NUTRIENT WORK GROUP MEETING SUMMARY
October 16, 2023

9:00 a.m. – 11:00 a.m.
Hybrid Meeting: Zoom and DEQ Room 111

ATTENDANCE: NUTRIENT WORK GROUP MEMBERS

Representative & Affiliation	Representing
Louis Engels City of Billings	Point Source Discharger: Large Municipal Systems (>1 MGD)
Rika Lashley Morrison-Maierle	Point Source Discharger: Small Municipal Systems with Lagoons
Alan Olson Montana Petroleum Association	Point Source Discharger: Non-POTW
Kelly Lynch Montana League of Cities and Towns	Municipalities
Matt Vincent Montana Mining Association	Mining
Karli Johnson (Sage Zook Substituting) Montana Farm Bureau Federation	Farming-Oriented Agriculture
Ellie Brighton Montana Stockgrowers Association	Livestock-Oriented Agriculture
Guy Alsentzer Upper Missouri Waterkeeper	Environmental Advocacy Organization
Kristin Gardner Gallatin River Task Force	Conservation Organization: Local
Sarah Zuzulock (Stephanie Bonucci Substituting) Zuzulock Environmental Services	Conservation Organization: Regional
Andy Efta U.S. Forest Service, Northern Region	Federal Land Management Agencies
Tina Laidlaw U.S. Environmental Protection Agency	Federal Regulatory Agencies
Jeff Schmalenberg Department of Natural Resources & Conservation	State Land Management Agency
Nick Banish Gallatin Local Water Quality District	County Water Quality Districts or Planning Departments
Dan Rostad Yellowstone River Conservation District Council	Soil and Water Conservation Districts – East of the Continental Divide
Samantha Tappenbeck Flathead Conservation District	Soil and Water Conservation Districts – West of the Continental Divide
Julia Altemus Montana Wood Products Association	Timber Industry

NOT IN ATTENDANCE: NUTRIENT WORK GROUP MEMBERS

Representative & Affiliation	Representing
Shannon Holmes City of Livingston	Point Source Discharger: Middle-Sized Mechanical System (<1 MGD)
David Brooks Montana Trout Unlimited	Conservation Organization: Statewide
Pete Cardinal Pete Cardinal Outfitters	Water or Fishing-Based Recreation
Scott Buecker AE2S	Wastewater Engineering Firms

ATTENDANCE: OTHER PARTICIPANTS

Adam Pummill, WGM
Adam Sigler, MSU Extension
Alanna Shaw, DEQ, MPDES Section Supervisor
Amanda Knuteson, Knuteson Law
Amy
Andy Ulven, DEQ, Water Quality Planning Bureau Chief
Brian Heaston, City of Bozeman
Christina Staten, DEQ, TMDL Section Supervisor
Christine Weaver, DEQ, Surface Water Discharge Permitting
Christoff Gaub, City of Great Falls
Christy Meredith, DEQ, Water Quality Standards and Modeling
Coralynn Revis, HDR
Darrin Kron, DEQ, Monitoring and Assessment Section Supervisor
Dave Clark, HDR
Ed Coleman, City of Helena
Erik Makus, EPA, Federal Regulatory Agency
Hannah New, DEQ, Surface Water Discharge Permitting
Jane Madison, DEQ, Water Quality Standards and Modeling
Jason Fladland, City of Great Falls
Jason Mohr, Legislative Services Executive Director
Jeff May, DEQ, Surface Water Discharge Permitting
Jeremy Perlinski, Robert Peccia & Associates
JoAnn
Joe Lierow, ExxonMobil Billing Refinery
Josh
Katie Makarowski, DEQ, Standards and Modeling Section Supervisor
Kristi Kline, Montana Rural Water Systems
Kurt Moser, DEQ, Legal Counsel
Lauren Sweeney, DEQ, Water Quality Standards and Modeling
Leea Anderson, City of Helena
Lindsey Krywaruchka, DEQ, Water Quality Division Administrator
Lisa Anderson, DEQ, TMDL Water Quality Scientist
Logan McInnis, City of Missoula
Loren Franklin, KC Harvey Environmental

Mark Ockey, DEQ, Water Quality Specialist
Mary Godfrey, DEQ, Program Support Specialist
Mary Harlow, Prickly Pear Land Trust
Matt Wolfe, Sibanye Stillwater
Michael Kasch, HDR
Michael Suplee, DEQ, Water Quality Standards and Modeling
Moira Davin, DEQ, Public Information Officer
Nathan Bartow, Bison Engineering Inc.
Peggy Trenk, Treasure State Resources Association
Peter Scott, Scott Law
Rachel Malison, Flathead Lake Bio Station/University of Montana
Rickey Schultz, HDR
Ron Pifer
Ryan Sudbury, City of Missoula
Ryan Urbanec, USDA
Sean Sullivan
Tatiana Davila, DEQ, Water Protection Bureau Chief
Theresa Froehlich, DEQ, Program Support Specialist
Thomas Kallenbach, Eliminite Inc.
Tiffany Lyden, DEQ, Water Quality Specialist
Torie Haraldson, DEQ, Water Quality Specialist
Troy Clift, DEQ, TMDL Water Quality Scientist
Vicki Marquis, Holland and Hart
Vicki Watson, University of Montana Watershed Clinic

MEETING PURPOSE / OBJECTIVES

Meeting Goal: Discuss the Adaptive Management Program process, the translator and response variables, and an update on the draft of Circular DEQ-15.

Overview of the Translation of Narrative Nutrient Standards

- Response variables and thresholds

Overview of the Implementation of the Adaptive Management Program

- Permitting basics
- Case study – permit example
- Nonpoint source load reduction estimates

Update on Circular DEQ-15

MEETING HIGHLIGHTS / DECISIONS MADE

- Future meeting schedule
    - Tuesday November 14, 2023 9 – 11 a.m. (Final meeting until after rulemaking)

MEETING INITIATION

Moira Davin, Department of Environmental Quality (DEQ), Public Information Officer and meeting facilitator, welcomed everyone to the meeting at 9:00 a.m. Moira Davin went over meeting logistics (slide 2, **Attachment A**), the meeting agenda (slide 5, **Attachment A**), and took a roll call of Nutrient Work Group (NWG) members present either via Zoom or in Room 111 of the DEQ Metcalf Building in Helena (slide 3, **Attachment A**).

Moira Davin handed it over to Michael Suplee, DEQ, Water Quality Standards and Modeling, to discuss the narrative nutrient standards translator (slide 6, **Attachment A**).

NARRATIVE NUTRIENT STANDARDS TRANSLATOR

Michael Suplee presented the key Montana (MT) statutes and rules related to the narrative translator (slide 7, **Attachment A**). 75-5-321(2)(c), Montana Code Annotated (MCA) directs DEQ to identify the appropriate response variables affected by nutrients and associated impact thresholds in accordance with the beneficial uses of the waterbody. Administrative Rules of Montana (ARM) 17.30.637(1) requires that state surface waters must be free from substances attributable to municipal, industrial, agricultural practices or other discharges that will (e) create conditions which produce undesirable aquatic life. Recreation and fishes and associated aquatic life are included in all waterbody beneficial use classes across MT.

Michael Suplee then presented New Rule 1 – Translation of Narrative Nutrient Standards (slide 8, **Attachment A**). The causal and response variables (combined criterion approach) are used to determine if narrative nutrient standards are met, with an emphasis on biological responses. The combined criteria approach is applied across many of the Montana Water Quality Act (MT WQA)/Clean Water Act (CWA) programs such as 303(d), Total Maximum Daily Load (TMDL), Nonpoint Source (NPS), Montana Pollutant Discharge Elimination System (MPDES), etc. This approach has been adopted in several states including Florida, Utah, Minnesota, Vermont, and currently proposed in Maine.

Michael Suplee then presented the draft translator from the December 2022 Draft Circular DEQ-15 (slide 9, **Attachment A**). The translator is divided up by ecoregional zones and stream gradient with their associated beneficial uses, either recreational or aquatic life.

Michael Suplee then presented on dissolved oxygen delta (DO Δ) and macroinvertebrates (slides 10-15, **Attachment A**). Excessive DO changes are linked to fish and aquatic macroinvertebrate impacts. Daily DO swings reflect the degree of primary productivity. DEQ directly interprets aquatic macroinvertebrates in MT's waterbody beneficial uses as part of "fish and associated aquatic life". Macroinvertebrates are the most widely assessed biological assemblage among states and tribal nations. Macroinvertebrates have limited migration, high biodiversity, and are responsive on early and long-term time scales making them very suitable for biological assessment.

The biotic indices used for the macroinvertebrate metrics were constructed by biologists to reflect water pollution impacts on the aquatic insect community. DEQ has had a standardized sampling method for macroinvertebrates since 2005 (slide 12, **Attachment A**). DEQ analyzed relationships between >200 macroinvertebrate metrics/indices and four causal variables (total phosphorus [TP], total nitrogen [TN], algal chlorophyll *a*, and algal ash free dry weight) within three MT ecoregion zones. The macroinvertebrate metrics and causal variables were part of a 17-year dataset (2005-2021) and

confounding effects of flow, specific conductivity, temperature, and pH were also analyzed (slide 13, **Attachment A**). He also explained that the logistic model was the best fit to the data and how reference sites were given consideration in the nutrient-macroinvertebrate logistic plots.

Michael Suplee then pointed out that Beck's Biotic Index (version 3) consistently came up as one of the best performing metrics in relation to nutrient concentration gradients and gave an overview of Beck's Biotic Index (slide 15, **Attachment A**). Beck's Biotic Index was developed in the 1950s by sampling up- and downstream of wastewater point sources. The index quantifies changes from desirable to undesirable aquatic life. Version 3 (Becks3) has modified computation and includes Class III (somewhat more tolerant) organisms.

Dave Clark, HDR asked, back on the translator, about the filamentous algae percent bottom cover, do diatoms count in this? Michael Suplee responded that no, they do not count. Filamentous algae cover is a visual observation. Dave Clark stated that it sounds like the reference sites are all in the upper parts of the watershed. Michael Suplee state that no, that is not correct, and a number of low-gradient reference sites are part of this analysis.

Michael Suplee then discussed the macroinvertebrate metrics for the mountains, low valleys and transitional, and plains macroinvertebrate ecoregion zones (slides 17-20, **Attachment A**). As noted, it was determined that Becks3 Biotic Index is the best representative metric. For the mountains ecoregion, the Becks3 threshold was 35.1. Across all regions, TN provided the strongest correlation to macroinvertebrate metrics but TP was found to be important too. For the low valleys and transitional ecoregion, Becks3 Biotic Index is also the best representative metric with a Beck3 threshold of 18.7. No macroinvertebrate metrics were proposed for the plains ecoregion.

Michael Suplee then presented the DO Δ metrics for the low valleys and transitional and the plains ecoregions (slides 21-24, **Attachment A**). In the low valleys and transitional ecoregions, initial investigation identified a DO Δ threshold protective of aquatic life. The 2023 field work will augment these findings. The most meaningful macroinvertebrate metrics show changes suggesting a draft threshold at 3.5 mg/L. Spring creeks have naturally occurring macrophyte beds which increase DO Δ by ~3 mg/L above the proposed threshold and they do not meet the Becks3 low valleys and transitional threshold of 18.7. DEQ is proposing to pull spring creeks out of the translation process and propose something different for them. Spring creeks in MT have all been inventoried, so we can take a different tactic for them going forward. In the plains, a DO Δ threshold of 6.0 mg/L (based on the DO Δ vs. DO minimum relationship from a 5-year study) is recommended. In the plains, 87% of the reference site data achieve this threshold in non-drought periods. The translator includes options to exclude data from drought periods.

Michael Suplee then discussed the proposed translator for wadeable streams and medium rivers (slide 25, **Attachment A**) and an example of a response variable in action (slide 26, **Attachment A**). From 2010-2016, a full seven years after remediation to remove metals was completed but when Silver Bow Creek still had the old treatment facility, the Beck3 score was 0 every year. High ammonia and high nutrients were still coming from the facility, even though the metals problem from Superfund sites had been solved. The Beck's score doubled in each subsequent year after the wastewater treatment plant was upgraded and online in 2017. This case shows that macroinvertebrates do respond to changes in causal variables and these changes can be quantified.

Dave Clark asked, back on the original relationship between TN and Beck's score, what happens if TP is the limiting nutrient and all the reference sites are based on TN? Michael Suplee responded that he doesn't think it changes the relationship much because they both led to the same basic Beck's score. It was just that the nitrogen (N) was tighter. If you were to focus on phosphorus (P), which is what our statute requires, it will be effective. Reducing P will bring down (improve) the Beck's score.

Nick Banish, Gallatin Local Water Quality District, asked if the model simulations were run with the dissolved rather than total nutrient fractions? Michael Suplee responded that we didn't look at solubles because data sets are much smaller and because solubles are gone once they're out in the system. Many studies show that total nutrients, because of the cycling that occurs in streams, are a better benchmark than soluble nutrients.

MEETING SURFACE WATER QUALITY STANDARDS THROUGH MPDES PERMITTING

Alanna Shaw, DEQ, MPDES Section Supervisor presented some permitting basics (slides 29-35, **Attachment A**). All point sources discharging pollutants into waters of the United States need an MPDES permit. MPDES permits establish limits protective of water quality standards. Limitations must control all pollutants or pollutant parameters which the Director determines may be discharged at a level which will cause, the reasonable potential to cause, or contribute to an excursion above any state water quality standards, including state narrative criteria for water quality. Montana's narrative standard is located in ARM 17.30.637(1) "State surface waters must be free from substances attributable to municipal, industrial, agricultural practices that will: (e) create conditions which produce undesirable aquatic life." Permittees have compliance options to meet effluent limits: achieve permit limits, short term compliance schedule (<5 years), apply for an individual variance which must be re-evaluated every 5 years or on the same term as the permit, or the Adaptive Management Program which allows for an incremental approach.

Alanna Shaw then presented a hypothetical case study (slides 37-40, **Attachment A**). Hopefully this case study will orient permittees to the permitting approach for facilities entering the Adaptive Management Program. Any facility entering the Adaptive Management Program should consider the extent to which the facility is optimized already, the extent of the characterization of nutrient causal and response variables in the receiving water, and potential watershed NPS opportunities. In our example, we have a reasonably well optimized facility (>80%), well characterized causal variables, some response variable data, and >60% of the watershed nutrient inputs are from NPS. Some other details about the facility are that it is discharging to a medium sized river, the waterbody is 303(d) listed for nutrients, no TMDL is in place, the facility is located in ecoregion 17: Middle Rockies with a TP ecoregional range of 0.02 – 0.04 mg/L and a TN ecoregional range of 0.20 – 1.21 mg/L, and nutrient diffusing substrates indicate P limitation.

Alanna Shaw then discussed three permit cycles and a TP prioritization approach using the facility example set up in the previous slides (slides 41-47, **Attachment A**). DEQ recognizes that Adaptive Management Plans (AMPs) may occur over four permit cycles (20 years) which allows for facilities to plan for and budget for capital improvements (slide 41, **Attachment A**). This facility discharges 10 million gallon per day (mgd) and the receiving water TP concentration is 0.05 mg/L with a flow of 40 mgd. This is a fairly reasonable optimization scenario with reasonable limits to meet for a facility that is already well optimized (slide 42, **Attachment A**). In order to work towards the top of the ecoregional range, a reduction of 28 lbs/day in NPS projects is needed. The limits shown account for offsets with NPS projects

(slide 43, **Attachment A**). By permit cycle 3 (year 5) the narrative standard has been met by this facility due to implementation of NPS projects, this is the best case scenario (slide 44, **Attachment A**).

There is also the option that the narrative standard is not quite met (slide 45, **Attachment A**). The facility needs to determine if they are on track to meet the standard or consider a different compliance option. The overarching limit schedule for this facility shows the transition from end of pipe limits to taking NPS projects into consideration (slide 46, **Attachment A**). Slide 47, **Attachment A** demonstrates how TN is addressed in the permit.

Kelly Lynch, Montana League of Cities and Towns, asked in reference to slide 45, **Attachment A** what happens if the narrative standard is not met but it is because of something else going on in the watershed – like shade or heat (not NPS related)? Michael Suplee responded that we know that kind of thing can occur. One of the things we are building into Circular DEQ-15, the conclusion would be that the stream has a problem but we can look at other things as to why the scores cannot be met. We may need to look at site-specific standards. We can look at environmental factors beyond just nutrients.

Rika Lashley asked where does the NPS information come from? Alanna Shaw responded that this is going to vary based on the facility and the receiving water. A good place to start would be a TMDL if one exists. The number of permit cycles needed for the AMP will vary based on whether this information exists. Rika Lashley also asked would a permit limit already be set even without knowing that? Alanna Shaw responded that the first permit cycle would be based on facility optimization.

Guy Alsentzer, Upper Missouri Waterkeeper asked where is the authority for allowing offsets and trading when you have an impairment with no TMDL? Kurt Moser, DEQ, Legal Counsel responded that under this scenario, we are talking about an underlying compliance schedule which is where the authority applies here. This complies with the CWA and the MT WQA. Guy Alsentzer also asked if the suite of Best Management Practices (BMPs) will be acceptable as a compliance plan? Kurt Moser stated the overall Adaptive Management Program gets you there. Every scenario will be different. Alanna Shaw added that this is a fairly gross oversimplification of what an AMP will look like.

Dave Clark stated that we need to see scenarios like these for TP for TN to see if the limits are even feasible.

Matt Wolfe, Sibanye Stillwater asked how the cap at current performance takes into account design load versus current load? So this is not accounting for future growth? Alanna Shaw responded that over the course of a single permit cycle, those limits are going to be based on current performance with some consideration for any shifts in the facilities flow rate.

Kelly Lynch asked if there has been a conversation about how any of this gets adjusted if a facility volunteers to keep its facility open for taking septic waste? Andy Ulven, DEQ, Water Quality Planning Bureau Chief said that that is something we need to discuss more.

NONPOINT SOURCE LOAD REDUCTION ESTIMATES

Andy Ulven presented some NPS load reduction estimates and emphasized that the projects are for illustrative purposes only (slide 48, **Attachment A**). Modeled load estimates are important for meeting milestones and demonstrating the likelihood of project effectiveness, but the long-term goal is instream attainment of beneficial uses (slide 49, **Attachment A**). Meeting the standard as soon as possible is in

the best interest of all (partners, citizens, and dischargers). The sooner projects are implemented, the sooner we might expect to see the in-stream response, which is the ultimate goal. Some projects may take a decade or longer to have the anticipated effect. Many BMPs address both N and P at the same time. Even though a permittee may be appropriately prioritizing P, projects addressing both N and P are still encouraged (slide 50, **Attachment A**).

Implementation is encouraged upfront and may be required if more is known (data collected and nutrient sources identified). However, the scenario laid out in our case study had less known up front, so more work on nutrient source ID and project ranking is needed in cycle 1. In this example, it is an agricultural watershed with substantial presence of cattle, but other source of nutrients include P bearing sediment from forest roads, subdivisions with onsite wastewater treatment systems, erosion caused by past channelizing activities, and some row crop agriculture. Factors that might affect the prioritization of these projects include the relative size of the source, landowner agreements and access, funding, and public sentiment. Annual reporting on progress will be ongoing throughout the AMP; permittees will also have access to the Adaptive Management Program Scientist for consultation. Ongoing evaluation of eligibility will be based on meeting milestones. This cycle 2 example is based on what was seen in Alanna Shaw's slides. We know that this AMP will need to demonstrate an ability to reduce watershed P load by 28 lbs/day of P by the end of permit cycle 2 (slide 51, **Attachment A**).

Andy Ulven then presented a scenario involving relocation of a cattle corral sitting near the waterbody upstream of the discharge, but it has been elusive due to stalled negotiations with the landowner (slide 52, **Attachment A**). It may not always be possible to implement every project identified with watershed partners. However, four separate livestock BMP projects have been identified and contracts have been signed to implement them. A load reduction estimate exceeding 28 lbs/day of P is demonstrated by the Livestock Deposition model which will be shown in subsequent slides. In addition, though this project was ranked fourth on the project priority list, funding is in place and there is a desire from residents to connect individual onsite wastewater treatment systems from a subdivision near the waterbody to a centralized treatment system. It is important to note that additional measures of conservatism and professional judgement will be applied on a project-by-project basis given site-specific considerations and models used.

Andy Ulven then walked through project examples to include riparian fencing and off-channel watering and subdivision onsite connections (slides 53-55, **Attachment A**). After permit cycle 3, if the narrative standard is met, there is likely to be a change in the AMP and further implementation may not be necessary. However, if the narrative standard has not been met, further NPS project implementation will be required. Further eligibility for a fourth permit cycle will be based on continuing to meet milestones for implementation, monitoring, and reporting, plus evaluating whether the response variables have shifter, and the narrative standard is being achieved (slide 56, **Attachment A**).

Kelly Lynch stated that some points of concern were that contracts and owner agreements need to be read carefully. The NPS owner is not required to do anything; they can pull out at anytime (their feet are not being held to the fire). Andy Ulven responded that that is a correct understanding. Kelly Lynch said she would be happy to talk on some template language on that.

Louis Engels, City of Billings, asked if entering into the Adaptive Management Program has changed at all? Does it still require a discharger to enter tertiary treatment prior to the program? Alanna Shaw responded saying that has never been the case. All of these projects are an alternative to going to

tertiary treatment, reducing nutrient concentrations in the receiving water without making that investment.

Guy Alsentzer asked if the Adaptive Management Program contemplates a trading source ratio? Andy Ulven replied that we have discussed this a little bit. We haven't come up with a specific ratio that we are looking for. We would be applying measures of conservatism in producing load reduction estimates. Darrin Kron, DEQ, Monitoring and Assessment Section Supervisor added that the location is very important, the further away it is from an area where uses are met, we will be thinking about that.

Moira Davin asked if this was a helpful exercise to walk through today? Kelly Lynch said that walking through the process of what it might look like is the first time they have seen this and appreciate that.

RECAP OF DEQ'S WORK

Lindsey Krywaruchka, DEQ, Water Quality Division Administrator presented a summary of DEQ's work so far (slide 58-59, **Attachment A**). The NWG reconvened in 2021 after passage of Senate Bill 358. A previous NWG met with DEQ during the preceding decade to work through development of numeric criteria. Due to the existing approved-for-CWA-purposes numeric criteria, DEQ did not start from a blank slate following Senate Bill 358. The combined criteria approach DEQ is proposing incorporates and builds on existing science to create water quality standards that are more protective and more reflective of MT watershed conditions. The November meeting is scheduled for 11/14/23. DEQ will share the draft rules prior to the meeting and walk through them as the primary agenda item.

UPCOMING MEETINGS

Moira Davin presented the upcoming meeting schedule (slide 61, **Attachment A**). The meeting will be held November 14, 2023 9 – 11:00 a.m.

PUBLIC COMMENT

Moira Davin opened it up for public comment.

Sean Sullivan asked Michael Suplee about the use of the threshold of 75th percentile of reference for metric inflections points. Is there evidence that this is commonly used? He is more familiar with the use of higher percentile thresholds (e.g., 85th and 95th), but that is more akin to use support and/or determining the discrimination efficiency of certain metrics. Michael Suplee responded that there is precedent for that. It has been long recommended by the Environmental Protection Agency (EPA) to use the 75th percentile for purposes of decision making. The reference sites provide context for the logistic models and show a meaningful relationship.

Vicki Watson, University of Montana Watershed Clinic said that all of today's presentations were very helpful. When will the recorded presentation be available for viewing? Moira Davin responded that DEQ does not record these meetings but there are summaries and PowerPoint presentations available on the NWG website. Vicki Watson stated that the Adaptive Management Program will require a lot of resources to work well. She asked if DEQ will have human and fiscal resources to carry out the continuing scientific work to estimate the load reductions and conduct follow-up monitoring needed to see responses in the waterbodies? Lindsey Krywaruchka said that DEQ is currently running at a 20%

vacancy rate in our agency and this has been a big load on our team. We may need some help down the road and want to look into how to invest in NPS projects.

Sean Sullivan asked Michael Suplee with the ecoregion approach what percentage of potentially affected dischargers are located on non-wadeable stream reaches as defined in WQPBWQM-009? Was there any effort to stratify your analysis by wadeable/non-wadeable waterbodies and the relationships between the BMI metrics and reference conditions, etc.? Michael Suplee said that there is a distinction between wadeable streams, medium rivers, and large rivers. We have long made a distinction in this process that large rivers will have their own translator. We are leaning towards the direction of water quality models like QUAL2K. The Department has never used macroinvertebrates to assess large rivers, but they have protection using other translator parts.

Brian Heaston, City of Bozeman asked how does this Adaptive Management Program process integrate with revision to an existing EPA approved TMDL? Christina Staten, DEQ, TMDL Section Supervisor responded that existing TMDLs may be revised to add implementation language for the wasteload allocation (WLA) for permittees entering the Adaptive Management Program. If a permittee in the Adaptive Management Program demonstrates that a different target value is appropriate for achieving beneficial uses, the TMDL will be revised to reflect the changed target value, which will modify the WLA and in turn the permittee's permit limit. Any TMDL revision that changes the TMDL target value and/or WLA would require the document be provided for public comment and re-approval by EPA.

Mary Harlow, Prickly Pear Land Trust asked how DEQ plans to address resort areas? DEQ responded that it is addressed on a permit-by-permit basis.

Thomas Kallenbach, Eliminite Inc. said that the Method for Estimating Attenuation of Nutrients from Septic Systems (MEANSS) Model suggests huge reductions in N and P. However, there has been no meaningful review of this model. Does DEQ plant to open the model to review? Lindsey Krywaruchka replied that we have done a peer review of the MEANSS Model with the United States Geological Survey and we stand by that review.

There was no further public comment.

The meeting ended at 11:00 a.m.

ATTACHMENT A: OCTOBER 16, 2023 NUTRIENT WORK GROUP MEETING PRESENTATION SLIDES

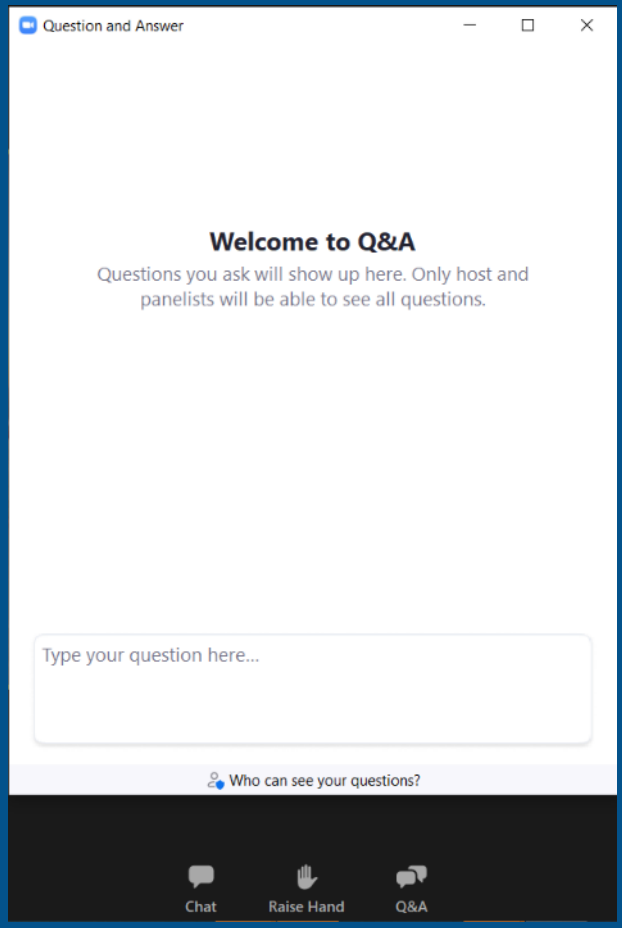
Nutrient Work Group

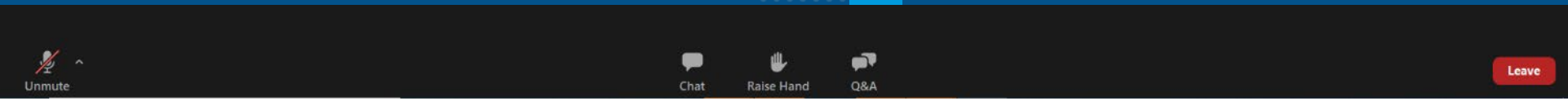
October 16, 2023

DEQ MONTANA

Welcome!

- This meeting is a webinar
- NWG members will be panelists
- Members of the public can raise their hand or use the Q&A feature to ask questions during the public comment portion of the meeting
- *9 raises your hand if you're on the phone
- State your name and affiliation before providing your comment





DEQ MONTANA

Roll Call

Nutrient Work Group Members

Interest Group	Representative	Substitute
Point Source Discharger: Large Municipal Systems (>1 MGD)	Louis Engels	
Point Source Discharger: Middle-Sized Mechanical Systems (<1 MGD)	Shannon Holmes	
Point Source Discharger: Small Municipal Systems with Lagoons	Rika Lashley	
Point Source Discharger: Non-POTW	Alan Olson	
Municipalities	Kelly Lynch	
Mining	Matt Vincent	
Farming-Oriented Agriculture	Karli Johnson	
Livestock-Oriented Agriculture	Ellie Brighton	
Conservation Organization - Local	Kristin Gardner	
Conservation Organization – Regional	Sarah Zuzulock	
Conservation Organization – Statewide	David Brooks	
Environmental Advocacy Organization	Guy Alsentzer	
Water or Fishing-Based Recreation	Pete Cardinal	
Federal Land Management Agencies	Andy Efta	
Federal Regulatory Agencies	Tina Laidlaw	
State Land Management Agencies	Jeff Schmalenberg	
Water Quality Districts / County Planning Departments	Nick Banish	
Soil & Water Conservation Districts – West of the Continental Divide	Samantha Tappenbeck	
Soil & Water Conservation Districts – East of the Continental Divide	Dan Rostad	
Wastewater Engineering Firms	Scott Buecker	
Timber Industry	Julia Altemus	

DEQ Updates

DEQ MONTANA

Agenda

Meeting Goal: Discuss the Adaptive Management Program process, the translator and response variables, and an update on the draft Circular DEQ-15.

Preliminaries

- Nutrient Work Group Roll Call

Overview of the Translation of Narrative Nutrient Standards

- Response variables and thresholds

Overview of the Implementation of the Adaptive Management Program

- Permitting basics
- Case study – permit example
- Nonpoint source load reduction estimates

Update on Circular DEQ-15

Public Comment & Close of Meeting

- Public comment

DEQ MONTANA

Narrative Nutrient Standards Translator

DEQ MONTANA

Regulatory Background

Key MT statutes and rules related to the narrative translator

- 75-5-321(2)(c), MCA: Directs DEQ to identify "the appropriate response variables affected by nutrients and associated impact thresholds in accordance with the beneficial uses of the water body."

- ARM 17.30.637(1) "State surface waters must be free from substances attributable to municipal, industrial, agricultural practices or other discharges that will:
  (e) create conditions which produce undesirable aquatic life."

  Proposed NEW RULE I "Translation of Narrative Nutrient Standards" ties to this narrative

- Recreation and fishes and associated aquatic life are included in all waterbody beneficial use classes across Montana

DEQ MONTANA

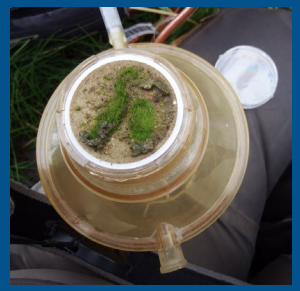
New Rule 1 – Translation of Narrative Nutrient Standards

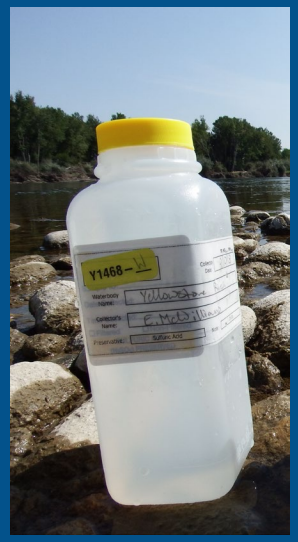
Used to determine if narrative nutrient standards are met

Combined criterion approach
- response variables
- causal variables

<u>Emphasizes biological response</u>

Applied across many MTWQA/CWA programs (303(d), TMDL, NPS, MPDES, etc.)





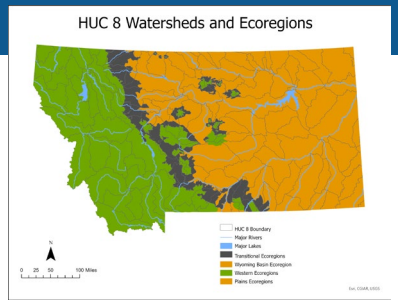
DEQ MONTANA

Translator: Wadeable Streams and Medium Rivers

Per Circular DEQ-15, Draft 3 (December 2022)

			Response Variable (threshold)			
Ecoregional Zone and Stream Gradient	**Associated Benefical Use**	**Nutrient Causal Variables (*see* nutrient concentration ranges, by ecoregion)**	**DO Delta**	**Benthic Chl*a* ; AFDW**	**% filamentous algae bottom cover**	**Macroinvertebrates**
Western and transitional ecoregions, all streams and medium rivers	Recreation	**X**		**X** (150 mg Chla/m^2; 35 g AFDM/m^2)	**X** (30% cover)	
Western and transitional ecoregions, streams and medium rivers with ≤1% water surface gradient	Aquatic Life	**X**	**X (TBD)**			**X** (metrics, thresholds TBD)
Western and transitional ecoregions, streams and medium rivers with >1% water surface gradient	Aquatic Life	**X**				**X** (metrics, thresholds TBD)
Eastern ecoregions, all streams and medium rivers	Aquatic Life	**X**	**X** (5.3 mg DO/L)			**X** (metrics, thresholds TBD)

X in translator means required parameter



DEQ MONTANA

Why Dissolved Oxygen Delta (Δ) and Macroinvertebrate Metrics?

Reflect floral and faunal characteristics

DO Δ

Excessive DO Δ is linked to fish and aquatic macroinvertebrate impacts (MN, MT, OH)

- Daily DO swings reflect degree of primary productivity

Aquatic Macroinvertebrates

DEQ directly interprets them in Montana's waterbody beneficial uses as part of "fish and *associated aquatic life*"

- Most widely assessed biological assemblage among States, Tribal Nations
- Limited migration, or are sessile— good for assessing local impacts
- High biodiversity suitable for biological assessment
- Responsive on early and long-term time scales (weeks to years)

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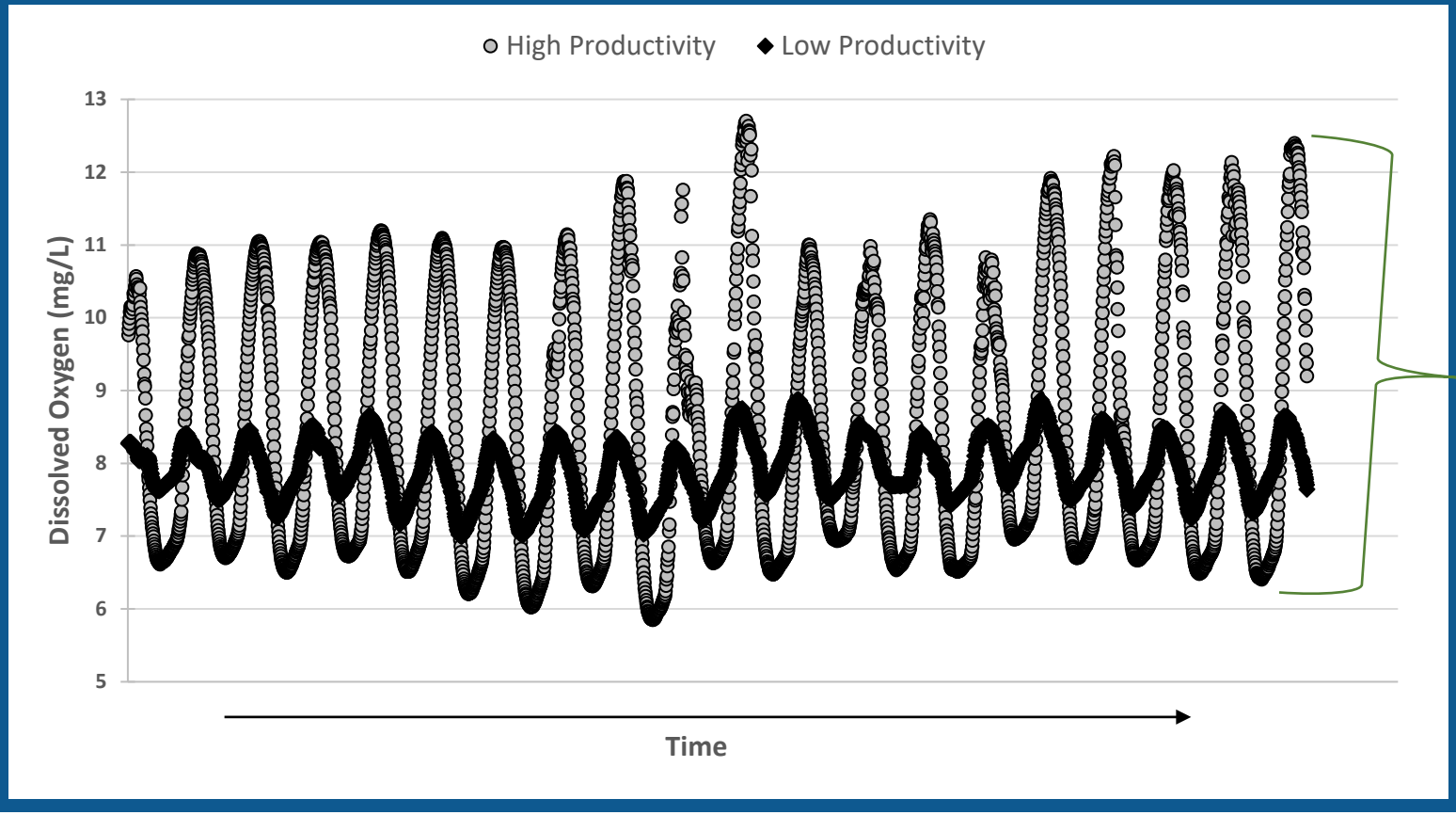
Dissolved Oxygen Delta

DO Δ is the daily DO change from low to high—measured by instrument, driven by flora



Nutrients ↑ → **DO Δ↑ DO MIN↓** → **Fish/aquatic life ↓**

DEQ MONTANA

Macroinvertebrate Metrics

Quantitative descriptions of the aquatic insect community

- Metrics for taxa (e.g., % Odonata)
- Metrics for taxa groups (e.g., number of mayflies, stoneflies, and caddisflies (Ephemeroptera, Plecoptera, and Trichoptera—EPT taxa)
- Biotic indices (e.g., HBI, Becks, Margalef's)
  - Constructed by biologists to reflect water pollution impacts on the aquatic insect community
- DEQ has standardized sampling method since 2005

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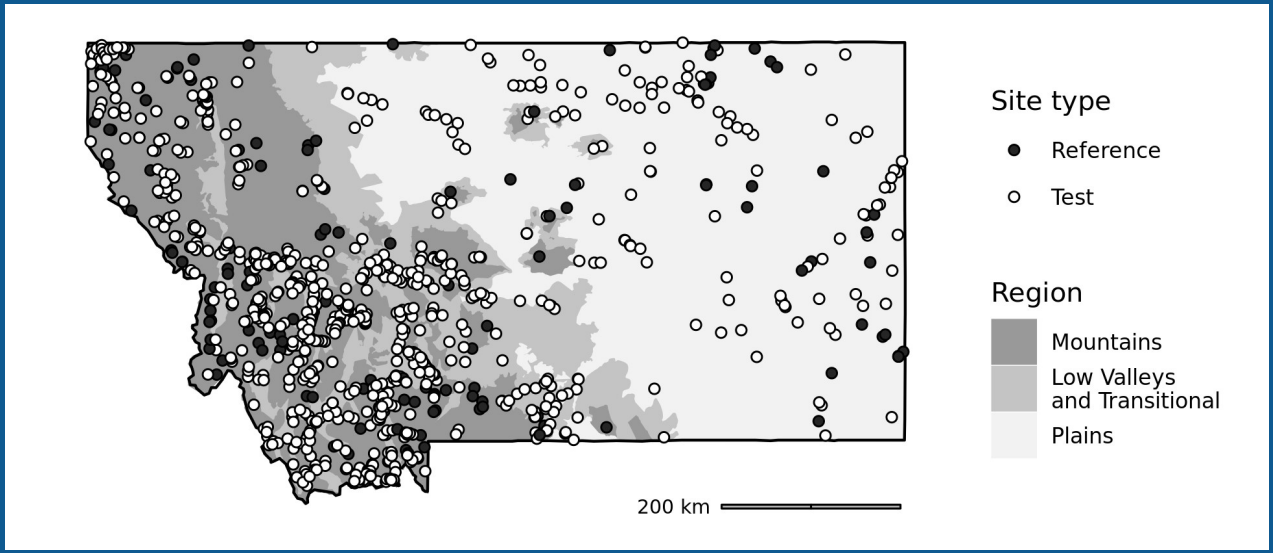
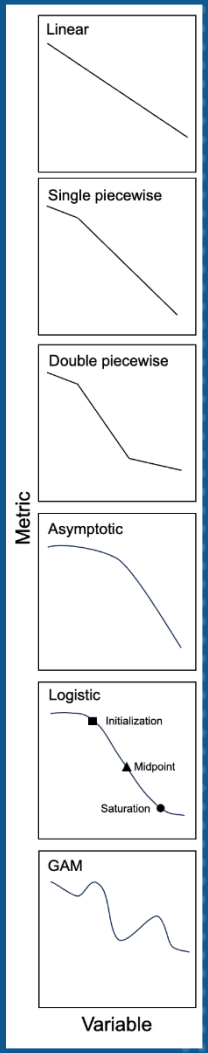
Macroinvertebrate Metrics

2023: Quantitative analysis for three Montana regions





Analyzed relationship between >200 macroinvertebrate metrics/indices and four causal variables (TP, TN, algal chlorophyll *a*, algal AFDW)

- 17-year dataset (2005-2021)
- Six model types considered; reference data provided context
- Analyzed confounding effects of flow, SC, temperature, pH

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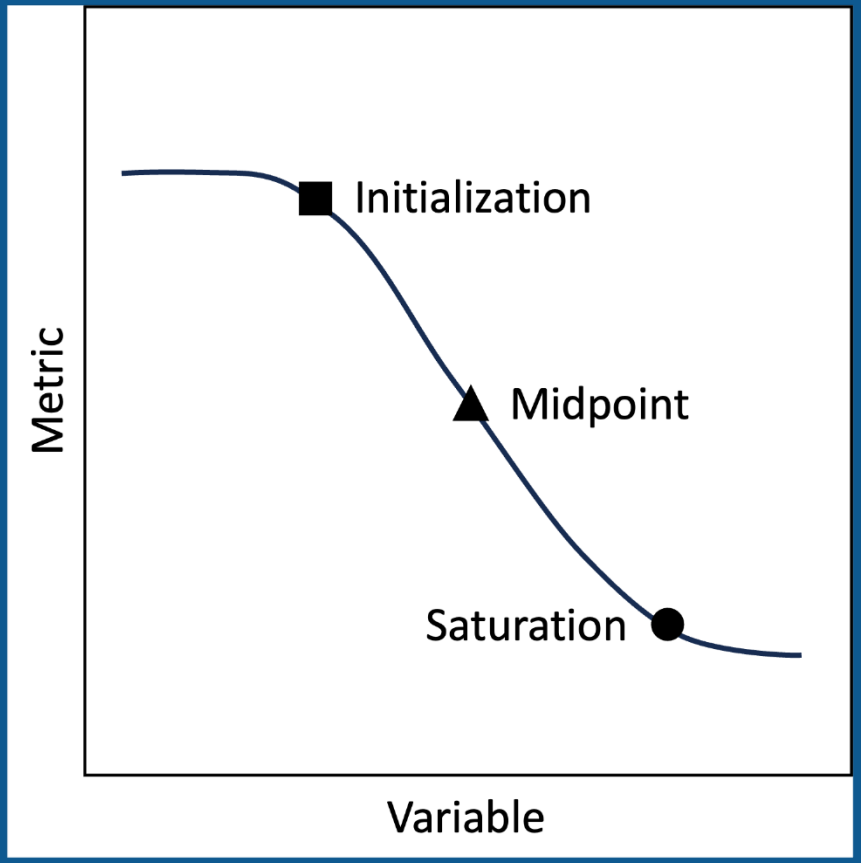
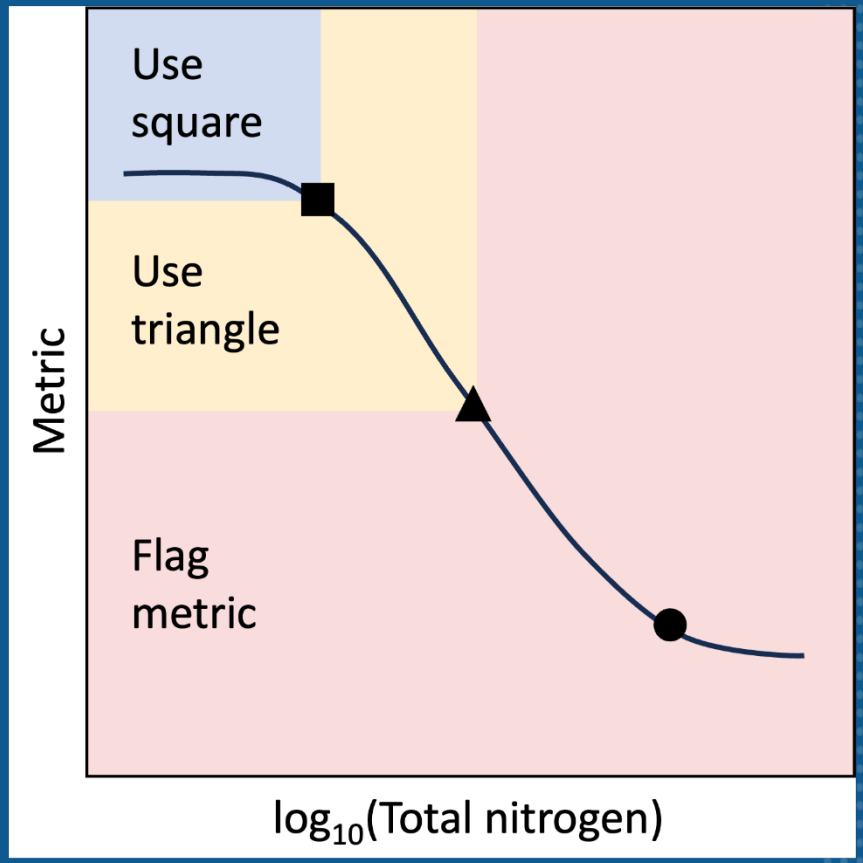
Macroinvertebrate Metrics

Logistic model was best fit; reference sites provide context



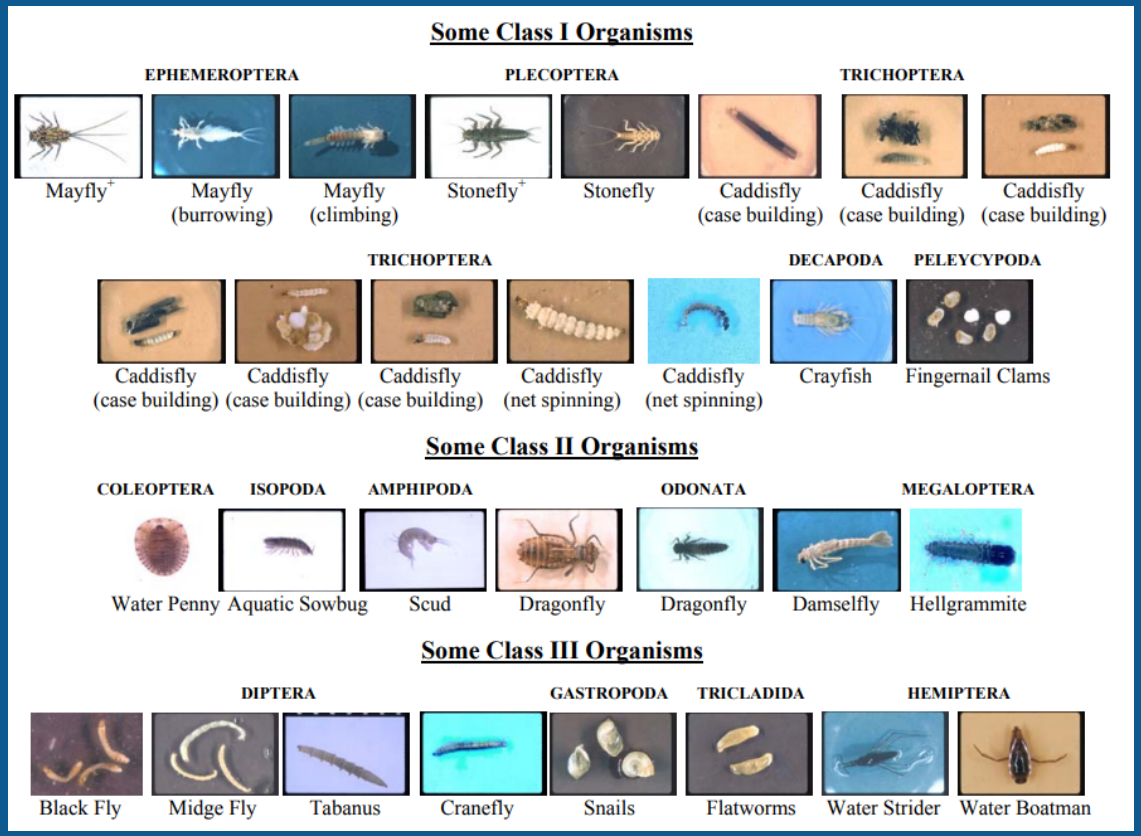


If 75% of reference sites had metric and total nitrogen values in a given colored region, the denoted point of change in the curve was considered the candidate threshold point

DEQ MONTANA

What is Beck's Biotic Index?

Developed in 1950s by William Beck—1st biotic index



- Developed by sampling up- and downstream of wastewater point sources
- Quantifies changes from desirable to undesirable aquatic life
- Version 3 (Becks3) has modified computation
  - Includes class III

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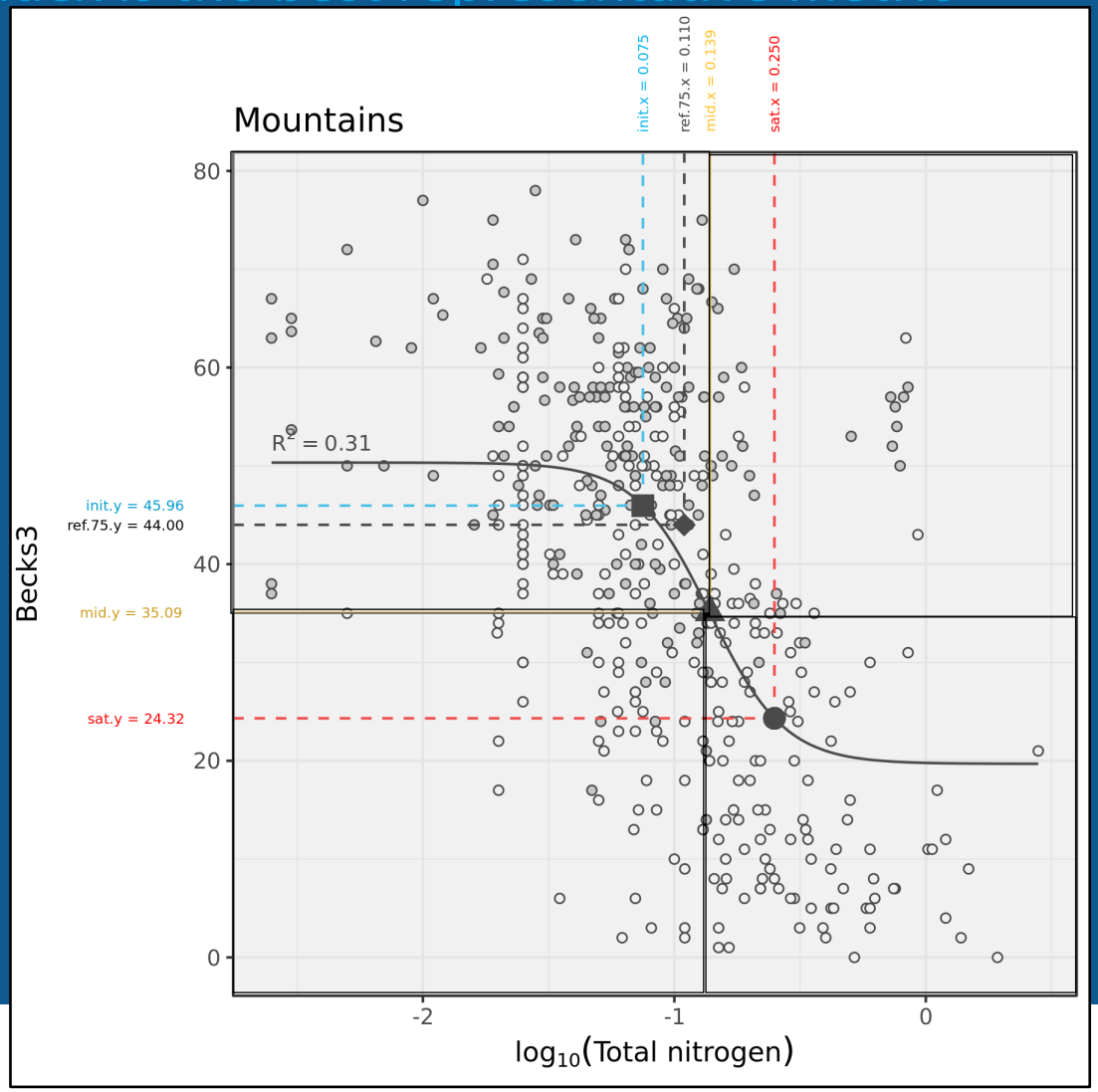
Questions so far?

DEQ MONTANA

Mountains: Macroinvertebrate Metrics

Becks3 Biotic Index is the best representative metric

Becks3 threshold:
35.1



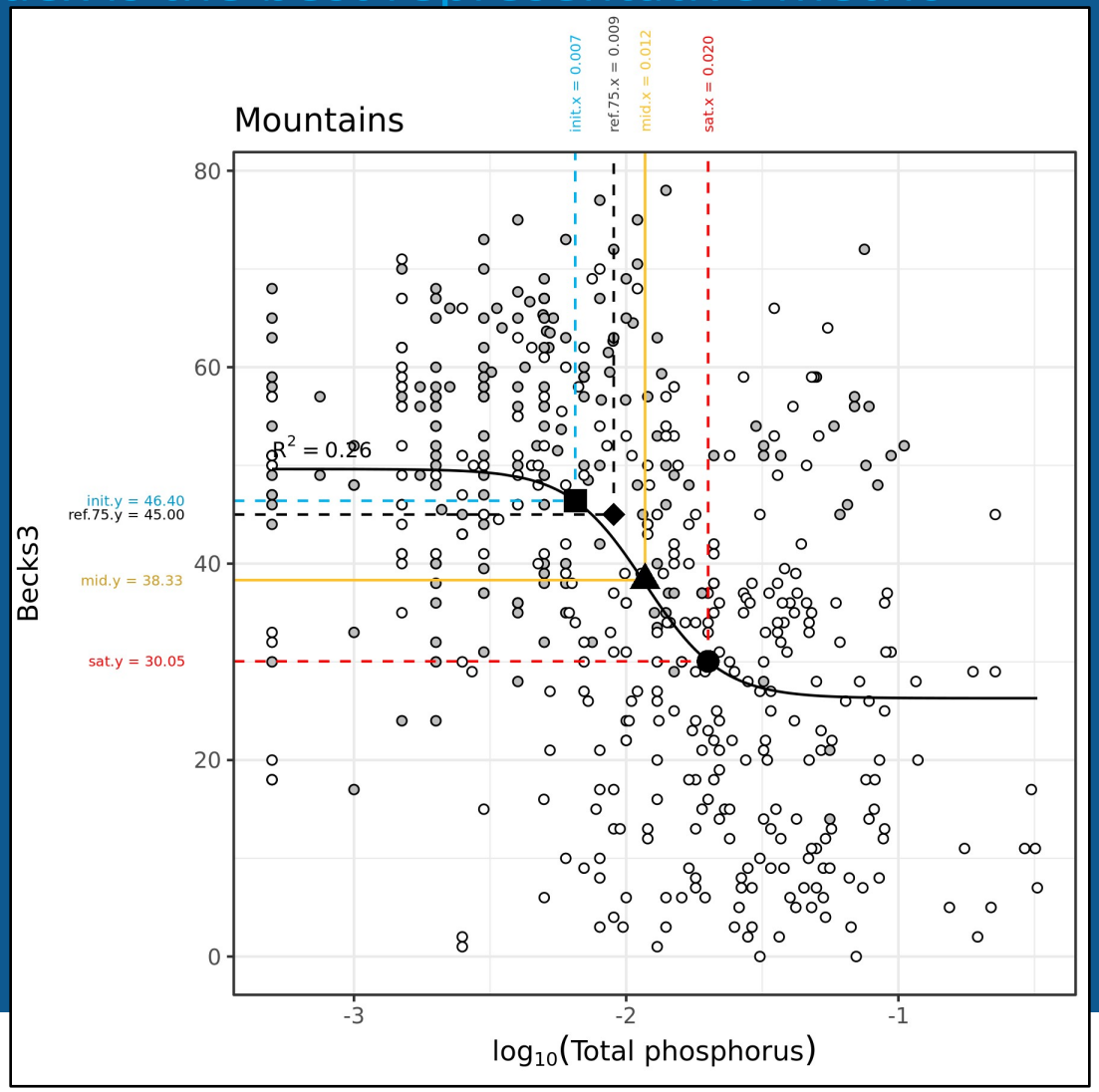
Data points:

Reference Test

Across all regions, TN provided the strongest correlations to macroinvertebrate metrics

Mountains: Macroinvertebrate Metrics

Becks3 Biotic Index is the best representative metric



Data points:

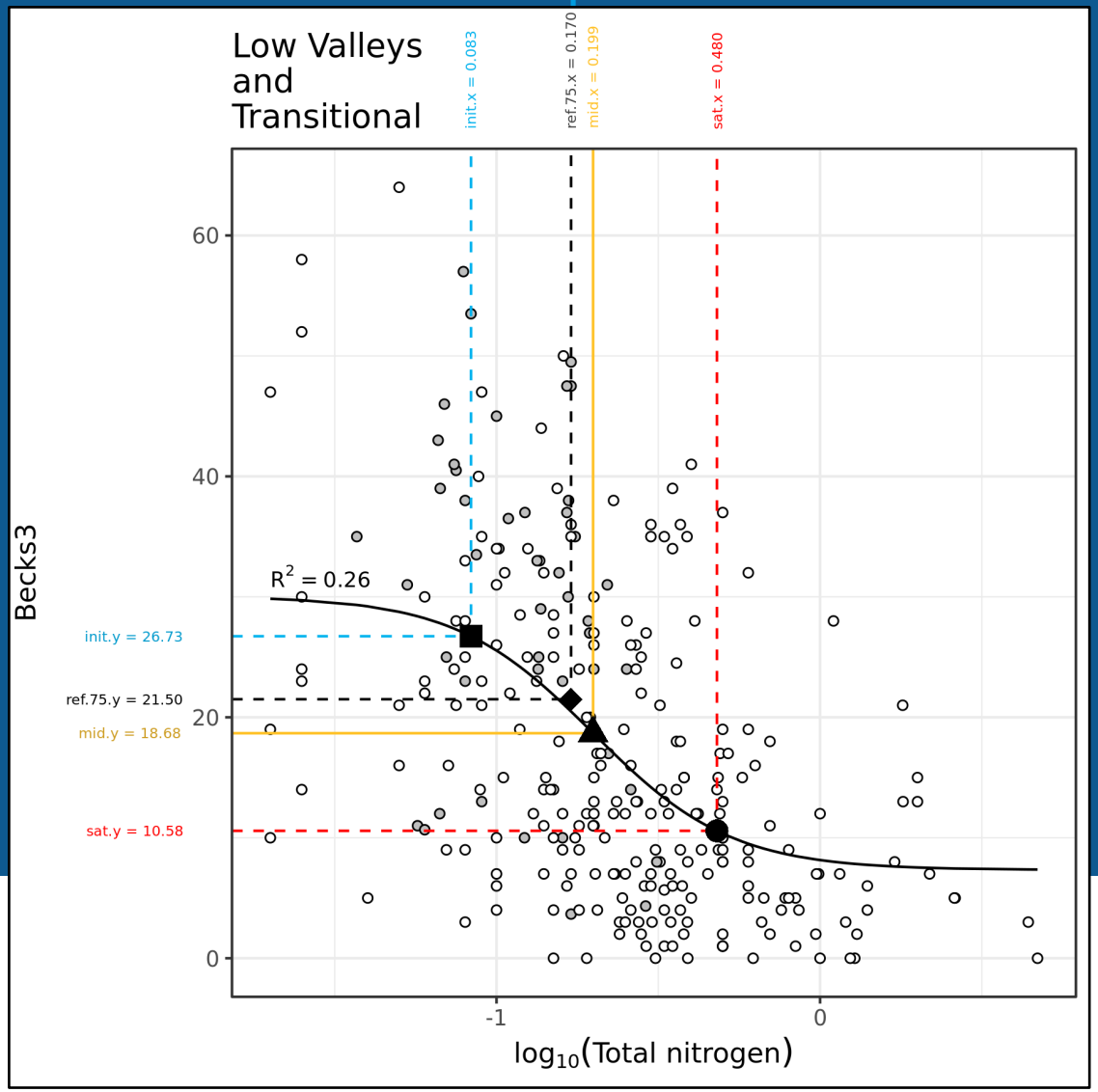
● Reference o Test

TN shows the strongest correlations to macroinvertebrate metrics—but TP is important too

Low Valleys and Transitional: Macroinvertebrate Metrics

Becks3 Biotic Index is also the best representative metric

Becks3 threshold: 18.7



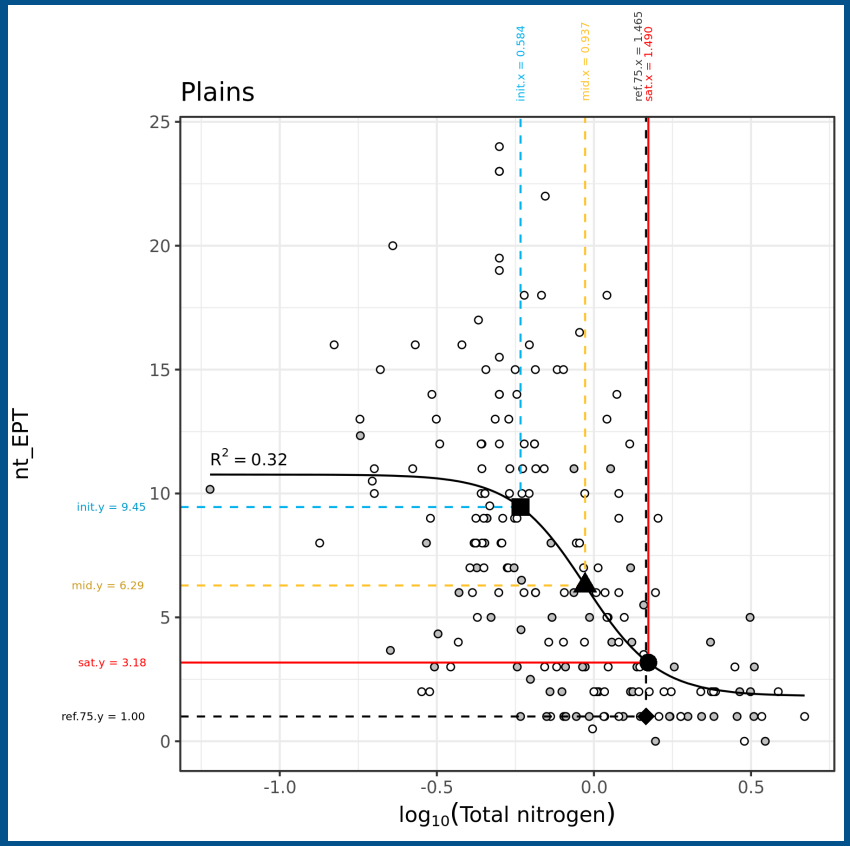
Data points:

- Reference
- Test

Plains: Macroinvertebrate Metrics

No macroinvertebrate metric proposed

- Logistic relationships shown
- Reference sites scattered across plots



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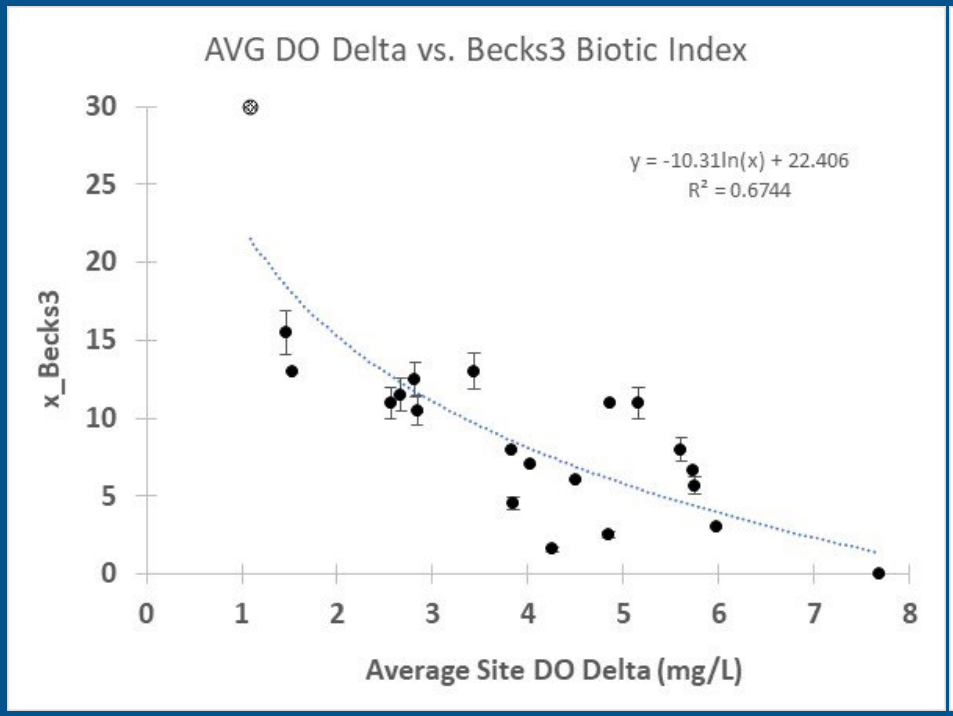
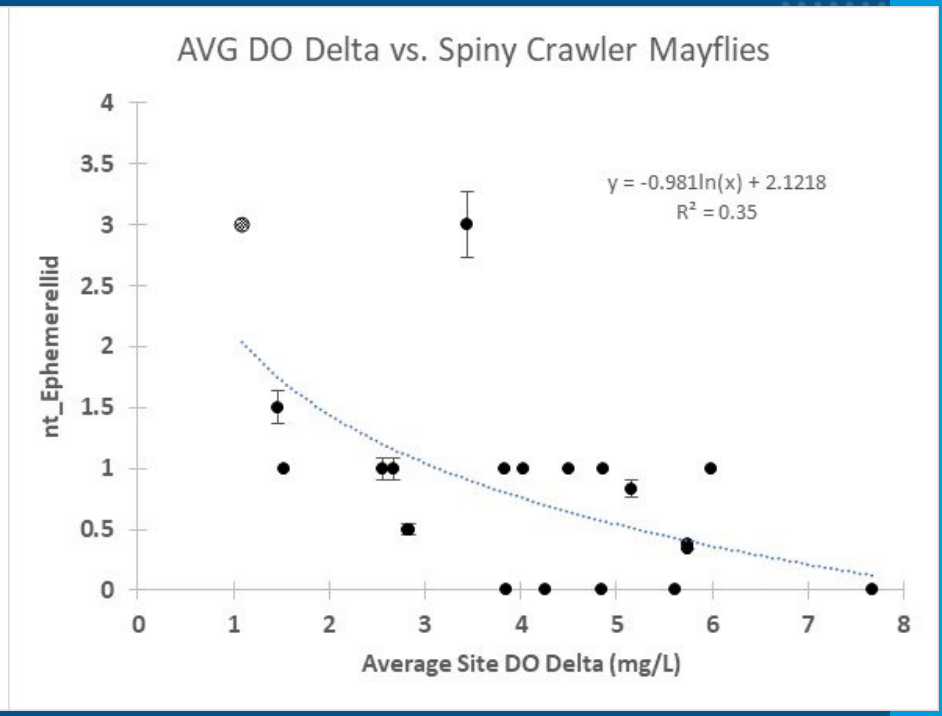
Low Valleys and Transitional: Dissolved Oxygen Δ

Initial investigation identified DO Δ threshold protective of aquatic life—2023 work (just completed) will augment findings





The most meaningful macroinvertebrate metrics show changes suggesting a draft threshold at 3.5 mg/L.

*Cross-hatch filled dot is the reference site

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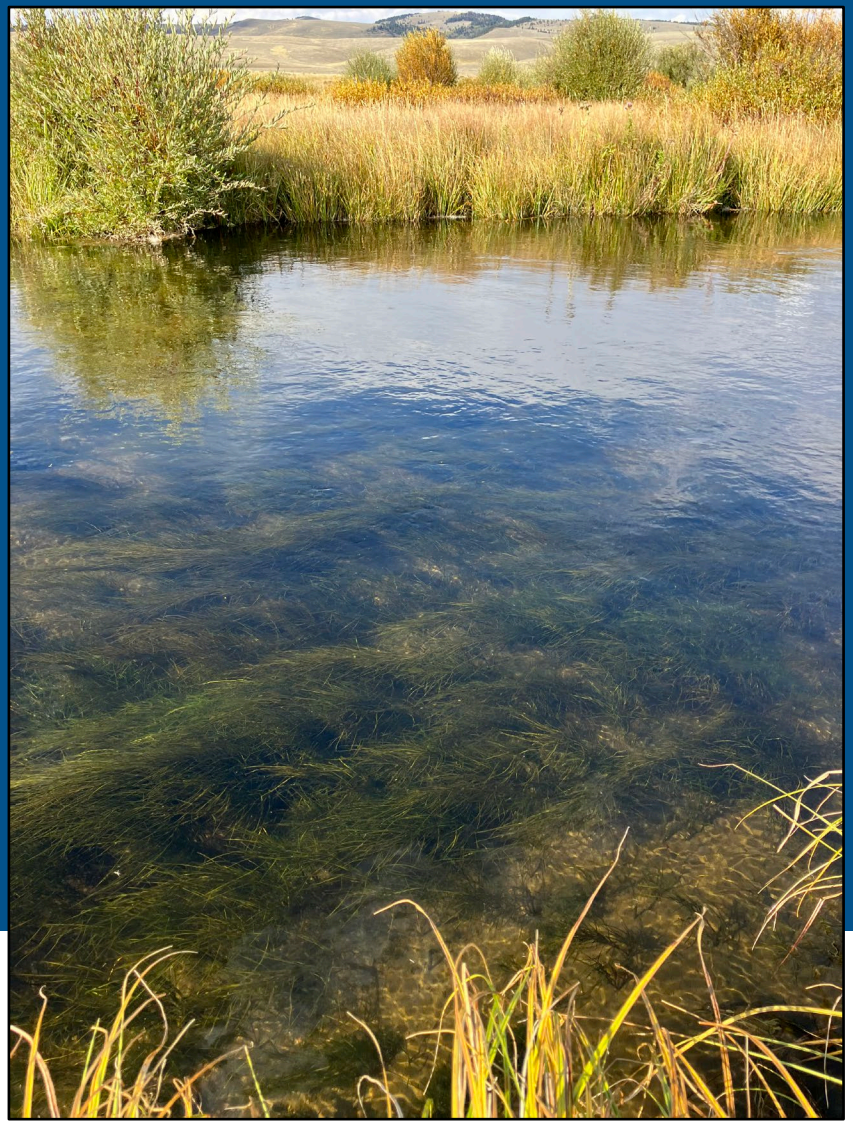
Low Valleys and Transitional: Dissolved Oxygen Δ

Spring Creeks: naturally occurring macrophyte beds increase DO Δ by ~3 mg/L above the proposed threshold, and have Becks3 scores below the threshold



Elk Springs Creek

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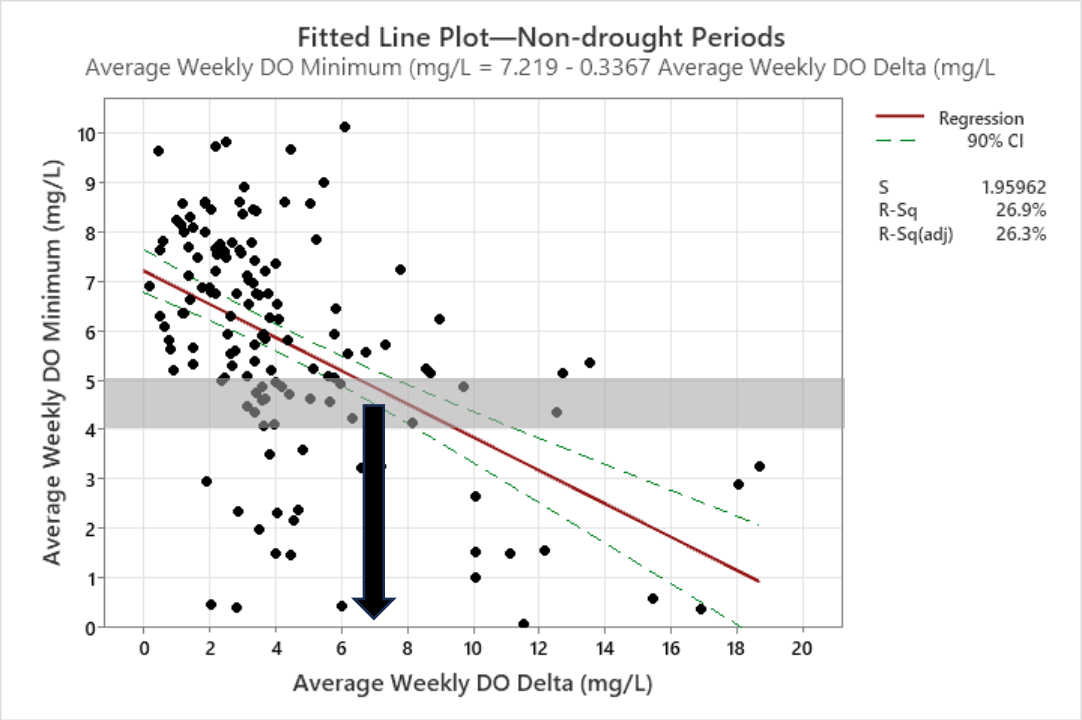
Plains: Dissolved Oxygen Δ (and DO Minima)

Montana Plains Region,
Non-Drought Periods
(2013-2017)



Ohio EPA
-applies a DO Δ of 6.5 mg/L

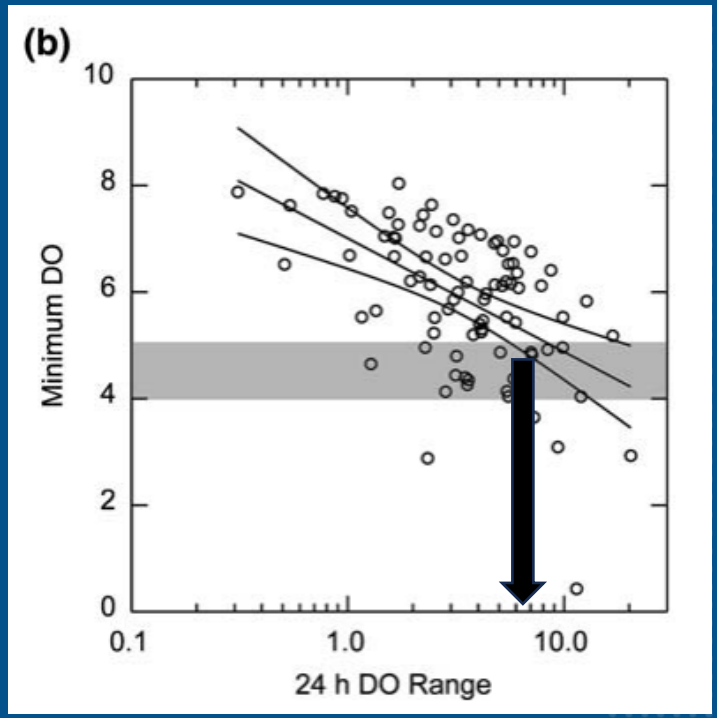


Figure From Miltner (2010)

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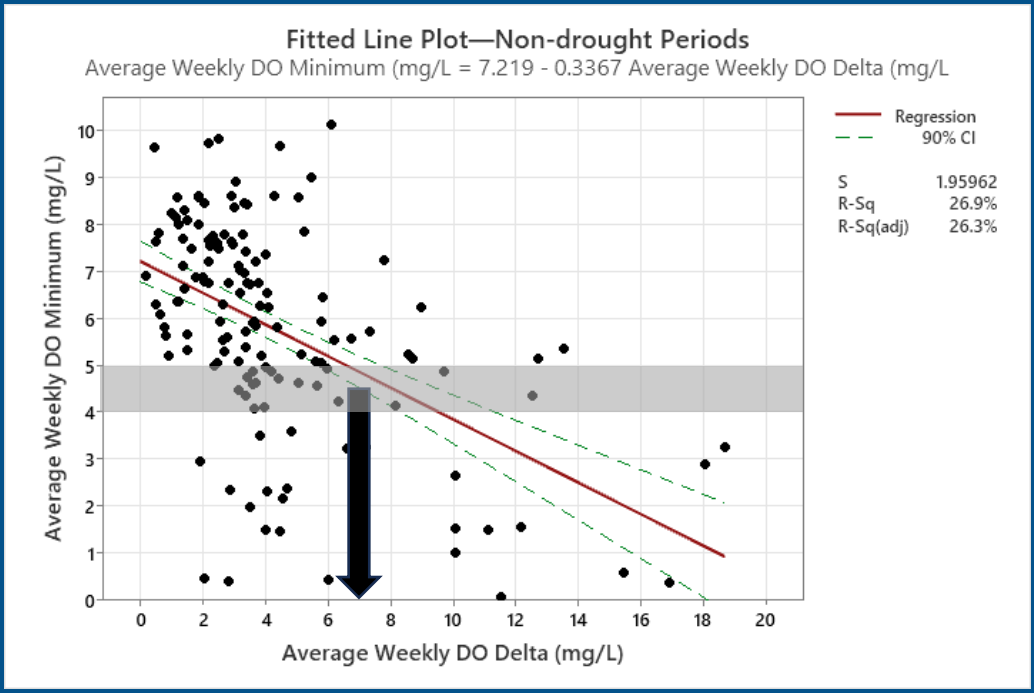
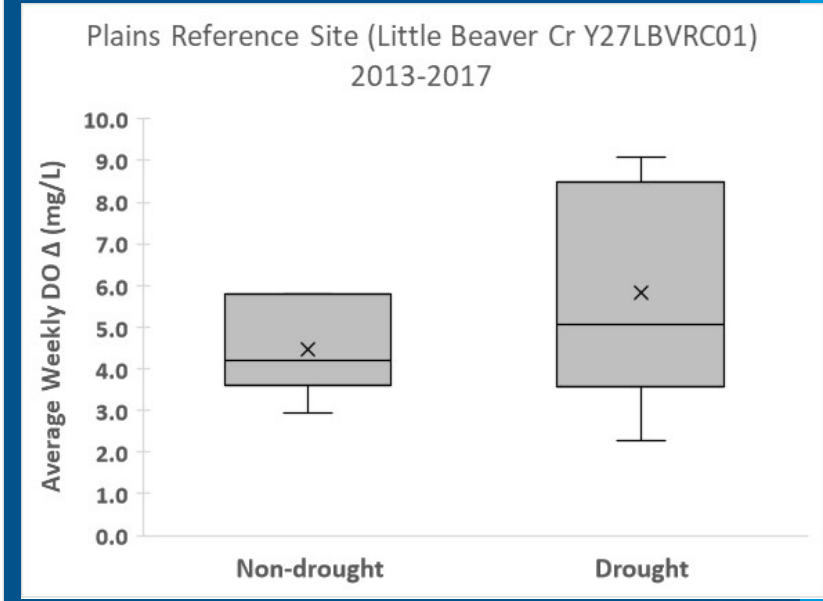
Plains: Dissolved Oxygen Δ and Drought

Montana Plains Region, Non-drought Periods (2013-2017)



Drought alone increases DO Δ in Plains streams



- **Plains: Proposed DO Δ threshold = 6.0 mg/L**
  - 87% of reference site data achieve this in non-drought periods
- **Translator includes option to exclude data from drought periods**

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DEQ's Proposed Translator—Wadeable Streams and Medium Rivers (OCT 2023)

Benefical Use and Applicable Zone			Causal Variable	Response Variable (threshold)			
Beneficial Use	**Stream Slope Zone***	**Macroinvertebrate Zone***	**TP, TN (*see* ecoregional nutrient concentration ranges in DEQ-15)**	**DO Delta†**	**Benthic Chl*a* ; AFDW**	**% filamentous algae bottom cover**	**Macroinvertebrates**
Recreation	Western and transitional ecoregions, all stream/medium river water surface slopes	n/a	**X**		**X** (150 mg Chla/m^2; 35 g AFDM/m^2)	**X** (30% cover)	
Aquatic Life	Western and transitional ecoregions, streams/medium rivers with >1% water surface slope	Mountains	**X**				**X** Becks3 Biotic Index (35.1)
Aquatic Life	Western and transitional ecoregions, streams/medium rivers with ≤1% water surface slope[a]	Low Valleys and Transitional[a]	**X**	**X** (*draft* =3.5 mg DO/L)			**X** Becks3 Biotic Index (18.7)
Aquatic Life	Eastern ecoregions, all streams/medium rivers	Plains	**X**	**X** (6.0 mg DO/L[b])			

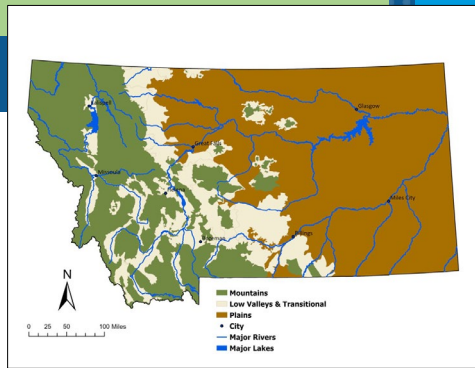
*Ecoregions comprising these zones are provided in **Table 2-2**.

† The allowable exceedance rate of a dataset of weekly average DO Δ values is 10% in the Low Valleys and Transitional and 15% in the Plains.

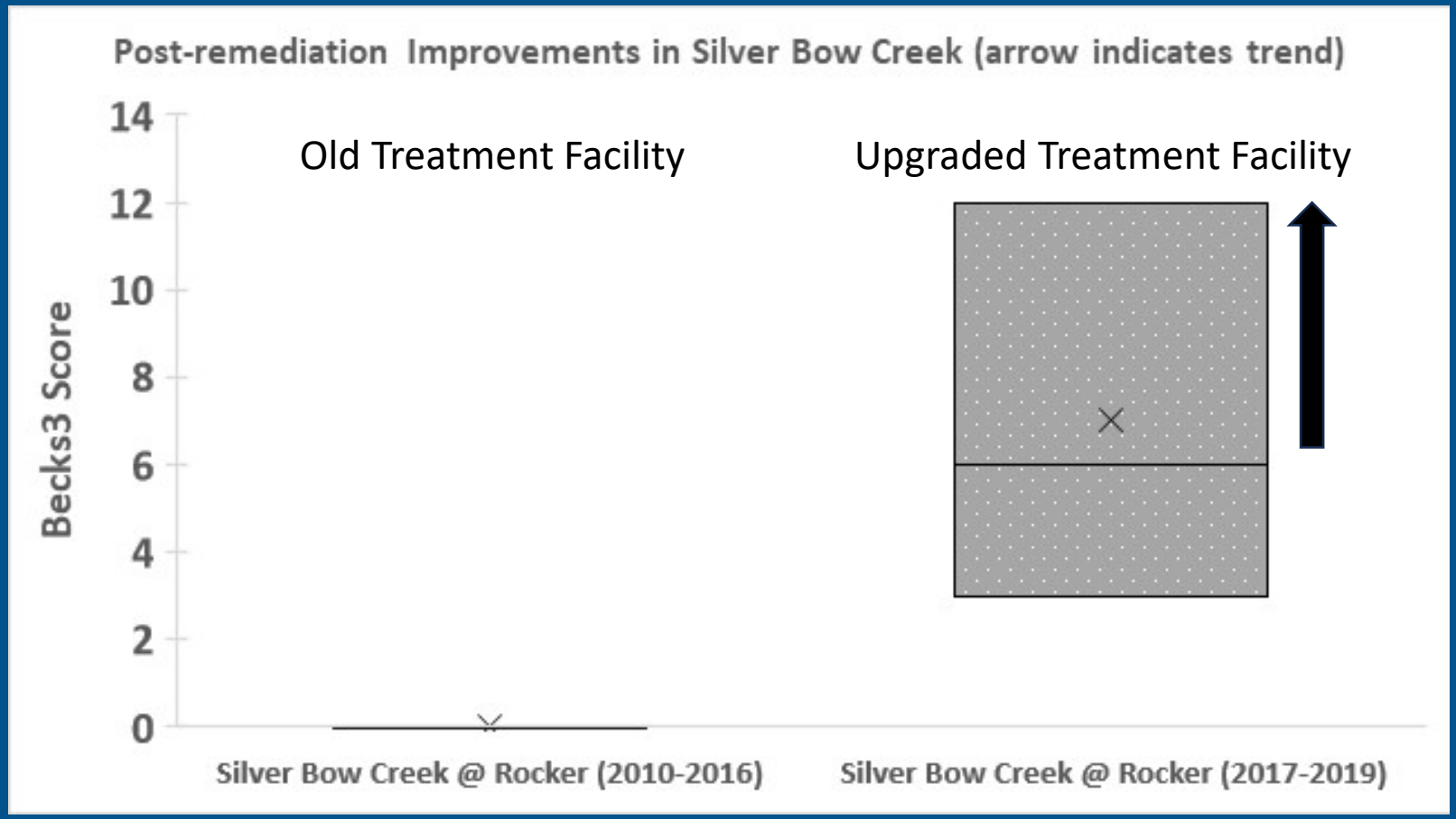
[a] Spring creeks have naturally-occuring macrophyte beds which cause DO Δ and Becks3 values that do not attain the thresholds; therefore, they may be exempted from this narrative translation. See endnote 1 for a list of spring creeks. Unlisted but verified spring creeks may be evaluated on a case-by-case basis.

[b] Data collected during drought periods may be excluded from analysis. See department guidance for definition of drought.

X in translator means required parameter



A response variable in action



Metals remediation was completed at this Silver Bow Cr site in 2003

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Questions?

DO Δ

Thresholds:

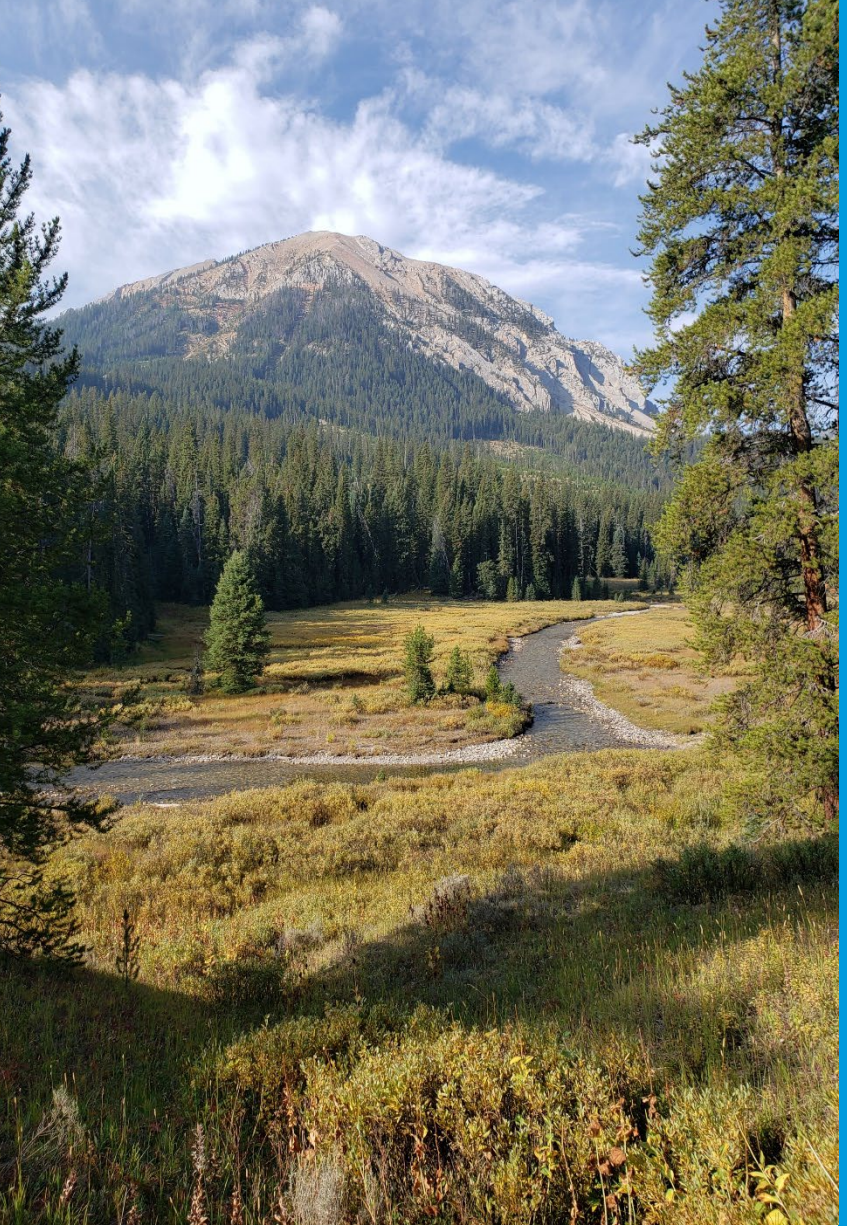
- Low Valleys and Transitional: 3.5 mg DO/L (*draft—to be finalized early 2024*)
- Plains: 6.0 mg/L (non-drought periods)

Macroinvertebrates

Becks3 Biotic Index

Thresholds:

- Mountains: 35.1
- Low Valleys and Transitional: 18.7 (spring creeks exempt)
- Plains: n/a



Meeting surface water quality standards through MPDES permitting.

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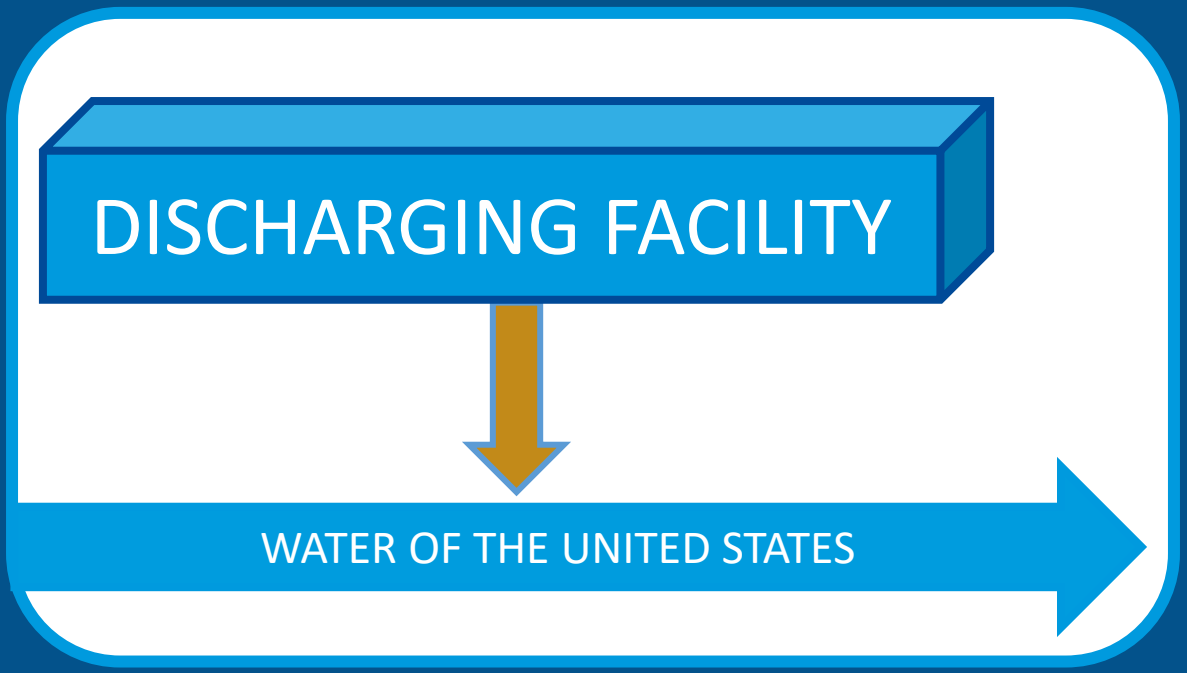
Who needs an MPDES permit?



All point sources discharging pollutants into waters of the United States.

CWA § 301a and 40 CFR 122.2(b)

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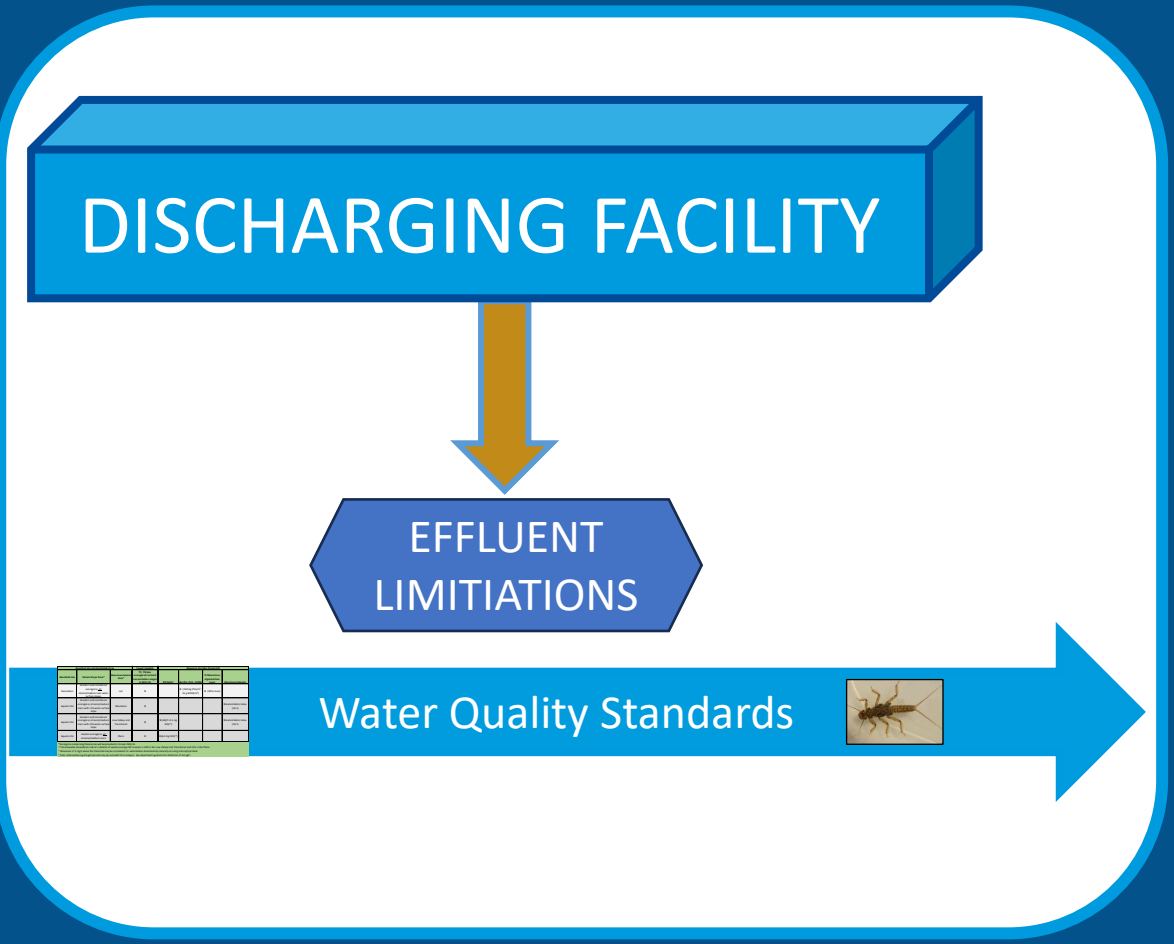
MPDES permits establish **limits** protective of water quality **standards.**



Limitations must control all pollutants or pollutant parameters…which the Director determines may be discharged at a level which will cause, have the ***reasonable potential to cause***, or contribute to an excursion above any state water quality standards, including state narrative criteria for water quality. 40 CFR 122.44(d)(1)(i)

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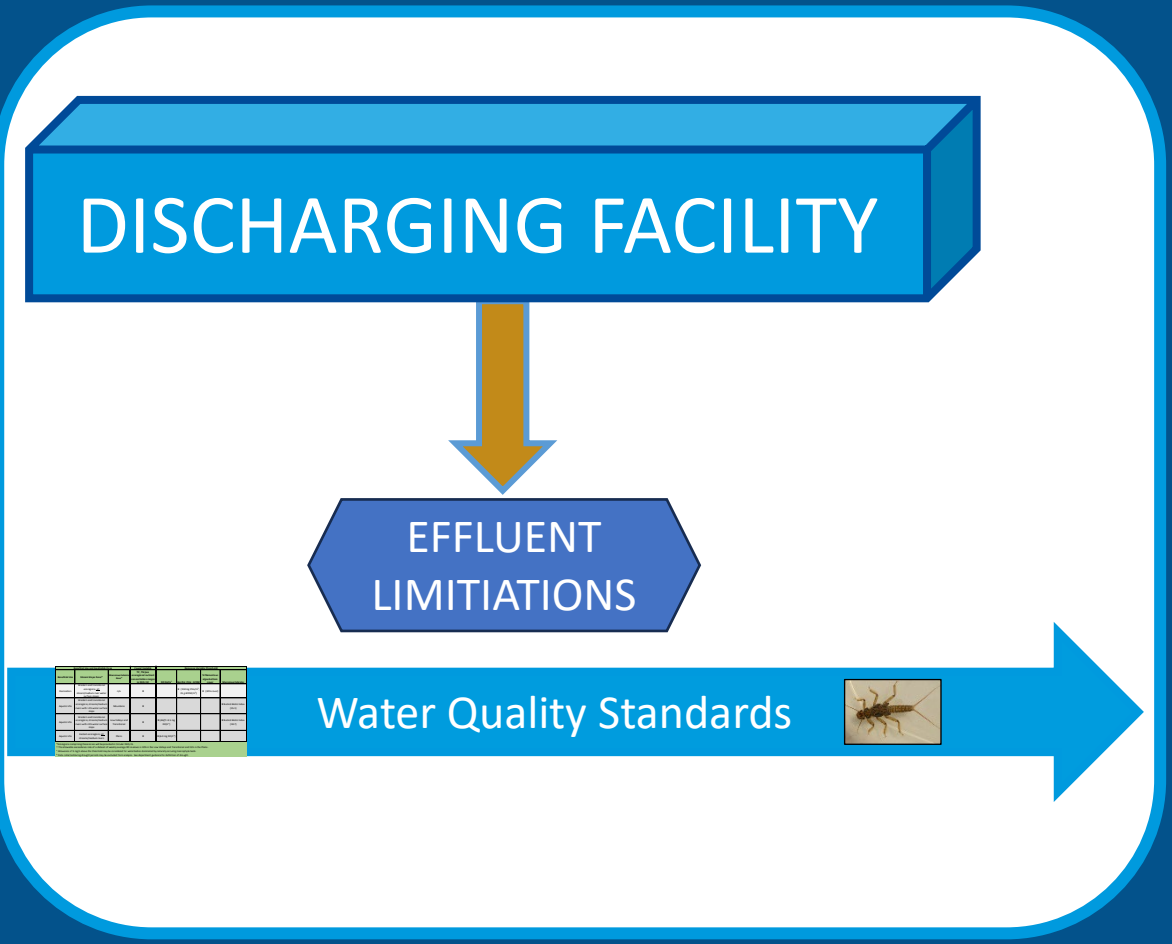
MPDES permits establish **limits** protective of water quality **standards.**



"State surface waters must be free from substances attributable to municipal, industrial, agricultural practices or other discharges that will: (e) create conditions which produce undesirable aquatic life."

ARM 17.30.637(1)

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Permittees have compliance options to meet effluent limits.

DISCHARGING FACILITY

EFFLUENT LIMITIATIONS

Water Quality Standards

Achieve permit limits

Permittees have compliance options to meet effluent limits.

DISCHARGING FACILITY

EFFLUENT LIMITIATIONS

Water Quality Standards

Achieve permit limits

Short term compliance schedule (<5 years)

DEQ MONTANA

Permittees have compliance options to meet effluent limits.

DISCHARGING FACILITY

EFFLUENT LIMITIATIONS

Water Quality Standards

- Achieve permit limits
- Short term compliance schedule (<5 years)
- Apply for an individual variance

DEQ MONTANA

Permittees have compliance options to meet effluent limits.

DISCHARGING FACILITY

EFFLUENT LIMITIATIONS

Water Quality Standards

- Achieve permit limits
- Short term compliance schedule (<5 years)
- Apply for an individual variance
- Adaptive Management Program

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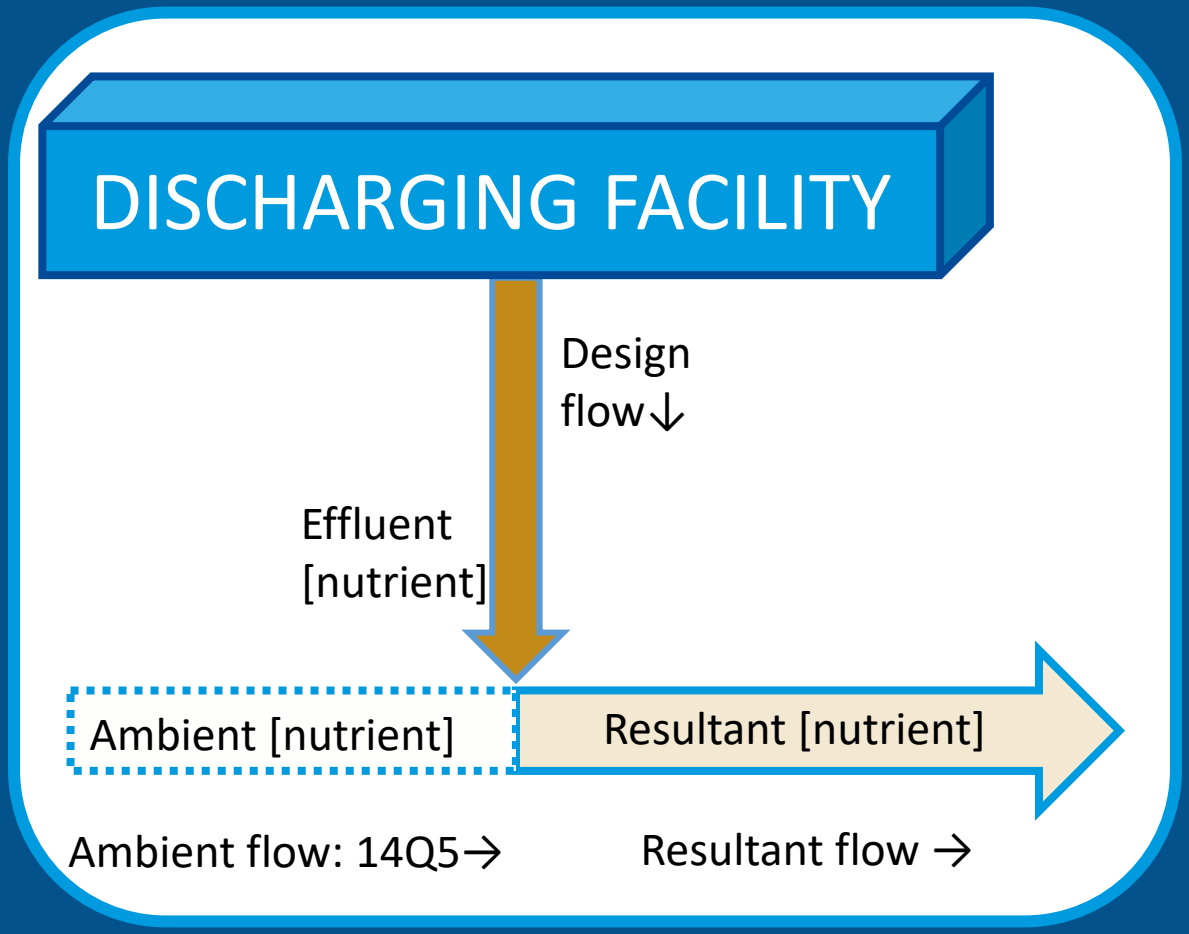
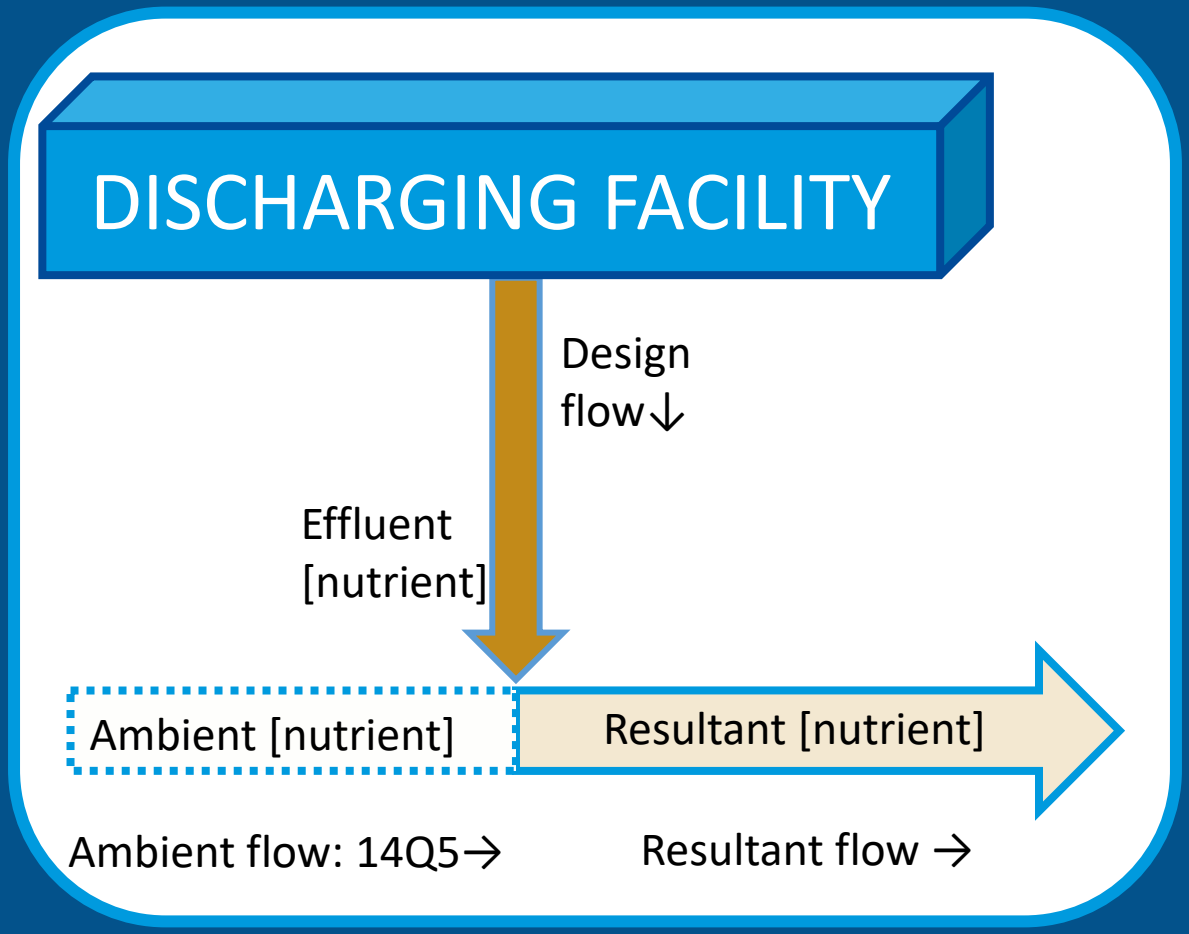
Case Study

DEQ MONTANA

Case Study Facility:



AMP MPDES Considerations:



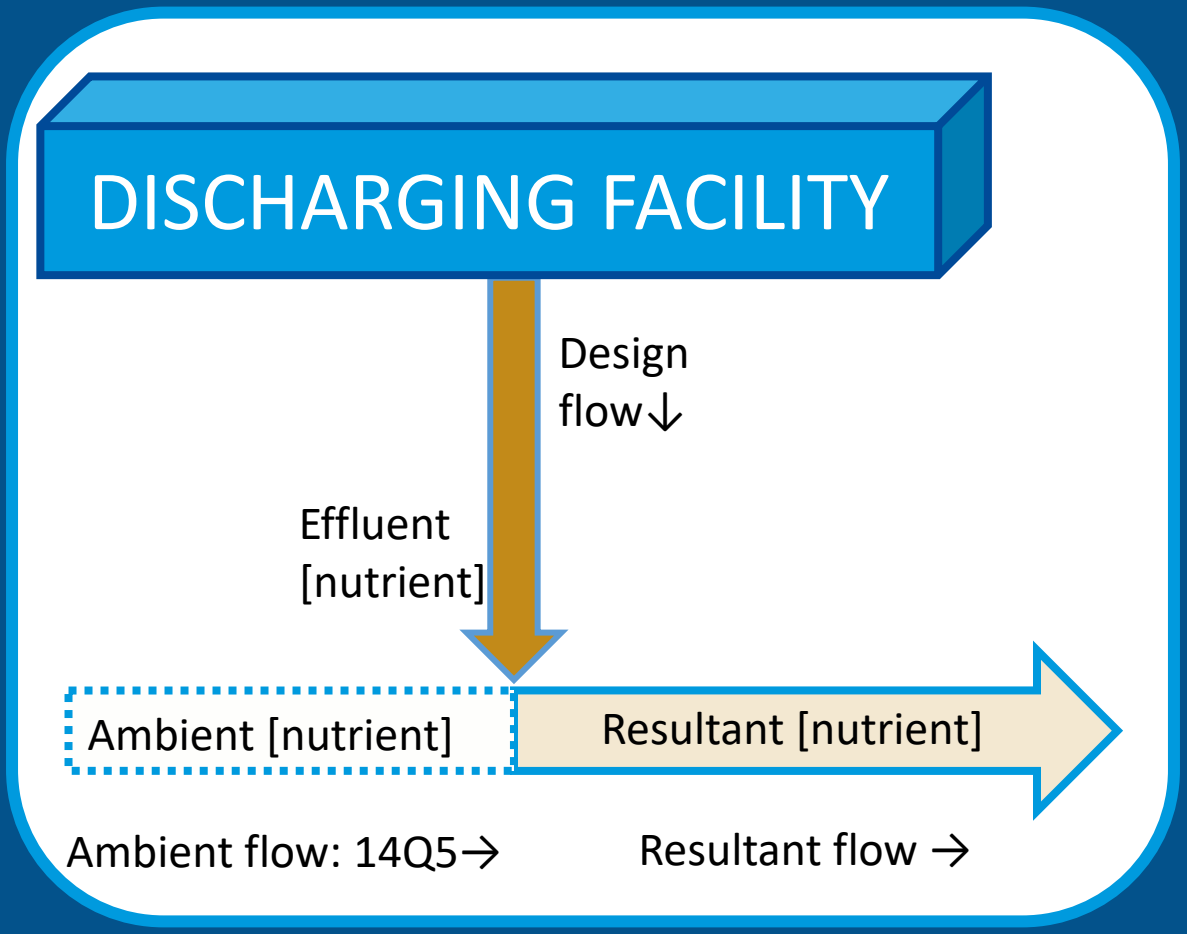
Facility optimization

Characterization of nutrient causal and response variables in receiving water

Watershed NPS opportunities

DEQ MONTANA

AMP MPDES Considerations:



Reasonably well optimized (>80%)

Well-characterized causal variables, some response variable data

>60% of watershed nutrient inputs from NPS

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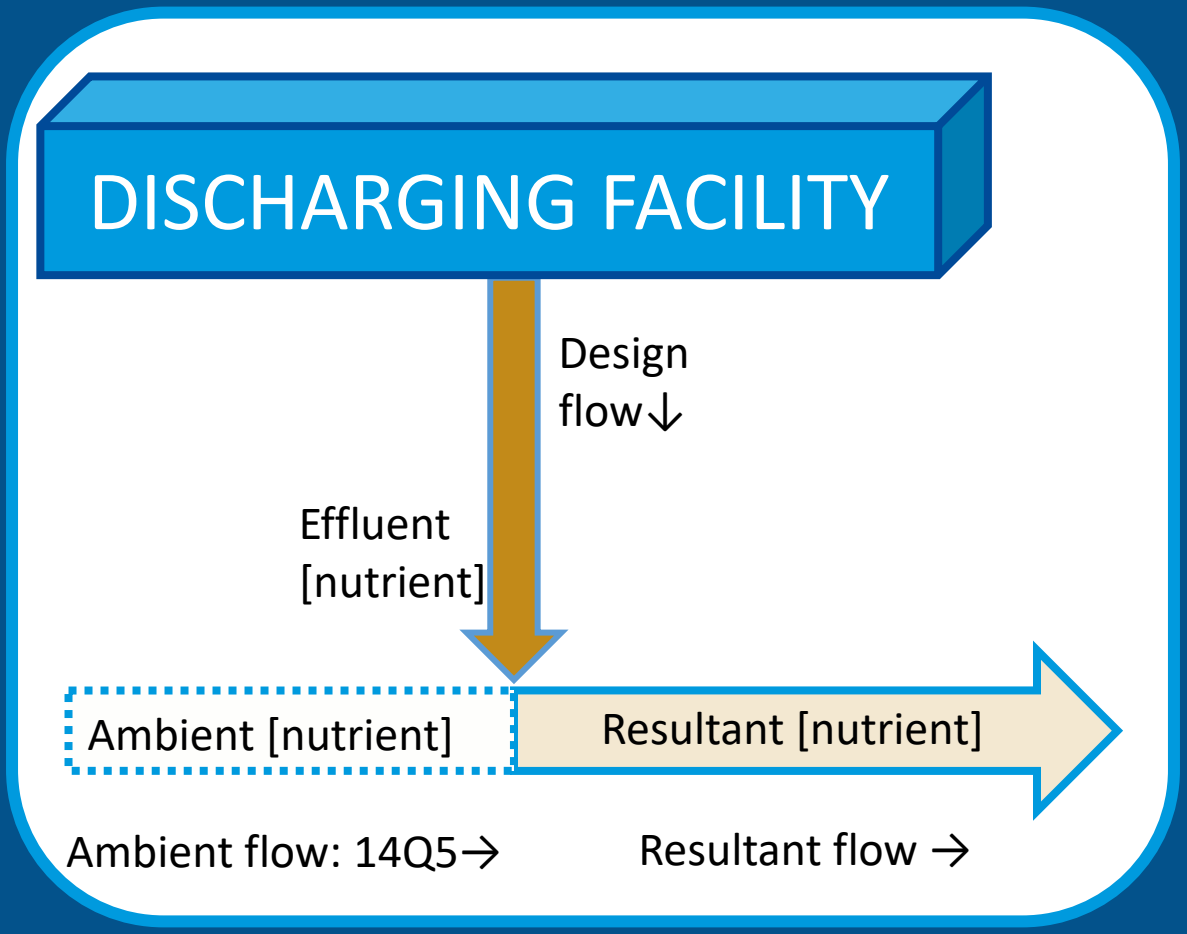
POTW discharging to a medium river:



- 303(d) listed for nutrients
- No TMDL in place
- In ecoregion 17: Middle Rockies
  - [TP] = 0.02-0.04 mg/l
  - [TN] = 0.20-1.21 mg/l
- Nutrient diffusing substrates indicate P limitation

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	Permit Cycle 1	Permit Cycle 2	Permit Cycle 3*
TP	facility performance & optimization (where appropriate)	facility and/or watershed load reduction estimates	meeting the narrative standard
AMP	Identify, plan, &/or begin implementation of NPS projects	Implementation, monitoring, & assessment of P prioritization	Continued implementation and monitoring of watershed projects.

* In some circumstances, AMPs may occur over four permit cycles (20 years)

Collect causal and response variable data through permit term:

Nutrient concentrations ΔDO Macroinvertebrate metric

DEQ MONTANA

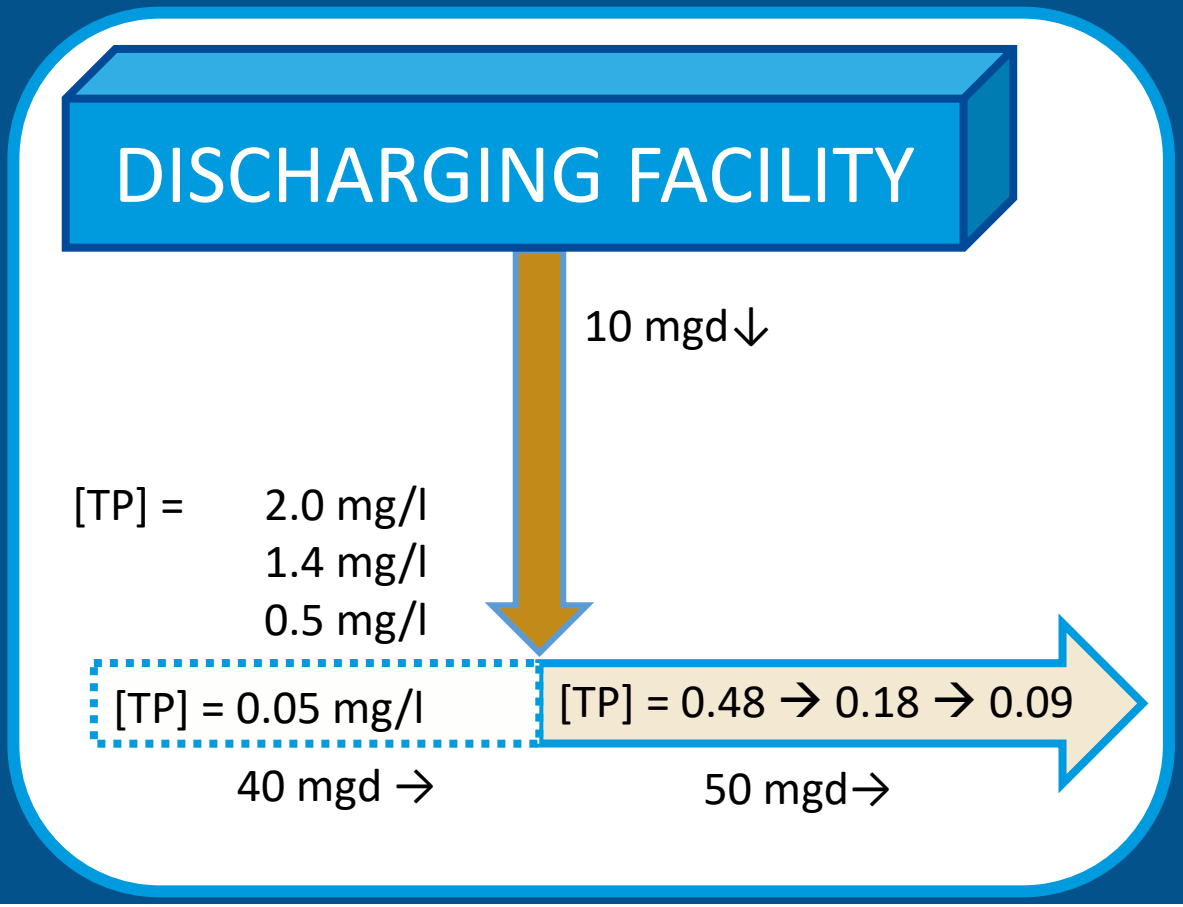
Permit Cycle 1: facility optimization

TP

Year 1-2:
167 lbs/day
(2.0 mg/l)

Year 3-4:
75 lbs/day
(1.4 mg/l)

Year 5:
42 lbs/day
(0.5 mg/l)



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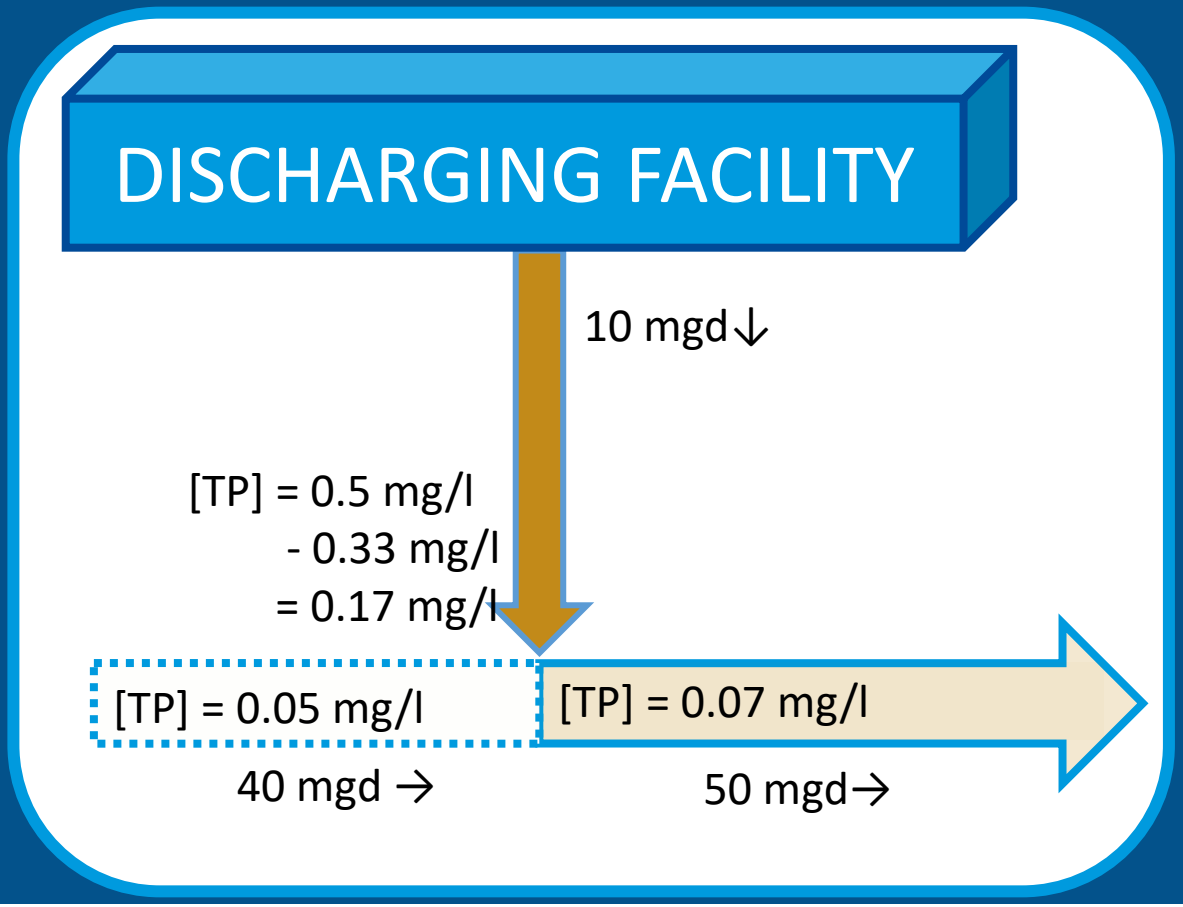
Permit Cycle 2 : -28 lbs/day NPS

TP

Year 1-2:
42 lbs/day
(0.50 mg/l)

Year 3-4:
23 lbs/day
(0.20 mg/l)

Year 5:
14 lbs/day
(0.17 mg/l)



Permit Cycle 3a : narrative standard met

TP

Year 1-2:
42 lbs/day
(0.50 mg/l)

Year 3-4:
42 lbs/day
(0.50 mg/l)

Year 5:
42 lbs/day
(0.50 mg/l)

DISCHARGING FACILITY

10 mgd↓

[TP] = 0.5 mg/l

[TP] = 0.05 mg/l

40 mgd →

[TP] = 0.07 mg/l

50 mgd→

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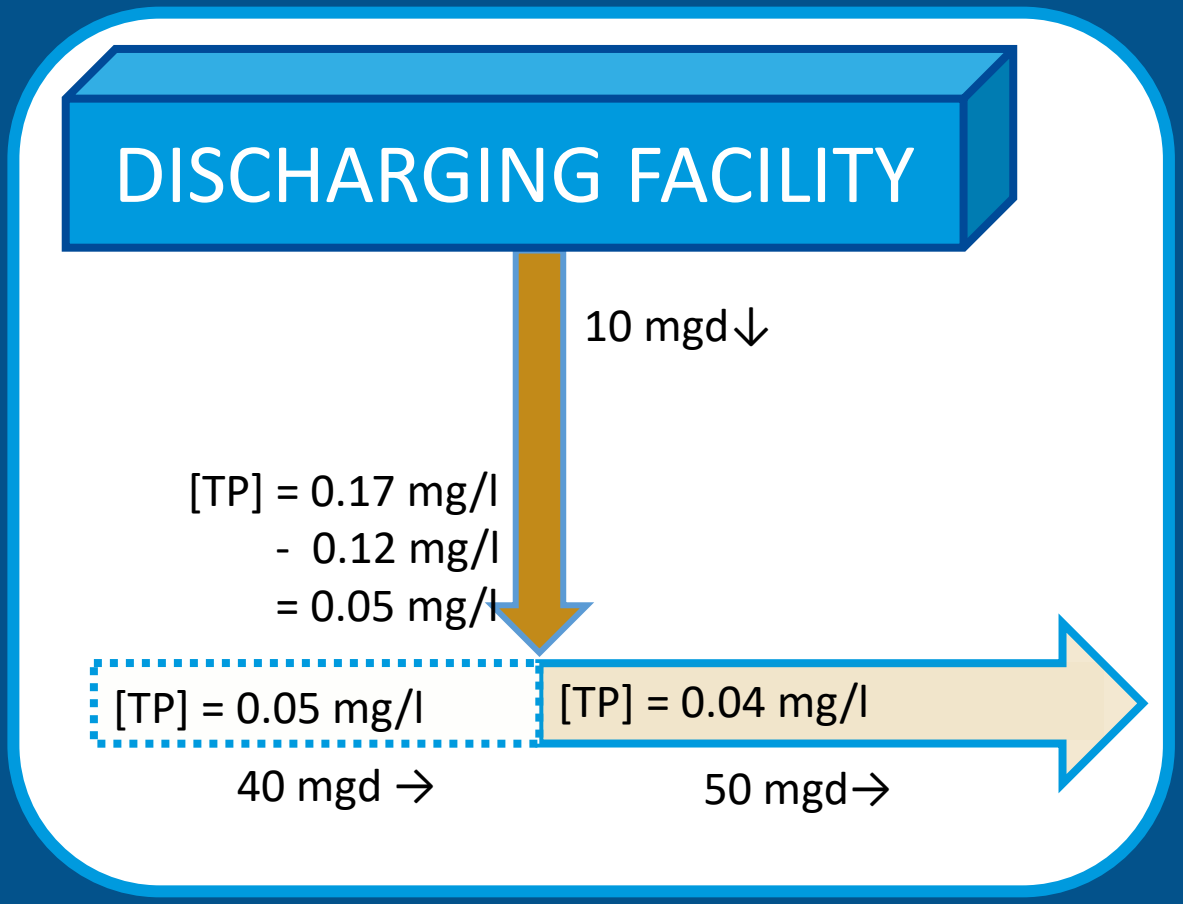
Permit Cycle 3b : narrative standard not met

TP

Year 1-2:
14 lbs/day
(0.17 mg/l)

Year 3-4:
5.9 lbs/day
(0.07 mg/l)

Year 5:
4.2 lbs/day
(0.05 mg/l)



1	2	3
Year 1-2: 167 lbs/day (2.0 mg/l)	**Year 1-2:** 42 lbs/day (0.50 mg/l)	**Year 1-2:** 14 lbs/day (0.17 mg/l)
Year 3-4: 75 lbs/day (1.4 mg/l)	**Year 3-4:** 23 lbs/day (0.20 mg/l)	**Year 3-4:** 5.9 lbs/day (0.07 mg/l)
Year 5: 42 lbs/day (0.5 mg/l)	**Year 5:** 14 lbs/day (0.17 mg/l)	**Year 5:** 4.2 lbs/day (0.05 mg/l)

DEQ MONTANA

	Permit Cycle 1	Permit Cycle 2	Permit Cycle 3*
TP	based on facility performance & optimization	based on facility and/or watershed load reduction estimates	based on meeting the narrative standard
TN	capped at current to allow for P prioritization	based on facility performance with optimization goals	reduced based on efficacy of P prioritization
AMP	Begin implementing watershed projects!	Implementation, monitoring, & assessment of P prioritization	Continued implementation and monitoring of watershed projects.

* In some circumstances, AMPs may occur over four permit cycles (20 years)

Collect causal and response variable data through permit term:

Nutrient concentrations ΔDO Macroinvertebrate metric

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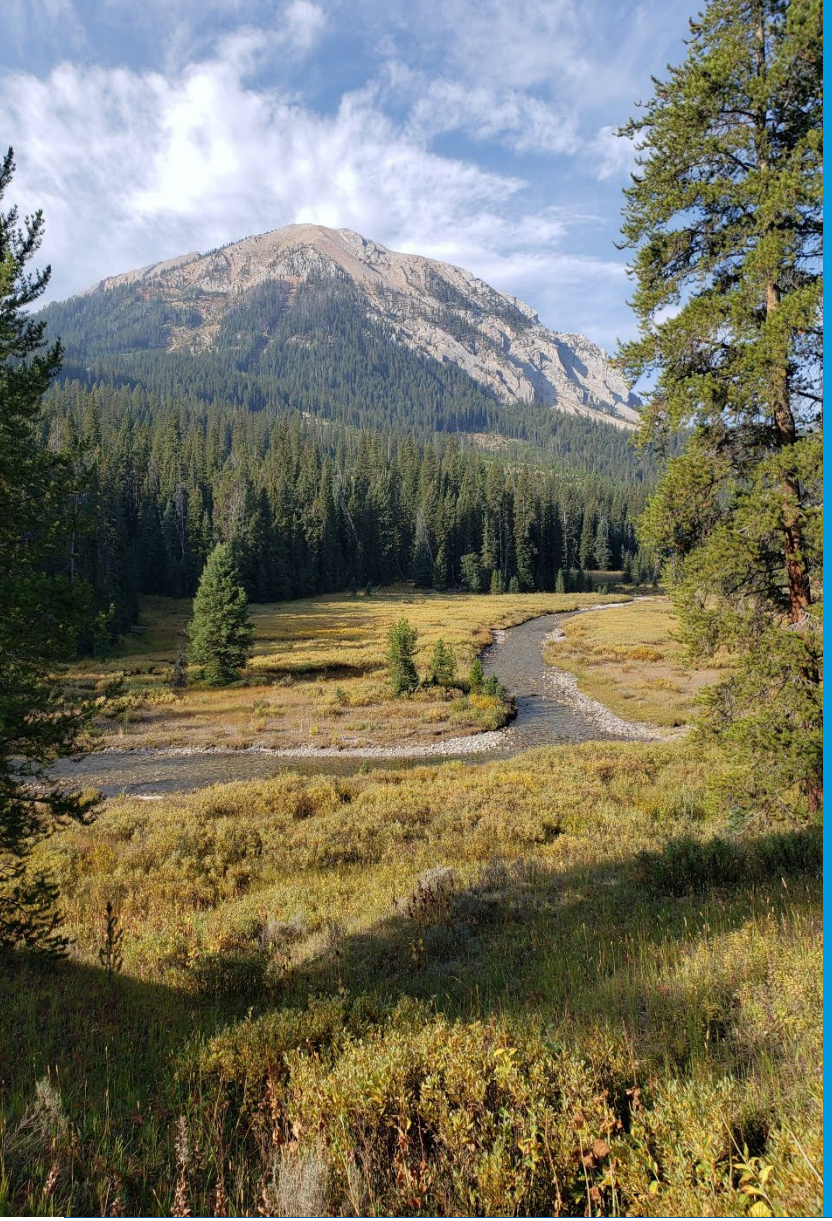
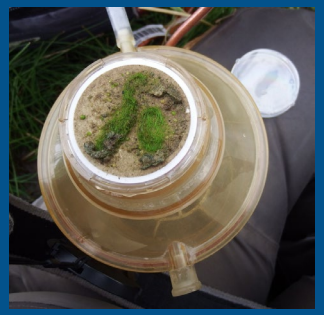
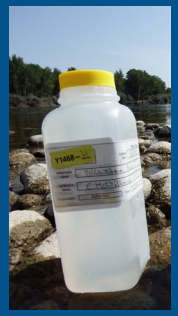


NPS Load Reduction Estimates

AMP Milestones

Long-term goal = instream attainment of beneficial uses



Short-term compliance = AMP milestones

1. Quantify nutrient sources
2. Identify partners and prioritize nutrient reduction projects
3. Submit signed contracts with project load reduction estimates to meet a specified goal
4. Verify project implementation (photos, site tours, etc.)
5. Annual monitoring & reporting

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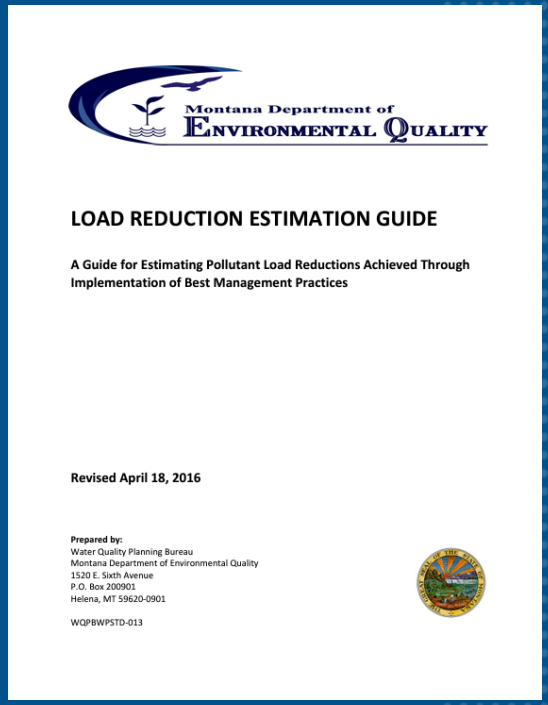
NPS Project Implementation

- "As soon as possible" is in the best interest of all
- Many BMPs address N and P; provide estimates for both
- Projects addressing N encouraged during P-prioritization phase

Resources:

- DEQ's 2016 Load Reduction Estimation Guide
- MEANSS model
- Consultation with DEQ AMP Scientist
- Other DEQ-approved models or methods


Montana Department of Environmental Quality

LOAD REDUCTION ESTIMATION GUIDE

A Guide for Estimating Pollutant Load Reductions Achieved Through Implementation of Best Management Practices

Revised April 18, 2016

Prepared by:
Water Quality Planning Bureau
Montana Department of Environmental Quality
1520 E. Sixth Avenue
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Helena, MT 59620-0901

WQPBWPSTD-013

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Milestones for Permit Cycle 1	Milestones for Permit Cycle 2	Milestones for Permit Cycle 3
Nutrient source ID, partners, monitor, ranked project list: 1. Cattle corral relocation 2. Riparian cattle fencing/off-channel watering 3. Road BMPs 4. Subdiv. onsite connections 5. Restore channels 6. Row crop BMPs	Monitor, implement to reduce >28 lbs/day of P* using ranked project list Continue project ID, secure contracts & owner agreements	Meet narrative standard by the end of the cycle Additional implementation:

* Estimates are secondary to response variable data – implementation above and beyond minimum is in permittee and watershed's best interest

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Milestones for Permit Cycle 1	Milestones for Permit Cycle 2	Milestones for Permit Cycle 3
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* Estimates are secondary to response variable data. Implementation above and beyond minimum is in permittee and watershed's best interest. Additional measures of conservatism may be applied to project load reduction estimates after consultation w/ DEQ.

For permit cycle #2, (4) riparian cattle fencing/off-channel watering projects and a subdivision onsite connection will be implemented.

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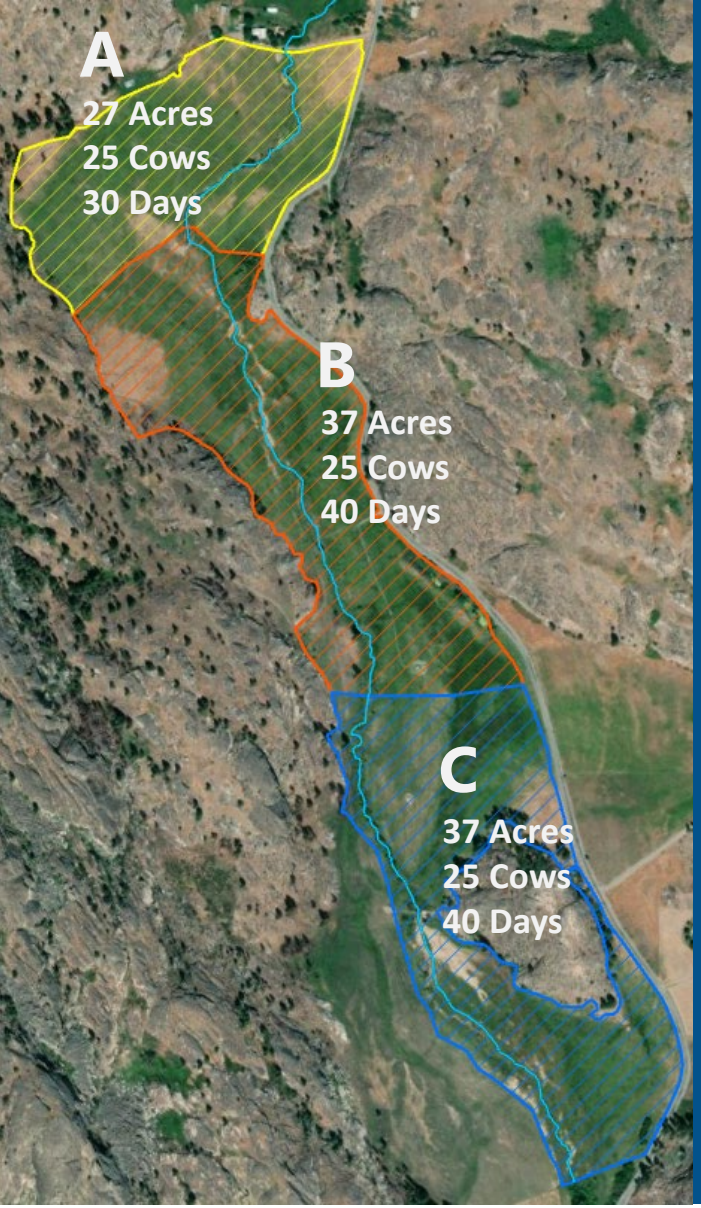
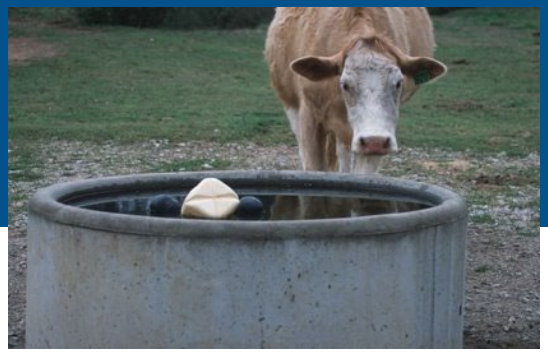


Riparian Fencing & Off-Channel Watering

Landscape modifications:

- 35-foot wide (2 acres) livestock exclusion buffer
- Wells, stock tanks, water lines
- Controlled cattle crossings
- ~12,700’ of exclusion fencing



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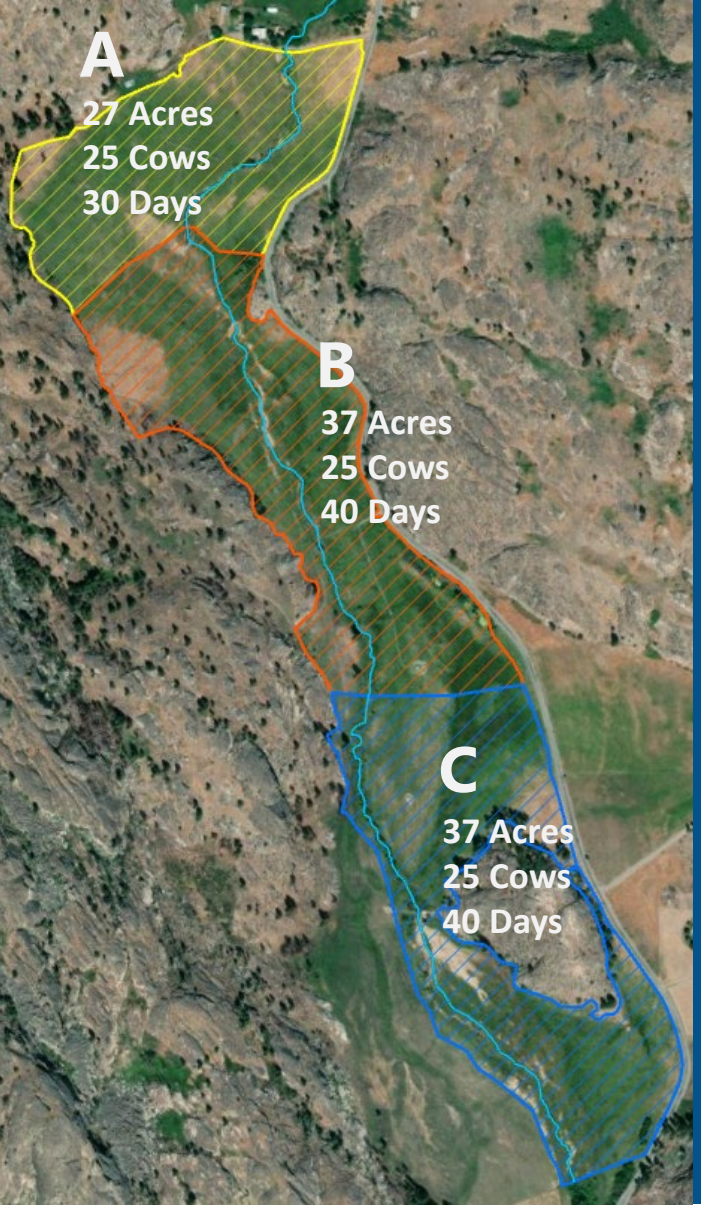

Riparian Fencing & Off-Channel Watering

Load Reduction = (number of animals) x (days on original pasture) x (daily P production) x (buffer acreage/total pasture acreage) x (conversion factor)

P Load Reduction	N Load Reduction
7.73 lbs/day	5.91 lbs/day

Combined with (3) similar projects, estimates are:

P Load Reduction	N Load Reduction
30.92 lbs/day	23.64 lbs/day

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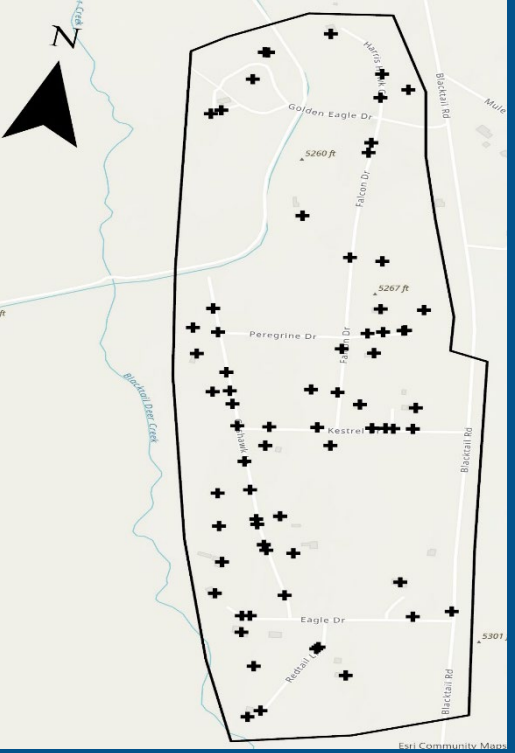

Subdivision Onsite Connections

- 69-home subdivision w/ individual onsite systems to be connected to POTW.
- After optimization, the plant is achieving 75% N removal and 95% P removal.
- Calculation: (total load entering stream from septic systems) – (total load entering stream from the same sources under centralized treatment)

Pollutant	Load from onsite (lbs/day)[1]	% Removed – onsite	Load Entering Stream – onsite (lbs/day)	% Removed– POTW	Total Load Entering Stream – POTW (lbs/day)	Load Reduction Credit (lbs/day)
TN	5.77	57.1%	2.47	75%	1.44	1.03
TP	1.22	94.78%	0.06	95%	0.06	0

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Milestones for Permit Cycle 1	Milestones for Permit Cycle 2	Milestones for Permit Cycle 3
Nutrient source ID, partners, monitor, ranked project list: 1. Cattle corral relocation 2. Riparian cattle fencing/off-channel watering 3. Road BMPs 4. Subdiv. onsite connections 5. Restore channels 6. Row crop BMPs	Monitor, implement to reduce >28 lbs/day of P* using ranked project list: **1. Riparian cattle fencing/off-channel watering** **2. Subdiv. onsite connections** Cont. project ID, secure contracts & owner agreements	Meet narrative standard by the end of the cycle Additional implementation: **1. Cattle corral relocation** 2. Road BMPs **3. Restore channels** 4. Row crop BMPs

* Estimates are secondary to response variable data. Implementation above and beyond minimum is in permittee and watershed's best interest. Additional measures of conservatism may be applied to project load reduction estimates after consultation w/ DEQ.

For permit cycle #3, a cattle corral relocation and several channel restoration projects have been contracted. Future eligibility and potential for additional implementation to be evaluated.

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Recap of DEQ's work: (Lindsey)

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Actions to Date:

- EPA approved DEQ's 2014 scientific rationale for numeric criteria
- SB358 did not repeal EPA's approval of numeric criteria for Montana
- DEQ developed its current proposal through 42 NWG meetings and multiple listening sessions and focus groups.
- DEQ now presents scientific rationale demonstrating that combined criteria incorporating response variables are more representative and protective of Montana's waters than the numeric criteria previously approved by EPA.
- DEQ developed an adaptive management program allowing dischargers to reduce nonpoint nutrient sources in the watershed instead of immediately investing in tertiary treatment.
- DEQ is prepared to begin implementing these rules in 2024.

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Where are we now?

DEQ will share draft rules prior to the November 2023 NWG meeting
DEQ will begin rulemaking in January 2024

Deliverables:

Rules

- Translation of Narrative Nutrient Standards
- Implementation of the Adaptive Management Program
- DEQ-12A repeal

Circular DEQ-15

- "Translation of Narrative Nutrient Standards and Implementation of the Adaptive Management Program"

Guidance Document(s)

Upcoming Meeting

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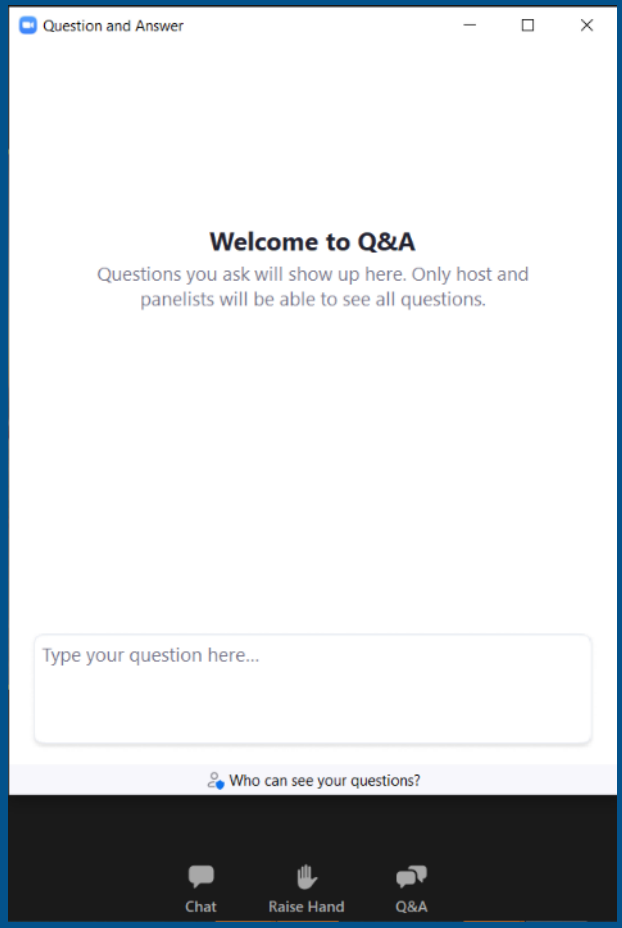
Upcoming Meeting Schedule

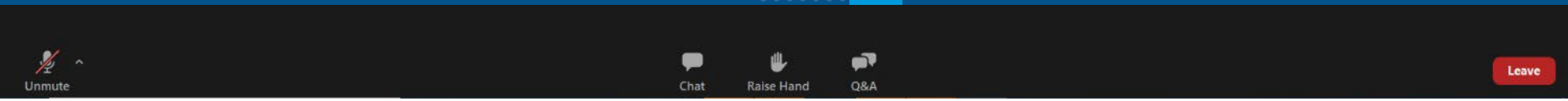
- Last meeting until after rulemaking
  - November 14, 2023 9 – 11:00 a.m.

Public Comment

Questions/ Comments

- Raise hand (*9 if on the phone) or type questions into the Q&A
- DEQ will unmute you if you wish to provide your comment orally
- If calling by phone, press*6 to unmute
- State your name and affiliation before providing your comment





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Thanks for Joining Us

Contact:
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To submit comments or questions

Submit Comments or Questions

https://deq.mt.gov/water/Councils

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