DEQ MONTANA

MAR 17-434

Narrative Nutrient Standards & Adaptive Management Programs

Preliminary Statement of Economic Impact (§2-4-405 MCA)

Our mission is to champion a healthy environment for a thriving Montana.

Preliminary Analysis of Economic Factors Identified in §2-4-405, MCA

Montana DEQ has prepared this preliminary economic impact analysis for the 2023-2024 Water Policy Interim Committee for its May 20-21 meeting. The analysis was developed with assistance from Eric Sivers, Water Quality Division policy analyst; Jeffery Blend, economist; Katie Makarowski, Water Quality Standards & Modeling supervisor; and Alanna Shaw, Montana Pollutant Discharge Elimination System (MPDES) permitting supervisor. This analysis provides DEQ's statement of economic impact of adoption of the rules proposed and focuses on the factors identified in §2-4-405 MCA. These factors are addressed in order below.

Classes that will bear the cost:

The costs of adopting narrative nutrient criteria will be borne by water users in towns and shareholders in industries that need to invest money to meet those standards. For towns, these costs will be borne over multiple years depending upon how towns finance their investments.

The costs of implementing an adaptive management plan (AMP) are significantly less than what would be required to meet the previous numeric nutrient criteria at the point of discharge. This is discussed in more detail below.

Classes that will benefit:

All Montanans will benefit from state waters supporting beneficial uses. Anglers and water recreationalists will benefit the most as well as homeowners that live on or near waterbodies.

Ratepayers of publicly-owned treatment works and industry shareholders will benefit from the lower costs and increased flexibility of Adaptive Management Program compliance as compared to the previous strategy of meeting end-of-pipe nutrient standards. The proposed, combined criterion approach presented in the rule package is a "weight-of-evidence" strategy, and the rule package also allows dischargers to make compliance decisions that best fit their needs. The combined criterion approach in DEQ-15 focuses on response variables - which are direct measures of the biological community or its effects. Response variables have the greatest weight in the proposed rules. This allows a watershed approach that is more flexible than the previous Circular DEQ-12A numeric criteria.

Description of the probable economic impact:

DEQ is mindful of its responsibility to formulate and adopt standards of water quality, considering the economics of waste treatment and prevention. The result of the proposed rule package is water quality standards that protect beneficial uses of state waters, plus new tools to reduce costs associated with attaining them. The proposed standards provide more flexibility than achieving stringent nutrient concentrations alone. The proposed standards allow DEQ to emphasize the importance of maintaining healthy instream biological conditions in lieu of attainment of specific nutrient concentrations. The proposal provides more flexibility to dischargers, allowing them to potentially invest less money to achieve greater water quality improvement in a watershed.

Several dischargers have claimed that the proposed rules would cause them to build new wastewater treatment plants, citing an estimated $100 million cost and accompanying economic

hardship. This is not a realistic claim for the proposed rules, according to a recent engineering study and economic impact analysis. In 2019, DEQ contracted with the Midwest Assistance Program to complete a series of water pollution control, economic, and cost-per-technology assessment-estimates for selected communities. The purpose of the study was to identify the highest attainable condition treatment requirements as a requirement of water quality standards variances. While the general variance has been repealed, the engineering and economic analyses for the highest attainable condition are still sound and provide a realistic "worst case scenario" cost estimate for any facility upgrades resulting from the proposed standards. The costs of outright compliance with DEQ-12A, which remain the effective standards for purposes of the federal Clean Water Act, are likely to be significantly greater than figures provided here from the Midwest Assistance Program study, as discussed below under the costs of inaction.

Midwest Assistance Program analysis proceeded as follows. First, using standard department procedures, the contractor completed a reasonable potential (RP) analysis and (if RP was found) estimated the average monthly limit permit limit each community would be required to meet if it were to comply with nutrient standards (nitrogen and phosphorus) in the receiving waterbody. In most cases, these standards were those provided in Circular DEQ-12A (which, per this rulemaking, will be fully repealed). Second, the contractor computed a series of community economic indices for each community, assuming the community was to try and comply with the DEQ-12A numeric nutrient standards. For those communities for whom compliance would cause substantial and widespread economic impacts, the contractor then identified the cost expenditure (as a percent of community median household income) DEQ would expect the community to pay to make progress towards compliance with numeric nutrient standards. Third, as a function of the cost expenditure derived above, the contractor identified a technology (and associated effluent quality) each community could afford. The technology identified for each community (e.g., sequencing batch reactor; 3-celled lagoon with aeration and phosphorus removal finishing) and the nutrient concentrations it is expected to discharge is, by definition, the highest attainable condition (HAC) treatment requirement for the community.

The contractor provided class V (i.e., concept screening level) engineering estimates developed by their engineer and wastewater subject matter experts. They collectively analyzed the RP analysis and public entity worksheets, contacted systems operators directly, and reviewed permits and fact sheets. From these reviews and analysis, they used their best professional judgement to identify the best course of action and estimated costs and outcomes. Three examples of Midwest Assistance Program work are below that refute the $100 million figure. Unless noted otherwise, all figures are in 2019 dollars.

Helena: Helena is a publicly-owned treatment works (POTW) utilizing a modified biological nutrient removal process. The current average flow is 3.19 million gallons per day (MGD), serving a population of approximately 33,000. The design flow is 5 MGD. The system meets current permit requirements.

> Phosphorus prioritization: Helena must meet stringent phosphorus limits. Helena will need to make significant upgrades to the wastewater treatment plant (chemical addition, tertiary clarifier, filtration, and ultra filtration) to approach these phosphorus requirements. The

estimated total cost is $17.5M with annual operation and management costs of $2.1M. Total annual costs estimated in the study would run $5 M.

Nitrogen: The recommended updates for nitrogen reduction include optimizing detention and aeration of the treatment system. This will involve limited, aeration system infrastructure additions and repairs. The estimated total cost is $100,000 with $10,000 in annual operation and maintenance costs.

Helena's total estimated capital costs of complying with the federal numeric criteria is $17.6M in 2019 dollars ($21M in 2023 dollars); compliance would be via a water quality standards variance established at the community HAC. This estimated dollar value is the cost of inaction since the original DEQ-12A standards would have to be met if the proposed criteria fail to be adopted, and as a result a variance would almost certainly be pursued.

Hamilton: Hamilton is a POTW constructed in 1984 with a design population of 5,200 and current population of 4,800. Upgrades include 1988 upgrade with return activated sludge, pump station with baffles in the second clarifier for more capacity, addition of anoxic selector basin and dissolved air flotation; 2009/2010 upgrades included addition of the bar screen and a generator, addition of a sampler, addition of SCADA control system and upgrade to solids handling; the facility just recently added UV and completed updates to the SCADA and changes with aeration to help with nutrient reduction. The current system has a 17-hour detention time and is a 1.984 MGD flow facility with 0.14 MGD inflow; wastewater treatment includes the oxidation ditch with rotating brush for aeration, 3 clarifiers, chlorine contact basin (sodium hypochlorite) and 2 aerobic digesters as well as UV. Current samples provide nutrient samples with nitrogen at 3.8 mg/L and phosphorus at 2.3 mg/L.

Phosphorus: Hamilton must meet total maximum daily load (TMDL)-assigned phosphorus limits. Hamilton will need to make significant upgrades to the plant (alum injection) to approach these requirements. Bulk sludge removal is included in this upgrade. The estimated total cost is $505,000 with annual operation and maintenance costs of $40,000.

Nitrogen: Significant nitrate and nitrite removal can be achieved by isolating a zone to focus aeration and rest periods. The system can optimize detention and aeration of their treatment system with limited, as needed, aeration system infrastructure additions and repairs. The estimated total cost of the nitrogen optimization is $10,400 in capital costs, with no additional annual cost.

Hamilton's total estimated capital costs of complying with the federal numeric criteria is $0.52M in 2019 dollars ($0.6M in 2023 dollars) and around $50,000 annually in operating costs. Like Helena, compliance would be via a water quality standards variance established at the community HAC. Again, this is the cost of inaction since the original DEQ-12A standards would have to be met (using a variance) instead of the proposed criteria.

Livingston: Livingston's current discharge permit does not have effluent limits for nutrients. Livingston discharges to a reach of the Yellowstone River that does not have identified nutrient impairments. Criteria concentrations for nitrogen and phosphorus haven't been conclusively determined, pending the completion of a large river model for the upper Yellowstone River.

However, DEQ has projected the likely results of the model and compared Livingston's discharge against them for the current permit. Livingston does not have reasonable potential to exceed the projected nitrogen and phosphorus standards and would not likely have reasonable potential given the standards proposed in this rule. In other words, not only will the proposed rules not require costly upgrades for the Livingston treatment plant, but DEQ projects that the plant's discharge will likely not require nitrogen or phosphorus effluent limits.

Billings: Billings recently completed a $62 million sewer facility upgrade, $40 million specifically for nutrient removal. The plant converted from an older activated sludge plant into a biological removal plant. Previous nutrient concentrations were 20 mg/L total nitrogen and 2-3 mg/L total phosphorus. After upgrades total nitrogen is estimated to be from 6-8 mg/L and total phosphorus below 1.0 mg/L. Effluent flow is currently 15 to 16 MGD. The utility will be able to meet nutrient effluent limits with the recent upgrades. The proposed rules would potentially negate the need for Billings to invest even more capital for nutrient criteria.

In short, the new proposed standards would potentially allow Helena, Hamilton, Billings, and other towns to meet standards with significantly less investment than the $100 million claimed figure and, further, at less cost than the estimates provided above, which would be incurred due to inaction.

Individual water quality standards variances continue to remain available to dischargers with the proposed standards, specifically to prevent substantial and widespread economic impacts. Similarly, the core intent of the Adaptive Management Program being proposed in this rule package is to provide additional time and flexibility for dischargers to seek and try alternative approaches to achieving water quality improvements and avoid costly capital improvements. DEQ understands that some dischargers are not enthusiastic about variances as a compliance option. However, it is simply not credible to imagine any municipal government would assume a very high-cost solution rather than avail themselves of a compliance tool intended to prevent precisely the economic impacts of concern. Notably, the general concept of economic-based nutrient variances was upheld by the Ninth Circuit Court of Appeals. *See Upper Mo. Waterkeeper v. EPA, 15 F.4th 966 (9th Cir. 2021)*.

The costs associated with implementing adaptive management plans are difficult to forecast since they will be unique to each watershed and, as stated in the name, adaptive to changing circumstances. Nonpoint source reduction projects will require greater investment, but significant increases in this funding will be less costly than facility upgrades. As an example of the potential scope, DEQ designated the Lower Gallatin watershed a priority area to focus available grant funding in a single watershed to greater effect, rather than spreading it more widely. This has resulted in expenditure of $961,627 over the last five years (total cost, including federal grant funding and match). DEQ judges that a greater investment would be required to attain water quality standards via nonpoint source reduction projects. DEQ nonpoint source program staff estimate that a coordinated and strategic investment of $5,000,000 in nonpoint source reduction and trading projects across the Lower Gallatin watershed could see measurable improvements in water quality, potentially restoring beneficial use support, as opposed to the more costly option of dischargers meeting end of pipe numeric standards. This would be a significant (five-fold over a priority

watershed) increase in nonpoint source funding and projects. Conversely, construction of a tertiary treatment facility would be more costly and only eliminates one source of pollutants.

Probable costs to DEQ:

DEQ has dedicated one full-time staffer to coordinate the Adaptive Management Program. Additional costs to implement the Adaptive Management Program include enforcement and compliance monitoring for individual adaptive management plans (AMPs). Services provided by DEQ to permittees entering the Adaptive Management Program will include, but are not limited to, review and approval of AMPs; training on necessary sampling methods; assistance on required data entry; and consultation on AMP development methods.

The fees proposed within this rule package will financially support, but not totally cover DEQ's services. DEQ calculated its costs for implementing the Adaptive Management Program on an annual basis at approximately $207,000. However, subject to statutory fee caps in 75-5-516, MCA, an Adaptive Management Program application fee must be capped at $5,000 and annual fees capped at $3,000 per MGD. The proposed rule includes an Adaptive Management Program annual fee that is identical to the existing discharge permit annual fee: $3,000 per MGD. Assuming, hypothetically, that seven permittees participate in the Adaptive Management Program on an annual basis, DEQ would need $29,588 from each permittee to cover department costs. Since every permittee except for Billings would pay much less than $29,588 (see below), the fee structure as proposed in ARM 17.30.201 is insufficient to recover all DEQ costs to implement the Adaptive Management Program. The seven largest municipalities paid the following in 2023 for annual fees (calculated at $3,000 per MGD). These amounts are equal to what each community would pay in AMP fees:

- Billings: $44,231.25
- Missoula: $20,747.50
- Great Falls: $23,845.50
- Bozeman: $17,915.00
- Butte-Silver Bow: $10,435.00
- Helena: $7,700.00
- Kalispell: $8,733.50

Additional funds will be required to fund the Adaptive Management Program. These seven annual fees total $133,607.75, which is $73,392 less than the expected annual cost of the Adaptive Management Program. In fact, the shortfall is greater than that, as Missoula is not expected to participate in adaptive management. The proposed rules do not apply to the Clark Fork River, and the water quality standards in place for Missoula will not change.

Compare costs/benefits of the rule to costs/benefits of inaction:

The primary benefits of adoption of the proposed criteria are swifter and more cost-effective attainment of nutrient water quality standards. Nonpoint source (NPS) reduction projects undertaken as adaptive management are expected to reduce other causes of stream and river impairment, such as temperature, sediment, and habitat modification.

DEQ expects that water quality across the state will improve with the adoption of the proposed criteria, including aquatic life in the receiving waters. Montana FWP estimates that expenditures from fishing activity totals over $900 million per year, and 67% of Montana FWP biologists surveyed in 2020 stated that, in rivers where they occur, filamentous algae blooms affected fishability and aesthetics a lot or a great deal *(Nuisance Cladophora Algae Survey, T. Selch, 2020)*. This proposal will increase the quality of the nearly $1 billion dollar fishing industry in Montana. It will also increase the quality of the experience of other non-fishing persons that enjoy water such as floaters and paddlers and increase property values. Improved water quality will also result in ecological benefits.

Overall, NEW RULE II (which provides the Adaptive Management Program) provides a means by which the narrative nutrient standards in NEW RULE I can be achieved by MPDES permittees incrementally. This will allow for an adaptive, iterative approach to compliance, allowing for the prioritization of less costly, evidence-based approaches before more expensive options. At the same time, more will be learned about the biological response in each affected watershed under the proposal—further enhancing the ability to make sound, scientifically-based nutrient management decisions. This step-by-step approach ensures best use of financial and other resources for the purpose of meeting the narrative nutrient standards over time.

Benefits / costs of proposed action:

Benefits of adopting proposed rules	**Costs of adopting proposed rules**
Water quality standard (WQS) assessment is based on weight-of-evidence approach that emphasizes biological health over exact nutrient concentrations (New Rule I)	WQS assessment is more complicated due to the measurement of biological response variables
Flexibility of additional compliance option (New Rule II)	AMP participation requires a fee (New Rule II)
Lower cost of NPS projects over infrastructure upgrades (New Rule II)	
Impetus for more NPS projects to improve watersheds (New Rule II)	
Improvement of water quality for recreationalists and other users of Montana state waters	

Benefits / costs of inaction:

Benefits of not adopting proposed rules	**Costs of not adopting proposed rules**
Montana doesn't have to learn to operate an AMP program	Less flexibility in WQS assessment
	Less flexibility in meeting WQS
	Return to numeric criteria in DEQ-12A
	Potential loss of state oversight to the EPA

Costs of inaction:

Communities discharging to state waters that are also Waters of the United States need to comply with Circular DEQ-12A standards. DEQ 12-A remains the applicable water quality standard until EPA approves a change, deletion, addition, or until EPA promulgates a more stringent water quality standard. *See* 33 U.S.C. § 1313(c): 40 C.F.R. § 131.21(e)[1]. If this rulemaking does not advance and replace the existing DEQ-12A standard, communities will have to comply with the requirements of the numeric nutrient standards that were promulgated in 2014. With the general variance directly repealed by the 67th Legislature in 2021, the costs of inaction on these proposed rules are the costs associated with facility upgrades to comply with the DEQ-12A standards.

DEQ's primary costs of inaction are:

- Prolonging the untenable situation in which Montana DEQ is unable to write discharge permits that EPA can review and approve, and
- Denying dischargers a more responsive, flexible, and effective compliance option, and
- Loss of state control if Montana is unable to provide a suitable replacement for DEQ 12-A, which is currently the effective standard for purposes of the federal Clean Water Act. In this case, EPA will either substitute the effective federal standard in MPDES permits on an individual basis or promulgate DEQ 12-A as the federal numeric standard for Montana. EPA's oversight would likely be substantially more expensive and less flexible to achieve.

Are there less costly or intrusive methods? There are no other viable paths to implement narrative criteria for Montana. Senate Bill 358 could not provide a "blank slate" for the purposes of federal law. A combined criterion approach is the only framework that also meets the state's requirements under the federal Clean Water Act. This is because Montana is not proposing a new standard; it is replacing an existing one that has already been approved for federal Clean Water Act purposes. The new standard must be shown to provide equivalent or better protection than the existing standard it replaces. And in response to more than 40 public stakeholder meetings over the past three years, DEQ has provided the flexibilities stakeholders really wanted and needed.

Analysis of any alternative methods for achieving the purpose, why they were rejected:

There are no viable alternatives for Montana's narrative nutrient criteria that will be effective for federal uses (i.e. MPDES permits, TMDLs). Under the federal Clean Water Act, Montana's state water quality standards are also the federal water quality standards within Montana. Montana could adopt a state standard that is not approvable for federal purposes. But this is not a viable alternative since most state surface waters are also Waters of the United States. Waters of the United States require federally-approved standards for discharge permits or total maximum daily loads because those are delegated federal programs. *See* 33 U.S.C. § 1313(c). The combined criterion approach proposed here is the only solution that meets the requirements of both state and federal law. The proposed rules provide adequate demonstration that the proposed criteria are

[1] On May 10, 2022, EPA acted on SB 358, disapproving the repeal of DEQ-12A and informing Montana that the revisions occasioned by SB 358 "cannot be used for any [Clean Water Act] purpose." Letter from Darcy O'Connor, Director, Water Division, EPA Region 8 to Christopher Dorrington, Director, Montana Department of Environmental Quality (May 10, 2022)

based on sound science and will be equally protective of state waters as compared to the numeric criteria previously approved in Montana. Nonetheless, DEQ has heard and considered the following alternative methods and rejected them for the reasons provided below.

Alternative 1: Eliminate numbers entirely. Eliminating the use of any numbers to implement nutrient standards fails to assure equivalent protection. Furthermore, Senate Bill 358 (75-5-321 MCA) directs DEQ to "identify the appropriate response *variables* affected by nutrients and associated impact *thresholds*" (emphasis added). These are direct references to variables that must be measured—and measures require numbers. Accordingly, these variables and thresholds are provided in Circular DEQ-15, adopted via this proposed rulemaking.

Alternative 2: Model different nutrient strategies from neighboring states. The nutrient standards strategies pursued by Colorado, Utah, or Idaho are not relevant to Montana. These states did not previously adopt base numeric nutrient standards in waters that receive discharges. They have no requirement to demonstrate that their chosen approach is equally protective of beneficial uses as the numeric criteria Montana previously adopted. That said, a close examination of these state's proposed or adopted criteria shows they comprise the same causal and response variables and thresholds Montana is proposing; the science is consistent across the region.

Alternative 3: Remove numbers from discharge permits. The discharging community has argued that discharge permits should not include numeric effluent limits. Under the pre-2014 narrative nutrient standard regime, however, permits included numeric limits. This allowed the discharger to measure what comes out of their pipe, and for DEQ to determine whether the discharge was in compliance with the permit. Dischargers further argue that numeric nutrient limits are "infeasible." This position is unsupportable since discharge permits have included numeric effluent limits for nutrients for decades. This position confuses the feasibility of determining, measuring, and reporting a numeric discharge limit with the widely recognized challenge of meeting a stringent effluent limit.

Does the proposed rule represent an efficient allocation of public and private resources?

Yes. The narrative standards proposed New Rule I allows DEQ to identify situations where biological communities are meeting beneficial uses regardless of the nutrient concentrations. That is a significant degree of flexibility not currently afforded under the numeric nutrient criteria adopted in 2014. Proposed New Rule II provides dischargers a new permit compliance option at a cost that may be much lower than major plant upgrades. Furthermore, the watershed improvements contained within that option are a significant bonus to Montana.

Comparison of current and proposed processes and options

For a facility discharging to a large river (e.g. Billings or Great Falls)

Current process	**Process under DEQ's proposal**
Prepare model to determine WQS	Prepare model to determine WQS
Determine reasonable potential	Monitor to assess standard attainment
Provide effluent limits as necessary	Determine reasonable potential
	Provide effluent limits as necessary
	Consider (where multiple dischargers are present) each facility's relative costs for upgrades, limits of technology etc.

Current options	**Options under DEQ's proposal**
Optimization	Optimization
Facility upgrades	Phosphorus prioritization
Nutrient trading	Facility upgrade
Individual variance	Nonpoint source adaptive management
	Nutrient trading
	Individual variance

For a facility discharging to a wadable stream or medium river (e.g. Helena)

Current process	**Process under DEQ's proposal**
Determine reasonable potential	Monitor biological health of waterbody to assess standard attainment
Provide effluent limits as necessary	Determine reasonable potential
	Provide effluent limits as necessary

Current options	**Options under DEQ's proposal**
Optimization	Optimization
Facility upgrades	Phosphorus prioritization
Nutrient trading	Facility upgrade
Individual variance	Nonpoint source adaptive management
	Nutrient trading
	Individual variance