**Response to Comments**

**Sibanye-Stillwater, dba, Stillwater Mining Company, East Boulder Mine**

**Modification of MPDES Permit MT0026808**

On October 8, 2025, the Montana Department of Environmental Quality (DEQ) issued Public Notice MT-25-05, stating DEQ's intent to issue a Montana Pollutant Discharge Elimination System (MPDES) permit to Stillwater Mining Company (Stillwater) for the East Boulder Mine Major Modification. Public notice MT-25-05 stated that DEQ prepared a draft modified permit, Fact Sheet, and Environmental Assessment. The public notice required that all substantive comments must be received or postmarked by November 7, 2025, in order to be considered in formulation of the final determination and issuance of the permit.

This Response to Comments document is an addendum to the permit record and supersedes relevant parts of the Fact Sheet, to the extent specific changes or clarification are discussed herein. Written public comments were received during the public comment period from October 8, 2025, to November 7, 2025. This document characterizes the public input received and DEQ has prepared necessary responses pursuant to ARM 17.30.1377.

The table below identifies individuals supplying written comments on the issuance of MPDES permit MT0026808.

| LIST OF PERSONS SUBMITTING COMMENTS ON DRAFT MPDES PERMIT MT0026808 | |
|---|---|
| **Section** | COMMENTER, TITLE, AFFILIATION |
| **1** | Corné Strydom, SVP and Head of Technical and Innovation, Sibanye Stillwater US PGM Operations |
| **2** | Matt Vincent, Executive Director, Montana Mining Association |
| **3** | Katie Howes, Chair, Good Neighbor Agreement Task Force |
| **4** | Sarah Zuzulock, Zuzulock Environmental Services on behalf of the Good Neighbor Agreement |
| **5** | Margaret E. Winter-Sydnor, Citizen |
| **6** | David Brooks, Executive Director, Montana Trout Unlimited |
| **7** | Dr. Vicki Watson, Aquatic Ecologist, Citizen |

**Section 1** - Comments Submitted by Corné Strydom, SVP and Head of Technical and Innovation with Sibanye Stillwater US PGM Operations

**Comment 1.1 Summary:** (GC-1) DEQ DID NOT CONSIDER RELEVANT INFORMATION PROVIDED AS PART OF SMC'S MODIFICATION REQUEST AND SMC REQUESTS THAT DEQ IMPOSE A TN FINAL EFFLUENT LIMIT TO 32 LBS/DAY, EFFECTIVE UPON ISSUANCE OF THE MODIFIED PERMIT, WITH REVISED NUTRIENT BIOASSESSMENT SPECIAL CONDITIONS.

**Comment 1.1:** The information provided by SMC supports a Total Nitrogen (TN) final effluent limit of 32 lbs/day with revised Nutrient Bioassessment Special Conditions.

As an initial matter, DEQ failed to consider relevant information provided as part of SMC's May 12, 2025, Request for Modification (Modification Request) and August 5, 2025, Supplement to Request for Modification (Supplemental Modification Request) that supports a final effluent limit of 32 lbs/day TN and demonstrates that the EBM is unable to satisfy the proposed final effluent limit of 16.0 lbs/day during the permit term. An agency's failure to consider all relevant information can render its decision erroneous, arbitrary, capricious, or otherwise unlawful under Montana law. Specifically, DEQ failed to consider TN load data from April 2025 (see Comments MMFS-1 through MMFS-3), SMC's future load analysis and WTP optimization review (see Comment MMFS-6), effluent flow at Outfall 002 and Outfall 003 (see Comment MMFS-10), and biological indicator data from EBR-003 (see Comment MMFS-16). DEQ also failed to assess historic TN load data that demonstrates TN concentrations higher than 16 lbs/day meet the narrative nutrient standards and nonsignificance criteria (see Comment MMFS-22). Additionally, as addressed in SMC's comments to the 2025 Major Modification Fact Sheet (2025 Fact Sheet), DEQ relied on several false assumptions, erroneous methods, and insufficient data points when evaluating the TN final effluent limit.

SMC's analysis, provided in Comment MMFS-31, demonstrates that a TN final effluent limit of 32 lbs/day satisfies the narrative nutrient standards, as modified by DEQ's narrative nonsignificance criteria. The information provided by SMC also demonstrates that an effluent limit of 16.0 lbs/day is not consistent with current facility performance and is not achievable during the permit term. See Comment MMFS-31. Additionally, although SMC does not disagree with the imposition of the Nutrient Bioassessment Special Conditions, SMC has requested revisions to the methodology DEQ has proposed (see Comment MMFS-25).

Accordingly, SMC requests that DEQ impose a TN final effluent limit to 32 lbs/day, effective upon issuance of the modified permit, with revised Nutrient Bioassessment Special Conditions.

***RESPONSE 1.1:***

DEQ reviewed all information provided by SMC and disagrees that the information provided by SMC supports a TN final effluent limit of 32 lbs/day with revised Nutrient Bioassessment Special Conditions, DEQ's review of the information submitted by SMC is discussed throughout this response to comments document.

SMC's Modification Request was to extend the compliance schedule included in the 2023-issued MPDES permit, postponing the effective date of the interim effluent limitation of 15.1 lbs TN/day and extending the first interim effluent limitation of 32 lbs TN/day. This compliance schedule was implemented for the eventual achievement of a final effluent limitation based on the base numeric nutrient criteria as

described in Department Circular DEQ-12A (DEQ-12A), which was repealed by the Montana Legislature in May 2025, submitted as a water quality standards change to EPA on May 7, 2025, and approved by EPA on October 3, 2025. DEQ lacks the legal authority to take an MPDES permitting action, including modification of a schedule of compliance, based on the DEQ-12A criteria, which are no longer in effect for purposes of state or federal law.

Final permit decisions made by the department are not, by rule, effective upon issuance (ARM 17.30.1378).

See ***Responses to Comments 1.2-1.34.***

**Comment 1.2 Summary:** (GC-2) FLAWED APPLICATION OF THE NARRATIVE NUTRIENT STANDARDS

**Comment 1.2:** In the alternative, SMC asserts that DEQ's implementation and application of the narrative nutrient standards and narrative significance criteria are flawed, and DEQ should therefore grant an extension of the Permit's current limit of 32 lbs/day. As acknowledged by DEQ, there is cause to modify the Permit's TN effluent limit pursuant to ARM 17.30.1361(2)(c), as well as the Permit's reopener provision, due to the repeal of Montana's numeric nutrient standards, as approved by EPA on October 3, 2025. As addressed in Comments MMFS-4, MMFS-5, and MMFS-9, there is also cause to modify the Permit pursuant to ARM 17.30.1361(2)(b) and (2)(d). As addressed below in SMC's comments to the 2025 Fact Sheet, 2025 Draft Permit, and 2025 Draft Environmental Assessment, SMC has identified numerous technical and legal errors in DEQ's implementation and application of the narrative standards and evaluation of the environmental impacts of the proposed action. SMC is concerned that the publication of the Draft Permit shortly after EPA's approval of the use of narrative standards did not allow sufficient time to ensure a proper analysis of the TN effluent limit for the EBM or proper development and implementation of the narrative nutrient standards.

Importantly, although there is cause to modify the Permit, there is no immediacy to implementation of the narrative standards in the Permit, particularly given that the current limit of 32 lbs/day is protective of the receiving waters as demonstrated by the biological data explained below (see Comment MMFS-31). DEQ can maintain the status quo by extending the Permit's current limit of 32 lbs/day through the permit term, during which time the agency can transparently develop its procedures for implementing the narrative standards and the public, including the regulated community, can methodically evaluate those procedures using the best available data and science.

Should DEQ decline SMC's request in Comment GC-1, SMC requests that DEQ grant SMC's original request to extend the interim effluent limit of 32 lbs/day and Compliance Plan deadline through the permit term.

***Response 1.2:***

The status quo of the existing permit (prior to this modification) involves the expiration of the interim 32 lbs/day TN effluent limit on December 29, 2025, followed by the imposition of an interim effluent limit of 15.1 lbs/day TN. The existing permit then also requires the expiration of the 15.1 lbs/day interim TN effluent limit on August 31, 2027, followed by the imposition of an interim TN effluent limit of 10.1 lbs/day. These planned interim limits are part of a schedule of compliance designed to lead to compliance with the now-repealed DEQ-12A nutrient criteria. This permit modification implements the

narrative standard at ARM 17.30.637(1)(e) which is in effect for purposes of state and federal law. DEQ disagrees that the narrative standard requires further development before it can be implemented in permits. DEQ's implementation of the narrative standard, including the related nondegradation criteria, is reasonable and is supported by credible data.

The immediacy of the modification was occasioned by the permittee's request to modify the permit's TN compliance schedule prior to the effective date of the next interim effluent limitation (originally September 1, 2025, and now December 29, 2025, following minor modification on August 14, 2025). As a state agency, DEQ must comply with state law and follow the directives of the state legislature. DEQ lacks the legal authority to take permitting actions based on repealed water quality standards and must implement currently applicable water quality standards when making permitting decisions. § 75-5-402, MCA. Therefore, DEQ may not modify a compliance schedule based on a repealed water quality standard but may reevaluate the final effluent limitation and determine if a new compliance schedule is appropriate, as was done in this case. DEQ determined that a compliance schedule is not necessary for SMC to meet the final TN effluent limit, as derived from the implementation of the narrative standard (and as imposed in the modified permit). Based upon the circumstances of this case, DEQ lacks any technical or regulatory basis for the application or extension of the 32 lbs/day interim effluent limitation.

In SMC's Supplemental Modification Request, SMC also requested that DEQ extend the 32 lbs/day first interim TN limit until narrative standards for nutrients were approved by EPA and implemented by DEQ in MT0026808. While SMC requested that DEQ delay this action pending EPA approval, EPA's guidance supports the issuance of draft permit actions implementing water quality standards changes while said changes are under consideration for EPA approval. 65 Fed. Reg. 24641, 24643 (April 27, 2000). Regardless, given EPA's October 3, 2025, approval of the water quality standards change from DEQ-12A nutrient criteria to narrative nutrient criteria, there is no need to delay implementation (See ***Responses to Comments 1.1 & 1.11***). DEQ may not take a permitting action based upon the now-repealed DEQ-12A nutrient criteria and the narrative standard is now the effective standard for purposes of state and federal law.

**Comment 1.3 Summary:** (GC-3) DEQ SHOULD ACKNOWLEDGE CLEAN WATER ACT ANTI-BACKSLIDING PROVISIONS.

**Comment 1.3:** If DEQ imposes a limit that is less than 32 lbs/day, DEQ should acknowledge that the exceptions to CWA's anti-backsliding provisions could permit a less stringent effluent limit in the future, including where DEQ reevaluates implementation of the narrative standards and revises the corresponding permit limit.

CWA section 402(o)(1) prohibits the renewal, reissuance, or modification of an existing NPDES permit containing effluent limitations, permit conditions, or standards less stringent than those established in the previous permit (i.e., anti-backsliding). There are, however, exceptions to anti-backsliding specified in statute and in federal regulations.[2] SMC recognizes DEQ's long-standing acknowledgment that anti-backsliding does not apply to limits not yet in effect.[3] SMC further recognizes that the exceptions to anti-backsliding also include circumstances where an alternative, less stringent limitation based on the narrative standard for nutrients is substituted for the proposed narrative standard (even if the proposed limits become effective prior to that change in the limitation).

Correspondingly, SMC requests that DEQ also acknowledge the applicability of those exceptions. For example, if the science supports an alternative to the limit for TN (e.g., based on a revised approach to narrative standard implementation), that new limit may apply, regardless of anti-backsliding and whether/if the proposed limit is already a condition in the permit. SMC has requested DEQ's acknowledgment of this potential given the importance of clarity regarding the applicability of the anti-backsliding provisions in the CWA.

Finally and most importantly, although SMC asserts that exceptions to anti-backsliding would apply to any subsequent revisions to DEQ's implementation of the state narrative standard (or to any replacement of some alternative limit that is not based on the state narrative standard), the uncertainty that stems from the anti-backsliding threat reinforces the importance of retaining the 32 lbs/day monthly average for TN pending a more thorough, transparent review of narrative standard implementation.

***Response 1.3:***
Future permitting actions are outside the scope of this modification. DEQ recognizes there are exceptions to the Clean Water Act's anti-backsliding requirements; however, those exceptions speak for themselves.

**Comment 1.4 Summary:** (MMFS-1) DEQ DID NOT CONSIDER THE FLOW DATA PROVIDED IN THE MODIFICATION REQUEST.

**Comment 1.4:** Section II. Permit Modification Request (pg. 2): DEQ did not identify the effluent flow data provided in Section 4.2 of the Supplemental Modification Request as information provided in support of SMC's request.

SMC's Supplemental Modification Request included updated effluent flow data indicating that effluent flows and TN loads from the EBM Water Treatment Plant (WTP) are significantly higher than projected at the time of permit issuance in 2023. Section 4.2.1 (Table 3-1) of the Supplemental Modification Request shows that the maximum average monthly flow of WTP effluent during the permit term was 538 gpm, which is approximately 280% greater than the flow used to develop the interim limit of 15.1 lbs/day in the 2023 permit (192 gpm). In addition, nutrient loading data provided in Section 4.2.3 (Table 4-3) shows that the combined TN load from the WTP and Outfall 003 ranged between 1.37 lbs/day and 24.3 lbs/day during the current permit cycle.

SMC requests that DEQ recognize and consider this data in their assessment of SMC's major modification request.

***Response 1.4:***
DEQ recognizes and considered the referenced data but disputes its relevance to the evaluation of a Water Quality Based Effluent Limitation (WQBEL) for TN derived from the narrative prohibition at 17.30.637(1)(e), and as modified by the applicable nonsignificance criteria at 17.30.715(1)(h) and (2). ***See Responses to Comments 1.5 and 1.34***.

**Comment 1.5 Summary:** (MMFS-2) TABLE 1 OF THE FACT SHEET DOES NOT REFLECT THE CORRECT HIGHEST AVERAGE MONTHLY TN LOADS.

**Comment 1.5:** Section III. Basis for Permit Modification (pg. 3): Table 1 of the 2025 Fact Sheet does not accurately reflect the highest average monthly TN loads observed following renewal of the Permit in 2023.

Table 1 provides a comparison of the highest average monthly TN loads from the EBM before and after MPDES renewal in 2023. Table 1 states that the highest average monthly TN load from Outfall 002 was 10.1 lbs/day in April 2025. However, Table 4-3 of SMC's Supplemental Modification Request shows that highest average monthly TN load from Outfall 002 was 21.54 lbs/day in April 2025.

SMC believes that DEQ may have incorrectly reduced the TN load at Outfall 002 for April 2025 in Table 1 to account for water that was diverted from Outfall 002 to the Underground Injection Control (UIC) system. As noted in Section 3.3.1 of the Supplemental Modification Request, since the beginning of 2025 a portion of the water that would typically be discharged to Outfall 002 had been temporarily directed to the UIC system to allow for cleaning and enhancing percolation rates given recent increases in observed mine water flows. Because the UIC system is only used on an as-needed, temporary basis, DEQ should not consider the UIC system when evaluating the average monthly TN load. In its analysis, DEQ should presume that all water that could be discharged at Outfall 002 will be discharged at Outfall 002.

Furthermore, the data from April 2025 should not be disregarded as an outlier. Highly variable flows, as observed April 2025 (see Figure 2-1, Supplemental Modification Request), are typical of mining in bedrock systems where groundwater flow is controlled by secondary porosity and isolated fracture systems. As the mine is developed lower into the water table, it is highly likely that the mine will continue to encounter isolated fracture systems and similar discharges as seen in April of 2025 will become more common. As DEQ acknowledged in the agency's 2023 Response to Public Comment, the inflow of water to the WTP from the mine is highly variable and cannot be controlled.

SMC requests that DEQ revise Table 1 to reflect that the highest average monthly TN load from Outfall 002 was 21.54 lbs/day in April 2025.

***Response 1.5:***

DEQ includes a revised Table 1 (below). DEQ notes a discrepancy between the claim made in the comment and modification request and the Discharge Monitoring Reports (DMRs) submitted by the permittee for April 2025: the permittee reported an average monthly discharge load of 12.82 lbs TN/day. This was one of four months since the 2023 permit renewal where the facility's average monthly TN loading exceeded 10 lbs/day. However, these elevated loads were a result of elevated effluent TN concentration, not of elevated WTP flow such that it does not support SMC's own justification that higher load-based interim TN limits are warranted based on projected increases in flow to a highly optimized WTP. This contextualizing information is also added to the revised Table 1. In no instance did SMC report an average TN load from Outfalls 002 and 003 that equaled or exceeded 15.1 lbs TN/day in their DMRs.

The commenter is correct that DEQ reduced the TN load at Outfall 002 for April 2025 in Table 1 to account for water that was diverted into the UIC and, additionally, to be consistent with the compliance data submitted by the facility. DEQ disagrees that it is appropriate to presume that all water that could be discharged at Outfall 002 will be discharged at Outfall 002 given a) the numerous months in 2025

when water that could have been discharged at Outfall 002 was discharged instead to the UIC and b) that any water discharged to the UIC is not subject to MPDES permit effluent limitations, including TN effluent limitations, such that it is inappropriate to presume this water was treated to the more stringent level required by the MDPES permit.

**Table 1:** Comparison of EBM Process and Septic Wastewater Flow and Total Nitrogen (TN) Effluent Concentrations and Loads (lbs/day)

| | **Outfall 002- Process Wastewater [(1)]** | | | | **Outfall 003 - Septic** | | | | **SUM** |
|---|---|---|---|---|---|---|---|---|---|
| | **Data Date Range** | **Avg (max) effluent [TN] (mg/L)** | **Avg (max) monthly flow (MGD)** | **Avg (max) monthly TN load (lbs/day)** | **Data Date Range** | **Avg (max) effluent [TN] (mg/L)** | **Avg (max) monthly flow (MGD)** | **Avg (max) monthly TN load (lbs/day)** | **Avg (max) monthly TN load (lbs/day)** |
| Pre-renewal (pre- and post-upgrade) | 8/31/00 - 8/31/05 | 91 [(2)] (214) [(2)] | 0.08 (0.26) | 53 [(2)] (183) [(2)] | 2000-2023 | No Data (50) | No Data (0.0058) | 1.3 [(3)] (2.4) | 54 (185) |
| | 9/30/05-8/31/10 | 76 [(2)] (367) [(2)] | 0.05 (0.21) | 12 [(2)] (89) [(2)] | | | | | 13 (91) |
| | 9/1/10-10/31/15 | 3.3 [(2)] (12) [(2)] | 0.26 (0.43) | 7.8 [(2)] (29) [(2)] | | | | | 9.1 (31) |
| | 11/1/15-3/31/21 | 7.5 (41) | 0.30 (0.46) | 16 (36) | | | | | 17 (38) |
| | 4/1/21 - 8/31/23 | 2.6 (5.7) | 0.26 (0.38) | 5.5 (13) | | | 0.005 0.011 | | 6.8 (16) |
| Post-renewal, pre-modification request | 9/1/23 - 5/31/25 | 1.6 (8.8) | 0.21 (0.43) | 2.5 (10) | 10/1/23 - 6/30/25 | 57 [(4)] (68) [(4)] | 0.005 [(4)] (0.017) [(4)] | 2.7 [(5)] (3.4) [(5)] | 5.2 (13) |
| Post-renewal, post-modification request | 6/1/25 to 10/31/25 | 6.2 (17) | 0.18 (0.40) | 4.1 (9.5) | 7/1/25 – 9/30/25 | 49 [(4)] | 0.005 [(4)] (0.007) [(4)] | 2.0 [(4)] | 6.1 (12) |

Footnotes: mg/L = milligrams per liter; MGD = million gallons per day; lbs/day = pounds per day.

(1) TN and flow data from NetDMRs and represent discharges through Outfall 002 to infiltration pond and do not include wastewater streams that are recycled or injected.

(2) Data was provided as Total Inorganic Nitrogen (TIN) and converted using average TIN:TN ratio of 6.0, for data from 2000 to October 31, 2015

(3) Septic average load from communication from SMC to DEQ's Hard Rock Section, for 2000 – 2015. Septic maximum load from 1992 EIS.

(4) Quarterly TN load data from the septic system provided in NetDMR

(5) Monthly TN load from the septic system included in the August 2025 modification request, Table 4-3.

**Comment 1.6 Summary:** (MMFS-3) SMC REQUESTS THAT DEQ RECONSIDER ITS ANALYSIS, TAKING INTO CONSIDERATION THE AVERAGE MONTHLY TN LOAD AT OUTFALL 002 IN APRIL 2025 AND SMC'S FUTURE LOAD ANALYSIS.

**Comment 1.6:** Section III. Basis of Permit Modification (pg. 3): DEQ erred by relying on the erroneous data in Table 1 to conclude that "DEQ does not believe that it's accurate to say that the EBM is not able to achieve the interim TN limit of 15.1 lbs/day."

First, as addressed in Comment MMFS-2, the data in Table 1 does not accurately reflect the highest average monthly TN load at Outfall 002, which exceeded the interim limit of 15.1 lbs/day.

Second, DEQ failed to consider SMC's future load analysis provided in Attachment 3 of the Modification Request and Section 2.2 of the Supplemental Modification Request. SMC's future load analysis relies on observed increases in annual average inflow to the WTP from the mine from 2008 to 2020 combined with observed increases in TN concentrations from 2021 to 2024 to predict TN loads during the permit term. SMC's analysis concludes that future groundwater inflow will increase to between 374 and 575 gpm in 2043 and TN loads will continue to increase to as high as 31.7 lbs/day (28.3 lbs/day from Outfall 002 + 3.4 lbs/day from Outfall 003) during the permit term. DEQ's failure to adequately consider SMC's future load analysis is addressed below in Comments MMFS-4 and MMFS-6.

SMC requests that DEQ reconsider its analysis, taking into consideration the average monthly TN load at Outfall 002 in April 2025 and SMC's future load analysis.

***Response 1.6:***
The modification of a compliance schedule based on DEQ-12A numeric nutrient criteria is inappropriate, as it constitutes a DEQ action based on a repealed water quality standard. See ***Responses to Comments 1.1 & 1.2***.

Additionally, any schedule of compliance granted in a permit must require compliance as soon as possible (ARM 17.30.1350). SMC met the next interim effluent limitation of 15.1 lbs TN/day for every month during which the 32 lbs TN/day first interim limit included in the 2023-issued permit was in effect. The exceedances referenced in the comment were not reported on the permittee's DMRs because they do not reflect actual discharges to the East Boulder River (via groundwater). See ***Response to Comment 1.5***. Based on the record before DEQ, SMC is currently able to comply with the modified final effluent limitation, which is derived from the narrative standard. Therefore, a compliance schedule is not appropriate under ARM 17.30.1350. Potential future loading increases may not be used to justify a compliance schedule.

**Comment 1.7 Summary: (**MMFS-4) SMC REQUESTS DEQ ACKNOWLEDGE THAT, PURSUANT TO ARM 17.30.361(2)(B), THE FUTURE LOAD ANALYSIS PROVIDED BY SMC IS NEW INFORMATION THAT WOULD HAVE WARRANTED A DIFFERENT PERMIT LIMIT AT THE TIME OF PERMIT ISSUANCE AND THEREFORE THERE IS CAUSE TO MODIFY THE PERMIT PER SMC'S SUPPLEMENTAL MODIFICATION REQUEST.

**Comment 1.7:** (MMFS-4) Section III. Basis of Permit Modification (pg. 3-4): DEQ incorrectly concluded that SMC's future load analysis did not warrant a major modification of the permit pursuant to ARM 17.30.1361(2)(b).

ARM 17.30.1361(2)(b) states that a permit may be modified when "the department receives new information that was not available at the time of permit issuance . . . and would have justified the application of different permit conditions at the time of issuance."

First, DEQ wrongfully concluded that SMC's future load analysis "does not constitute new information" but is instead "a new analysis of old, pre-September 2023, information." DEQ improperly conflates new information with new data. Although DEQ's regulations do not define "information," it is reasonable to conclude that new analysis based on better methods and on-the-ground understanding constitutes new information that might warrant an amendment of a permit condition. In a similar context, EPA has indicated that new modeling information could constitute "new information" under CWA section 402(o)(1).[5] Additionally, although it is accurate that SMC relied on pre-September 2023 groundwater inflow data, DEQ's conclusion completely ignores that SMC's analysis combined inflow data with TN concentration data from 2021 to 2024.

Second, DEQ broadly concluded that the information provided by SMC would not have justified different permit terms at the time of issuance; however, DEQ did not clearly explain why it reached this conclusion. DEQ stated that SMC's future groundwater flow analysis "indicates lower flow than the estimated maximum groundwater inflow of 737 gpm included in the 2000-issued permit." However, the interim limit of 15.1 lbs/day in the Permit was determined based on the highest average monthly TN load observed since WTP upgrades were made in 2020, not on the estimated groundwater inflow.

SMC requests DEQ acknowledge that, pursuant to ARM 17.30.361(2)(b), the future load analysis provided by SMC is new information that would have warranted a different permit limit at the time of permit issuance and therefore there is cause to modify the permit per SMC's Supplemental Modification Request.

***Response 1.7:***

DEQ disagrees that SMC's future load analysis would have warranted different interim effluent limitations at the time of permit issuance. SMC is correct that the interim limit of 15.1 lbs TN/day was determined based on the highest average monthly TN load observed since WTP upgrades were made in 2020. However, in no instance since the effective date of the 2023-issued permit has a higher than typical month for TN loading been attributable to higher than typical flow, only higher than typical TN concentration. Moreover, this point is moot given the approval of the narrative nutrient standard by EPA, see ***Response to Comments 1.1 and 1.2***.

**Comment 1.8 Summary:** (MMFS-5) DEQ SHOULD ACKNOWLEDGE THAT THE WTP OPTIMIZATION REVIEW PROVIDED BY SMC IS NEW INFORMATION THAT WOULD HAVE WARRANTED A DIFFERENT PERMIT LIMIT AT THE TIME OF PERMIT ISSUANCE AND THEREFORE THERE IS CAUSE TO MODIFY THE PERMIT PER SMC'S SUPPLEMENTAL MODIFICATION REQUEST.

**Comment 1.8:** Section III. Basis of Permit Modification (pgs. 3-4): DEQ incorrectly concluded that SMC's WTP optimization review did not warrant a major modification of the permit pursuant to ARM 17.30.1361(2)(b).

First, DEQ stated that SMC's WTP optimization review is not "new information" because it relies on information that was available upon issuance of the permit. At the same time, DEQ acknowledged that SMC's analysis relied on "new information for Outfall 003." DEQ does not explain how an analysis that

relies on new information is not "new information" under ARM 17.30.1361(2)(b). DEQ's position is inconsistent and finds no basis in the regulations.

Second, DEQ's assessment of SMC's WTP optimization review does not follow the same logic that the agency applied when developing the Permit's interim TN limits and is contrary to DEQ's assessment of the onsite septic system performance.

In 2023, DEQ set the interim limits for TN based on WTP performance. In the agency's 2023 Response to Public Comment, DEQ acknowledged that the effluent data for the 2023 renewal was "based on a limited period of record" (21 months) compared to the agency's preferred 3 to 4.5 years of data. DEQ also recognized that there is considerable variability in the WTP TN concentrations and resulting loads. DEQ's response to Comment #A-1 indicates that additional data was needed for the agency's to fully evaluate the WTP's ability to meet the interim limits.[6]

In the context of the onsite septic system, DEQ acknowledged that new information supplied by SMC that demonstrated the system is "performing considerably worse than the estimations on which the facility-wide compliance schedule was based . . . , likely would have justified a modest increase in the first interim load-based limit." Through its future load analysis, SMC has similarly provided new information indicating that the WTP is performing worse than assumed at the time of permit issuance, which could result in exceedances of the proposed final effluent limit of 16.0 lbs/day.

SMC requests that DEQ acknowledge that, pursuant to ARM 17.30.1361(2)(b), the WTP optimization review provided by SMC is new information that would have warranted a different permit limit at the time of permit issuance and therefore there is cause to modify the permit per SMC's Supplemental Modification Request.

***Response 1.8:***

DEQ acknowledges that the WTP optimization review and Outfall 003 loading data was new information. DEQ disagrees that the WTP optimization review would have warranted different interim permit limits at the time of permit issuance, had it been available at the time. DEQ concurred that the Outfall 003 loading data would have warranted a different permit limit at the time of permit issuance, as is stated on page 4 of the Fact Sheet. However, this point is moot given the approval of the narrative nutrient standard by EPA, see ***Response to Comments 1.1 and 1.2***. DEQ lacks the legal authority to revise a compliance schedule for final TN effluent limits based on DEQ-12A nutrient criteria, which are no longer in effect for purposes of state or federal law. Any consideration of a compliance schedule must be based on achieving a limit based on the narrative standard as soon as possible. See also ***Response to Comment 1.6***.

**Comment 1.9 Summary:** (MMFS-6) DEQ IMPROPERLY DISCOUNTED SMC'S FUTURE LOAD ANALYSIS AND WTP OPTIMIZATION REVIEW WHEN DETERMINING THE APPROPRIATE TN EFFLUENT LIMIT UNDER THE NARRATIVE STANDARD.

**Comment 1.9:** Section III. Basis of Permit Modification (pgs. 3-4): DEQ improperly discounted SMC's future load analysis and WTP optimization review when determining the appropriate TN effluent limit under the narrative standard.

DEQ acknowledged that the imposition of the narrative standards, on its own, warrants a major modification of the Permit's TN limits pursuant to ARM 17.30.1361(2)(c) and the Permit's reopener provision. As addressed in Comment GC-1, DEQ must consider all relevant information before the agency when setting permit conditions. Information need not be "new" to be relevant. SMC's future load analysis and WTP optimization provide relevant information regarding average monthly TN loading during the permit term, the performance of the WTP facility, and the EBM's inability to satisfy the proposed final effluent limit of 16.0 lbs/day during the permit's term.

SMC requests that DEQ consider SMC's future load analysis and WTP optimization review when modifying the Permit's TN effluent limits.

***Response 1.9:***
DEQ disagrees that SMC's future load analysis is relevant for the assessment of a TN WQBEL under the narrative standard. The calculation of the WQBEL was based on TN loading over a time period when the facility's discharge did not result in a measurable change in aquatic life attributable to nutrient loading so as to protect the receiving water from degradation. This time period is consistent with current facility performance. A schedule of compliance, when appropriate, must require compliance as soon as possible (ARM 17.30.1350(1)(a)). Where an effluent limitation is based on long term average loading, the permittee has demonstrated the ability to meet the limitation therefore a compliance schedule is not appropriate.

No changes to the draft permit or EA were made in response to this comment.

**Comment 1.10 Summary:** (MMFS-7) DEQ DID NOT SUFFICIENTLY CONSIDER SMC'S REQUEST TO EXTEND THE INTERIM LIMIT OF 32 LBS/DAY.

**Comment 1.10:** Section III. Basis for Permit Modification (pg. 4): DEQ did not sufficiently consider SMC's request to extend the interim limit of 32 lbs/day.

DEQ states that "final effluent limits must now be derived from the narrative criteria." SMC agrees that a revision to the Permit's final effluent limit must be consistent with the narrative nutrient standards. However, as discussed in Comment GC-2, this would not preclude DEQ from granting SMC's request to extend the existing interim limit of 32 lbs/day through the permit term, which SMC has shown satisfies the narrative and nonsignificance requirements (see Comment MMFS-31). Extending the interim limit through the permit term would allow the opportunity for DEQ to reevaluate the final effluent limit, consistent with the narrative standards, at permit reissuance in 2028.

SMC requests that DEQ revise this statement in the 2025 Fact Sheet to reflect that the Permit's current interim effluent limit of 32 lbs/day may be extended through the permit term.

***Response 1.10:***
DEQ sufficiently considered SMC's request to extend the interim limit of 32 lbs/day and provided summary rationale for this denial in the Fact Sheet. However, this point is moot given the approval of the narrative nutrient standard by EPA, see ***Responses to Comments 1.1 and 1.2***. Because the basis of the permit modification is the change in water quality standards pursuant ARM 17.30.1361(2)(c), neither (2)(b) nor (2)(d) are implicated. DEQ determined that a final TN effluent limit of 16.0 lbs/day is necessary to meet the now applicable narrative water quality standard. To establish an interim compliance

schedule-based limit of 32 lbs/day, DEQ would also have to find a compliance schedule is warranted and that 32 lbs/day is an appropriate interim step toward achieving the final effluent limit of 16.0 lbs/day. As noted above, DEQ did not find that a compliance schedule was necessary. DEQ has no legal authority to establish (or extend) a compliance schedule under these circumstances.

DEQ also disagrees that the 32 lbs TN/day effluent limit satisfies the narrative and nonsignificance requirements. SMC's own analysis demonstrates only that the loading of TN since 2015, well below 32 lbs TN/day, has not had a measurable impact on aquatic life, not that 32 lbs/day satisfies the narrative and nonsignificance requirements. If SMC wishes to challenge DEQ's implementation of the narrative standard, it may seek an appeal of the permit. However, DEQ may not take a permitting action based upon a now-repealed state water quality standard.

**Comment 1.11 Summary:** (MMFS-8) SMC REQUESTS THAT DEQ INCLUDE A COMPLIANCE SCHEDULE THAT WOULD ALLOW SMC REASONABLE TIME TO ACHIEVE COMPLIANCE OR TO FURTHER EVALUATE, THROUGH ONGOING DATA COLLECTION, THE FOUNDATION FOR THE 16 LBS TN/DAY FINAL EFFLUENT LIMIT.

**Comment 1.11:** Section III. Basis for Permit Modification (pg. 4): DEQ incorrectly concluded that a compliance schedule is not justified.

DEQ concluded that, based on the agency's "derivation of final effluent limitations for TN as well as the information provided by SMC, DEQ does not find that a compliance schedule is justified." Relatedly, DEQ concluded that "[a] compliance schedule may not be extended because a facility plans to have greater wastewater inputs in the future" and "SMC's projections for increased wastewater flow have not yet occurred and do not interfere with its present compliance with effluent limits."

DEQ's conclusions regarding the need for a compliance schedule disregard the data provided in Table 4-3 demonstrating TN loading as high as 24.24 lbs/day. DEQ also fails to explain why projected TN loads during the permit term are not relevant when determining a permittee's ability to comply with effluent limitations. When determining an appropriate permit limit and the necessity for a compliance schedule, a regulator should consider whether a permittee can comply with effluent limits within the permit term. Compliance schedules are necessarily prospective and require consideration of future conditions.

Finally, DEQ failed to consider the need for a compliance schedule to allow sufficient time for the agency to properly implement the narrative standards. By DEQ's own analysis in the 2025 Fact Sheet, the interim stepdown to 15.1 lbs/day is not consistent with the narrative standard, and a higher effluent limit is warranted. At the same time, SMC has provided evidence that the interim limit of 32 lbs/day is protective of the quality of the receiving water. Accordingly, it is reasonable for DEQ to extend the existing compliance schedule, or to provide a new compliance schedule, to provide DEQ sufficient time to develop its implementation of the narrative standards.

Should DEQ impose a final effluent limit of 16.0 lbs/day, SMC requests that DEQ include a compliance schedule that would allow SMC reasonable time to achieve compliance or to further evaluate, through ongoing data collection, the foundation for that limit.

***Response 1.11:***
DEQ does not require additional time to implement narrative standards (see ***Responses to Comments 1.1 & 1.2***). DEQ is required to implement effective water quality standards in permits. § 75-5-402, MCA; ARM 17.30.1344. The narrative standard at ARM 17.30.637(1)(e) is in effect for purposes of state and federal law and DEQ is not authorized under statute or rule to delay its implementation or to delay implementation through a compliance schedule while it develops implementation policies. Further, a compliance schedule may only be derived with the purpose of achieving the water quality standard at the end of the compliance schedule and DEQ must first make a finding that a "discharger cannot immediately comply with the final WQBEL upon the effective date of the permit." *See* EPA Memorandum, James A. Hanlon, Director, Office of Wastewater Management, *Compliance Schedules for Water Quality-Based Effluent Limitations in NPDES* Permits (May 10, 2007).

DEQ agrees that an interim stepdown to 15.1 lbs TN/day is not consistent with the narrative standard as it was implemented as an interim effluent limitation as part of a compliance schedule to achieve a final effluent limitation for TN based on DEQ-12Anutrient criteria. However, this reasoning also applies to the first interim effluent limitation of 32 lbs TN/day.

DEQ does not dispute that 16 lbs TN/day is more than 15.1 lbs TN/day but notes that it is lower than the permittee's proposed WQBEL of 32 lbs TN/day, which is unsupported by biological response variable data and facility effluent loading data (see ***Response to Comment 1.34***). Compliance schedules are granted only when deemed appropriate and require compliance as soon as possible (ARM 17.30.1350). Where an effluent limitation is based on long term average loading, the permittee has demonstrated the ability to meet the limitation therefore a compliance schedule is not appropriate. Under these circumstances, the record does not support SMC's request for a compliance schedule. See also ***Response to Comment 1.6***.

**Comment 1.12 Summary:** (MMFS-9) DEQ MISREPRESENTED INFORMATION ABOUT INDIVIDUAL VARIANCES IN THE 2023 FACT SHEET.

**Comment 1.12:** Section III. Basis for Permit Modification (pgs. 4-5): DEQ incorrectly concluded that good cause does not exist to warrant a modification of the Permit pursuant to ARM 17.30.1361(2)(b).

DEQ stated that the "2023 Fact Sheet included an individual variance as a potential compliance option that could be used if it was found that compliance with the final effluent limitation was not achievable." DEQ then stated that "[t]he reference in the [2023] Fact Sheet did not concern interim limits". This is an inaccurate representation of DEQ's statements in 2023 Fact Sheet. The actual statement in the 2023 Fact Sheet did not distinguish between interim and final limits:

"*If the permittee believes compliance with the total nitrogen limits is not possible at this time, 40 CFR 131.14 and ARM 17.30.662 provide a process for seeking an individual variance from the water quality standard."*[7]

SMC relied on DEQ's representations in the 2023 Fact Sheet and if an individual variance was only applicable to the final limits, DEQ should have clearly stated so.

SMC requests that DEQ correct its misrepresentation that the 2023 Fact Sheet. SMC also requests that DEQ acknowledge that the unavailability of an individual variance is a basis for modification pursuant to ARM 17.30.1361(2)(d).

***Response 1.12:***
Compliance schedules implement interim effluent limitations for the purpose of eventual attainment of a final effluent limitation which is based on a water quality standard. An individual variance, more accurately referred to as a water quality standards variance, is defined at 40 CFR § 131.3(o) as, "a time-limited designated use and criterion for a specific pollutant(s) or water quality parameter(s) that reflect the highest attainable condition during the term of the WQS variance." As such, water quality variances temporarily change the applicable water quality standard for a given permittee(s) or water body/waterbody segment(s) such that the final effluent limitation is calculated using this temporary standard for the term of the variance. DEQ accurately stated that the 40 CFR 131.14 and ARM 17.30.662 describe the process for seeking an individual variance from a water quality standard in the 2023 Fact Sheet. Further, all discussion of variances for TN in the 2023 Fact Sheet pertained to DEQ-12A nutrient criteria, which are no longer in effect. See ***Responses to Comments 1.1 & 1.2***.

DEQ disagrees that "the unavailability of an individual variance is a basis for modification pursuant to ARM 17.30.1361(2)(d)." While the guidance provided to SMC by EPA that an individual variance is not available is outside of SMC's control, SMC had reasonably available remedies (including submitting to DEQ an application for an authorization to degrade/feasibility allowance) not pursued between the receipt of this guidance and the 2025 modification request.

Regardless, DEQ may no longer issue a variance, or a compliance schedule based upon DEQ-12A nutrient criteria and compliance schedules may not be authorized to provide permittees time to pursue a potential variance. *See* EPA Memorandum, James A. Hanlon, Director, Office of Wastewater Management, *Compliance Schedules for Water Quality-Based Effluent Limitations in NPDES* Permits (May 10, 2007) (noting that a compliance schedule is not appropriate based solely on time needed to develop a site-specific water quality criterion). Compliance schedules are only appropriate if attainment of a water quality standard "is feasible within a reasonably foreseeable timeframe." *Upper Mo. Waterkeeper v. EPA,* 15 4th 966, 975 (9th Cir. 2021). Compliance schedules must be based on the timeframe needed to achieve a water quality-based effluent limitation, which has been derived to meet established water quality standards. A yet-to-be established water quality standard, derived through a yet-to-be pursued variance process, provides no lawful target from which to develop or authorize a compliance schedule.

**Comment 1.13 Summary:** (MMFS-10) DEQ FAILED TO INCLUDE A DESCRIPTION OF THE EFFLUENT FLOW AND TN LOAD FOR EACH OUTFALL, INCLUDING HISTORIC AND ANTICIPATED FLOWS AND LOADS. EPA INSTRUCTS PERMIT WRITERS TO CHARACTERIZE THE EFFLUENT CRITICAL CONDITIONS (FLOW AND CONCENTRATION).

**Comment 1.13:** Section IV. Facility Information (pg. 5): DEQ's summary of the EBM facilities lacks relevant information that is provided in the Modification Request and Supplemental Modification Request.

EPA instructs permit writers to characterize the effluent critical conditions (flow and concentration). DEQ failed to include a description of the effluent flow and TN load for each Outfall, including historic and anticipated flows and loads as provided in Section 2.2 of the Supplemental Modification Request.

SMC requests that DEQ include this information in Section IV and utilize it when determining an appropriate TN effluent limit.

***Response 1.13:***
EPA instructs permit writers to characterize the effluent critical conditions when using a steady-state water quality model to assess the impact of a discharge on its receiving water where a dilution allowance or mixing zone is permitted (EPA NPDES Permit Writers' Manual p. 6-16-6-17*)*. These models are appropriate for characterizing the impact of an effluent discharge on its receiving water for numeric criteria but not for narrative criteria, for which EPA's NPDES Permit Writers Manual recommends alternative approaches. A steady-state water quality model was not used in assessing reasonable potential or effluent limitations in this case.

Historic and anticipated flows are not relevant to the assessment of a WQBEL calculated to reflect TN loading over a discrete period of discharge for which bioassessment data verify TN loading meets the nonsignificance criteria at ARM 17.30.715.

**Comment 1.14 Summary:** (MMFS-11) DEQ SHOULD REVISE THE 2025 FACT SHEET TO CORRECT VARIOUS ERRORS.

**Comment 1.14:** Section V.B. Basis for TN WQBELS (pg. 7): DEQ mischaracterized the EBM 2014 MPDES permit.

SMC has identified the following inaccuracies in DEQ's summary of the 2014 permit:

- DEQ refers to individual variances described in Circular DEQ-12B then notes that SMC applied for and received an individual nutrient variance. Circular-12B provided for general nutrient variances, not individual variances. SMC applied for and received a general nutrient variance, not an individual variance.

- DEQ states that "DEQ determined that the 32 lbs/day facility-wide effluent limitation imposed in the 2000 permit was more stringent and was therefore maintained in the 2015 permit as a TN limit (based on anti-backsliding requirements)." This statement is inaccurate. The 2015 permit did not have a facility-wide effluent limit of 32 lbs/day. Instead, the permit included a final effluent limit for TN based on the sum of Outfall 001 and Outfall 002 (did not include Outfall 003) of 30 lbs/day. As noted in DEQ's 2015 Response to Public Comment, the 30 lbs/day limit was based on WTP performance and was found to be protective of the environment and technically feasible to achieve.[9]

- The nitrogen-based effluent limit for Outfall 003 in the 2015 permit was a continuation of the 2 lbs/day nitrate plus nitrite limit in the 2000 permit.

SMC requests that the 2025 Fact Sheet be revised as follows:

- Note that DEQ-12B allowed general nutrient variances, and that SMC applied for and received a general nutrient variance, not an individual variance.

- Correct the statements regarding the 2015 effluent limits to reflect that the limit for Outfall 001 and Outfall 002 was 30 lbs/day, which was based on WTP

performance and found to be protective of environmental and technically feasible, not anti-backsliding.

- Include a statement that Outfall 003 had a 2 lbs/day limit for nitrate plus nitrite, as opposed to TN.

**Response 1.14:**
DEQ does not modify Fact Sheets in response to comments. The response to comment document is an addendum to the permit record and supersedes relevant parts of the Fact Sheet, to the extent specific changes or clarifications are discussed herein.

The commenter is correct that page 7 of the Fact Sheet states that, "SMC applied for and received an individual nutrient variance which allowed for the discharge of up to 15 mg/L of TN at a discharge rate of 0.72 mgd (500 gpm)." It should state, "SMC applied for and received a general nutrient variance which allowed for the discharge of up to 15 mg/L of TN at a discharge rate of 0.72 mgd (500 gpm), for a monthly average limit of 90 lbs/day, for a monthly average limit of 90 lbs/day."

The commenter is correct that the 2015 effluent limits for TN for Outfall 001 and 002 was 30 lbs/day and that Outfall 003 was assessed a 2 lbs/day limit for nitrate plus nitrate (not TN).

**Comment 1.15 Summary:** (MMFS-12) SMC REQUESTS THAT DEQ REMOVE ALL STATEMENTS THAT SMC AGREED TO THE IMPLEMENTATION OF THE BASE NUMERIC STANDARDS DURING THE 2023 RENEWAL PROCESS.

**Comment 1.15:** Section V.B. Basis for TN WQBELS (pg. 7): DEQ mischaracterizes SMC's position on the implementation of the base numeric nutrient standards during the 2023 renewal process.

DEQ presumes that SMC agreed to the implementation of the base numeric standards because the Nutrient Workgroup consultation process was ongoing at the time of the 2023 permit renewal. SMC would like to clarify that it only agreed to the implementation of the base numeric nutrient standards because SMC was told by DEQ and EPA that the permit had to be written to the numeric standards and that the individual variance was a potential option if compliance with the TN limits was not possible. See Comment MMFS-9.

SMC requests that DEQ remove all statements that SMC agreed to the implementation of the base numeric standards during the 2023 renewal process.

**Response 1.15:**
DEQ disagrees that its characterization is inaccurate, SMC's comment characterizes their position as agreement to the implementation of the base numeric nutrient standards. DEQ notes that the permittee did not appeal the issuance of the 2023-issued permit, which included water quality-based effluent limitations based upon DEQ-12A nutrient criteria. See also ***Response to Comment 1.14.***

**Comment 1.16 Summary:** (MMFS-13) DEQ'S RELIANCE ON APPENDIX A IS LEGALLY AND TECHNICALLY FLAWED.

**Comment 1.16:** Section V.B. Basis for TN WQBELS (pg. 8): DEQ's reliance on Appendix A is legally and technically flawed.

DEQ states that the agency relied on the "the narrative nutrient translation process described in Appendix A" to "interpret the narrative prohibition as modified by the nonsignificance criterion." SMC has identified several legal errors with DEQ's adoption and implementation of Appendix A. See Comments MMFS-27 through MMFS-30.

SMC Requests that DEQ revise Appendix A in accordance with these comments.

## Response 1.16:

See ***Responses to Comments 1.30 and 1.31***.

**COMMENT 1.17 SUMMARY:** (MMFS-14) DEQ MISINTERPRETED AND MISAPPLIED THE NONSIGNIFICANCE CRITERION AT ARM 17.30.715(1)(H).

**Comment 1.17:** Section V.B. Basis for TN WQBELS (pg. 8): DEQ has misinterpreted and misapplied the nonsignificance criterion at ARM 17.30.715(1)(h).

DEQ states "[w]here the nonsignificance criterion is applicable, as in the case of EBM, the applicable protections are more stringent such that no measurable effects on any existing or anticipated use nor measurable change in aquatic life or ecological integrity are permissible." DEQ misinterprets the narrative nonsignificance criterion (ARM 17.30.715(1)(h)), which provides:

*(1) The following criteria will be used to determine whether certain activities or classes of activities will result in nonsignificant changes in existing water quality due to their low potential to affect human health or the environment. These criteria consider the quantity and strength of the pollutant, the length of time the changes will occur, and the character of the pollutant. Except as provided in (2), changes in existing surface or ground water quality resulting from the activities that meet all the criteria listed below are nonsignificant, and are not required to undergo review under 75-5-303, MCA:*

. . .

*(h) changes in the quality of water for any parameter for which there are only narrative water quality standards if the changes will not have a measurable effect on any existing or anticipated use or cause measurable changes in aquatic life or ecological integrity.*

The presumption under the regulation is that a change is significant unless one of the two criteria listed in 17.30.715 (1)(h) is satisfied. However, DEQ erroneously revised "or" to "nor". Under DEQ's mistaken reading of the nonsignificance criterion, an increase in TN loading will be deemed nonsignificant only if the change will not have a measurable effect on any existing or anticipated use and will not cause measurable changes in aquatic life or ecological integrity. This reading is inconsistent with the plain language of the regulation and the ordinary, disjunctive meaning of the word "or."[10]

Rather, 17.30.715(1)(h) should be read such that a change in TN loading is deemed nonsignificant if the change will not have a measurable effect on any existing or anticipated use or will not cause measurable changes in aquatic life or ecological integrity. Under this plain-language reading of the regulation, an increase in TN loading may cause a measurable change in aquatic life and still be considered nonsignificant if it will not have a measurable effect on an existing or anticipated use, and vice versa.

Ultimately, although DEQ has misinterpreted the nonsignificance criterion, SMC has demonstrated that discharge of 32 lbs/day TN does not have a measurable effect on any existing or anticipated use and does not cause measurable changes in aquatic life or ecological integrity (see Comment MMFS-31). Nonetheless, SMC requests that DEQ revise its statement of the nonsignificance criterion in the 2025 Fact Sheet consistent with this comment and re-evaluate the nonsignificance criterion accordingly.

***Response 1.17:***

While DEQ erroneously quoted the rule, DEQ disagrees that it misinterpreted or misapplied the nonsignificance criterion at ARM 17.30.715(1)(h). If the nonsignificance criterion were applied as the commenter suggests, assimilative capacity would not be maintained, and high-quality waters would not be protected through the nondegradation policy. Under such an interpretation, water quality in high-quality waters could be lowered to a level that would only minimally support existing beneficial uses and the purpose of the nondegradation rules and the state's nondegradation policy would be significantly undermined. DEQ may not interpret its nondegradation rules in a manner that is plainly inconsistent with the spirit of the rule or in a manner that is contrary to statute. *Clark Fork Coalition v. DEQ,* 2008 MT 407, ¶ 40.

**COMMENT 1.18 SUMMARY:** (MMFS-15) DEQ SHOULD DETERMINE THAT THE DISCHARGE OF TN AT LEVELS HISTORICALLY DISCHARGED IS NONSIGNIFICANT.

**Comment 1.18:** Section V.B. Basis for TN WQBELS (pg. 8): DEQ failed to establish a causal connection between observed measurable changes in aquatic life and discharges from the EBM.

DEQ identifies "effect size" as the basis to determine measurable change and notes that "[e]ffect size is best understood as the numeric expression of the practical, real-world significance of a difference between two groups, rather than the statistical difference." While SMC agrees that effect size is a valid basis to determine measurable change, DEQ still must determine if the discharge is the cause of the observed measurable change per ARM 17.30.715(1)(h). DEQ cannot attribute a measurable difference to the EBM discharge if the difference is not statistically significant. As provided in Appendix B of the Supplemental Modification Request, biological monitoring data indicated that there was no statistically significant difference between upstream and downstream biological monitoring sites for any of the metrics evaluated.

SMC requests that DEQ evaluate whether a discharge is the cause of a measurable change and not simply whether there was a measurable change, as required by ARM 17.30.715(h). Being that there is no statistically significant difference in the upstream and downstream biological monitoring data, DEQ should determine that the discharge of TN at levels historically discharged is nonsignificant.

### *Response 1.18:*

SMC agrees that effect size is a valid basis to determine measurable change but claims that statistical significance is necessary to demonstrate causality. This is erroneous for several reasons. First, the nonsignificance criterion applicable to narrative water quality standards do not require that a measurable change in aquatic life be statistically significant to be measurable. Second, the inferential statistic SMC used (Wilcoxson rank sum) to compare upstream and downstream sites has not attained some of its important test assumptions (e.g. sufficient spatial replicates for control and treatment sites; independence of replicates, i.e. the data have temporal pseudoreplication; Hurlbert 1984) which devalues conclusions drawn from the tests. The department's approach of computing annual deltas and comparing the deltas to an effect size is much more informative, as it is responsive to year-specific weather conditions (Mazor et al. 2009) and to the progression of modifications that occurred to the mine's treatment process over time and does not rely on any questionable inferential statistical results. Third, as demonstrated in the revised Appendix B, measurable changes in aquatic life covary with periods of high TN loading. All other parameters of concern for which the facility has reasonable potential to cause or contribute to an excursion from an applicable water quality standard are controlled by effluent limitations that are protective of beneficial uses therefore that the most likely cause of this impact is the discharge of TN from the facility.

**COMMENT 1.19 SUMMARY:** (MMFS-16) DEQ ERRED IN NOT INCLUDING MONITORING LOCATION EBR-003 AS A BACKGROUND MONITORING SITE.

**Comment 1.19:** Section V.B. Basis for TN WQBELS (pg. 8): DEQ erroneously excluded monitoring location EBR-003 as a background monitoring site in its assessment of the nonsignificance criterion.

DEQ states that EBR-003 does not suitably fit the definition of an upstream control site because the site is adjacent to the EBM. This determination is flawed as it does not consider the hydrologic system in the vicinity of EBR-003 or the available water quality data. Furthermore, the current permit and historic permits use site EBR-003 for background water quality to characterize the East Boulder River as a receiving water.

Currently and throughout the life of the mine, all point and non-point discharges at the EBM initially enter groundwater prior to entering surface water. The EBM does not currently have point source or non-point discharges that enter the East Boulder River at or upstream of monitoring site EBR-003. There are multiple lines of evidence to support that monitoring location EBR-003 is a suitable background monitoring site. First, the 2015 Potentiometric Map provided in the 2025 Fact Sheet shows that groundwater flows away from the East Boulder River and towards the center of the valley where the river flows north of the TSF. The elevation of the River near EBR-003 is approximately 6160 feet above mean sea level, whereas the elevation of the groundwater in this area is lower than 6140 feet. Because both point and nonpoint source discharges enter groundwater prior to entering surface water, it is not physically possible for mine discharges to enter surface water at or above EBR-003.

Additionally, the synoptic flow monitoring data from 2015 and 2016 (March 2015 synoptic flows are shown in Figure 1 of the 2025 Fact Sheet) show that the flow at EBR-003 is similar to and within the measurement error (8% - 10%) of the flows at EBR-002. This demonstrates that this reach of the river is a stable reach and does not gain water from groundwater. In the agency's 2023 Response to Public Comment, DEQ acknowledged that groundwater does not discharge into the East Boulder River until EBR-004a, and influx is limited by low permeability.

Lastly, Figure 2 of the 2025 Fact Sheet provides TN concentrations for sites EBR-001, EBR-002, EBR-003, EBR-004a, and EBR-005 during the 2015-2018 growing seasons (July 1 – Sept. 30, annually). This graph does not provide an accurate assessment to compare water quality between sites as some sites are monitored more frequently than others and therefore the box and whisker plots provided in Figure 2 of the 2025 Fact Sheet do not provide a valid basis to compare water quality between monitoring sites. SMC developed box plots that compare synoptic (collected during the same monitoring period, typically the same day) TN concentrations from EBR-001, EBR-002, and EBR-003 (see Figure 1, attached). TN plots include calculated TN (TKN + NO2+NO3) and TN using the persulfate analytical method. Figure 1 shows that both calculated TN and TN using the persulfate analytical method are similar to TN concentrations at EBR-001 and EBR-002.

The water quality and synoptic flow data along with the 20 feet of separation between the East Boulder River and the groundwater system provide conclusive evidence that EBR-003 is a suitable background monitoring location.

SMC requests that DEQ use monitoring location EBR-003 as a background monitoring site in its assessment of the nonsignificance criterion.

***Response 1.19:***

DEQ agrees with the commenter and erred in failing to consider EBR-003 a background monitoring site. Attachment B has been modified to reflect this change. DEQ notes that the inclusion of EBR-003 as a background monitoring site further supports its conclusion that EBM's discharge caused a measurable change in aquatic life as described in response to comment 1.34.

**COMMENT 1.20 SUMMARY:** (MMFS-17) DEQ'S INCLUSION OF EBR-004 AND EBR-004A IN THE NONSIGNIFICANCE ANALYSIS WAS NOT APPROPRIATE.

**Comment 1.20:** Section V.B. Basis for TN WQBELS (pg. 8): DEQ's inclusion of EBR-004 and EBR-004a in the nonsignificance analysis was not appropriate.

In a meeting with the Montana League of Cities and Towns held on October 23, 2025, to discuss implementation of the narrative standards, DEQ stated that the agency would not be assessing discharges within or downstream of mixing zones. However, DEQ evaluated stations EBR-001 and EBR-002 as upstream control sites and EBR-004(a) and EBER-005 as downstream sites to conduct a comparative evaluation of measurable impacts to aquatic life. Although the 2025 Fact Sheet states that DEQ only evaluated EBR-004a, the Fact Sheet also includes evaluation of data from EBR-004. The use of EBR-004 and EBR-004a in the nonsignificance evaluation is not appropriate because the Permit includes a surface water mixing zone for TN from "immediately upstream of EBR-004A to immediately downstream of EBR-005." Water quality standards and nonsignificance criteria may be exceeded within

a mixing zone per ARM 17.30.507(1)(a). Because EBR-004 and EBR-004A are within the surface water mixing zone for TN, they should not be used to determine if the discharge meets the narrative nonsignificance criterion.

Additionally, the 2025 Fact Sheet states: "In this document, combined data from EBR-004 and EBR-004(a) will be referred to as EBR-004(a)." However, graphs, interpretation, and statistical summaries separate these two sites throughout the document.

SMC requests that DEQ exclude EBR-004 and EBR-004a from its comparison to upstream control sites and correct the statement regarding combined data from these sites.

***Response 1.20:***

DEQ agrees with the commenter that the inclusion of EBR-004 was inappropriate as it might be upstream of the facility's permitted discharge, although it may not necessarily be upstream of the mine's effects including TSF effects—particularly in the early years of the mine's operation (see ***Response to Comment 4.11***). Appendix B has been updated to reflect the change to exclude EBR-004 in comparisons to upstream control sites. DEQ further agrees that the inclusion of EBR-004a was inappropriate as it is located within the facility's approved mixing zone for TN and has removed it from its analyses in the revised Appendix B. DEQ notes, however, that the exclusion of EBR-004a does not change any of its conclusions regarding the assessment of the final effluent limitation for TN.

**COMMENT 1.21 SUMMARY:** (MMFS-18) SMC HAS IDENTIFIED SEVERAL ERRORS IN DEQ'S DISCUSSION OF THE BASIS FOR THE TN WQBELS.

**Comment 1.21:** Section V.B. Basis for TN WQBELS (pgs. 8-10.): SMC has identified the following additional errors in DEQ's discussion of the basis for the TN WQBELS:

- DEQ states the agency conducted a "comparative evaluation of measurable impacts to aquatic life." This evaluation is not consistent with the narrative nonsignificance criterion (ARM 17.30.715(1)(h)), which considers whether there are "measurable changes in aquatic life," not measurable impacts.

- The unit of measure for the chl-a value at EBR-004a should be corrected from mg/L to $mg/m^2$.

- DEQ appears to conflate median and mean in its discussion of chl-a densities.

- DEQ states that "[i]t has been observed that, over a range of chl-a values from 40 to 1,280 mg chl-a $m^{-2}$, there needs to be about a 50 mg chl-a $m^{-2}$ increase for the change to be visually observed in streams (Suplee et al., 2009)." This statement inflates the assumption, based on "authors' experience" used in Suplee et al., 2009.[12] This assumption was not verified in the assessment of how green is too green and is not a quantifiable metric that should be used in future permits.

- DEQ states that the measurable change for chl-a and AFDM are about 20 $mg/m^2$ ($g/m^2$ for AFDM); however, statistical review of the referenced dataset shows that 2 standard deviations are equal to 19.6 $mg/m^2$ for chl-a and 19.8 $g/m^2$ for AFDM.

DEQ states that "AFDM was generally slightly higher downstream at EBR-004a and EBR-005 than upstream at EBR-002 and EBR-001." This is true; however, when compared to background site EBR-003 (see Comment MMFS-16), the AFDM at EBR-005 is always lower than background.

SMC requests that DEQ make the following corrections to its analysis:

- Perform a comparative evaluation that is consistent with the narrative nonsignificance criterion.
- Revise the unit of measure for the chl-a value at EBR-004a to mg/m2.
- Correct or clarify the agency's discussion of chl-a densities.
- Remove the assumption regarding visual observations of change in streams from Suplee et al., 2009 from the Fact Sheet and not use it to determine measurable change in chl-a in future permitting activities.
- SMC requests that DEQ indicate the basis for the use of 20 mg/m2 (g/m2 for AFDM) or use the actual value of 2 times the standard deviation as the measurable change.
- Note that AFDM at EBR-005 is less than background and remove the reference to EBR-004a per Comment MMFS-17.

***Response 1.21:***

The commenter is correct that ARM 17.30.715(1)(h) considers "measurable changes in aquatic life," but neglected to consider the criteria at 17.30.715(2)(a)-(g), which are also appliable and include, at (a) "cumulative impacts or synergistic effects." DEQ disagrees its consideration of measurable impacts was in error.

The commenter is correct that the unit of measure for chl-a is $mg/m^2$, this was a typographic error: the unit of measurement, in all instances, for chl-a, in the Fact Sheet is $mg/m^2$.

The discussion of chl-a densities in the Fact Sheet, in every case, refer to means (not medians).

The statement that "[i]t has been observed that, over a range of chl-a values from 40 to 1,280 mg chl-a $m^{-2}$, there needs to be about a 50 mg chl-a $m^{-2}$ increase for the change to be visually observed in streams (Suplee et al., 2009)," was included to provide Fact Sheet readers with an initial frame of reference regarding the practical visual resolution of increasing attached algae levels in Montana streams. The 50 mg $m^{-2}$ chl-a level was incorporated into the 2009 study, as it informed the specific photos which were included in the survey, and the 50 mg chl-a resolution level was agreed to by all authors. The authors had, collectively, decades of experience on this subject at the time the study took place. See page 126 of Suplee et al. 2009.

With respect to the comment regarding the difference between 19.6 mg $m^{-2}$ (for chl-a) and 19.8 mg $m^{-2}$ (for AFDW) relative to "about 20", the department notes that these values have one significant figure less than the standard deviations reported in Schulte and Craine (2023) but one significant figure greater than 20. Whether one uses (for chl-a, for example) 19.58, 19.6, or 20 as an effect size, the conclusions drawn by the department are unaffected (same for AFDW).

The department agrees that AFDW at EBR-005 is less than that at EBR-003 and has removed EBR-004a from its analyses. (see ***Responses to Comments 1.20 & 1.28***).

**COMMENT 1.22 SUMMARY:** (MMFS-19) DEQ'S USE OF THE O/E MODEL FOR ASSESSING TN TO DETERMINE WHETHER TN DISCHARGES CAUSE A MEASURABLE CHANGE IN AQUATIC LIFE OR ECOLOGICAL INTEGRITY IS FLAWED.

**Comment 1.22:** Section V.B. Basis for TN WQBELS (pg. 11): DEQ's use of the O/E model for assessing TN to determine whether TN discharges cause a measurable change in aquatic life or ecological integrity is flawed.

SMC agrees with DEQ's exclusion of the Middle Rockies diatom sediment increaser metrics based on the fact that the diatom metric was established to indicate sediment impairment.[13] In its use support determination DEQ uses the O/E model as a sediment indicator rather than a nutrient indicator.[14] DEQ should likewise reject the O/E model as an indicator for nutrient impacts. Furthermore, the O/E scores are highly variable on the East Boulder River: at sites EBR-001 and EBR-002 O/E scores can fluctuate as many as 0.43 O/E units and up to 0.51 O/E units when EBR-003 is included as a background site.

Additionally, the value of 15.9% (0.159) is the mean relative percent difference in O/E scores between paired samples and does not assess the precision between individual sites or among reference conditions. Use of the relative percent difference of replicate samples is not appropriate to assess the change between separate sites and is much more stringent than the 2 standard deviations of a population mean, which is what DEQ used in the 2025 Fact Sheet for detecting the "measurable difference" in other parameters. As noted above, the variability in background monitoring sites on the East Boulder River can fluctuate as many as

0.51 O/E units, which is much larger than a mean relative percent difference of 15.9% found between replicate sites. This indicates that the use of mean relative percent difference does not provide for accurate assessment of a measurable change and cannot be used to determine if the discharge is the cause of the change as is required in ARM 17.30.715(1)(h).

SMC also notes that DEQ cites to an incorrect source in its discussion of the measurable change threshold for O/E. DEQ should have cited the journal article "Precision of benthic macroinvertebrate indicators of stream condition in Montana"(Stribling et al., 2008).[15] The correct article evaluates the precision of two discontinued bioassessment tools, the Montana MMI and the 2006 O/E models.[16] These models are not the same as the currently used 2012 O/E model.[17] It is SMC's understanding that DEQ has not assessed the precision or variation of the 2012 model, and to assume similar variance among different models is inherently flawed.

SMC requests that DEQ not utilize the O/E model for assessing whether TN causes a measurable change in aquatic life or ecological integrity. DEQ should instead rely on Chl-a, AFDM, and HBI to provide an assessment of a measurable change based on reference conditions, as established in the recent nutrient threshold report

***Response 1.22:***
The department disagrees with the comment. The O/E metric is a very suitable macroinvertebrate metric for assessing the effects of total nitrogen and nutrient impacts in western US streams (Suplee et al. 2016; Fergus et al. 2023). The O/E metric is the macroinvertebrate metric with the highest degree of specificity to a location, as its computation requires several key physiographic parameters (e.g. catchment area, elevation, annual air temperature) to ensure good match between the observed population and the expected population.

The department agrees that the correct citation for the 2008 article was that provided in the comment but disagrees that the effect size the department used (0.159) is incorrect. The department's measurable O/E change was based (as noted) on the published scientific study from Montana (Stribling et al. 2008) in which 77 reference and non-reference sites were sampled twice on the same day (154 samples) and the within-site repeatability of the O/E metric examined. The average relative percent difference (RPD) from the study for mountain areas was 15.9%. RPD tells us the amount of variability between measurements taken at the same site at the same time; it is a direct measure of the metric's precision. RPD reflects laboratory variability (sample processing and taxa identification) and inherent within-site variation. The study was based on reference and non-reference sites; therefore, it captured a wide range of potential RPDs (reference sites usually have lower RPDs than non-reference sites). RPD informs effect size because it would be unreasonable to expect a site-to-site delta (e.g., EBR-002 minus EBR-005) to be meaningful if it is less than the variability normally observed in routine sampling.

It is irrelevant that the paper was based on an earlier version of the O/E model. The updated model (which includes some additional physiographic predictors) might produce slightly different O/E results for each replicate, but the relative difference between site replicates will mirror the earlier version of the model. DEQ further notes that SMC submitted O/E results to the department for the purposes of evaluating the impacts of TN discharges on aquatic life.

**COMMENT 1.23 SUMMARY:** (MMFS-20) DEQ'S EVALUATION OF THE HILSENHOFF BIOTIC INDEX RELIES ON AN INCORRECT STANDARD DEVIATION FOR EVALUATING THE MEASURABLE CHANGE THRESHOLD.

**Comment 1.23:** Section V.B. Basis for TN WQBELS (pg. 11): DEQ's evaluation of the Hilsenhoff Biotic Index relies on an incorrect standard deviation for evaluating the measurable change threshold.

DEQ states that "[f]or HBI, the measurable change threshold was calculated by analyzing the variability in DEQ's western MT reference stream sites over the past 20 years, for which an average site has (over that time period) a standard deviation of 0.5 HBI units." SMC's assessment of the Schulte and Craine data (Schulte and Craine 2023), which was used to determine the impairment threshold for HBI, indicates that the standard deviation reported in the 2025 Fact Sheet is incorrect. The East Boulder River is in the Middle Rockies Ecoregion, therefore the assessment of HBI should be based on reference data from this ecoregion. Using the Schulte and Craine report's applicable harm-to-use threshold of 3.52 HBI

units with the supplementary information provided in conjunction with that report (available here: https://deq.mt.gov/water/Programs/standards) demonstrates that the standard deviation of reference cites stratified by the Mountainous sites in the Middle Rockies Ecoregion is approximately 0.95 HBI units. Therefore, the effect size would be approximately 1.9 HBI units.

Additionally, the measurable effects criterion in the 2025 Fact Sheet is aimed at highlighting increased values in HBI (indicating nutrient enrichment). However, in many cases there are measurable effects demonstrating improvement (lower HBI values) between upstream and downstream sections. Given the highly variable data and inconsistent response along the stressor gradient (similar to what was observed in the Chlorophyll-a data) it is not possible to conclude that the mine is causing or contributing to higher HBI scores.

SMC requests that DEQ revise the measurable change threshold for HBI to 1.9 HBI units based on 2 times the standard deviation when stratified by level III ecoregion and region from the Schulte and Craine 2023 data. In addition, in its evaluation of the nonsignificance criteria DEQ should consider the entirety of the data, which shows that in many years the downstream sites showed improvement in HBI compared to upstream sites.

***Response 1.23:***

The department disagrees that it used an incorrect measurable change threshold for HBI. SMC estimated that 2 standard deviations (2SD) of the reference site HBI scores equals 1.9 HBI units (the department computed 2SD = 1 HBI unit). But SMC's computation was based on among-site variation in the Middle Rockies, not within-site variation in the Middle Rockies (as done by the department). It is no surprise that among-site variability is higher, even among reference sites within an ecoregion; the reason the department has characterized so many different reference sites within the Middle Rockies ecoregion is to best characterize the range of possibilities there. But for purposes of defining an effect size, within-site variation (i.e. pooled standard deviation of a group of reference sites in a physiographic zone, like an ecoregion) is a much better reflection of the base level of noise one must get beyond in order to state that a difference has meaning. See also, ***Response to Comment 4.8*.**

**COMMENT 1.24 SUMMARY:** (MMFS-21) DEQ MISREPRESENTS THE NONPOINT SOURCE DISCHARGES AT THE EBM.

**Comment 1.24:** Section V.B. Basis for TN WQBELS (pg. 11): DEQ misrepresents the non-point source discharges at the EBM.

As noted in Comment MMFS-16, non-point source discharges at the EBM enter groundwater in the vicinity of the TSF and are then transported within the groundwater system and ultimately enter the East Boulder River within a similar reach as the point source discharges. Therefore, it is inaccurate for the 2025 Fact Sheet to state that EBR-003 is located downstream of non-point TN discharges. For these reasons, and as detailed in Comment MMFS-16, EBR-003 should be used as a background monitoring location. Because EBR-003 is upstream of both point and non-point source discharges, including EBR-003 as a background site provides an evaluation of cumulative impacts of non-point and point sources as both sources enter the East Boulder River between EBR-004a and EBR-005.

SMC requests that DEQ remove the statement that EBR-003 is located downstream of non-point TN discharges and as requested in Comment MMFS-16, use EBR-003 as a background monitoring site.

***Response 1.24:***
See ***Response to Comment 1.19***. DEQ does not modify Fact Sheets in response to comments, but here clarifies that EBR-003 is located upstream of non-point TN discharges.

**COMMENT 1.25 SUMMARY:** (MMFS-22) DEQ'S USE OF THE "CAP-AT-CURRENT" METHODOLOGY IS INCONSISTENT WITH THE NONSIGNIFICANCE CRITERIA (ARM 17.30.715(1)(H) AND (2)).

**Comment 1.25:** Section V.B. Basis for TN WQBELS (pg. 12): DEQ's use of the "cap-at-current" methodology is inconsistent with the nonsignificance criteria (ARM 17.30.715(1)(h) and (2)).

DEQ states that the facility will be capped at current performance on a mass loading basis. "Cap-at-current" does not provide a sufficient evaluation of the nonsignificant criteria based on the reasonably foreseeable discharge of TN loads (around 31.7 lbs/day) that the mine is projected to have within the permit term (see Comment MMFS-3). The 2025 Fact Sheet does not provide the necessary comparison of historic discharges and biological metrics to properly determine at what TN load the EBM discharge would not meet nonsignificance criteria.

SMC requests that DEQ complete the nonsignificance analysis and assess a discharge limit that meets the criteria in ARM 17.30.715(1)(h) and (2) after correcting the errors noted throughout these comments. This analysis must include a comparison of historic discharges and any measurable changes in chl-a, AFDM, and HBI. SMC has provided this comparison, with incorporation of the requested changes included in its comment on Appendix B (see Comment MMFS-31).

***Response 1.25:***
DEQ disagrees that its analyses were inconsistent with the applicable nonsignificance criteria or that an analysis of projected TN loading is relevant to the assessment of WQBELs for this parameter. DEQ disagrees that its analysis must include a comparison of historic discharges and any measurable changes in chl-a, AFDM, and HBI exclusively. See ***Responses to Comments 1.21, 1.22, 1.23, and 4.5***)

**COMMENT 1.26 SUMMARY:** (MMFS-23) DEQ'S CONCLUSION THAT SMC'S DISCHARGE AT THE EBM FROM 2000 TO 2017 HAD A MEASURABLE IMPACT ON AQUATIC COMMUNITIES IS NOT SUPPORTED IN THE RECORD.

**Comment 1.26:** Section V.B. Basis for TN WQBELS (pg. 12): DEQ's conclusion that SMC's discharge at the EBM from 2000 to 2017 had a measurable impact on aquatic communities is not supported in the record.

DEQ fails to identify the TN load from 2000 through 2014. DEQ also fails to recognize that even during years where average monthly TN discharges exceeded 32 lbs/day, the biological data was similar to or improved from background (see Comment MMFS-20). In addition, DEQ has evaluated if there is a

measurable change in the chl-a, AFDM, HBI, and O/E but fails to establish with any level of confidence that the discharge is the cause of the measurable change (see Comment MMFS-19).

SMC requests that DEQ's conclusion regarding measurable impacts on aquatic communities be modified to indicate SMC's discharge at the EBM has not had a measurable change in aquatic life or ecological integrity or a measurable effect on current or anticipated uses.

***Response 1.26:***
DEQ has included an analysis of TN loading from 2000-2014 in the revised Appendix B and further notes that information submitted to the department, including in support of this modification request, that it takes ~1 year for water discharged from Outfall 002 to reach the East Boulder River, such that same-year biological response variable data is not illustrative of the impact of the discharge on the surface receiving water. See ***Response to Comment*** 1.20.

DEQ does not agree it is appropriate to modify its conclusion regarding measurable impacts and changes in aquatic life because SMC's related claim is not supported by the Department's revised analysis. See Response to Comment 1.34.

**COMMENT 1.27 SUMMARY:** (MMFS-24) DEQ'S DETERMINATION OF THE TN FINAL EFFLUENT LIMIT IS INCONSISTENT WITH THE NARRATIVE NUTRIENT CRITERIA AND NONSIGNIFICANCE CRITERIA.

**Comment 1.27:** Section VI. Final Effluent Limitations (pg. 12): DEQ's determination of the TN final effluent limit is inconsistent with the narrative nutrient criteria and nonsignificance criteria.

DEQ concluded that "current [post-2018] facility TN loading does not result in measurable changes to aquatic life or ecological integrity." On this basis, DEQ calculated the TN final effluent limit "by evaluating the facility's TN loading from 2018 to present and capping the facility at this level of discharge by calculating the mean monthly average mass loading from 2018-present for outfalls 002 and 003, multiplying this value by the long-term average (LTA) multiplier at the 95% confidence interval." This approach to the narrative nutrient standards is flawed in several respects:

- DEQ states that pre-2018 TN loading to the EBM "had a measurable impact on aquatic communities"; however, DEQ's interpretation of the nonsignificance criteria is inconsistent with the plain language of the rule (see Comment MMFS-14).

- DEQ failed to address whether discharge from the EBM was the cause of any measurable changes observed prior to 2018 (see Comments MMFS-19, MMFS-23).

- DEQ did not consider whether an effluent limit above purported current facility performance would satisfy the narrative standards and nonsignificance criteria.

- EPA's 1991 TSD method is based on numeric water quality criteria that are used to develop waste load allocations (WLA), which are then multiplied by the long-term average (LTA) multiplier.[19] Because the narrative standard does not

specify a numeric limit, it is not appropriate to use EPAs 1991 TSD method for setting narrative effluent limits for nutrients. Additionally, during DEQ's meeting with point source dischargers on October 23, 2025, DEQ stated that the TSD methods (referring to EPA's 1991 TSD Method) would not be used to set nutrient permit limits.

Additionally, state and federal regulations establish that "[f]or continuous discharges, all permit effluent limitations, standards, and prohibitions, including those necessary to achieve water quality standards, must *unless impracticable* be stated as . . . maximum daily and average monthly discharge limits." EPA has acknowledged flexibility with respect to the duration or frequency of nutrient limits, recognizing that states may adopt seasonal or annual averaging periods for nutrient criteria.

SMC requests that DEQ reevaluate the TN final effluent limit proposed in the 2025 Fact Sheet. SMC also requests that, as DEQ conducts a detailed evaluation of the discharge limits as described in these comments, the agency consider average annual nutrient limitations, based on both historic and future projected TN load, that better reflect the seasonality of nutrient loading, and which could be paired with the 32 lbs/day average monthly limit analyzed herein (see Comment MMFS-31).

***RESPONSE 1.27:***
DEQ disagrees with the comment. The TSD multipliers were not used for reasonable potential analysis and were applied here appropriately to account for variability when calculating an effluent limitation based on long term average (LTA) performance. DEQ notes that the removal of the TSD multipliers would, in this case, result in a more stringent effluent limitation of 10.4 lbs TN/day, as indicated in Table 2 of the Fact Sheet. DEQ presumes that the permittee is not requesting this change.

**COMMENT 1.28 SUMMARY:** (MMFS-25) DEQ'S PROPOSED NUTRIENT BIOASSESSMENT SPECIAL CONDITIONS INCORPORATES FLAWED METHODOLOGY.

**Comment 1.28:** Section VII. Special Conditions (pg. 12): DEQ's proposed Nutrient Bioassessment Special Conditions incorporates flawed methodology.

DEQ's Nutrient Bioassessment Special Conditions require monitoring of site EBR-004a, which is located within the mixing zone and is therefore not an appropriate monitoring site. In addition, the aquatic flora visual assessment method detailed by DEQ is a highly subjective assessment. While studies have suggested that visual assessments can have good concordance with diatom-based assessments, these same studies show anywhere between 12% and 30% error rates in ecological assessment agreement. EBM has increased sampling parameters to include AFDM and believes direct quantifiable measures of primary productivity (i.e., Chlorophyll-a and AFDM) are sufficient. Taxonomic composition of algae samples is already required; therefore, no additional field surveys are needed for potentially nuisance native taxa. Lastly, the frequency of benthic macroinvertebrate assessments under the EBM MPDES Permit should be consistent with the DEQ-approved EBM Biomonitoring Plan, which requires benthic macroinvertebrate assessments every two years (or annually if certain triggers occur).

SMC requests that DEQ modify the Nutrient Bioassessment Special Conditions by removing EBR-004a as a monitoring site, removing the aquatic flora visual assessment method, and amending the frequency of benthic macroinvertebrate assessments to align with the existing EBM Biomonitoring Plan.

***Response 1.28:***

DEQ has removed the requirement from the permit that bioassessment monitoring be conducted at EBR-004a. Further, DEQ noted an error in failing to remove the condition at D.3.d, requiring the submission of a Nutrient Compliance Plan as a condition of Outfall 001 start up. This section has also been removed. See ***Responses to Comments 1.20 and 4.11***.

**COMMENT 1.29 SUMMARY:** (MMFS-26) DEQ SHOULD AMEND ITS FIGURES CONSISTENT WITH SMC'S COMMENTS ON THE 2025 FACT SHEET.

**Comment 1.29:** Figures (pgs. 15-23): DEQ's Figures should be amended consistently with SMC's comments on the 2025 Fact Sheet.

SMC requests that DEQ revise the figures attached to the 2025 Fact Sheet as follows:

- Figure 3. EBR-004a should be removed from this figure as it is in the mixing zone for TN (see Comment MMFS-17).
- Figure 4. EBR-004 and EBR-004a should be removed from this figure as they are in the mixing zone for TN (see Comment MMFS-17).
- Figure 5a. This figure should be removed as EBR-004a is in the mixing zone for TN (see Comment MMFS-17).
- Figure 5b. The measurable change threshold should be set at 19.6 $mg/m^2$ (see Comment MMFS-18).
- Figure 6. EBR-004a should be removed from this figure as it is in the mixing zone for TN (see Comment MMFS-17).
- Figure 8a. This figure should be removed from this figure as EBR-004a is in the mixing zone for TN (see Comment MMFS-17).
- Figure 8b. Measurable change threshold should be set at 1.9 HBI units (see Comment MMFS-20).
- Figures 9, 10a, and 10b. These figures should be removed as O/E is not a valid metric to assess nutrient impairment (see Comment MMFS-19).

***Response 1.29:***
See ***Responses to Comments 1.20, 1.21, and 1.23***.

**COMMENT 1.30 SUMMARY:** (MMFS-27) DEQ PROMULGATED APPENDIX A WITHOUT PROCEEDING THROUGH PUBLIC NOTICE AND COMMENT RULEMAKING IN VIOLATION OF THE MONTANA ADMINISTRATIVE PROCEDURES ACT (MAPA).

**Comment 1.30:** Appendix A: DEQ promulgated Appendix A without proceeding through public notice and comment rulemaking in violation of the Montana Administrative Procedures Act (MAPA).

MAPA defines a "rule" as "each agency regulation, standard, or statement of general applicability that implements, interprets, or prescribes law or policy."[25] Before an administrative agency adopts a rule, MAPA mandates that the agency "comply with the public notice and comment procedures detailed in §§ 2-4-302 and -305, MCA."[26] These procedures include, among other requirements, that the agency give written notice of its proposed rule, hold a hearing, afford interested parties the opportunity to submit data, views, or arguments, consider comments in those submissions, and issue a statement explaining its reasons for adopting the rule.[27] "Unless a rule is adopted in substantial compliance with these procedures, the rule is not valid.[28]"

DEQ admits that Appendix A is a "translation" that the agency uses to "interpret" the narrative standards, and an agency's interpretation of law falls squarely within MAPA's definition of a "rule" that is subject to notice and comment rulemaking.[29]

SMC requests that DEQ proceed through notice and comment rulemaking prior to implementing Appendix A.

***Response 1.30:***

DEQ disagrees with the comment. DEQ did not promulgate Appendix A. The Appendix A "checklist" document outlines DEQ's internal process for analyzing data and applying the best available science in the application of the narrative standard at ARM 17.30.637(1) (e). The checklist contains agency considerations for developing draft permit limits, informs DEQ's decision making process, and characterizes the scope of what typically should be considered when applying the narrative nutrient standard. The checklist document does not establish any binding criteria for the agency or the general public and does not create any obligations for the regulated community. Therefore, the requirements for rulemaking do not apply.

**COMMENT 1.31 SUMMARY:** (MMFS-28) EPA HAS NOT APPROVED APPENDIX A.

**Comment 1.31:** Appendix A: EPA has not approved Appendix A, as required under CWA section 303(c).

Pursuant to CWA section 303(c), any rules implementing the state's narrative standards must be submitted to and approved by EPA. In its October 3 letter explaining the agency's rationale for approving HB 664, EPA refers to a "checklist" that DEQ shared with EPA containing DEQ's "initial thoughts for implementing the narrative standard for NPDES permitting."[30] The checklist referenced by EPA is not attached to the letter and DEQ's May 7 letter and associated materials have not been made available for public review. Assuming the checklist referenced in the EPA letter is the same checklist

appearing in Appendix A, it is clear EPA views the checklist as implementing the narrative standards, but that EPA viewed the checklist as preliminary at the time of DEQ's submission. Accordingly, the Appendix A checklist has not been approved by EPA.

SMC requests that DEQ obtain EPA approval of Appendix A as required by CWA section 303(c).

***Response 1.31:***
DEQ disagrees with the comment. While section 303(c) of the CWA requires the submission of water quality standards for approval by EPA, Appendix A is an internal guidance document regarding implementation of a water quality standard, not a water quality standard. EPA does not have approval authority over DEQ's internal guidance documents for purposes of MPDES permitting. See also ***Response to Comment 1.30.***

**COMMENT 1.32 SUMMARY:** (MMFS-29) SMC REQUESTS THAT DEQ COMPLY WITH THE REQUIREMENT OF ARTICLE II, SECTION 9 OF THE MONTANA CONSTITUTION AND THE MONTANA OPEN MEETING LAWS BY ENSURING THAT MEETING OF THE NUTRIENT PERMIT LIMITS PANEL AND OPEN TO THE PUBLIC.

**Comment 1.32:** Appendix A: Meetings of the Nutrient Permit Limits Panel are not open to the public in violation of Article II, Section 9 of the Montana Constitution, and Montana's open meeting laws.

Montana's open and public meetings law is governed by Article II, Section 9 of the Montana Constitution and implemented through the Montana open meeting statutes, codified at §§ 2-3-201 through 2-3-221, MCA. The public's constitutional "right to know" guarantees that no person shall be "deprived of the right to . . . observe the deliberations of all public bodies or agencies of state government and its subdivisions, except in cases where the demands of individual privacy clearly exceed the merits of public disclosure."

Montana's open meeting laws apply to "[a]ll meetings of public or governmental bodies, boards, bureaus, commissions, agencies of the state, or any political subdivision of the state." A "meeting" is defined as "the convening of a quorum of the constituent membership of a public agency or association described in 2-3-303, whether in person or via electronic means, to hear, discuss, or act upon a matter over which the agency has supervision, control, jurisdiction, or advisory power." Public notice is a critical component of Montana's open meeting laws. Without adequate notice, an "open" meeting is open in theory only, not in practice.

The legislature explicitly expressed its intent that the open meeting laws be "liberally construed." Although "public or government body" is not defined in the open meeting statutes, the Montana Supreme Court has construed the terms to "include a group of individuals organized for a governmental or public purpose."[36] For example, a committee assembled for the purpose of assisting in the governor's selection of a commissioner by providing a slate of names of possible candidates for consideration is a public or governmental body. Id. Similarly, board subcommittees are subject to the open meeting laws where their role is to influence or determine the outcome of an issue before the board.[37]

Appendix A requires consideration of the recommendations of the Nutrient Permit Limits Panel. The Panel meets the definition of a public or government body meeting—its members are gathered for the purpose of advising DEQ on appropriate nutrient permit limits, a legislatively designated function of

DEQ. The fact that the Panel's recommendations may not be binding on DEQ does not mean that they are not subject to the requirements of the open meeting laws.

In Appendix B, DEQ indicates that the Panel held a meeting on September 15, 2025, to make a recommendation regarding the EBM Permit's TN effluent limit. DEQ did not provide notice of the September 15 meeting, and it does not appear that DEQ intended for meetings of the Panel to be open to the public. Moreover, DEQ did not describe the contents of the meeting or the recommendation of the Panel in the MMFS. As a result, SMC and other interested parties have been denied their constitutional right to know in this action and in any action moving forward where Panel meetings do not comply with Montana's opening meeting statutes. Additionally, although DEQ stated that the agency would seek permittee involvement early in the permitting process to discuss data gathering, the nature of receiving water(s), and the nature of discharge, SMC was not afforded an opportunity to discuss these topics with DEQ prior to the issuance of the draft permit modification.

SMC requests that DEQ comply with the requirement of Article II, Section 9 of the Montana Constitution and the Montana open meeting laws by ensuring that meeting of the Nutrient Permit Limits Panel and open to the public.

***Response 1.32:***

DEQ disagrees that the cited meeting was a public meeting subject to Montana's open meeting laws. This meeting was an internal, ad-hoc meeting of DEQ staff to share data and perspectives from different programs within the agency. The purpose of the nutrient panel is to coordinate information from within the agency's program areas to inform DEQ's permitting program's development of tentative permit limits based on the narrative standard at ARM 17.30.637(1)(e). The attendees were all DEQ employees, panel membership was not made by agency appointment, and no final permitting decisions were made in the meeting. The meeting relied on internal agency technical expertise to discuss the case-by-case application of the narrative nutrient criterion and was held to ensure internal agency collaboration and to assist the permit writer in the agency's preparation of tentative (or draft) permit limits. The panel has no decision-making authority and essentially functions as an internal workgroup. All tentative permitting decisions were made at the discretion of the agency as advised by the best professional judgement of the permit writer.

All of DEQ's MPDES permitting decisions are subject to robust public participation procedures as set forth in rule. Any final permitting decision of the agency is subject to public notice and comment under both the Montana Water Quality Act and the Montana Environmental Policy Act.

**COMMENT 1.33 SUMMARY:** (MMFS-30) APPENDIX A RELIES ON FLAWED PARAMETERS AND ANALYSIS TO INTERPRET AND ASSESS THE NARRATIVE NUTRIENT STANDARD AND NONSIGNIFICANCE CRITERIA.

**Comment 1.33:** SMC has identified the following issue with Appendix A which, had Appendix A been made available for public comment, SMC and other interested parties would have had the opportunity to comment on prior to their application in a permitting action:

- DEQ's Beneficial Use Assessment Methods use a Level I/Level II analysis.[38] DEQ should revise Appendix A to match a similar protocol for establishing nutrient effluent limits where direct indicators (e.g., Chl-a and AFDM) are first evaluated, and indirect indicators are assessed only when a Level I assessment is unclear.

- The Beck's Biotic Index is a highly variable metric with a standard deviation of 12.51 in Mountain reference streams from Shulte and Craine, 2023, which is over 1/3 of the impairment threshold.[39] The high variability in the Beck's Biotic Index limits its use as an effective indicator metric.

- For active discharges, Appendix A should include an evaluation of historic discharges to historic monitoring of indicator parameters.

- Appendix A should include the thresholds that will be used to evaluate each indicator parameter so that a permittee can provide an evaluation of the data based on these criteria.

SMC Requests that DEQ revise Appendix A to address these comments.

***Response 1.33:***

DEQ disagrees that it relied upon flawed parameters or analysis to interpret and assess the narrative nutrient standard and the related nonsignificance criteria. DEQ further disagrees that it should use a different methodology in this case by using a Level I/Level II analysis. DEQ's approach under the narrative standard emphasizes biological effects rather than on numeric nutrient concentrations. The Level I/level II process the commenter refers to is a 2016 DEQ Monitoring & Assessment Section assessment method which placed greatest emphasis on exceedances of numeric total N and total P criteria, less emphasis on chlorophyll-a and AFDW, and then only used the macroinvertebrate HBI for cases which remained unclear. Notably, the DEQ-12A nutrient criteria were still in effect in 2016. At this juncture, the department believes—in the absence of reliance on numeric nutrient thresholds—that consideration of multiple biological assemblages and metrics is a prudent path forward, as all of them provide important information.

The department further disagrees that "high variability in the Beck's Biotic Index limits its use as an effective indicator metric," and also notes that Beck's Biotic Index version 3 (Becks3) was not utilized in any decision making on the permit and is therefore outside of the scope of the comments on said permit action.

The department agrees with the comment that, in this case, it should include an evaluation of historic discharges to historic monitoring of indicator parameters in Appendix B and has plotted the O/E metric (upon which the department's findings are largely based) alongside the combined TN load for Outfalls 002 and 003 for the 2000-2025 time period (Appendix B; Figure 10). In the same graph is shown the delta values for the O/E metric (EBR-002 minus EBR-005 and EBR-003 minus EBR-005). There were only total inorganic nitrogen (TIN) data available in the DMRs for the 2000-2014 time period, therefore the department back-calculated TN for that time period using the average discharge TN:TIN ratio for the 2015-2021 period (6.0). It takes approximately 1 year for discharges to percolate into the groundwater and work their way to site EBR-005, and the figure's loading values reflect this time lag. This change was also made to Figures 5, 8, and 10a for consistency.

The figure shows that high loads in the early years of the mine's operation correspond to the greatest O/E deltas between the upstream control sites (EBR-002, -003) and the downstream effect site (-005). The great majority of these deltas exceed the measurable change threshold. More recently, with improved treatment and lower TN loads, almost all of the O/E deltas are below the measurable change threshold. These data clearly support the idea that the high TN loads reaching the East Boulder River during the early years of the mine's operation where too high and were impacting aquatic life, whereas the effect of recent TN loads is mostly indistinguishable from background at EBR-002 and -003.

**COMMENT 1.34 SUMMARY:** (MMFS-31) DEQ'S ANALYSIS IN APPENDIX B IS ERRONEOUS AND SHOULD BE RE-EVALUATED CONSISTENT WITH SMC'S COMMENTS.

**Comment 1.34:** SMC has provided a revised analysis, following the format of DEQ's analysis in Appendix B, consistent with SMC's comments on the 2025 Fact Sheet. The following is a summary of the key issues identified by SMC and how they have been addressed in SMC's revised analysis:

- Monitoring site EBR-003 should be considered a background site as it has been used historically in the EBM MPDES permit and based on the information provided in Comment MMFS-16. The updated analysis includes EBR-002 and EBR-003 as background monitoring sites.

- Measurable impacts at EBR-004 or EBR-004a should not be considered when developing effluent limits as these sites are within the approved surface water mixing zone for TN. See Comment MMFS-17. The updated analysis does not consider EBR-004 and EBR-004a.

- The measurable threshold for HBI identified in the 2025 Fact Sheet should be based on reference sites in the Middle Rockies Ecoregion using the same dataset from the Schulte and Craine 2023 report.[40] See Comment MMFS-20. The updated analysis assesses measurable change in HBI from reference sites in the Middle Rockies Ecoregion based on data from Schulte and Crain 2023. This data shows a standard deviation of 0.95 HBI units, therefore a measurable change (2 times the standard deviation) is approximately 1.9 HBI units.

- O/E should not be used as an indicator parameter for nutrient impacts. See Comment MMFS-19. The updated analysis does not use O/E as an indicator parameter for nutrient impairment.

- A key factor missing from DEQ's assessment is a comparison of the EBM discharge to the nutrient indicator metrics (chl-a, AFDM, and HBI). See Comment MMFS-22. The updated analysis provides a comparison of the change from background for each nutrient indicator metric to the historic TN discharge (late 2015 through 2024) to Outfall 002. Because there is approximately 1 year in travel time within the groundwater system prior to the discharge entering the East Boulder River (Hydrometrics 2017), the comparison evaluates the nutrient indicator with the discharge from the previous year.

SMC's updated analysis shows that since late 2015, the average monthly TN load discharged to the EBM MPDES Outfalls has ranged from 4.4 lbs/day to 36.3 lbs/day. The highest TN loads were seen in 2016 and 2017. During this period, TN loads ranged from 7.1 lbs/day to 35.2 lbs/day in 2016 and 12.7 lbs/day to 36.3 lbs/day in 2017. The TN load discharged to Outfall 003 was not part of the required monitoring or effluent limits until September 2023; however, it is reasonable to assume average TN loads between 2023 and 2024 are representative of historic loads to Outfall 003. In addition, the data provided in Appendix 3 of the Modification Request and Section 2.2 of the Supplemental Modification Request provides a reasonable assessment of anticipated TN loads during the permit term (28.3 lbs/day from Outfall 002 + 3.4 lbs/day from Outfall 003).

A review of the change in indicators with background monitoring sites EBR-002 and EBR-003 shows that there was no measurable change in chl-a (Figure 2), no measurable change in AFDM (Figure 3), and no measurable change in HBI (Figure 4) from 2016 through 2024. The comparison of TN discharge to the change in indicator parameters is conclusive evidence that average monthly loads greater than 32 lbs/day met the narrative nutrient standard (ARM 17.30.637(1)(e)) and nonsignificance criteria (ARM 17.30.715(1)(h), (2)).

SMC requests that DEQ revise Appendix B as follows:

- Applicable Water Quality Criteria: It should be noted that, per ARM 17.30715(1)(h), discharges are considered nonsignificant if they meet this criterion.

- Section 2.b. It should be noted that the Boulder River TMDL (DEQ, 2009) acknowledged that the two downstream segments of the East Boulder River were listed as impaired for chl-a and also recognized that data collection (i.e. 2006-2007) and evaluation at the time of the TMDL development showed that segments MT43B004_141 and MT43B004_142 may be meeting the applicable narrative water quality standards for nutrients. Section 2.j. should be revised as follows:
    - Chlorophyll a:
        - Reach average values provided by DEQ appear to be the average of all replicate samples, it is more appropriate to provide average values of the annual mean of replicate samples as the annual mean is what is evaluated for recreational use threshold and measurable change.
        - Date range for chl-a data is incorrect (see revisions below).
        - Provide reach average value of annual mean for upstream sites EBR-001 (mean 4.15 ± 0.967 mg/m2, (2022-2024)), EBR-002 (mean 45.9 ± 64.3 mg/m2, (1999-2024)), and EBR-003 (mean 36.3 ± 47.9 mg/m2, (1999-2024)).
        - Remove EBR-004 and EBR-004a from evaluation (see Comment MMFS-17).
        - Provide reach average value of annual mean for downstream based on EBR-005 (mean 4.89 mg/$m^2$ +/- 3.3 mg/$m^2$ (2013-2024)) not EBR-004 and EBR-004a (see Comment MMFS-17).

        - Remove EBR-004 and EBR-004a from box plots (see Comment MMFS-17).
        - Remove chl.a.4.2 plot showing change in EBR-004(a) – EBR-002 (see Comment MMFS-17)
        - Revise chl.a.5.2 plot to show measurable change threshold to 19.6 mg/$m^2$ (see Comment MMFS-18). SMC has provided the plot showing the change in threshold to 19.6 mg/$m^2$ in Figure 2, attached. Note that there are no identified measurable changes between EBR-002 or EBR-003 and EBR-005.
    - AFDW:
        - Add note that there are no exceedances of the undesirable rec threshold at any sites.
        - Correct measurable change to 19.8 g/m2 for AFDM (see Comment MMFS-18).
        - Provide note that there are no identified measurable changes between EBR-002 or EBR-003 and EBR-005.
        - Reach average values provided by DEQ appear to be the average of all replicate samples, it is more appropriate to provide average values of the annual median of replicate samples as the annual median is what is evaluated for recreational use threshold and measurable change.
        - Date range for AFDM data is incorrect see revisions below
        - Provide reach average of annual median value for upstream sites EBR-001 (mean 1.22 ± 0.55 g/m2, (2022-2024)), EBR-002 (mean 2.44 ± 1.72 g/m2, (2022-2024)), and EBR-003 (mean 6.77 ± 0.50 g/m2, (2021-2024)).
        - Reach annual average values for downstream should be reported for EBR-005 (mean 4.89 g/m2 +/- 2.56 g/m2 (2021-2024)).
        - EBR-004a should be removed from AFDM.all plot (see Comment MMFS-17)
        - There is no plot of the change from EBR-002 or EBR-003 and EBR-005. SMC has provided these plots in Figure 3, attached. The plots show that there are no identified measurable changes between EBR-002 or EBR-003 and EBR-005.
- Section 2.J should be Section 2.k.
- Section 2.K should be 2.i, and should be further revised as follows:
    - Hilsenhoff Biotic Index
        - Revise measurable change threshold to 1.9 HBI units (see Comment MMFS-20)
        - Note that there are no identified measurable changes between EBR-002 or EBR-003 and EBR-005.
        - Include reach average values of the annual median of replicate samples as the annual median for upstream and downstream sites as discussed below.
        - Report reach average values for upstream sites EBR-001 (mean 2.33 ± 1.03 HBI units (2022-2024)), (EBR-002 (mean 3.47 ± 1.28

HBI units (2000-2024)), and EBR-003 (mean 3.14 ± 0.83 HBI units (1998-2024))) and downstream site (EBR-005) (2.86 +/- 0.65 HBI units (2000-2024)).
        - Remove HBI.4.2.plot showing change in EBR-004(a) – EBR-002 (see Comment MMFS-17).
        - Revise blue line (measurable change threshold) on HBI.5.2plot to 1.9 HBI Units (see Comment MMFS-20). SMC has provided this plot in Figure 4, attached.
        - Add plot of change from EBR-003 and EBR-005. SMC has provided this plot in Figure 4.
        - Provide note that the plots comparing EBR-002 and EBR-003 to EBR-005 show that there are no identified measurable changes between EBR-002 or EBR-003 and EBR-005.
    - Observe/Expected – Remove O/E from analysis due to inherent flaws in evaluation and to align DEQ policy in use support determination. (see Comment MMFS-19)
- Section 2.L should be 2.m.
- Section 2.M should be 2.n.
- Section 3.b only needs to provide ecoregional range for TN as that is the only parameter being considered for this modification.
- It is unclear why the In River Nutrient Dataset was provided as it is not information considered in the checklist provided in Appendix A. If DEQ believes this data should be provided, it would be clearer to add a Section 3.d for in-stream nutrient concentrations. It is also unclear why the data only included information from 2015-2018. This data should be revised to include data from 2015 through 2024. Suggest adding a note stating that the instream concentrations of TP and TN are within the range of concentrations which have been demonstrated to be protective of aquatic life and recreation beneficial uses in the Middle Rockies Ecoregion.
- Add Section 3.e. to provide an assessment of historic discharges from 2016 through 2024 to the change in indicator parameters (chl-a, AFDM, and HBI) between background (EBR-002 and EBR-003) and end of mixing zone (EBR-005). SMC has provided these plots in Figures 5 through 10, attached. The plots show that Average Monthly discharges of more than 32 lbs/day did not result in identified measurable changes between upstream of the discharge and at the end of the mixing zone.
- Although the summary of findings refers the reader to the 2025 Fact Sheet, key findings should be summarized in the checklist so that the Nutrient Limits Panel is able to review the key findings and provide recommendations. The key findings from the revised analysis should include:
    - In general, direct nutrient indicator parameters (chl-a and AFDM) were similar to or showed improved conditions at the end of the mixing zone (EBR-005) compared to upstream monitoring sites (EBR-002 and EBR-003).
    - HBI (Indirect nutrient indicator parameter) show that, except for 2020, HBI was similar to or showed improved conditions at the end of the

mixing zone (EBR-005) compared to upstream monitoring sites (EBR-002 and EBR-003).
- From 2015 to 2024 there were no measurable changes in direct or indirect nutrient indicator parameters.
- Discharges to Outfall 002 from 2015 to 2024 had average monthly TN loads between 4.4 lbs/day and 36.3 lbs/day.
- Assuming discharges to Outfall 003 were similar to the average of the average monthly TN load between 2023 and 2024, there were multiple instances where the total discharge to the Outfalls were near or above 32 lbs/day between 2016 and 2017.
- Since there were no measurable changes in primary or secondary indicator parameters when discharges were near or exceeded the current TN limit of 32 lbs/day, there is sufficient evidence to show that the sum of all outfalls TN effluent limit of 32 lbs/day meets the definition of nonsignificance per ARM 17.30.715(1)(h) and ARM 17.30.715(2).

***Response 1.34:***

DEQ has revised Appendix B of the Fact Sheet (included as an appendix to this RTC document) to include EBR-003 as a background site but notes that its inclusion supports the conclusions drawn in the main body of the Fact Sheet. Most importantly, the use of EBR-003 (when compared to EBR-005) supports the conclusion that measurable changes in O/E were observed pre-2005, corresponding with the period of highest TN loading from the facility. Further, the use of EBR-003 as an upstream site supports the identification of a measurable change in HBI in 2002 (See Figure 8b), which corresponds with the previous year's TN loading which was the highest in the mine's history.

DEQ has removed EBR-004a and EBR-004 from its analyses (see ***Responses to Comments 1.20 and 4.11***). DEQ notes that the removal of these monitoring stations did not change any if its conclusions.

DEQ disagrees that the measurable change threshold for HBI should be 1.9 HBI units. See ***Response to Comment 1.23***.

DEQ disagrees that O/E should not be used as an indicator parameter for nutrient impacts, see ***Response to Comment 1.22***.

DEQ agrees that its assessment is strengthened by the inclusion of TN loading data and has included this data in its analyses and all figures comparing up and downstream biological response variables in the revised Appendix B. These data are presented consistent with the estimated 1-year travel time as indicated by this comment.

DEQ disagrees that the highest TN loads were seen in 2016 and 2017 as this ignores the period of much higher loading at the facility pre-2010. See ***Response to Comment 1.33***.

DEQ added a statement to Appendix B stating that, "discharges are nonsignificant if they meet both of these criteria" referring both to ARM 17.30715(1)(h) and (2). DEQ notes that AFDW data for EBR-002 were available from 2022-2024 while data for EBR-003, and EBR-005 were available for 2021-2024.

DEQ declines to change the measurable change threshold for chlorophyll-a, see ***Response to Comment 1.21***. DEQ has included notes that there were no identified measurable changes between up and downstream sites for chl-a in Appendix B. DEQ disagrees that its approach to summary statistics for chl-a and AFDW were inappropriate.

DEQ has added statements regarding biological response variables where no exceedances of beneficial use thresholds were observed to Appendix B.

Plots were not included for AFDW because they offer little value to the analysis given the extremely short period of record for both downstream sites. Data analysis does not indicate any measurable change in AFDW up and downstream of the discharge, as noted in the revised Appendix B.

Section 2 labelling in Appendix B has been corrected.

In stream data was included in Appendix B for comparison to ecoregional range values. Data from 2015-2018 were readily available at the time of analysis and, given their limited applicability to the final decision making DEQ declines to revise this figure.

DEQ does not agree that it is appropriate to include discharge loading information in Section 3, which refers to ecoregional range values. Instead, this information was analyzed as a lead-in to Section 2 and incorporated throughout.

DEQ disagrees the Checklist must be updated with additional information related to findings of the nutrient panel. The nutrient panel made no specific findings. See also, ***Response to Comment 1.32.*** Furthermore, Appendix B was in development at the time of the meeting, and this did not affect the quality of feedback or recommendations made by DEQ staff.

**COMMENT 1.35 SUMMARY:** (DPM-1) SMC REQUESTS THAT DEQ IMPOSE A TN FINAL EFFLUENT LIMIT OF 32 LBS/DAY OR EXTEND THE CURRENT INTERIM LIMIT OF 32 LBS/DAY THROUGH THE PERMIT TERM.

**Comment 1.35:** Section B. Effluent Limitations (Tables 2 and 3); Section E. Compliance Schedule: DEQ proposes to amend the Permit by removing the compliance schedule for TN and imposing a final effluent limit of 16.0 lbs/day for Outfalls 001/002/003. As discussed in SMC's General Comments and comments to the 2025 Fact Sheet, the final effluent limit provided in Table 3 was not properly developed. As states in Comments GC-1 and GC-2, SMC requests that DEQ impose a TN final effluent limit of 32 lbs/day or extend the current interim effluent limit of 32 lbs/day through the permit term.

***Response 1.35:***

See *Responses to Comments 1.1-1.34*.

**COMMENT 1.36 SUMMARY:** (DPM-2) SMC REQUESTS THAT DEQ REVISE TABLE 3 TO REFLECT AN ACCURATE EFFECTIVE STARTING DATE FOR THE TN FINAL EFFLUENT LIMIT FOR OUTFALLS 001/002/003.

**Comment 1.36:** Section B. Effluent Limitations (Table 3): DEQ proposes to amend Table 3 to state that the effluent limit of 16.0 lbs/day is effective "Immediately." However, the interim limit in Table 2 remains effective until December 29, 2025. Should DEQ proceed with the proposed action, SMC requests that DEQ revise Table 3 to reflect an accurate effective starting date for the TN final effluent limit for Outfalls 001/002/003.

***Response 1.36:***

DEQ has revised the effective date of the final TN effluent limit of 16 lbs/day to December 30, 2025.

**COMMENT 1.37 SUMMARY:** (DPM-3) SCRIVENER'S ERROR FOR TN UNITS IN TABLE 3.

**Comment 1.37:** Section B. Effluent Limitations (Table 3): DEQ proposes to amend Table 3 by removing the units (lbs/day) associated with the TN – Final Limits for Outfalls 001/002/003. SMC believes this is a scrivener's error.

***Response 1.37:***

SMC is correct that this was a scrivener's error. This has been corrected Table 3 of the permit.

**COMMENT 1.38 SUMMARY:** (DPM-4) SMC REQUESTS THAT THE SPECIAL CONDITIONS BE AMENDED AS SET FORTH IN COMMENT MMFS-25.

**Comment 1.38:** Section D.5. Nutrient Bioassessment Special Conditions: DEQ proposes to add a special condition requiring annual nutrient bioassessments. SMC requests that the special conditions be amended as set forth in Comment MMFS-25.

***Response 1.38:***

See ***Response to Comment** 1.28***.**

**COMMENT 1.39 SUMMARY:** (DEA-1) DEQ'S ANALYSIS OF THE NO ACTION ALTERNATIVE FAILS TO ADDRESS THE FULL RANGE OR ENVIRONMENTAL AND SOCIOECONOMIC IMPACTS THAT WOULD RESULT IF DEQ TAKES NO ACTION ON THE PROPOSED MODIFICATION.

**Comment 1.39:** No Action Alternative: DEQ's analysis of the No Action Alternative fails to address the full range of reasonably foreseeable environmental and socioeconomic impacts that would result if DEQ

takes no action on the proposed MPDES modification, as required pursuant to § 75-1-201(1)(b)(iv)(C)(III), MCA.

Section 75-1-201(1)(b)(iv)(C)(III), MCA states: “the agency shall complete a meaningful no-action alternative analysis. The no-action alternative analysis must include the projected beneficial and adverse environmental, social, and economic impact of the project's noncompletion.”

Under the No Action Alternative, the EBM would remain subject to the current MPDES effluent limits set out in the Permit, including the step-down interim limit of 15.1 lbs/day TN effective December 29, 2025. Because TN loading limits will become increasingly restrictive while mine inflows to the WTP are expected to increase over the remaining life of mine, the facility could face two foreseeable compliance pathways: (1) Increased reliance on the Class V Boe Ranch UIC well to divert a portion of treated effluent from the East Boulder River; or

(2) Reduction of mine production or underground development to limit water inflows and maintain discharge compliance.

Both of these options have distinct and direct impacts that must be disclosed under MEPA. Increased injection would reduce or eliminate surface discharge, decreasing baseflow in the East Boulder River and potentially affecting dilution capacity, temperature, and aquatic habitat. Reduced mine production would have direct socioeconomic impacts, including potential reductions in employment, income, and local economic activity in Stillwater County and the surrounding region.

SMC requests that DEQ revise the Draft EA to fully address the projected adverse environmental, social, and economic impact of the No Action Alternative.

### *Response 1.39:*

DEQ disagrees that meaningful review of the no-action alternative has not occurred. The no action alternative here was captured by the EA for the 2023-issued permit. No action on the part of DEQ would maintain the permit conditions in the previous version of the effective permit, which has already undergone MEPA review. In this regard, the no action alternative in the EA for this action has been updated to provide additional clarity.

**COMMENT 1.40 SUMMARY:** (DEA-2) DEQ DIDN’T ACKNOWLEDGE THE MOST RECENT EIS FOR THE MINE.

**Comment 1.40:** Impacts on the Human Environment: DEQ states that the operation of the mine was analyzed in the 1992, 2012, and 2025 Environmental Impact Statements. SMC requests that this statement be revised to reflect that the most recent Environmental Impact Statement was completed in August 2024 for EBM Amendment 004.

### *Response 1.40:*

The commenter is correct that the most recent EIS was completed in August 2024 for EBM Amendment 004, however this EIS refers to EBM Amendment 004 not current operations of the mine. Discharges

associated with the expansion are not yet authorized by the MPDES permit. However, DEQ acknowledges this EIS document and notes that it supports the conclusions of this permitting action, stating, "Historical biological monitoring data indicate exceedances (greater than 4.0 Hilsenhoff Biotic Index (HBI)) have occurred during the sampling period, and that data may indicate water quality impairment through nutrient enrichment in the East Boulder River has occurred (Rhithron 2015, 2018), although there was little indication of nutrient enrichment during more recent sampling (Rhithron 2020)."

## **Section 2** – Comments Submitted by Matt Vincent, Executive Director of Montana Mining Association

### **COMMENT 2.1 SUMMARY:** DEQ SHOULD WORK WITH THE PERMITTEE TO INCORPORATE THE APPROPRIATE CHANGES TO THE DRAFT PERMIT BEFORE FINALIZING.

**Comment 2.1:** Our first and most pertinent comment is for DEQ to fully consider the detailed comments provided by Sibanye Stillwater and to work cooperatively with the permittee to incorporate the appropriate changes to the draft permit before finalizing.

### ***Response 2.1:***

DEQ fully considered the detailed comments provided by SMC and has incorporated those changes deemed appropriate.

### **COMMENT 2.2 SUMMARY:** DEQ SHOULD MODIFY ITS NONSIGNIFICANCE ANALYSIS TO APPLY BOTH CONDITIONS OF THE NARRATIVE CRITERION IN ARM 17.30.715(1)(H).

**Comment 2.2:** Page 8. Basis for TN WQBELS: DEQ states "[w]here the non-significance criterion is applicable, as in the case of EBM, the applicable protections are more stringent such that no measurable effects on any existing or anticipated use nor measurable change in aquatic life or ecological integrity are permissible." This is an incorrect interpretation of the nonsignificance criterion for narrative standards in ARM 17.30.715(1)(h), which states:

> *(1) The following criteria will be used to determine whether certain activities or classes of activities will result in nonsignificant changes in existing water quality due to their low potential to affect human health or the environment. These criteria consider the quantity and strength of the pollutant, the length of time the changes will occur, and the character of the pollutant. Except as provided in (2), changes in existing surface or ground water quality resulting from the activities that meet all the criteria listed below are nonsignificant, and are not required to undergo review under 75-5-303, MCA:*
> *(h) changes in the quality of water for any parameter for which there are only narrative water quality standards if the changes will not have a measurable effect on any existing or anticipated use or cause measurable changes in aquatic life or ecological integrity.*

ARM 17.30.715(1)(h) clearly provides two conditions that are nonsignificant not that both conditions must be met. Furthermore, DEQ's implementation of the nonsignificant evaluation is flawed in that the analysis only considers if there is a measurable change between upstream and downstream locations. However, 17.30.715(1)(h) clearly states the discharge must be the cause of the measurable change. DEQ should modify the analysis to properly apply both conditions of the narrative nonsignificant criterion in ARM 17.30.715(1)(h).

***Response 2.2:***

See ***Response to Comment 1.17.***

**COMMENT 2.3 SUMMARY:** DEQ SHOULD MODIFY THE ANALYSIS TO SPECIFICALLY EVALUATE WHETHER THE DISCHARGE IS THE CAUSE OF ANY OBSERVED MEASURABLE CHANGE.

**Comment 2.3:** Page 8. Basis for TN WQBELS: DEQ states "[e]ffect size is best understood as the numeric expression of the practical, real-world significance of a difference between two groups, rather than the statistical difference." Although "effect size" may be a viable way to determine if there is a measurable change for some variables, if there is no statistically significant difference between the upstream and downstream datasets then it is not possible to determine with any level of confidence that the discharge is the cause of the measurable change. DEQ should modify the analysis to specifically evaluate whether the discharge is the cause of any observed measurable change.

***Response 2.3:***

See ***Response to Comment 1.18***.

**COMMENT 2.4 SUMMARY:** DEQ SHOULD PROVIDE A MORE THOROUGH EVALUATION TO DETERMINE THE HIGHEST TN LOAD THAT WOULD SATISFY THE NONSIGNIFICANCE CRITERIA.

**Comment 2.4:** Page 12. Basis for TN WQBELS: DEQ's use of "cap-at-current" to set the TN effluent limit does not provide a thorough evaluation of what TN effluent limit would meet the nonsignificance criteria in ARM 17.30.715(1)(h). Since the East Boulder Mine has indicated that TN loads may reach 32 lbs/day, it is crucial that the DEQ evaluate the maximum TN load up to 32 lb/day that would meet the nonsignificance criterion. DEQ should provide a more thorough evaluation to determine the highest TN load that would satisfy the nonsignificance criterion in ARM 17.30.715(1)(h).

***Response 2.4:***

The application of measures of conservatism in MPDES permits are appropriate and the assessment of effluent limitations based on the nonsignificance criteria at both the assessment of the criterion at ARM 17.30.715(1)(h) and ARM 17.30.715(2) which directs the agency to consider additional factors including cumulative impacts or synergistic effects and changes in the loading of parameters. The period over which the facility's discharge has not caused a measurable change in aquatic life demonstrates that the corresponding TN loading is protective of the nonsignificance criteria, on average. This period does not include loading "up to 32 lbs/day.". See also ***Responses to Comments*** *1.17, 1.18 and 4.5*.

**COMMENT 2.5 SUMMARY:** DEQ SHOULD REVISE THE CRITERIA IN APPENDIX A AND ANALYSIS IN APPENDIX B TO BE CONSISTENT WITH ITS ESTABLISHED BENEFICIAL USE ASSESSMENT METHODS.

**Comment 2.5:** Appendix A and B. DEQ appears to use all indicator parameters equally in their assessment of the narrative standard. This is contrary to DEQ's Beneficial Use Assessment Methods which include Level I and Level II analyses which prioritize direct indicator parameters and only assesses indirect indicator parameters when Level I assessment is unclear. The Fact Sheet shows that TN concentrations in receiving waters are within the range of concentrations which have been demonstrated to be protective of aquatic life and recreation beneficial uses. There is also no measurable change in chl-a and AFDW (direct indicator parameters). Based on the data from these direct indicator parameters there is clear documentation that the mine is not causing a measurable change in aquatic life or ecological integrity. DEQ should revise the criteria in Appendix A and analysis in Appendix B to be consistent with its established Beneficial Use Assessment Methods.

***Response 2.5:***

See ***Response to Comment 1.31***.

**COMMENT 2.6 SUMMARY:** MMA WOULD LIKE TO KNOW IF THE INTERNAL NUTRIENT PANEL MET REGARDING THE NUTRIENT LIMITS PROPOSED IN THE DRAFT EAST BOULDER MINE PERMIT MODIFICATION.

**Comment 2.6:** Lastly, at a meeting held with point-source dischargers in Helena on October 23, 2025, DEQ Water Quality personnel described in a presentation of how narrative nutrient standards would be implemented in permits, its formation of an internal "nutrient review panel" that would critically evaluate nutrient limits proposed for draft permits. It was MMA's understanding from this presentation that the meetings of this internal nutrient panel would not be open to the public nor the permittee. MMA questions how such closed meetings actually contribute to trust and transparency in the regulatory decision-making process, in addition to compliance with Montana's open meeting laws. Specific to this draft permitting action, MMA would like to know if this internal panel met regarding the nutrient limits proposed in the draft East Boulder Mine permit modification.

***Response 2.6:***
Yes, the meeting was held on September 15, 2025. See also ***Response to Comment 1.32***.

**Section 3** - Comments Submitted by Kaite Howes, Chair of the Good Neighbor Agreement Task Force

**COMMENT 3.1 SUMMARY:** THE COUNCILS SEEK CLARIFICATION ON THE METHODOLOGY EMPLOYED BY THE DEPARTMENT IN DETERMINING EFFLUENT LIMITS FOR TOTAL NITROGEN UNDER THE NARRATIVE STANDARD.

**Comment 3.1:** It is unclear how the total nitrogen limits are derived, and how the analysis of the narrative standard correlates to the proposed effluent limit, which is described as a limit that caps the facility at current water treatment performance. Councils request further explanation on how the Department applied the narrative standard to establish these limits, with particular emphasis on the fact that capping discharge at current conditions does not accurately reflect the intent or purpose of the narrative standards translation and application of non-significance criteria.

This disparity is particularly concerning for waters throughout the state that are not considered high quality and therefore not subject to nonsignificance criteria, where it appears that the Department could utilize the impairment thresholds to determine effluent limitations in a permit, and not measurable change. Councils are concerned this approach prioritizes pollution management, rather than the proactive approach of pollution prevention.

Please see the attached technical memo for specific examples and subsequent questions.

***Response 3.1:***

As described in the Fact Sheet and in ***Responses to Comments 1.8, 1.9, and 2.4***. DEQ derived TN limits by first identifying a period of time over which SMC's discharge did not cause a measurable change in aquatic life and took a long-term average of the facility's TN loading over this period, assessing an effluent limitation based on this long-term loading. DEQ disagrees that this approach does not accurately reflect the intent or purpose of the narrative standards translation and application of non-significance criteria.

The TN limitation set in this case is protective of the non-significance criteria appliable to narrative criteria, leveraging long term discharge and biological response variable datasets. While the commenter is correct that a "cap at current" based final effluent limitation is not appropriate in all, or even many, cases, DEQ believes that it is appropriate in this case based on its analysis of these data.

This permit action does not concern a receiving waterbody that is not high quality with respect to nutrients and implementation of the narrative standard is made on a case-by case basis. Comments on other potential permitting actions are outside of the scope of this action.

**COMMENT 3.2 SUMMARY:** THE COUNCILS SEEK REVISED CONSISTENCY OR JUSTIFICATION IN THE MONITORING METHODS UTILIZED

**Comment 3.2:** Biological assessment protocols are not aligned with those required under the Hard Rock Operating Permit, and greater coordination is encouraged to ensure consistency between permits. There are also discrepancies in representing upstream and downstream conditions, and DEQ should

conduct an updated assessment of impairment for the East Boulder River to ensure that effluent discharge limits are based on current and accurate environmental conditions.

***Response 3.2:***
Thank you for the comment regarding the assessment of the East Boulder River. This request will be passed to DEQ's Monitoring and Assessment Section who can then incorporate this request in accordance with their workload and current schedule.

**COMMENT 3.3 SUMMARY:** DEQ SHOULD FURTHER DESCRIBE THE BASIS AND CUMULATIVE EFFECT OF THE 9.5-12 LB/DAY NONPOINT SOURCE LOADING ESTIMATE IN THE FACT SHEET, AND UPDATE AND REISSUE THE DRAFT FACT SHEET WITH ANY CHANGES MADE IN THE BASIS FOR DETERMINATION OF PERMIT LIMITS IN RESPONSE TO PUBLIC COMMENTS ON THE DRAFT RENEWAL.

**Comment 3.3:** The 2025 draft Environmental Assessment includes a description of nonpoint discharges of TN from the waste rock storage area and Tailings Storage Facility (regulated under the Operating Permit). DEQ should further describe the basis and cumulative effect of the 9.5-12 lb/day nonpoint source loading estimate in this Fact Sheet. As stated on page 10 of the 2023 Fact Sheet, "DEQ finds no reason to believe the approved mixing zones will have cumulative effects that threaten or impair the existing uses of the receiving water."

The Councils appreciate the acknowledgement of nonpoint source contributions to groundwater; however, this continues to be a concern with respect to the assessment of cumulative impacts, as the two sources of nitrogen to groundwater (percolation and nonpoint from tailings and waste rock) at the mine facility cannot be separated or distinguished in the aquifer and both report to the East Boulder River.

In addition to the key comments described above, the Councils and GNA Technical Advisors have attached additional comments and questions related to the permit renewal that cover the following topics:

- Monitoring Locations
- Bioassessment Methods
- Editorial Revisions for Accuracy

Finally, the Councils request that DEQ update and reissue the draft Fact Sheet with any changes made in the basis for determination of permit limits in response to public comments on the draft renewal to limit future confusion on the basis for MPDES permit limits.

***Response 3.3:***
Comments on the 2023-issued permit are outside of the scope of this public notice and DEQ does not modify Fact Sheets in response to comments. However, DEQ has included revised appendices and figures to supplement the administrative record and notes that the response to comments document supersedes relevant parts of the Fact Sheet, to the extent specific changes or clarifications are discussed herein.

**Section 4** – Comments Submitted by Sarah Zuzulock and Stephanie Bonucci, GNA Technical Advisors

**COMMENT 4.1 SUMMARY:** DEQ SHOULD PROVIDE DETAILED JUSTIFICATION FOR HOW THE NARRATIVE NUTRIENT LIMITS IN THE 2025 PERMIT MODIFICATION ARE EQUALLY PROTECTIVE OF WATER QUALITY COMPARED TO THE 2023 LIMIT BASED ON THE NUMERIC WATER QUALITY STANDARD.

**Comment 4.1:** (Draft Permit) Table 3 of the permit describes facility wide effluent discharge limits, applies the narrative nutrient standard for total nitrogen (TN), and removes the numeric nutrient standards and compliance schedule issued in 2023. DEQ should provide a detailed justification describing how the narrative nutrient limits in the 2025 permit modification are equally protective of water quality compared to 2023 permit limits based on numeric nutrient standards. This draft permit represents DEQ's first application of the narrative nutrient standards and has implications to future MPDES permit renewals and modifications that need to be transparent and well understood for effective public review and comment.

***Response 4.1:***

The 2025 permit modification was developed under the narrative nonsignificance criterion which states that a change is not significant if it will not have a measurable effect on any existing or anticipated use or cause measurable changes in aquatic life or ecological integrity. The modification was further evaluated under the provisions of ARM 17.30.715(2).

Among other biological measures of aquatic life, the draft 2025 permit used the O/E metric which is a direct measure of aquatic life and ecological integrity for a biological assemblage (aquatic insects). The "E" of O/E is derived from regionally-applicable reference sites, so it tells us how similar a test site is to the reference condition. Like the draft 2025 permit, the 2023 permit was also based on nonsignificance, but as applied to a numeric total nitrogen (TN) criterion which was itself based on a harm-to-use threshold. The TN concentration calculated to meet nonsignificance criteria in 2023 was 0.10 mg TN/L (after mixing). The 2025 approach examines departure from ecological integrity as directly measured in the receiving stream; the 2023 approach took a regionally-applicable numeric TN criterion shown scientifically to be protective of aquatic life and then applied a rule-based nondegradation policy reduction factor to it. Whether the nonsignificance reduction factor in state law is the most appropriate factor to apply to a TN criterion has not been established scientifically. In contrast, the 2025 approach has shown changes (or lack thereof) in measures of aquatic life and ecological integrity specific to the East Boulder River up- and downstream of the mine and during different periods of the mine's activities. For these reasons, the department believes the current approach is equally protective (and more site specific).

While this draft permit is the DEQ's first application of the narrative nutrient standards post-repeal of the DEQ-12Anutrient standards, it is not DEQ's first time applying ARM 17.30.637(1)(e) which has been in effect since the 1970s. Notably, many state surface waters were never covered by DEQ-12A.

**COMMENT 4.2 SUMMARY:** DEQ HAS NOT USED ALL AVAILABLE DATA IN ITS ASSESSMENT AND INCORRECTLY ASSIGNS UPSTREAM AND DOWNSTREAM MONITORING SITES FOR THIS REVIEW.

**Comment 4.2:** (Fact Sheet) Page 8 describes that DEQ used the narrative nutrient translation process described in Appendix A, stating that "…this approach uses all available data on nutrient concentrations and biological response variables (benthic algae, macroinvertebrates (i.e., aquatic insects), dissolved oxygen delta, diatoms, etc.), comparing conditions up- and downstream of the discharge to assess a) whether the discharge has reasonable potential to cause or contribute to an excursion from the narrative nutrient criterion and b) identify the discharge concentration protective of the narrative nutrient criterion, as modified by nonsignificance criteria where applicable." As noted in the comments below, DEQ has not used all available data in this assessment and incorrectly assigns upstream and downstream monitoring sites for this review.

***Response 4.2:***
Diatom data submitted to DEQ by the permittee was not relevant for the assessment of nutrient impacts (see ***Response to Comment 4.6***). DEQ has corrected errors in the assignment of up and downstream monitoring sites by including EBR-003 and excluding EBR-004 and EBR-004a. See Response to Comments 1.19, 1.20, and 1.34.

**COMMENT 4.3 SUMMARY:** DOES DEQ CONSIDER THE NEW WATER QUALITY RESULTS FROM OUTFALL 003 SIGNIFICANT?

**Comment 4.3:** (Fact Sheet) Page 12 states, "the facility will be capped at current performance on a mass loading basis, ensuring no change in the loading of TN. Based on this analysis, DEQ considers this change in water quality nonsignificant." Does DEQ consider the new water quality results from Outfall 003 significant?

***Response 4.3:***
This comment lacks clarity regarding what results, specifically, the commenter is referring to. The department presumes that the commenter is referring to effluent data from Outfall 003 as reported in the permittees DMRs, modification request, and modification request supplement. The permit implements a facility-wide TN effluent limitation based on applicable nonsignificance criteria that is inclusive of discharges from Outfall 003.

**COMMENT 4.4 SUMMARY:** WHAT IS THE BASIS FOR THE UPDATED APPLICABLE NUMERIC NUTRIENT CONCENTRATIONS FOR THE MIDDLE ROCKIES ECOREGION?

**Comment 4.4:** (Fact Sheet) Page 9 notes that DEQ has updated the applicable numeric nutrient concentrations for the Middle Rockies Ecoregion to 0.139-0.980 mg/L TN. What is the basis for this update in comparison to the previous numeric TN water quality standard for this ecoregion of 0.30 mg/L TN?

***Response 4.4:***
In Suplee and Watson (2013), for each ecoregion, harm-threshold nutrient concentrations were identified as a range and within that range a value was recommended based on the weight of evidence presented. Since that time, newer work has been completed (e.g., Schulte and Craine 2023) which expands the initial ranges discussed in the 2013 document. Given that the current approach emphasizes biological response, the department believes it is more valuable to present the range of potential nutrient harm thresholds for consideration rather than the value identified previously and adopted as a standard.

**COMMENT 4.5 SUMMARY:** HOW WAS THE EAST BOULDER RIVER'S PHOSPHORUS LIMITED NATURE USED IN DETERMINING THE FINAL PERMIT LIMITS?

**Comment 4.5:** (Fact Sheet) Page 9 notes that the East Boulder River is phosphorus limited. How was this information used in determining the final permit limits under the narrative standard?

***Response 4.5:***
The phosphorus (P)-limited status of the East Boulder River is relevant to the implementation of 17.30.715(2), which directs DEQ to assess cumulative impacts or synergistic effects and any other information deemed relevant by the department and that relates to the criteria in (1). The East Boulder River has a high N:P upstream of the EBM's discharge, which is exacerbated by TN loading by the mine. A high N:P ratio, driven even higher by increased nitrogen concentrations, increases the risk of the propagation of *Didymosphenia geminata* (didymo algae), a form of undesirable aquatic life (Whitton et al. 2009; Coyle 2016). This justifies measures of conservatism in the assessment of a final TN effluent limitation including, but not limited to, not assessing the effluent limitation at a level higher than that which has been demonstrated to be protective of the nonsignificance criterion at 17.30.715(1)(e) by projecting the maximum TN loading that may be protective of this criterion. This cannot be done with a high level of confidence with the available dataset (as described in Response To Comment 1.18) Further, the imposition of visual monitoring of algae, including didymo is included as a monitoring special condition.

**COMMENT 4.6 SUMMARY:** DEQ SHOULD CONSIDER INCORPORATION OF DIATOM AND PERIPHYTON BIOASSESSMENTS IN THEIR INTERPRETATION OF THE NARRATIVE NUTRIENT STANDARDS.

**Comment 4.6:** (Fact Sheet) Page 9 notes that the permittee submitted diatom bioassessment data that was not used in this analysis as diatoms are not considered nutrient biological response variables. As noted in Rhithron 2024 (page 14), diatom bioassessments can be used for "…calculation of metric expressions of community composition, tolerance, and function" and are not limited to being an indicator of impacts from sedimentation. Narrative interpretations of this dataset can be used to assess for impacts attributed to nutrient enrichment, oxygen saturation, organic pollution, metals pollution and others. DEQ should consider incorporation of diatom and periphyton bioassessments in their interpretation of the narrative nutrient standards.

***Response 4.6:***
In general, the department agrees that diatom metrics can have merit in assessing streams for nutrient impacts. However, in this case the department only had the sediment-increaser metric, which (as stated in the Fact Sheet) is not an appropriate metric for assessing nutrient impacts. The department developed the sediment-increaser taxa metric in the 2000s. Three pollutant-specific diatom metrics were developed by the department at that time (Teply 2010); diatoms were identified which were selectively sensitive to either metals, or nutrients, or sediment. Unfortunately, the department was unable to calibrate and validate a nutrient-increaser diatom taxa metric for the Middle Rockies ecoregion (only for the plains ecoregions and the Northern Rockies ecoregion). Thus, there is no nutrient increaser taxa metric for the area of the East Boulder Mine. In the future, and case by case, the department is open to examining other diatom metrics which have been shown to be sensitive to nutrients.

**COMMENT 4.7 SUMMARY:** DEQ SHOULD DESCRIBE HOW THE MEASURABLE CHANGES THRESHOLDS WILL BE USED IN FUTURE PERMIT RENEWALS.

**Comment 4.7:** (Fact Sheet) For the Benthic Algae Bioassessment (page 10) DEQ defines a measurable effect as "…equivalent to at least 2 standard deviations, or about 20 mg chl-a m -2; this approach equates to using a p-value of about 0.05 in a statistical test (like a t-test) to compare two datasets." DEQ should describe how the measurable changes thresholds will be used in future permit renewals. Will they be recalculated for each 5-year permit term or used as static upper bounds in East Boulder Mine's future permits?

***Response 4.7:***
Thank you for your comment. Future permitting actions are outside of the scope of this permitting decision. Future permit renewals would be reviewed under the applicable rules and site-specific information available at that time. Future permit renewal actions would also provide opportunities for public review and comment.

**COMMENT 4.8 SUMMARY:** DEQ SHOULD PROVIDE A MORE DETAILED DESCRIPTION OF THE MEASURABLE CHANGE THRESHOLDS ESTABLISHED FOR O/E AND HBI BIOASSESSMENT METRICS.

**Comment 4.8:** (Fact Sheet) DEQ is utilizing two macroinvertebrate bioassessment methods (page 11) including O/E and HBI. DEQ should provide a more detailed description of the measurable change thresholds established for O/E and HBI bioassessment metrics and their cited references.

***Response 4.8:***
Measurable O/E change was based on a published scientific study from Montana (Stribling et al. 2008) in which 77 reference and non-reference sites were sampled twice on the same day (154 samples) and the within-site repeatability of the O/E metric examined. The average relative percent difference (RPD) from that study for mountain areas was 15.9%. RPD tells us the magnitude of variability between measurements taken at the same site at the same time and is a measure of the metric's precision. RPD

reflects variability due to the laboratory (sample processing and taxa identification) and the inherent within-site variation. The study was based on reference and non-reference sites; therefore, it captured a wide range of potential RPDs (reference sites usually have lower RPDs than non-reference sites). RPD informs effect size because it would be unreasonable to expect a site-to-site delta (e.g., EBR-002 minus EBR-005) to be meaningful if it is less than the variability normally observed during routine sampling. For HBI, DEQ had no equivalent study, but instead computed typical within-site variability of mountainous reference sites—which have been repeatedly sampled over the past 20+ years—as 2 standard deviations (2SD) for a meaningful difference (i.e., effect). Essentially, the department used the pooled standard deviation of its mountainous (Middle Rockies) reference sites. 2SD of within-site natural variability (derived from reference sites) is used as an effect size in the Environmental Effects Monitoring program under the Canadian Pulp and Papermill Effluent Regulations (Munkittrick et al. 2009).

**COMMENT 4.9 SUMMARY:** DEQ SHOULD JUSTIFY THE ANALYTICAL METHODOLOGY CHOSEN FOR DISCHARGE AND AMBIENT WATER QUALITY MONITORING.

**Comment 4.9:** (Draft Permit) Analytical monitoring requirements for TN are inconsistent throughout the permit. Table 6, Table 7, Table 8 and Table 9 describe monitoring requirements for discharge water quality, and require TN to be calculated as the sum of TKN + nitrate-nitrite nitrogen. Table 10 and Table 11 describe surface and groundwater ambient water quality monitoring requirements, and require TN to be measured as total persulfate nitrogen. Determination of TN using TKN and nitrate concentrations requires a calculation of TN from these analytical results; and determination of TN using total persulfate nitrogen is an analytical method resulting in a discrete TN concentration. DEQ should justify the analytical methodology chosen for discharge and ambient water quality monitoring.

***Response 4.9:***

Thank you for your comment. This comment is outside the scope of this permit modification.

Tables 6, 7, 8 and 9, 10, and 11 are not proposed to be modified as part of this permit modification and the monitoring requirements set forth therein were previously subject to public notice and comment procedures associated with the 2023 permit renewal.

**COMMENT 4.10 SUMMARY**: DEQ SHOULD CONSIDER MAKING THE FOLLOWING ADJUSTMENTS TO THE MONITORING STATIONS FOR THIS EVALUATION.

**Comment 4.10:** Page 8 describes the bioassessment monitoring stations used in this permit modification. DEQ should consider making the following adjustments to the monitoring stations used for this evaluation.

Response 4.10:
See ***Responses to Comments*** *4.11*, 4.12, 4.13, 4.14, 4.15, ***and*** *4.16*.

**COMMENT 4.11 SUMMARY:** DEQ SHOULD ONLY UTILIZE DATA FROM EBR-004A AND EBR-005 AS REPRESENTATIVE OF DOWNSTREAM CONDITIONS.

**Comment 4.11:** DEQ combined data from stations EBR-004 and EBR-004a to evaluate downstream impacts. It is not appropriate to combine data from EBR-004 and EBR-004a as described. This monitoring location was moved from EBR-004 to EBR-004a in 2013 after it was determined by SMC and DEQ that EBR-004 is located upstream of East Boulder Mine groundwater discharge influence and is therefore not relevant in the comparison of upstream to downstream impacts. This was confirmed by synoptic monitoring assessments completed by SMC in 2015, as shown in Figure 1 of this Fact Sheet. DEQ should only utilize data from EBR-004a and EBR-005 as representative of downstream conditions.

***Response 4.11:***
DEQ has removed stations EBR-004 and EBR-004a from its analyses. See ***Response to Comment*** *1.20***.**

**COMMENT 4.12 SUMMARY:** THE FACT SHEET INCORRECTLY STATES THAT STATION EBR-003 IS ADJACENT TO THE FACILITY WHEN IN FACT IT IS UPSTREAM.

**Comment 4.12:** The Fact Sheet incorrectly states that "Station EBR-003 is adjacent to the facility, but upstream of where discharges from Outfall 002 enter the East Boulder River and therefore did not suitably fit the definition of an upstream control site nor a downstream impact site." This is incorrect – EBR-003 is upstream of both Outfall 002 discharges and permitted but not constructed Outfall 001. EBR-003 should be used as the primary upstream reference site for both water chemistry and biological assessments.

***Response 4.12:***
See response to comment 1.19. DEQ disagrees that EBR-003 should be used as the primary upstream reference site for both water chemistry and biological assessments as the results using both sites show similar response patterns.

**COMMENT 4.13 SUMMARY:** THE USE OF SITE EBR-001 AS AN UPSTREAM CONTROL FOR THE BIOLOGICAL ASSESSMENT IS NOT APPROPRIATE.

**Comment 4.13:** DEQ has utilized sites EBR-001 and EBR-002 as upstream controls for the biological assessment. The use of site EBR-001 for this assessment is not appropriate, and DEQ should consider removing this site from their evaluation. As summarized in Table 2 of Rhithron 2024, EBR-001 was monitored in 1998 and not again until 2022, 2023 and 2024. This provides a very limited data set in comparison to other sites used for the assessment. Further, this site was not included in the 2025 biological monitoring data collection and is not planned for future years because of the ability to utilize EBR-002 and EBR-003 as upstream reference locations. Another reason this site is not appropriate for this evaluation is the different habitat and streambed conditions in comparison to other sites referenced for this analysis.

***Response 4.13:***
DEQ agrees that the very limited dataset for EBR-001 limits its utility as an upstream site for purposes of biological assessment and has removed it from all analyses in the revised Appendix B. The department notes, however, that this removal does not change any conclusions as this site was not relied upon given its limitations.

**COMMENT 4.14 SUMMARY:** DEQ SHOULD BE CONSISTENT WITH THE TIME PERIODS USED IN ITS ANALYSIS.

**Comment 4.14:** DEQ notes data from 1998-2024 was used for this evaluation. DEQ should be consistent in the time periods used for both water chemistry and biological data evaluation, as well as add an N-value to each analysis.

***Response 4.14:***

DEQ has added n-values to each box plot in the revised Appendix B. Any differences in time periods used for water chemistry and biological data reflect actual differences in the availability of data and are clearly indicated.

**COMMENT 4.15 SUMMARY:** MONITORING SITE EBR-003 IS APPROPRIATE FOR AN UPSTREAM REFERENCE AND DEQ SHOULD USE THE SAME UPSTREAM SITE FOR THE BIOLOGICAL MONITORING DATA ASSESSMENT USED TO APPLY THE NARRATIVE STANDARD.

**Comment 4.15:** (Draft Permit) Monitoring requirements in the draft permit include ambient monitoring for the East Boulder River at monitoring location EBR-003 (page 10). This site is appropriate for an upstream reference including in the event East Boulder Mine constructs and utilizes Outfall 001 (direct discharge) as DEQ should use the same upstream reference site for the biological monitoring data assessment used to apply the narrative standard.

***Response 4.15:***

See Response to Comment ***1.19***.

**COMMENT 4.16 SUMMARY:** DEQ SHOULD CORRECT THE INCORRECT STATEMENT, "EBR-003 IS UPSTREAM OF EBM'S DISCHARGE FROM OUTFALL 002 BUT DOWNSTREAM OF NON-POINT TN DISCHARGES."

**Comment 4.16:** (Fact Sheet) Page 12 incorrectly states that "EBR-003 is located upstream of EBM's discharge from Outfall 002 but downstream of non-point TN discharges." DEQ should correct this to state that EBR-003 is upstream of non-point TN discharges from the East Boulder Mine as demonstrated by synoptic monitoring efforts conducted by SMC that have been provided to DEQ.

***Response 4.16:***
DEQ agrees with the commenter and has modified its assessment to consider EBR-003 an upstream site. See Response to Comment **1.19**.

**COMMENT 4.17 SUMMARY:** DEQ SHOULD COORDINATE WITH THE DEQ HARD ROCK OPERATING PERMIT REQUIREMENTS.

**Comment 4.17:** (Draft Permit) The draft permit describes Nutrient Bioassessment Special Conditions (page 16) requiring annual bioassessment monitoring in accordance with Rithron 2024. DEQ should coordinate with DEQ Hard Rock Operating Permit requirements so biological assessment protocols are consistent in both permits (e.g. aquatic flora visual assessment).

***Response 4.17:***

The biological assessment required by the DEQ Hard Rock Operating permit does not serve the same purpose as that required in the MPDES permit. DEQ notes that SMC has requested the removal of sampling site EBR-002 from its biological monitoring plan under the Hard Rock Operating permit but maintains that ongoing, annual sampling at this site is important for ongoing assessment of appropriate TN effluent limits for the facility for MPDES purposes. Similarly, DEQ believes that annual sampling, at least for the remaining permit term, is warranted. As described in ***Responses to Comments 1.28 and 4.5*** visual assessment of aquatic flora is needed given the high risk of didymo propagation in the receiving water because of the very high N to P ratio.

**COMMENT 4.18 SUMMARY:** DEQ SHOULD COMPLETE AN UPDATED ASSESSMENT OF IMPAIRMENT FOR THE EAST BOULDER RIVER.

**Comment 4.18:** (Fact Sheet) Page 9 states that "The East Boulder River where the mine discharges is not listed as impaired for nutrients or excessive algal growth, though downstream reaches have been listed as impaired for chlorophyll-a since the mid-1990s (2023 Fact Sheet)." Reliance on assessments of impairment that were completed approximately 30 years ago is inappropriate. To adequately assess current conditions and derive effluent discharge limits for this permit, DEQ should complete an updated assessment of impairment for the East Boulder River.

***Response 4.18:***

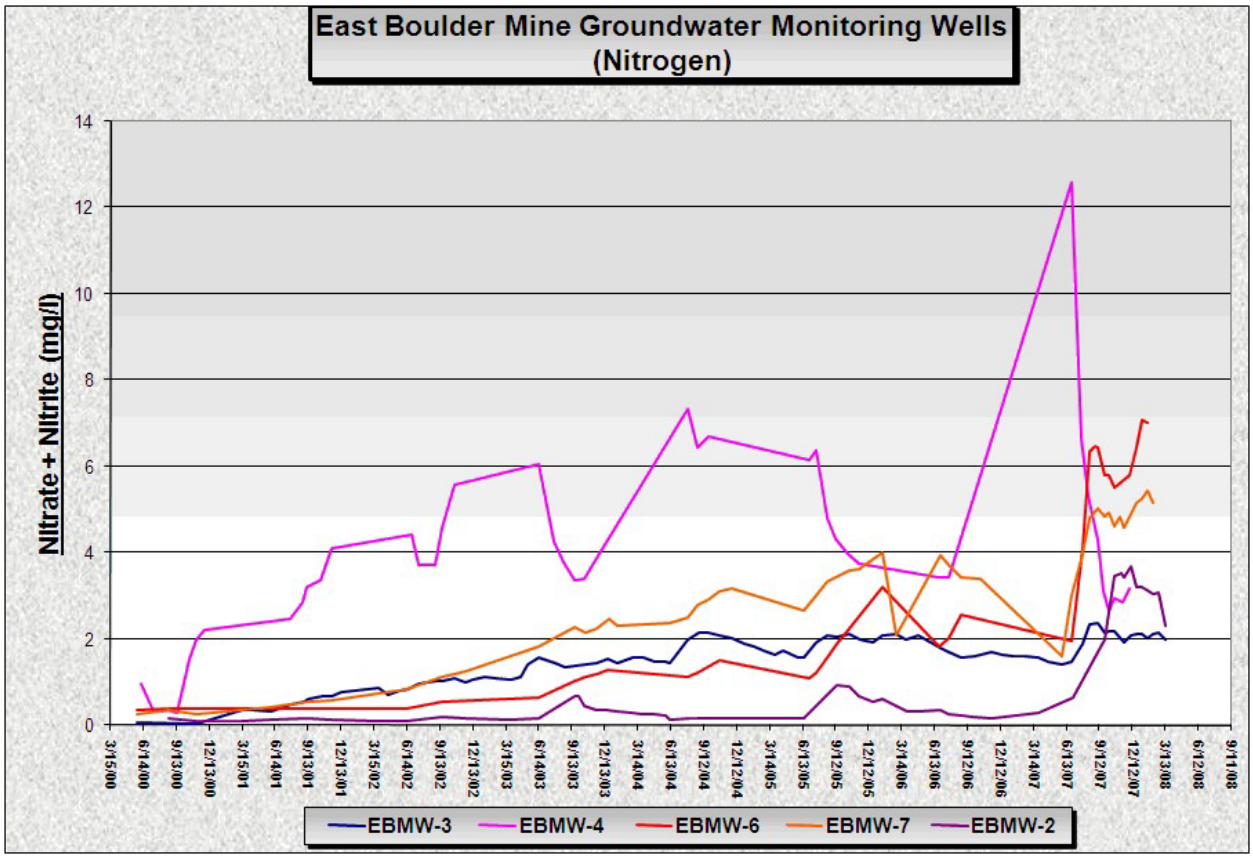
See ***Response to Comment 3.2***.

**COMMENT 4.19 SUMMARY**: WATER CHEMISTRY DATA FROM EBM DOES NOT SUPPORT THE CONCLUSION THAT "SMC'S DISCHARGE AT EBM FROM 2000-2017 HAD A MEASURABLE IMPACT ON AQUATIC COMMUNITIES…".

**Comment 4.19:** (Fact Sheet) Page 12 states, "In conclusion, there is evidence that SMC's discharge at EBM from 2000-2017 had a measurable impact on aquatic communities but that this impact has not been present from 2018 to present. This pattern is consistent with the history of upgrades to and optimization of the WTP. The water chemistry data from EBM does not support this conclusion. Groundwater impacts with elevated TN below the EBM were first noted in 2009. Impairment prior to that timeframe is unlikely to be mine related. Source control measures were implemented to reduce nitrogen from non-point sources from 2009-2018, outside of the water treatment plant performance.

***Response 4.19:***

SMC first identified an upward trend in the concentration of TIN in monitoring wells downgradient of the facility in 2007, with exceedances of the 6.5 mg/l action threshold identified in the 2000-issued permit reported in 2008 (2010 AOC). This action threshold represented 87% of the nondegradation-based groundwater limit for TN in groundwater (7.5 mg TN/l), which was subsequently exceeded by the facility 21 times between 2008-2010, which were violations of the 2000-issued permit. These impacts to groundwater were not the first instances of elevated TN concentrations (above background) in groundwater downgradient of the facility and were preceded by an exceedance of the facility's TN effluent load limit in 2007. DEQ disagrees that "impairment prior to that timeframe is unlikely to be mine related," given the elevated nitrate + nitrite concentrations downgradient of the mine's discharge to groundwater as early as 2000 (see below figure) and given the high TN loads discharged to Outfalls 002 and 003 in the first ~7 years of mine operation (Appendix B, Figures 8,10).



**COMMENT 4.20 SUMMARY:** DEQ SHOULD REVISE THE PARAGRAPH ON PAGE 12 OF THE FACT SHEET FOR ACCURACY.

**Comment 4.20:** Page 12 - Paragraph needs to be revised for accuracy: "When EBM initiated discharge through the infiltration basin in 2000, the WTP consistent of a six fixed-bed denitrification cell system. Since this time, the EBM WTP has undergone extensive upgrades, improving TN removal from effluent. In 2007/2008, SMC converted one of the six cells in the original denitrification cell system to a heated mixed bed bioreactor (MBBR) followed by a second in 2012. Between 2018-2022, three additional cells were converted from fixed beds to rock cells. In 2021, SMC added a thickener to help with the clarification step and installed two 10-micron disc filters to treat any wastewater that would be discharged. In addition, optimization and source reduction efforts have been on-going since 2016."

***Response 4.20***:

DEQ notes the typographical error in the first sentence of this passage where "consistent" should read "consisted." Further, the "six fixed-bed denitrification cell system" should read "six cell fixed-bed denitrification system," the MBBR system is a moving bed bioreactor and the second MBBR cell is unheated, not heated as implied by the quoted text. The three additional cells were converted from fixed beds to MBBRs.

**Section 5** – Comments Submitted by Margaret E Winter-Sydnor

**COMMENT 5.1 SUMMARY:** I DO NOT BELIEVE THE CURRENT NARRATIVE NUTRIENT STANDARD IS SUFFICIENT TO PROTECT MONTANA WATERS.

**Comment 5.1:** I am in opposition of the issuing of modifications to Stillwater East Boulder Mine's permit for implementing the water quality standards change from Base Numeric Nutrient Criteria applied in the 2023 renewal to the narrative nutrient criterion at ARM 17.30.637(1)(e) with respect to the Facility's water quality-based effluent limit for total nitrogen. If this modification is issued, I do not believe it will sufficiently protect water quality and beneficial uses.

I do not believe the current narrative nutrient standard (or limits in the revised permit) is sufficient to protect Montana waters. And, even if the narrative standard is made sufficiently stringent in the future, the permittee will benefit from the permit shield provision of the Clean Water Act throughout the term of the permit and be allowed to cause potential harm to our waters. I do not believe DEQ should issue any new, renewed, or modified discharge permits until the agency has adopted a science-based narrative replacement rule that is demonstratively capable of preventing harm to MT waters.

Furthermore, I believe the EPA's approval of MT HB 664 was in violation of section 7 of the Endangered Species Act of 1973. The EPA noted in their approval of HB 664 that they failed to complete consultation with FWS to ensure against jeopardy to listed species or destruction or adverse

modification of critical habitat. The EPA has been given a 60 day notice of intent to file suit (submitted 10/31/25) regarding violations of the ESA in connection with their approval of revisions to MT's water quality standards for nutrients. I believe DEQ should not issue any new, renewed, or modified discharge permits until such time that the EPA has either remedied this violation or the potential suit has been settled. I am concerned that any permits issued prior to that being resolved will pose a significant threat to water quality and beneficial uses of Montana waters.

***Response 5.1:***

The narrative nutrient standard is currently in effect for purposes of state and federal law and has been approved by EPA. The repeal of numeric nutrient standards, EPA's approval of HB 664 as a water quality standards change, and whether the narrative nutrient standard is sufficiently protective of water quality and beneficial uses are outside of the scope of this permitting action.

DEQ must implement currently effective water quality standards in MPDES permits (see ***Response to Comment 1.2***).

DEQ disagrees that the modification, if issued, would not sufficiently protect water quality and beneficial uses. The department has shown that some downstream biological assemblages/metrics have remained similar to upstream control sites over the life of the mine, while another (O/E macroinvertebrate metric) has shown an impact in the earlier years of the mine's operation when the mine's average TN discharge loads were highest. The permit limit was developed giving consideration to the more sensitive O/E biological metric and the permit will protect water quality and beneficial uses of the East Boulder River consistent with the narrative prohibition at 17.30.637(1)(e) as modified by the applicable nonsignificance criteria at ARM 17.30.715.

**Section 6** – Comments Submitted by David Brooks, Executive Director, Montana Trout Unlimited

**COMMENT 6.1 SUMMARY**: MTU IS UNCLEAR ON THE METHODOLOGY DEQ HAS USED TO ESTABLISH NEW EFFLUENT LIMITS FOR TOTAL NITROGEN (TN) UNDER NARRATIVE STANDARDS.

**Comment 6.1:** It seems that the proposed TN limits in the permit modification are based on capping the E. Boulder facility at its current (or relatively recent or even projected future) water treatment performance, rather than water quality criteria as defined by the narrative standards being evaluated in Appendix A of the draft permit fact sheet. As stated in the Fact Sheet: "To interpret the narrative prohibition as modified by the nonsignificance criterion, DEQ used the narrative nutrient translation process described in Appendix A of this Fact Sheet and documented in Appendix B. (page 8, Fact Sheet)." But MTU does not see a "narrative nutrient translation process being described in Appendix A. Appendix A is a checklist of narrative criteria and the data that has been collected to describe those criteria for the receiving waterbody. How that data is being translated into effluent standards remains unclear. Thus, we request a clearer explanation of how the proposed TN limit of 16lbs/day is explicitly related and derived from narrative standard criteria, rather than the current or likely water quality discharges from the facility. We are also curious as to why the new limit of 16lbs/day was set given that DEQ states in the

Fact Sheet that the facility is quite capable of achieving the current permit's interim discharge level of 15.1lbs/day of TN (page 3, Fact Sheet).

***Response 6.1:***

See Responses to Comments 1.1, 3.1 and 4.1

**COMMENT 6.2 SUMMARY:** WHY IS THE MORE ROBUST SCIENTIFIC UNDERSTANDING OF HOW NARRATIVE CRITERIA HAVE IMPROVED NOT BEING CITED OR APPLIED?

**Comment 6.2:** MTU also requests a more thorough use of scientific literature to determine nonsignificant impacts of TN to a receiving waterbody. The only citation for how DEQ determines measurable effects of TN loads to a receiving waterbody, according to the Fact Sheet (page 8) is a 2015 publication by DEQ staff. Having participated for years on the Nutrient Work Group established by HB358 and disbanded by HB 664, MTU has consistently heard from the Department that new science, since MT's adoption then repeal of numeric nutrient standards, makes applying narrative standards far more site specific and stringent than before the adoption in MT of numerics. Why is that more robust scientific understanding of how narrative criteria have improved not being cited or applied? Similarly, for establishing the long term average multiplier that is used to calculate the 16lbs/day TN in this draft permit, DEQ is relying on a 1991 EPA method (page 13, Fact Sheet). Is there no more recent and site specific methodology for this calculation?

***Response 6.2:***

The commenter mischaracterizes the extent to which scientific literature was used in DEQ's analysis (see References section of the Fact Sheet and this Response to Comments document). A robust scientific understanding of how narrative criteria can be applied protectively has been applied in this permit. The use of the TSD multiplier is intended to capture variability in samples (based on their sample) representing an activity that is not monitored continuously and is a statistical approach that is both appropriate and widely used in NPDES permitting. DEQ notes that TSD multipliers need not be site specific as they are derived from statistical principles not biological ones.

**COMMENT 6.3 SUMMARY**: A DISCHARGE LEVEL OF TN THAT DOES NOT ALLOW WATER QUALITY CRITERIA TO RECOVER FROM PREVIOUS, MEASURABLE IMPACTS, SHOULD BE CONSIDERED A SIGNIFICANT IMPACT.

**Comment 6.3:** The Fact Sheet also makes clear that the draft permit level of 16lbs/day of TN is based on the assumption that since 2018 measurable impacts to water quality criteria in the E. Boulder attributable to TN discharge from the facility have tapered off or become nonsignificant. In fact, if water quality criteria have not recovered to pre-discharge levels since 2018, then it is reasonable to consider that TN discharge levels since 2018 continue to suppress water quality such as macroinvertebrates and continue to maintain higher than normal baseline levels of other criteria, such as algae, chlorophyll-A, etc. A discharge level of TN that does not allow water quality criteria to recover from previous, measurable impacts, should be considered a significant impact. For example, Figure 9 (page 22, Fact Sheet) seems to clearly show that macroinvertebrate populations are already being measurably

impacted below the facility discharge, as compared to monitoring sites above the facility's discharge, according to media data through 2024, thus well after 2018. The same conclusion can be drawn for macroinvertebrates in Figure 10.

### *Response 6.3*:

This comment pre-supposes that no recovery in water quality criteria has been documented, which is not the case. The biological criterion based on the macroinvertebrate O/E metric has shown recovery in recent years (relative to the upstream control) compared to the first five years of the mine's operation when TN loads were particularly high.

**COMMENT 6.4 SUMMARY**: CONCERNS ABOUT THE MAY 31ST WATER QUALITY MONITORING.

**Comment 6.4:** In regard to monitoring, DEQ has established a once-a-year requirement (minimum with no incentive or impetus to do more). The monitoring period is between July 1 and September 30. Reporting on findings to DEQ by the company are not due until the following May 31st. Why isn't the monitoring period more specific for each water quality criteria, based on a more precise understanding of when measurable impacts to each criteria are most likely to be observable? For example, does a September 30 monitoring date really capture possible impacts to macroinvertebrates that have already completed their aquatic lifestage(s) earlier in the year or true impacts of algae, which can be well on the wane by this late in the season. Similarly, delta for dissolved oxygen (day versus night) is likely to much greater during the warmest days of summer than at the end of September. Is there any reason that DEQ doesn't require a monitoring to be tailored to observing measurable impacts to water quality criteria when they are most likely to be observed? Additionally, DEQ not getting results from a monitoring program until May 31st of the following year means that any adaptive management would likely lag for at least another full year. How long does it actually take monitoring data to be compiled and reported to DEQ?

### *Response 6.4:*

Generally, monitoring periods are specific for water quality (chemical and biological) parameters which are sensitive to season. For example, the department's standard operating procedures for collecting diatoms, macroinvertebrates, and benthic algae all contain index periods. The department has researched and published on the appropriate time periods for collecting and assessing nutrients (Suplee et al. 2007).

The department is aware of the times of year that water quality and biological parameters are most sensitive to impact and has tailored its standard operating procedures to reflect this. For example, the index period for collecting algal biomass and aquatic insect (macroinvertebrate) samples corresponds to the summer growing season (June 21 to October 1).

**COMMENT 6.5 SUMMARY:** MTU REQUESTS THAT APPENDIX B, WHAT IS SUPPOSED TO BE THE ACTUAL ANSWERS TO AND DATA FOR THE NARRATIVE NUTRIENT STANDARD CHECKLIST (APPENDIX A) BE REDONE SUCH THAT THE ANSWERS, DATA AND GRAPHIC REPRESENTATIONS ARE MORE COMPREHENSIBLE TO THE PUBLIC.

**Comment 6.5:** Finally, MTU requests that Appendix B, what is supposed to be the actual answers to and data for the Narrative Nutrient Standard checklist (Appendix A) be redone such that the answers, data and graphic representations are more comprehensible to the public. As it is currently included in the Fact Sheet, Appendix B is a rather incomprehensible presentation of data and narrative answers to the checklist questions. DEQ needs to provide a much cleaner presentation/documentation of data/answers to the checklist for public evaluation. That is especially true of the graphic representation of data. Most of these graphs have no key to what appear to be lines that perhaps represent means or thresholds (the blue lines on most graphs are not explained). Most of the labels for these graphs do not seem to comport with the information in those graphs. To provide a single example, the graph (pdf page 41 of 69) is labeled: "Observed measurable change between EBR-004(a) and EBR-002 in 2008." Yet the graph's axis is a 25-year timeline and there is no indication of what the blue line represents. Most of the graphs in Appendix B are equally confusing.

***Response 6.5:***
DEQ notes that all figures included in the Fact Sheet included captions describing their contents. These have been added to the figures in Appendix B, which is a technical document intended to summarize the analyses performed by the department in service of translating the narrative nutrient standard. All information used for decision-making purposes was clearly described in the Fact Sheet.

**Section 7** – Comments Submitted by Dr. Vicki Watson, Aquatic Ecologist

**COMMENT 7.1 SUMMARY:** 30 DAYS IS INSUFFICIENT TIME FOR THE INTERESTED PUBLIC TO STUDY THESE DOCUMENTS. I AGREE WITH DEQ'S CONCLUSION AND THANK THEM FOR KEEPING TN LOADING AT A LEVEL THAT EVIDENCE SUGGESTS IS NEEDED TO PROTECT WATER QUALITY IN THE EAST BOULDER RIVER AND DOWNSTREAM.

**Comment 7.1:** I heard about this only a few days ago so I have not had time to study the massive documents thoroughly. I note that the document was released on October 8, 2025 and comments are due November 7, 2025.

I feel that one month is insufficient time for the interested public to study these documents and comment thoughtfully.

If I have understood the document correctly from my brief review, it appears that DEQ plans to reduce the allowed load of Total Nitrogen to the receiving water from 32 lbs/day to 16 /bs per day.

The mine has been meeting that lower limit using upgraded treatment/management, and the lower load has improved water quality conditions in the receiving water. There were water quality problems earlier

when the load was higher. Hence the lower loading has been shown to be achievable and beneficial, and allowing a higher load could be detrimental.

If the above is correct, I agree with DEQ's conclusion and thank them for keeping TN loading at a level that evidence suggests is needed to protect water quality in the East Boulder River and downstream.

There may be other issues raised by changes in the permit, but as I said, I had insufficient time to examine all the possible ramifications of the changes.

I would like to be receive future notices of actions on this permit. Thank you.

***Response 7.1:***

The 30-day public comment period for this permit modification, which is limited to modifying the final effluent limitation for TN, a single parameter, was consistent with the public notice procedures for permit actions at ARM 17.30.1372. In consideration of the limited scope of this permit modification, DEQ considers 30 days to be an adequate amount of time to comment on the proposed permit modification. DEQ notes that this is the same amount of time provided for public notice MT-23-02 for the 2023-renewal of the full permit MT0026808 for the East Boulder Mine. DEQ further notes that no commenter requested a Public Hearing.

DEQ thanks the commenter for their comment and concurs with the commenter's high-level characterization in paragraph 4 of the comment. DEQ does note that this modification changes the final effluent limitation based on DEQ-12A nutrient standards to one based on the narrative standards at ARM 17.30.637(1)(e) and that 32 lbs TN/day was the first interim effluent limitation in the 2023-issued permit, not the final effluent limit.

The department has added the commenter to the applicable interested parties' lists.

No changes were made to the permit or EA in response to this comment.

# REFERENCES


Coyle, M.K. (2016). *Didymosphenia geminata* in the Kootenai River in Libby, Montana: Nuisance Mat Characteristics and Management Strategies for Suppression. PhD Dissertation, University of Idaho, 248 pp.

Fergus, C.E., Brooks, J.R., Kaufmann, P.R., Herlihy, A.T., Hill, R.A., Mitchell, R.M., and P. Ringold (2023). Disentangling natural and anthropogenic effects on benthic macroinvertebrate assemblages in western US streams. *Ecosphere* DOI: 10.1002/ecs2.4688

Hurlbert, S.H. (1984). Pseudoreplication and the design of ecological field experiments. *Ecological Monographs* 54: 187-211.

Mazor, R.D., Purcell, A.H., and V.H. Resh (2009). Long-term variability in bioassessments: A twenty-year study from two northern California streams. *Environmental Management* 43: 1269-1286.

Munkittrick, K.R., Arens, C.J., Lowell, R.B., and G.P. Kaminski (2009). A review of potential methods of determining critical effect size for designing environmental monitoring programs. *Environmental Toxicology and Chemistry* 28: 1361-1371.

Stribling, J.B., Jessup, B.K., and D.L. Feldman (2008). Precision of benthic macroinvertebrate indicators of stream condition in Montana. *Journal of the North American Benthological Society* 27: 58-67.

Suplee, M.W. 2023. An Analysis of Daily Patterns of Dissolved Oxygen Change in Flowing Waters of Montana. Helena, MT: Montana Dept. of Environmental Quality.

Suplee, Michael W., Varghese, A., and J. Cleland (2007). Developing nutrient criteria for streams: An evaluation of the frequency distribution method. *Journal of the American Water Resources Association* 43: 453-472.

Suplee, M.W., Sada, R.H., Feldman, D., and G. Bruski (2016). Whole-stream Nitrogen and Phosphorus Addition Study to Identify Eutrophication Effects in a Wadeable Prairie Stream. Helena, MT: Montana Dept. of Environmental Quality.

Teply, M. (2010). Diatom Biocriteria for Montana Streams. Cramer Fish Sciences, Lacy WA.

Whitton, B.A., Ellwood, N.T.W., and B. Kawecka (2009). Biology of the freshwater diatom *Didymosphenia*: A review. *Hydrobiologia* 630: 1-37.

# MT0026808 SMC EBM NARRATIVE TN CHECKLIST

Alanna Shaw

```
knitr::opts_chunk$set(echo = TRUE, warning = FALSE)
```

```
pacman::p_load(rmarkdown, tidyverse, ggplot2, ggpubr, ggtext, rstatix, datarium, performance, see, boot, patchwork, janitor)
```

---

# APPLICABLE WATER QUALITY CRITERIA:

## ARM 17.30.637:

1. State surface waters must be free from substances attributable to municipal, industrial, agricultural practices or other discharges that will:
    a. settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines;
    b. create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter), or globules of grease or other floating materials;
    c. produce odors, colors, or other conditions as to which create a nuisance or render undesirable tastes to fish flesh or make fish inedible;
    d. create concentrations or combinations of materials which are toxic or harmful to human, animal, plant, or aquatic life; and
    e. **create conditions which produce undesirable aquatic life.**

SMC-EBM is classified as a new source (2023 Fact Sheet), therefore the above criterion is modified by the below nonsignificance criteria:

## 17.30.715(1)(h):

changes in the quality of water for any parameter for which there are only narrative water quality standards if the changes will not have a measurable effect on any existing or anticipated use or cause measurable changes in aquatic life or ecological integrity.

AND

## 17.30.715(2):

2. Notwithstanding compliance with the criteria of (1), the department may determine that the change in water quality resulting from an activity which meets the criteria in (1) is degradation based upon the following:
    a. cumulative impacts or synergistic effects;
    b. secondary byproducts of decomposition or chemical transformation;
    c. substantive information derived from public input;
    d. changes in flow;
    e. changes in the loading of parameters;
    f. new information regarding the effects of a parameter; or
    g. any other information deemed relevant by the department and that relates to the criteria in (1).

Discharges are considered nonsignificant if they meet both of these criteria.

---

# Narrative Nutrient Standards: Checklist of Considerations for Developing Permit Limits

This checklist and guide provides a series of factors for MPDES Permit Writers (and others) to consider when developing total nitrogen (TN) and total phosphorus (TP) permit limits under the narrative nutrient standard at ARM 17.30.637(1)(e). This approach considers best-available scientific knowledge on Montana rivers and streams at the regional scale, as well as site-specific conditions and scientific information for the waterbody in question. Receiving waterbody characteristics influence the way TN and TP affect primary productivity and biomass, dissolved oxygen and pH patterns, and aquatic life metrics. The process outlined here is intended to account for these effects at the site-specific level.

# 1. CONSULTATION:

## Who is the DEQ staff person with expertise on the receiving waterbody?

Michael Suplee, Ph.D. (SMS WQPB)

# 2. SITE-SPECIFIC CHARACTERISTICS OF THE RECEIVING WATERBODY

##TN loading, 2000-2025:

```
TN_dmr <- read_csv("TN_DMR_2000_2025.csv")
```

```
## Rows: 302 Columns: 3
## ── Column specification ────────────────────────────────────────────────────────
## Delimiter: ","
## chr (2): DMR_Date, TIN_TN_lbday
## dbl (1): TIN_TN_ratio
##
## ℹ Use `spec()` to retrieve the full column specification for this data.
## ℹ Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
TN_003 <- read_csv("TN_003_lbday.csv")
```

```
## Rows: 25 Columns: 2
## ── Column specification ────────────────────────────────────────────────────────
## Delimiter: ","
## dbl (2): Year, TN_003_lbday
##
## ℹ Use `spec()` to retrieve the full column specification for this data.
## ℹ Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
TN_dmr <- TN_dmr %>%
            mutate(parsed_date = mdy(DMR_Date)) %>%
            mutate(Year = year(parsed_date)) %>%
            mutate(TIN_TN_lbday = as.numeric(TIN_TN_lbday, na.rm = T))  %>%
            mutate(TIN_TN_ratio = as.numeric(TIN_TN_ratio))  %>%
            mutate(TN_lbday_002 = (TIN_TN_lbday*TIN_TN_ratio))

#negatively skewed

TN_dmr_sum <- TN_dmr %>%
                group_by(Year) %>%
                summarize(ann_mean_TN = mean(TN_lbday_002, na.rm = TRUE),
                          ann_SD_TN = sd(TN_lbday_002, na.rm = TRUE))

TN_dmr_sum <- TN_dmr_sum %>%
              full_join(TN_003, by = join_by(Year), keep = FALSE) %>%
              mutate(TN_lbday = ann_mean_TN + TN_003_lbday)
```

# a. Is the waterbody a ditch, a wadeable stream, a medium river, or a large river?

wadeable stream

# b. Is the waterbody currently on the 303(d) list for nutrients, benthic chlorophyll a or ash free dry weight, dissolved oxygen, or pH?

MT43B004_143- East Boulder River Headwaters to National Forest Boundary) is the immediate surface water receiving water and is not on the 303(d) list for nutrients, benthic chlorophyll a or ash free dry weight, dissolved oxygen, or pH.

Downstream segments of the EBR are on the 303(d) list for nutrient-related parameters:

- MT43B004_142 (National Forest boundary to Elk Creek) is listed as impaired for for chlorophyll-a
- MT43B004_141 (Elk Creek to mouth (Boulder River)) listed as impaired for chlorophyll-a
- MT43B004_132 Boulder River, downstream of where the East Boulder River flows into the Boulder River is listed as impaired for total nitrogen.

# c. What is the growing season hydrologic condition of the receiving waterbody?

perennial

# d. Is the receiving waterbody a Spring Creek (see Decker-Hess, 1989)?

No

# e. Is there a lake downstream of the discharge that is near enough that the facility’s discharge is likely to have effects?

No

## f. What is the critical condition flow of the receiving water?

7Q10: 3.23 mgd (5.0 cfs) (2023 Fact Sheet)

14Q5: 6.79 mgd (10.5 cfs) (2023 Fact Sheet)

## g. Is the receiving waterbody, for several miles upstream of the facility and then downstream of the discharge (or mixing zone, where applicable), heavily shaded by riparian canopy or is it largely open to sunlight?

upstream: largely open to sunlight (1992 FEIS; field photographs)

downstream: largely open to sunlight (1992 FEIS; field photographs)

## h. What is the dominant substrate ($D_{50}$) of the receiving waterbody upstream of the facility and downstream of the discharge (or mixing zone, where applicable)?

upstream: gravel/cobble (1992 FEIS; field photographs)

downstream: gravel/cobble (1992 FEIS; field photographs)

## i. Has continuous dissolved oxygen (DO) been monitored within several miles upstream of the facility and downstream of the discharge (or mixing zone, where applicable)?

upstream: no

downstream: no

Have there been exceedences of DEQ-7 DO standards?

upstream: unknown

downstream: unknown

### Which ones and where?

upstream: unknown

downstream: unknown

### What is the average DO delta during summer?

upstream: unknown

downstream: unknown

## j. Has attached benthic algae been quantified (as chlorophyll *a*, ash free dry weight, or visually assessed) in the Receiving Waterbody upstream of the facility and downstream of the discharge mixing zone (where applicable)?

Yes, as chlorophyll-a and AFDW (AFDM).

## What are the reach average values?

indicated below chlorophyll-a and AFDW headers

## How do they compare to the undesirable recreational thresholds in Suplee et al. (2009) and/or other DEQ resources?

# TN DISCHARGE HISTORY:

## chlorophyll a:

- undesirable rec threshold: 150 mg chl-a $m^{-2}$ (indicated in figures by red horizontal line)
  - ~3 exceedences of the undesirable rec threshold (upstream of discharge)
- measurable change: 20 mg chl-a $m^{-2}$ (indicated in figures by blue horizontal line)
  - no identified measurable changes between upstream (EBR-002/EBR-003) and downstream (EBR-005) of discharges

```
chl.a <- read_csv("Tab 12 Chlor 4I.csv")
```

```
## Rows: 643 Columns: 3
## ── Column specification ────────────────────────────────────────────────────────
## Delimiter: ","
## chr (1): Station
## dbl (2): MeanChl_mgm2, Year
##
## ℹ Use `spec()` to retrieve the full column specification for this data.
## ℹ Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
chl.a <- chl.a %>%
                  filter(Station != "EBR-004") %>%
                  filter(Station != "EBR-004a") %>%
                  filter(Station != "EBR-001") %>%
                  filter(Year >= "2000")

# EBR-002: 1999-2024
# EBR-003: 1999-2024
# EBR-005: 2013-2024
```

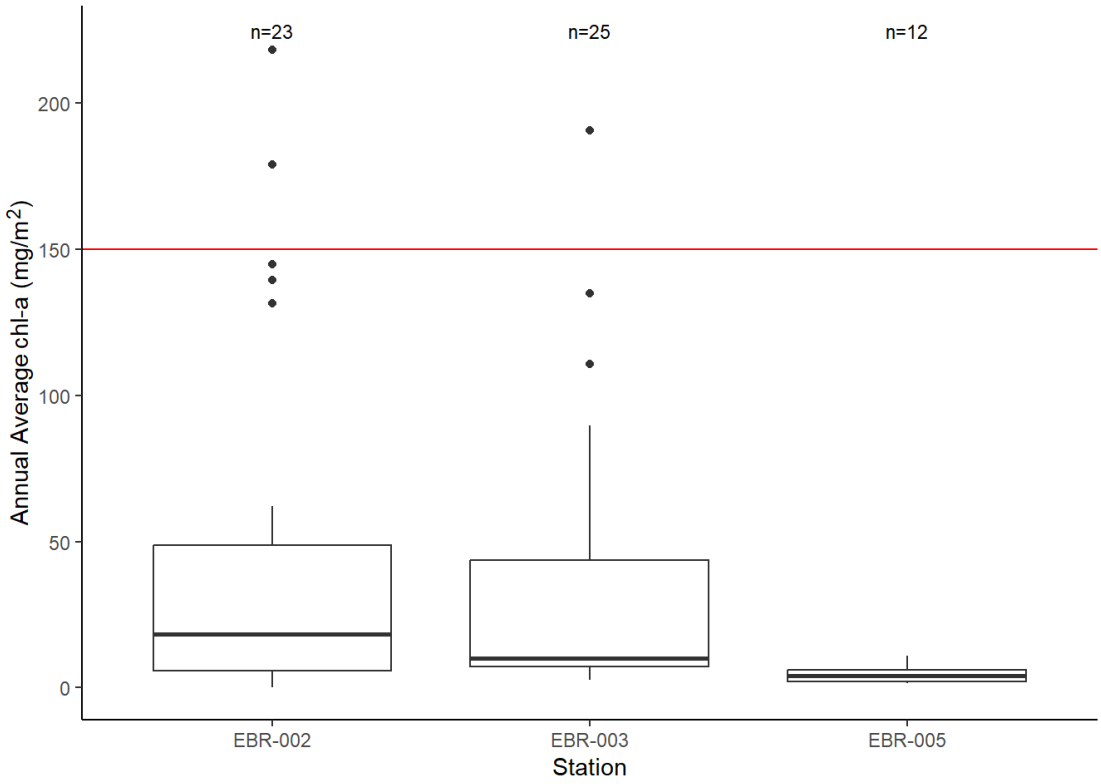
```
chl.a_sum <- chl.a  %>%
                group_by(Station, Year) %>%
                summarize(ann_mean_chl = mean(MeanChl_mgm2, na.rm = TRUE))
```

```
## `summarise()` has grouped output by 'Station'. You can override using the
## `.groups` argument.
```

```
chl.a_sitesum <- chl.a  %>%
                group_by(Station) %>%
                summarize(ann_mean_chl = mean(MeanChl_mgm2, na.rm = TRUE),
                          ann_sd_chl = sd(MeanChl_mgm2, na.rm = TRUE))

counts_chl.a <- chl.a_sum %>%
  group_by(Station) %>%
  summarise(n = n())

chl.a_sum.plot <- ggplot(chl.a_sum) +
            aes(x = Station, y = ann_mean_chl) +
            geom_boxplot() +
            labs(x = "Station", y = "Annual Average chl-a (mg/m<sup>2</sup>)") +
             geom_text(data = counts_chl.a, aes(x = Station, y = max(chl.a_sum$ann_mean_chl) + 4, label = paste0("n
=", n)),
            vjust = 0, size = 3) +
            geom_hline(yintercept = 150, color = "red") + #red line indicates harm to recreational use threshold of 1
50 mg Chl-a m^-2
            theme_classic() +
            theme(axis.title.y = element_markdown())
```

Figure 4. Box and whisker plot of mean annual chlorophyll-a densities at each EBR monitoring station (upstream stations EBR-002 and EBR-003 monitored 2000-2024, downstream station and EBR-005 monitored 2013-2024). The red line denotes the harm recreational beneficial use threshold of 150 mg chl-a/$m^2$ (values above this line indicate impairment). Number of years with chl-a data (each year computed average of repeat measures) indicated by “n=” values.

```
chl.a_sum.plot #red line indicates harm to recreational use threshold of 150 mg Chl-a m^-2
```




- station average values (note: period of record longer for upstream stations than downstream):

```
knitr::kable(chl.a_sitesum, digits = 3, col.names = c("Station",  "Mean mg Chl-a/m<sup>2</sup>",  "SD mg Chl-a/m<sup>
2</sup>"))
```

| Station | Mean mg Chl-a/m$^2$ | SD mg Chl-a/m$^2$ |
|---|---|---|
| EBR-002 | 39.194 | 108.634 |
| EBR-003 | 34.589 | 111.966 |
| EBR-005 | 4.894 | 8.163 |

```
chl.a_002 <- chl.a %>%
                    filter(Station == "EBR-002") %>%
                            group_by(Year) %>%
                            summarize(ann_mean_chl.002 =
                                      mean(MeanChl_mgm2, na.rm = TRUE))

chl.a_003 <- chl.a %>%
                    filter(Station == "EBR-003") %>%
                            group_by(Year) %>%
                            summarize(ann_mean_chl.003 =
                                      mean(MeanChl_mgm2, na.rm = TRUE))

chl.a_005 <- chl.a %>%
                filter(Station == "EBR-005") %>%
                  group_by(Year) %>%
                  summarize(ann_mean_chl.005 =
                              mean(MeanChl_mgm2, na.rm = TRUE))
```

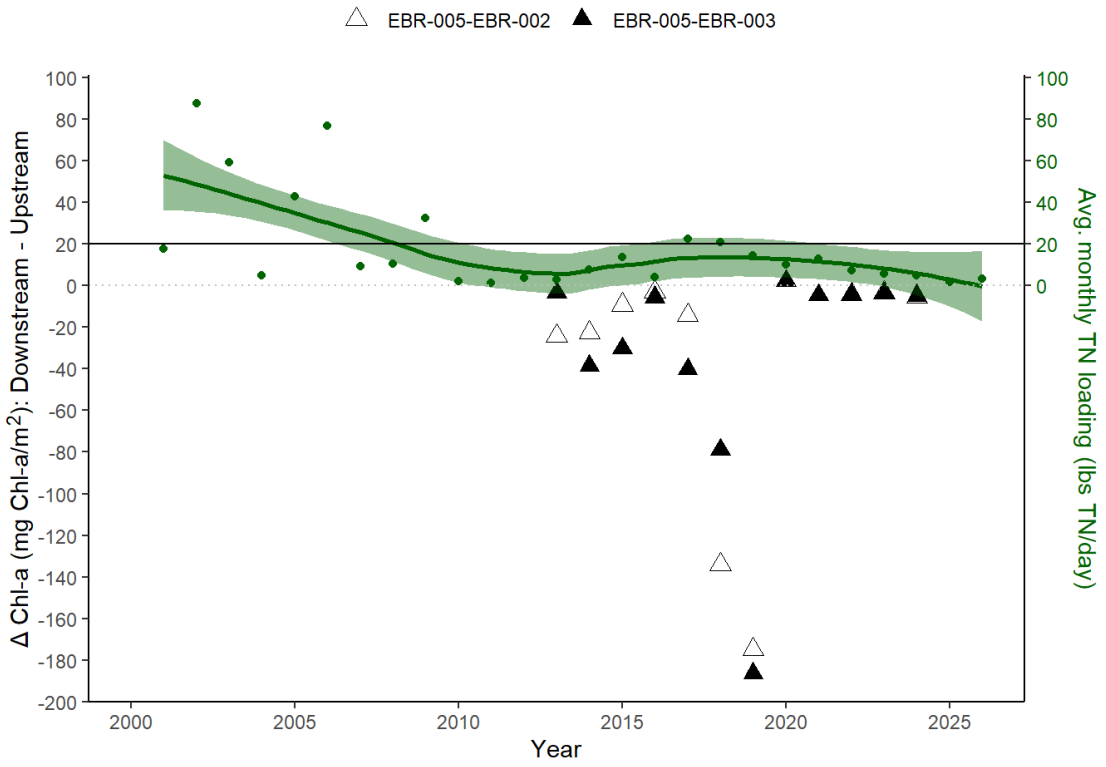
```
chl.a_delta <- chl.a_005 %>%
  full_join(chl.a_002, by = join_by(Year), keep = FALSE) %>%
  full_join(chl.a_003, by = join_by(Year), keep = FALSE) %>%
  full_join(TN_dmr_sum, by = join_by(Year), keep = FALSE) %>%
  mutate(delta_5_chl_2 = ann_mean_chl.005 - ann_mean_chl.002) %>%
  mutate(delta_5_chl_3 = ann_mean_chl.005 - ann_mean_chl.003) %>%
  mutate(Year_plus1 = Year + 1)

chl.a_delta_long <- chl.a_delta %>%
                    pivot_longer(
                      cols = starts_with("delta"),
                      names_to = "down_up",
                      values_to = "delta"
                    )

chl.a_delta_long_5 <- chl.a_delta %>%
                    pivot_longer(
                      cols = starts_with("delta_5"),
                      names_to = "down_up",
                      values_to = "delta"
                    )

chl.a_scale_factor <- 1
```

```
chl.a.delta.5.plot <- ggplot(chl.a_delta_long_5) +
            aes(x = Year, y = delta) +
            geom_point(aes(shape = down_up), size = 3) +
            scale_shape_manual(values = c("delta_5_chl_2" = 2,
                                          "delta_5_chl_3" = 17),
                               labels = c("EBR-005-EBR-002",
                                          "EBR-005-EBR-003")) +
            labs(x = "Year") +
            geom_point(aes(x = Year_plus1, y = ann_mean_TN),
                       color = "darkgreen") +
            geom_smooth(aes(x = Year_plus1, y = ann_mean_TN),
                        color = "darkgreen", fill = "darkgreen") +
            scale_x_continuous(breaks = seq(from =1990, to = 2025, by = 5)) +
            scale_y_continuous(name = "Δ Chl-a (mg Chl-a/m<sup>2</sup>): Downstream - Upstream",
                               breaks = seq(from = -200, to = 200, by = 20),
                               sec.axis = sec_axis(~ . /chl.a_scale_factor,
                                                   name = "Avg. monthly TN loading (lbs TN/day)",
                                                   breaks = seq(from = 0, to = 100, by = 20))) +
            geom_hline(yintercept = 0, linetype = "dotted", color = "grey") +
            geom_hline(yintercept = 20, linetype = "solid", color = "black") +
            theme_classic() +
            theme(legend.position = "top",
                  legend.title = element_blank(),
                  axis.title.y = element_markdown(),
                  axis.title.y.right=element_text(color = "darkgreen"),
                  axis.text.y.right=element_text(color = "darkgreen"))
```

Figure 5. Difference between downstream (EBR-005) and upstream (EBR-002 & EBR-005) chlorophyll-a concentrations over the course of the mine's history. The green dots indicate mean monthly TN load (lbs/day) annually for the year prior to chlorophyll-a, accounting for the ~1 year travel time of effluent from ground to surface waters. 2001-2014 TN load calculated based on the TN:TIN ration in effluent from Nov 2015-March 2021 (6.0). The green line is a locally estimated scatter plot smoothing function, which fits local regressions to subsets of the data, indicating overall data trend. The green shading around the line represents the 95% confidence interval around the smoothing function. Horizontal line indicates the measurable change threshold for HBI.

```
chl.a.delta.5.plot
```

```
## `geom_smooth()` using method = 'loess' and formula = 'y ~ x'
```




No identified measurable changes between upstream and downstream sites, note: limited period of record corresponding to lower TN loading.

### AFDW:

- undesirable rec threshold: 35 g/m$^2$ (indicated in figures by red horizontal line)
- measurable change: 20 g/m$^2$

```
AFDM <- read_csv("Tab 13 AFDW 4I.csv") %>%
                  convert_as_factor(Station, Year)
```

```
## Rows: 54 Columns: 3
## ── Column specification ────────────────────────────────────────────────────────
## Delimiter: ","
## chr (1): Station
## dbl (2): AFDM_gm2, Year
##
## ℹ Use `spec()` to retrieve the full column specification for this data.
## ℹ Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
AFDM <- AFDM %>%
                filter(Station != "EBR-004") %>%
                filter(Station != "EBR-004a") %>%
                filter(Station != "EBR-001")
```

```
AFDM_sitesum <- AFDM  %>%
                group_by(Station) %>%
                summarize(ann_mean_AFDM = mean(AFDM_gm2, na.rm = TRUE),
                          ann_sd_AFDM = sd(AFDM_gm2, na.rm = TRUE))
AFDM_year <- AFDM  %>%
                group_by(Station, Year) %>%
                summarize(ann_mean_AFDM = mean(AFDM_gm2, na.rm = TRUE),
                          ann_sd_AFDM = sd(AFDM_gm2, na.rm = TRUE))
```

```
## `summarise()` has grouped output by 'Station'. You can override using the
## `.groups` argument.
```

- station average values:

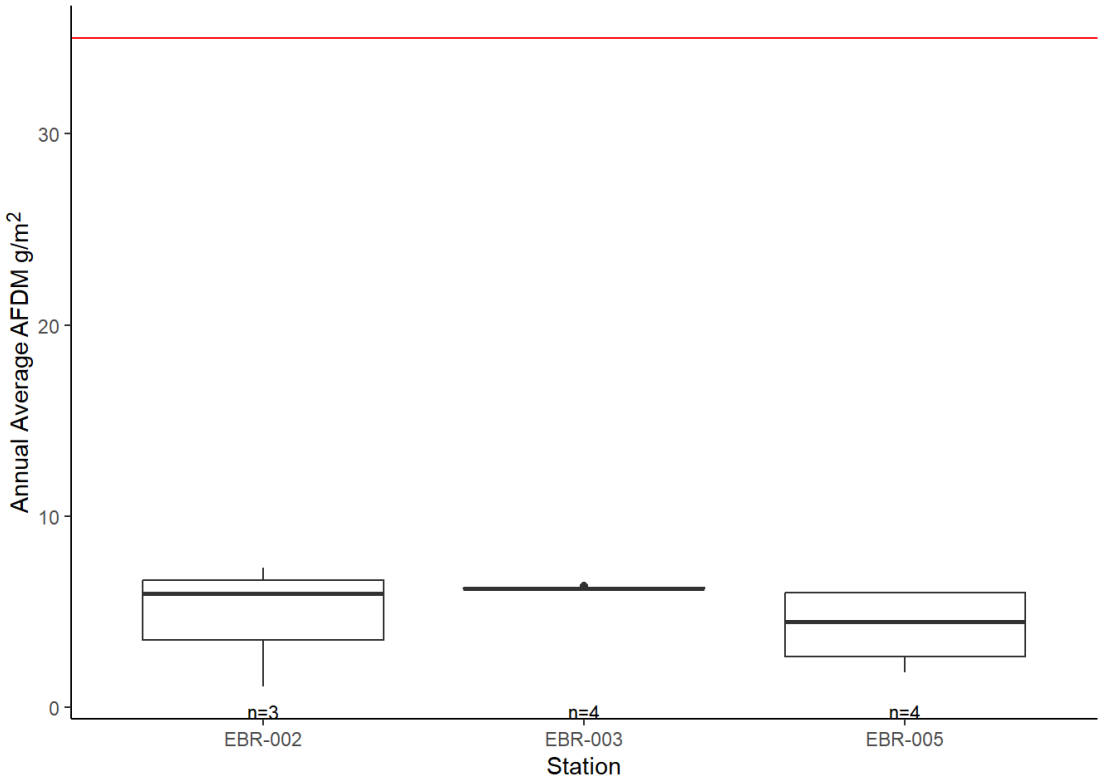
```
knitr::kable(AFDM_sitesum, digits = 3, col.names = c("Station", "Mean AFDM (g/m^2^)", "SD AFDM (g/m^2^)"))
```

| Station | Mean AFDM (g/m$^2$) | SD AFDM (g/m$^2$) |
|---|---|---|
| EBR-002 | 4.792 | 5.239 |
| EBR-003 | 6.251 | 2.020 |
| EBR-005 | 4.198 | 2.821 |

```
counts_AFDM <- AFDM_year %>%
  group_by(Station) %>%
  summarise(n = n())

AFDM.all <- ggplot(AFDM_year) +
            aes(x = Station, y = ann_mean_AFDM, group = Station) +
            geom_boxplot() +
            labs(x = "Station", y = "Annual Average AFDM g/m<sup>2</sup>") +
            geom_text(data = counts_AFDM,
                      aes(x = Station,
                          y = max(AFDM$ann_mean_AFDM) + 4,
                          label = paste0("n=", n)),
            vjust = 0, size = 3) +
            geom_hline(yintercept = 35, color = "red") + #red line indicates harm to recreational use threshold of 35
mg m-2 AFDW
            theme_classic() +
            theme(axis.title.y = element_markdown())
```

Figure 6. Box and whisker plot of mean annual ash free dry mass (AFDM) concentrations at each EBR monitoring station (2022-2024 for EBR-002 and 2022-2024 for EBR-003 & EBR-005). The red line indicates the harm to recreational beneficial use threshold of 35 g AFDW /m$^2$ (values above this line indicate impairment). Number of years with AFDM data (presented as annual average) indicated by “n=” values.

```
AFDM.all
```




#no exceedences of undesirable recreation threshold (indicated by red line) at any Station.

```
AFDM_001 <- AFDM %>%
                  filter(Station == "EBR-001") %>%
                          group_by(Year) %>%
                          summarize(ann_mean_AFDM.001 =
                                    mean(AFDM_gm2, na.rm = TRUE))

AFDM_002 <- AFDM %>%
                  filter(Station == "EBR-002") %>%
                          group_by(Year) %>%
                          summarize(ann_mean_AFDM.002 =
                                    mean(AFDM_gm2, na.rm = TRUE))

AFDM_003 <- AFDM %>%
                  filter(Station == "EBR-003") %>%
                    group_by(Year) %>%
                    summarize(ann_mean_AFDM.003 =
                                mean(AFDM_gm2, na.rm = TRUE))

AFDM_005 <- AFDM %>%
                  filter(Station == "EBR-005") %>%
                    group_by(Year) %>%
                    summarize(ann_mean_AFDM.005 =
                                mean(AFDM_gm2, na.rm = TRUE))
```

```
AFDM_delta <- AFDM_005 %>%
  full_join(AFDM_002, by = join_by(Year), keep = FALSE) %>%
  full_join(AFDM_003, by = join_by(Year), keep = FALSE) %>%
  mutate(ann_meam_AFDM.5_3_delta = ann_mean_AFDM.005 - ann_mean_AFDM.003) %>%
  mutate(ann_meam_AFDM.5_2_delta = ann_mean_AFDM.005 - ann_mean_AFDM.002)
```

No measurable changes identified, very limited period of record.

visual: NA

# k. Are vascular aquatic plants (macrophytes) common in the receiving waterbody?

upstream: NO (% cover)

downstream: NO (% cover)

# l. Have benthic macroinvertebrates been sampled within several miles upstream/downstream of the discharge?

## Beck's Biotic Index 3: NA

## Hilsenhoff Biotic Index:

- harm to use threshold: 3.52
    - several instances of exceedances of this threshold (up and downstream of discharge), most exceedances at EBR-002 & EBR-003 (upstream)
- measurable change threshold: 1

```
HBI <- read.csv("Tab 6 MDEQ HBI 4K.csv")

HBI <- HBI %>%
              filter(Station != "EBR-004")%>%
              filter(Station != "EBR-004a")%>%
              filter(Station != "EBR-001")%>%
                  filter(Year >= "2000")
```

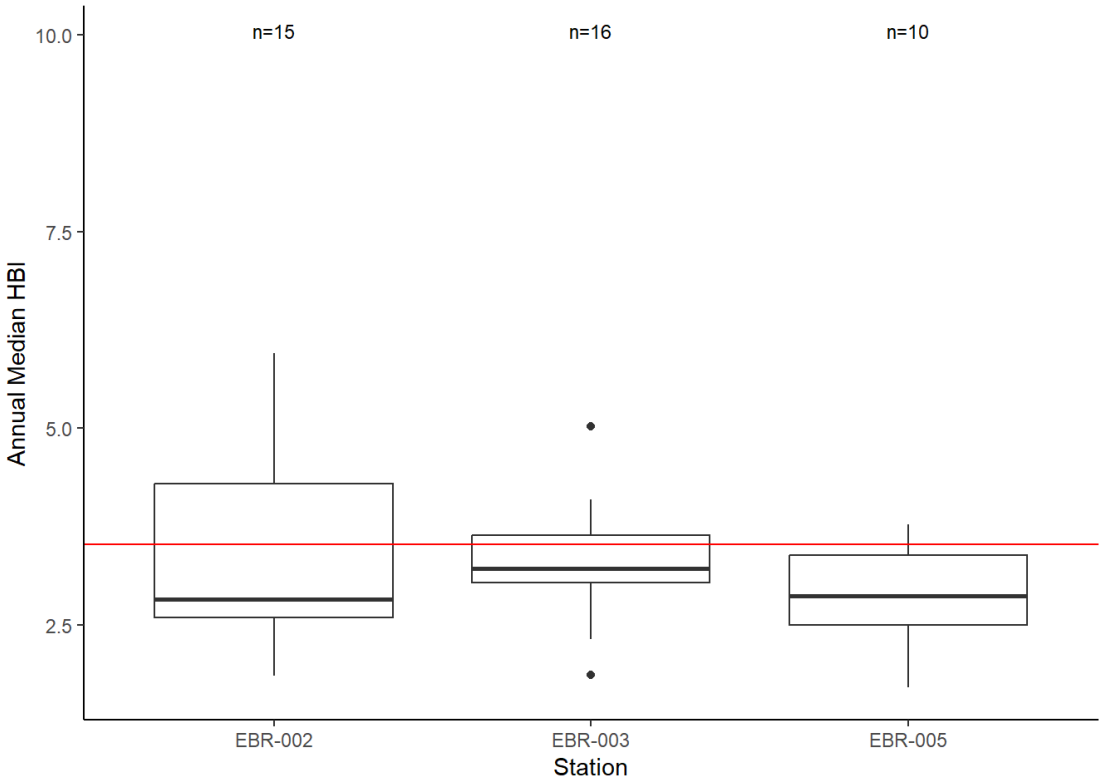
```
HBI_year <- HBI  %>%
                group_by(Station, Year) %>%
                summarize(ann_med_HBI = median(MDEQ_HBI, na.rm = TRUE),
                          ann_sd_HBI = sd(MDEQ_HBI, na.rm = TRUE))
```

```
## `summarise()` has grouped output by 'Station'. You can override using the
## `.groups` argument.
```

```
counts_HBI <- HBI_year %>%
  group_by(Station) %>%
  summarise(n = n())

HBI.all <- ggplot(HBI_year) +
            aes(x = Station, y = ann_med_HBI, group = Station) +
            geom_boxplot() +
            labs(x = "Station", y = "Annual Median HBI") +
            geom_text(data = counts_HBI, aes(x = Station, y = max(HBI_year$ann_med_HBI) + 4, label = paste0("n=",
n)),
            vjust = 0, size = 3) +
            geom_hline(yintercept = 3.52, color = "red") + #harm to use threshold
            theme_classic()
```

Figure 7. Box and whisker plot of annual median Hilsenhoff Biotic Index (HBI) at each EBR monitoring station (2000-2024). The red line indicates the harm to aquatic life beneficial use threshold of 3.52 (values above this level indicate impairment). Number of years with HBI data (each year computed from repeat measures) indicated by "n=" values.

```
HBI.all
```




```
HBI_002 <- HBI %>%
                  filter(Station == "EBR-002") %>%
                          group_by(Year) %>%
                          summarize(ann_med_HBI.002 = median(MDEQ_HBI, na.rm = TRUE),
                                    ann_IQR_HBI.002 = IQR(MDEQ_HBI, na.rm = TRUE))
HBI_003 <- HBI %>%
                  filter(Station == "EBR-003") %>%
                          group_by(Year) %>%
                          summarize(ann_med_HBI.003 = median(MDEQ_HBI, na.rm = TRUE),
                                    ann_IQR_HBI.003 = IQR(MDEQ_HBI, na.rm = TRUE))

HBI_005 <- HBI %>%
                  filter(Station == "EBR-005") %>%
                          group_by(Year) %>%
                          summarize(ann_med_HBI.005 = median(MDEQ_HBI, na.rm = TRUE),
                                    ann_IQR_HBI.005 = IQR(MDEQ_HBI, na.rm = TRUE))
```

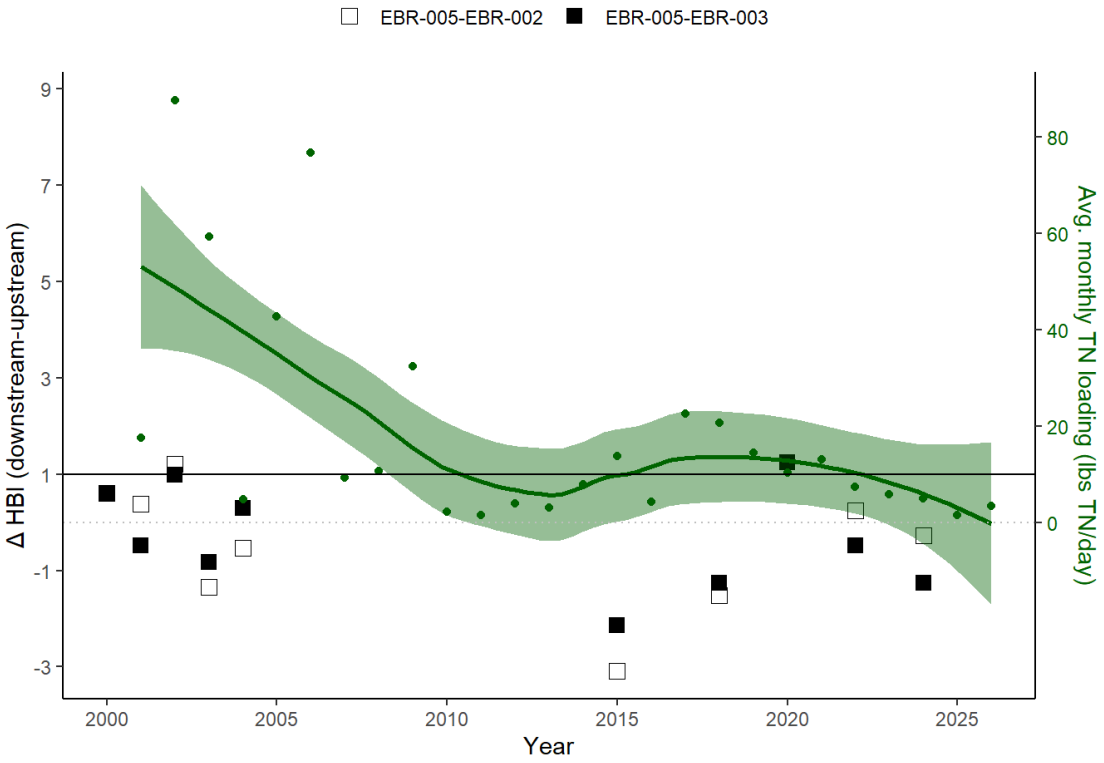
```
HBI_delta <- HBI_005 %>%
  full_join(HBI_002, by = join_by(Year), keep = FALSE) %>%
  full_join(HBI_003, by = join_by(Year), keep = FALSE) %>%
  full_join(TN_dmr_sum, by = join_by(Year), keep = FALSE) %>%
  mutate(Year_plus1 = Year + 1) %>%
  mutate(delta_5_ann_med_HBI_3 = ann_med_HBI.005 - ann_med_HBI.003) %>%
  mutate(delta_5_ann_med_HBI_2 = ann_med_HBI.005 - ann_med_HBI.002)

HBI_delta_long <- HBI_delta %>%
                    pivot_longer(
                      cols = starts_with("delta"),
                      names_to = "down_up",
                      values_to = "delta"
                    )


HBI_delta_long_5 <- HBI_delta %>%
                    pivot_longer(
                      cols = starts_with("delta_5"),
                      names_to = "down_up",
                      values_to = "delta"
                    )

HBI_scale_factor <- 0.1
```

```
HBI.5.delta.plot <- ggplot(HBI_delta_long_5) +
            aes(x = Year, y = delta) +
            geom_point(aes(shape = down_up), size = 3) +
            scale_shape_manual(values = c("delta_5_ann_med_HBI_2" = 0,
                                          "delta_5_ann_med_HBI_3" = 15),
                               labels = c("EBR-005-EBR-002",
                                          "EBR-005-EBR-003")) +
            labs(x = "Year") +
            geom_point(aes(x = Year_plus1, y = ann_mean_TN*HBI_scale_factor), color = "darkgreen") +
            geom_smooth(aes(x = Year_plus1, y = ann_mean_TN*HBI_scale_factor), method = loess, color = "darkgreen", f
ill = "darkgreen") +
            scale_x_continuous(breaks = seq(from =1990, to = 2025, by = 5)) +
            scale_y_continuous(name = "Δ HBI (downstream-upstream)",
                               breaks = seq(from = -5, to = 10, by = 2),
                               sec.axis = sec_axis(~. /HBI_scale_factor,
                                                   breaks = seq(from = 0, to = 100, by = 20),
                                                   name = "Avg. monthly TN loading (lbs TN/day)")) +
            geom_hline(yintercept = 0, linetype = "dotted", color = "grey") +
            geom_hline(yintercept = 1, linetype = "solid", color = "black") +
            theme_classic() +
            theme(legend.position = "top",
                  legend.title = element_blank(),
                  axis.title.y.right=element_text(color = "darkgreen"),
                  axis.text.y.right=element_text(color = "darkgreen"))
```

Figure 8. Difference between downstream (EBR-005) and upstream (EBR-002 & EBR-003) Hilsenhoff's Biotic Index (HBI) benthic macroinvertebrate scores over the course of the mine's history. The green dots indicate mean monthly TN load (lbs/day) annually for the year prior to macroinvertebrate sampling, accounting for the ~1 year travel time of effluent from ground to surface waters. 2001-2014 TN load calculated based on the TN:TIN ration in effluent from Nov 2015-March 2021 (6.0). The green line is a locally estimated scatterplot smoothing function, which fits local regressions to subsets of the data, indicating overall data trend. The green shading around the line represents the 95% confidence interval around the smoothing function. Horizontal line indicates the measurable change threshold for HBI.

```
HBI.5.delta.plot
```

```
## `geom_smooth()` using formula = 'y ~ x'
```




Observed measurable change between EBR-005 and EBR-002/EBR-003 in 2002 and between EBR-005 and EBR-003 2020.

# Observed/Expected

- harm to use threshold : ≤ 0.9
- measurable change: 0.159

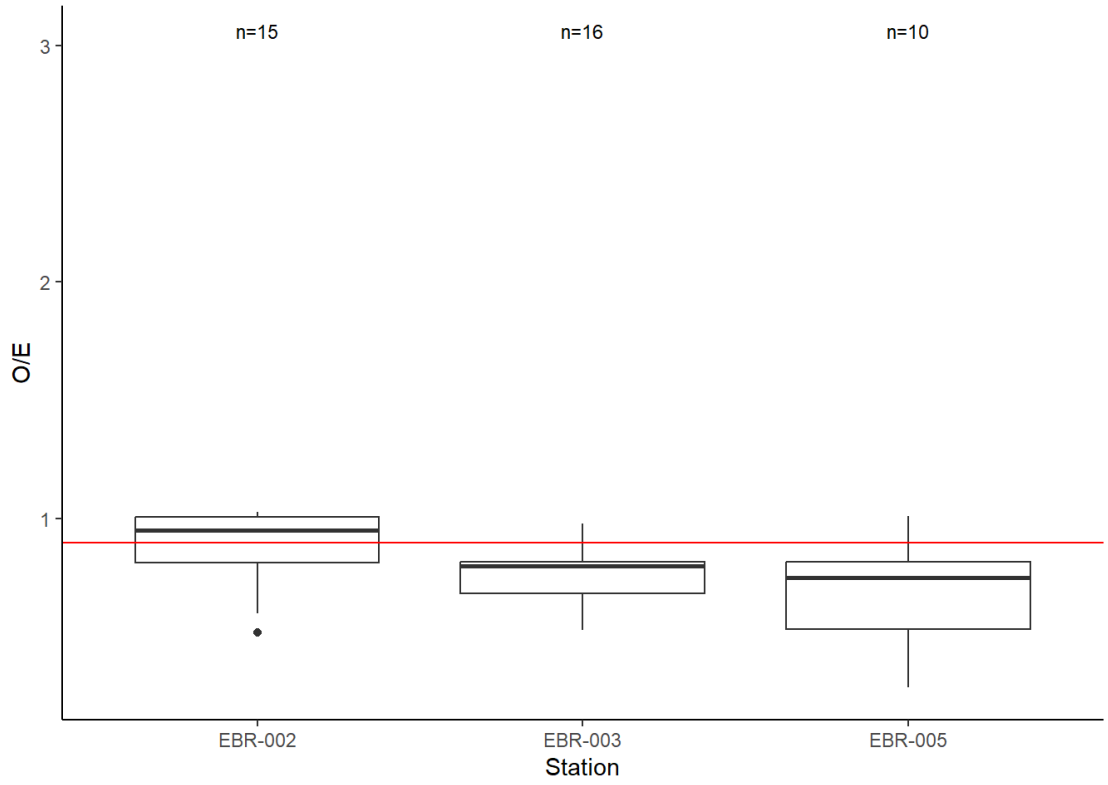
```
OE <- read.csv("Tab 5 OE 4K.csv")

OE <- OE %>%
              filter(Station != "EBR-004") %>%
              filter(Station != "EBR-004a") %>%
              filter(Station != "EBR-001") %>%
              remove_empty("cols") %>%
                  filter(Year >= "2000")

OE_year <- OE  %>%
                group_by(Station, Year) %>%
                summarize(ann_med_OE = median(OE2, na.rm = TRUE),
                          ann_IQR_OE = IQR(OE2, na.rm = TRUE))
```

```
## `summarise()` has grouped output by 'Station'. You can override using the
## `.groups` argument.
```

```
counts_OE <- OE_year %>%
  group_by(Station) %>%
  summarise(n = n())

OE.all <- ggplot(OE_year) +
            aes(x = Station, y = ann_med_OE, group = Station) +
            geom_boxplot() +
            labs(x = "Station", y = "O/E") +
            geom_text(data = counts_OE, aes(x = Station, y = max(OE_year$ann_med_OE) + 2, label = paste0("n=", n)),
            vjust = 0, size = 3) +
            geom_hline(yintercept = .9, color = "red") + #harm to use threshold
            theme_classic()
```

Figure 9. Annual median observed/expected (O/E) benthic macroinvertebrate values at each EBR monitoring station (1998-2024). The red line indicates the harm to aquatic life beneficial use threshold of 0.9 (values below this level are consistent with impairment). Number of years with O/E data (each year computed from repeat measures) indicated by “n=” values.

```
OE.all
```




O/E scores indicates some level of impairment of aquatic community beneficial uses, with EBR-003 and EBR-005 below the impairment threshold.

```
OE_002 <- OE %>%
              filter(Station == "EBR-002") %>%
                      group_by(Year) %>%
                      summarize(ann_med_OE.002 = median(OE2, na.rm = TRUE),
                                ann_IQR_OE.002 = IQR(OE2, na.rm = TRUE))
OE_003 <- OE %>%
              filter(Station == "EBR-003") %>%
                      group_by(Year) %>%
                      summarize(ann_med_OE.003 = median(OE2, na.rm = TRUE),
                                ann_IQR_OE.003 = IQR(OE2, na.rm = TRUE))

OE_005 <- OE %>%
                  filter(Station == "EBR-005") %>%
                         group_by(Year) %>%
                         summarize(ann_med_OE.005 = median(OE2, na.rm = TRUE),
                                   ann_IQR_OE.005 = IQR(OE2, na.rm = TRUE))
```

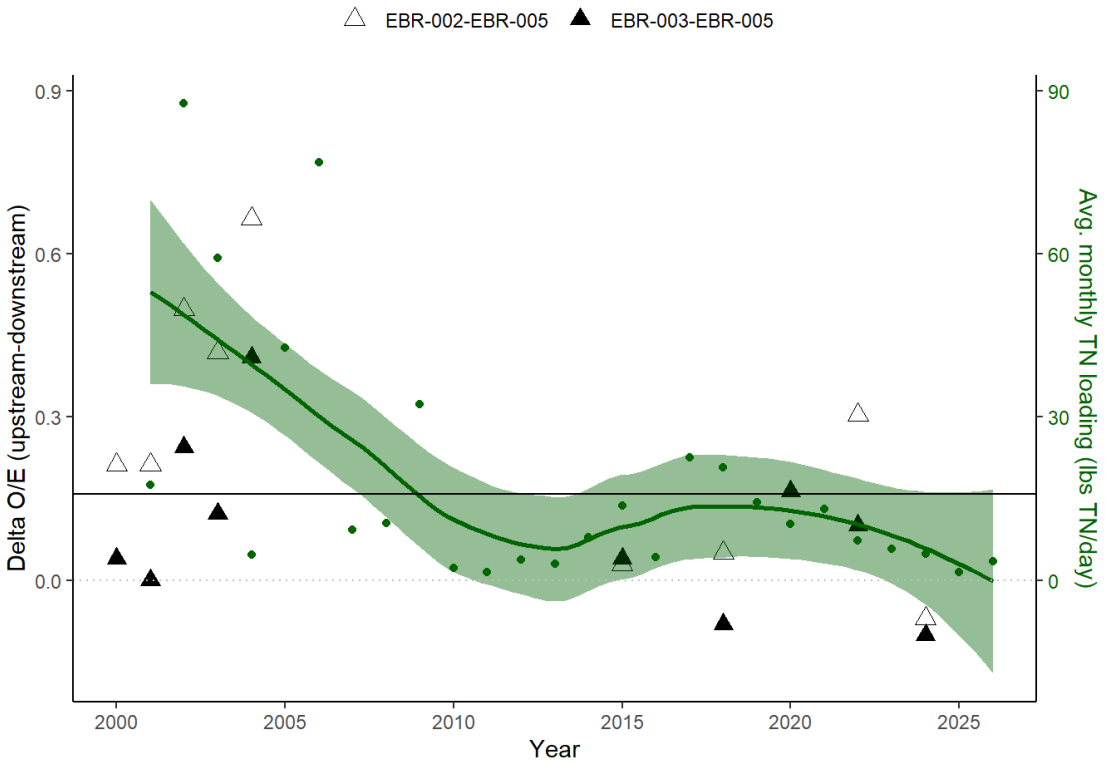
```
OE_delta <- OE_005 %>%
  full_join(OE_002, by = join_by(Year), keep = FALSE) %>%
  full_join(OE_003, by = join_by(Year), keep = FALSE) %>%
  full_join(TN_dmr_sum, by = join_by(Year), keep = FALSE) %>%
  mutate(Year_plus1 = Year + 1) %>%
  mutate(delta_5_OE_2 = ann_med_OE.002 - ann_med_OE.005) %>%
  mutate(delta_5_OE_3 = ann_med_OE.003 - ann_med_OE.005) %>%
  full_join(TN_dmr_sum, by = join_by(Year), keep = FALSE) %>%
  mutate(Year_plus1 = Year + 1)

OE_delta_long <- OE_delta %>%
                    pivot_longer(
                      cols = starts_with("delta"),
                      names_to = "down_up",
                      values_to = "delta"
                    )

OE_delta_long_5 <- OE_delta %>%
                    pivot_longer(
                      cols = starts_with("delta_5"),
                      names_to = "down_up",
                      values_to = "delta"
                    )

OE_scale_factor <- 0.01
```

```
OE.5.delta.plot <- ggplot(OE_delta_long_5) +
            aes(x = Year, y = delta) +
            geom_point(aes(shape = down_up), size = 3) +
            scale_shape_manual(values = c("delta_5_OE_2" = 2,
                                          "delta_5_OE_3" = 17 ),
                               labels = c("EBR-002-EBR-005",
                                          "EBR-003-EBR-005")) +
            labs(x = "Year") +
            geom_point(aes(x = Year_plus1, y = ann_mean_TN.x*OE_scale_factor), color = "darkgreen") +
            geom_smooth(aes(x = Year_plus1, y = ann_mean_TN.x*OE_scale_factor), method = loess, color = "darkgreen",
fill = "darkgreen") +
            scale_x_continuous(breaks = seq(from =1990, to = 2025, by = 5)) +
            scale_y_continuous(name = "Delta O/E (upstream-downstream)",
                               sec.axis = sec_axis(~. /OE_scale_factor, name = "Avg. monthly TN loading (lbs TN/da
y)")) +
            geom_hline(yintercept = 0, linetype = "dotted", color = "grey") +
            geom_hline(yintercept = 0.159, linetype = "solid", color = "black") +
            theme_classic() +
            theme(legend.position = "top",
                  legend.title = element_blank(),
                  axis.title.y.right=element_text(color = "darkgreen"),
                  axis.text.y.right=element_text(color = "darkgreen"))
```

Figure 10. Difference between downstream (EBR-005) and upstream (EBR-002 & EBR-003) O/E benthic macroinvertebrate scores over the course of the mine's history. The green dots indicate mean monthly TN load (lbs/day) annually for the year prior to macroinvertebrate sampling, accounting ro the ~1 year travel time of effluent from ground to surface waters. 2001-2014 TN load calculated based on the TN:TIN ration in effluent from Nov 2015-March 2021 (6.0). The green line is a locally estimated scatterplot smoothing function, which fits local regressions to subsets of the data, indicating overall data trend. The green shading around the line represents the 95% confidence interval around the smoothing function. Horizontal line indicates the measurable change threshold for O/E.

```
OE.5.delta.plot
```

```
## `geom_smooth()` using formula = 'y ~ x'
```




Measurable change in O/E between stations EBR-005 and EBR-002 between 2000-2004 and again in 2022.

MVFP: not appropriate for mountain stream

## m. Have diatom metrics been computed for the receiving waterbody within several miles upstream/downstream of the discharge?

Yes, but sediment increasers (not nutrient specific).

## n. Are there any other unusual, notable characteristics of the receiving waterbody that need to be documented?

See background for monitoring station information.

# 3. ECOREGIONAL RANGES:

The following table provides ranges of TN, TP concentrations which have been demonstrated to be protective of aquatic life and recreation beneficial uses at the ecoregional scale.

| Region | Ecoregion (Level III) | Ecoregion (Level IV) | Range | | Applicable Time Period | |
|---|---|---|---|---|---|---|
| | | | Total Phosphorus (µg/L) | Total Nitrogen (µg/L) | Start of Growing Season | End of Growing Season |
| Western | Northern Rockies (15) | all | 20 - 40 | 139 - 750 | July 1 | Sept. 30 |
| Western | Canadian Rockies (41) | all | 20 - 60 | | July 1 | Sept. 30 |
| Western | Idaho Batholith (16) | all | | | July 1 | Sept. 30 |
| Western | Middle Rockies (17) | all except 17i | | 139 - 980 | July 1 | Sept. 30 |
| Western | Middle Rockies (17) | Absaroka-Gallatin Volcanic Mountains (17i) | 43 - 106[b] | Use values from the lower end of the Middle Rockies (17) ecoregion range | July 1 | Sept. 30 |
| Transitional | Northwestern Glaciated Plains (42) | Sweetgrass Upland (42l), Milk River Pothole Upland (42n), Rocky Mountain Front Foothill Potholes (42q), and Foothill Grassland (42r) | 20 - 206[c] | 199 - 775[d] | July 1 | Sept. 30 |
| Transitional | Northwestern Great Plains (43) | Non-calcareous Foothill Grassland (43s), Shields-Smith Valleys (43t), Limy Foothill Grassland (43u), Pryor-Bighorn Foothills (43v), and Unglaciated Montana High Plains (43o)[a] | 20 - 41[e] | 199 - 1125[f] | July 1 | Sept. 30 |
| Eastern | Northwestern Glaciated Plains (42) | all except those listed above for 42 | 70 - 150 | 540 - 1830 | June 16 | Sept. 30 |
| Eastern | Northwestern Great Plains (43) and Wyoming Basin (18) | all except for those listed above for 43, and 43c below | | | July 1 | Sept. 30 |
| Eastern | Northwestern Great Plains (43) | River Breaks (43c) | None recommended | None recommended | None recommended | None recommended |

[a] For the Unglaciated High Plains ecoregion (43o), range applies to the polygon located just south of Great Falls, MT.

[b] Based on the 10th and 90th percentiles of the natural background concentrations for this level IV ecoregion.

[c] Lower end based on streams' origins in the Canadian Rockies; upper end on 90th percentile of natural background for these ecoregions.

[d] Lower end based on macroinvertebrate response; upper end on region-specific Chl*a* computation (see page 3-24 of document in endnote 3).

[e] Lower end based on similarity to Middle Rockies, upper end on Elk Creek reference site.

[f] Lower end based on macroinvertebrate response; upper end on region-specific Chl*a* computation (see page 3-37 of document in endnote 3).

## a. The site in question is in which level III (or level IV) ecoregion?

Middle Rockies (17g)

## b. The ecoregional range is:

**TP:** 20-60 µg/L (0.02-0.06 mg/L)

**TN:** 139-980 µg/L (0.139-0.980 mg/L)

## c. The growing season is:

July 1-Sept 30

# In River Nutrient Dataset (2015-2018):

```
TNTP_EBR <- read.csv("EBR_inriver_nutrients.csv")

TNTP_EBR <- TNTP_EBR %>%
                filter(Station != "EBR-004")%>%
                filter(Station != "EBR-004a")%>%
                filter(Station != "EBR-001")
```

```
TP_EBR_gs <- TNTP_EBR %>%
                mutate(parsed_date = mdy(Sample_Date)) %>%
                mutate(Sample_Month = month(parsed_date)) %>%
                mutate(Year = year(parsed_date)) %>%
                filter(Sample_Month == 7 | Sample_Month == 8 | Sample_Month == 9) #subset for growing season months:
July, August, & September

TP_EBR_gs_sum <- TNTP_EBR %>%
                mutate(parsed_date = mdy(Sample_Date)) %>%
                mutate(Sample_Month = month(parsed_date)) %>%
                mutate(Year = year(parsed_date)) %>%
                filter(Sample_Month == 7 | Sample_Month == 8 | Sample_Month == 9) %>%
                group_by(Station) %>%
                summarize(ann_med_gs_TP = median(TP_mgl, na.rm = TRUE),
                          ann_IQR_gs_TP = IQR(TP_mgl, na.rm = TRUE))  %>%
                mutate(ann_med_gs_TP.mm = ann_med_gs_TP/(1000*30.97)) %>% # conversion to molar mass #converstion to
molar mass
                mutate(ann_IQR_gs_TP.mm = ann_IQR_gs_TP/(1000*30.97)) # conversion to molar mass

counts_TP <- TP_EBR_gs %>%
  group_by(Station) %>%
  summarise(n = n())

TP.plot <- ggplot(TP_EBR_gs) +
            aes(x = Station, y = TP_mgl, group = Station) +
            geom_boxplot() +
            labs(x = "Station", y = "Total Phosphorus (mg/L)") +
            geom_text(data = counts_TP, aes(x = Station, y = max(TP_EBR_gs_sum$TP_mgl) + 4, label = paste0("n=", n)),
            vjust = 0, size = 3) +
            annotate("rect",
                       xmin = -Inf, xmax = Inf,
                       ymin = 0.02, ymax = 0.06,
                       fill = "orange", alpha = 0.2) +
            theme_classic()

TP_EBR_gs_sum_table <- TP_EBR_gs_sum[,1:3]
```

```
knitr::kable(TP_EBR_gs_sum_table, digits = 3, col.names = c("Station", "Median [TP] (mg/L)", "IQR [TP] (mg/L)"))
```

| Station | Median [TP] (mg/L) | IQR [TP] (mg/L) |
|---|---|---|
| EBR-002 | 0.010 | 0.000 |
| EBR-003 | 0.010 | 0.004 |
| EBR-005 | 0.005 | 0.000 |

```
TN_EBR <- TNTP_EBR %>%
                mutate(parsed_date = mdy(Sample_Date)) %>%
                mutate(Month = month(parsed_date)) %>%
                mutate(Year = year(parsed_date))

TN_EBR_gs <- TNTP_EBR %>%
                mutate(parsed_date = mdy(Sample_Date)) %>%
                mutate(Sample_Month = month(parsed_date)) %>%
                mutate(Year = year(parsed_date)) %>%
                filter(Sample_Month == 7 | Sample_Month == 8 | Sample_Month == 9)


TN_EBR_gs_sum <- TNTP_EBR %>%
                mutate(parsed_date = mdy(Sample_Date)) %>%
                mutate(Sample_Month = month(parsed_date)) %>%
                mutate(Year = year(parsed_date)) %>%
                filter(Sample_Month == 7 | Sample_Month == 8 | Sample_Month == 9) %>%
                group_by(Station) %>%
                summarize(ann_med_gs_TN = median(TN_mgl, na.rm = TRUE),
                          ann_IQR_gs_TN = IQR(TN_mgl, na.rm = TRUE))  %>%
                mutate(ann_med_gs_TN.mm = ann_med_gs_TN/(1000*14.01)) %>% #conversion to molar mass
                mutate(ann_IQR_gs_TN.mm = ann_IQR_gs_TN/(1000*14.01)) # conversion to molar mass

counts_TN <- TN_EBR_gs %>%
  group_by(Station) %>%
  summarise(n = n())

TN.plot <- ggplot(TN_EBR_gs) +
            aes(x = Station, y = TN_mgl, group = Station) +
            geom_boxplot() +
            labs(x = "Station", y = "Total Nitrogen (mg/L)") +
            geom_text(data = counts_TN, aes(x = Station, y = max(TN_EBR_gs_sum$TN_mgl) + 2, label = paste0("n=", n)),
            vjust = 0, size = 3) +
            annotate("rect",
                       xmin = -Inf, xmax = Inf,
                       ymin = 0.139, ymax = 0.980,
                       fill = "green", alpha = 0.2) +
            theme_classic()

TN_EBR_gs_sum_table <- TN_EBR_gs_sum[,1:3]
```

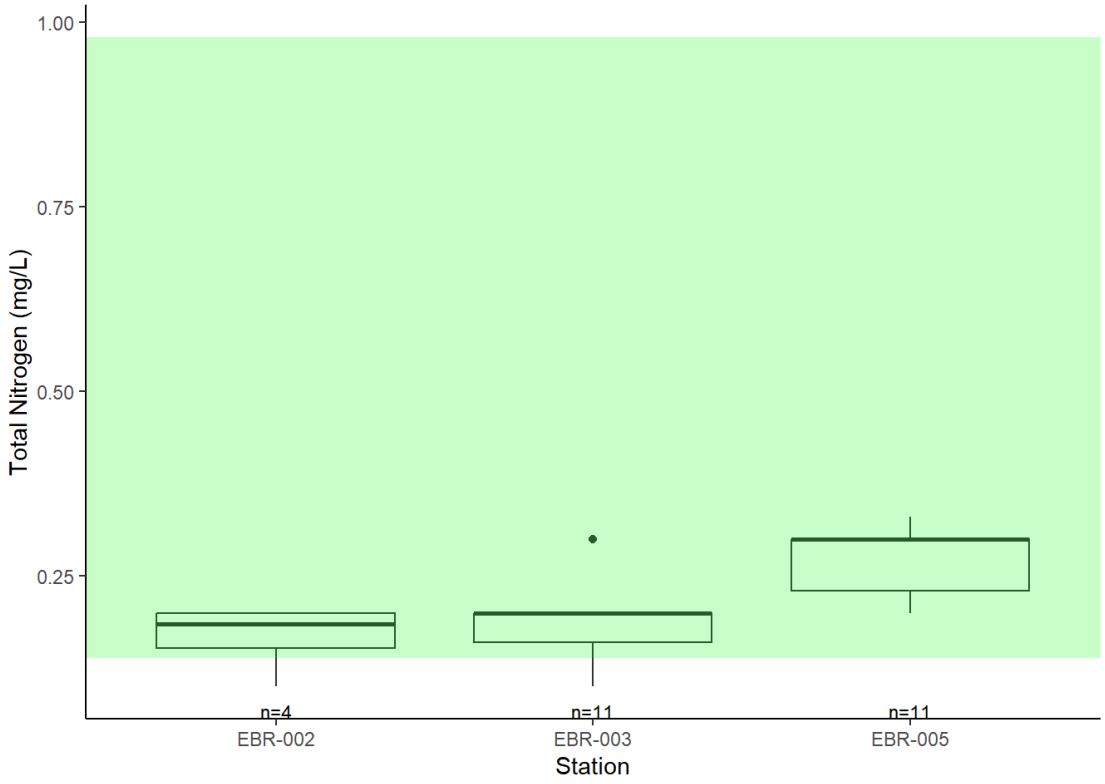
```
knitr::kable(TN_EBR_gs_sum_table, digits = 3, col.names = c("Station", "Median [TN] (mg/L)", "IQR [TN] (mg/l)"))
```

| Station | Median [TN] (mg/L) | IQR [TN] (mg/l) |
|---|---|---|
| EBR-002 | 0.185 | 0.048 |
| EBR-003 | 0.200 | 0.040 |
| EBR-005 | 0.300 | 0.070 |

Figure 2. Ambient total nitrogen (a) and total phosphorus (b) concentrations at monitoring stations EBR-001, EBR-002, EBR-003, and EBR-005 during the 2015-2018 nutrient growing seasons (July 1- Sept 30, annually). Shading indicates ecoregional range values for the Middle Rockies ecoregion.

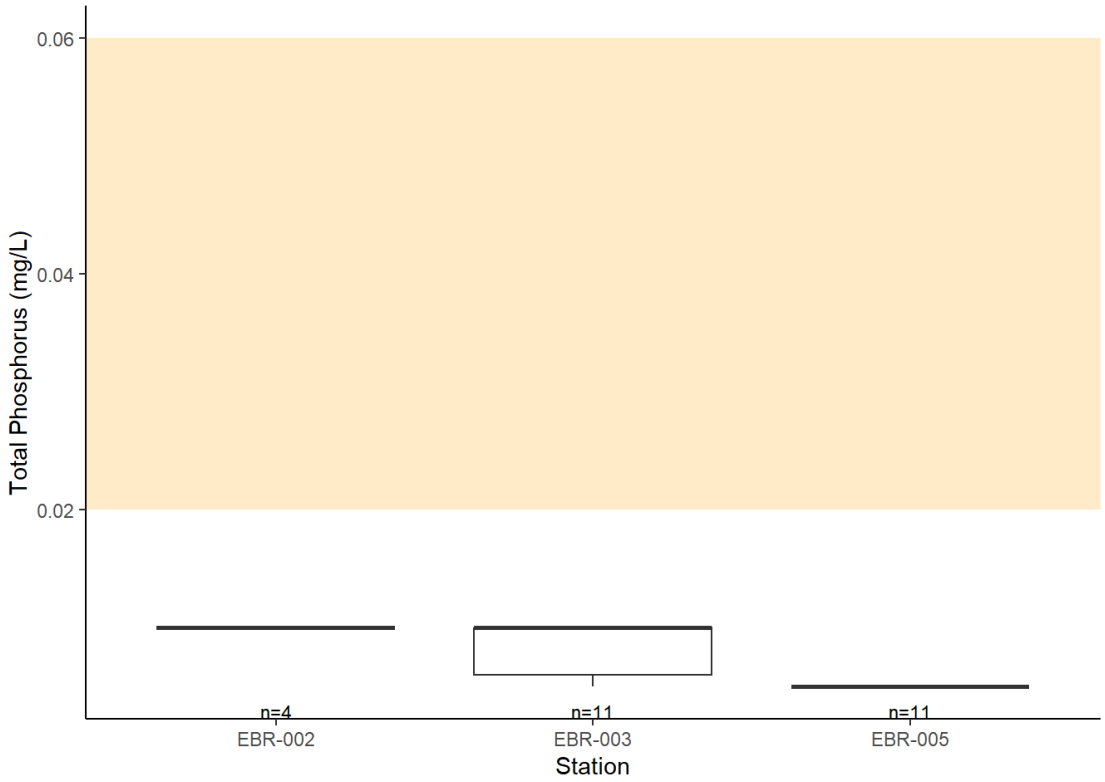
a.

```
#a
TN.plot
```


1.00
0.75
0.50
0.25
Total Nitrogen (mg/L)
n=4
n=11
n=11
EBR-002
EBR-003
EBR-005
Station

b.

```
#b
TP.plot
```


0.06
0.04
0.02
Total Phosphorus (mg/L)
n=4
n=11
n=11
EBR-002
EBR-003
EBR-005
Station

## **N:P** during growing season

```
TN_TP_EBR_SUM <- TN_EBR_gs_sum %>%
                  inner_join(TP_EBR_gs_sum, by = "Station") %>%
                  mutate(NtoP = ann_med_gs_TN.mm/ann_med_gs_TP.mm)

NP.plot <- ggplot(TN_TP_EBR_SUM) +
            aes(x = Station, y = NtoP) +
            geom_point() +
            labs(x = "Station", y = "Growing Season: Median Molar N:P") +
            geom_hline(yintercept = 16, color = "black") + #line indicates Redfield N:P ratio of 16:1 (values above l
ine indicate P limitation, below indicate N limitation)
            theme_classic()
```

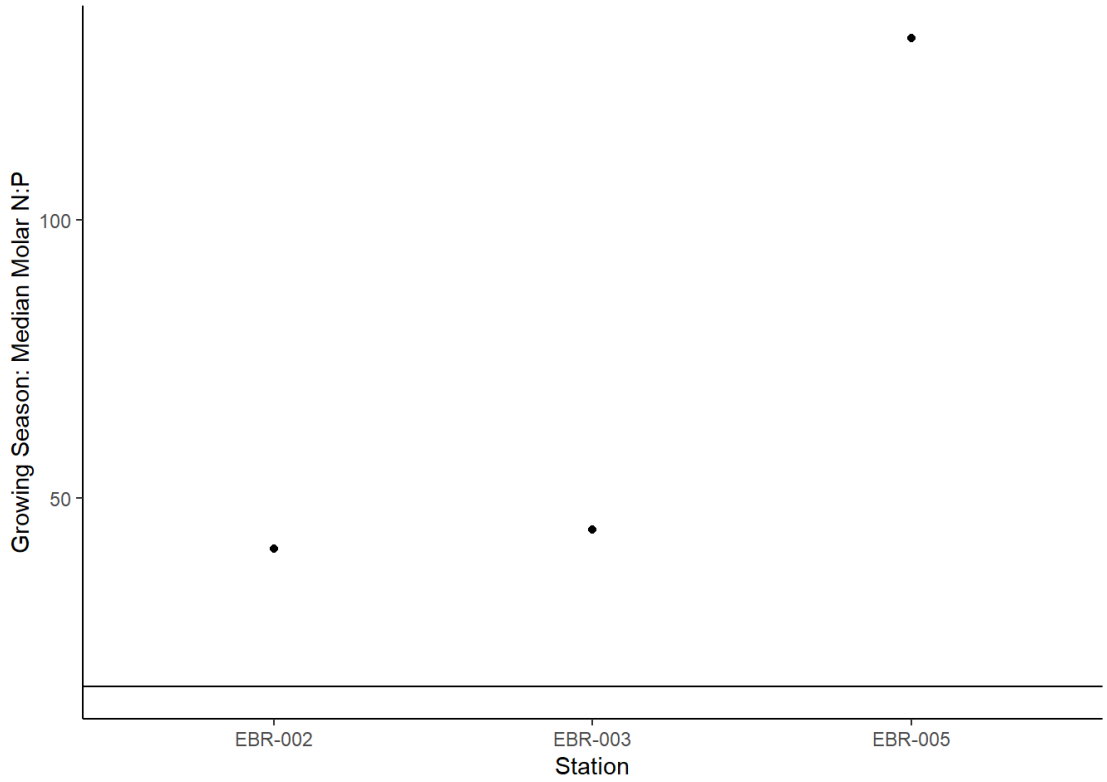
```
TN_TP_EBR_SUM.table <- TN_TP_EBR_SUM[,c("Station", "NtoP")]
knitr::kable(TN_TP_EBR_SUM.table, digits = 3, col.names = c("Station", "N:P"))
```

| Station | N:P |
|---|---|
| EBR-002 | 40.895 |
| EBR-003 | 44.211 |
| EBR-005 | 132.634 |

```
 #annual median TN:TP by site (± IQR)
```

Figure 3. Median molar total nitrogen (TN) to total phosphorus (TP) ratio at East Boulder River monitoring stations during the 2015-2018 nutrient growing seasons (July 1-Sept 30). Black line represents Redfield N:P ratio of 16:1, values above the line indicate P limitation and below the line indicate N limitation.

```
NP.plot
```




# 4. REACH SPECIFIC CRITERIA:

## Have criteria already been developed for the receiving waterbody? If so, what are the values?

No, NA.

# 5. SUMMARIZE FINDINGS

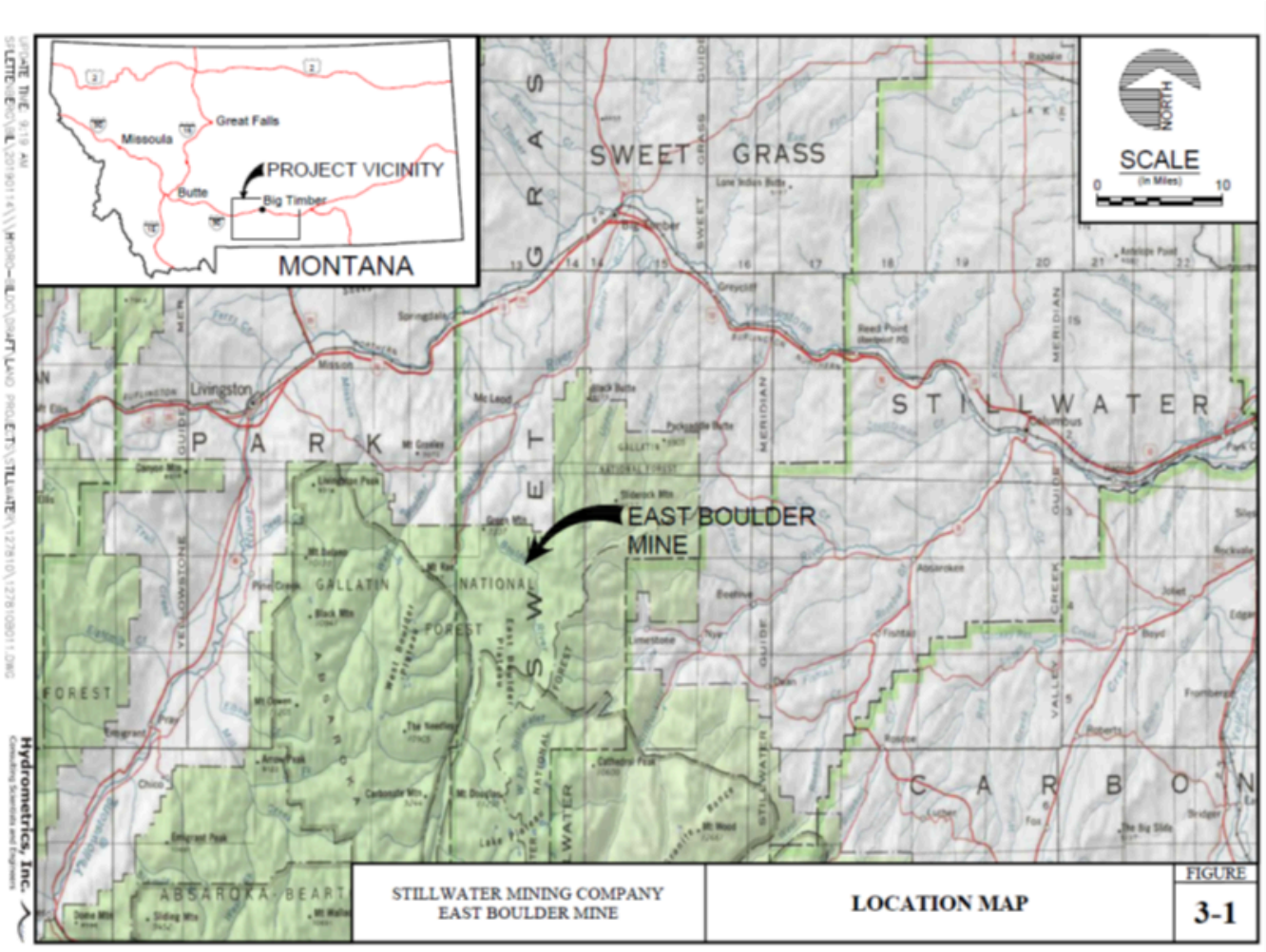
SEE 2025 MAJOR MODIFICATION FACT SHEET

# 6. HOLD NUTRIENT LIMITS PANEL MEETING

Meeting Held: September 15, 2025

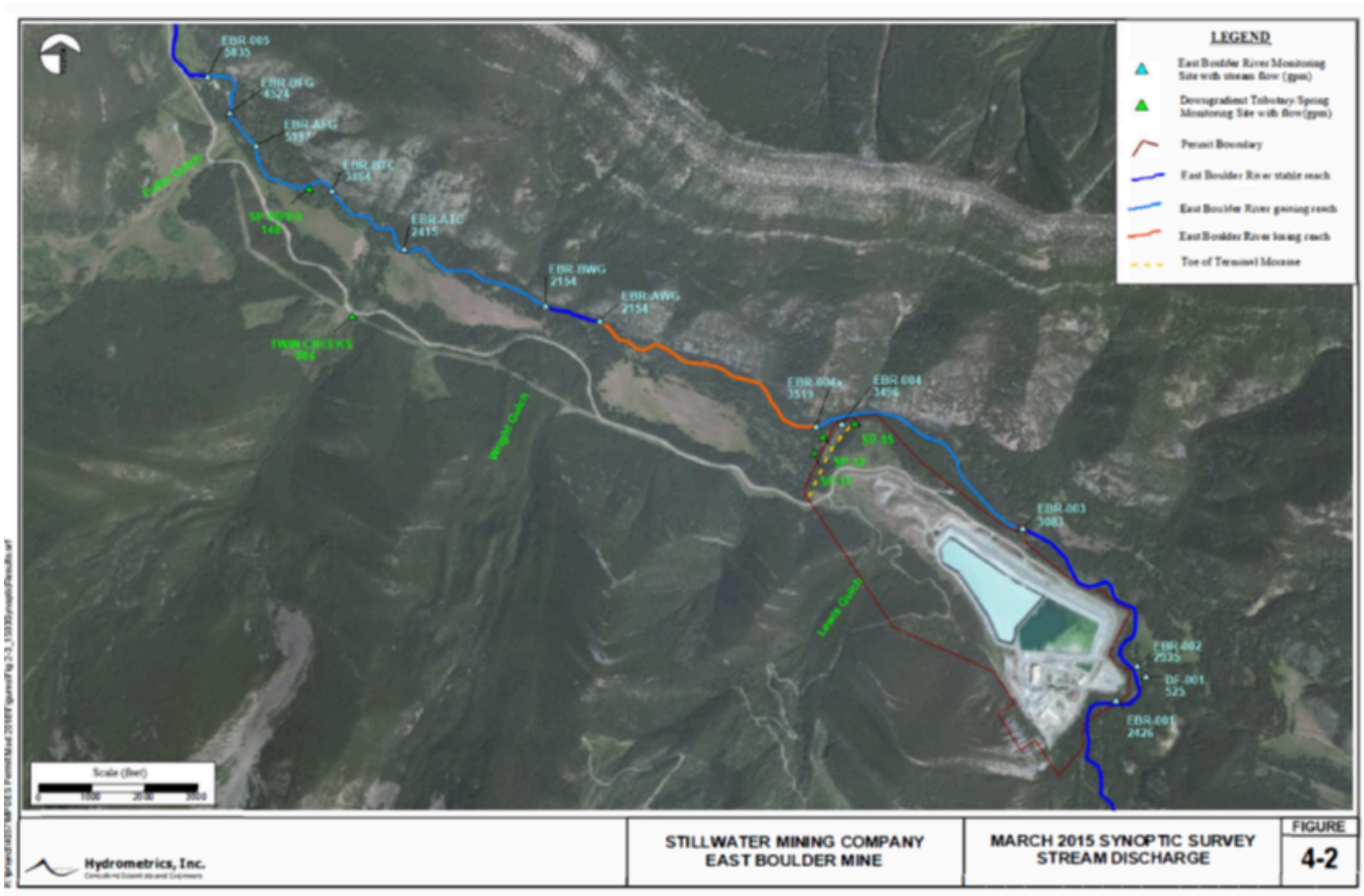
# BACKGROUND:

## Facility Location:

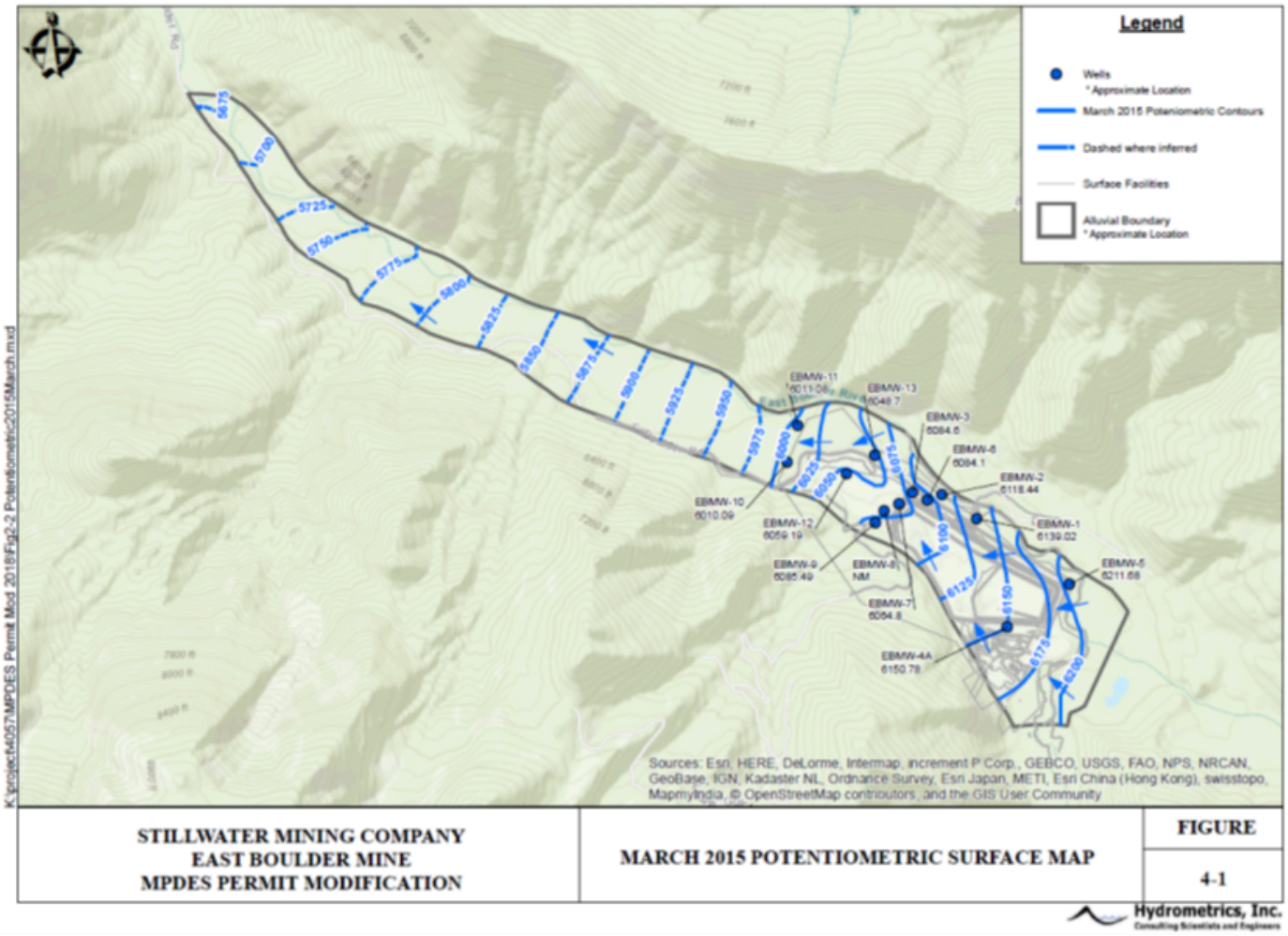



## Discharge & Monitoring Sites (w/ Synoptic Survey Stream

Discharge):


LEGEND
East Boulder River Monitoring Site with stream flow (gpm)
Downgradient Tributary Spring Monitoring Site with flow (gpm)
Permit Boundary
East Boulder River stable reach
East Boulder River gaining reach
East Boulder River losing reach
Toe of Tertiary Moraine
EBR.005 5835
EBR.0FG 4328
EBR.AFG 5397
EBR.0FC 3464
EBR.AFC 2415
EBR.0WG 2154
EBR.AWG 2154
EBR.004x 3513
EBR.004 3456
EBR.003 3083
EBR.002 2535
DF.001 525
EBR.001 2426
Scale (feet)
0
1000
2000
3000
Hydrometrics, Inc.
STILLWATER MINING COMPANY
EAST BOULDER MINE
MARCH 2015 SYNOPTIC SURVEY
STREAM DISCHARGE
FIGURE
4-2

# 2015 Potentiometric Map




| STILLWATER MINING COMPANY<br>EAST BOULDER MINE<br>MPDES PERMIT MODIFICATION | MARCH 2015 POTENTIOMETRIC SURFACE MAP | FIGURE<br>4-1 |
|---|---|---|

Hydrometrics, Inc.
Consulting Scientists and Engineers

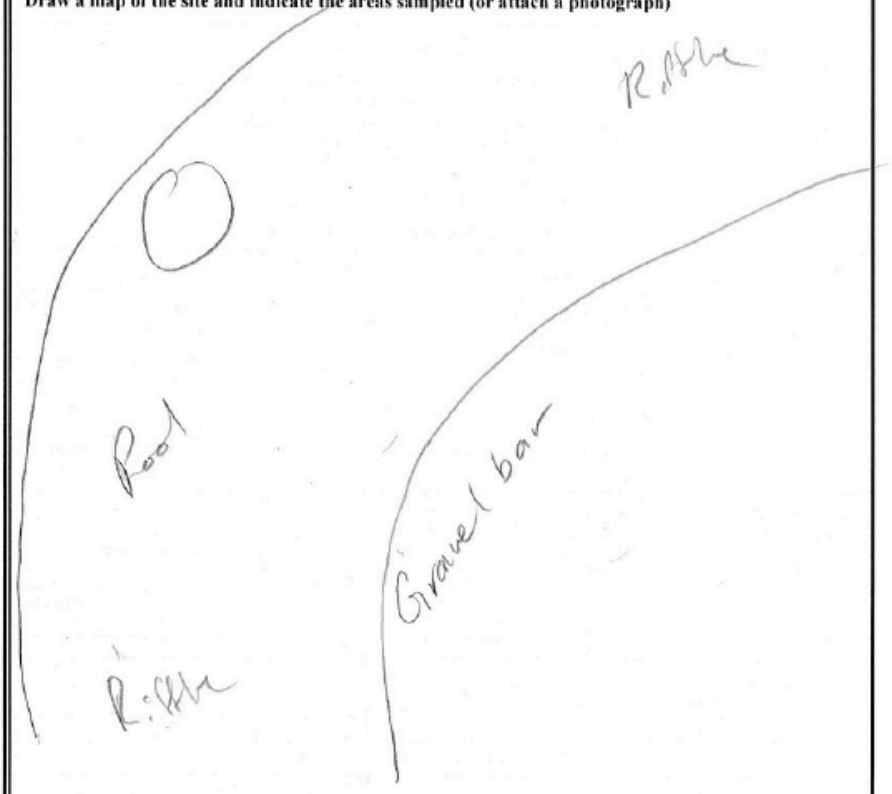
# SAMPLING SITES (STATIONS):

## EBR-002

**PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET**
**(FRONT)**

| | | |
|---|---|---|
| STREAM NAME EBR ~~STATE~~-002 | LOCATION | |
| STATION #_____ RIVERMILE_____ | STREAM CLASS | |
| LAT _____ LONG _____ | RIVER BASIN | |
| STORET # | AGENCY | |
| INVESTIGATORS | | |
| FORM COMPLETED BY | DATE _____<br>TIME _____ AM PM | REASON FOR SURVEY |

| | | | | |
|---|---|---|---|---|
| **WEATHER CONDITIONS** | **Now** | | **Past 24 hours** | **Has there been a heavy rain in the last 7 days?** ❑ Yes ❑ No<br>**Air Temperature**_____° C<br>**Other**_____ |
| | ❑ | storm (heavy rain) | ❑ | |
| | ❑ | rain (steady rain) | ❑ | |
| | ❑ | showers (intermittent) | ❑ | |
| | ___%❑ | %cloud cover | ❑ ___% | |
| | ❑ | clear/sunny | ❑ | |
| **SITE LOCATION/MAP** | **Draw a map of the site and indicate the areas sampled (or attach a photograph)** | | | |
| **STREAM CHARACTERIZATION** | **Stream Subsystem**<br>☑ Perennial ❑ Intermittent ❑ Tidal<br>**Stream Origin**<br>❑ Glacial ❑ Spring-fed<br>☑ Non-glacial montane ❑ Mixture of origins<br>❑ Swamp and bog ❑ Other_____ | | | **Stream Type**<br>❑ Coldwater ❑ Warmwater<br>**Catchment Area**_____km² |




(Rhithron 2025 Appendix F)

### EBR-002: Habitat Assessment

- epifaunal substrate/available cover: optimal (20/20)

- embededdness: optimal (20/20)
- velocity/depth regime: optimal (19/20)
- sediment deposition: optimal (18/20)
- channel flow status: optimal (18/20)

## EBR-003

Site EBR-003. Looking downstream.

EBR-003 DWN I (Rhithron 2025 Appendix G)

Site EBR-003. Looking downstream.

EBR-003 DWN II (Rhithron 2025 Appendix G)

Site EBR-003. Looking upstream.

EBR-003 UP (Rhithron 2025 Appendix G)

## EBR-003: Habitat Assessment

- epifaunal substrate/available cover: optimal (19/20)
- embededdness: optimal (19/20)
- velocity/depth regime: optimal (20/20)
- sediment deposition: optimal (19/20)
- channel flow status: optimal (20/20)

# EBR-005

Site EBR-005. Looking downstream.

EBR-005 DWN (Rhithron 2025 Appendix G)

Site EBR-005. Looking upstream.

EBR-005 UP (Rhithron 2025 Appendix G)

## EBR-005: Habitat Assessment

- epifaunal substrate/available cover: optimal (19/20)
- embededdness: optimal (19/20)
- velocity/depth regime: optimal (18/20)
- sediment deposition: suboptimal (15/20)
- channel flow status: optimal (19/20)

# SAMPLING SCHEDULE:

**Table 2.** History of macroinvertebrate and periphyton sampling for biological assessment, and periphyton sampling for chlorophyll *a* determination at sites in the East Boulder River drainage associated with facilities of the Sibanye-Stillwater Mining Company. An "m" indicates that a site was sampled for invertebrates in the indicated year. A "p" indicates that periphyton was sampled for biological assessment. Periphyton was sampled for chlorophyll *a* determination, (indicated by a "c"), and ash-free dry mass(indicated by an "a").

| Year | EBR-001 | EBR-002 | EBR-003 | EBR-004a | EBR-005 |
|---|---|---|---|---|---|
| 1998 | m* | m | m | m | |
| 1999 | | m/c | m/c | m/c | |
| 2000 | | m/c | m/c | m/c | |
| 2001 | | m/c | m/c | m/c | |
| 2002 | | m/c | m/c | m/c | |
| 2003 | | m/c | m/c | m/c | |
| 2004 | | m/c | m/c | m/c | |
| 2005 | | c | c | c | |
| 2006 | | m/c | m/c | m/c | |
| 2007 | | m/c | m/c | m/c | |
| 2008 | | m/c | m/c | m/c | |
| 2009 | | m/p/c | m/p/c | m/p/c | |
| 2010 | | m/c | m/c | m/c | |
| 2011 | | c | c | c | |
| 2012 | | m/p/c | m/p/c | m/p/c | |
| 2013 | | c | c | c | c |
| 2014 | | c | c | c | c |
| 2015 | | m/p/c | m/p/c | m/p/c | m/p/c |
| 2016 | | c | c | c | c |
| 2017 | | c | c | c | c |
| 2018 | | m/p/c | m/p/c | m/p/c | m/p/c |
| 2019 | | c | c | c | c |
| 2020 | | | m/p/c | m/p/c | m/p/c |
| 2021 | | | c/a | c/a | c/a |
| 2022 | m/p/c/a | m/p/c/a | m/p/c/a | m/p/c/a | m/p/c/a |
| 2023 | c/a | c/a | c/a | c/a | c/a |
| 2024 | m/p/c/a | m/p/c/a | m/p/c/a | m/p/c/a | m/p/c/a |