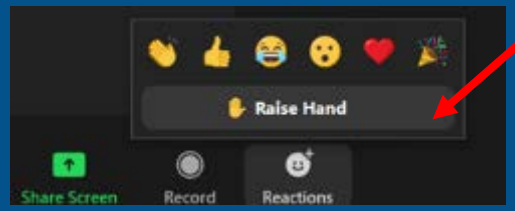
Nutrient Work Group Session Four

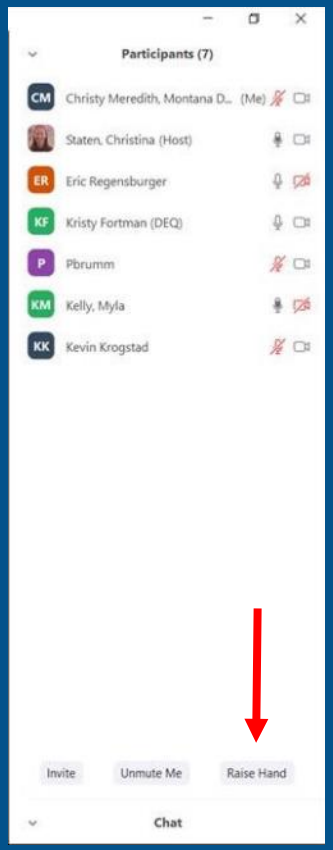
August 25, 2021

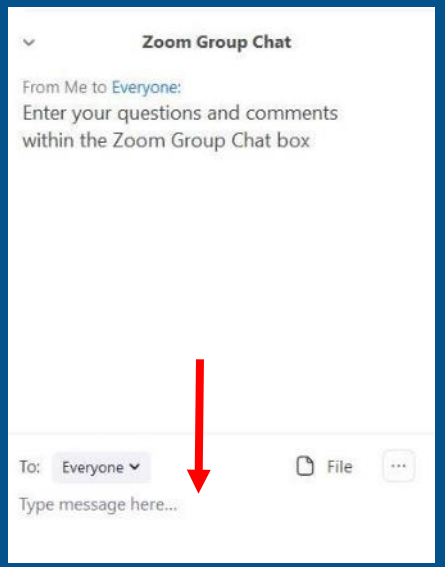
DEQ MONTANA

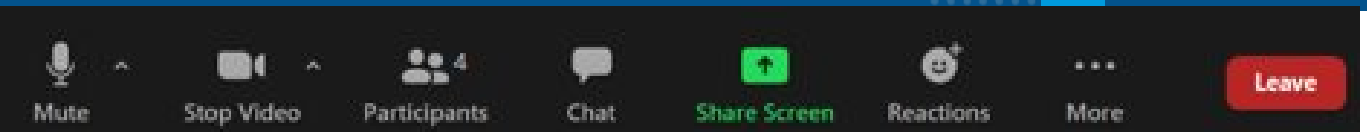
Welcome!

- Please keep your microphone muted until called on
- Only NWG Members may participate during discussions
- Please reserve public comment until the end
- *6 unmutes your phone
- State your name and affiliation before providing your comment
- Enter questions in the chat box or raise hand
- Turning off your video feed provides better bandwidth
- Please sign-in to the chat box with name and affiliation









DEQ MONTANA

Introductions

DEQ Staff

- Christopher Dorrington, Director
- George Mathieus, Deputy Director
- Kurt Moser, Legal Counsel
- Moira Davin, Public Relations
- Amy Steinmetz, Water Quality Division Administrator
- Jon Kenning, Water Protection Bureau Chief
- Rainie DeVaney, Discharge Permitting Section Supervisor
- Galen Steffens, Water Quality Planning Bureau Chief
- Myla Kelly, WQ Standards & Modeling Section Supervisor
- Kristy Fortman, Watershed Protection Section Supervisor
- Darrin Kron, WQ Monitoring & Assessment Section Supervisor
- Michael Suplee, Water Quality Science Specialist

DEQ MONTANA

Introductions

Nutrient Work Group Members

Interest Group	Representative	Substitute
Point Source Discharger: Large Municipal Systems (>1 MGD)	Susie Turner	
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	Tammy Johnson	
Farming-Oriented Agriculture	John Youngberg	
Livestock-Oriented Agriculture	Jay Bodner	
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	Wade Fellin	
Federal Land Management Agencies	Andy Efta	
Federal Regulatory Agencies	Tina Laidlaw	
State Land Management Agencies	Jeff Schmalenberg	
Water Quality Districts / County Planning Departments	Pete Schade	
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	

Ground Rules

- Speak one at a time – refrain from interrupting others.
- Wait to be recognized by facilitator before speaking.
- Facilitator will call on people who have not yet spoken before calling on someone a second time for a given subject.
- Share the oxygen – ensure that all members who wish to have an opportunity to speak are afforded a chance to do so.
- Be respectful towards all participants.
- Listen to other points of view and try to understand other interests.
- Share information openly, promptly, and respectfully.
- If requested to do so, hold questions to the end of each presentation.
- Remain flexible and open-minded, and actively participate in meetings.

DEQ MONTANA

Roles and Responsibilities

The Nutrient Work Group is an advisory group to DEQ.

Members agree to:

- Provide specific local expertise, including identifying emerging local issues;
- Review project reports and comment promptly;
- Attend as many meetings as possible and prepare appropriately;
- Complete all necessary assignments prior to each meeting;
- Relay information to and from their broader interest group counterparts after each meeting and gather information/feedback from their counterparts as practicable before each meeting;
- Articulate and reflect the interests that NWG members bring to the table;
- Maintain a focus on solutions that benefit the entire state;
- Present recommendations for the rulemaking throughout the planning process.

DEQ MONTANA

Agenda

Meeting Goal: Finalize Response Variables & Thresholds, Discussion on Response Variables in MPDES Permits

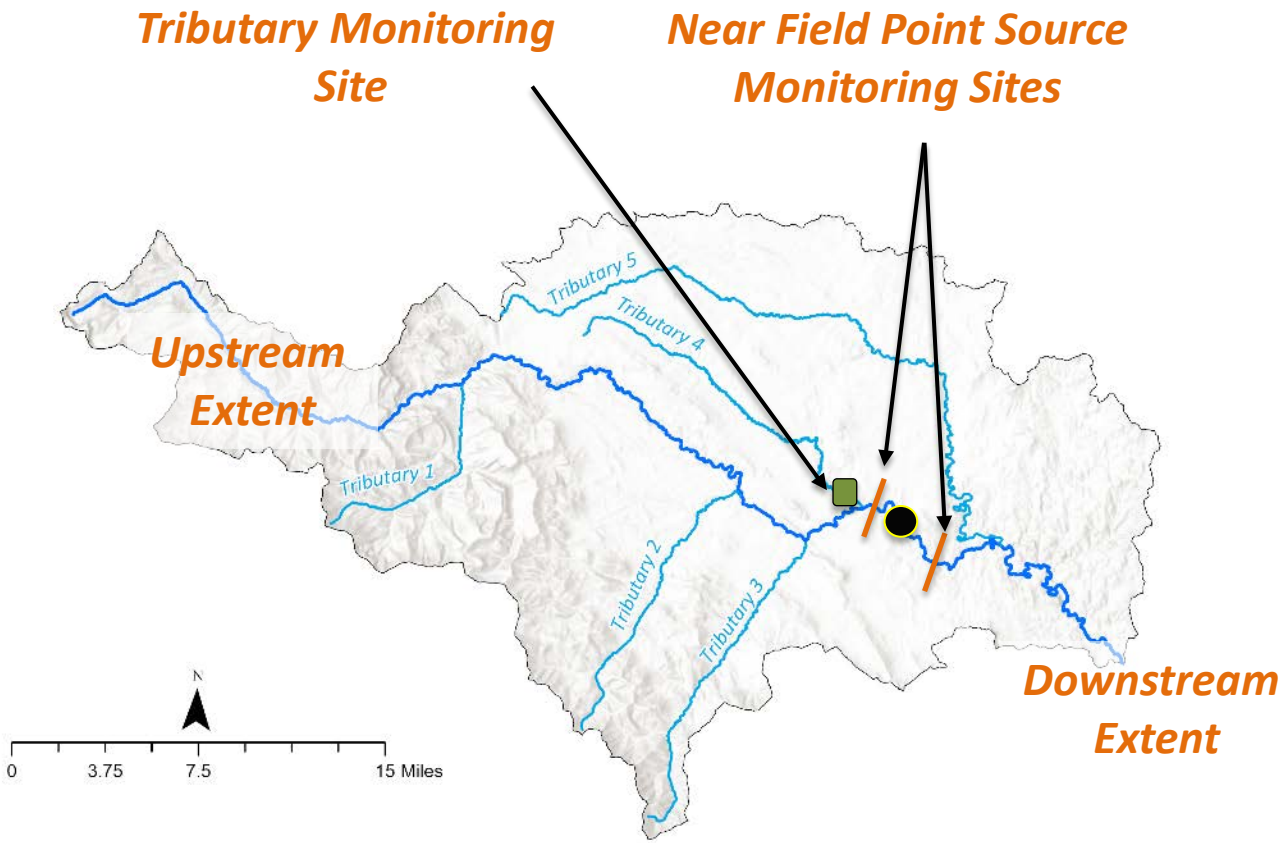
- Technical Subcommittee Report:
  - Western & Eastern Montana Thresholds
  - Sample Type & Frequency
  - Data & Monitoring Resources Recap
- Introduction to Response Variables Use in MPDES Permits
- Feedback on Program Implementation & Rulemaking Process
- Outstanding Action Items
- Public Input
- If Time: Microsoft Teams Tutorial

DEQ MONTANA

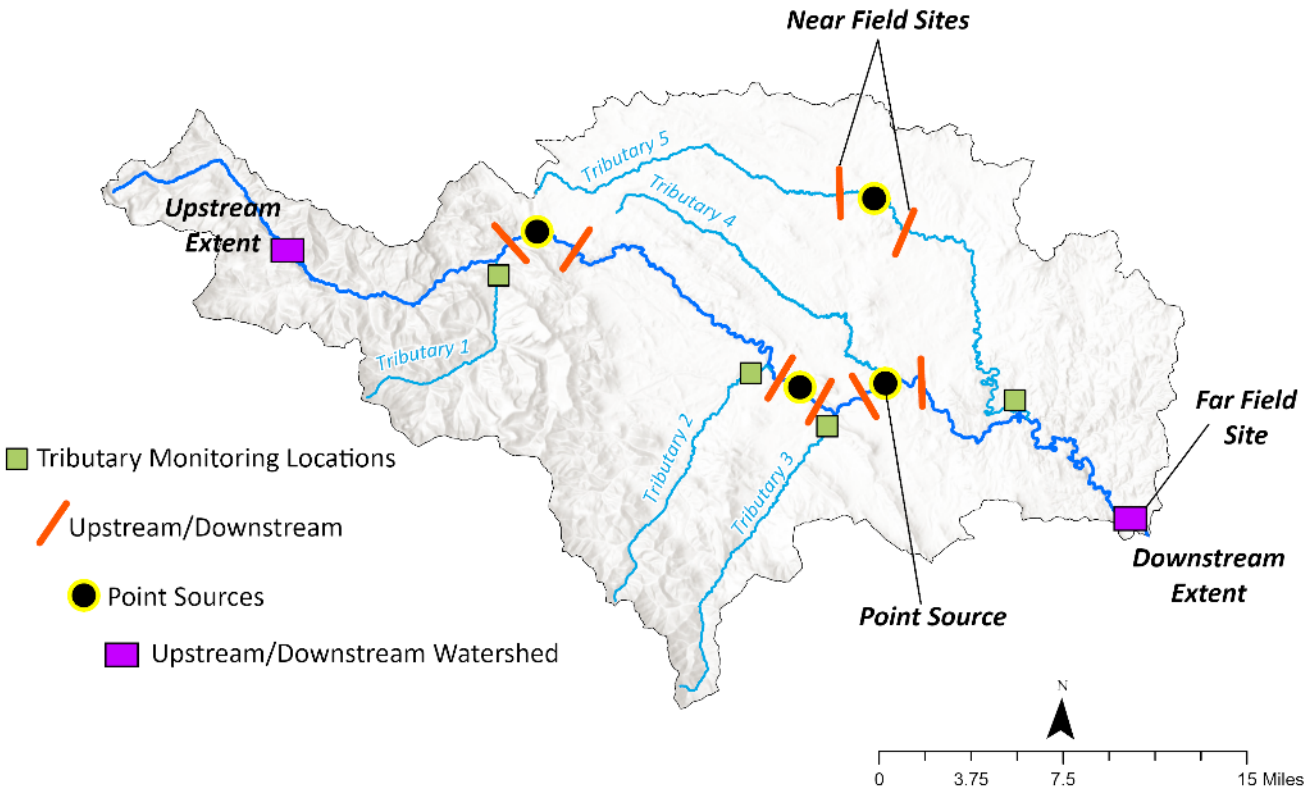
Nutrient Work Group

Technical Subcommittee Report

Example of a Simple AMP Watershed



Example AMP Watershed with Multiple MPDES Permittees

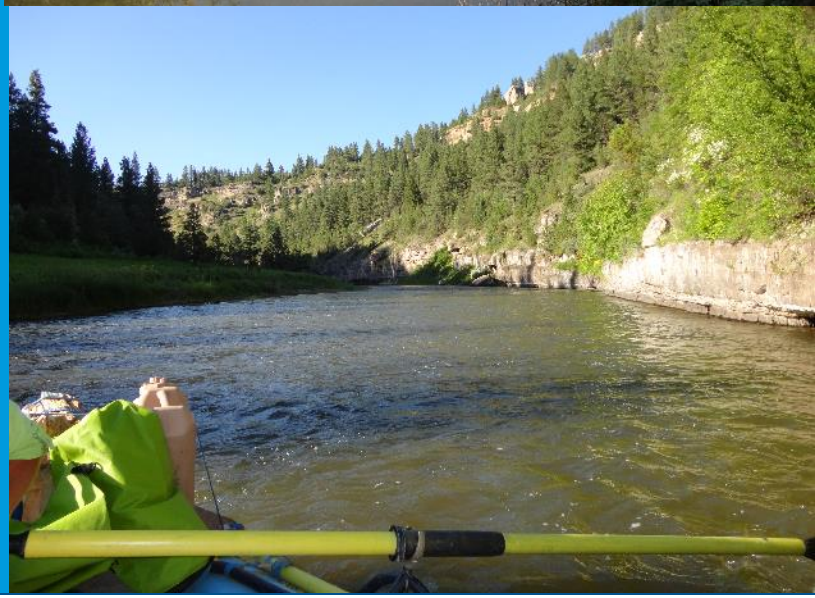


Note: This map demonstrates monitoring locations upstream and downstream of point sources. The locations shown are for illustrative purposes only. In addition to upstream and downstream, monitoring downstream of the confluence would be required to demonstrate cumulative effects.

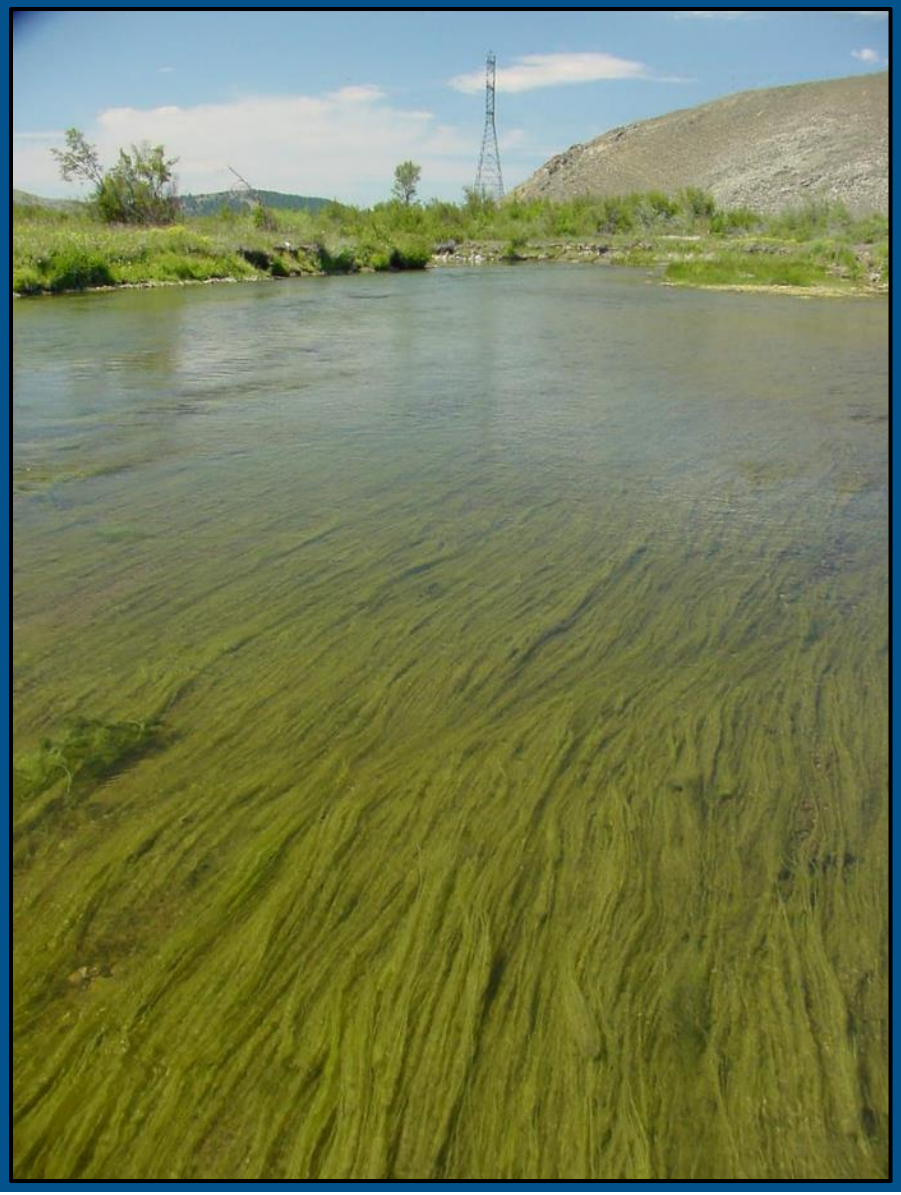
DEQ MONTANA

Medium Rivers and Wadeable Streams

In Western and Eastern Montana



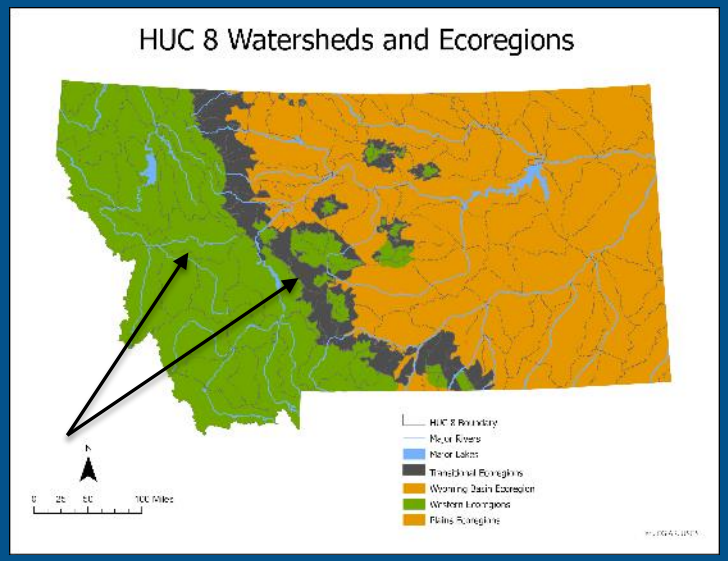
DEQ MONTANA



Nuisance algal growth, western Montana rivers and streams

DEQ MONTANA

Western MT Medium Rivers and Wadeable Streams: DEQ's Recommended Response Variables & Thresholds

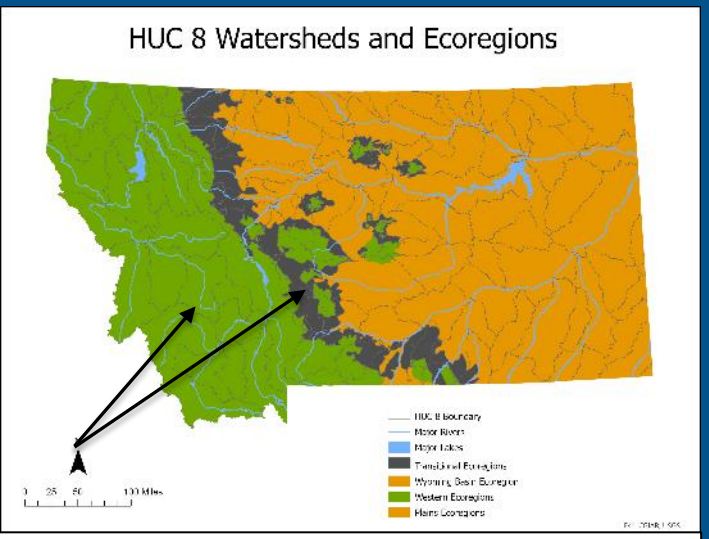


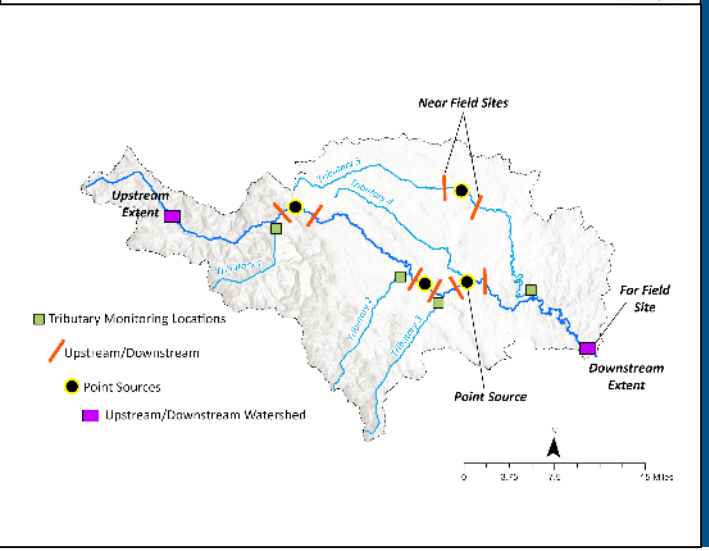
Data Collection Index Period:
July 1 to September 30, annually

- Average stream bottom (benthic) chlorophyll *a* over a sampling reach
  - Threshold: 125 mg Chl*a*/m^2
- Average stream bottom (benthic) ash free dry weight (AFDW) over a sampling reach
  - Threshold: 35 g/m^2
- Average % stream bottom cover by filamentous algae over a sampling reach
  - Threshold: 30%
- Macroinvertebrates, Hilsenhoff Biotic Index (HBI)
  - Threshold: relative us/ds comparison

DEQ MONTANA

Western MT: Sampling Frequency





Near Field Sites

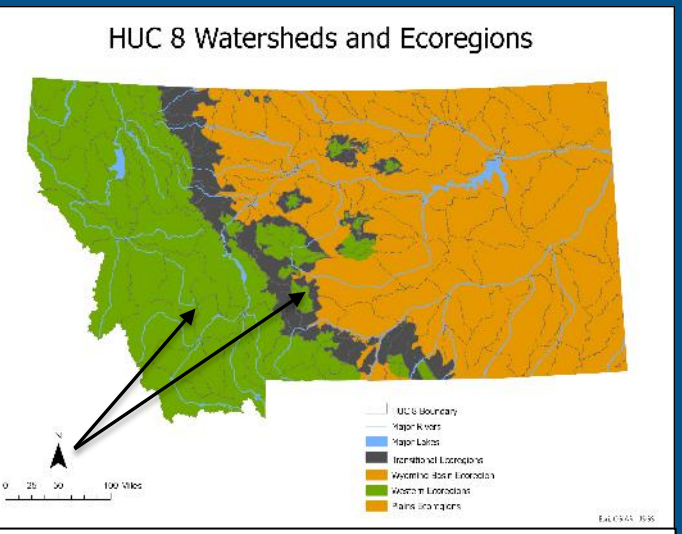
- Benthic Chla, AFDW, and TP, TN concentrations: *At least twice annually during the index period, with at least six weeks between each sampling event*
- Visual Assessment of % Bottom Cover*: At least monthly during the index period; two events must pair with the Chla/AFDW sampling.*
- Macroinvertebrates, to calculate HBI: *At least once annually during the index period, corresponding to one of the other sampling events*

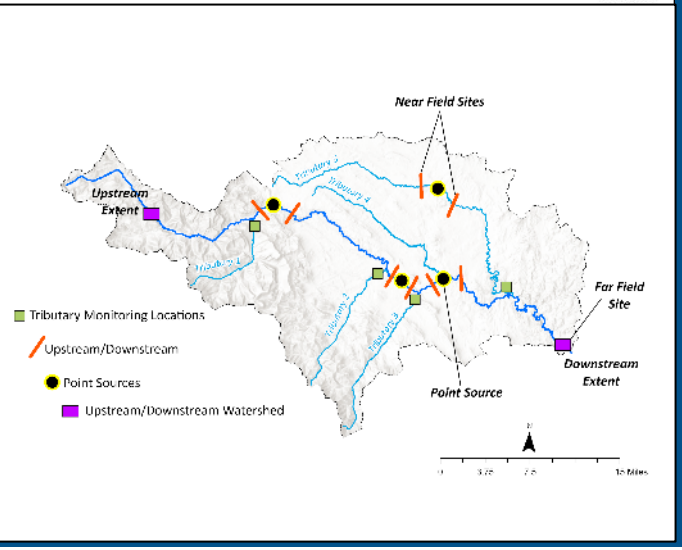
Far Field Sites

- D/S: Same response variables, nutrients, and frequency of collection as near field sites
- U/S: Variable, depending on objectives

DEQ MONTANA

Western MT: Sampling Frequency

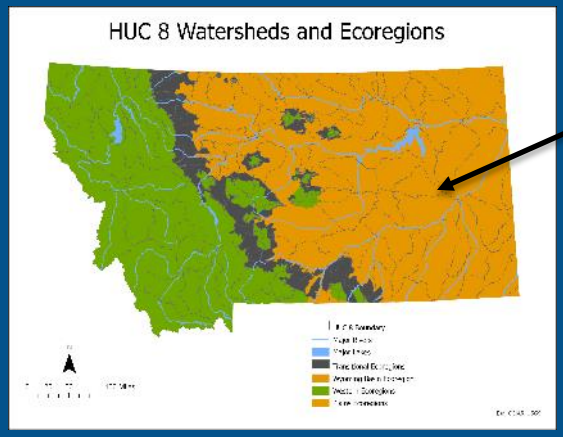


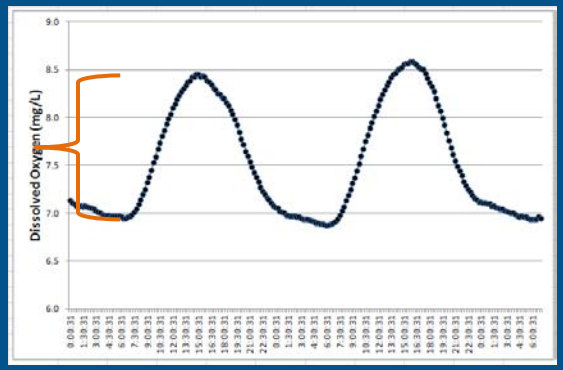


Tributaries

- TP, TN Concentrations: *At least twice annually during the index period, with at least six weeks between each sampling event.*

Eastern MT Medium Rivers and Wadeable Streams: DEQ's Recommended Response Variables & Thresholds





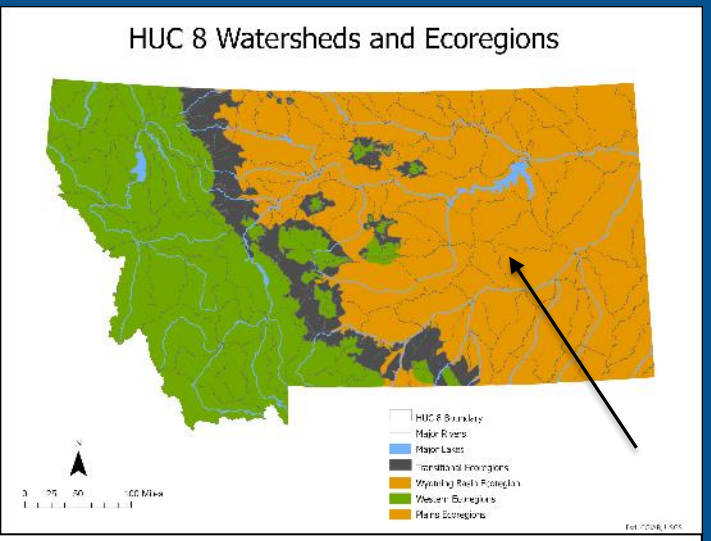
Data Collection Index Period:
July 1 to September 30, annually

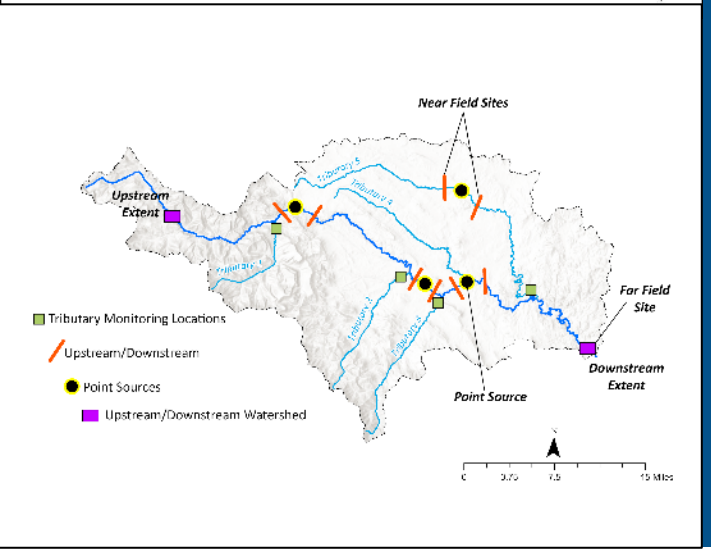
- Dissolved Oxygen Delta (DO Δ) as a weekly average
  - Threshold: 5.3 mg DO/L

- Biochemical Oxygen Demand (BOD_5)
  - Threshold: Relative us/ds comparison

DEQ MONTANA

Eastern MT: Sampling Frequency





Near Field Sites

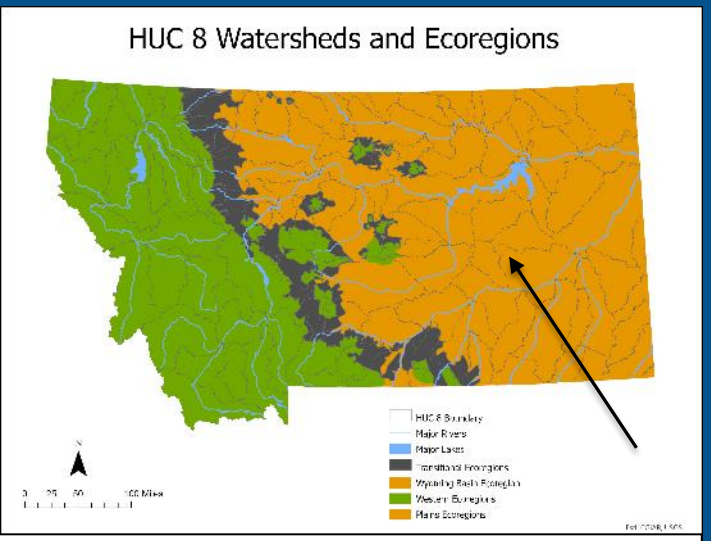
- Dissolved Oxygen, DO Delta, Temperature: *Instruments must be deployed annually for a minimum of 30 continuous days with at least 21 days collected in August.*
- TP, TN Concentrations: *At least twice annually during the index period, with at least 30 days between each sampling event.*
- BOD_5: *At least once annually during September or October (Note: October is after the index period).*

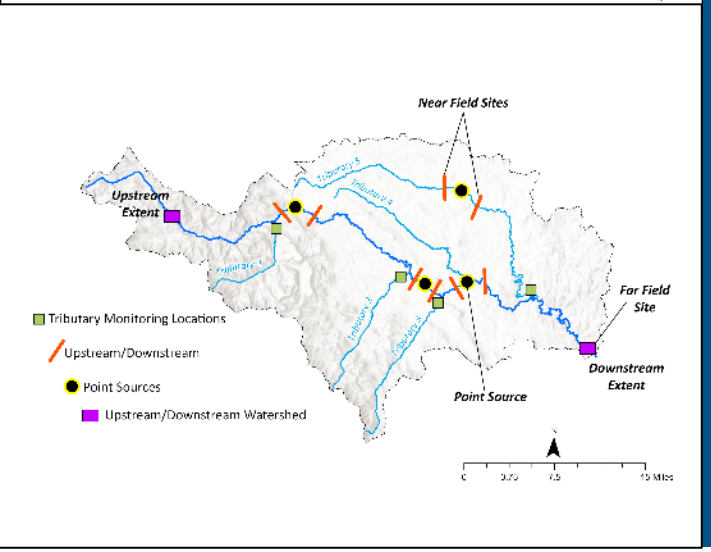
Far Field Sites

- D/S: Same response variables, nutrients, and frequency of collection as near field sites
- U/S: Variable, depending upon objectives

DEQ MONTANA

Eastern MT: Sampling Frequency

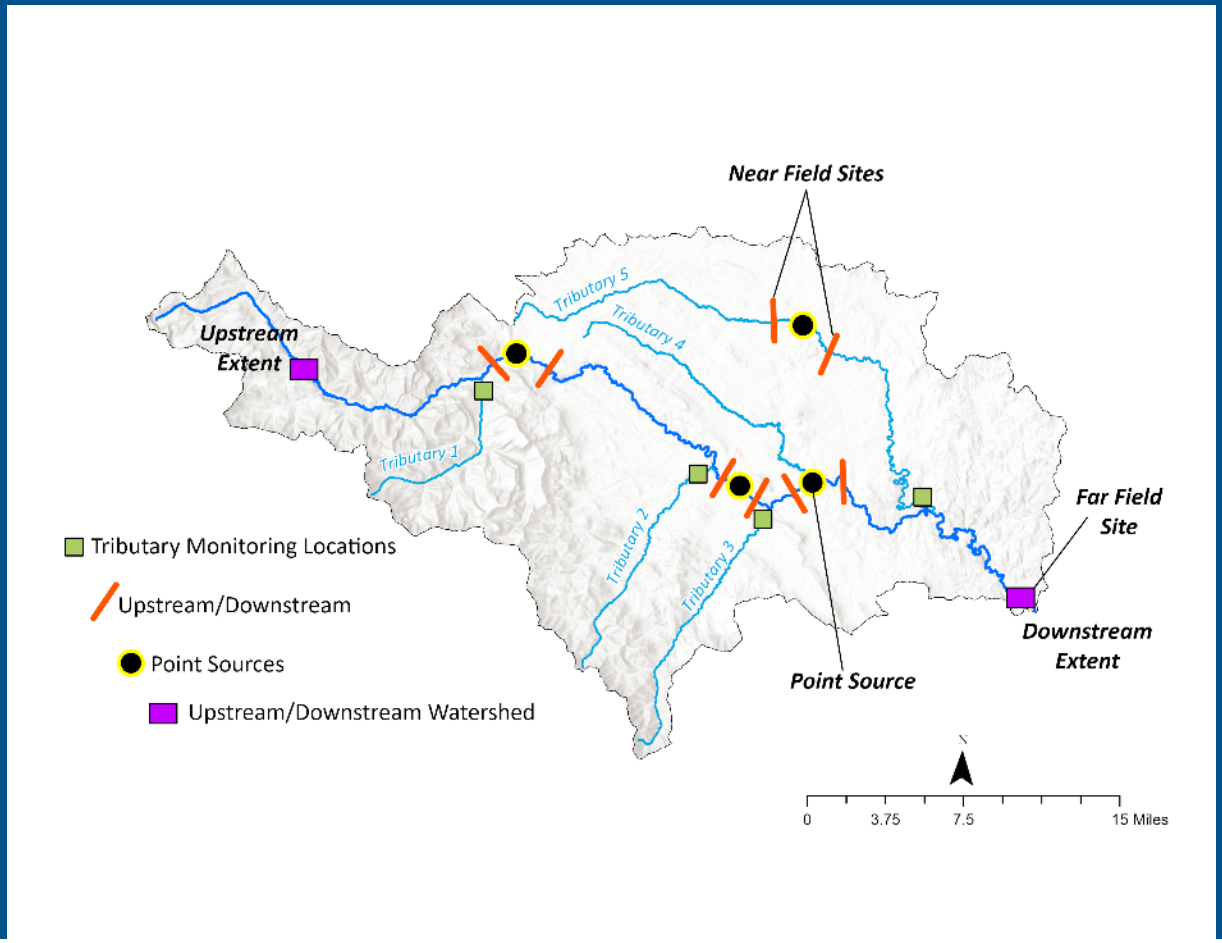




Tributaries

- TP, TN Concentrations: *At least twice annually during the index period, with at least 30 days between each sampling event.*

Relative Change: Up- and Downstream of Point Source (Near Field Sites)



Note: This map demonstrates monitoring locations upstream and downstream of point sources. The locations shown are for illustrative purposes only. In addition to upstream and downstream, monitoring downstream of the confluence would be required to demonstrate cumulative effects.

DEQ MONTANA

Relative Change Data Provides Insights on Point Source Effects

Informs decisions about where to target nutrient reductions

Three Scenarios, for Illustration

Scenario 1: Little relative difference, variable (sometimes algae is lower below the facility, sometimes higher). On average, upstream and downstream sites meet threshold of 125 mg Chla/m^2.

Benthic Chlorophyll *a* (mg/m^2)

Sampling Event	Upstream	Downstream	Difference
July 15, 2022	60	129	69
August 30, 2022	55	54	-1
July 15, 2023	90	91	1
August 30, 2023	95	121	26
July 15, 2024	30	75	45
August 30, 2024	35	20	-15
July 15, 2025	49	49	0
August 30, 2025	70	60	-10
July 15, 2026	10	50	40
August 30, 2026	20	20	0
5-Year Average:	**51.4**	**66.9**	**15.5**

Scenario 2: Large effect from the point source. Algae is high below the facility and routinely exceeds the 125 mg Chla/m^2 threshold. Upstream, the river consistently meets the threshold. The problem can be linked to the point source.

Benthic Chlorophyll *a* (mg/m^2)

Sampling Event	Upstream	Downstream	Difference
July 15, 2022	60	115	55
August 30, 2022	55	300	245
July 15, 2023	30	250	220
August 30, 2023	35	115	80
July 15, 2024	30	125	95
August 30, 2024	35	140	105
July 15, 2025	49	250	201
August 30, 2025	25	275	250
July 15, 2026	10	155	145
August 30, 2026	20	155	135
5-Year Average:	**34.9**	**188**	**153.1**

Scenario 3: Algae exceeds the 125 mg Chla/m^2 threshold upstream of the point source, and exceeds below, at about the same level. Addressing upstream nutrient sources will be very important.

Benthic Chlorophyll a (mg/m^2)

Sampling Event	Upstream	Downstream	Difference
July 15, 2022	250	255	5
August 30, 2022	175	185	10
July 15, 2023	200	199	-1
August 30, 2023	300	295	-5
July 15, 2024	150	150	0
August 30, 2024	135	135	0
July 15, 2025	159	165	6
August 30, 2025	175	170	-5
July 15, 2026	200	210	10
August 30, 2026	250	225	-25
5-Year Average:	**199.4**	**198.9**	**-0.5**

DEQ is still working out the details of how all the data will be considered and assessed collectively

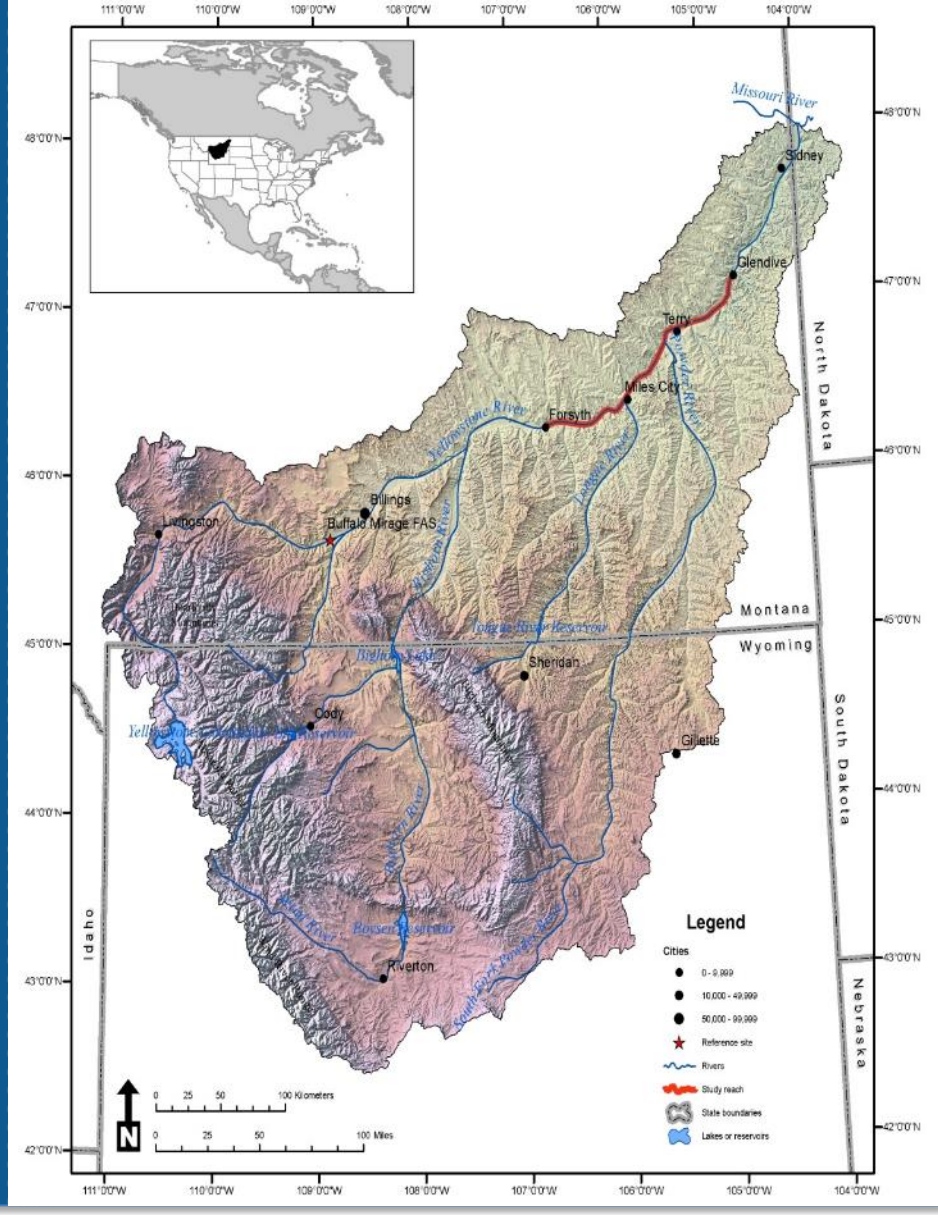
DEQ MONTANA

Large Rivers

Yellowstone River

Response Variables Related to Nutrients that can be Modeled in Large Rivers

- Dissolved oxygen concentrations (DO)
- Benthic algal biomass (chlorophyll *a*, AFDW) in near-shore areas
- pH
- Phytoplankton concentrations (relating to DO, turbidity)
- Total organic carbon (drinking water)
- Total dissolved gas (as linked via DO supersaturation)



DEQ MONTANA

Nutrient Modeling Toolbox (NMT) and Model Selection Decision Tool (MSDT)

- NMT consists of 30 publicly available models to assist in developing site-specific nutrient goals. One page fact sheet on each model.

- MSDT guides users through several questions and program lists the recommended models as each question is answered.

DEQ MONTANA

Large Rivers

- Water quality models are DEQ's recommended method, especially when multiple point sources present
  - DEQ will provide guidance
- Data collection will differ somewhat from medium rivers and wadeable streams
  - DEQ will provide guidance
- Simulation of different management activities (point and nonpoint) on nutrients can inform the effect on the most sensitive response variable in the watershed

DEQ MONTANA

Nutrient Work Group Discussion and Feedback

Data & Monitoring Resources Overview

DEQ MONTANA

DEQ Data and Monitoring Resources

DEQ collects ambient water quality data
- Conducts internal projects
- Support monitoring partnerships and volunteer monitoring
- Data types include nutrients and response variables

Data is useable
- Meets stringent data quality requirements
- Stored in databases in same location and format

Data is available
- Stored in DEQ's EQuIS database
- Publicly-accessible via National Water Quality Portal https://www.waterqualitydata.us/

DEQ MONTANA

DEQ Data and Monitoring Resources

Assessment information is available

- DEQ's Clean Water Act Information Center https://www.cwaic.mt.gov/
- EPA's How's My Waterway https://www.epa.gov/waterdata/hows-my-waterway

Other information and reports

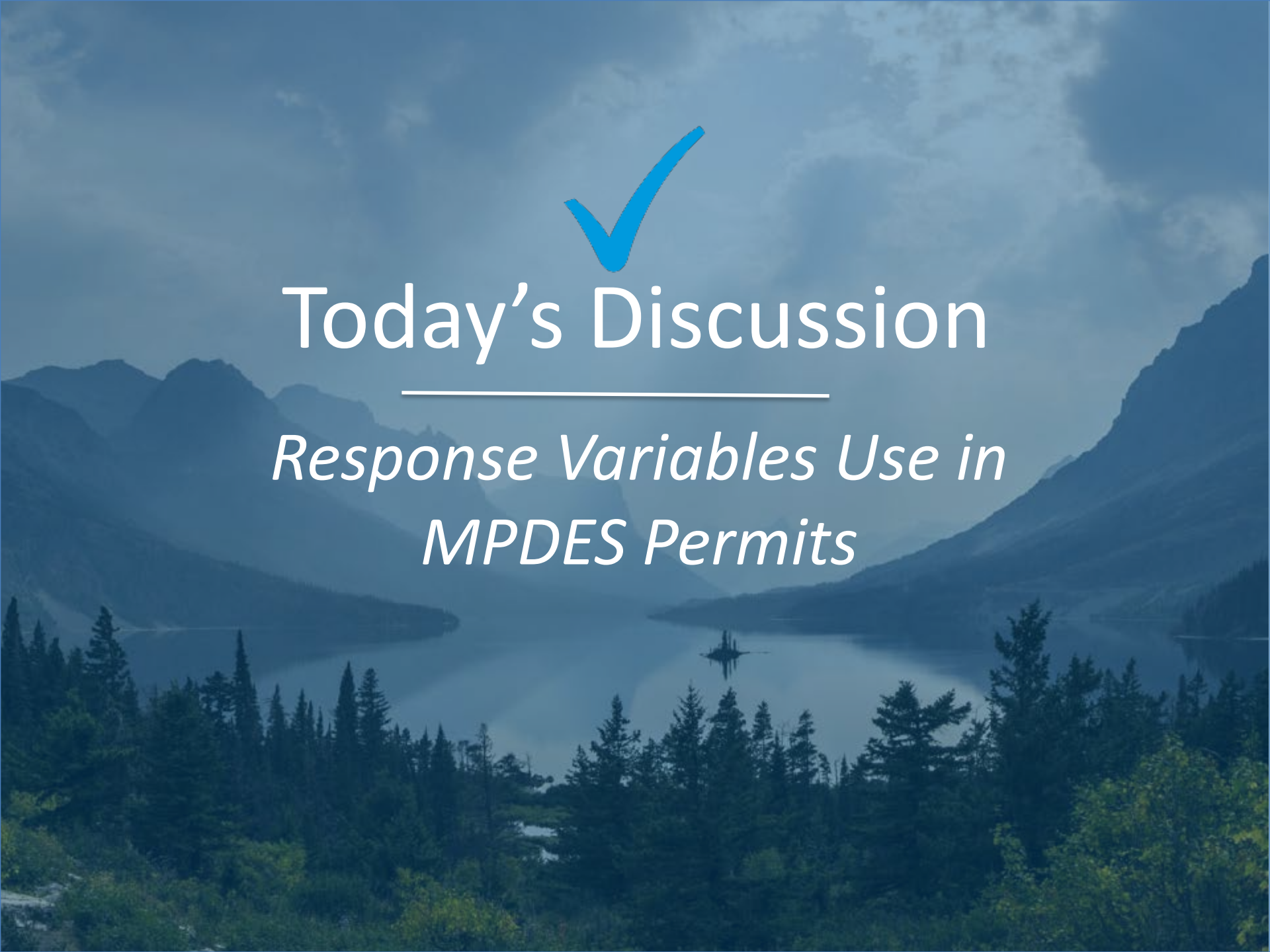
- DEQ Water Quality Library https://svc.mt.gov/deq/wqlibrarysearch/

Other resources may be available

- Standard Operating Procedures
- Training
- Equipment Support

DEQ MONTANA

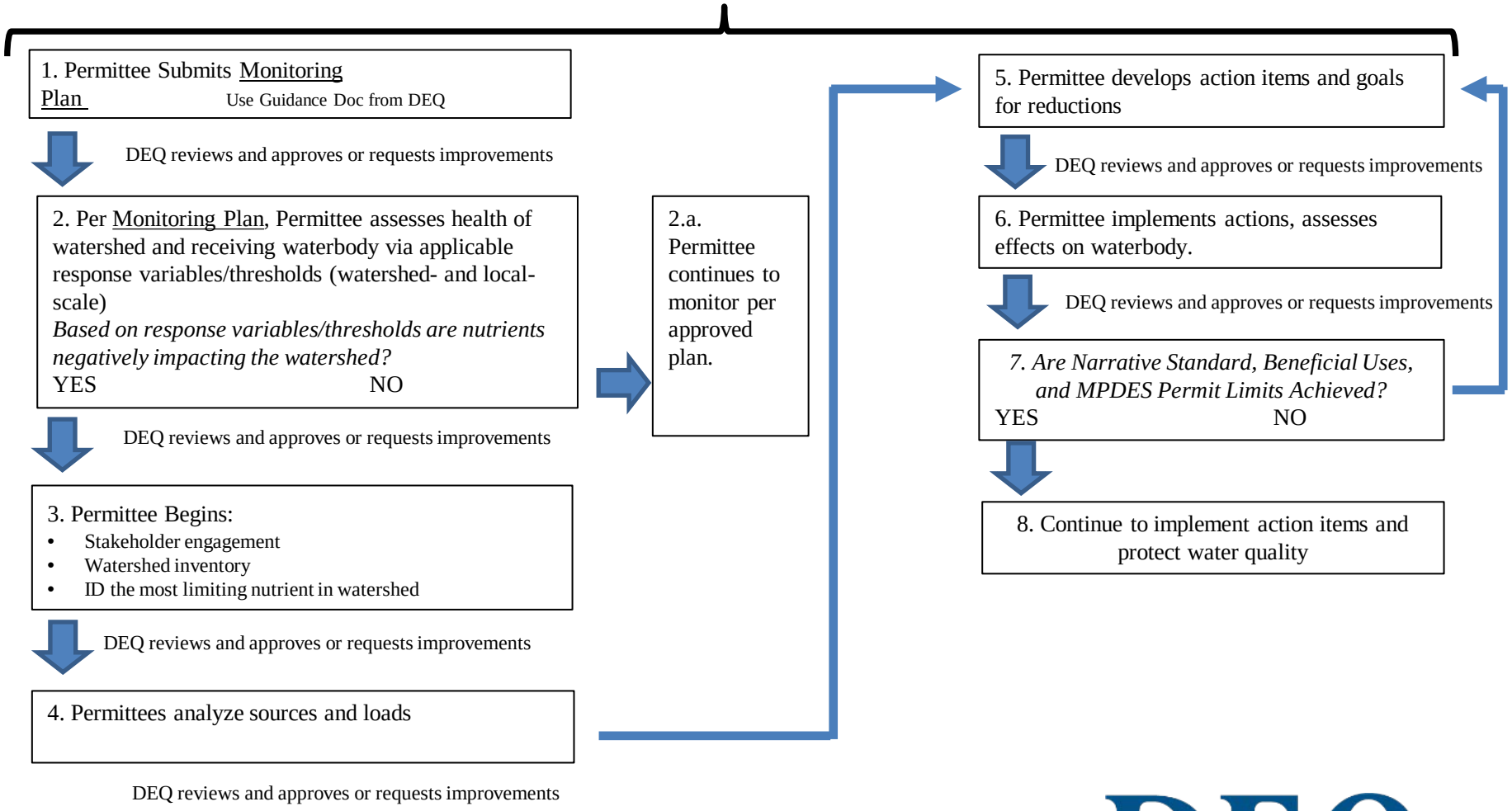
Discussion / Questions



Today's Discussion

Response Variables Use in MPDES Permits

Adaptive Management Program



DEQ MONTANA

MPDES Decision Making Components

- Narrative and numeric water quality standards
- Reasonable Potential Analysis to cause or contribute to an exceedance of a water quality standard
  - Quantitative or qualitative analysis
- Effluent Limits; narrative or numeric

MPDES Decision Making Components

- Narrative and numeric water quality standards
- Reasonable Potential Analysis to cause or contribute to an exceedance of a water quality standard
  - Quantitative or qualitative analysis
  - Use response variable data for RPA decisions
- Effluent Limits; narrative or numeric
  - Relative change or threshold effluent limits based on response variable near field data

DEQ MONTANA

Example Permit Conditions Through Time

DEQ Approval of Monitoring Plan

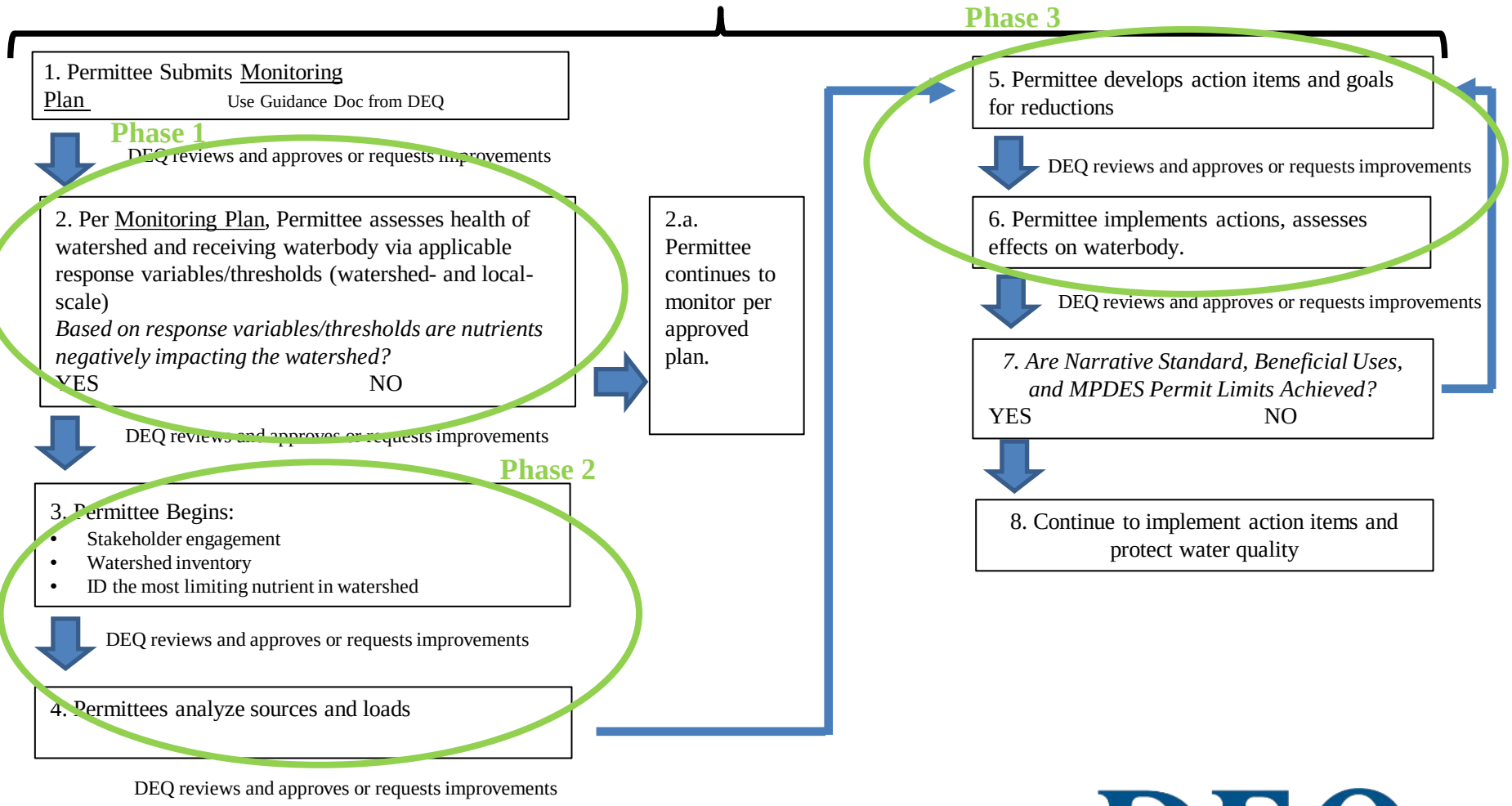
First Phase
Monitoring:
• Response Variables • TN and TP
• Major Tributaries
• Upstream/Downstream Extent
Effluent Limits:
• Retain existing TN/TP loads
• May add relative change or threshold response variable(s)
Special Conditions:
• Watershed Inventory
• Annual Reporting
• Optimization Efforts

Second Phase
Monitoring:
• Response Variables • TN and TP
• Major Tributaries
• Upstream/Downstream Extent
Effluent Limits:
• Retain existing TN/TP loads
• May add relative change or threshold response variable(s)
Special Conditions:
• Update Watershed Inventory
• Engage Stakeholders
• Quantify other loads
• ID limiting nutrient
• Annual Reporting
• Optimization Efforts

Third Phase
Monitoring:
• Response Variables • TN and TP
• Major Tributaries
• Upstream/Downstream Extent
Effluent Limits:
• Retain existing TN/TP loads
• May add relative change or threshold response variable(s)
• May convert response variable data to new TP/TN limit
Special Conditions:
• Update Watershed Inventory
• Engage Stakeholders
• Quantify other loads
• ID limit nutrient
• Develop actions, implement, and assess reductions and health of watershed
• Annual Reporting
• Optimization Efforts

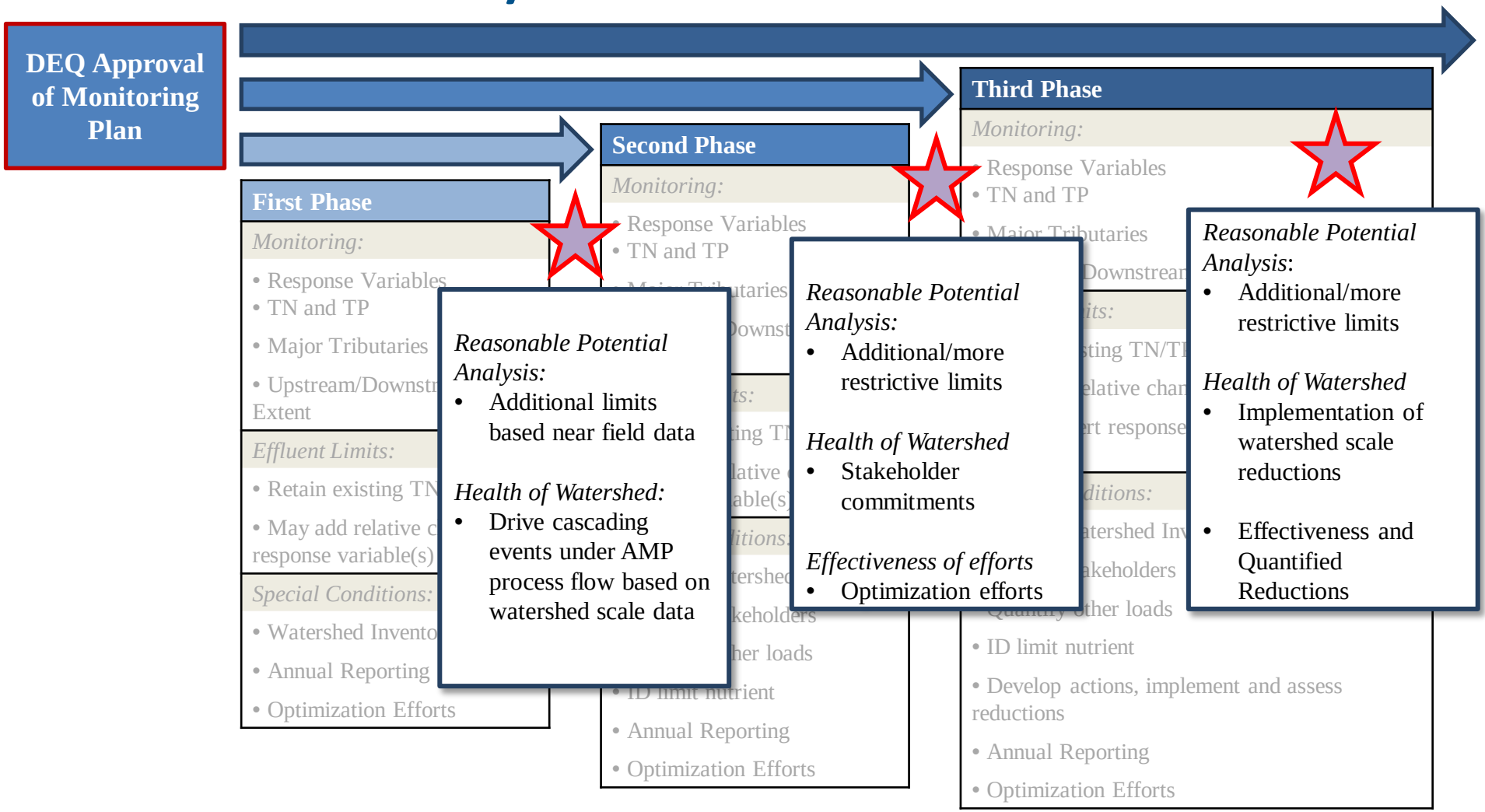
DEQ MONTANA

Adaptive Management Program



DEQ MONTANA

Key Decision Points



Additional MPDES Considerations

- Individual MPDES permit conditions will be tailored case-by-case to fit specific conditions
- MPDES permit include Nutrient Reopener Provision
  - Allows DEQ add new or more stringent conditions, when necessary
- DEQ may accelerate sequence of steps
  - TMDL requirements
  - Downward trend in water quality

Watershed Conditions Scenarios

Scenario 1) One MPDES point source within watershed and streams within watershed unimpaired/unimpacted from nutrients.

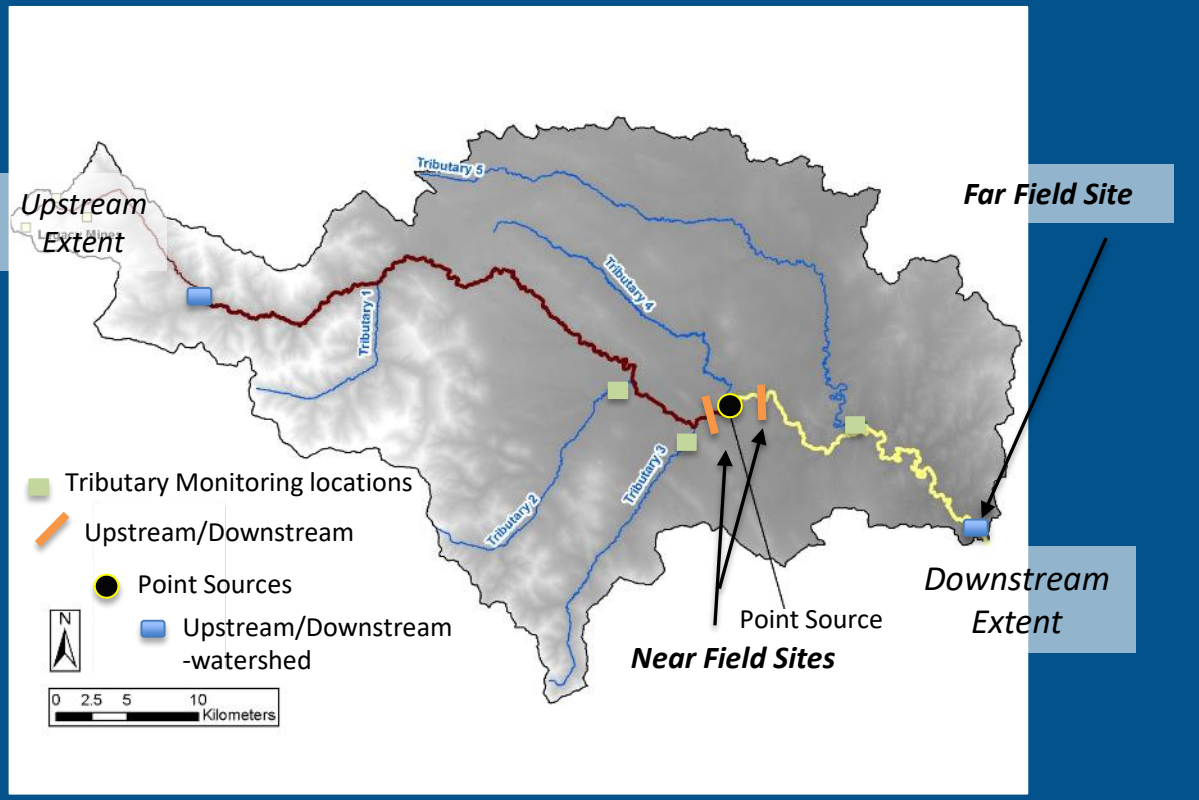
Scenario 2) One MPDES point source within watershed and streams within watershed impaired or impacted from nutrients.

Scenario 3) Multiple MPDES point sources within watershed and streams within watershed unimpaired/unimpacted from nutrients.

Scenario 4) Multiple MPDES point sources within watershed and downstream segment within watershed impaired or impacted from nutrients.

DEQ MONTANA

Scenario 1: One MPDES Permittee and Nutrient Healthy Watershed



Scenario 1) One MPDES point source within watershed and streams within watershed unimpaired for nutrients

First Phase; Example Permit Conditions

Effluent Limits:

- Retain existing TN/TP-if applicable
- Potential for adding response variable relative change or threshold effluent limits
- Potential require nutrient Optimization efforts

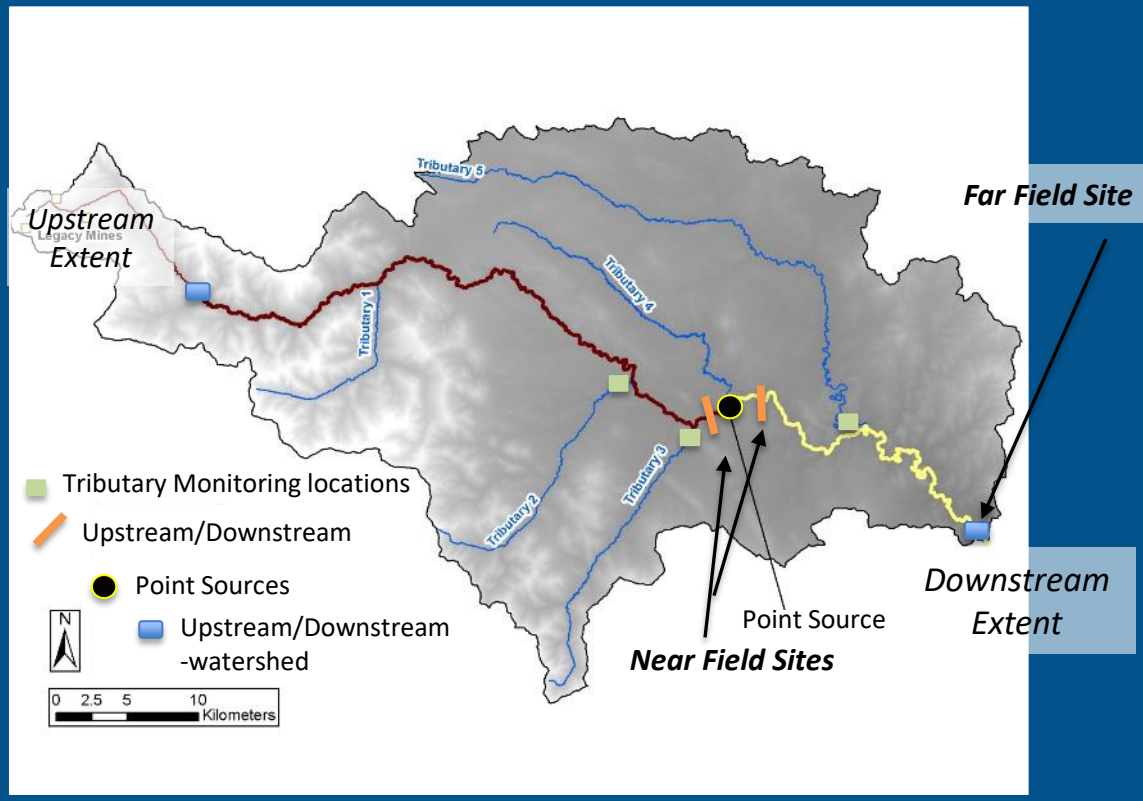
Monitoring:

Initial watershed scale monitoring plan include minimum elements:

- Upstream and downstream watershed extent boundaries
- Major tributaries
- Watershed inventory

DEQ MONTANA

Scenario 2: One MPDES Permittee and Nutrient Impacted Watershed



Scenario 2) One MPDES point source within watershed and streams within watershed impaired/impacted from nutrients

First Phase; Example Permit Conditions

Effluent Limits:

- Retain existing TN/TP-if applicable
- Add relative change or threshold response variable effluent limits

- Require nutrient optimization efforts

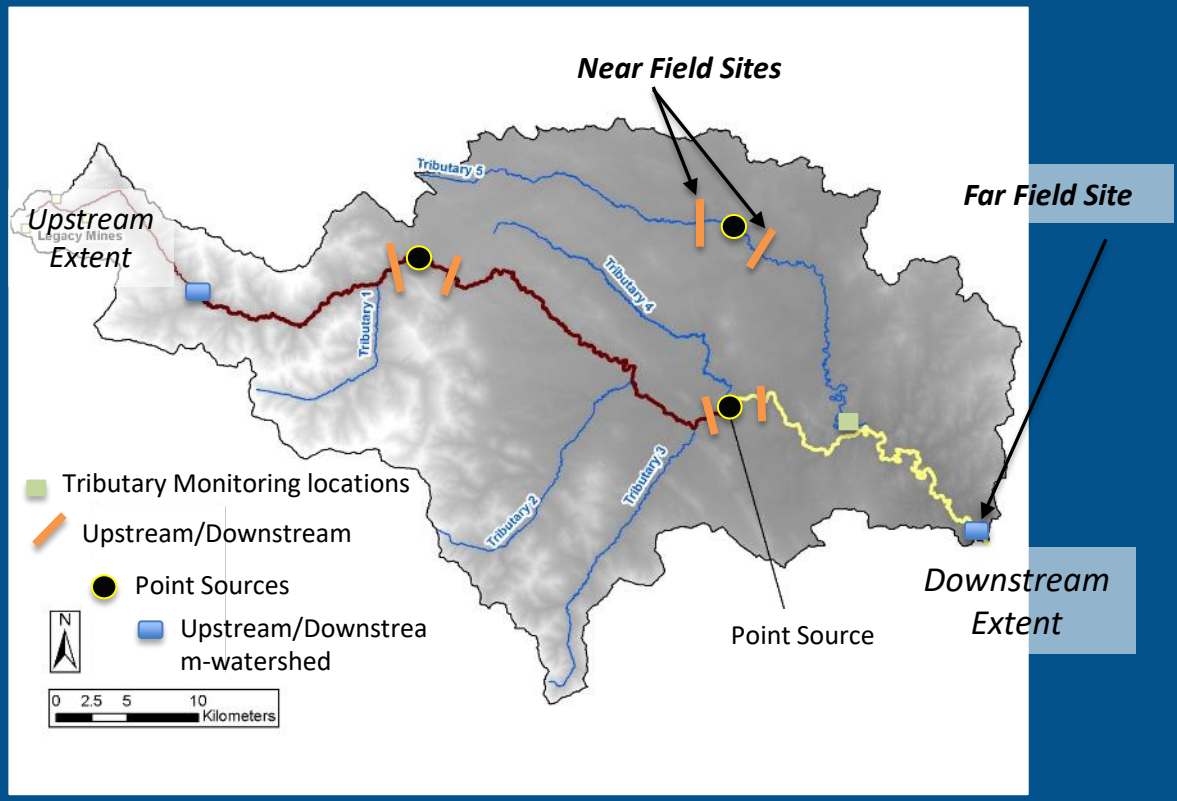
Monitoring:

Initial watershed scale monitoring plan include minimum elements:

- Upstream and downstream watershed extent boundaries
- Major tributaries
- Watershed inventory

DEQ MONTANA

Scenario 3: Multiple MPDES Permittees and Nutrient Healthy Watershed



Scenario 3: Multiple MPDES point sources within watershed and streams within watershed impaired/impacted from nutrients

First Phase; Example Permit Conditions

Effluent Limits:

- Retain existing TN/TP-if applicable
- Potential for adding relative change or threshold response variable effluent limits-Permittee specific analysis based on near field response variable data
- Require nutrient optimization efforts

Monitoring:

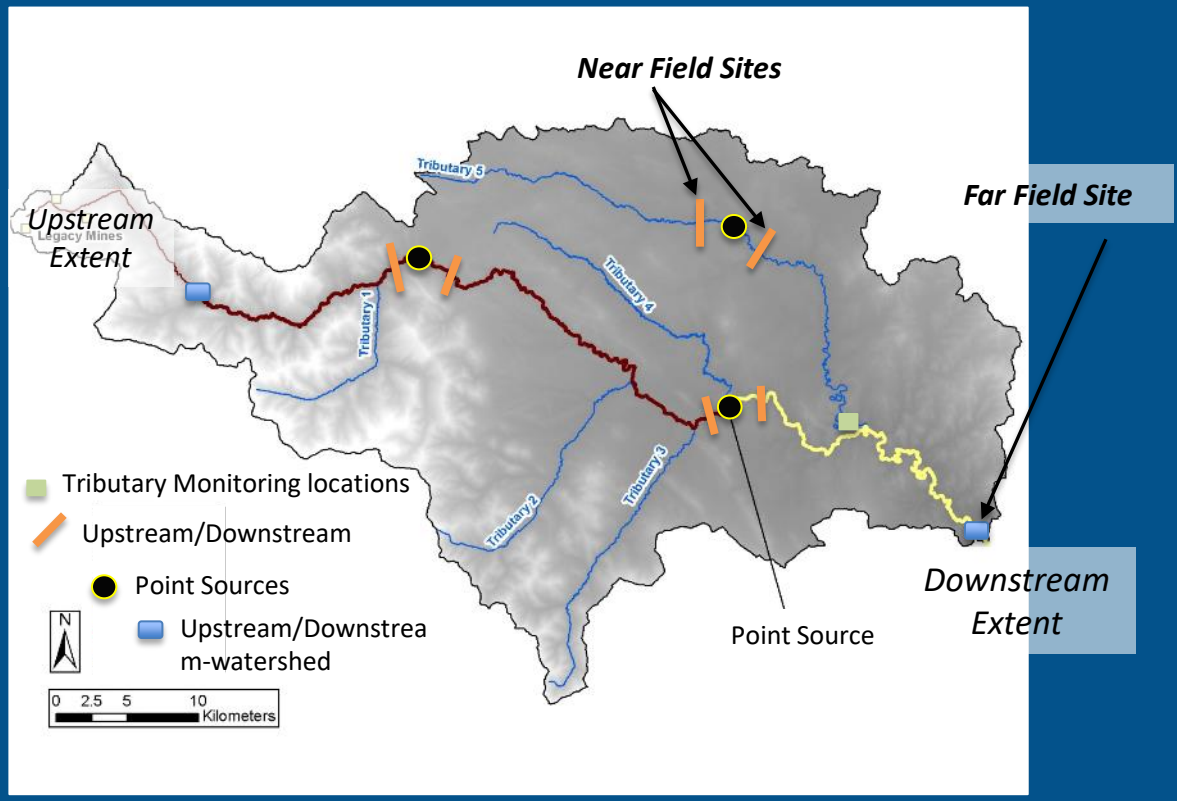
Initial watershed scale monitoring plan include minimum elements:

- Upstream and downstream watershed extent boundaries
- Major tributaries
- Watershed inventory

*Permittees will be required through time to complete entire AMP process.

DEQ MONTANA

Scenario 4: Multiple MPDES Permittees and Nutrient Impacted Watershed



Scenario 4: Multiple MPDES point sources within watershed and streams within watershed impaired/impacted from nutrients

First Phase; Example Permit Conditions

Effluent Limits:

- Retain existing TN/TP-if applicable
- Add relative change or threshold response variable effluent limits-Permittee specific analysis based on near field response variable data
- Require nutrient optimization efforts

Monitoring:

Initial watershed scale monitoring plan include minimum elements:

- Upstream and downstream watershed extent boundaries
- Major tributaries
- Watershed inventory

*Permittees will be required through time to complete entire AMP process.

DEQ MONTANA

Example Response Variable Monitoring Table: Near Field Sites

Table 2. Instream Nutrient Response Variable Monitoring Requirements – Near Field

Parameter	Units	Sample Type	Minimum Frequency	Reporting Requirement	RRV (1)
Upstream Benthic Algal Chlorophyll-a (2)	mg/m^2	See SOP	Twice/Season (3)	Seasonal Average and Daily Maximum (4)	0.1
Downstream Benthic Algal Chlorophyll-a (2)	mg/m^2	See SOP	Twice/Season (3)	Seasonal Average and Daily Maximum (4)	0.1
Upstream Benthic Algal Ash Free Dry Weight (5)	g/m^2	See SOP	Twice/Season (3)	Seasonal Average and Daily Maximum (4)	0.1
Downstream Benthic Algal Ash Free Dry Weight (5)	g/m^2	See SOP	Twice/Season (3)	Seasonal Average and Daily Maximum (4)	0.1
Upstream Macroinvertebrates (6)	HBI (6)	See SOP	Once/Season (7)	Single Sample	--
Downstream Macroinvertebrates (6)	HBI (6)	See SOP	Once/Season	Single Sample	--
Upstream Filamentous Algae Percent Bottom Cover (5)	%	Visual (See SOP)	1/Month (8)	Single Sample	1 (?)
Downstream Filamentous Algae Percent Bottom Cover (5)	%	Visual (See SOP)	1/Month (8)	Single Sample	1 (?)
Upstream Dissolved Oxygen Delta	mg/L	Auto Sampler	Continuous (10)	Weekly Average	0.5
Downstream Dissolved Oxygen Delta	mg/L	Auto Sampler	Continuous (10)	Weekly Average	0.5
Total Nitrogen, as N (9)	mg/L	Grab	1/Month (8)	Single Sample	0.07
Total Phosphorus, as P (9)	mg/L	Grab	1/Month (8)	Single Sample	0.003

(1) Required Reporting Value
(2) Samples must be collected and analyzed using DEQ Standard Operation Procedure (SOP) WQPBWQM-011
(3) Season is July through September. Sampling events must be at least 6 weeks apart.
(4) Highest value of the two sampling events. If more than two sampling events, report maximum.
(5) DEQ Assessment Methods (2016).
(6) Hilsenhoff Biotic Index. DEQ Standard Operation Procedure WQBWQM-009
(7) Must be sampled during one of the benthic algal sampling events.
(8) July through September only. Two of the sampling events must pair with the benthic algal events. Report monthly.
(9) Persulfate digestion method.
(10) Minimum 30 continuous days. At least 21 days in August.

DEQ MONTANA

Discussion / Questions

Action Items

Nutrient Work Group Action Items

	Action	Who*	Status
1	Provide documents in advance of NWG meetings	DEQ	On-going
2	Get Microsoft Teams up and running for NWG and TSC members	DEQ	Complete
3	Address the question of nonpoint source participation in the AMP process	DEQ, NWG	Complete
4	Consensus opinion of farming and nonpoint source community on this process and what they think is possible or realistic	Nonpoint source representatives	Comment Noted
5	Add timeframes to the Adaptive Management Program flowchart	DEQ and TSC	On-going
6	Indicate responsibilities for adaptive management program in flow chart	DEQ and TSC	Complete
7	Summarize the process for determining a wadeable stream vs large river	DEQ	Complete
8	Add groundwater to the adaptive management program framework	DEQ and TSC	Complete
9	Summarize and provide training on SOPs for sampling nutrients	DEQ	On-going
10	Provide copy of EPA action letter on Utah's headwater streams	DEQ	Complete
*** NWG = Nutrient Work Group, TSC = Technical Subcommittee**			

Technical Subcommittee Action Items

In-Progress Action Items			
#	Action	Who	Status
1	Provide feedback from the TSC about the time component in the flow chart	TSC	In progress
2	Update the flowchart and supporting materials based on TSC feedback	Rainie DeVaney, Mike Suplee	In progress
3	Receive feedback from TSC on time component of each flowchart step.	TSC	In-progress
4	Define what phosphorus prioritization means	DEQ and TSC	Pending
5	Define roles and responsibilities of DEQ and permittees for AMP process	DEQ	In-progress
6	Identify and define what is needed to determine how far upstream and downstream monitoring should occur for a point source	TSC	In-progress
7	Put together case study of what DEQ thinks is a reasonable minimum of data collection for large rivers	DEQ	In-Progress

DEQ MONTANA

Technical Subcommittee Action Items

Complete Action Items			
#	Action	Who	Status
1	Distribute the flowchart and supporting materials to the TSC in a format to provide comments/track changes	Rainie DeVaney, Mike Suplee	Complete
2	Consider other measures that may trigger action (Box 7 of flowchart)	TSC	Complete
3	Clarify in the supporting documents that the narrative standards are those referenced in the Administrative Rules of the Montana of the State of Montana.	Rainie DeVaney, Mike Suplee	Complete
4	Define the overall work for the AMP by the June 23 Nutrient Work Group meeting	TSC	Complete
5	Provide information to the TSC on how to get on the agenda for a future meeting	Rainie DeVaney, Mike Suplee	Complete
6	Schedule two TSC meetings between each Nutrient Work Group	Rainie Devaney, Mike Suplee	Complete
7	Set up Teams TSC collaboration site. Send invite email. Post comments received from TSC members and draft DEQ documents	Moira Davin, Christina Staten	Complete
8	Update AMP definition based on TSC feedback. Share out to TSC.	Rainie DeVaney, Mike Suplee	Complete
9	Decide whether medium sized rivers should be broken out	TSC	Complete
10	Add the draft approach for determining watersheds to Teams for feedback from TSC	Mike Suplee	Complete
11	Reorganize technical subcommittee Teams folders so they are more intuitive	DEQ	Complete
12	Receive written comments from League of Cities and Towns	Amanda McInnis	Complete
13	Medium rivers definition	Mike Suplee	Complete
14	Create bibliography of nutrient-related literature	DEQ	Complete

DEQ MONTANA

Nutrient Work Group Feedback

What type of training would be most helpful to you when the Adaptive Management Program is rolled out?

- Field training
- Online videos
- Online webinars
- In-person meetings:
  - Locations?
  - Which months work best?

Are there additional training topics that would be helpful to execute the Adaptive Management Program?

Are there partnerships that would be valuable for the Adaptive Management Program?

Are there creative ways to get the word out across the state about the new program? Should communication methods vary? What types should be used?

We are halfway through this process and are getting into specifics on program implementation. DEQ realizes there are still unknowns about implementation; however, how are you feeling about the process so far?

What would make you feel more engaged in the NWG or TSC?

Do you feel you understand the information presented or is it too complex?

How could you help contribute to the process and implementation? Do you already have ideas and plans you would like to share?

Next Meetings

Next Meeting

- Wednesday, September 22: 9 – 11 a.m.
- Next meeting topics:
  - Wrap-up from today's meeting
  - Outstanding questions
  - AMP – TMDL relationship
- Technical Subcommittee meeting
  - Tuesday, September 7: 1:30 – 3:30 pm

DEQ MONTANA

Future Meetings

Listening Session:

September 23: 1-3 p.m.

Website question submittal button
https://deq.mt.gov/water/Councils

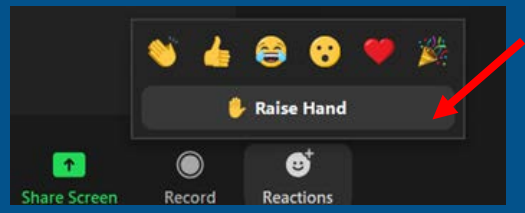
Nutrient Work Group Meetings

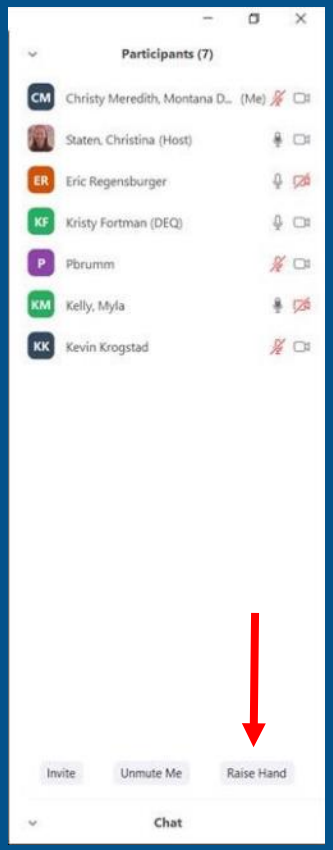
- October 27: 9-11 a.m.
- November Meeting?
  - Rule change updates
  - Outstanding items
  - Guidance & SOP Updates

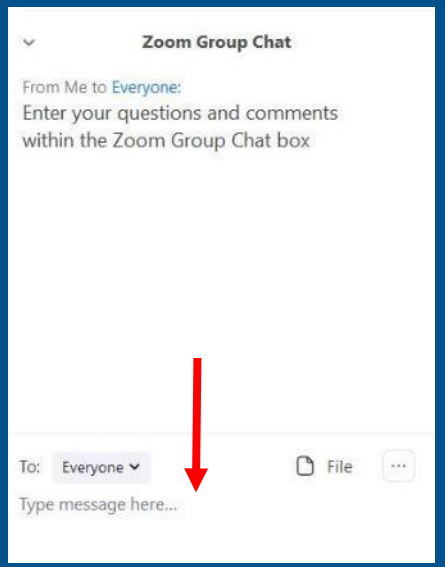
Public Comment

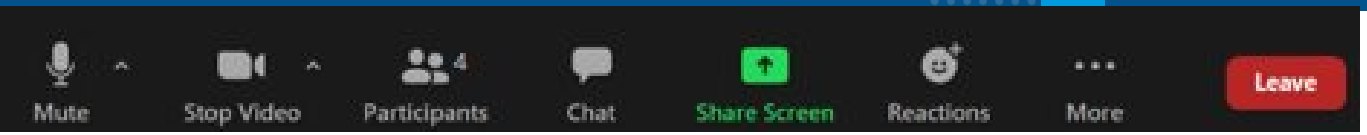
Questions/ Comments

- Raise hand or type questions into the chat
- Please keep your microphone muted until called on
- If calling by phone, press*6 to unmute
- State your name and affiliation before providing your comment









DEQ MONTANA


As Time Allows:
MS TeamsTutorial

Thanks for Joining Us

Contact:
Galen Steffens
Galen.Steffens2@mt.gov

To submit comments or questions

Submit Comments or Questions

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

DEQ MONTANA