RESPONSE TO COMMENTS

Draft Ammonia Toxicity Assessment Method

Public comments were received between August 5, 2024, and October 6, 2024, by the Montana Department of Environmental Quality (DEQ) on the draft Ammonia Toxicity Assessment Method. DEQ received 85 comment letters.

Summarized here are the substantive comments related to the draft Ammonia Toxicity Assessment Method received or postmarked by October 6, 2024. DEQ received comments from 79 citizens and 6 organizations. Individual comments are grouped into similar concepts and addressed together. Many commentors submitted identical comments and they are grouped together as a single comment.

COMMENT 1. For three years I have been participating in volunteer water quality sampling of Rock Creek and its tributaries in Carbon County to establish baseline data. Our organization is partnering for analysis with Monitoring Montana Waters of the Flathead Lake Biological Station. We regularly monitor DO, but we are unable to monitor ammonia at this time. Rigorous water quality monitoring is essential to Montana's water future.

RESPONSE: DEQ's recent ammonia monitoring in the watershed may provide insight if further monitoring by volunteer efforts is worthwhile. DEQ appreciates our partnership and thanks you for your monitoring efforts.

COMMENT 2. Pages 1-2. Section 2. "It is assumed that all waters classified as A-1, B-1, C-1, B-2 and C-2 support salmonid growth and propagation… Because of the temporal variability of the early life stages for different salmonid fish species found in cold-water or marginal cold-water streams in Montana, the early life stage standards should be applied year-round for these waters. Warm-water fisheries early life stages are applied from March 15th through August 31st." For ease of reference, the EPA recommends including an assessment method decision framework table, similar to Table 5-3 in the draft dissolved oxygen (DO) assessment method (see below for an excerpt), to explicitly identify which criteria apply to each Class and during what timeframes based on early life stage considerations.

RESPONSE: A beneficial use decision framework process diagram and assessment method decision framework table were added to Section 5.1 in the Ammonia Toxicity Assessment Method.

COMMENT 3. Acute NH3 compliance assessment should occur at no more than three-year periods rather than assessment occurring over too-long ten year periods. More frequent assessment will allow harmful ammonia toxicity to be detected in a more timely manner.

COMMENT 4. Adjust the assessment of compliance with acute criteria to three-year rather than decadal periods so that water bodies with toxic ammonia conditions can be addressed for improvement more quickly.

COMMENT 5. Assessment of compliance with acute criteria should be restricted to three-year rather than decadal periods to conform with Montana water quality standards, and so that waterbodies with toxic ammonia conditions can be addressed for improvement more quickly.

RESPONSE: When analyzing data for assessments, data collected within the past 10 years are considered current, unless there are known changes to sources that an assessor references. DEQ uses a 10-year timeframe because data collection across a large state may occur sporadically and DEQ must use all readily available and credible data for beneficial use assessments. This allows for more waters to be assessed because they will more likely meet minimum data requirements. Additionally, assessors may include data that is older than 10 years if they justify sources have not changed. When evaluating data, DEQ conforms to the allowed aquatic life standard exceedance rate as stated in Circular DEQ-7, which says, "criteria… can only be exceeded once, on average, in a three year period". Because we use a longer timeframe of data, we also use a 10% exceedance rate. If either are exceeded, the assessment unit is listed as impaired by ammonia. Discretion will be used by the assessor to determine which data are appropriate to ensure that beneficial uses for that waterbody are protected.

COMMENT 6. Models cannot be relied on to reliably predict where and when elevated ammonia levels will occur. Only truly representative monitoring can accurately determine ammonia impacts.

COMMENT 7. Monitor ammonia levels through actual sampling rather than relying on modeling. Collected data will more adequately protect our Montana waters. High NH3 causes large diel DO swings over 24 hours which can adversely affect aquatic life.

COMMENT 8. Conduct adequate monitoring of temperature, pH, and ammonia in Class-A Closed waters rather than relying on modeling.

COMMENT 9. BRPA is also concerned about the proposal's dependence on modeling as opposed to data collection. What we want to see is actual data points and a robust data set to determine what the baseline is and what impacts may occur in the future, and we are working hard to do just that. We think DEQ should as well.

COMMENT 10. Protection of Class-A Closed waters from ammonia toxicity should be strengthened. Rather than solely depending upon models, monitoring should be conducted in these waters to obtain actual temperature, pH, and ammonia data.

COMMENT 11. To help in the protection of those waterways, we need more monitoring, not less and we need real data collection, not more modeling. There is nothing more important and critical in understanding any natural process than utilizing the most scientific methodology in data collection and collecting that data as often as possible. We realize of course that consistent and routine data monitoring has its shortcomings such as logistics, manpower, and financial support. But there must be a balance reached in any effort, realizing that any particular model is only as good as the best scientific data collected and inputted into that model.

COMMENT 12. Class-A Closed waters are to be maintained for high-quality purposes such as drinking source-waters and salmonids, yet they are poorly protected from toxic ammonia.

The draft document (MDEQ-a, p.2) states that "no increases of toxic parameters above naturally occurring concentrations are allowed". However, the draft method describes a reactive approach toward protecting these waters. Rather than measuring tNH3, pH, and temperature in Class-A Closed waterbodies, these waters are only to be assessed if modeling, or if monitoring upstream vs. downstream from anthropogenic sources, indicates that the sources have increased ammonia concentrations.

Use of a model(s) underscores rather than minimizes the need for actual data because, as the old adage states, *a model is only as good as the data used to build it*. Models often fall far short of accurately depicting reality (Pilkey and Pilkey-Jarvis 2006, Heddam 2014, Saltelli and Funtowicz 2014). Additional information is not given, so the model(s) used by MDEQ cannot be evaluated for predictive reliability, but predictive capability is known to be strongly limited by few data for model construction, calibration, and validation (Pilkey and Pilkey-Jarvis 2006). Additional information also is not given to clarify the vague description of monitoring upstream vs. downstream from various sources. How will sufficient frequency of monitoring be determined? What sources will be selected, and on what basis? What season(s)? These important points require further consideration (see II.B5 below).

RESPONSE: Modeling is only proposed for A-closed waters because A-closed streams contain a very protective narrative standard for ammonia. DEQ-7 states that no increases of toxic parameters above naturally occurring concentrations are allowed. Therefore, in order to understand what the natural conditions are, a model or historical data comparison would be needed. DEQ added a statement to the Ammonia Toxicity Assessment Method clarifying that models should be based on data collected on the assessment unit and/or a reference waterbody.

COMMENT 13. Inappropriate data are allowed.

COMMENT 14. When evaluating ammonia do not include NH3 data from times prior to significant changes (pollution, etc.) in those waters. That information is not relevant to present conditions and should not be included in their evaluation.

COMMENT 15. Exclude inappropriate data in compliance assessment; any data taken prior to a new significant change in pollution sources should be excluded from evaluation to avoid subjectivity and bias, and misrepresentation of present conditions.

COMMENT 16. Allowing data that is a decade old to make an "acceptable" assessment of a waterbody's current status is also not appropriate in a watershed that is experiencing the kind of growth and change that Ravalli County is undergoing.

COMMENT 17. Inappropriate data should be excluded from compliance assessment. For example, if a given assessment unit has sustained a known significant change(s) in a source(s), data taken prior to those changed should be excluded from the evaluation. Clearer guidance should be added about use of data to avoid bias.

COMMENT 18. Inappropriate use of data collected prior to a known new pollution source(s) – The draft ammonia assessment method (MDEQ-a, p.3) maintains that data collected up to a decade ago are to be considered current—and that if known significant changes in sources have occurred (for example, an increase in sewage or a new sewage source), then best professional judgment can be used to decide which data collected during the decade to include for compliance assessment. Inclusion of data collected prior to the change would be non-protective. Moreover, the lack of further requirements, restrictions or clear guidance increases the likelihood of subjective/ biased rather than science-based data selection.

RESPONSE: Please refer to Section 6.0 of DEQ's Beneficial Use Assessment Method document (Makarowski 2020) for more information regarding DEQ's methods for evaluating data and information to ensure data quality is representative of current conditions and adequate for making assessment decisions. Section 3.1 in the Ammonia Toxicity Assessment Method explains that if significant changes in sources have been documented within the last 10 years, the assessor may use best professional judgment when determining which data are appropriate to exclude from the assessment. The assessor documents the specific changes, identifies data currency alternatives, and determines which years of data are appropriate to include in the assessment process.

COMMENT 19. The proposed document fails to accurately evaluate the various forms of NH3.

RESPONSE: The only types of data that are to be applied directly to this assessment method are total and total recoverable ammonia as nitrogen, which includes NH_3 and NH_4. An assessor may use dissolved ammonia to see if concentrations are above the standard but may not use dissolved ammonia to determine if water quality standards are being met.

COMMENT 20. The data currency, quantity, and quality required in the draft ammonia assessment method are inadequate to protect sensitive aquatic life from adverse effects of ammonia.

COMMENT 21. This document fails to propose monitoring or assessment thresholds capable of accurately identifying harm to the most sensitive uses of surface waters.

COMMENT 22. Among the other items detailed in the Expert Report, we are also concerned by proposed sample size, timing, and averaging of incomplete datasets and/or modeling in lieu of representative monitoring, all of which is contrary to a wide body of expert evidence and statistical methods, and therefore not only lacks a strong scientific foundation, but so too lacks the necessary preventative characteristics that DEQ's implementation of water quality standards must possess pursuant to fundamental environmental rights enshrined in our constitution.

RESPONSE: DEQ generally disagrees with these comments. See responses to prior comments. DEQ implements a rigorous quality assurance program and requires other programs and organizations to submit quality assurance documentation during our call for data. Beneficial use assessment programs evaluate both scientific rigor and the desire to screen increased number of waters across the state. Assessment approaches used in this Ammonia Toxicity Assessment Method call for different data quantity levels depending on the decisions being made. Less data can be used for initial screening to catch egregious problems, but this method calls for a more rigorous amount of data to justify delisting ammonia or indicating that aquatic life is fully supported by ambient ammonia conditions. Many states use similar minimum data requirements.

COMMENT 23. Sampling frequency and coverage is inadequate for assessing compliance with ammonia criteria.

COMMENT 24. More and better sampling is necessary to sufficiently assess compliance with ammonia criteria.

COMMENT 25. Increase the sampling frequency of ammonia to at least monthly to reliably assess conditions and proactively protect aquatic life from ammonia toxicity.

COMMENT 26. Ammonia must be sampled in individual waterways at least every 30 days to closely track conditions and detect NH3 toxicity quickly and proactively.

COMMENT 27. The sampling frequency should be increased to at least monthly along with additional sampling during major storms and droughts, so that ammonia conditions in Montana waters can be reliably assessed and sensitive aquatic life can be protected from ammonia toxicity.

COMMENT 28. Concerning the feasibility of ammonia sampling, manpower is the most viable and logistical option available here. During my 30+ years of water-quality sampling, we sampled for nutrients and ammonia fairly frequently knowing the protocols for sampling and preservation of that sample are a necessary requirement. It is hard to do that automatically, (at least to the extent of my knowledge). But the utilization of water-quality platforms that can monitor ambient conditions such as temperature, pH, dissolved oxygen and more are available and quite helpful in determining conditions of our state's waterways. But routine and consistent sampling while maintaining a strict time schedule can be accomplished on a monthly, even perhaps a weekly basis depending upon other logistics and manpower.

COMMENT 29. Grossly inadequate sampling frequency described as acceptable by MDEQ will yield such sparse data that it will not be possible to assess compliance reliably. In some? many? cases, such as the case of 3 exceedances among 7 samples spread over 10 years, a waterbody sustaining toxic ammonia levels in almost half of the sparse samples could receive no consideration for additional protection throughout an entire decade.

COMMENT 30. DEQ-a (pp. 2-3) asserts that the problem with EPA's approach is that "standards attainment decisions based on this rate do not take into consideration the number of sampling results or the variability of sampling frequencies [that]…may create a large variance in exceedance rates depending on the size of the data set." The draft writing ignores the fact that ~3 (acute) to 6 (chronic; 3 samples, each 6 days apart, in a 30-day period; two 30-day periods) samples per year are insufficient to assess compliance with ammonia criteria; at a minimum, monthly sampling is needed to reliably estimate an average concentration. Ammonia concentration status cannot be assessed reliably from more sparse data, as shown by peer-reviewed science. As north temperate examples, *sampling frequency shorter than monthly* in streams was required for reliable characterization of ammonium concentrations (Harmeson and Barcelona 1981). In a second study, Torres et al. (2022) reported that realistic assessment of N concentrations required more than 50 samples per year to achieve a small error (less than 10%) and a 95% confidence interval. *Monthly sampling* was insufficient for reliable characterization unless augmented by inclusion of storm events and random sampling. A third study concluded that in river segments influenced by sewage effluents, a sampling frequency of *weekly or less* was necessary to assess ammonium concentrations accurately (Vilmini et al. 2018).

COMMENT 31. It will fail to protect sensitive aquatic life such as salmonids and their food resources in Montana waters from stress, disease, and death due to ammonia toxicity. MDEQ-a then states that "In addition to the 10% exceedance rule [decision], a no more than one exceedance in a three-year timeframe will also be applied." But the problem remains: grossly inadequate sampling frequency will yield such sparse data that reliable assessment of compliance with ammonia water quality standards will not be possible.

RESPONSE: DEQ generally disagrees with these statements. The beneficial use assessment program screens all state waters and determines minimum data requirements for assessment of Montana's

waters using Montana's ammonia standards. Minimum data requirements do not inhibit more robust sampling designs that could be used for more certainty. Montana's ammonia standards are based on EPA's recommended criteria and the minimum data requirements in this document generally align with many other states. Assessors may document data that is not used for the assessment and justify its exclusion, including data collected prior to any known significant changes to sources. Less data may be used for initial screening to catch egregious problems that will result in an assessment method being listed as impaired, but this method calls for a more rigorous amount of data to justify delisting ammonia or indicating that aquatic life is fully supported by ambient ammonia conditions.

COMMENT 32. Ammonia concentrations are known to vary substantially depending on storm events (e.g., Rosenzweig et al. 2008), differences in discharges by sources such as wastewater treatment plants (Gammons et al. 2011, Nagisetty et al. 2019), locations/density of livestock, etc. (Hughs and Vadas 2021). The inadequate sampling frequency that would be required by the draft document will fail to capture average conditions reliably as well as toxic, more extreme conditions.

COMMENT 33. Arbitrary selection of the location of sampling locations/assessment units. Given the crucial impact on water quality of specific pollution sources and inflow from impacted tributaries, it is absolutely necessary to develop and apply criteria on where sampling locations will be established. Otherwise, key water quality impactors may be missed in the sampling process, giving a distorted picture of actual water quality and how to improve it

COMMENT 34. The draft assessment method also states that only one site, even over an entire large assessment unit (e.g., a major river segment), will be acceptable for monitoring if it is in an area the assessor thinks is "most at risk" using best professional judgment. Some evaluations would be relatively easy; for example, a site influenced by a larger wastewater treatment plant with only secondary treatment would be more vulnerable to ammonia toxicity than a site receiving discharge from a small wastewater treatment plant with higher-quality/lower-ammonia effluent. Evaluation of other sites, such as sites affected by livestock agriculture or certain mining activities or cropland fertilizers, may be more difficult. The draft ammonia assessment method does not consider that the first, subjective estimate from best professional judgment may be wrong, and it does not require preliminary data to aid in assessment of the most at-risk site(s).

RESPONSE: The Ammonia Toxicity Assessment Method provides guidance and considerations for developing monitoring designs and assessing data quality, however the waterbody condition must be evaluated using all existing and readily available data and information. The Assessment Method recommends samples be collected when ammonia toxicity levels are highest or when sources are most prevalent. It also suggests selecting sampling sites that capture both permitted and potential nonpoint sources of pollution. However, this is a guidance document and will not make specific monitoring location requirements. Sampling plans or other similar quality assurance documents are required for data use and should address sources and sampling locations at a project level.

COMMENT 35. Less protective acute toxicity criteria, to be applied to salmonid waters unless salmonids are actually detected, defeats the goal of consistent protection for these sensitive valuable species.

MDEQ-a (p.1) stipulates that all waters classified as A-1, B-1, C-1, B-2, and C-2 are assumed to support salmonid growth and propagation year-round in cold-water and marginal cold-water streams. Yet, MDEQ-a (p.2) states that "more stringent acute standards apply when salmonid fish are present than when they are not." This agency caveat is not protective. How will presence be assessed? Early life

stages, assumed by MDEQ as present year-round in coldwaters and marginal coldwaters, are cryptic and easily missed, and rare to uncommon species can be difficult to detect as well (Peterson et al. 2003, Wood et al. 2021). Clarification is lacking.

Furthermore, MDEQ's planned allowance of less protective ammonia criteria in waters designated for salmonids if, through whatever undescribed effort, salmonids are not detected, means that these waters will only be afforded the protection that is needed for such sensitive species and early life history stages if they are actually detected in the sampling site. MDEQ's nonprotective acceptance of more toxic ammonia levels in waters that are supposed to be consistently safe for salmonid populations fails to consider the fact that *fish move* to different locations in a given waterbody. They may move into the assessment unit shortly after it is assessed for their "presence" and, if so, will confront toxic ammonia conditions if the draft document is accepted.

COMMENT 36. Consistently apply the more protective acute ammonia toxicity standard to all cold waters that are assumed to support salmonid growth and propagation whether or not salmonid presence is detected.

COMMENT 37. Regularly apply the protective acute ammonia toxicity standard to all cold waters that can support cold water fish growth and propagation whether or not their viable presence is known.

COMMENT 38. Applying less protective acute toxicity criteria to potential salmonid waters unless salmonids are detected is not protective and will limit reaches of streams that could provide habitat. Early life stages are especially easy to miss.

COMMENT 39. Exclusion of sampling waters where DEQ concludes that salmonids are not present. There is no protocol given for how DEQ will make that determination, and in fact the agency is not qualified to do so. Moreover, even if there is not a resident trout population present, hundreds of small streams serve as seasonal spawning and rearing sites that ultimately determine fish populations throughout a watershed, even if eggs and immature fish are only in these streams for a few weeks or months.

COMMENT 40. Arbitrary characterization of acute NH3 toxicity criteria being only applied when salmonids are known to be present in an assessment unit, without defining how or when salmonid presence is evaluated.

RESPONSE: The Ammonia Toxicity Assessment Method document does not provide an exclusion of sampling for waters without salmonids. Additionally, it does not exclude assessing acute toxicity in warm water classified streams. For ammonia assessment, determining which fishery is present will depend primarily on Montana's beneficial use classification system for surface waters, which is explained in Section 2.2.1 of DEQ's Beneficial Use Assessment Method (Makarowski 2020). Use classifications are assigned to all waterbodies in the state of Montana according to their present and future beneficial uses. The Ammonia Toxicity Assessment Method addresses Montana's aquatic life beneficial use, which expects surface waters to support the growth and propagation of fishes (either salmonid or non-salmonid) and associated aquatic life, waterfowl and furbearers. Administrative Rules of Montana (ARMs) 17.30.621-629 contain the beneficial use information for each designated use class in the state. Based on this use classification system, DEQ will calculate and apply the appropriate acute and chronic ammonia standards for the protection of either salmonid or non-salmonid fishes and their emergent life stages. If an assessor determines there are cold water species present in a warm water classified

waterbody (B-3 or C-3), they will verify their findings with Montana Fish, Wildlife, and Parks and will assess for cold water species. Supporting fishery data will be provided to DEQ WQ Standards Section for consideration of updating a use classification for the waterbody. DEQ added Section 2.1 to the Ammonia Toxicity Assessment Method to clarify how standards are applied.

COMMENT 41. Provide clearer guidance and requirements for delineating assessment units or reaches. An analysis of land use and collection of preliminary data should both be included. The current vague description leaves ample room for subjectivity and could fail to protect Montana waters.

COMMENT 42. The proposals provide a vague definition of sampling in an "assessment unit." Following ten years of systematic monitoring of the Bitterroot River at several points under the authority of the Tri-State Water Quality Council, systematic monitoring on the Bitterroot River as reduced to monitoring at two sites in Missoula where it discharges into the Clark Fork River. This left us with virtually no systematic monitoring in the entire drainage. It appears that this state of affairs would justify this situation if the Bitterroot River from the junction of the East and West Forks to Maclay Bridge were considered an "assessment unit." This is a major step backward! For over a decade no significant, consistent and systematic data was collected in Ravalli County that could be of any specific use. Clearly, multiple sites that contribute major ammonia pollution need to be monitored, not just one site for this entire system. The maximum length of a segment shall be 140 miles. The section mentioned is 85.15 miles, so theoretically, it could be one AU. (It's 3 at the moment.)

COMMENT 43. Clearer guidance and clear requirements should be provided regarding delineation of assessment units or reaches.

COMMENT 44. Assessment units and reaches (waterbodies and portions of waterbodies, respectively) are poorly defined.

RESPONSE: The Ammonia Toxicity Assessment Method cites Section 3.3.3 of DEQ's Beneficial Use Assessment Method (Makarowski 2020) when discussing guidance for assessment unit delineations. An assessment unit (AU) is the smallest unit for which a water quality impairment determination can be made, and rarely change over time. They are intended to represent a relatively homogenous segment of a waterbody and are used to track water quality assessment information. AUs may be broken into "reaches" based on concentrated human activity, land use, or changes in geophysical features that are likely to influence the overall characteristics of the AU, but assessment decisions regarding impairments are always made for the AU as a whole. Major rivers are usually broken into multiple assessment units and many factors affect how assessment units are characterized. DEQ strives for assessment units less than 140 miles long, but it is provided as a maximum limit.

COMMENT 45. The application period is currently inadequate to protect many species during spawning and early life phases.

COMMENT 46. According to MDEQ (Skaar 2001, partially reproduced in Appendix A of both draft methods), the application period for the chronic ammonia criteria (March 15 – August 31) is inadequate to protect spawning and early life history stages of 12 warmwater species. MDEQ-a (p.2) states that "the chronic criterion[a] is tailored to protect early life stages of fish when they are present." Early life history stages of salmonids are assumed to be present yearround in cold-water or marginal cold-water streams, but that the chronic ammonia criteria are to apply to warm-water

fisheries early life stages only during the period from March 15 through August 31. Appendix A in both draft methods documents partially reproduces Skaar (2001). The original table legend is as follows:

The following table lists the known or expected spawning times for most fishes in Montana. This table was prepared for the purpose of identifying periods when "early life stages" of fish may be present. EPA has defined the early life stage for salmonids to be 30 days after emergency/swim-up; for all other species it is 34 days after spawning. This information is necessary when applying Dissolved Oxygen and Ammonia water quality standards to individual waterbodies.

The U.S. EPA defined the early life stage for warmwater (non-salmonid) fish species to extend 34 days after spawning. Thus, the March 15 – August 31 period planned for application of the draft ammonia assessment method will not protect the spawning and early life history stages of 12 species of warmwater fishes known from Montana surface waters adequately after their last spawn. These species extend spawning through the first half (5 - *fathead chub, longnose dace, plains minnow, redside shiner, sturgeon chub*) or the second half of August (7 - *carp, emerald shiner, fathead minnow, sand shiner, sticklefin chub, spottail shiner, stonecat*). Therefore, according to MDEQ (Skaar 2001), the 34-day "early life stages" period for these species should extend through the first half (5 species) or all (7 species) of September.

COMMENT 47. Extend the assessment of compliance with the state's chronic ammonia criteria to protect spawning and early life stages of 13 warm water fish species.

COMMENT 48. Conduct the assessment of compliance with chronic criteria during the period of early life stages for sensitive coldwater and warmwater fish species.

COMMENT 49. Assessment of compliance with the state's chronic ammonia criteria should be extended through September to protect the early life stage period for 12 warmwater fish species. The chronic criteria should be applied both during and for 34 days after the known early life stage period for these species. Clarification should be added about the timing of sampling to protect warmwater fish species that do versus do not spawn in warmest months.

COMMENT 50. Assessment of Compliance with the Chronic Criteria is Not Protective. As explained, in a given assessment unit or reach, the chronic criteria are to be based on average monthly calculations of a "30-day average" from only 3 samples, spaced at least 6 days apart, within each of two 30-day periods during any growing season within a three-year timeframe. The draft writing (MDEQ-a, p.2) states that the chronic criterion is "tailored to protect early life stages of fish" but, as explained (section II.B.2), the 15 March through 31 August MDEQ-defined growing season is inadequate to protect early life stages for some warmwater fish species.

RESPONSE: DEQ modified the applicable timeframe for applying the chronic early life stages equation for warm-water fisheries. The new timeframe is March 15th through September 30th to better protect spawning and early life stages. Improved guidance on temporal requirements was added to Section 3.3 of the Ammonia Toxicity Assessment Method.

COMMENT 51. The proposed approach fails to accurately capture emergent life stages of various aquatic life, including salmonids and their primary food sources in macroinvertebrates, and as such lacks any semblance of anticipatory and preventative character.

RESPONSE: EPA's recommended ammonia criteria, which DEQ ammonia standards are based upon, considered all available macroinvertebrate toxicology in constructing ammonia exceedance frequency, exceedance duration, and thresholds. Please also see the response to comments 45-50.

COMMENT 52. MDEQ also fails to consider periods when ammonia concentrations are generally highest (e.g., Chen et al. 2014).

RESPONSE: The Ammonia Toxicity Assessment Method aims to prioritize periods when ammonia concentrations are anticipated to be the highest as well as when ammonia is the most toxic to aquatic life. Language in Section 3.3 of the Assessment Method was updated for clarification. It now states, "To evaluate the chronic 30-day criteria, data collected at any time of year can be used to calculate a 30-day average, but it is preferred to have at least one 30-day average fall within the timeframe of July 1st through September 30th to capture conditions when ammonia is expected to be the most toxic." To delist ammonia as a cause of impairment "it is required to have about half of the calculated 30-day averages fall within the timeframe of July 1st through September 30th and the other half collected between November 1st and April 30th (to capture conditions when ammonia concentrations are expected to be the highest). Additionally, for a delisting on a B-3 or C-3 stream, minimum data requirements for the acute and 2.5x the chronic criteria must be fully met within the timeframe when early life stages are present, March 15th through September 30th."

COMMENT 53. In western mountainous areas, stream sampling has revealed a pattern of increasing ammonia concentrations in late spring/early summer (June) and a decrease in winter beginning in September for most sites (Chen et al. 2014). Warmwater fish species differ somewhat in their early life stage periods (see Section II.B.2 above; MDEQ-a, Appendix A, and Skaar 2001). Some species do not spawn in summer (June-August). Would those species be omitted from consideration in ammonia sampling? – If so, that would be non-protective. Would additional samples be taken during the early life periods for those species to ensure their protection? Clarification is needed.

RESPONSE: Samples may be collected at any time of the year. The chronic criteria standard equations used to evaluate the samples differ based on the presence or absence of fish early life stages. The Ammonia Toxicity Assessment Method includes an appendix containing the spawning times of Montana fishes, which show both salmonid and non-salmonid spawning periods. According to this appendix (prepared by Montana Fish, Wildlife, and Parks) the spawning times of warmwater fish species fall within the timeframe of March 1 – September 30. The Assessment Method requires samples be evaluated using the early life stages chronic criteria equation in warmwater fisheries (streams with a B-3 or C-3 use class) during this timeframe and **year-round** for streams and rivers that support coldwater fisheries. Even if there are warmwater fish species in coldwater streams, the early life stages chronic criteria equation would still be used to evaluate the chronic ammonia standard year-round.

COMMENT 54. Simultaneously sample ammonia, temperature, and pH; they should not be separated by more than a few minutes, and if the selected method of ammonia analysis calls for preservative, it should be added immediately after the sample is collected.

COMMENT 55. MDEQ-a (pp.4-5) states that samples are to be preserved "as soon as possible". Samples should be preserved immediately.

COMMENT 56. The draft ammonia assessment method instructs that ambient water temperature and pH must be measured at the same time as ammonia is measured (within an hour; this stipulation is

repeated at the bottom of MDEQ-a, p.7). The writing is incorrect; the authors mean that pH and temperature must be measured at the same time as samples *are taken* for ammonia analysis, not at the same time as ammonia is actually *measured*. Furthermore, “at the same time” differs markedly from “within an hour.” Within an hour, storm conditions can substantially alter pH (Gburek and Pionke 1993) and near-surface ammonia concentrations due to changes in incoming atmospheric (Yao and Zhang 2019, Prieto-Blanco et al. 2020) and/or stormwater levels (Rosenzweig et al. 2008). Most commonly, one person in a field crew of two (usually required for safety considerations) measures environmental background conditions like temperature and pH while the other person takes samples at the same time for ammonia analysis.

RESPONSE: Language in the Assessment Method was clarified to address any misunderstandings. Section 3.2 now states, "Ambient water temperature and pH must be measured at the same time as ammonia is collected to accurately calculate ammonia standards."

COMMENT 57. Contrary to what's been shared, ammonia is not easily treated and is not the only form of nitrogen that can be toxic to aquatic life.

COMMENT 58. Ammonia is not “easily treated” by adding oxygen unless nitrifying bacteria are also present. Conversion of ammonia to nitrite, then nitrate, is accomplished by nitrifying bacteria under aerobic conditions (Montana State University Extension 2005).

COMMENT 59. DEQ falsely states that ammonia is the only form of nitrogen that is toxic to aquatic life. Nitrate can be toxic to aquatic life, not just ammonia.

COMMENT 60. Include more realistic, scientifically accurate information about the toxicity of total ammonia and nitrate, acknowledge that Montana surface and groundwaters are contaminated by nitrate and ammonia, and that explain that salmonids are especially sensitive to ammonia toxicity.

COMMENT 61. Scientifically accurate writing is needed in the introductory background information. The toxicity of total ammonia and of nitrate, which often forms from ammonia by nitrifying bacteria under aerobic conditions, should be described.

COMMENT 62. The proposed document fails to accurately state how NH3 is affecting Montana surface waters.

COMMENT 63. The draft ammonia assessment method wrongly states that ammonia is the only toxic form of nitrogen affecting Montana surface waters; that introducing oxygen drives ammonia-N into more oxidized states such as nitrites and nitrates, which are not toxic to aquatic life at the levels found in Montana surface waters; and that ammonia usually meets the state’s water quality standards.

The introductory writing of the draft ammonia assessment method sets the tone of this document by falsely assuring readers that ammonia is easily treated, and that ammonia is the only form of nitrogen that can be directly toxic to aquatic life at the levels found in Montana surface waters. In correction, (i) Nitrate is directly toxic to aquatic life (Camargo and Alonso 2006) at levels found in Montana surface waters, and also in shallow ground waters that can contribute substantially to river flows during low-flow conditions. While nitrite generally is low in surface and sub-surface waters (Stanley

and Maxted 2008), nitrate is excessive and escalating in many waters across the U.S., including Montana waters (below).

RESPONSE: This assessment method only focuses on toxicity of ammonia. DEQ updated the name of this document to, "Ammonia Toxicity Assessment Method". While ammonia may contribute to increased concentrations of nitrogen and decreased dissolved oxygen, DEQ assesses these secondary effects of excessive eutrophication using other assessment methods as guidance. DEQ also updated Section 1.1 in the Ammonia Toxicity Assessment Method to reflect these comments.

COMMENT 64. According to DEQ's own document, "The Montana 2020 Final Water Quality Integrated Report" states that 35% of the state's own waterways, river miles more specifically, are degraded or impaired by nutrients. There is a direct link between the two parameters of nitrogen and ammonia. Whether it be through oxidation or ammonification, both parameters and their respective levels in our waterways is critical in understanding the potential of toxicity for wildlife. This is not a time to cut back, diminish, or relax any water-quality parameter analyses.

COMMENT 65. The Draft Method Fails to Consider Other Important Roles of Ammonia. Aside from its role as a toxin, ammonia is important in aquatic ecosystems in two other ways: It is a major form of the key nutrient, nitrogen, essential for growth of algae and aquatic plants (Wetzel 2001, Glibert et al. 2016), and can also be an oxygen-demanding (oxygen-consuming) chemical (Mallin et al. 2006). The noxious macroalga, *Cladophora*, which now seasonally carpets nutrient-contaminated Montana waters such as parts of the Gallatin River (e.g., Ochenski 2022), thrives especially in ammonia- and phosphorus-enriched waters (Dodds 1991, Ensminger et al. 2000). Toxic cyanobacteria blooms, such as those that seasonally affect various Montana reservoirs, can also be highly stimulated by ammonia, including enhanced toxin production (Glibert et al. 2016, Le et al. 2024). Total ammonia can be an oxygen-demanding substance because it takes up oxygen during the nitrification process when it is converted to nitrate (Stumm and Morgan 1996). Thus, it can contribute to low-oxygen stress and death of aquatic life. Neither the harmful impacts of ammonia in fueling noxious and toxic algal blooms nor the role of ammonia as an oxygen-consuming chemical is considered in the draft method.

COMMENT 66. : MDEQ-a (p.4) states that its use of the term "ammonia" refers to total ammonia (here, tNH3= un-ionized ammonia, gaseous NH3, + ionized ammonia, NH4+N), as recommended by U.S. EPA (2013). However, only one of three basic functional roles of ammonia, toxicity, is MDEQ's focus. MDEQ fails to consider ammonia as a source of the key macronutrient, nitrogen (N), for algae and aquatic plants, including the noxious macroalga *Cladophora*. MDEQ additionally does not consider the oxygen demanding/consuming action of ammonia (Mallin et al. 2006), which can be substantial in sewage-affected waters (below).

COMMENT 67. Assessment should include other important roles of ammonia as a major algal/plant nutrient and a chemical oxygen-demanding substance, as well as toxicity. These rolls can be major at lower concentrations than those causing ammonia toxicity.

COMMENT 68. This document fails to examine or accurately state the various relationships of NH3 and its nitrogenous derivatives in terms of their effects on state waters (including existing impairment prevalence).

COMMENT 69. Draft method fails to consider major harm from ammonia other than toxicity.

RESPONSE: DEQ uses other assessment methods to evaluate induced eutrophication effects to aquatic life and recreational uses. Please refer to the response to comments 57-63. To clarify Montana's current nutrient impairment status, the 2020 Montana Water Quality Integrated Report states that 7,231 river miles are impaired for nutrients. This is approximately 35% of the assessed river miles (20,832 miles), but only about 12% of the states **total** perennial river miles (59,400 miles). Additionally, DEQ selects watersheds or large river systems across the state for implementing assessment projects to help frame and inform total maximum daily load (TMDL) development. Most projects are implemented in areas where water quality threats have been observed. Other waters are assessed on a case-by-case basis depending on responses during our biennial call for data or if data is available in national databases. Because the monitoring is targeted to address threatened waterbodies, overall statistical results about nutrient impairment do not necessarily represent the average conditions across Montana.

COMMENT 70. Montana is experiencing increased levels of ammonia, which is commonly oxidized into harmful and increasing amounts of nitrates in our waters.

COMMENT 71. Montana waters are also affected by toxic levels of ammonia. The paucity of ammonia data available for Montana waters makes MDEQ's assertion of "generally meeting the state's water quality standards" questionable. Ammonia concentrations historically were low, ~0.02 mg/L (U.S. EPA 1976). Ammonia is much more toxic than nitrate, especially at pH above 8 and warm temperatures (Emerson 1975, Camargo and Alonso 2006). MDEQ (2016, p.1) aptly noted that "Elevated levels of ammonia are toxic to aquatic life and salmonid fishes are particularly sensitive." U.S. EPA (2013) recommended 0.26 mg/L total ammonia-N (tNH3) or less in warmer conditions (25oC, pH 8.0) to protect sensitive freshwater mussels from chronic toxicity (30-day rolling average).

Various reports suggest that toxic ammonia levels in Montana streams are more common than indicated by MDEQ-a, and would be expected to coincide especially with contamination from untreated or partially treated sewage discharges, livestock wastes, cropland fertilizer runoff, and certain mining activities. As examples, the study reported by Gammons et al. (2011) documented high ammonia-N, up to 4.62 mg/L, as well as high nitrate in a small stream contaminated by sewage at the headwaters of the Clark Fork River during mid-summer baseflow conditions. MDEQ (2016) described a partially treated sewage discharge into Second Yellow Mule Creek that increased ammonia levels (4.7 mg/L) above the state's acute ammonia standard (4.13 mg/L at the pH and temperature conditions). The National Park Service (NPS 2022) described a segment of the Yellowstone River (Wyoming border to the park boundary) and a segment from the park boundary to Reese Creek as listed on Montana's 303(d) list of impaired waters due, in part, to ammonia that exceeded the state's water quality standards (MDEQ 2019). MDEQ (2021) added the Yellowstone River from Huntley Diversion Dam to the mouth of the Big Horn River. Various other surface waters are impaired due to un-ionized ammonia, such as Canyon Ferry Reservoir, Prickly Pear Creek (discharge ditch to Lake Helena and Highway 433 Crossing to Helena wastewater treatment plant discharge), Big Dry Creek (Steves Fork to mouth at Fort Peck Reservoir), and Whitetail Deer Creek (headwaters to mouth) (MDEQ 2021). Specific sources warrant adequate monitoring, especially given that the goal, as stated in MDEQ-a, is to protect sensitive beneficial aquatic life(below).

RESPONSE: DEQ is not aware of information documenting increasing levels of ammonia across the state or in any regions of the state. Assessment units that are currently impaired for ammonia may be based on a limited dataset or from conditions before upgrades to water treatment plants were completed. The Ammonia Toxicity Assessment Method will provide guidance and clarification on how all ammonia assessments should be completed and will produce more consistent and accurate 303(d) listings. Section

3.4 now states that DEQ and other monitoring entities can “prioritize monitoring of waters that have been previously identified as impaired or waters at higher risk of ammonia impairment due to human activities, point sources, agricultural, use, or other factors.”

COMMENT 72. Too little sampling on both a temporal basis (not frequent enough sampling to adequately capture seasonal variations through the year, especially in high-stress times of late summer/early fall) and a geographic basis (not nearly enough sampling locations).

COMMENT 73. The poor sampling designs and lax data requirements are inadequate for protecting sensitive aquatic life from the adverse effects of harmful DO conditions and ammonia toxicity.

RESPONSE: DEQ disagrees with these comments. The beneficial use assessment program is designed to screen available data across the state using existing water quality standards. The method balances the ability to review available data, ability to collect a data set with reasonable efficiency and resources, create credible certainty of outcome, and boost the number of waters the state may be able to assess overall. DEQ provides minimum data requirements with timeframe guidance that are the most sensitive to uses. Any monitoring project may collect more data than minimum requirements to boost certainty. Additionally, a more robust dataset requiring more samples spread over more time is required to determine if an assessment unit is fully supporting a use or to delist ammonia as a cause of impairment.

COMMENT 74. Lack of clarity in analysis, for example, providing that "If acute or chronic minimum data requirements are met, any sample may represent a four-day average to compare to the 2.5x than the chronic criteria."

COMMENT 75. For chronic toxicity assessment, sampling should be required to include at least two intervals of four consecutive days of tNH3 concentration measurements within each designated 30-day period, to conform with Montana water quality standards for evaluation of 2.5 times the CCC.

COMMENT 76. MDEQ-a (p.2) states that, in addition to the above analysis, the *highest* 4-day average within a 30-day period should be less than 2.5 times the chronic criterion. However, since only 3 samples spaced at least 6 days apart within a 30-day period are required, sampling does not include 4 consecutive days of sampling. Therefore, even one 4-day average is not available—despite the explicit requirement that the highest 4-day average among multiple 4-day averages within the 30- day period should be calculated (MDEQ 2019, p.75). Subsequently, MDEQ-a (p.6) advises that “if acute or chronic minimum data requirements are met, ***any*** *sample* may *represent* a 4-day average” [emphasis added] to compare to the 2.5x-the-CCC value. This step weakens protection because the draft method would allow the assessor to use the sample with the *lowest* ammonia concentration, rather than the highest, for comparison to the 2.5x-the-CCC value. In other counsel, MDEQ-a (p.8) states that an impairment would occur if more than 10% of individual samples from the acute criterion evaluation exceed 2.5x the “chronic standard” (CCC), or more than 1 sample in any 3-year period exceeds 2.5x the “chronic standard.”

RESPONSE: DEQ’s interpretation of the ammonia chronic criteria evaluation is consistent with the evaluation of the chronic criteria for our metals assessment. Allowing one sample to represent a 4-day average to evaluate 2.5x the chronic criterial allows DEQ to collect and review a larger dataset with reasonable efficiency and resources and increases the number of waters the state is able to assess. Additionally, both the Assessment Method and the water quality standard (circular DEQ-7) state “the **highest** four-day average within the 30-day period should not exceed 2.5 times the CCC”. In cases where

there are multiple samples within a 4-day period, it is required to average those samples and compare that value to 2.5x the chronic criteria. There is no limit on the maximum number of samples allowed for beneficial use assessment, any monitoring project may collect more than minimum data requirements to increase certainty.

COMMENT 77. The inclusion of a discussion on NH3 methodology and assessment as purposely constrained by alleged economic burden is, frankly, absurd, particularly when the cost of NHC sampling is minimal proportionate to other parameters, NH3 pollution is widespread in many state waters, and the cost of inaction and/or NH3 impairment is clearly reflected in the loss of keynote fisheries and world class recreational opportunities. As such we object to the inclusion of cost as a lawful parameter for restricting proposed sampling and assessment methodologies insofar as doing so is untethered to a scientific process for demonstrating a waterway's compliance with water quality standards.

COMMENT 78. The second reason given for this unacceptable sampling requirement in the draft ammonia assessment method is that, despite MDEQ's cost emphasis, the reality is that ammonia samples are inexpensive to collect and analyze in comparison to many other chemical environmental contaminants (CECs).

COMMENT 79. Grossly inadequate sampling frequency - MDEQ first describes its approach as closely mirroring U.S. EPA's (2013) recommendations with respect to calculation of acute versus chronic toxicity and exceedance frequency. However, MDEQ downplays EPA's recommended exceedance frequency for chronic toxicity (no more than one exceedance within three years) based entirely on data expense—defeating MDEQ's stated purpose to protect sensitive aquatic life.

COMMENT 80. The draft document does not carefully consider the number of samples needed for accurate assessment of compliance. The decision was based not on science but, rather, on the costs of acquiring data.

COMMENT 81. Despite MDEQ's cost emphasis, the reality is that ammonia samples are inexpensive to collect and analyze in comparison to many other chemical environmental contaminants (CECs). It is also noteworthy that sensitive aquatic life such as trout species and the macroinvertebrate taxa they depend upon as food are the foundation of Montana's lucrative recreational fishing/ tourism industry. That industry is estimated at a value of ~$350 million per year, supporting 6,280 jobs (American Fisheries Society 2023). Surely these extremely valuable sensitive species merit more protection than sampling only ~8 to 11 times for toxic ammonia per assessment unit (that is, for example, in a stream, river, or stream or river reach) over an entire decade?

RESPONSE: An assessment method is not a state rule or regulation; therefore, cost is not a lawfully restricting parameter of DEQ's sampling or assessment. Our programs are funded by federal and state funding associated with the federal Clean Water Act and the State's Water Quality Act, and DEQ uses funding as efficiently and effectively as possible. New threats and continued water quality restoration activities continue across Montana and DEQ understands that more water quality information is useful. Minimum data requirements are necessary to define in an assessment method, yet do not limit the amount of data that can be applied to the method. Additionally, anyone can collect credible data and submit it to DEQ during the call for data for each Integrated Report. DEQ removed language indicating cost as a barrier for collecting more samples in this assessment method.

COMMENT 82. The Bitterroot River Protection Association strongly urges DEQ to reconsider the recently proposed changes to your collection protocols. We agree wholeheartedly with the assessment of JoAnn Burkholder, Director of the Center for Applied Aquatic Ecology at North Carolina State University, that these draft methods will make degradation of Montana waters for ammonia and oxygen stress worse for sensitive and valuable aquatic life.

COMMENT 83. Viewed on a decade-by-decade basis, Montana rivers are at perhaps their highest stress levels since the adoption of the Clean Water Act, and these stress conditions occur now almost each and every year in almost each and every river system. This is absolutely the time for DEQ to adopt the most reliable, stringent, error-proof, widespread and effective sampling protocols available, particularly for such crucial parameters as dissolved oxygen and ammonia. The minimal additional cost of implementing an effective sampling assessment plan is dwarfed by the devasting economic costs, environmental and quality of life costs that Montana would incur if water quality in our rivers, lakes and streams continues to decline. And that decline can be rapid — for an example, we just need to look at what has happened in the last five to ten years to water quality in the Gallatin River downstream from Big Sky.

RESPONSE: DEQ's chemical and biological sample collection protocols are posed on our website and remain unchanged. An assessment method provides guidance for assessing impairment status related to a specific water quality standard and making a beneficial use determination. Assessment methods may suggest sampling locations, but do not affect DEQ's standard operating procedures for data collection. DEQ's sampling designs are ultimately determined by the project manager or team managing a monitoring project. Plans are reviewed and approved by a quality assurance officer. External data submitted to DEQ must have a sampling strategy (sampling and analysis plan or similar document) with quality assurance components for DEQ to use when determining if the data is credible. Often, the data DEQ receives during the call for data are collected by external entities that may not follow the same sampling requirements as DEQ, but all current, readily available data must be used for assessment. Justification to not include data in an analysis must be provided by the assessor.

COMMENT 84. DEQ's decision-making here must be guided by Article II, Section 3 and Article IX, Section 1 or the Montana Constitution. These provisions to a 'clean and healthful environment' and the State's duty to 'maintain and improve a clean and healthful environment' are intended to not "merely prohibit that degree of environmental degradation which can be conclusively linked to ill health or physical endangerment." MEIC v. DEQ, 1999 MT at ¶77, 296 Mont. at 230, 988 P.2d at 1249. Read together, they require DEQ to assure its actions afford "protections which are both anticipatory and preventative." Id. In contrast and as examined fully by the expert report, DEQ's proposed NH3 methodologies represent inaccurate or conclusory findings and, as a result, are not capable of accurately identifying harm much less preventing harm to the environment and therefore must be reconsidered.

COMMENT 85. DEQ's draft proposed assessment methods for ammonia will not protect Montana's aquatic life from ammonia pollution, so this public comment is in opposition to the draft standards. This proposal will result in poorly monitored streams, creeks and rivers, that are more prone to increased ammonia levels and less oxygen.

RESPONSE: Montana's beneficial use assessment program provides an evaluation of existing conditions of state waters. It compares existing conditions to previously approved water quality standards. Standards are developed to protect the most sensitive uses. The beneficial use assessment program

identifies assessment unit/pollutant combinations for which TMDLs are needed. DEQ implements TMDLs (science based cleanup plans) for impaired conditions. DEQ then administers permits in alignment with the TMDLs and awards clean water act funding toward nonpoint sources. The combination of programs are administered to improve water quality.

COMMENT 86. MCA § 75-5-303(1) mandates that "[e]xisting uses of state waters and the level of water quality necessary to protect those uses must be maintained and protected." Further, "[u]nless authorized by [a nondegradation review] or exempted from review under 75-5-317, the quality of high quality water must be maintained. As detailed in the expert report, application of proposed methodologies will allow exceedances of criteria to go un-recorded, in effect allowing degradation contrary to the express requirements of the WQA.

The proposed NH3 methodology creates similar impacts on the magnitude, frequency, and duration of Montana's NH3 criteria. Here again inadequate sampling frequency undermines the representativeness of the data set, and data-poor assessment allows exceedances of criteria to escape undetected. In the interests of avoiding duplication we refer DEQ to examine the particularized findings of Dr. Burkholder's report on the deficiencies and errors in proposed NH3 methodology.

RESPONSE: DEQ disagrees with these comments. Beneficial use assessment methods are not standards, they are guidelines for DEQ scientists to use when assessing water quality conditions to Montana's water quality standards. This assessment method fully upholds the requirements of the ammonia water quality standard and does not degrade the standard. Monitoring designs and sampling efforts may be implemented for more robust certainty than the minimum data requirements provided by assessment methods. Assessment methods must focus on the minimum data requirements necessary to initiate a beneficial use assessment but do not limit the number of samples collected or amount of data used for assessment.

COMMENT 87. As with all DEQ changes to water standards and methods, the U.S. Environmental Protection Agency must give the state final authorization based upon the requirements of the Clean Water Act. We hope that you will be working closely with EPA before approving these changes in method.

RESPONSE: Assessment methods are guidance documents, not water quality standards. The Environmental Protection Agency (EPA) does not take official action on assessment methods but does take official action on states' Integrated Reports that contain the outcome of beneficial use decisions based on the assessment methods. To ensure coordination of the overall beneficial use assessment program, DEQ provided a preliminary draft to the EPA prior to public comment. DEQ addressed questions and suggestions from EPA at that time. EPA provided a few additional comments during the public comment period which DEQ will address in the final Ammonia Toxicity Assessment Method.

COMMENT 88. GWA is quite disappointed in these proposed changes to relax water-quality standards and methodology. This effort along with the former effort to relax nutrient standards does not paint a pretty picture in the direction that DEQ is heading. As stated above, now is not the time to go down this road. Truthfully, we should never take that direction. Standards must remain high, consistency maintained, and regulations must always be enforced. By not doing so, DEQ will lose an opportunity to maintain the integrity of their historical data as well as sacrifice the state's waterways. DEQ has

already lost some integrious high ground as a scientific based organization. We urge the agency to not degrade the agency even more.

COMMENT 89. I am appalled to learn of the diminished water quality standards being proposed for Montana's rivers and streams. In particular, the levels of ammonia put our fish populations at great risk. How is it possible to put one of the main economic drivers of Montana prosperity and business in jeopardy? Please, do not approve these lowered quality standards. We will all regret such action.

COMMENT 90. The draft water quality assessment standards proposed by the Montana Department of Environmental Quality for sampling ammonia are ineffective, arbitrary, unsound scientifically and, overall, inadequate to insure that the quality of Montana surface waters and the health of aquatic ecosystems do not substantially deteriorate.

COMMENT 91. I recently became aware that you were considering weakening the d ammonium pollution in our waterways and lakes. We are fishermen and know the damage that high levels of dissolved oxygen (and ammonia) cause of fish-stocks and water quality. Please reject the proposed changes and protect these waters for all Montanans.

COMMENT 92. The important and critical mission here is to maintain those waterways across the state in the most unimpaired status as possible. You do so for the health of the public, but also for the health of our natural environment and for the many plants and animals needing to be sustained by this life-giving and life-sustaining resource. DEQ states on their homepage of their website the following. “DEQ protects Montana’s environment and promotes a healthy and thriving way of life for all Montanans – as reflected in the Agency’s mission statement. At DEQ, we believe Montana communities and businesses flourish when environmental protections are effectively and consistently implemented in a transparent way. DEQ works together with stakeholders and partners in private industry, non-governmental organizations, tribes, the public, and local governments to protect the environment, fully comply with the laws of Montana, and to support Montana’s natural resource economy.” The key word or phrase repeated here is the “protection of Montana’s environment”. An agency does not protect those resources by weakening the standards needed in order to ensure that protection. The Gallatin Wildlife Association is a nonprofit organization that advocates for the conservation of terrestrial and aquatic species. With that in mind, we strongly encourage DEQ to instill the recommendations as listed by the Upper Missouri Waterkeeper’s office. We thank them for their recommendations. Our science-affiliated agencies need to always uphold the people’s trust by upholding the best, and most recent available science.

RESPONSE: An assessment method is not a water quality standard. DEQ disagrees that the Ammonia Toxicity Assessment Method degrades or weakens ammonia standards or relaxes protection. The Assessment Method provides clarity and guidance to the public and DEQ scientists for consistent and protective beneficial use assessment outcomes that follow the water quality standards.

COMMENT 93. The proposed methodologies reflect standards of general applicability that are pointedly designed to protect designated uses and implement antidegradation requirements, and as such require promulgation through rulemaking pursuant to the Montana Administrative Procedures Act. The proposed methodologies also reflect methods for making designated use and water quality criteria impairment decisions, including defining the duration or frequency of water quality criteria, and as such appear to constitute a new water quality standard within the meaning of Section 303(c) of the CWA and pursuant to the holding of Florida Public Interest Research Group Citizen Lobby, Inc.,

et al. v. EPA, 386 F.3d 1070 (11th Cir. 2004). As such, we expect DEQ to submit any finalized criteria methodologies to EPA for consideration.

COMMENT 94. The proposed NH3 methodology qualifies as revisions of standards subject to Section 303(c) of the CWA because: 1. The documents address designated uses, water quality criteria, and antidegradation requirements for surface waters in Montana; 2. The documents express levels of protection by virtue of established sampling and assessment parameters that constrain impairment determinations and change the magnitude, duration, and frequency of criteria applied.

RESPONSE: This assessment method is merely a guidance document to implement generally consistent evaluation of readily available and existing data when comparing to a previously implemented and EPA approved water quality standard. The document does not redefine or erode water quality standards including any magnitude, duration or frequency criteria. It does not address antidegradation.

COMMENT 95. The Montana Supreme Court has found that where an agency applies a metric of general applicability to constrain its decision-making, and such metrics have not undergone MAPA rulemaking, the agency acts unlawfully by using a legislative rule outside the rulemaking process. Here, the proposed DO and NH3 methodologies qualify as a statement of general applicability in that they expressly apply to DEQ's evaluation of DO and NH3 water quality standards in Montana surface waters. And, these documents would "interpret" the commands of Circular DEQ-7 and MCA 75-5-303, and ARM 17.30.601 et seq. Those interpretations would then be "implemented" by the DO and NH3 methodologies by expressly setting out agency "policy", which is then carried out by staff or partners vis-a-vis sampling and assessments of waterway health. The proposed DO and NH3 methodologies qualify as a legislative rule under MAPA and must be promulgated through a formal rulemaking to be lawful under state law.

RESPONSE: DEQ disagrees with these comments. The Ammonia Toxicity Assessment Method is not a new or revised water quality standard. Nor is it a state rule or regulation, as stated in Section 1.0 of the Assessment Method. The Assessment Method is provided to assist staff and to inform the public about impairment decisions based on Montana's ammonia water quality standards. The Assessment Method is guidance only and does not qualify as a legislative rule. It does not redefine the duration or frequency of Montana's ammonia standard nor does it modify any antidegradation components of Montana law. Montana's ammonia standard includes duration and frequency requirements which this method follows. This guidance document contains suggested data requirements and uses established Montana's ammonia standards to provide a defensible data analysis process.

COMMENT 96. Insofar as these sampling regimens and assessment protocols define and establish magnitude, duration, or frequency of applicable water quality criteria by virtue of how and when sampling occurs and allows possible exceedances of criteria to escape unmonitored, they are in-fact revisions of standards subject to EPA review.

RESPONSE: DEQ disagrees with this comment. The assessment guidance and its consideration of data provides adequate protection of beneficial uses, while also providing opportunity to screen as many waters across the state as possible. Providing monitoring and minimum assessment data guidance does not change the magnitude, duration, or frequency of applicable water quality criteria.

COMMENT 97. The draft document (p.8) states that an impairment listing for ammonia would be initiated if more than 10% of samples collected for assessment of acute toxicity exceed the standard

(acute toxicity criteria) over 10 years, or if more than 1 sample within any 3-year period exceeds the criteria. Thus, at least 2 samples must be in violation of the acute toxicity criteria to count as an exceedance. Yet, as MDEQ acknowledges (p.2), "Montana's standards incorporate an exceedance frequency component that indicates no more than *one* exceedance within three years." The draft document (p.1) notes that the assessment method is not a state rule or regulation. Nevertheless, why is it sanctioned by MDEQ despite apparently not conforming to Montana standards? This question applies to the draft method's treatment of 2.5x the CCC as well.

RESPONSE: The exceedance frequency of no **more** than one exceedance in three years allows one exceedance in that time frame. If that assessment unit or reach has greater than one exceedance in three years, then the impairment determination would be to list or keep the assessment unit listed for ammonia. DEQ is conforming to Montana's water quality standards using this exceedance rate.

COMMENT 98. I cannot emphasize enough the problematic nature of DEQ's proposing these inadequate assessment methods. Levels of ammonia only need to exceed the lethal levels once for impacts to occur to populations of fish, stoneflies, mayflies and other aquatic species. And chronic pollution levels — even if not lethal — significantly impair the utility of our waters and the nature of our aquatic ecosystems, most visibly in the form of blanketing aquatic macrophytes on river bottoms and algae blooms in our lakes.

COMMENT 99. Please remember and include in your assessment planning that ammonia levels only need to exceed lethal levels once to have serious deleterious effects on fish and other vertebrate and invertebrate aquatic life. Thus, careful and stringent sampling is required.

RESPONSE: To capture both long-term and short-term exposure to ammonia, DEQ standards include both a chronic and an acute aquatic life standard. The chronic standard aims to protect aquatic life from exposure to ammonia at a low dose, but for a longer duration (30 days). The acute standard is intended to protect aquatic life from ammonia at a higher dose for a short duration (1 hour). Montana's water quality standards, which fall in line with most states, indicate that no more than one exceedance can occur within any 3-year timeframe. The Assessment Method follows the standard along with an additional protection of no more than a 10% exceedance rate. If either fail, the decision is to list the waterbody for Ammonia. The Ammonia Toxicity Assessment Method indicates that DEQ must use all readily available and credible data and provides minimum data requirements and data evaluation guides that protect aquatic life. DEQ follows other assessment methods to evaluate induced eutrophication factors.

COMMENT 100. I feel these proposed assessment methods will not sufficiently protect Montana aquatic life because the deficient sampling protocols will not accurately gauge the disease, stress and mortality of vital Montana fisheries due to toxic ammonia levels.

COMMENT 101. The assessment method for ammonia is critically important to maintaining healthy fisheries in Montana, but unfortunately, the draft assessment methods are not protective of aquatic life and will fail to reliably assess stress, disease, and death of salmonids from ammonia toxicity or harmful levels of DO.

RESPONSE: DEQ does not assess stress, disease, or mortality of fishes. The Ammonia Toxicity Assessment Method provides guidelines to the public and DEQ scientists for assessing water quality conditions to Montana's water quality standards. The ammonia water quality standard has both acute

and chronic standards that protect fish and other aquatic life from both long-term and short-term exposure to ammonia.

COMMENT 102. In sum, to best utilize finite resources and advance the state of scientific knowledge and precautionary water resource management we urge the Department to withdraw these proposals and, instead, re-evaluate their scientific basis taking into account best-available science and agency duties under the MWQA and CWA.

RESPONSE: This assessment method provides guidance to evaluate ammonia conditions that exceed Montana's standard and evaluate if ammonia conditions support or impair aquatic life. If EPA updates national ammonia criteria based on new science, Montana will review the national guidance and consider state water quality criteria updates during the next triennial water quality standards review process.

COMMENT 103. As described herein the proposed methodologies reflect significant scientific error, omissions, or conclusory findings that will not afford Montana surface waters the necessary management capable of maintaining and preserving high-quality water or accurately and efficiently identifying degraded water quality.

COMMENT 104. I'm writing to comment on the Draft Ammonia Assessment Method, which is concerning for Montana waterways. It is crucial to better refine the approach to these proposals, which will help protect our water quality and aquatic life.

COMMENT 105. It is crucial to better refine the approach to these proposals, which will help protect our water quality and aquatic life. Pristine water is good for Montana's aquatic life AND for Montanans. Our beautiful state constitution grants us the right to a clean and healthful environment, for all Montanans now and in the future, and I feel that these draft assessment methods for ammonia and dissolved oxygen in our water do not live up to the standards of this crucial right.

COMMENT 106. Scientists have identified many flaws in the draft methods- everything from claims that falsely underrate the negative effects of ammonia on aquatic life, to inappropriate sampling methods that would inaccurately measure the presence, extent, and toxicity of these pollutants in Montana waterways.

COMMENT 107. My overall evaluation is that application of the methods as described in the draft documents will fail to assess harmful ammonia concentrations accurately and, therefore, will fail to protect the aquatic life beneficial use from ammonia toxicity.

RESPONSE: While DEQ does not agree with comments 103-107, multiple sections were added or edited to improve clarity, scientific methodology, and overall guidance in the ammonia assessment process. Listed below are the sections that were edited or added:

Section 2.1 Overview of Montana's Ammonia Water Quality Standards

- DEQ added this section to clarify Montana's beneficial use classification system and explain how the use class of a waterbody determines which calculations to use for the evaluation of the acute and chronic criteria.
- DEQ included a sentence stating, if an assessor determines there are cold water species present in a warm water classified waterbody, they will assess for cold water species.

Section 3.3 Sampling Timeframe and Temporal Requirements

- DEQ edited this section to include more specific sampling timeframes for chronic and acute criteria evaluation.
- DEQ clarified that at least one 30-day average should fall within the timeframe of July 1 – September 30 to list. About half of the of the 30-day averages must fall within this timeframe and the other half should fall within the timeframe from November 1 – April 30 to delist.
- DEQ changed the timeframe used when delisting ammonia on B-3 and C-3 streams for the acute criteria and 2.5x the chronic criteria evaluation from March 15 – August 31 to March 15 – September 30.

Section 3.6 Minimum Data Requirements

- DEQ updated the title of this section from "Sample Size" to "Minimum Data Requirements"

Section 3.6.2 Chronic Criteria

- DEQ clarified that there are two parts to the chronic criteria and explained the requirements for each part.
- DEQ removed the term "growing season" and clarified the temporal requirements in Section 3.3
- DEQ included language that directs the assessor to Section 4.1.1 for guidance on calculating average monthly ammonia concentrations.
- DEQ clarified the assessment methodology for evaluating 2.5x the chronic criteria and included a required minimum number of samples.

Section 4.1 Preparing Data for Assessment

- DEQ added this section to synthesize minimum data requirements and temporal requirements.
- This section also clarifies which types of ammonia samples are appropriate for beneficial use assessment.

Section 4.1.1 Calculating Monthly Averages

- DEQ added this section to provide guidance on how to calculate monthly averages to evaluate the chronic criteria.

Section 4.2 Assessment Process

- DEQ edited this section to reflect changes in temporal and minimum data requirements and improve overall clarity in the assessment process.
- References to sections that explain the process in greater detail were added to each step.

Section 5.0 Assessment Decisions and Documentation

- DEQ added this section to provide an overview of the possible assessment outcomes after comparing the data to water quality standards.

Section 5.1 Assessment Decision Framework

- DEQ added this section to clearly state when data indicates that a waterbody should be listed, delisted, not listed, or if there is insufficient information to complete a beneficial use assessment.
- DEQ created a beneficial use decision framework process diagram and an assessment method decision framework table and included those in this section.