the permit process. Reductions to nonpoint sources are implemented through a combination of federal, state,*

*and local programs. Any sort of timeline or additional requirements inserted into the TMDL for nonpoint sources would be non-binding and not have the effect of rule.*

91. At the July 2018 stakeholder information meeting, DNR commented that additional requirements for implementation of NR 151 would need to be promulgated through NR 151.004 This is required by NR151.004 and NR151.005 because the modeling has shown that existing NR 151 regulations will not attain water quality and TMDL reductions below the existing NR151 performance standard will not attain water quality. Appendix J demonstrates that the majority of agricultural lands may already be significantly below the NR151 performance requirements of a PI=6, where TMDL reductions impart further reductions. Because NR151.005 requires a rule be promulgated under NR151.004 for the TMDL reductions to become a requirement for nonpoint loadings, when will DNR be promulgating a rule to require nonpoint source reductions? *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: The decision to initiate rule making for a targeted performance standard to address a TMDL is not made by DNR alone. We would look for broad community support or respond to a request from the affected stakeholders to develop a targeted performance standard before we undertook such a project. The DNR undertook only the first targeted performance standard in 2016 and is now taking on a second one in 2019. The capacity for rulemaking is not unlimited within the program so the priority of a request would need to be weighed.*

92. Wisconsin was a leader in establishing technology-based effluent limits on phosphorus back in 1992 at 1.0 mg/L. As a result, Wisconsin municipal treatment plants have already removed approximately 90% of the phosphorus in their discharges. It is thus not surprising that most of the phosphorus impairments in Wisconsin's waters do not come from municipal treatment plants, but from nonpoint sources.

The TMDL seeks to impose extremely restrictive limits on point source dischargers, despite the fact that baseline phosphorus loadings in the Upper Fox and Wolf River TMDL area are dominated by nonpoint sources. Because point sources have already removed a substantial amount of phosphorus from their discharges, reducing phosphorus discharges from point sources to the level proposed in the TMDL will not result in meaningful water quality improvement. Scenarios modeled by USGS in 2016 showed only a 2% reduction in Lake Winnebago total phosphorus (TP) concentrations even if WWTP loadings were set to zero. This reduction may not even be measurable.

The Draft TMDL Report discusses reasonable assurances for reduction of phosphorus from nonpoint sources. Such efforts have, however, been historically ineffective. MEG requests that DNR provide further explanation as to how TMDL implementation will achieve the proposed reductions in



nonpoint source phosphorus pollution. (*Stafford Rosenbaum for Municipal Environmental Group – Wastewater Division*)

*Response: The reductions in the TMDL are based on meeting both local water quality standards and the water quality standards for downstream lakes. There are multiple efforts from a variety of sources intended to reduce phosphorus from nonpoint sources. All of these efforts continue to gain momentum (whether it is cover crops, farmer-led initiatives, targeted performance standards). State, federal and local governmental entities are implementing available programs to the extent allowable by statutes and codes. The post-TMDL implementation plan or 9-Element watershed plan is the appropriate place to detail commitments by those responsible for nonpoint source implementation outlining effective actions to meet the load allocation.*

93. Example A, B, and C calculations in Appendix J seem to be referencing the wrong table on where to find TP Percent reduction for each subbasin. In the Examples A, B, and C it says to refer to Appendix G, Table 6 for finding percent TP reductions required. Appendix G, Table 6 reads Baseline total phosphorus (TP) and total suspended solids (TSS) loads for municipalities with MS4 permits. Baseline loads include a 20% TSS reduction and 15% TP reduction from loads estimated by the UFWB SWAT watershed model. I believe that the table that this example is probably referring to is Appendix H, Table 6 which reads Annual total phosphorus reductions to meet local water quality targets and additional reductions to meet targets in downstream waterbodies. Reductions for TMDL subbasins 55, 56, 58, 59, 80, and 81 (marked with an asterisk,\*) include recommended load reduction goals from point and nonpoint sources on tribal lands in each subbasin or should each example refer to the corresponding table in Appendix J? (*Outagamie County LCD*)

*Response: Thank you for the comment. Examples A, B, and C in Appendix J have been corrected.*

94. The first line (The SnapPlus target yield for (Model Subwatershed/Subbasin/Huc 12) is calculated from) in each example suggests that the calculations in Examples A, B, and C are supposed to show the reader how the target yield numbers in Appendix J Tables 1, 2, and 3 were calculated. If so it appears the wrong numbers are being used in each of the examples for the SnapPlus Baseline Yield and each subsequent target yield is incorrect and does not match that of the tables.

Example A. In this example the Baseline TP yield (lbs/ac/yr) in Appendix J, Table 2 is 2.37 lbs/ac/yr but in Example A the value stated is 1.72 lbs/ac/yr.

The resulting math of SnapPlus Target Yield =  $2.37 \text{ lbs/ac/yr} * (100\% - 83\%) = .4029 \text{ lbs/ac/yr}$ . This matches the Target (lbs/ac/yr) listed in Table 2 of 0.41

*(Outagamie County LCD)*

*Response: Thank you for the comment. Examples A, B, and C in Appendix J have been corrected. Additional text will also be added to Section 4.3 of Appendix J:*

*“Because percent reductions are calculated from TMDL Subbasin LAs, they are unique to TMDL Subbasins and are not calculated for any other watershed scale (Model Subwatersheds and HUC12s). SnapPlus yield targets for the other watershed scales are calculated by applying the percent reduction corresponding to the TMDL Subbasin that the watershed is located within. For example, since Model Subwatershed 1 is in TMDL Subbasin 78, we use the percent reduction for TMDL Subbasin 78 (34%) to determine the SnapPlus target yield for Model Subwatershed 1. In some cases HUC12s are larger than TMDL subbasins, and in other cases the converse is true, and therefore the percent reductions and SnapPlus target yields for HUC12s are area-weighted averages of the values associated with overlaying TMDL subbasins. In Table 3, when there is overlap between HUC12s and multiple TMDL Subbasins, only TMDL Subbasins that comprise 10% of its total area are listed in the TMDL subbasin column”*

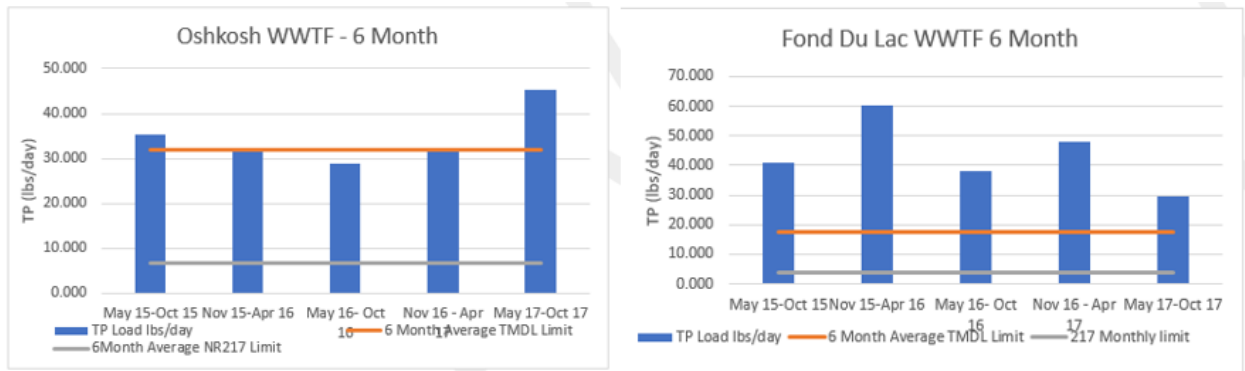
### **Phased TMDL and Staged Implementation Comments:**

95. The City had discussed with the TMDL team an approach for developing the TMDL with interim milestones and phased, adaptive implementation. The City believes that interim milestones and wasteload allocations could be included in the TMDL to recognize a phased or staged approach and to allow the TMDL to be implemented over time to allow for adaptive implementation of the TMDL. The adaptive implementation process would include initial load reductions and could be followed by monitoring and modeling, additional investigation of potential SSCs or UAAs, modifications to the TMDL if appropriate, and continuation of this cycle.

Without this phased or staged approach, point sources would be forced to meet "final" allocations in a very short timeframe compared to nonpoint sources, and anti- backsliding rules would apply to the point sources even if it is later found that a more moderate allocation would have been appropriate for them. Thus, without the phased or staged approach, the TMDL will not be equitable in its allocations, and most importantly, the TMDL will not be implementable within a timeline similar to what the City is held to in their permit. (*City of Oshkosh with concurrence from City of Fond du Lac*)

*Response: The TMDL allocations must be set to meet water quality standards. Wisconsin Administrative Code already outlines the US EPA approved phased approach. Specifically, s. NR 217.16 governs the relationship between WQBELS and TMDL derived mass allocations. Under s. NR 217.16, a TMDL derived mass allocation maybe placed in leu of a more stringent effluent limit calculated under s. NR 217.13 and may remain in effect while nonpoint reductions are being implemented. If sufficient reductions can not be attained from nonpoint sources, DNR may remove the TMDL derived effluent limits and replace them with the more stringent s. NR 217.13 derived effluent limits. The figure and table below reflect the relief, and thus the “phased approach”, that*

the Cities benefit from by using the TMDL derived mass allocations in place of the more stringent s. NR 217.13 limits.



Facility	NR 217.13 Limit (mg/L)	Current avg. (mg/L)	TMDL Allocation 6 month avg. (mg/l)	TMDL Allocation Monthly (mg/L)
Oshkosh	0.04	0.35	0.31	0.93
Fond du Lac	0.04	0.64	0.27	0.82

96. MEG requests that DNR strongly consider and provide additional information on a phased TMDL implementation. This is particularly necessary for this TMDL area, where there is such significant uncertainty that the water quality criterion is appropriate and attainable. A phased TMDL would provide additional time to study and revise the criteria if appropriate, without locking permittees into stringent wasteload allocations that could be subject to anti-backsliding restrictions.

A phased TMDL would also allow for achievement of interim milestones and waste load allocations while allowing time for achieving important nonpoint source reductions. A phased implementation process could include initial load reductions followed by monitoring and modeling and resulting modifications to the TMDL allocations. Without a phased approach, point sources will be forced to meet final allocations over a short timeframe as compared to nonpoint sources. And, as discussed above, reductions from such allocations will not result meaningful water quality improvements.

The authority to implement a phased TMDL approach exists under the Clean Water Act. The U.S. EPA has issued several guidance documents that discuss the permissible use of phased or staged TMDLs. See *Guidance for Water Quality-Based Decisions: The TMDL Process*, Environmental Protection Agency (1994); *Memorandum: Clarification Regarding "Phased" Total Maximum Daily Loads*, Environmental Protection Agency (2006). MEG requests that DNR provide further evaluation of a phased approach to the Upper Fox and Wolf River TMDL. (*Stafford Rosenbaum for Municipal Environmental Group – Wastewater Division*)

Authority exists to implement phased TMDLs/staged implementation within the administrative code. During the discussions in 2016, the USEPA was supportive of a phased approach and there are other examples such as the East Branch of the DuPage River, Salt Creek dissolved oxygen TMDLs in Illinois and others in various other USEPA regions. It is important to note that USEPA has issued several guidance documents that discuss the permissible use of phased TMDLs and staged implementation. See *Guidance for Water Quality-Based Decisions: The TMDL Process*, Environmental Protection Agency (1991); *Memorandum: Clarification Regarding "Phased" Total Maximum Daily Loads*, Environmental Protection Agency (2006). In addition, the use of a phased approach for TMDLs has been acknowledged by the courts in various challenges to the TMDL process in those cases. See, e.g., *Natural Res. Defense Council v. Muszynski*, 268 F.3d 91 (2d Cir. 2001); *S. Appalachian Mountain Stewards v. Red River Coal Co., Inc.*, 2015 WL 1647965 (W.D. Virginia 2015). (*City of Oshkosh with concurrence from City of Fond du Lac*)

*Response: Response: Phased or staged TMDL wasteload allocations (WLAs), as described in the comment, are not supported by the memo referenced (Memorandum: Clarification Regarding "Phased" Total Maximum Daily Loads, U.S. EPA 2006) in that WLAs are unable to be phased in the way envisioned in the comment as outlined below. However, implementation of wasteload load allocations and other water quality based effluent limits can be "phased" through use of adaptive management or the multi-discharge variance (MDV).*

*U.S. EPA's memo also clearly states that all TMDL WLAs must be set to meet water quality standards:*

*"Under the phased approach the TMDL has LAs (load allocations) and WLAs (wasteload allocations) calculated with margins of safety **to meet water quality standards**" (emphasis added by U.S. EPA).*

*TMDLs do not create new regulatory requirements but rather are implemented through existing regulations. For Wisconsin, ch. NR 217, Wis. Adm. Code sets out the requirements for implementation of the wasteload allocation from a TMDL. Specifically, s. NR 217.16(2):*

*If the phosphorus limitation based on an approved TMDL is less stringent than the water quality based effluent limitation calculated in s. [NR 217.13](#), the department may include the TMDL based limit in lieu of the limit calculated in s. [NR 217.13](#) if the limit calculated under s. [NR 217.13](#) has not yet taken effect. If the department includes the TMDL based limitation for phosphorus in the WPDES permit in lieu of the limit calculated in s. [NR 217.13](#), the TMDL based limit may remain in the permit for up to two permit terms to allow time for implementation of the TMDL, or the implementation period specified in the TMDL, whichever is less. The department may include a schedule of compliance to achieve a TMDL based limit if the department determines a schedule of compliance is necessary.*

*Please note that NR 217.16(2) is consistent with a phased TMDL approach as laid out in U.S. EPA's memo from 2006:*

*In such cases, the Guidance recommends that some additional provision in the TMDL, such as a schedule and description of the implementation mechanisms for nonpoint source control measures, be included to provide reasonable assurance that the nonpoint source measures will achieve the expected load reductions. Such additional provisions also assure compliance with federal regulations 40 CFR 130.2(i), which provide that in order for the wasteload allocations to be made less stringent, more stringent load allocations must be "practicable".*

*To bolster the reasonable assurance section of the TMDL, the department is utilizing new modeling capabilities to express the load allocation as an edge of field yield consistent with output from SnapPlus and has conducted analysis to show that the load allocations in the TMDL, which give point sources relief from NR 217.13 limits, are achievable with reasonable implementation of agricultural management practices.*

*The East Branch and Salt Creek TMDLs are being taken out of context in their relevance to the Upper Fox and Wolf Basin TMDL. The TMDLs for the DuPage River and Salt Creek in Illinois were for chlorides and total dissolved solids (TDS), and the "phased implementation" was related to NPDES permit requirements to reduce phosphorus, for which Illinois has not adopted numeric criteria. However, it can be used as a hypothetical for comparison. If a state does not have numeric promulgated water quality standards for the pollutants in question, then water quality targets can be used in setting allocations. The lack of numeric water quality standards allows more flexibility for so called phased or adaptive approaches such that targets are set in the TMDL and once reached compared to water quality monitoring and then targets can be adjusted as needed. Wisconsin has promulgated numeric phosphorus criteria which prevents this approach for phosphorus TMDLs in Wisconsin; however, through negotiations with U.S. EPA the department was successful in gaining elements of a phased or adaptive approach for point sources through NR 217.18, the watershed adaptive management option.*

*When questioned about the TMDLs, U.S. EPA noted that while the East Branch and Salt Creek TMDLs contain phased implementation for BOD and dissolved oxygen, this was due to a unique circumstance involving the removal of a dam. Subsequent TMDL approvals (for example, the Ottawa River, Ohio, TMDL Decision Document) explicitly state that timelines and milestones included in the TMDL regarding the implementation of WLAs permits are not part of the EPA decision document. EPA approval is for the allocations; permit conditions and compliance schedules are laid out in administrative code and set during the permitting process.*

*The additional legal cases cited at the end of this comment, over earlier versions of the comment that cited other legal cases, do not pertain to Wisconsin which has its own set of administrative*

*rules, contained in ch. NR 217, Wis. Admin. Code, for the placement of TMDL mass allocations in permits.*

97. The EPA guidance documents approve the use of a phased approach where, as is the case in the Upper Fox River basin, the City believes that the use of future data or improved analytical techniques will increase the accuracy of the load calculations necessary to achieve the appropriate water quality criteria.

Also related to this, the City was encouraged that macrophytes are included in the TMDL and agree that macrophytes can play a critical role in reducing suspended sediment and internal phosphorus loadings within in the pool lakes. An initial estimate of 25 percent reduction of internal loading was modeled and we believe that estimate might be low, especially given the history of the pool lakes with its high density of macrophytes. Additional factors will impact internal loading, such as carp and other invasive species. Implementing best management practices for reducing internal loading will require time and could have impact much greater than the assumed 25 percent reduction. A phased TMDL approach would support an adaptive strategy for implementing the TMDL in the pool lakes, and it should also include a scenario with greater reductions than 25 percent.

For all of the above reasons, we believe the suggested phased, adaptive implementation approach to the TMDL process for this basin is not only appropriate under the unique factual circumstances but also supported by applicable law and should be specifically provided for within the TMDL. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: Please see earlier comments regarding phased TMDLs.*

*The impact of carp is implicitly accounted for in the modeled internal loadings and any potential reduction due to carp management measures was not considered because the department's fisheries program has stated that no method exists that can differentially only harvest carp without harming other fish species, specifically lake sturgeon. As such, the department was limited to examining the impact of aquatic plant restoration and its impact on internal loading. Section 5.1.3 of the TMDL Report explains the department's analysis. Figure 17 of the TMDL Report shows the current extent of vegetation and what is potentially restorable under current water level management and what could be restored under a three-foot drawdown. The comment provides no supporting documentation or analysis for supporting a higher percent reduction attributed to aquatic plant restoration.*

*If a phased approach could be implemented, we feel it would be less favorable to the regulated community because the department would be required to implement it on the selected 25% reduction in internal loading used in the selected allocation scenario (Scenario B). Under such a phased approach, allocations would be adjusted down to Scenario A levels if after a prescribed implementation period, likely 10 to 15 years to be consistent with s. NR 217.16(2), the necessary*



*restoration in aquatic vegetation and accompany reductions did not occur. In addition, internal load reductions were coupled with external load reductions meaning that both Oshkosh and Fond du Lac benefit in their wasteload allocations from reductions in internal loadings without those reductions being tied to specific actions.*

### **Permitted Municipal Separate Storm Sewer System:**

98. The Upper Fox/Wolf River TMDL Hearing Draft document identifies a TSS Waste Load Allocation (WLA) to the City of Oshkosh MS4 system for the Sawyer Creek Subbasin (Subbasin 30). However, neither Sawyer Creek, nor any downstream waterbody, is listed as "impaired" for TSS or TSS related issues, on the 303(d) list. The TMDL provides no justification for assignment of a TSS WLA for the City of Oshkosh's MS4 system in Sawyer Creek. Please explain the rationale for this assignment of a TSS WLA to the Oshkosh MS4 system or remove the TSS WLA. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: Only a portion of Wisconsin's water have been assessed as being impaired or not. Sawyer Creek is one such waterbody that has not been assessed yet for TSS or TP impairments; however, it has been evaluated for chloride. TMDLs serve both as water quality restoration plans for documented impaired waters and water quality protection plans to maintain existing health and restore undocumented impairments. The allocations for Sawyer Creek are set to meet water quality criteria and water quality targets for Sawyer Creek. For TSS, Sawyer Creek has a 47% percent reduction from baseline which indicates that the TMDL baseline pollutant loadings are too high for Sawyer Creek to meet water quality criteria or targets. Such a high reduction indicates that Sawyer Creek is likely suffering from excessive sedimentation or TSS related impairments. The TMDL allocations and corresponding reductions serve to both maintain and improve existing water quality.*

99. MS4 existing pollutant loads (TSS and TP) and waste load allocations (WLAs) were calculated differently during the development of the Upper Fox/Wolf River Basins TMDL compared to all previous TMDLs in the state. Two examples include:
- a. Using SWAT instead of WinSLAMM to generate MS4 pollutant loadings
  - b. Accounting for pollutant deposition in the streams and channels

The new and unique approach for MS4 pollutant load analysis, and how it will impact implementation approaches for MS4s, must be more clearly defined in the Upper Fox/Wolf River Basins TMDL document. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: The statement "were calculated differently during the development of the Upper Fox/Wolf River Basins TMDL compared to all previous TMDLs in the state" is not an accurate statement. A similar approach was employed in the Milwaukee River Basin TMDL. The Milwaukee*

*River Basin TMDL used HSPF modeling, checked against WinSLAMM, to calculate urban pollutant loads and accounted for pollutant deposition in streams and channels. A similar approach was employed in the Upper-Fox Wolf Basin TMDL; however, instead of HSPF, the modeling was conducted with SWAT with checks made using WinSLAMM. The use of SWAT allowed for routing of urban loads to downstream waterbodies. In addition, urban areas were differentiated into 4 cover types instead of just one allowing for more refinement in the modeling. Additional language will be added to the report concerning implementation of the percent reductions within the MS4 General Permit.*

100. The Upper Fox/Wolf River TMDL Hearing Draft document identifies an 83% reduction in Total Phosphorus (TP) for the City of Oshkosh MS4 for all four subbasins impacted by the MS4 system (See Appendix H, Table 5; page 13). The City of Oshkosh has conducted extensive city-wide stormwater pollution reduction analyses in accordance with WDNR procedures and policies in 2008 and 2014. Each of these planning documents evaluated the maximum level of pollution reduction achievable under extreme scenarios. The analyses found that even if 100% of the MS4 land area were treated with available management measures (an unrealistic assumption) the TP reduction targets of the Upper Fox/Wolf River TMDL Hearing Draft could not be achieved. With the adoption of this TMDL document, the WDNR is setting standards that, are not technically, or financially attainable. The City of Oshkosh requests that the TMDL document be amended to acknowledge the fact that the MS4 TP targets cannot be attained through current, or foreseeable future management measures. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: The department is unable to comment on the unseen results of the analysis conducted by the City of Oshkosh. The TMDL reductions for the permitted MS4s are implemented through the permit. Several compliance options are available through the permit including water quality trading and an extended compliance schedule. These implementation options were placed in the permit to address financial and technical concerns. Please refer to the City's permit for details.*

101. The City of Oshkosh recognizes the nature of stormwater discharge and agricultural runoff as "diffuse pollution sources". However, in the case of the Upper Fox/Wolf River TMDL the disparity between the MS4 phosphorus discharge compared to the entire basin's agricultural sources is so enormous, that the TMDL should recognize this condition. The City of Oshkosh recommends that the TMDL document include this statement: "Even if all MS4 sources met their total phosphorus Waste Load Allocation, the net impact on the trophic condition of the Winnebago Pool Lakes would not be measurable and would fall within the margin of error of the TMDL modeling analysis." *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: Such a comment could apply to any of the individual sources within the TMDL. This includes both permitted and unpermitted MS4s, permitted and unpermitted agricultural operations, and permitted wastewater dischargers.*

102. While we understand that the TMDL process is incredibly complex and that no stakeholder will believe the results to be entirely fair, our MS4-and I'm sure other point sources--continue to be very concerned about the disparity between point source and nonpoint source expectations. The report confirms that a majority of the phosphorus entering Lake Winnebago is from nonpoint sources, yet actions by those sources are voluntary and require a cost share. MS4s and wastewater plants will be spending millions of dollars to achieve the limits set by the TMDL, with no measurable improvement to the Lake's water quality. *(City of Fond du Lac, Municipal Separate Storm Sewer System)*

*Response: The percent reduction stipulated in the TMDL, which is a proportional mass reduction based on contribution, is measured from a baseline condition. The baseline for municipal point sources such as Fond du Lac is set to reflect permit limits, even if existing effluent quality is lower (better) than what is permitted. The agricultural baseline condition reflects existing average conditions, which in most cases is lower than regulatory requirements.*

*Under the TMDL, the bulk of the mass reduction is assigned to nonpoint sources. Because of these allocated reductions to nonpoint sources, the TMDL provides Fond du Lac with a higher effluent limit than it received under NR 217.13, Wis. Admin. Code.*

*Issues pertaining to equality based on nonpoint cost share requirements should be directed toward the legislature. The department does have the ability, if directed by the legislature and governor's office, to adopt more stringent nonpoint performance standards consistent with the load allocation and nonpoint reductions.*

103. MS4 existing pollutant loads (TSS and TP) and waste load allocations (WLAs) were calculated differently during the development of the Upper Fox/ Wolf River Basins TMDL compared to all previous TMDLs in the state. One example is the use of WinSLAMM loadings versus SWAT loadings for urban areas. All previous TMDL analyses were based on WinSLAMM loadings for MS4s, which is consistent with the most common modeling tool used by MS4s and endorsed by DNR. The SWAT generated MS4 pollutant loadings used in the Upper Fox/ Wolf Basin TMDL results in pollutant loadings that are orders of magnitude less than WinSLAMM. Another discrepancy is the delivery point, and thus reporting point, for the MS4 pollutant loads. Supposedly the SWAT modeling accounts for pollutant deposition in the streams and channels between the storm sewer outfall and a receiving water. However, for the two major MS4s in the Upper Fox/ Wolf River Basins (Oshkosh and Fond du Lac), most of the storm outfalls discharge directly to the impaired receiving water and there is little to no pollutant deposition occurring. Both of these issues mean that calculating MS4 progress toward achieving the WLAs will require new approaches compared to other TMDLs. This will especially be a concern if/when MS4s evaluate water quality trading with agricultural sources (for example: which urban pollutant loads will be applied- SWAT or WinSLAMM values?). The new and unique approach for MS4 pollutant load analysis, and how it will impact implementation

approaches for MS4s, must be more clearly defined in the Upper Fox / Wolf River Basins TMDL document. *(City of Fond du Lac, Municipal Separate Storm Sewer System)*

*Response: As stated in the TMDL, the permitted MS4 reductions are implemented through the MS4 permit. The implementation mechanism laid out in the permit and further explained in the guidance relies on a percent reduction framework. This approach is consistent for all TMDLs within the state of Wisconsin. Fond du Lac can use WinSLAMM or an equivalent model to simulate the no-controls scenario and apply the percent reductions stipulated in the permit to obtain the needed mass. Fond du Lac can then add in management practices and compare the results to determine what additional reductions are needed. This entire process can be done with WinSLAMM and does not require new approaches compared to other TMDLs.*

104. The MS4 WLAs require a very high reduction in pollutant loads. Based on previous citywide WinSLAMM modeling and ongoing citywide WinSLAMM modeling we do not believe that it is currently technically feasible to meet the proposed WLAs. *(City of Fond du Lac, Municipal Separate Storm Sewer System)*

*Response: Please see response to comment 100.*

#### **Incorporation by Reference of Previously Submitted Comments:**

105. Thank you for the opportunity to comment on the July 2018 draft TMDL Reports. These comments are submitted on behalf of the City of Oshkosh (the "City"). We understand the City of Fond du Lac has filed technical comments on August 2, 2018, a copy of which is attached hereto. Please be advised the City of Oshkosh joins in the City of Fond du Lac's August 2nd comments for the record in this matter.

*Response: The comments and responses from August 2, 2018 are included and reflect that both Oshkosh and Fond du Lac submitted the comments.*

Also, the City of Oshkosh, along with the City of Fond du Lac, have filed numerous written comments in the record of this matter including, but limited to, the following:

- a. Position Statement in support of the requests by the cities of Oshkosh and Fond du Lac for the Wisconsin Department of Natural Resources (WDNR) to conduct standards attainability evaluation for the Upper Fox/Lake Winnebago basin dated June 30, 2014;

**POSITION STATEMENT IN SUPPORT OF THE REQUESTS BY THE CITIES OF  
OSHKOSH AND FOND DU LAC FOR DNR TO CONDUCT A STANDARDS  
ATTAINABILITY EVALUATION FOR THE UPPER FOX/LAKE WINNEBAGO BASIN**

**A. Introductory Statement**

The current phosphorus water quality criterion for Lake Winnebago is 0.04 mg/l. DNR is currently engaged in a total maximum daily load ("TMDLs") process that will assign new reduction requirements for all sources of phosphorus in the basin, with the goal to achieve the .04 mg/l criterion.

The development of a phosphorus based TMDL for the Upper Fox River poses a number of unique challenges, particularly given the role of Winnebago pool lakes. Lake Winnebago and the associated lakes (Butte des Morts, Winneconne and Poygan) are large shallow lakes with large amounts of legacy phosphorus. As indicated in this Position Statement, the preliminary analyses by consultants for the cities of Fond du Lac and Oshkosh also indicate that benthic release of phosphorus from sediments and the mass balance of phosphorus in the basin are substantial concerns. For these reasons, it is likely that achievement of the water quality standard of 0.04 mg/l is not attainable. If that is the case, then setting allocations based on that number does not make sense.

Therefore, before any allocations are made as part of the TMDL, the potential to attain the designated use and water quality criterion should be evaluated. This could be done as a formal use attainability analysis (UAA) or site specific criteria (SSC) analysis, or at a minimum, as a preliminary evaluation of data to determine whether the designated use and water quality criterion can be attained (the "Cities' Suggested Approach"). Sound TMDL allocations must be based on sound data and science. At a minimum there should be a pause in the process to allow the preliminary data to be evaluated against the factors set forth in 40 CFR s. 131.10(g) and other relevant guidance, and to determine whether the designated use and water quality criterion can be attained before allocations are made.

The Cities' Suggested Approach not only makes sense from a sound science and policy perspective, it is fully consistent with recent guidance from EPA and the DNR that establishing designated uses that accurately reflect the properties of a waterbody is crucial to achieving the goals of the Clean Water Act.

Against that background, the purpose of this Position Statement is to support the Cities' Suggested Approach by providing:

- (1) The results of a preliminary technical analysis which indicates that Lake Winnebago has significant internal phosphorus loadings (including significant naturally occurring benthic and other sources), which will likely prevent the achievement of the current .04 mg/L criterion even if point and non-point sources are reasonably controlled.

- (2) Legal support for the Cities' Suggested Approach that a UAA or similar analysis should be conducted before any allocations are made in the TMDL process.

**B. Preliminary Technical Analysis Supports the Request for DNR to Conduct the UAA for Lake Winnebago**

1. A survey of available data for the basin strongly supports the proposition that there are very significant sources of phosphorus that are naturally occurring in the Lake Winnebago basin.

A limited literature review was conducted to identify the likely range in magnitude of benthic phosphorus loading sources affecting Lake Winnebago. This review concluded that benthic sediments contribute between 22,000 and 1,954,000 pounds per year of phosphorous to Lake Winnebago. The large range is due to the fact that the rate of phosphorous release from sediments is related to several inter-related factors, the most significant of which is temperature. The best professional estimate of the Cities' consultants, based on the literature search and experience, is that the lake currently receives about 1,000,000 pounds per year from the benthic sediments. Furthermore, previous evaluations of Lake Winnebago nutrient loading have concluded, "The total phosphorus (TP) profile in Lake Winnebago is a digenic profile and does not reflect an increase in phosphorus load over the past 60 years" and "From early on, these lakes have probably always been eutrophic" (*Transport and Fate of Sediments and Nutrients in the Winnebago Pool System*, Gustin, August 1994). The benthic profile data support the conclusion that the Lake was eutrophic before the human induced increases in nutrient loading,

Lake Winnebago has long supported a fishery and both primary and secondary recreation. The evidence is that Lake Winnebago has never met the 0.04 mg/l phosphorous criterion. Further scientific study would likely justify a site specific phosphorous criterion somewhat higher than 0.04 mg/l under NR102.06 (7).

2. Preliminary mass balance analysis conducted from the available data in the basin supports the Cities' contention that upstream, historical, and/or naturally occurring sources of phosphorus will prohibit the attainment of the current phosphorus numerical criterion. A simplified mass balance was completed by quantifying the loads entering and exiting the lake using information currently available in the public domain (for 2009 through 2011). This included, among other sources, the United States Geological Survey (USGS) flow data, the Wisconsin Surface Water Integrated Monitoring System (SWIMS), the Lower Fox River TMDL study, the Public Service Commission (PSC) of Wisconsin reports for source (drinking) water supplies, and Discharge Monitoring Reports (DMRs) filed by point source dischargers. The results of this study demonstrate the Oshkosh WWTF and Fond du Lac WPCP represent approximately 2.9 percent and 2.2 percent of the influent phosphorus load to Lake Winnebago, respectively. Assuming the concentration in the lake effluent is equal to the concentration within the lake, the



average lake concentration ranges from approximately 0.06 to 0.1 mg/L. There was a net storage of phosphorus (i.e., sedimentation) in the lake during this time period.

The simple mass balance indicated that if both treatment facilities achieved a WQBEL of 0.04 mg/L, the total reduction in phosphorus load to the lake would be approximately 35,700 pounds per year. This would only reduce the current concentration in the lake by between 3.8 to 6.5 percent, representing only a few hundredths of a milligram per liter.

As part of this evaluation, the average flow of each input and output (rivers, wastewater treatment facilities, water withdrawals) was multiplied by its respective water quality criterion, proposed WQBEL, or source water concentration to determine the feasibility of reaching a phosphorus concentration of 0.04 mg/L in the lake. Even at the established water quality criteria and proposed WQBELs, over 500,000 pounds per year of phosphorus would still need to be removed to achieve a lake concentration of 0.04 mg/L. It is also important to note that groundwater flow into the lake is insignificant based on the water balance, which provides minimal opportunities for dilution. Therefore, it appears future phosphorus loads coming into the lake at respective river water quality criteria and proposed WQBELs are such that the lake would likely never reach 0.04 mg/L. The net storage (sedimentation) of phosphorus observed during the 2009 through 2011 time period is evidence of a buildup of phosphorus in the lake sediments that represents a potential long-term source of phosphorus, as discussed previously. Furthermore, given that Lake Winnebago was potentially eutrophic prior to European settlement, thus contributing to the amount of legacy phosphorus, it appears unlikely that the water quality criterion of 0.04 mg/L is attainable.

**C. DNR's Own Technical Support Document for the Lower Fox TMDL Provides Further Support of the Cities Request for a UAA or SSC for Lake Winnebago**

The following comment and response appears at p. 154 of the DNR's Technical Support Document for the establishment of the TMDL for the Lower Fox River basin:

**“14. Comments:** Please consider using a more equitable reduction (proportional to the loading) for Lake Winnebago (outlet) until the Wolf River and Upper Fox River TMDLs are complete.

**Response:** This was considered early in the TMDL development process. However, based on conversations with various researchers studying the Lake Winnebago system, a 40% TP reduction and a 48% TSS reduction are the most munificent reductions we can assume from Lake Winnebago, since naturally it is a eutrophic/hyper eutrophic lake. *Reducing the phosphorus concentration leaving the lake by greater than 40% at the outlet of the lake may not be possible given the part of the phosphorus input to Lake Winnebago likely originates from internal lake loading (released from bottom sediment).” . . . .*

(Emphasis added.)

The foregoing exchange is strong, additional technical support (provided by DNRs own expert) to support the Cities' request for the UAA or SSC to assess the impact of naturally occurring sources of phosphorus as an impediment to the attainment of the phosphorus numerical criterion for Lake Winnebago.

**D. There is Strong Support for the Cities' Suggested Approach in EPA and DNR Guidance**

Both the DNR and the EPA have recently stated that establishing designated uses that accurately reflect the properties of a waterbody is crucial to achieving the goals of the Clean Water Act. Recent pronouncements by EPA and DNR in guidance/preamble/scoping statements provide ample support for the Cities' request that DNR perform a UAA or SSC for Lake Winnebago prior to establishing TMDL allocations.

1. EPA Guidance

In its guidance on designated uses the EPA states,

“Setting water quality goals through assigning ‘designated uses’ is best viewed as a process for states and tribes to review and revise over time rather than as a one-time exercise.” “The overall success of pollution control efforts depends on a reliable set of underlying designated uses in water quality standards.”

...

“[S]tates need[ ] to invest in putting in place more refined use designations along with differentiated criteria to protect those uses.”

...

“We believe that setting attainable water quality goals is important in stimulating action to improve water quality.

...

We do not believe that setting unattainable uses advances actions to improve water quality.”

...

“A process of setting incremental water goals through refined designated uses, that in turn advances progress toward an ultimate goal, can help us achieve our long term goals faster. One way to achieve efficiency in the process of assigning attainable designated uses is to better synchronize UAA analyses with the TMDL process.”

...

“In practice, UAAs may be conducted prior to, concurrently with, or after the development and implementation of a TMDL. In many cases, the data generated during a TMDL could well serve as the foundation for deciding whether a change in a use is warranted.” See <http://water.epa.gov/scitech/swguidance/standards/uses/uaa/info.cfm>

## 2. EPA Statements in Federal Register Preamble

On September 4, 2013, EPA announced a proposed rule that would change the federal water quality standards regulation in 40 CFR Part 131. In the preamble accompanying these proposed rule changes, EPA made a number of statements about the use of UAA that support the Cities’ request in this case:

“...states and tribes have broad discretion to determine the appropriate level of specificity to use in identifying and defining designated uses, and nothing in this proposal is intended to narrow that discretion. To further clarify this in rule text, the proposal would add the following language to 131.10(g): “To meet this requirement, States may, at their discretion, utilize their current use categories or subcategories, develop new use categories or subcategories, or adopt another use which may include a location-specific use”

....

“3. Designate a location-specific use and adopt criteria to protect that use: A state or tribe may determine that a use is unattainable for one particular parameter (e.g. altered pH due to highly mineralized geology, or a combined sewer overflow (CSO)-impacted use) or suite of parameters in specific locations. In such situations, the state or tribe may choose to adopt a use that more accurately reflects the location-specific expectations. . . . The concept of HAU (highest attainable use) should not be confused with “site-specific criteria.” A site-specific criterion is designed to protect the current unchanged designated use, but the criterion value may be different from the statewide or otherwise applicable criterion because it is tailored to account for site-specific conditions that may cause a given chemical concentration to have a different effect on one site than on another.”

See 78 Fed. Reg. 54518, 54523-24 (September 4, 2013)

## 3. DNR Guidance

Similarly, in its recent scoping statement for a proposed rule package to establish procedures for reviewing water quality standards for waterbodies in Wisconsin, the DNR stated,

“The objectives of the proposed rule modifications are to bring outdated Designated Use categories and subcategories into alignment with current scientific understanding of waterbody types and their aquatic communities, and to correspondingly adjust water quality criteria based on these Uses. These changes are needed in order to a) perform accurate and scientifically-defensible assessment of waterbody quality, b) ensure

that permittees are not required to meet over-or under-protective discharge limits, and c) match appropriate water quality management tools (best management practices, etc.) with the correct uses of a waterbody.”

...

“The Clean Water Act specifies that an opportunity to update Designated Uses for individual waterbodies should be made available every three years, though this has not been done since the 1980’s. Wisconsin has 88,000 stream miles and 15,000 lakes, and the outdated code, “defaults” the vast majority of these waters to an unspecified fish and aquatic life Use. Much more is now known about these waters, and reclassifications need to be made so that our permitting programs are based on the receiving waters’ actual Uses, and are not potentially over-or under-protective.”

...

“[i]f updates to the Designated Use categories/subcategories and their corresponding Water Quality Criteria are not made, waterbodies will continue to be assessed based on outdated and inaccurate information. Because Designated Uses are the foundation of many of WDNR’s water quality programs, this leads to inaccurate assessments, *inappropriate target goals for Total Maximum Daily Load analyses, and over-or under- protective discharge limits for permittees with WPDES permits.*” (Emphasis added)

See Statement of Scope for proposing rule changes to Chapters NR 102, 104 and 105 SS 002-14 (DNR# WY-25-13) (December 19, 2013).

All of these EPA and DNR statements contained in relevant guidance/support documents provide strong support for the Cities’ Suggested Approach to assess the achievability of the 0.04 mg/l criterion for Lake Winnebago before imposing TMDL allocations.

**E. If an Attainability Evaluation Supports a Modification of the Current Criterion, the DNR Should Establish a Site Specific Criterion for Lake Winnebago Before it establishes the TMDLs for the Upper Fox/Lake Winnebago Basin**

To determine whether and to what extent it is appropriate to refine the designated use and associated phosphorus criteria for Lake Winnebago, the DNR should follow the Cities’ Suggested Approach. Should the results of this suggested assessment process indicate that the DNR needs to change the existing use and associated phosphorus criteria for Lake Winnebago, Oshkosh and Fond du Lac would strongly recommend that such change be made prior to establishing allocations through the TMDL.<sup>1</sup> The evidence the DNR compiles during the suggested assessment process could be used subsequently in the Upper Fox/Wolf TMDL.

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<sup>1</sup> The DNR should replace the current designated use with the Highest Attainable Use (HAU). The EPA stated in its recent proposed amendments to the federal Water Quality Standards Rule that it intends to require all states seeking

*footnote continued on next page...*

## **F. Conclusion**

Based upon the preliminary technical analysis as well as the applicable federal and state guidance/support documents, The DNR cannot formulate an accurate, defensible, or achievable TMDL for the Upper Fox River basin without first reevaluating the attainability of Lake Winnebago's designated use and water quality criterion through one or more of the methods described in the Cities' Suggested Approach. Much of the data required for such an assessment is already being gathered as part of the TMDL. However, DNR should ensure that the appropriate data such as several deeper, dated sediment core samples and laboratory estimations of sediment release under different conditions are gathered and evaluated before the allocation phase of the TMDL is undertaken.

In the absence of conducting such data gathering as part of the assessment process outlined in this Position Statement, the resulting TMDL will be unlikely to achieve its purpose, and it may subject the Cities of Oshkosh and Fond du Lac to incurring exorbitant costs for engineered solutions which, although limiting their respective phosphorus discharges, will never achieve the current numerical goal for phosphorus in Lake Winnebago. Utilizing one or more of the assessment processes described in the Cities' Suggested Approach as well as the data gathering described above will provide adequate assurance that such unjustified costs (which ultimately will be borne by ratepayer citizens) are not imposed on point sources in the basin.

**Dated this 30<sup>th</sup> day of June, 2014**



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Paul Kent, Stafford Rosenbaum LLP  
Attorney for City of Fond du Lac



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Arthur J. Harrington, Godfrey & Kahn, S.C.  
Attorney for City of Oshkosh

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to amend current designated uses to replace them with the Highest Attainable Use (HAU) for a given waterbody. Determining the HAU requires consideration of the same factors the DNR considers under a UAA. In addition, to determine the HAU, the DNR must also consider the effectiveness of BMPs, the efficacy of treatment technology, and predictive water quality models.

*Response: This letter and its contents were discussed with Paul Kent and Art Harrington at a meeting held September 9, 2014 starting at 2:00 pm in room 306 of DNR's Central*

*Office. Attendance from DNR included then Division Administrator Russ Rasmussen and DNR legal counsel Robin Nyffeler and Cheryl Heilmann, as well as several other DNR staff. As part of the discussion DNR agreed to review historic conditions in Lake Winnebago; however, a process for a concurrent UAA was not agreed to since it would mean removing the recreational use for Lake Winnebago and it was deemed premature since the modeling and analysis for Lake Winnebago had not been conducted.*

*As discussed in other comments, paleoecological cores were obtained from Lake Winnebago which indicate that Lake Winnebago was not eutrophic prior to European settlement.*

*Modeling that was conducted as part of the TMDL effort examined resuspension and internal loading of phosphorus. The TMDL Report documents these efforts and findings.*

*The comment (14) lifted from Lower Fox TMDL Report was discussed and it was pointed out that the comment is taken out of context since the capping of reductions of total phosphorus in Lake Winnebago at 40% also provided a boundary condition for the Lower Fox TMDL allocations. A boundary condition was necessary because the Lower Fox TMDL did not include analysis of Lake Winnebago or the Upper For-Wolf Basins. The boundary condition was also a conservative assumption since it had to provide a reasonable assurance for the Lower Fox allocations. The comment also predates the detailed modeling and evaluation of Lake Winnebago performed by USGS as part of this TMDL development effort. It was also discussed that the Lower Fox TMDL could be updated with the boundary condition updated to reflect results from the Lake Winnebago modeling.*

*The simple analysis performed by the Cities supports that reductions at their wastewater facilities does have an impact on water quality:*

**The simple mass balance indicated that if both treatment facilities achieved a WQBEL of 0.04 mg/L, the total reduction in phosphorus load to the lake would be approximately 35,700 pounds per year. This would only reduce the current concentration in the lake by between 3.8 to 6.5 percent, representing only a few hundredths of a milligram per liter.**

*Few individual discharges, whether it be individual point sources or individual agricultural operations, likely can have this much of a singular impact on the water quality of Lake Winnebago. A 3.8 to 6.5 percent reduction is significant when it comes from only two individual dischargers.*



- b. Technical comments of the cities of Oshkosh and Fond du Lac relating to the TMDL modeling for Lake Winnebago and the Pool Lakes dated April 23, 2015;

TECHNICAL COMMENTS OF THE CITIES OF OSHKOSH AND FOND DU LAC RELATING TO THE TMDL  
MODELING FOR LAKE WINNEBAGO AND THE POOL LAKES.

April 23, 2015

### Introduction

On February 6, 2015 the Wisconsin Department of Natural Resources (WDNR), U.S. Environmental Protection Agency (USEPA) (participating by phone) and the U.S. Geological Survey (USGS) (WDNR, USEPA and USGS collectively referred to as the "Agencies") met with the Cities of Oshkosh and Fond du Lac and provided the Cities with an opportunity to review the USGS modeling and the approach for future refinement of the pool lake modeling for incorporation into the Lake Winnebago, Upper Fox and Wolf River Total Maximum Daily Load (TMDL). The USGS modeling presentation was essentially the same as that provided at the September 17, 2014 public meeting.

The purpose of the February 6 meeting was to discuss the lake modeling and incorporation of the modeling into the TMDL (the "TMDL Modeling"). While the Agencies acknowledged that Oshkosh and Fond du Lac had submitted a position statement (transmitted July 2, 2014) to the WDNR that outlined significant issues related to the ability of Lake Winnebago to achieve the water quality criterion of 40 micrograms per liter ( $\mu\text{g/L}$ ) total phosphorus (TP), the parties agreed to limit the scope of the meeting to the TMDL Modeling. However, the parties agreed that significant discussion and consideration of the TMDL targets, allocations and implementation are needed for a successful and equitable TMDL.

The purpose of this document is to provide technical comments of the Cities on the subject of the lake modeling for consideration by the Agencies as part of the TMDL. In addition, while the parties agreed to limit the scope of the meeting to TMDL modeling, the Cities concluded while drafting these comments that the TMDL modeling cannot be neatly segregated and discussed separately from other issues raised by the Cities, including the ability of Lake Winnebago to achieve its water quality criteria. As a result, these comments address issues specific to the TMDL modeling and include technical analysis related to issues raised in the 2014 position statement in the section titled "Additional Comments on TMDL Approach."

### Model Comments

The modeling presented by USGS at the September 2014 information meeting and again on February 6, 2015 attempts to account for Lake Winnebago nutrient dynamics. The model calibrates to lake growing season TP dynamics only when model sediment TP release is multiplied by a factor of five.

With the sediment release correction, overlaying the modeling results generally correlate well with growing season monitoring data. However, the model requires a manual reset for the next growing season to continue the calibration.

This manual start point and empirical curve fitting correction factor greatly simplifies the modeling approach of the sediment conditions and dynamics that contribute to lake water quality. The current model with a simplified approach provides useful insights into the importance of internal loading to current lake nutrient dynamics; however this model is an over-simplification, particularly when looking ahead to the implementation phase of the TMDL. The correction factor establishes that internal loading is highly important to the phosphorus budget of Lake Winnebago, but is an arbitrary value. It forces a fit to a particular data set without providing insight into how internal loading may vary as a function of multiple environmental factors.

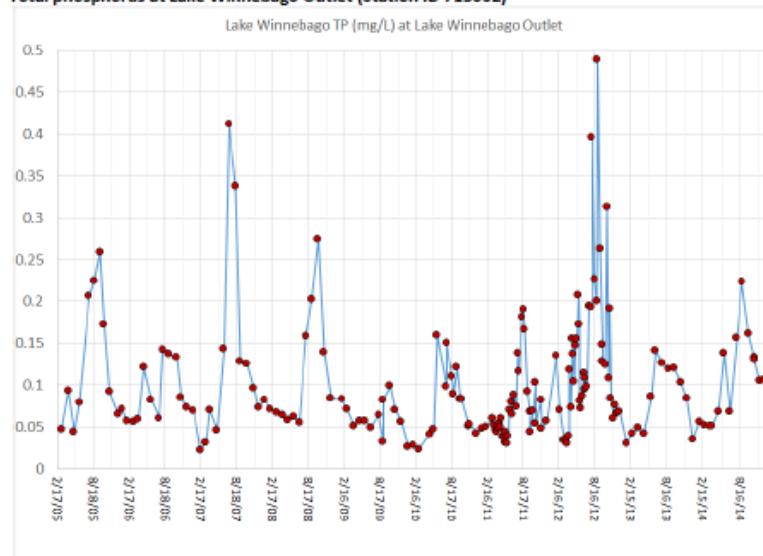
Consequently, a mechanistic model is recommended to capture Lake Winnebago water quality dynamics. A mechanistic model integrates lake physics, water chemistry, and water quality. Confidence in a model entails calibration to a set of years and then "hindcasting" of subsequent (or preceding) years water quality. A mechanistic model is a more scientifically-sound means of predicting water quality response to proposed scenarios, and is particularly necessary when a large expenditure of public funds by the Cities depends on model outputs.

1

The most widely used reservoir/lake mechanistic model is CE-QUAL-W2, which has a long history of use by the U.S. Army Corps of Engineers (USACE), USEPA, and the USGS. At the February 6 meeting, the USGS confirmed the importance of sediment nutrient dynamics to Lake Winnebago water quality. Therefore a mechanistic model would need to include a mechanistic sediment water interface to capture lake nutrient dynamics. CE-QUAL-W2 does not have this component, nor does any commercially available lake or reservoir water quality models. Integration of the USGS PRHEEQC model with CE-QUAL-W2 in a simulation package has been demonstrated as a potential means of overcoming this model capability deficit in the current version of CE-QUAL-W2 (Werner et al., 2006; Werner et al., 2008). As a result, it is recommended that USGS use the PRHEEQC model with CE-QUAL-W2 in a simulation package to ensure accurate modeling of Lake Winnebago's water quality. A mechanistic model is recommended since it would demonstrate whether factual support exists for the development of site specific criteria (SSC) or completing a use attainability analysis (UAA).

The need for a mechanistic model is clear when considering total phosphorus data from the outlet of Lake Winnebago. There is a very high degree of seasonal and inter-annual variability (Figure 1). An empirical (arbitrary factor to fit data) curve fit to any year of data will clearly not capture TP dynamics of other years. A mechanistic TP model would use a block of years to provide data for calibration (e.g. 2004-2009). The model would then need to accurately reproduce data in a subsequent block of years (e.g. 2010-2014). This process of "hindcasting" builds confidence in the capacity of the model to predict outcomes of proposed TMDL actions. Per the requirements of a mechanistic model (e.g. CE-QUAL-W2), hydrological data (e.g. inflows and outflows), meteorological data (e.g. wind speed, wind direction, precipitation, temperature), and lake water quality are all required data inputs.

FIGURE 1.  
Total phosphorus at Lake Winnebago Outlet (Station ID 713002)



Grouping data from Figure 1 into seasons (solar calendar basis) also demonstrates the need for a mechanistic model (Figure 2). The median TP value between all seasons is statistically significant ( $p < 0.05$ , Wilcoxon-Mann-Whitney rank sum tests). Thus, each season is a distinct statistical population. Spring and

fall overlap the growing season. Distribution of data within each season is non-normal, except for winter (Figure 3). Non-linearity of data probability plot distribution is a well-known test for normal distribution for small sample sizes (Helsel and Hirsch, 2002). The clear inference from distribution of seasonal data is that the variability of nutrient dynamics within the growing season cannot be captured by a curve fit to any one year or averaging of years. A mechanistic model is necessary to capture nutrient dynamics over more finely grained time scales (e.g. daily, weekly, or monthly) to accurately predict seasonable TP concentrations.

A frequency distribution analysis of the entire data set shown in Figure 1 reveals that approximately 90% of TP values exceed the proposed 40 µg/L criterion (Figure 4), and this percentage is even higher during the growing season (Figure 3). Demonstrating how such a radical reduction in TP values might be achieved requires the application of rigorous scientific standards. These standards would necessarily include a scientifically acceptable mechanistic model.

Lake modeling and calibration needs to incorporate two very important aspects of phosphorus concentrations in the lake water column. First, the lake modeling needs to account for the complex sediment dynamics that result in sediments contributing significant phosphorus to the lake during certain conditions while the sediments act as a phosphorus sink during other conditions. From the perspective of an accurate model based on site conditions, the lake model should be calibrated to account for more than just surface phosphorus concentrations. Second, from a TMDL implementation and monitoring perspective, we recommend the Agencies develop and calibrate the lake model based on how Lake Winnebago will be evaluated for compliance with the proposed water quality criterion of 40 µg/L TP. For example, if only surface values will determine compliance, then only surface values should be used for this metric. Surface TP values, however, significantly depend on the dynamics of phosphorus release from sediments. Therefore, even if the water surface TP concentration is the compliance criterion, a mechanistic understanding of lake nutrient dynamics is essential.

FIGURE 2.

Probability plot of Lake Winnebago discharge TP values. Data are the same as in Figure 1.

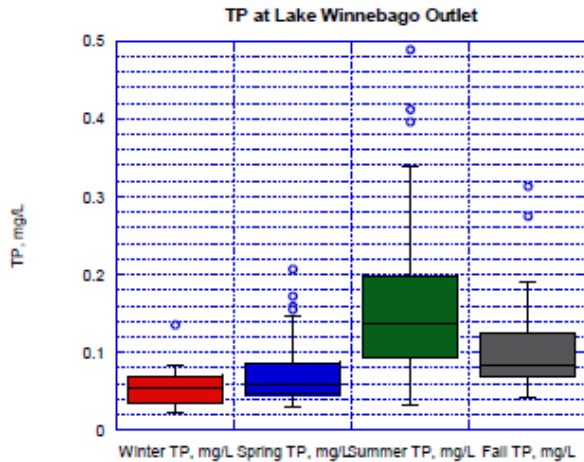


FIGURE 3.  
Season frequency distribution (probability plot) of TP at the Lake Winnebago outlet.

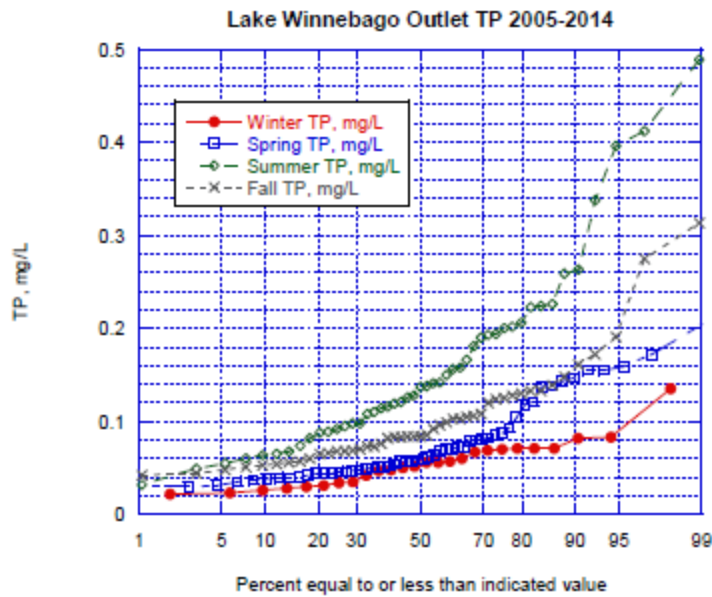
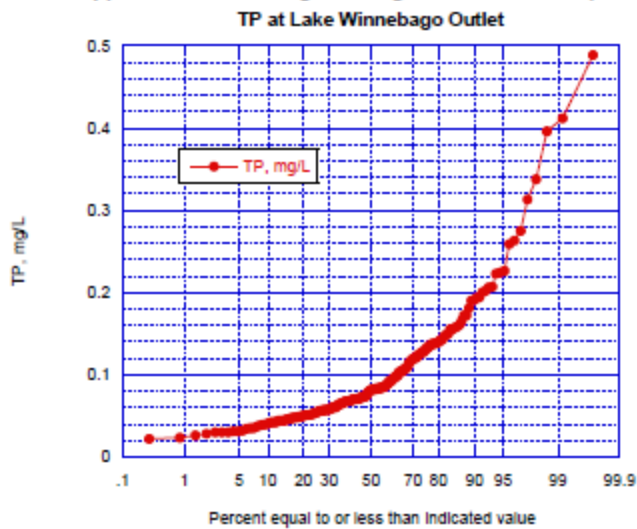


FIGURE 4.  
Probability plot of Lake Winnebago discharge TP concentrations (2005-2014).



The hydrodynamic features of a mechanistic model are essential to a TMDL or UAA. For example, the USGS continuous monitoring station reveals transient periods of anoxia followed by elevated TP concentrations. These data suggest that periods of low wind can allow sufficient summer stratification to induce anoxia at the sediment surface and consequent increase of internal phosphorus loading. Thus, hydrodynamics figures importantly into internal phosphorus loading and potential impacts on water quality.

CE-QUAL-W2 includes flushing, unlike the current USGS model. Based upon the Agencies' comments at the meeting, the Cities understand that the current model is not intended as the basis for the TMDL plan and is intended to be refined in the future by the Agencies. By accounting for lake hydrodynamics as expressed in these comments, the Agencies will create a defensible record for determining whether the water quality goals assigned to Lake Winnebago are attainable.

Sediment transport to and deposition within Lake Winnebago is also essential to capturing long-term lake nutrient dynamics. This element is not part of the current USGS model and should be included in any lake model used for long term water quality management and as the basis for a large expenditure public resources.

With regard to mechanistic modeling of lake phosphorus dynamics, the WDNR stated at the meeting that it is considering using the Jensen model to incorporate a settling (and flushing) component; however, the lakes used in the Jensen study are significantly smaller than Lake Winnebago and the other pool lakes. At the meeting, there was consensus by the parties that Lake Winnebago has a very large "fetch" and is frequently well-mixed. However, these features do not apply to the lakes used in the Jensen model. Therefore, the Jensen model may not be well suited for Lake Winnebago and the other pool lakes in this TMDL study basin.

### **Phosphorus Data**

The phosphorus data is shown only for the water surface. The Agencies should provide additional lake data or summary graphs of lake water column phosphorus data. At the meeting, the Agencies stated that the surface phosphorus values do not change much through the rest of the profile. However, the Agencies should provide data which can be used to explain the vertical stratification of TP concentrations within the water column and variability.

The Oshkosh raw water TP data demonstrates concentrations that are greater than those shown by USGS. Statistical regression performed on the Oshkosh data demonstrates at least 2, possibly 3, statistically distinct data sets that include growing, non-growing, and a subset within the non-growing season (Figure 4). These and other intake data must be included within water quality analyses and modeling by the Agencies for making final TMDL, SSC, or UAA decisions.

### **Dissolved Oxygen and Temperature Data**

The Agencies should provide the Cities with weekly, by hour, plots of the DO and temperature isopleths included in the presentation from the sonde array. The Agencies' assertion that the water column is aerobic should be subjected to review at more finely grained time scales than presented by USGS at the meeting. The USGS acknowledges that there are transient periods of several days of anoxia during the growing season. However, the isopleth presented by the Agencies does not adequately explain the sustained periods of depressed dissolved oxygen in the column that clearly originate at the sediment surface. Diurnal thermal stratification is a plausible cause for these longer term depressed DO events. It is not possible to discern this dynamic from the data set presented.

The DO and temperature isopleths were completed for a single location in Lake Winnebago, at the deepest point in the lake. The isopleths show significant durations when DO was very low, which could result in phosphorus release from the sediments. A single location in the lake during a single year is not sufficient to capture lake dissolved oxygen dynamics. While the sonde array deployment may provide sufficient calibration data for a dynamic model, there must be data from other sampling stations to determine if the model needs to capture lateral variability of dissolved oxygen concentrations. For example, for CE-QUAL-W2 data from other sampling stations would help determine the number of sections necessary to construct the model. Lake data presented to date does not allow discounting the potential for zones of low dissolved oxygen within the lake above sediments that could contribute significantly to internal phosphorus loading.



## Winter Data

Use of TP data from only the growing season, and calibrating the models for only the growing season median values, leaves out a significant time of year which would not meet the proposed TP target of 40 µg/L. Modeling will require year-round data to capture early season TP dynamics. Approximately 70% of the winter TP concentrations at the Lake Winnebago outlet exceed 40 µg/L (Figure 3). As winter has the lowest TP concentration of any season from 2005-2014, a lake nutrient dynamic model must account for these baseline "exceedance" conditions upon which growing season TP concentrations build. We recommend that the USGS use the growing season that is defined in the phosphorus regulations (May through October rather than April through September) to avoid confusion and make implementation more straight-forward.

Year-round data must be included in the analysis, especially when lake phosphorus values and model calibration points are still increasing, suggesting that phosphorus water column concentrations have not stabilized. Using only growing season TP data does not capture the trends in the water column. A mechanistic model calibrated to nutrient dynamics on a year round basis is necessary to accept model results as representative of nutrient dynamics. The WDNR intends that the TMDL will be allocated monthly for an entire year and permit limits will not be limited to growing seasons. Therefore the data used to determine the TMDL and permit limits should at least be consistent. (Note that we are requesting seasonal versus monthly allocations, however, as outlined below.)

## Other Data Needs

As previously noted, Lake Winnebago experiences depressed oxygen concentration near the sediment surface at times. This phenomenon is a consequence of sediment oxygen demand (SOD). A critical element of the CE-QUAL-W2 model is to capture dissolved oxygen (DO) dynamics. Mere modeling fitting of sediment oxygen demand (SOD) does not necessarily constitute calibration of DO dynamics. SOD must be measured directly. The USEPA isolation chamber SOD method is the widely acceptable method in shallow lakes such as Lake Winnebago (Murphy and Hicks, 1986; US EPA, 2009).

The Agencies should conduct near sediment redox studies with corroborating phosphate, sulfate, iron, and manganese data. These data will provide mechanistic insight into the dynamics of sediment phosphorus release.

The phosphorus release and water column concentrations can be heavily influenced by near sediment redox. As a result, redox data with corroborating phosphate, sulfate, iron, and manganese data is important and fundamental to understanding lake sediment dynamics. This information should be used by the Agencies during model calibration. Whereas it is understood that redox can be a difficult parameter to interpret (Nordstrom and Wilde, 2005), with correlating data, redox data is statistically robust with regard to determining state conditions at the sediment surface. These state conditions include thresholds for significantly increased mass flux from sediment to the water column for Fe(II), Mn(II), phosphate, ammonium, and methylmercury.

The historic nutrient status of Lake Winnebago is of interest. Whereas the current pool stage elevation is maintained by a dam at Neenah, historic accounts suggest that the lake has had poor water quality (Kubiak, 1999). It is not clear if Lake Winnebago would have ever met the proposed 40 µg/L TP criterion at original or current pool depths and volumes. A paleolimnology study with Lead-210 dated cores and diatom reconstruction of water quality would provide critical insight into past water quality over the last 150 years (Kerfoot et al 1999; Heiskary and Swain, 2002). WDNR has conducted many paleolimnology studies that reconstruct past water quality in other lakes (Garrison, 2008). Restoration of lake water quality to a prior water quality state needs historic justification. It is recommended that the Agencies conduct a paleolimnology study to establish historic water quality and to document a timeline for water quality degradation.



## Additional Comments on TMDL Approach

The Oshkosh, Appleton, Neenah, and Menasha water withdrawals should be included in the TMDL modeling. At our recent meeting the Agencies indicated that these withdrawals are “trivial”; a conclusion that is not supported in the record. It is important to include the withdrawals in the TMDL initially so that these municipalities can get “credit” for the amount of phosphorus they are removing from the lake via raw water treatment as part of an overall compliance strategy. For example, the WDNR has expressed reluctance to allow streambank restoration as a compliance strategy in the Rock River TMDL because the SWAT modeling did not quantify the stream bank erosion load. This TMDL should account for such sources/sinks or, alternatively, there should be a de minimis level agreed to for all sources/sinks. WWTP TSS loadings may actually be trivial compared to other sources, and the WDNR should consider leaving WWTP TSS limits at current concentrations similar to the Rock River Basin and other TMDLs.

The WDNR should use seasonal (May - October and November - April) or annual allocations in this TMDL instead of monthly allocations for the following reasons:

1. The lake modeling only looks at seasonal response, and the lake detention time is on the order of two years not months. Therefore, it should not be necessary and is not appropriate to set monthly allocations.
2. The WDNR’s draft phosphorus implementation guidance of January 2015 indicates dischargers that have stringent limits and that discharge to lakes with more than a 1 year detention time may be granted annual limits rather than 6-month average or monthly average limits.
3. Monthly wasteload allocations (e.g. for the Rock River Basin) can result in very stringent limits for treatment plants during some months and WDNR has not been willing to grant the relief offered by NR 217.13(7) or NR 217.14(2) or (3) in associated permits. That is, WDNR has not allowed the permit limits to be increased to the water quality criterion or multiplied by three for the monthly average limit, unlike what is offered for a similarly-stringent NR 217.13 water quality based effluent limit. This approach is unreasonable, particularly in this case where the pollutant of concern is non-toxic, is discharged to a large lake, and has a criterion expressed as a growing season median. It is also more difficult for WWTPs to comply with monthly limits, and even more so when limits vary greatly from month to month, where a single event or inherent process variability could result in a monthly violation at these very low limits. Using seasonal or annual allocations would be less likely to result in effluent limits that are below the criterion or needlessly stringent during some months.
4. The TMDL report itself should contain an explicit statement that grants relief offered by NR 217.13(7) and NR 217.14(2) and (3). This would acknowledge that WWTPs are designed and operated to achieve effluent concentrations that are consistently *below*, not *just at*, their effluent limits. A Municipal Environmental Group (MEG) survey found that WWTPs averaged 0.6 mg/L effluent TP when permits included monthly average limits of 1.0 mg/L or higher, for example. Allowing these forms of relief would provide some leeway for occasional, short-duration wet weather events and process upsets that can occur at a WWTP while still meeting the goals of the TMDL. Not allowing this type of relief would drive up construction and operating costs significantly and unnecessarily.

The Cities would like to discuss the TMDL baselines with the WDNR before allocations are made. In the Rock River TMDL baselines were set at permitted limits and design average flows, while in the Lower Fox River TMDL they were set at current discharge levels. The Lower Fox River approach essentially penalized treatment plants for excellent performance. In our opinion the opposite should be the case; treatment plants are already removing 90 percent of their influent phosphorus and this should be acknowledged. Setting the WWTP baseline at permitted levels (1 milligram per liter [mg/L] and design average flow) should at least partially address this issue.

As stated above, the topics discussed at the February 6 meeting and comments within this document are critical to the successful development and implementation of the TMDL. However, while the parties agreed

not to discuss topics beyond the technical modeling agenda at the meeting, the Cities believe that the technical issues with TMDL modeling cannot be considered separate and apart from other issues raised by the Cities in their 2014 legal position statement. The ultimate purpose of the TMDL modeling is to provide an accurate accounting of current phosphorus loadings in the watershed and reductions necessary to achieve Lake Winnebago's water quality criteria. However, issues encountered in the TMDL modeling only bolster the Cities' concern that Lake Winnebago's water quality criteria is unattainable. As a result, the Cities offer the following statements for consideration by the Agencies as they proceed with TMDL development and goal setting.

A proposed TMDL or UAA plan needs to be effective at achieving water quality goals to justify large expense of public funds on the improvements the plan entails. As a foundation to efficacy, the proposed water quality standards for Lake Winnebago must be attainable. No convincing scientific evidence has been presented to support a conclusion that 40 µg/L may be attained in Lake Winnebago by mere control of external phosphorus input. Advances in limnology and lake management call into question this overall strategy (Cooke et al., 2005; Schindler, 2006). A larger perspective on water quality drivers within Lake Winnebago needs to be considered if future water quality goals are to be met.

- During development of NR 102 phosphorus criteria the WDNR indicated Lake Winnebago is a unique lake unlike any other in the state. The WDNR also indicated that NR 102 lake and reservoir criteria were based on Minnesota studies. Following Minnesota rules would result in criterion 60 µg/L, or perhaps 90 µg/L, and not the WDNR proposed 40 µg/L. This is not to suggest that 60 or 90 µg/L is an attainable target, but it questions the use of 40 µg/L and reinforces special consideration is not being given to Lake Winnebago and the pool lakes when it was accepted during development NR 102 that the pool lakes would be candidates for site specific criteria.
- Common carp are present in Lake Winnebago. Recent studies demonstrate carp population density decisively affect lake water quality (Lathrop et al.; Lin and Wu, 2013) and even a small sampling of publications strongly implicate that carp may be managed by several methods (Bajer et al., 2011; Silbernagel and Sorensen, 2013; Zielinski et al., 2014). An evaluation of the impact of carp on Lake Winnebago water quality is necessary to understand if control of this invasive, non-native species is necessary to meet TMDL or UAA goals.
- As a large, shallow lake, it is not clear that lowering of TP alone to even 40 µg/L would meet Secchi disk or chlorophyll-a goals. The well-known alternative stable states phenomenon (Scheffer, 1998) has been observed in lakes across the world. Alternative stable states are caused by ecosystem structure (e.g. high carp populations) which resist major shifts in water quality. The phenomenon is complex, but subject to experimental investigation. Other large, shallow lakes, such as Lake Apopka in Florida are notable examples of this phenomenon (Bachmann et al., 1999; Schaus et al., 2010).

The purpose of these comments is not to conduct a thorough review of the scientific and engineering literature relative to remediation of water quality in Lake Winnebago. However, a mere point source reduction approach to remediation of Lake Winnebago water quality needs further scientific scrutiny to understand whether it can achieve water quality goals. The WDNR should consider an initial TMDL target of 100 µg/L for the pool lakes as suggested in previous questions submitted by the Cities (transmitted with the position statement to the WDNR July 2, 2014). This approach was used in the Rock River Basin TMDL for several similarly-impounded lakes such as Koshkonong that did not meet the NR 102 definition of a reservoir. The pool lakes do not meet the definition of reservoir, either, and are dominated by river flow.

The Agencies should consider cost-effectiveness in the TMDL allocations. If this cannot be done explicitly as an allocation method (see EPA guidance), then it could be considered by allowing adaptive implementation of the TMDL. See the DuPage River Salt Creek Workgroup web site and associated TMDLs for an example of how this can work and be approved by USEPA Region V. Another way to accomplish this would be to set the Pool Lakes target at 100 µg/L initially as suggested above; there is precedent in Wisconsin for this in the Rock River TMDL. If after several years of implementation it becomes apparent that a more stringent target

is required, the TMDL could be revised. This downward-ratcheting makes much more sense than setting a stringent and potentially unachievable target initially and then finding the target is not attainable, and anti-backsliding regulations would make it difficult to then increase the WWTP effluent limits.

Finally, it was noted during the February meeting that nonreactive phosphorus values at the City of Oshkosh and Fond du Lac are above 40 µg/L. Recent sampling by the City of Oshkosh between November 2014 and February 2015 shows that effluent nonreactive phosphorus concentrations averages about 104 µg/L, well above the 40 µg/L target. Similarly, the City of Fond du Lac's recent (December 2014 through January 2015) soluble nonreactive phosphorus has averaged 90 µg/L. Consequently, achieving an effluent limit equal to 40 µg/L is not possible without extreme measures.

### Modeling Meeting Summary

The Cities of Oshkosh and Fond du Lac appreciated the opportunity to meet with the Agencies to review the lake modeling and the approach for integrating it into the TMDL. Having observed other TMDLs in the state and elsewhere and understanding the challenges that other TMDLs have had, the Cities are committed to helping make the Lake Winnebago TMDL a positive example for the rest of the state. While it is understood that the lake modeling completed to date is not considered the final and official lake modeling to support the TMDL, the Cities also understand that significant changes in the modeling are not anticipated by the Agencies. Without addressing the significant shortcomings of the lake modeling approach that are addressed in these comments, the TMDL process for this water basin will be deficient. For these reasons, the Cities would appreciate a follow-on discussion and look forward to another meeting to discuss how to advance the understanding and modeling of the pool lakes.

### References

- Bachmann, R.W., Hoyer, M.V., Canfield Jr, D.E., 1999. The restoration of Lake Apopka in relation to alternative stable states. *Hydrobiologia* 394, 219-232.
- Bajer, P., Chizinski, C., Sorensen, P., 2011. Using the Judas technique to locate and remove wintertime aggregations of invasive common carp. *Fisheries Management and Ecology* 18, 497-505.
- Cooke, G.D., Welch, E.B., Peterson, S.A., Nichols, S.A., 2005. *Restoration and Management of Lake and Reservoirs*, 3rd Edition. Taylor & Francis, New York, New York.
- Garrison. 2008. Paleolimnology as a Lake Management Tool. [http://www.uwsp.edu/cnr-ap/UWEXLakes/Documents/programs/lakeleaders/crew7/kemp\\_station\\_september\\_2008/lake%20leaders%20paleo%2008%20garrison.pdf](http://www.uwsp.edu/cnr-ap/UWEXLakes/Documents/programs/lakeleaders/crew7/kemp_station_september_2008/lake%20leaders%20paleo%2008%20garrison.pdf).
- Heiskary S, Swain E. 2002. Water Quality Reconstruction from Fossil Diatoms: Applications for Trend Assessment, Model Verification, and Development of Nutrient Criteria for Lakes in Minnesota, USA, Minnesota Pollution Control Agency, Saint Paul, Minnesota.
- Helsel, D.R., Hirsch, R.M., 2002. Chapter A3, Statistical Methods in Water Resources. *Techniques of Water-Resources Investigations of the United States Geological Survey*. Book 4, Hydrologic Analysis and Interpretation. United States Geological Survey, Reston, Virginia.
- Kerfoot WC, Robbins JA, Weider LJ. 1999. A new approach to historical reconstruction: Combining descriptive and experimental paleolimnology. *Limnology and Oceanography*. 44(5):1232-1247.
- Kubiak WJ. 1999. *Great Lakes Indians: A Pictorial Guide*. Baker Books.
- Lathrop, R.C., Liebl, D.S., Welke, K., *Shallow Eutrophic Lake Wingra*.
- Lin, Y.-T., Wu, C.H., 2013. Response of bottom sediment stability after carp removal in a small lake. *Annales de Limnologie-International Journal of Limnology*. Cambridge Univ Press, pp. 157-168.
- Murphy, P.J., Hicks, D.B. (Eds.), 1986. *In-situ method for measuring sediment oxygen demand*. University of Georgia, Institute of Natural Resources, Athens Georgia.

- Nordstrom, D.K., Wilde, F.D., 2005. Reduction-Oxidation Potential (Electrode Method). USGS.
- Schaus, M.H., Godwin, W., Battoe, L., Coveney, M., Lowe, E., Roth, R., Hawkins, C., Vindigni, M., Weinberg, C., Zimmerman, A., 2010. Impact of the removal of gizzard shad (*Dorosoma cepedianum*) on nutrient cycles in Lake Apopka, Florida. *Freshwater Biology* 55, 2401-2413.
- Scheffer, M., 1998. *Ecology of Shallow Lakes*. Chapman & Hall, London, United Kingdom.
- Schindler, D.W., 2006. Recent advances in the understanding and management of eutrophication. *Limnology and Oceanography* 51, 356-363.
- Silbernagel, J.J., Sorensen, P.W., 2013. Direct Field and Laboratory Evidence that a Combination of Egg and Larval Predation Controls Recruitment of Invasive Common Carp in Many Lakes of the Upper Mississippi River Basin. *Transactions of the American Fisheries Society* 142, 1134-1140.
- US EPA, 2009. *Sediment Oxygen Demand*. US EPA, Athens, Georgia.
- Werner, F., Eulitz, K., Graupner, B., Mueller, M., 2008. Pit lake Baerwalde revisited: Comparing predictions to reality. *Proceedings of the 10th International Mine Water Association (IMWA) Congress, Karlovy Vary, Czech Republic*.
- Werner, F., Müller, M., Graupner, B., 2006. Predicted and observed water quality data from the coal mine pit lake Barwalde, Lausitz, Germany. *Proceedings of the 7th International Conference on Acid Rock Drainage, Society for Mining, Metallurgy and Exploration, Littleton, Colorado*, pp. 2333-2343.
- Zielinski, D.P., Voller, V.R., Svendsen, J.C., Hondzo, M., Mensinger, A.F., Sorensen, P., 2014. Laboratory experiments demonstrate that bubble curtains can effectively inhibit movement of common carp. *Ecol. Eng.* 67, 95-103.

*Response: The department shared these comments with the US EPA consultant team tasked with the development of the TMDL. The bulk of the comments contained in the submittal revolve around the suitability of the lake models employed in the TMDL instead of the use of a mechanistic model. The Cities recommend the use of the mechanistic model CE-QUAL-W2. Both the department and the USGS disagree with the Cities assertion that a more complex model will provide better and more reliable results.*

*The department's approach for this TMDL was based on the experience of trying to use CE-QUAL-W2 to simulate Petenwell and Castle Rock as part of the Wisconsin River TMDL development process. The development of the Wisconsin River TMDL was concurrent to the Upper Fox-Wolf TMDL; however, the lake modeling was further along in the Wisconsin River Basin TMDL. As part of the Wisconsin River TMDL, RTI International and LimnoTech were retained by US EPA to develop a CE-QUAL-W2 model for Castle Rock and Petenwell. When reviewing the model and LimnoTech's submittal, the department found that the model:*



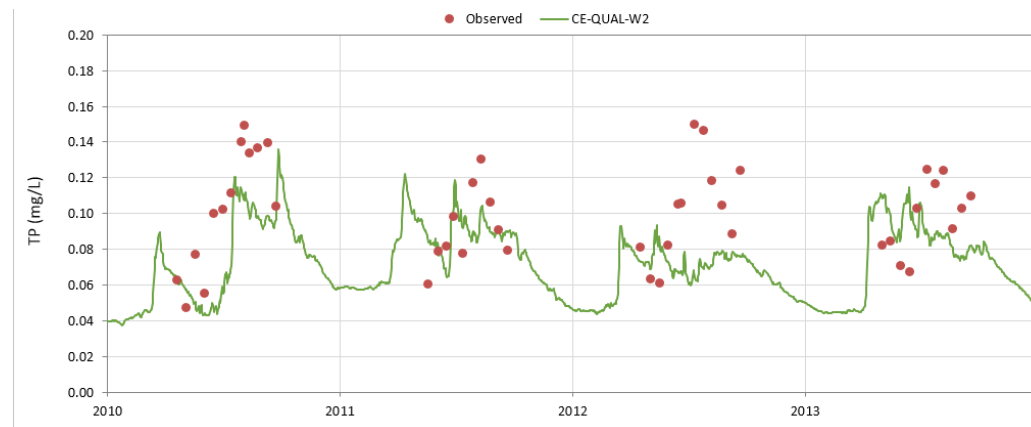
- Under-predicted TP at seven of the eight reservoir stations
- Under-predicted variability in chlorophyll a at all eight reservoir stations
- Poorly simulated the seasonal pattern of TP in the reservoirs, particularly missing the peak in mid-summer
- Poorly simulated seasonal patterns in the relative abundance of algal groups

The department made attempts to recalibrate and refine the CE-QUAL-W2 model and reached out to other experts about how to obtain a better fit. Modifications and adjustments included:

- Boundary conditions
  - Nutrient concentrations interpolated from monitoring data
  - Seasonal pattern in labile vs. refractory organic nutrients
- Vertical mixing (wind sheltering)
- Nitrogen cycling
  - Decrease ammonium release from sediment
  - Increase denitrification of nitrate
- Algal parameters
  - Changed several parameters to better simulate observed succession of algal groups (diatoms, blue-greens, other)

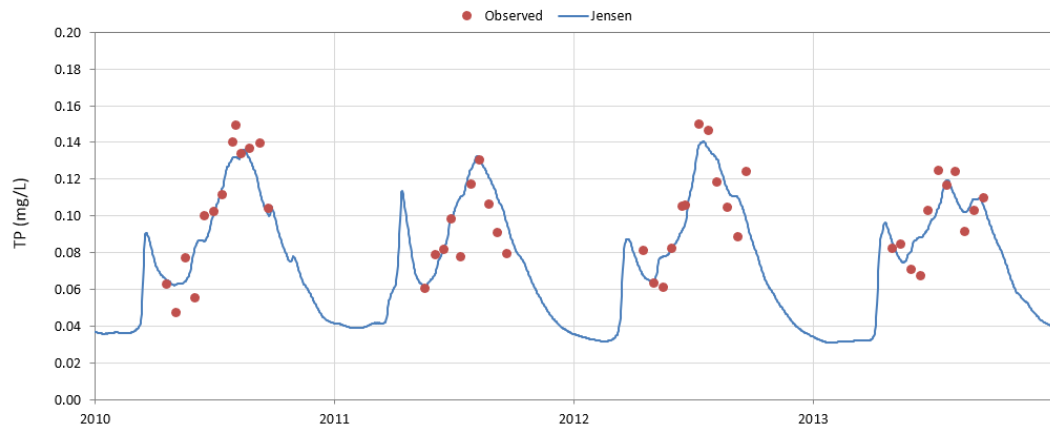
In addition, the department consulted with Thomas Gallagher of HDR, Inc., who had been retained by NACASI to review the Wisconsin River TMDL, specifically the reservoir modeling. In consultation with HDR it was determined that the more complex, mechanistic model was not accurately representing the system and a different approach would be needed.

Below is a plot of observed and simulated phosphorus concentrations using CE-QUAL-W2 for Petenwell:



The CE-QUAL-W2 model is consistently underpredicting total phosphorus concentrations and does not accurately simulate the annual or seasonal variation. At this point, the department tried to use the Jensen model (Jensen, J. P., Pedersen, A. R., Jeppesen, E., & Søndergaard, M. 2006. An empirical model describing the seasonal dynamics of phosphorus in 16 shallow eutrophic lakes after external loading reduction. *Limnology and Oceanography* 51 (1) 791-800).

The Jensen model relies on daily inflows of water and total phosphorus, accounts for water temperature, and has calibrated rates of phosphorus release from bottom sediments accounting for internal loading. The results for Petenwell are shown below:



Unlike CE-QUAL-W2, the Jensen model accurately simulated the total phosphorus as well as the annual and seasonal variability. A summary of the modeling statistics comparing both Jensen and CE-QUAL-2E to monitored results is provided below and shows a significantly better fit and accuracy for the Jensen model supporting the department's position that a more complicated model does not mean better or more accurate results.

Water Body	Period	RMSE ( $\mu\text{g/L}$ )		Bias (%)	
		Jensen	CE-QUAL-W2	Jensen	CE-QUAL-W2
Petenwell Reservoir	Apr-Sep	14	35	0	-18
	Jun-Sep	14	37	0	-20
Castle Rock Reservoir (Main Body)	Apr-Sep	11	20	+1	-7
	Jun-Sep	12	21	-1	-13
Castle Rock Reservoir (Yellow River Arm)	Apr-Sep	19	43	+2	-28
	Jun-Sep	18	49	+1	-34



*Additional information regarding the selection and use of Jensen and its comparison to the CE-QUAL-2E model can be found in the TMDL report “Total Maximum Daily Loads for Total Phosphorus in the Wisconsin River Basin” dated April 26, 2019.*

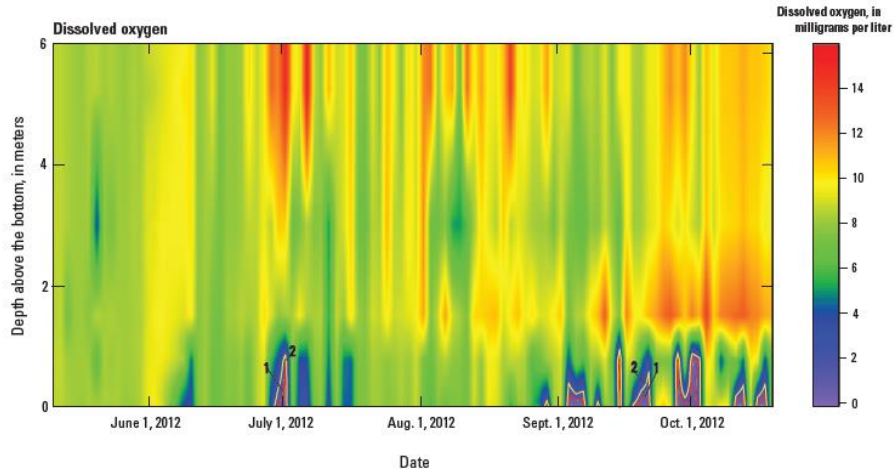
*The results presented above informed the decision of both the the department and USGS to not pursue use of CE-QUAL-2E for Lake Winnebago. In addition, the dataset available for calibration and validation was more expansive for Castle Rock and Petenwell than was available for Lake Winnebago.*

*Regarding comments pertaining to the suitability of Jensen, while the Jensen model does not explicitly simulate oxygen, the authors note that “...temperature integrates most of the seasonal mechanisms responsible for phosphorus release in eutrophic relatively iron-rich lakes.” Also, stratification in Lake Winnebago and the Pool Lakes is very intermittent at best and does not appear to be a strong driver of surface P concentrations.*

*Jensen is a compromise between simple, steady-state, annual time step models and complex dynamic models such as CE-QUAL-2E. It is applicable to shallow drainage lakes and reservoirs with water residence times between a few weeks and several months (Lake Winnebago has a residence time of 187.5 days) and depending on the size of the water body, needs generally 2-3 years of at least monthly monitoring data. For Lake Winnebago, a combination of a mass-balance model, BATHTUB model, and the Jensen model were utilized. The details can be found in a 72-page USGS report that is included as Appendix E in the TMDL Report.*

*Response to Other Data needs:*

*The release of phosphorus from sediment under depressed oxygen conditions was evaluated. Below is Figure 2 from the USGS report found in Appendix E which shows measured dissolved oxygen levels in Lake Winnebago. Continuous monitoring was deployed at the deepest part of the lake and shows that due to the extensive mixing that occurs, anaerobic conditions were seldom encountered and when they were, anaerobic conditions were limited to only the deepest part of the lake which makes up a small fraction of the overall of lake. The mean depth of Lake Winnebago is 4.5 meters. The area and volume of the lake at specific depths were computed from detailed contours.*



*As requested, the TMDL study included a paleoecological study of Lake Winnebago to evaluate historic phosphorus concentrations. Results of the study are included in Appendix F.*

*Response to the additional TMDL comments:*

*The Cities have provided no evidence to support their claims that the water quality criteria for Lake Winnebago is unachievable and the Cities have failed to identify which specific issues with the TMDL modeling bolster their claim. The lake modeling conducted by USGS, while not always employing specific methods requested by the Cities, provided a comprehensive evaluation and simulation of Lake Winnebago and the Pool Lakes.*

*Potential credits generated from withdrawal of phosphorus through drinking water treatment is a permit issue and not addressed in the TMDL.*

*The characterization of streambank stabilization within the Rock River Basin is not correct. The baseline condition in TMDLs assumes compliance with permit requirements which includes stable conveyance systems within permitted MS4s. Therefore, explicit numeric reduction credit is not available for stabilization of streambanks within permitted MS4s. Approved water quality trades involving streambank stabilization have occurred in areas outside permitted MS4s*

*TMDLs do not create new rules or requirements but rather are implemented through existing statutes, administrative codes, and permits. Placement of wasteload allocations into permits will conform with ch. NR 217, Wis. Administrative Code.*

*The frequency of allocations is based on the characteristics of the receiving water, specifically the residence time. To date, monthly allocations were provided for riverine*

systems; however annual or seasonal allocations have been used for TMDLs addressing lakes and reservoirs. This TMDL, as well as the Wisconsin River TMDL used annual allocations. Analysis shows that the annual allocations needed to meet water quality criteria for downstream lakes and reservoirs also meet water quality criteria for the streams and rivers.

The Cities comments regarding the attainability of criteria is not supported by the modeling. Specifically, the wasteload allocations assigned to the Cities are achievable. The consultant for Oshkosh stated after a meeting that Oshkosh could optimize to meet a limit of 0.31 mg/L and Strand Associates conducted treatment pilot studies for Fond du Lac that consistently achieved an effluent quality of 40 µg/L total phosphorus. Note, Fond du Lac's wasteload allocation translates to an effluent limit of 0.27 mg/L (270 µg/L) which is over six times higher than 40 µg/L. Both of these examples show that the reductions assigned to the Cities are achievable.

Wisconsin's chlorophyll a criterion is based on studies conducted in both Wisconsin and Minnesota. In Wisconsin, the data used in the analysis were all chlorophyll a samples collected from the top 2 meters of the water column in Wisconsin lakes and reservoirs during the period July 8 – Sept 22 (WisCALM chlorophyll a assessment period) from 2002 to 2016. Multiple values from the same station and date were averaged, and samples without a corresponding user perception rating were excluded.

The findings of Wisconsin's user perception survey and resulting selection of a "moderate algae" level of 20 µg/L chlorophyll a is consistent with Wisconsin's previous thresholds and assessment protocols and earlier research done by other parties, as described below. The 2016 analysis of Wisconsin user perception data supported the continued use of this threshold.

- A chlorophyll a threshold of 20 µg/L chlorophyll a was previously used by WDNR to develop Wisconsin's statewide phosphorus criteria for lakes, promulgated in 2010. During development of the statewide phosphorus criteria, the threshold of 20 µg/L chlorophyll a was based on Minnesota's work, discussed below. WDNR has also used this concentration in assessment protocols since the promulgation of P criteria in 2010.
- WDNR's definition of a "moderate algae" level directly corresponds with the Minnesota Pollution Control Agency's (MPCA's) definition of a "nuisance" algal bloom. Minnesota conducted an earlier study that surveyed user perceptions of lakes' recreational suitability and physical appearance (Heiskary and Walker, 1988). The study coupled user perceptions with simultaneously collected data on

*phosphorus, chlorophyll a, and Secchi depth. MPCA defined four algal bloom categories during their development of phosphorus criteria for Minnesota lakes: a “mild bloom” is greater than 10 µg/L; a “nuisance bloom” is greater than 20 µg/L; “severe nuisance bloom” is greater than 30 µg/L; and a “very severe nuisance bloom” is greater than 40 µg/L chl a (Heiskary and Wilson, 2008).*

*The impact of carp is implicitly accounted for in the resuspension and internal loading factors of the lake modeling. There is not enough data to specifically tease out or assign a specific number or allocation to carp. Control methods for carp are limited due to the presence of lake sturgeon in Lake Winnebago. Any methods to remove carp could also harm lake sturgeon.*

*The concept of a phased TMDL, adaptive implementation, or progressive ratcheting down of reductions is discussed at length in other comments. In summary, US EPA will not approve a TMDL that does not meet promulgated water quality criteria. Unlike in the states cited in the legal cases, Wisconsin has administrative code, ch. NR 217, Wis. Admin. Code, that dictates the implementation of TMDL wasteload allocations into permits.*

*The TMDL modeling shows a clear linkage between phosphorus concentrations and chlorophyll a response.*

*The TMDL is not a mere point source reduction approach to remediating Lake Winnebago but rather assigns reductions to both point and nonpoint sources and addresses internal loading.*

*Text in the comment regarding using an approach like the Rock River TMDL when comparing water quality criteria between Lake Koshkonong and Lake Winnebago does not accurately reflect the facts. Both lakes have water quality criteria assigned per ch. NR 102, Wis. Admin. Code. Lake Koshkonong has a promulgated criterion of 100 µg/L and Lake Winnebago has a promulgated criterion of 40 µg/L. The department simply can not assign Lake Winnebago a target of 100 µg/L because Lake Koshkonong has a criterion of 100 µg/L. They are different lakes with different residence times and different depths.*

*The TMDL did not assign wasteload allocations to the Cities that result in effluent limits of 40 µg/L. The TMDL wasteload allocations, based on baseline design flows, equates to effluent limits of 0.31 mg/L (310 µg/L) for Oshkosh and 0.27 mg/L (270 µg/L) for Fond du Lac. For municipal wastewater facilities, the baseline was set at 1 mg/L total phosphorus and the facility’s design flow.*

- c. Comments from the cities of Oshkosh and Fond du Lac following technical discussion related to lake modeling and its support of the Lake Winnebago TMDL on May 28, 2015;

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**Comments from the Cities of Oshkosh and Fond du Lac Following Technical Discussion Related to Lake Modeling and its Support of the Lake Winnebago TMDL on May 28, 2015**

Thank you for meeting with the Cities of Oshkosh and Fond du Lac on May 28, 2015 to discuss the Upper Fox River, Wolf River and Lake Winnebago TMDL. The attendees at the meeting included:

Steve Brand/Oshkosh	Kevin Sorge/Oshkosh
Jordan Skiff/Fond du Lac	Jeremy Cramer/Fond du Lac
Dale Robertson/USGS	Keith Marquardt/WDNR
Kevin Kirsch/WDNR	Matt Diebel/WDNR
Ted Johnson/WDNR	Rob McLennan/WDNR
Jean Chruscicki/USEPA	David Werbach/USEPA
Brent Brown/CH2M	David Austin/CH2M
Jane Carlson/Strand	Nick Bartolerio/Strand
Andy Somor/Cadmus	

These comments refer to the "TMDL team," which includes the Wisconsin Department of Natural Resources (WDNR), U.S. Geological Survey (USGS), the U.S. Environmental Protection Agency (USEPA), and their technical consultant, the Cadmus Group.

The Cities appreciated the update on watershed and lake modeling, overall schedule update, and the opportunity to continue discussions that resulted from the February 6, 2015 meeting and subsequent comments provided by the Cities to the TMDL team. As the two largest publicly owned treatment facilities in the watershed, the Cities will be significantly impacted by the allocations in the final TMDL and have a strong vested interest in a scientifically sound TMDL.

As a follow up from the May 28 meeting, we offer the following comments. The comments are grouped into four main categories: Record of Comments, Lake Modeling, Site Specific Water Quality Criteria, and Next Steps. These categories follow the major topics discussed at the May meeting. The Cities understand that these comments will be included in the TMDL record, and expect that the TMDL team will either incorporate the recommendations in these comments into the TMDL or respond to the recommendations raised in these comments prior to finalizing the TMDL.

At the outset of these Comments, the Cities thought it would be useful to summarize our positions on the technical issues discussed at the meeting. In particular, the Cities believe that the current TMDL modeling approach does not accurately capture the complex nutrient dynamics in Lake Winnebago. The Cities continue to recommend a mechanistic model, and as a second option, may support an ensemble modeling approach, if it can accurately capture Lake Winnebago's complex nutrient dynamics. The Cities also recommend WDNR consider whether the 40 microgram per liter ( $\mu\text{g/L}$ ) phosphorus criterion for Lake Winnebago is even attainable in light of the USGS's preliminary modeling and the findings in Marie-Pierre Gustin's Ph.D. dissertation, "Source, Transport, and Fate of Sediments and Nutrients in the Winnebago Pool System," both of which are discussed below. The Cities recommend WDNR consider whether Lake Winnebago requires a Use Attainability Analysis (UAA) or Site Specific Criteria (SSC) and how a UAA or SSC will be implemented. The Cities collectively face costs that could be in excess of \$140 million dollars to comply with the 40  $\mu\text{g/L}$  phosphorus criterion, and as a result, developing a scientifically sound modeling approach and identifying and implementing an attainable criterion is of vital concern to the Cities.

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## Record of Comments

The WDNR and USEPA confirmed that comments received from the Cities in response to their meetings with the TMDL team are being included as part of the TMDL record. To date, the Cities do not know when or how the comments they provide are being addressed by the TMDL team. The Cities are hopeful that engaging the TMDL team in a dialogue early in the TMDL process will result in an improved TMDL and allocations that are equitable, implementable and rooted in sound science using best available methods and approaches. By taking this proactive approach, the Cities hope to avoid some of the issues encountered in the Rock and Lower Fox River TMDLs. The Cities expect that the TMDL team's responses to comments raised by the Cities are thorough and technically sound. While the Cities, and particularly Fond du Lac, believe time is of the essence, the Cities expect that the TMDL team will not place the TMDL schedule at a higher priority than responding appropriately to comments and ensuring the final TMDL is rooted in best available science and compliance tools.

## Lake Modeling

Lake Winnebago is a unique system, and there may not be one model that fully accounts for all of the physical, chemical, and biological phenomena occurring in the lake. The Cities have proposed use of a mechanistic modeling approach to most closely and accurately represent the complex dynamics of Lake Winnebago nutrient dynamics. Mechanistic modeling has been used in other TMDLs and the USGS stated mechanistic modeling is being developed for portions of the Wisconsin River TMDL. The TMDL team noted that adding a mechanistic model(s) to the current lake modeling effort would delay the completion date and increase cost of the TMDL. The TMDL team and Cities acknowledged that permit schedules are different for the two Cities, where Fond du Lac has a very aggressive compliance schedule that may already require drastic improvements at the WWTP prior to completion of the TMDL. However, the Cities believe a mechanistic model is the most accurate modeling approach because it could simulate the complex nutrient dynamics in Lake Winnebago.

While not as accurate as a mechanistic model, the USEPA described an 'ensemble' approach, which would examine the results of several models to increase the confidence in the modeling results. The USEPA suggested that the ensemble approach was useful for the Western Lake Erie TMDL. The USGS reviewed a basic ensemble approach using the models that are part of the Wisconsin Lake Modeling Suite (WiLMS<sup>1</sup>) but it was not proposed as an equivalent ensemble approach to what has been used in other TMDLs, such as the Western Lake Erie. If the TMDL team chooses not to use a mechanistic model, which would be the most accurate model, then the Cities agree that an ensemble approach has the potential to improve confidence in the modeling effort compared to simpler models, such as the BATHTUB or Jensen model. If an ensemble approach is used by the TMDL team, the Cities expect that the specific ensemble approach used will be able to support all of the compliance tools that are available, including Use Attainability Analysis (UAA) and Site Specific Criteria (SSC).

Since the February 6, 2015 meeting, the USGS ran the Jensen model for Lake Winnebago. The Cities discussed the significance of wind effects on nutrient cycling, and the USGS and WDNR technical service staff agreed that the existing models do not account for the wind effects on nutrient cycling. The Cities do not believe the Jensen model is directly applicable to Lake Winnebago due to its large size and depth. However, if the TMDL team continues to use the Jensen model, the Cities request that the TMDL team add a wind effects algorithm to the Jensen model and compare output from the Jensen model to the BATHTUB simulation output and actual data. This work can be used as part of an 'ensemble' modeling approach.

The USGS utilized years 2009 through 2011 for model calibration. The model captures the total phosphorus (TP) concentration peaks of 2009 and 2010, but does not capture the peak of 2011. In years prior to 2009-2011 and years subsequent to this period, TP peaks are substantially greater than in 2011. Drought years

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<sup>1</sup> The Wisconsin Lake Modeling Suite (WiLMS) model is a lake water quality-planning tool. The WiLMS model structure is organized into four (4) principal parts, which include the front-end, phosphorus prediction, internal loading and trophic response. <http://dnr.wi.gov/lakes/model/>



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appear to have the highest TP peaks, which suggests that sediment nutrient dynamics may have a significant impact on TP in the water column. Future modeling must capture these peaks to generate confidence in the modeling effort. The USGS suggested that some of these peaks may be due to sampling error (e.g., algae particle entrainment). Review of laboratory chain of custody, data flags, and quality assurance and quality control procedures are necessary to determine whether the USGS's hypothesis is acceptable. If a review of these items does not explain the TP peaks, then models must capture TP growing season peaks to demonstrate that they can accurately determine the TP budget for Lake Winnebago.

The 1995 Ph.D. dissertation by Marie-Pierre Gustin, "Source, Transport, and Fate of Sediments and Nutrients in the Winnebago Pool System," (Gustin study) was briefly discussed in the meeting. It appears to be the most comprehensive study of nutrients in Lake Winnebago completed to date. The Gustin study analyzed sediment core data and concluded that the sedimentation rate to Lake Winnebago had not changed from the previous 100 years. Furthermore, the Gustin study found that Lake Winnebago retains only about 45 percent of its phosphorus load due to site-specific factors.

The TMDL team needs to reconcile the Gustin study's findings with the scientific rationale of the TMDL plan. Specifically, the Cities request that the TMDL team complete a systematic comparison of modeling methods, results, and conclusions between the Gustin study and the TMDL process, particularly with respect to conclusions regarding water quality in Lake Winnebago and drivers of water quality, such as internal nutrient recycling.

The Gustin study's findings raise questions as to what previous state of water quality the proposed TMDL plan can reasonably expect to attain. Paleolimnological evidence would establish a historical record of eutrophication in Lake Winnebago necessary to answer these questions. In addition to the Lead-210 and stratigraphic evidence in the Gustin study, water quality reconstruction analyses from diatoms, and possibly invertebrates, in dated cores would be vital to determine attainable water quality targets. The Cities briefly discussed this work during the May meeting, and the TMDL team did not object to this proposed work.

The USEPA stated that funds allocated for the lake modeling effort are limited but a small number of additional scenarios could potentially be examined using current funds. The Cities welcome the opportunity to examine additional scenarios and request the TMDL team determine how this will fit within the TMDL schedule.

### **Site Specific Water Quality Criteria**

Chapter NR 102 of the Wisconsin Administrative Code establishes numeric total phosphorus water quality criteria based on water body type, including a criterion of 40 µg/L for non-stratified reservoirs such as Lake Winnebago. While this criteria may be appropriate for other water bodies in this category, it is not clear this criterion is attainable in Lake Winnebago. This is supported by the preliminary USGS modeling results presented at the May meeting that show that even with an immediate 50 percent reduction in phosphorus load, the 40 µg/L criterion would still be exceeded by more than 50 percent (63 µg/L versus 40 µg/L) in 2050. How a 50 percent reduction in phosphorus would be achieved in the near term was not presented but represented a highly optimistic assumption used solely to test the ability of Lake Winnebago to attain the 40 µg/L criterion. As a modeling exercise, however, failure to meet a 40 µg/L criterion on generational time scales under a highly optimistic, assumed load reduction, which in itself is likely unattainable by 2050, strongly suggests a fatal flaw in the 40 µg/L criterion or in the assumption that the criterion is attainable. The Cities request that the TMDL team reconcile this apparent flaw before draft allocations are developed. Maintaining a criterion that is not achievable in 50 years with a highly optimistic reduction in phosphorus loadings while the Cities are bound by WPDES permit compliance schedules of only 9 years is inequitable for the Cities.

While discussing the preliminary modeling results, USEPA and WDNR staff stated that if the final modeling results show that a 40 µg/L water quality criterion is unattainable, the criterion would be adjusted through the establishment of an SSC. USEPA staff stated that SSC have been used in Minnesota, and in those cases,

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the TMDL process was paused when it was determined that a SSC would be established and the TMDL modeling was used to inform the SSC. It is not clear how the TMDL process would be used to inform a SSC for Lake Winnebago. It appears that the process used in Minnesota has not yet been used in Wisconsin and UAA and SSC are not currently well-defined as available tools in Wisconsin. The Cities request information on how and when the TMDL team will determine whether the 40 µg/L TP criterion is attainable and, if it is determined to be unattainable, how and when the TMDL team will pause the TMDL development process to determine an attainable criterion.

### Next Steps

The Cities appreciate the willingness of the TMDL team to discuss the TMDL process, to provide data used in the TMDL, and to take into consideration comments from the Cities. To continue these lines of communication, the Cities request additional meetings prior to the completion of the TMDL. The Cities request a meeting with the TMDL team following completion of the watershed and lake modeling and scenario runs, but prior to the preliminary allocations. As the WDNR indicated was done for the Milwaukee TMDL, the Cities also request a larger stakeholder meeting following the preliminary allocations, followed by sector stakeholder meetings prior to the public meeting. The Cities request information on modeling scenarios that are being run for the TMDL and will provide suggested modeling scenarios to the TMDL team within a month. The Cities also request the USGS data from the continuous monitoring sonde array in Lake Winnebago in Excel spreadsheet or database format.

The Cities understand the TMDL team's concerns that a budget and schedule has been established for the TMDL. However, the schedule and financial impact of *implementing* the TMDL is significantly greater. For the Oshkosh and Fond du Lac wastewater treatment facilities alone, compliance with projected water quality goals could cost in excess of \$140 million dollars, while these two sources account for less than 3 percent of the total phosphorus loading to Lake Winnebago. The high cost of compliance is the reason the Cities are requesting to meet with the TMDL team providing comments for the TMDL team to incorporate into the TMDL approach. While the Cities acknowledge and appreciate WDNR's confidence that the TMDL will result in limits that are less strict than the criterion, the Cities still have permit compliance schedules where the criterion is listed as the WQBEL and the TMDL completion is beyond the deadlines imposed by WDNR to complete planning for upgrades to comply with WQBELs. Furthermore, if the TMDL implementation does not result in Lake Winnebago complying with the 40 µg/L criterion, WDNR may require that the criterion be met by the Cities. For these reasons, setting an attainable criterion and developing a scientifically sound modeling approach, both of which will lead to a successful TMDL implementation, is vital to the Cities.

Finally, we encourage WDNR to prioritize efforts in completing the SCC guidance and related rules and to develop similar tools for UAAs. It appears that one or both of these tools may become necessary in the Upper Fox/Wolf TMDL development and implementation efforts. The sooner these tools are made available, the less public funds will be wasted trying to achieve an unattainable criterion and the more funds can be used to provide the best environmental benefit.

*Response: As written in the comment:*

*"The Cities understand that these comments will be included in the TMDL record, and expect that the TMDL team will either incorporate the recommendations in these comments into the TMDL or respond ...."*

*These comments, as well as previous comments have been reviewed and considered and incorporated, as appropriate within the TMDL. As discussed in previous responses, the*

*department chose not to pursue a mechanistic model and instead used an ensemble of models to simulate Lake Winnebago.*

*The application of the promulgated water quality criterion of 40 µg/L has been addressed in other comments. The same applies for the Cities desire to pursue a UAA.*

*Record of Comments: The TMDL comments were addressed as indicated by the Cities with recommendations, as appropriate, incorporated in the TMDL study.*

*Lake Modeling: The use of the mechanistic modeling for the Wisconsin River Basin TMDL is addressed in the response to comment 105 (b). As proven in the Wisconsin River TMDL, a mechanistic model does not provide the most accurate simulation. Contrary to what the cities may claim, a mechanistic model is unlikely to provide additional information beyond the modeling approaches already employed in the TMDL.*

*While Jensen does not account for wind, the model does assume a shallow mixed system. The Cities have no basis for their claims that Jensen is not applicable to Lake Winnebago. The results from the ensemble modeling approaches were compared and are summarized in the modeling report found in Appendix E.*

*The Gustin Study was reviewed as part of the TMDL development process and an independent paleoecological study was conducted and can be found in Appendix F.*

*Site Specific Water Quality Criteria: The SSC process was used, similar to Minnesota, in the Wisconsin River Basin TMDL; however, instead of pausing the TMDL two sets of allocations were included in the TMDL. Unlike the Wisconsin River Basin TMDL, analysis for Lake Winnebago does not support the establishment of an SSC. This is addressed extensively in other comments.*

*Next Steps: The department conducted additional stakeholder meetings and allowed for two formal comment periods.*

*The resulting allocations translated into effluent limits higher than the 40 µg/L NR 217.13 limits already in the Cities' permits. The department does not understand how the Cities arrived at the following statement:*

*WDNR to complete planning for upgrades to comply with WQBELs. Furthermore, if the TMDL implementation does not result in Lake Winnebago complying with the 40 µg/L criterion, WDNR may require that the criterion be met by the Cities. For these reasons, setting an attainable criterion and developing a scientifically sound modeling approach, both of which will lead to a successful TMDL implementation, is vital to the Cities.*

*At best, the above statement is a loose paraphrasing of the language in ch. NR 217, Wis. Admin. Code which effectively changes the meaning and intent of the actual NR 217 language.*

- d. City of Oshkosh comments to the SWAT and WiLMS models draft report dated October 28, 2016;

*Note: A copy of these comments can be found in Appendix M*

*Response: When received, these comments were forwarded to US EPA and their contractor CADMUS. CADMUS reviewed the comments and made clarifications in supporting documentation that can be found in Appendices C and D. If warranted, adjustments were made to the models. Any resulting modifications are also discussed in the appendices. Many of these comments were also repeated in material submitted on November 4, 2016 and are also addressed in the CADMUS response memo below.*

- e. Comments of City of Fond du Lac to the Upper Fox River and Wolf River TMDL public comments on draft SWAT and WiLMS models presentations and reports dated November 4, 2016; and

*Note: A copy of these comments can be found in Appendix M.*

*Response: These comments are similar to comments submitted under (d.) above. In addition to the response provided for comment (d.) please see the attached CADMUS memo below which was drafted in response to the comments. In addition, the memo included in response to (f.) also addresses issues raised in comments (d.) and (e.).*



## MEMORANDUM

To: Jean Chrusicki, EPA Region 5  
Keith Marquardt, Wisconsin Department of Natural Resources

From: Andy Somor, The Cadmus Group, Inc.

Subject: Response to comments on UFWB SWAT and WiLMS model reports

Date: March 3, 2017

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This memo addresses technical comments submitted by the City of Oshkosh and Strand Associates on two draft reports prepared by The Cadmus Group, Inc. on watershed and lake modeling to support the development of phosphorus and sediment Total Maximum Daily Loads (TMDLs) for the Upper Fox and Wolf River Basins (UFWB). The watershed modeling report (*Upper Fox-Wolf Basins TMDL: SWAT Model Setup, Calibration, and Validation*) describes the configuration, calibration, and validation of a Soil and Water Assessment Tool (SWAT) watershed model of the UFWB. The lake modeling report (*Upper Fox-Wolf Basins TMDL: WiLMS Lake Model Setup and Results*) describes the configuration, calibration, and validation of lake phosphorus response models for 21 lakes in the UFWB using the Wisconsin Lake Modeling Suite (WiLMS).

A total of 164 comments were submitted by the City of Oshkosh and Strand Associates on the UFWB TMDL watershed and lake modeling reports. The comments can be broadly grouped into three categories:

1. Comments requesting clarification on the intended use of watershed and lake models;
2. Comments on the complexity and level of detail of model formulations, input data, and settings; and
3. Comments requesting additional description of model inputs, settings, and outputs.

The following sections present responses to these three topics.

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### Topic 1. Intended Use of Watershed and Lake Models

Output data from the UFWB SWAT and WiLMS models will be used for phosphorus and sediment loading capacity and allocation analysis. Relevant model output data for loading capacity and allocation analysis are listed below:

- a) SWAT predictions of *average annual streamflow in stream and river reaches* are used in the calculation of allowable phosphorus and sediment loads for stream and river reaches in combination with phosphorus and sediment concentration targets;
- b) SWAT predictions of *average annual nonpoint source phosphorus and sediment loads* are used in the calculation of the percent reduction from existing nonpoint source loads needed to achieve allowable phosphorus and sediment loads;
- c) SWAT predictions of the *relative magnitude of phosphorus and sediment loads from major land cover types* are used to allocate total allowable nonpoint phosphorus and sediment loads to nonpoint sources;
- d) SWAT predictions *annual water volumes and phosphorus loads input to modeled lakes* are used to calibrate and validate lake response models; and
- e) WiLMS predictions of the *average annual phosphorus load that corresponds to in-lake phosphorus concentration targets* are used to define the allowable phosphorus load for each lake.

The UFWB SWAT model will not be used to evaluate the effect of alternative watershed management strategies on sediment and phosphorus loads (i.e., scenario analysis). Loading capacity and allocation analysis will use SWAT output data but will be completed outside of the SWAT modeling environment using a Microsoft Access database. A description of the loading capacity and allocation analysis methodology will be documented with draft phosphorus and sediment load allocations.

### Topic 2. Complexity and Level of Detail of Model Formulations, Input Data, and Settings

The watershed and lake modeling framework selected for the UFWB TMDL uses well-established models and standard inputs and settings for TMDL development. Both the SWAT watershed model and the Canfield-Bachmann lake response model applied in WiLMS have been used to develop dozens of EPA-approved TMDLs throughout the U.S.<sup>1</sup> For UFWB TMDL modeling, decisions on input datasets and model settings were based on past modeling efforts, scientific literature, and results of sensitivity analysis. Examples include:

- SWAT subwatershed size: Jha et al. (2004) report that SWAT streamflow predictions are relatively insensitive to subwatershed size but recommend drainage area thresholds of  $\leq 3\%$  for predicting sediment loads and  $\leq 5\%$  for predicting phosphorus loads. The drainage area threshold used for the UFWB SWAT model (approximately 0.5% of the total basin area) is below the recommended values.
- SWAT elevation data: Cotter et al. (2003) report that SWAT predictions are sensitive to the resolution of the digital elevation model (DEM) used for model input and that prediction errors below 10% for streamflow, sediment, and phosphorus could be achieved with DEM resolutions

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<sup>1</sup> Example TMDLs using SWAT watershed model and the Canfield-Bachmann lake model can be found with the EPA AskWaters TMDL Document Search [https://iaspub.epa.gov/apex/waters/f?p=ASKWATERS:DOC\\_SEARCH:::72](https://iaspub.epa.gov/apex/waters/f?p=ASKWATERS:DOC_SEARCH:::72) using the search terms "SWAT" and "Canfield-Bachmann".



of  $\leq 300$  meters. The DEM resolution used for the UFWB SWAT model (10 meters) is below this threshold.

- SWAT agriculture management settings: Land cover/land use datasets were used to map crop types for the UFWB SWAT model and county land and water conservation departments were surveyed to determine farming practices associated with each crop. This approach follows the methods described by Kirsch et al. (2002), Larose et al. (2007), and Heathman et al. (2008).
- SWAT initial soil phosphorus settings: Initial soil phosphorus concentrations input to the UFWB SWAT model were based on soil sample data reported by county land and water conservation departments and the University of Wisconsin Soil Testing Laboratories. The reported soil phosphorus concentrations were assumed to be derived from the Bray-1 testing method and were divided by one-half for input as initial soil soluble phosphorus concentrations in SWAT, based on recommendations in Vadas and White (2010).
- SWAT point source data: Sensitivity analysis showed that UFWB SWAT model predictions at calibration sites were relatively insensitive to point source input data because point source discharges account for a low percentage of total flows and sediment/phosphorus loads at calibration sites.
- WiLMS model calibration and validation data: Total phosphorus concentration samples from modeled lakes were used to calculate growing season median values for calibration and validation using methods described in *Wisconsin 2016 Consolidated Assessment and Listing Methodology (WisCALM) for CWA Section 303(d) and 305(b) Integrated Reporting* (WDNR, 2015).

The watershed and lake models, input datasets, and settings used for the UFWB TMDL have been evaluated through a comparison of model predictions to sample data collected from the basin. This evaluation is documented in each model report. For the UFWB SWAT model, performance statistics for predictions of streamflow, phosphorus, and sediment meet or exceed acceptability guidelines in most cases. Recent revisions to the SWAT model have further improved model performance and final performance statistics will be documented in the final SWAT model report along with additional discussion of instances in which performance statistics are below satisfactory guidelines. For the WiLMS model, validation results show that predicted total phosphorus concentrations are on average within  $\pm 12\%$  of observed concentrations. Model outputs will continue to be evaluated as they are applied for phosphorus and sediment loading capacity and allocation analysis. Uncertainties in model predictions may be factored into draft and final phosphorus and sediment allocations.

### Topic 3. Additional Description of Model Inputs, Settings, and Outputs

The watershed and lake modeling reports focus on SWAT and WiLMS model inputs, settings, and performance. Requests by the City of Oshkosh and Strand Associates for additional information on these topics will be considered for future updates to the modeling reports. Example requests that can be incorporated into updated modeling reports include more detailed maps of model inputs and clarification of model settings.

Additional detail on model output data will be provided in other UFWB TMDL documentation. For example, SWAT predictions of nonpoint source phosphorus and sediment loads by subbasin will be



presented in documentation accompanying draft phosphorus and sediment allocations and will also be presented in the UFWB TMDL report.

#### References

Cotter, AS, Chaubey, I, Costello, TA, Soerens, TS, and Nelson, MA. 2003. Water Quality Model Output Uncertainty as Affected by Spatial Resolution of Input Data. JAWRA Journal of the American Water Resources Association, 39: 977–986

Heathman, GC, Flanagan, DC, Larose, M, and Zuercher, BW. 2008. Application of the soil and water assessment tool and annualized agricultural non-point source models in the St. Joseph River watershed. Journal of Soil and Water Conservation, 63(6), 552-568.

Jha, M, Gassman, PW, Secchi, S, Gu, R, and Arnold, J. 2004. Effect of Watershed Subdivision on SWAT Flow, Sediment, and Nutrient Predictions. JAWRA Journal of the American Water Resources Association, 40, 811–825.

Kirsch, K, Kirsch, A, and Arnold, JG. 2002. Predicting sediment and phosphorus loads in the Rock River basin using SWAT. Transactions of the ASAE, 45(6), 1757-1769.

Larose, M, Heathman, GC, Norton, LD, and Engel, B. 2007. Hydrologic and atrazine simulation of the Cedar Creek watershed using the SWAT model. Journal of Environmental Quality, 36(2), 521-531.

Vadas, PA, and White, MJ. 2010. Validating soil phosphorus routines in the SWAT model. Transactions of the ASABE, 53(5), 1469-1476.

Wisconsin Department of Natural Resources (WDNR). 2015. Wisconsin 2016 Consolidated Assessment and Listing Methodology (WisCALM) for CWA Section 303(d) and 305(b) Integrated Reporting. Available online at: <http://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=115661179>.

- f. Joint comments of the cities of Fond du Lac and Oshkosh on the Upper Fox/Wolf River TMDL meetings held on August 23 and 28, 2017, dated November 17, 2017.

*Response: Below is a copy of the responses provided to the comments submitted from the meetings held on August 23 and 29, 2017:*

State of Wisconsin  
DEPARTMENT OF NATURAL RESOURCES

Scott Walker, Governor  
Daniel L. Meyer, Secretary  
Telephone 608-266-2621  
Toll Free 1-888-936-7463  
TTY Access via relay - 711



May 15, 2018

Jane Carlson, Senior Associate  
Strand Associates, Inc  
910 West Wingra Drive  
Madison, WI 53715

SUBJECT: Department Response to the Cities of Oshkosh and Fond du Lac Regarding Upper Fox & Wolf TMDL Development

Dear Ms. Carlson:

In the fall of 2016 the Cities of Oshkosh and Fond du Lac submitted 164 comments on the SWAT and WiLMS modeling reports. All comments were considered and, where appropriate, adjustments made with results presented at the public meeting on August 23, 2017. The cities presented new questions on August 29, 2017, with an indication that previous questions had been addressed. The Department also stated that we would not be responding to all comments in writing but rather considering comments and making the appropriate changes and updates to the TMDL and its report.

The correspondence DNR has received has contained some inaccurate information about the roll-out for the Wisconsin River and Rock River TMDLs that we wish to correct. Changes in allocations and modeling did occur during and after the public informational hearing for the Rock River TMDL. For the Wisconsin River TMDL, the Department met with impacted facilities, provided draft allocations, conducted a series of stakeholder meetings, provided a review period, and will be considering comments and making the appropriate changes and updates to the TMDL and its report. Once that is completed, a yet to be scheduled public informational hearing(s) will be conducted which under s. NR 212.77, Wis. Admin. Code requires a minimum 30-day comment period. A written response to comments submitted during the 30-day comment period is sent as part of the final TMDL package to U.S. EPA for its approval.

Like the Wisconsin River TMDL, prior to the public informational hearings and minimum 30-day comment period required by s. NR 212.77, Wis. Admin. Code, stakeholders in the Upper Fox-Wolf TMDL will be provided an opportunity to review all reports and associated allocations and provide input through stakeholder meetings and a comment period.

The letter from the Cities dated November 17, 2017 raises 11 main comments. Comments (1) and (2) are addressed above. Model methodology and results have been discussed at past stakeholder meetings and will be detailed in the draft TMDL report. During the meeting on August 29<sup>th</sup>, the cities' consultant stated that it is difficult to comment on the TMDL without seeing the allocations and the complete report. The Department will conduct additional public meeting(s) and a comment period prior to the public informational hearing process to address this issue.

Documentation of the pool lakes, comment (3), will be provided as part of the draft TMDL report. As outlined above, an informal review period will occur so stakeholders have a chance to review material and provide comments prior to the formal public informational hearing.

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Loads from forests and background (comment 4) have been adjusted and calibrated to long-term monitoring data. In the model, wetlands act as both sinks and sources of phosphorus. Dane County is not dredging wetlands but rather dredging stream channels as part of an ongoing study to assess its impact and effectiveness.

Comments (5) and (6) both relate to the evaluation of site specific criteria (SSC). Multiple lines of evidence show that a criterion of 40 micrograms/liter (ug/L) total phosphorus (TP) is appropriate to meet the recreational designated use for Lake Winnebago; however, a SSC can be recommended if it is documented that a waterbody never met the promulgated criterion. As such, cores were collected and the diatoms analyzed. The results, which have been shared, show that Lake Winnebago historically met 40 ug/L TP.

A Use Attainability Analysis (UAA) involves showing that the designated use, in this case the recreational use, for Lake Winnebago is not appropriate. In discussions with U.S. EPA, the analysis conducted as part of the TMDL analysis can serve as the first step in the UAA process provided it is demonstrated that a designated use cannot be achieved. Recreational use is an existing use for Lake Winnebago, and therefore cannot be removed. Lake modeling and allocation analysis indicate that standards protecting this existing use can be met.

Comment (7) regarding phased or staged implementation is not supported by the memo referenced (Memorandum: Clarification Regarding "Phased" Total Maximum Daily Loads, U.S. EPA 2006). In addition, the East Branch and Salt Creek TMDLs are being taken out of context.

TMDLs do not create new regulatory requirements and are implemented through existing regulations. For Wisconsin, s. NR 217, Wis. Admin. Code sets out the requirements for implementation of the wasteload allocation from a TMDL. Specifically, NR 217.16(2):

*If the phosphorus limitation based on an approved TMDL is less stringent than the water quality based effluent limitation calculated in s. NR 217.13, the department may include the TMDL based limit in lieu of the limit calculated in s. NR 217.13 if the limit calculated under s. NR 217.13 has not yet taken effect. If the department includes the TMDL based limitation for phosphorus in the WPDES permit in lieu of the limit calculated in s. NR 217.13, the TMDL based limit may remain in the permit for up to two permit terms to allow time for implementation of the TMDL, or the implementation period specified in the TMDL, whichever is less. The department may include a schedule of compliance to achieve a TMDL based limit if the department determines a schedule of compliance is necessary.*

Please note that NR 217.16(2) is consistent with a phased TMDL approach as laid out in U.S. EPA's memo from 2006:

*In such cases, the Guidance recommends that some additional provision in the TMDL, such as a schedule and description of the implementation mechanisms for nonpoint source control measures, be included to provide reasonable assurance that the nonpoint source measures will achieve the expected load reductions. Such additional provisions also assure compliance with federal regulations 40 CFR 130.2(i), which provide that in order for the wasteload allocations to be made less stringent, more stringent load allocations must be "practicable".*

To satisfy this requirement, the Department is utilizing new modeling capabilities to express the load allocation as an edge of field number and has conducted analysis to show that the load allocations in the TMDL, which give point sources relief from NR 217.13 limits, are achievable.

U.S. EPA's memo also clearly states that all TMDLs must be set to meet water quality standards:

*"Under the phased approach the TMDL has LAs (load allocations) and WLAs (wasteload allocations) calculated with margins of safety to meet water quality standards (emphasis added by U.S. EPA).*

The TMDLs for the DuPage River and Salt Creek in Illinois were for chlorides and TDS, and the "phased implementation" was related to NPDES permit requirements to reduce phosphorus. However, it can be used as a hypothetical for comparison. If a state does not have numeric promulgated water quality standards for the pollutants in question then water quality targets can be used in setting allocations. The lack of numeric water quality standards allows more flexibility for so called phased or adaptive approaches such that targets are set in the TMDL and once reached compared to water quality monitoring and then targets can be adjusted as needed. Wisconsin has promulgated numeric phosphorus criteria which prevents this approach for phosphorus TMDLs in Wisconsin; however, through negotiations with U.S. EPA the Department was successful in gaining elements of a phased or adaptive approach for point sources through NR 217.18, the watershed adaptive management option.

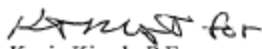
Regarding comment (8) on internal load reductions, the Department has been working to provide an estimate of additional reductions in internal loading within Lake Winnebago that can be achieved through re-establishment of vegetation. This work will be summarized in the draft TMDL report. Any reduction in internal loading used in the TMDL must be supported and the TMDL already assumes that as external loadings are reduced a proportional reduction in internal loading occurs.

Regarding comments (9) and (10), the Department has developed TMDLs evaluating the relationship between phosphorus and TSS. In addition, TMDLs have explicitly stated that reserve capacity is for point sources to address new or expanded discharges or to account for sources not allocated in the TMDL.

The episodic nature of nonpoint loading, comment (11), is the reason that models such as SWAT are used to calculate the nonpoint loads and why agricultural models such as SnapPlus and urban models such as SLAMM are used in implementation analysis. Appendices D, E, and F of the SWAT Report shows plots of measured flow, TSS, and phosphorus against modeled results showing the episodic nature of the flows and loadings.

The Department will make the draft TMDL and supporting material available throughout the public participation process. The roll-out of the TMDL will be consistent with the process outlined above.

Sincerely,

  
Kevin Kirsch, P.E.  
Water Resource Engineer  
Wisconsin Department of Natural Resources

  
Keith Marquardt  
Water Resources Management Specialist  
Wisconsin Department of Natural Resources

c: Permit File – Region and Central Office

Please be advised that we re-incorporate by reference these technical comments, many of which were unsatisfactorily addressed by the WDNR. For this reason, we are re-incorporating them by reference as part of the formal comments in the record in this proceeding. Of course, if you have any questions, please feel free to contact the undersigned at your convenience. Thank you for the opportunity to provide input to this very important TMDL process. *(City of Oshkosh with concurrence from City of Fond du Lac)*

*Response: These comments have been addressed either through explicit responses or modifications to the TMDL study and report.*

106. We appreciate the Wisconsin Department of Natural Resources' (WDNR's) attempt to find a more balanced approach to this TMDL by including reductions in Lake Winnebago internal loading prior to making allocations. One of the proposed approaches assumes macrophyte restoration to reduce wind-driven sediment suspension. We understand that future TMDL report revisions will include additional information on this concept. We suggest the TMDL report include a discussion of potential associated water quality trades available to point sources. Will stringent credit thresholds and trade ratios apply to in-lake macrophyte restoration practices? It would be helpful to the macrophyte restoration effort if the WDNR would detail a streamlined approach to water quality trading (WQT) in the TMDL Report because the current Wisconsin guidelines make WQT onerous in many cases. *(Comment from August 2, 2018, re-submitted by reference by Strand Associates on behalf of the Cities of Fond du Lac and City of Oshkosh)*

*Response: Thank you for your comment regarding our efforts to include aquatic plant restoration activities into the TMDL. The draft TMDL report has included additional information on the proposed restoration of aquatic vegetation within the Winnebago Pool system including Lake Winnebago. However, DNR feels that including details regarding water quality trading within the TMDL report is not appropriate. Water quality trading shall be conducted consistent with the WI Statutes and WDNR Guidance. Please note, as of November 2019, the Department of Natural Resources has implemented 18 water quality trades, approved 24 water quality trades, knows of 13 more! additional draft trades pending, and continues to receive inquiries about water quality trading from interested point source dischargers. For additional information and/or specific questions regarding water quality trading should be directed to the WDNR regional or statewide water quality trading coordinators. (Note: comment and response also listed under Comment 01 in Appendix L)*

107. The paleoecological study results suggest that the total phosphorus (TP) concentration in Lake Winnebago was at or above the water quality criterion of 40 micrograms per liter (ug/L) prior to anthropogenic development in the area (1310 to 1725). Based on this data, we do not believe that the 40 ug/L criterion is appropriate or attainable, considering that this would require all phosphorus sources to be lower than the naturally occurring "background" sources from the 1300s. It would be

impossible to completely reverse anthropogenic impacts, considering the extensive development and construction of dams that occurred since 1725.

In Section 2.4.2 of the draft TMDL Report, it states that the lake phosphorus model was used with tributary concentrations set to 20 ug/L TP to simulate conditions prior to extensive anthropogenic development in the watershed. This was then used in the pool lake modeling to suggest that the historic Lake Winnebago TP concentration could have been below 40 ug/L. Please provide additional information to support the tributary TP concentrations used in this analysis. The diatom analysis indicates that the Lake Winnebago TP concentration was higher than the lake model predicted under these conditions, suggesting that the tributary concentrations were greater than 20 ug/L prior to extensive settlement, or that another parameter in the model needs to be adjusted to accurately predict Lake Winnebago TP concentrations.

Section 2.4.3 of the draft TMDL Report presents a regression analysis indicating water column TP concentrations of 35 to 47 ug/L should result in meeting the recreational use target of 20 ug/L chlorophyll (CHL) 70 percent of the summer days in Lake Winnebago. We have questions about the way the analysis was done and would appreciate additional explanation in the TMDL Report. However, our biggest question relates to the 20 ug/L CHL target. We understand this target is not codified and is based on surveys of user perceptions in Minnesota. Lake Winnebago is unique, and its users likely have different perceptions than a typical Minnesota lake user. The TP concentrations that were determined from this analysis coincide fairly closely with the pre-development sediment core results; does this mean the lake was at 20 ug/L CHL 70 percent of summer days back in 1310-1725? Again, we do not believe these historical TP concentrations are attainable considering anthropogenic development. *(Comment from August 2, 2018, re-submitted by reference by Strand Associates on behalf of the Cities of Fond du Lac and City of Oshkosh)*

*Response: Please see response to comments 4 and 5 (Appendix L). The tributary concentration of 20 µg/L used in the pre-settlement lake modeling scenario is based on reference stream and river TP concentrations reported in Robertson et al. (2006). The lake modeling estimated a pre-settlement Lake Winnebago TP concentration of 32 µg/L. This result falls within the prediction interval for pre-settlement Lake Winnebago TP concentrations derived from diatom analysis (32 to 59 µg/L). Allocations to meet the 40 µg/L in Lake Winnebago do not require tributary phosphorus loads to be less than the natural background loads which, as mentioned above, is estimated at 20 µg/L total phosphorus.*

*The model does accurately predict TP concentrations for Lake Winnebago. The historic scenario simply involves replacing the incoming loads in the calibrated and validated existing conditions lake model with pre-settlement loading rates and allows the model to run until a new equilibrium is reached.*



*The 20 µg/L Chlorophyll a numeric target is contained in the Wisconsin Consolidated Assessment and Listing Methodology (WisCALM, Section 4.5, <http://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=144407523>).*

*The chlorophyll-a target of 20 µg/L was originally obtained from Minnesota studies; however, subsequent analysis using Wisconsin lake user perception data also support the use of a 20 µg/L for Wisconsin lakes. In particular, users of shallow drainage lakes in Wisconsin such as Lake Winnebago perceive recreational use impairments at similar chlorophyll-a levels as users of other lake types in other regions of Wisconsin, including the northern forested region. In addition, Lake Winnebago is a drinking water source and the chlorophyll-a numeric target of 20 µg/L significantly reduces the probability of harmful algal blooms and thus supports the public health and welfare designated use of this lake in addition to the recreational use.*

*Anthropogenic development is not a factor in the development of water quality criteria and standards.*

*Using the current total phosphorus and chlorophyll relationship for Lake Winnebago, a historic total phosphorus concentration of 30 to 40 µg/L would have resulted in a chlorophyll-a concentration at or below 20 µg/L greater than 70% of the time. Meeting the allocations in the TMDL will allow attainment of the water quality criteria of 40 µg/L TP. (Note: comment and response also listed under comment 06, Appendix L)*

108. We have previously submitted comments stating that we believe TP loadings from forest and wetland (defined as “uncontrollable” sources in the TMDL Report) can be reduced through implementation of best management practices (BMPs). Regardless of what Dane County is doing in streams, sediments can be dredged from wetlands, wetland plants can be harvested, gully erosion in forested areas can be corrected, and so on. Background load reductions are inherent in the TMDL’s suggestion that Lake Winnebago TP concentration can be reduced to a value lower than the pre-anthropogenic development concentration identified in the paleoecological study. We request that the agencies add language to the TMDL Report stating that background sources were considered uncontrollable for purposes of setting load and wasteload allocations, but that this definition is not intended to prohibit trading with these sources. *(Comment from August 2, 2018, re-submitted by reference by Strand Associates on behalf of the Cities of Fond du Lac and City of Oshkosh)*

*Response: The water quality trading guidance dated August 2013 ([https://dnr.wi.gov/topic/surfacewater/documents/WQT\\_guidance\\_Aug\\_21\\_2013signed.pdf](https://dnr.wi.gov/topic/surfacewater/documents/WQT_guidance_Aug_21_2013signed.pdf)) outlines options for wetland restoration and stabilization of gullies. Methods exist for the calculation of credits from such practices. Dredging of wetlands and harvesting of wetland vegetations is more complicated from both a credit calculation perspective and an implementation perspective. Methods to calculate credits have not been formalized and implementation can be limited once issues pertaining to waterfowl migration and breeding, fish spawning, and other wildlife and habitat issues*

*are considered. In addition, the research has been inconsistent on the benefits of such dredging given the costs associated, dredging back to parent material, and re-establishment of native plant species. The statement “Background load reductions are inherent in the TMDL’s suggestion that Lake Winnebago TP concentration can be reduced to a value lower than the pre-anthropogenic development concentration identified in the paleoecological study” is inaccurate and not supported by the TMDL modeling and analysis; allocations and the criteria for Lake Winnebago are not set such that they are lower than pre-anthropogenic levels.*

*The TMDL did not apply reductions to background sources; however, water quality trading can occur with these sources. Existing practices in the water quality trading guidance that could be applied to background sources include streambank stabilization and gully stabilization. (Note: comment and response also listed under comment 17, Appendix L)*

109. Nonpoint sources will not be required to reduce TP loadings as a result of this TMDL. Nonpoint sources will, however, need to reduce loadings significantly for the TP criterion in Lake Winnebago to be met. We believe it is unlikely that nonpoint sources will make meaningful reductions that will lead to improvements in water quality, especially near term, and especially without a significant increase in cost-sharing funding. Wisconsin Admin Code § NR 217.16 allows TMDL-based limits to be used in Wisconsin Pollutant Discharge Elimination System (WPDES) permits for two or possibly three permit terms if nonpoint source loads have been substantially reduced. NR 212.76, on the other hand, simply says TMDL-based water quality based effluent limits (WQBELs) can be included in permits in lieu of or in addition to other WQBELs. The WDNR should provide assurances that further reduction will not be demanded of point sources if the nonpoint source reductions are not met within the next 20 years. *(Comment from August 2, 2018, re-submitted by reference by Strand Associates on behalf of the Cities of Fond du Lac and City of Oshkosh)*

*Response: DNR agrees that nonpoint reductions will be necessary to meet water quality goals. Nonpoint source programs, requirements, and activities including past Wisconsin priority watersheds and current farmer led-groups have been shown to reduce nonpoint loads. Please refer to the implementation section the of draft TMDL report*

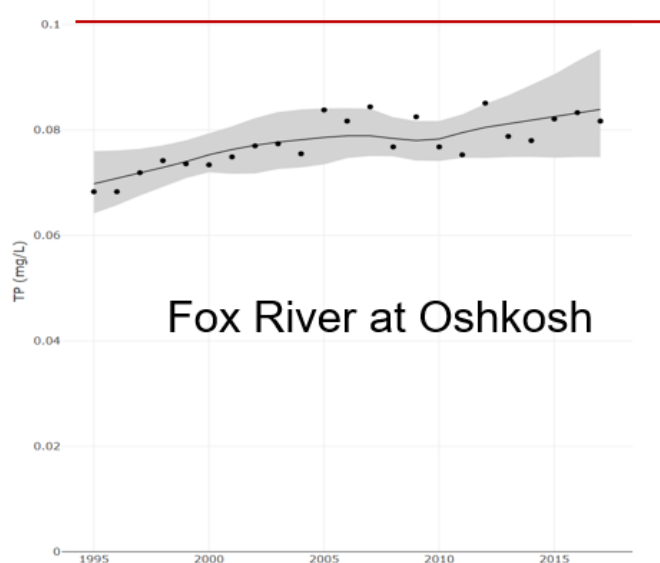
*The TMDL cannot supersede administrative code, in this case s. NR 217, Wis. Admin. Code, either through mandating new requirements or eliminating existing code requirements. The language in NR 217.16 was required by US EPA and reflects their interpretation of a “phased TMDL”. NR 217.16(2) does offer the DNR some flexibility; DNR must first make a determination and then the DNR “may impose” (instead of explicit language requiring) the imposition of more stringent effluent limits. (Note: comment and response also listed under comment 18, Appendix L)*

110. The United States Geological Survey (USGS) pool lake modeling included several scenarios that are not mentioned in the TMDL report. We recall from the October 2016 meeting with United States

Environmental Protection Agency (USEPA), WDNR, and USGS that the pool lake modeling showed if the Oshkosh and Fond du Lac treatment plant loads were set to zero, it would only reduce the Lake Winnebago TP concentration by 2 ug/L, from 90 ug/L to 88 ug/L. This change is so small that it is not reliably measurable. The TMDL report indicates that the municipal separate storm sewer systems (MS4s) have an even smaller impact. With this in mind, it is unreasonable to expect point sources to expend millions of dollars to make further load reductions until significant strides are made with nonpoint load reductions. *(Comment from August 2, 2018, re-submitted by reference by Strand Associates on behalf of the Cities of Fond du Lac and City of Oshkosh)*

*Response: Not all the phosphorus loading scenarios simulated with the lake models were designed to be future alternatives for implementation or to identify allocations to meet water quality standards. Any individual phosphorus source, whether it be a point source or an agricultural operation, can claim to only be a small part of the overall phosphorus load and thus individually play an insignificant role; however, it is the cumulative effect of each source that negatively impacts water quality necessitating reductions from all sources. Please see response to comment 15 regarding the contribution percentage of different sources and associated costs.*

*The monitoring station (Station 713056) on the Upper Fox River at Oshkosh, located downstream of the Oshkosh WWTF, has shown increasing phosphorus concentrations since monitoring was initiated in 1995. A summary plot for the station is shown below:*



*Contrary to the modeling referenced in the comment, these increasing concentrations reflect broadly the impact of upstream sources and locally the impact of the MS4 and WWTF. By contrast, since 2005 the monitoring site for the Upper Fox River at Berlin has shown downward trends in phosphorus concentration as has the monitoring site for the Wolf River at New London.*

*Please also see comment 20 (Appendix L) regarding phasing of TMDLs and TMDL waste load allocations. (Note: comment and response also listed under comment 19, Appendix L)*

111. Finally, we would like to clarify one of our previous comments and apologize for the confusion. In the WDNR's May 15, 2018 response to the City's November 17, 2017 comments, the WDNR responded to our suggestion for a phased or staged TMDL by noting that the DuPage River and Salt Creek TMDLs were for chlorides and total dissolved solids (TDS). However, we were referring to the 2004 Salt Creek and East Branch DuPage River TMDLs for dissolved oxygen. Illinois does have numeric water quality standards for dissolved oxygen. For these TMDLs, USEPA approved a phased, holistic approach with adaptive implementation, in lieu of placing more stringent ammonia and biochemical oxygen demand effluent limits in wastewater treatment facility permits. Additional information is available at the DuPage River Salt Creek Workgroup Web site (<http://drscw.org/wp/>) and on the Illinois Environmental Protection Agency (IEPA) TMDL report status page. Note that USEPA staff also stated in the October 2016 meeting that a phased or staged approach would be approvable for the Upper Fox Wolf TMDL as long as the TMDL included a roadmap for eventually meeting water quality criteria. We suggest that it would be possible to include both interim and final wasteload allocations in the TMDL report, along with the schedule and conditions under which the final wasteload allocations would go into effect, so that NR 217.13 limits do not go into effect in the meantime. We believe this would be an appropriate approach for many reasons, including the following: significant phosphorus load reductions have already been made by point source dischargers and making additional load reductions will come at a premium cost; point sources represent a small percentage of the total loading; there are many uncertainties related to the pool lake phosphorus criterion value and attainability; there is little assurance that nonpoint sources will reduce their loadings in a timely manner; and the internal lake TP loading is very high and will take decades to reduce. *(Comment from August 2, 2018, re-submitted by reference by Strand Associates on behalf of the Cities of Fond du Lac and City of Oshkosh)*

*Response: Phased or staged TMDL wasteload allocations (WLAs), as described in the comment, are not supported by the memo referenced (Memorandum: Clarification Regarding "Phased" Total Maximum Daily Loads, U.S. EPA 2006) in that WLAs are unable to be phased in the way envisioned in the comment as outlined below. However, implementation of wasteload load allocations and other water quality based effluent limits can be "phased" through use of adaptive management or the multi-discharge variance (MDV).*

*U.S. EPA's memo also clearly states that all TMDL WLAs must be set to meet water quality standards:*

*"Under the phased approach the TMDL has LAs (load allocations) and WLAs (wasteload allocations) calculated with margins of safety to meet water quality standards" (emphasis added by U.S. EPA).*

*TMDLs do not create new regulatory requirements but rather are implemented through existing regulations. For Wisconsin, ch. NR 217, Wis. Adm. Code sets out the requirements for implementation of the wasteload allocation from a TMDL. Specifically, s. NR 217.16(2):*

*If the phosphorus limitation based on an approved TMDL is less stringent than the water quality based effluent limitation calculated in s. [NR 217.13](#), the department may include the TMDL based limit in lieu of the limit calculated in s. [NR 217.13](#) if the limit calculated under s. [NR 217.13](#) has not yet taken effect. If the department includes the TMDL based limitation for phosphorus in the WPDES permit in lieu of the limit calculated in s. [NR 217.13](#), the TMDL based limit may remain in the permit for up to two permit terms to allow time for implementation of the TMDL, or the implementation period specified in the TMDL, whichever is less. The department may include a schedule of compliance to achieve a TMDL based limit if the department determines a schedule of compliance is necessary.*

*Please note that NR 217.16(2) is consistent with a phased TMDL approach as laid out in U.S. EPA's memo from 2006:*

*In such cases, the Guidance recommends that some additional provision in the TMDL, such as a schedule and description of the implementation mechanisms for nonpoint source control measures, be included to provide reasonable assurance that the nonpoint source measures will achieve the expected load reductions. Such additional provisions also assure compliance with federal regulations 40 CFR 130.2(i), which provide that in order for the wasteload allocations to be made less stringent, more stringent load allocations must be "practicable".*

*To bolster the reasonable assurance section of the TMDL, the department is utilizing new modeling capabilities to express the load allocation as an edge of field yield consistent with output from SnapPlus and has conducted analysis to show that the load allocations in the TMDL, which give point sources relief from NR 217.13 limits, are achievable with reasonable implementation of agricultural management practices.*

*The East Branch and Salt Creek TMDLs are being taken out of context in their relevance to the Upper Fox and Wolf Basin TMDL. The TMDLs for the DuPage River and Salt Creek in Illinois were for chlorides and total dissolved solids (TDS), and the "phased implementation" was related to NPDES permit requirements to reduce phosphorus, for which Illinois has not adopted numeric criteria. However, it can be used as a hypothetical for comparison. If a state does not have numeric promulgated water quality standards for the pollutants in question, then water quality targets can be used in setting allocations. The lack of numeric water quality standards allows more flexibility for so called phased or adaptive approaches such that targets are set in the TMDL and once reached compared to water quality monitoring and then targets can be adjusted as needed. Wisconsin has*

*promulgated numeric phosphorus criteria which prevents this approach for phosphorus TMDLs in Wisconsin; however, through negotiations with U.S. EPA the department was successful in gaining elements of a phased or adaptive approach for point sources through NR 217.18, the watershed adaptive management option.*

*When questioned about the TMDLs, U.S. EPA noted that while the East Branch and Salt Creek TMDLs contain phased implementation for BOD and dissolved oxygen, this was due to a unique circumstance involving the removal of a dam. Subsequent TMDL approvals (for example, the Ottawa River, Ohio, TMDL Decision Document) explicitly state that timelines and milestones included in the TMDL regarding the implementation of WLAs permits are not part of the EPA decision document. EPA approval is for the allocations; permit conditions and compliance schedules are laid out in administrative code and set during the permitting process. (Note: comment and response also listed under comment 19, Appendix L)*