DRAFT Montana Nonpoint Source Management Plan

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Cover photos (clockwise from upper left): Irrigated fields in Flathead Valley; Trout Unlimited and USFS Middle Fork Judith Restoration Project tour; Vermillion River post-restoration; Lewis and Clark Conservation District Beaver Creek Restoration Project tour.

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Acronyms

AIS	Aquatic Invasive Species
AML	Abandoned Mine Lands
ARM	Administrative Rules of Montana
BLM	Bureau of Land Management
BoR	Bureau of Reclamation
CD	Conservation District
CWA	Clean Water Act
CWAIC	Clean Water Act Information Center
DES	Department of Emergency Services
DEQ	Department of Environmental Quality
DNRC	Department of Natural Resource Conservation
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FWP	Montana Department of Fish, Wildlife, and Parks
MACD	Montana Association of Conservation Districts
MCA	Montana Code Annotated
MDT	Montana Department of Transportation
MPDES	Montana Pollution Discharge Elimination System
MWCC	Montana Watershed Coordination Council
NFWF	National Fish and Wildlife Foundation
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resource Conservation Service
NWQI	National Water Quality Initiative
OSG	Sewer Overflow and Stormwater Reuse Municipal Grants

PCB	Polychlorinated biphenyl
PFAs	Per- and polyfluoroalkyl substances
PPCP	Pharmaceuticals and Personal Care Products
PSPP	Pesticide Stewardship Partnership Program
RRGL	Renewable Resource Grants and Loans
SMZ	Streamside Management Zone
TIE	Total Maximum Daily Load Implementation Evaluation
TMDL	Total Maximum Daily Load
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
WMCC	Western Montana Conservation Commission
WRP	Watershed Restoration Plan

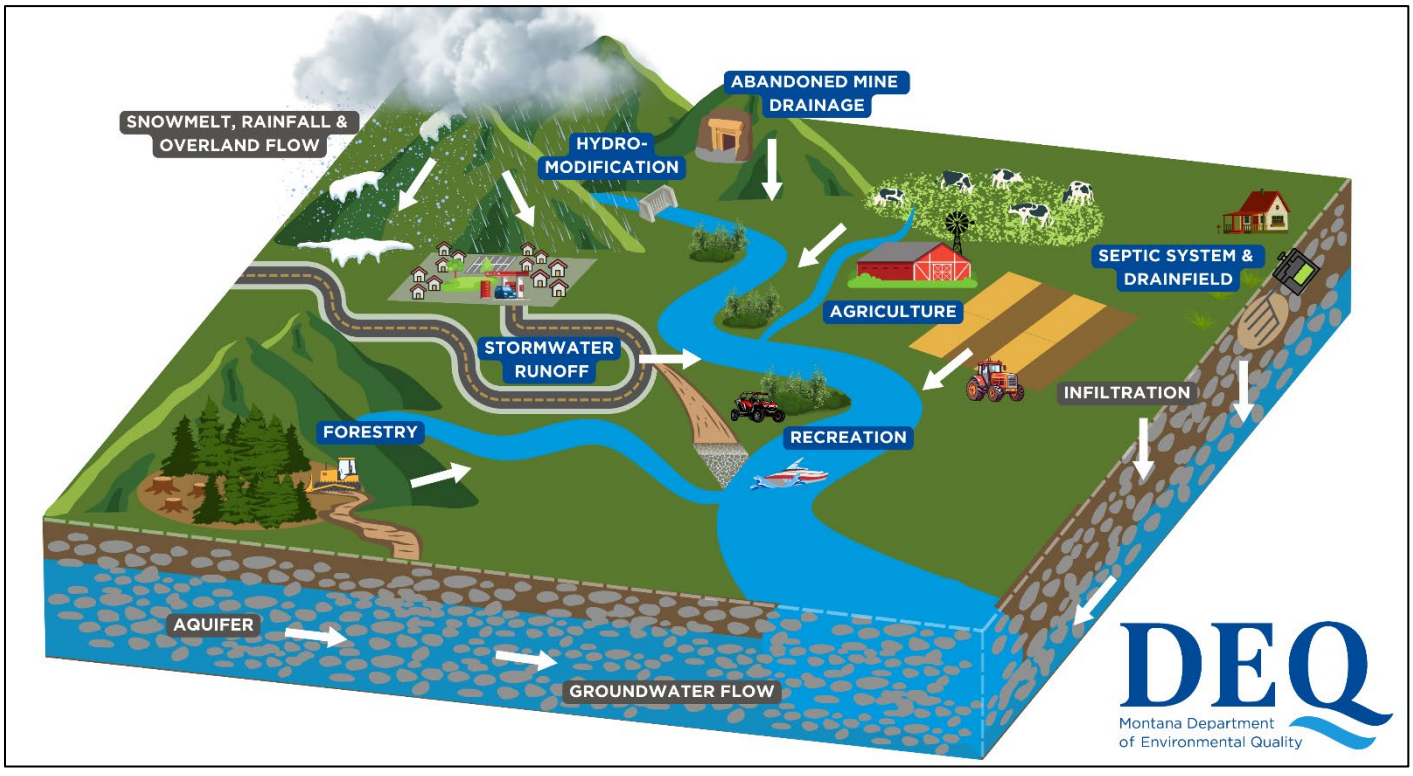
MONTANA'S NONPOINT SOURCE MANAGEMENT PLAN OVERVIEW

Montana's Nonpoint Source Management Plan describes the framework of Montana's Nonpoint Source and Wetlands Section and the strategies it employs to address nonpoint sources of pollution that impact water quality throughout the state. Montana's State Legislature, the Governor, and EPA have designated DEQ as the state agency responsible for developing and implementing many aspects of Montana's Nonpoint Source Management Plan. DEQ's Nonpoint Source and Wetlands Section has made great strides over the past 20 years, but the scale of nonpoint source pollution across the state requires a targeted approach to demonstrate measurable improvements.

WHAT IS NONPOINT SOURCE POLLUTION?

Nonpoint source pollution is the largest contributor of water quality problems on a statewide basis when compared to point sources of pollution. *(DEQ, 2021)*

Nonpoint source pollution is water pollution that originates from many diffuse sources spread over a wide area. Nonpoint source pollution comes from a variety of land use activities and enters lakes, rivers, and wetlands via runoff, subsurface flows, or aerial transport. Common nonpoint pollutants include sediment, nutrients (nitrogen and phosphorus), temperature, metals, pesticides, pathogens, and salinity. Nonpoint source pollution is controlled primarily through voluntary best practices and projects. In contrast, point source pollution, as defined under the federal Clean Water Act and Montana Water Quality Act (Title 75, Chapter 5, Montana Code Annotated (MCA)), includes pollutants that enter surface water via any discernible, confined and discrete conveyance. Point sources are regulated through discharge permits issued by DEQ.



NONPOINT SOURCE MANAGEMENT AUTHORITY

The 1972 federal Clean Water Act (CWA) established a national framework for protecting and improving water quality. Implementation of the CWA in the early decades resulted in considerable national water quality improvements through improved treatment requirements for point sources such as industrial and municipal wastewater discharges. CWA Section 208 directed states to develop "Areawide Waste Treatment Management Plans" to address nonpoint sources of pollution. In Montana, the DEQ protects water quality from point source discharges through the Montana Pollutant Discharge Elimination System (MPDES) and serves as the lead planning agency for addressing nonpoint sources.

Following early successes in controlling point source pollution, Section 319 amendments were made to the CWA in 1987, requiring that states develop plans for controlling nonpoint sources of water pollution. CWA Section 319 also provides cost share grants to states for a wide variety of nonpoint source pollution control activities contingent upon EPA approval of a state's Nonpoint Source Management Plan.

As authorized by the state legislature and directed by the governor, DEQ is the agency responsible for identifying and developing necessary water quality protection and improvement programs in Montana. As such, DEQ is the lead agency for nonpoint source pollution control in Montana and is responsible for updating the Nonpoint Source Management Plan on a five-year basis. This Nonpoint Source Management Plan is an update to the 2017 Plan, reflecting new initiatives and improvements to Montana's Nonpoint Source and Wetland Section activities.

Primary Changes From the 2017 Nonpoint Source Management Plan

- Stated prioritization factors for water quality restoration (**Section 1.5**) and protection (**Section 1.7**).
- Instead of *requiring* that CWA Section 319 funding address impaired waterways, these are now prioritized.
- Strategies to address nonpoint source pollution from different land uses (**Section 3.0**) are more specific and actionable.
- Clarified eligibility requirements for the use of CWA Section 319 funds within MS4s (municipal separate storm sewer systems; **Section 3.1.7**)
- Inclusion of the Nonpoint Source Focus Watershed strategy, which began in 2019.
- Streamlined and clarified interim milestones (**Table 8**).
- Updated **Appendix A – Best Management Practices** to include beaver reestablishment and beaver mimicry as best practices.

GOAL OF THE NONPOINT SOURCE AND WETLANDS SECTION

DEQ's mission is to champion a healthy environment for a thriving Montana. Montana's Nonpoint Source and Wetlands Section goal is to protect and restore water quality from the harmful effects of nonpoint source pollution. This Nonpoint Source Management Plan helps accomplish this goal by:

- Informing citizens about the sources of nonpoint source pollution and effects on water quality and identifying actions that citizens can take to reduce nonpoint source pollution (**Appendix A - Best Management Practices**).
- Supporting and acknowledging the efforts of local, state, and federal partners in addressing nonpoint source pollution.
- Describing how DEQ will continue to work with program partners and provide statewide leadership toward implementing this Nonpoint Source Management Plan.

- Identifying strategies, programs and resources for protecting and restoring water quality affected by nonpoint source pollution.
- Providing resources to promote, plan, implement, and evaluate voluntary water quality improvement projects and practices

The program goal and information contained within this Nonpoint Source Management Plan are consistent with the required program objectives defined within EPA's Nonpoint Source Program and Grants Guidelines for States and Territories (EPA, 2024). These EPA objectives are contained within **Appendix B**, along with a crosswalk on where each objective is addressed within this Nonpoint Source Management Plan.

IMPLEMENTING THE NONPOINT SOURCE MANAGEMENT PLAN

The approaches and resources described in this Nonpoint Source Management Plan are the state's primary vehicle for engaging Montana's citizens in implementing voluntary management practices and fostering stewardship of water resources. Although DEQ is the lead agency for the state's Nonpoint Source Management Program, many other agencies, entities, and individuals play critical roles in the implementation of this Plan. Through communication, collaboration, and shared resources, we can work together to effectively protect and restore water quality from the harmful effects of nonpoint source pollution.

By implementing this plan, the Nonpoint Source and Wetlands Section envisions that:

- Montana's citizens understand the consequences of nonpoint source pollution and address concerns proactively
- Watershed groups around the state actively engage local landowners and partners to address nonpoint source pollution in socially acceptable and economically beneficial projects and programs

- Riparian areas, floodplains and wetlands are healthy and managed in ways that protect creeks, streams, rivers, ponds and lakes
- Indigenous fish and other aquatic life are sustained through generations by well-managed and citizen-supported natural resource programs and conservation

1.0 MONTANA'S NONPOINT SOURCE POLLUTION MANAGEMENT FRAMEWORK

Montana's Nonpoint Source and Wetlands Section is housed within the Water Quality Division at the Montana Department of Environmental Quality (DEQ). The goal of the Nonpoint Source and Wetlands Section is to protect and restore water quality from the harmful effects of nonpoint source pollution. This is best achieved through a process that integrates Clean Water Act programs including water quality standards, monitoring and assessment, total maximum daily loads (TMDLs), and the voluntary implementation of best practices outlined in watershed restoration plans (WRPs). Throughout this process DEQ seeks to involve all stakeholders through communication, cooperation, common goals, and consensus. DEQ recognizes the necessity of a community-based, locally-led and community-driven watershed approach to sustainable water quality restoration. Using this approach, DEQ, watershed groups, conservation districts, other agencies, Tribes, academia, and non-governmental organizations can work together to effectively increase public understanding and participation in nonpoint source pollution reduction. Successful nonpoint source pollution reduction is only possible with the collective desire for clean water and individuals' voluntary actions and project implementation.

1.1 The Water Quality Improvement Process

All Montanans, neighbors, and visitors contribute to water quality degradation *and* solutions. DEQ has developed a process that aligns with state and federal laws to identify and remedy the causes and sources of pollution (**Figure 1-1**). This process follows the outline and requirements of the Montana Water Quality Act (MCA) sections 75-5-701 through 704 as well as Clean Water Act Sections 303(d) and 319.

To implement the process steps defined in **Figure 1-1**, DEQ's Nonpoint Source and Wetlands Section integrates with other programs within the Water Quality Division including Water Quality Standards and Modeling, Monitoring and Assessment, and TMDL Sections.

Achieving and protecting clean water begins with identifying water quality pollution and establishing corresponding water quality standards. The next step is monitoring and assessing state waters to determine if they meet the established standards. The results of these efforts are reported every two years in DEQ's Water Quality Integrated Report. For those waters not meeting standards, TMDLs and/or WRPs are developed, followed by implementation of best practices for nonpoint sources, and potentially, point-source permit wasteload allocations. The outcomes of these activities are monitored, assessed, and used to identify appropriate adjustments to activities, processes, or programs based on lessons learned.

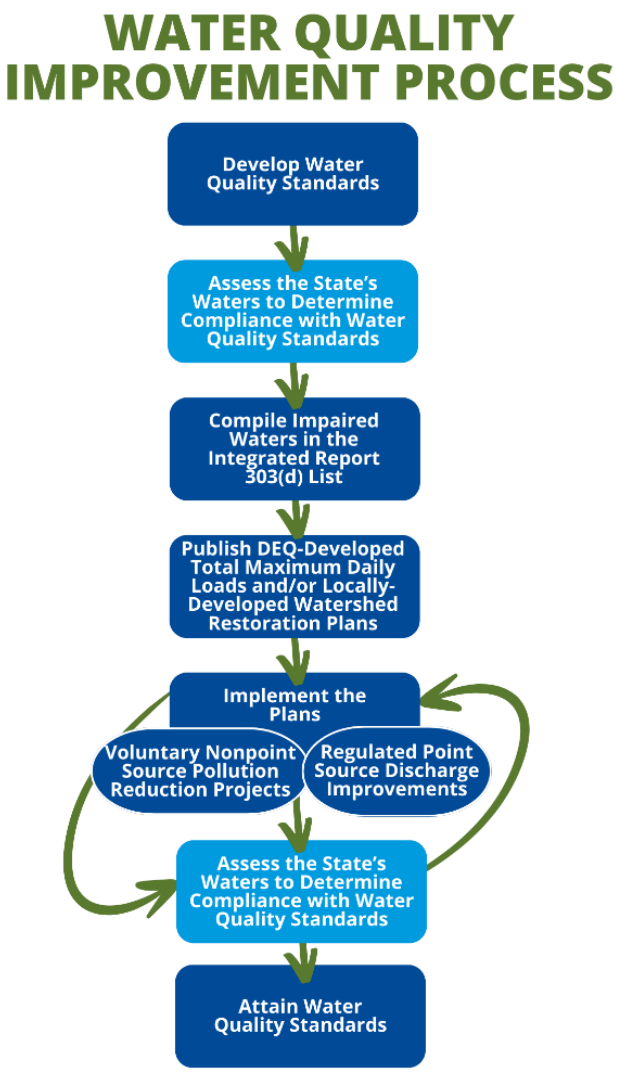


Figure 1-1: Montana DEQ's Adaptive Water Quality Improvement Process

1.2 Water Quality Standards

Water quality standards are part of the foundation for DEQ's water quality programs; they describe desired water quality conditions and define the water quality goals to support beneficial uses of waters. Montana's water quality standards include a use classification system that designates the beneficial uses for a waterbody, the standards of water quality necessary to ensure that the uses are supported, and a nondegradation policy to maintain and protect water quality that has already been achieved. Water quality standards and use classification systems for surface and ground waters are defined in the Administrative Rules of Montana, Title 17, Chapter 30, Subchapters 6, 7, and 10.

Beneficial uses, as designated through Montana's use classification system, are those which a waterbody should be capable of supporting, whether or not they are currently attained. Beneficial uses can include aquatic life support, recreation, drinking water, agricultural and industrial water supply. All

state waters are assigned a use class which describes the uses the waters are to be maintained suitable for, as well as the water quality standards that must be met. For surface waters, Montana relies primarily on a watershed-based classification system, whereas ground water classifications are based on salinity (specific conductance) conditions.

Consistent with the Montana Water Quality Act, DEQ's Standards and Modeling Section formulates and adopts new water quality standards and modifies existing standards as appropriate through time. In doing so, DEQ coordinates with stakeholders, advisory groups, and lawmakers and adheres to formal rulemaking procedures, including opportunities for public participation, to adopt changes.

1.3 MONITORING AND ASSESSMENT

Collecting and evaluating water quality data is an integral part of water quality management. A water quality assessment is a structured decision-making process consisting of (1) planning a water quality evaluation, (2) collecting water quality data, (3) analyzing the data, and (4) reporting the results. DEQ supports internal and external monitoring efforts to address the many different data needs associated with the Nonpoint Source and Wetlands Section.

To determine beneficial use support, DEQ monitors and assesses waterbodies for likely causes and sources of pollution. These activities are often pursued at a watershed scale in support of subsequent TMDL development as discussed in **Section 1.4**. Montana separates causes of pollution into two broad categories: pollutants and non-pollutants. Pollutants typically include measurable constituents in water such as metals, nutrients (nitrogen and phosphorus), toxic chemicals, and sediment. Temperature is also categorized as a pollutant. Non-pollutants generally include descriptive conditions such as flow alteration or loss of riparian, wetland, or instream habitat. As a result of the assessment process, Montana's waters are segmented into assessment units and are assigned varying levels of beneficial use support as follows:

1. **Fully Supporting:** The waterbody meets all water quality standards to support designated beneficial uses.
2. **Threatened:** The waterbody currently meets water quality standards but will likely exceed a pollutant limit if current conditions do not change.
3. **Not Fully Supporting (Partial Support):** The waterbody does not meet one or more of its water quality standards and thus one or more beneficial uses are limited. Note that a lake or stream segment might fully support one use, such as agriculture, while only partially supporting another use, such as aquatic life.

Assessed waterbodies that do not meet water quality standards are placed on the state's list of impaired waters. This list identifies each pollution cause that limits the waterbody's beneficial uses, and the probable sources. All assessed waters information, including the state's list of impaired waters, is summarized every two years within Montana's Water Quality Integrated Report, which undergoes EPA review and approval consistent with CWA Section 303(d). In preparation for the Water Quality Integrated Report, DEQ solicits data and information from local, state, and federal agencies, volunteer monitoring groups, private entities, non-profit organizations, and individuals with an interest in water quality.

To assist resource managers and members of the public with water quality improvement and protection activities, assessment results for each assessment unit are available on the web via DEQ's Clean Water

Act Information Center (CWAIC). Note that DEQ often separates larger streams into smaller segments called assessment units.

DEQ's Monitoring and Assessment Section monitors state surface waters and develops assessment methods to:

- Identify causes and sources of nonpoint source pollution
- Track trends in water quality
- Establish baseline data
- Evaluate whether water quality standards are attained and beneficial uses are supported
- Support standards and TMDL development
- Evaluate the success of watershed restoration

DEQ often uses water quality data collected by others and provides stakeholders with information on monitoring methods, data analysis, and quality assurance to help ensure broad applicability of data collected throughout Montana.

1.4 TMDL Development and Water Quality Restoration Planning

DEQ is responsible for developing TMDLs consistent with state and federal requirements. A TMDL is a plan to attain and maintain water quality standards. The basic steps of the TMDL development process include:

1. Defining measurable targets to represent attainment of water quality standards (**Section 1.2**) and comparing the waterbody's existing condition (**Section 1.3**) to the targets.
2. Defining the allowable pollutant load (i.e., the total maximum daily load).
3. Quantifying the pollutant load from significant sources, often relying on water quality monitoring data.
4. Allocating the allowable pollutant load among the significant point and nonpoint sources.

In Montana, TMDL documents are typically developed for all streams within a given watershed impaired by a certain pollutant or set of pollutants. Although TMDLs apply to pollutants, the TMDL planning document typically addresses both pollutant and non-pollutant impairment causes in a watershed (**Section 1.3**). The scale of the watershed is generally based on U.S. Geological Survey Hydrologic Unit Code (e.g., 8- or 10-digit HUC) boundaries. Leading prioritization factors for TMDL development are:

- New individual permit applications (75-5-702(9), MCA)
- Consultation with the Statewide TMDL Advisory Group established under 75-5-702(10), MCA
- Degree of public interest and support, availability of resources, and likelihood of voluntary actions correcting impairment
- Program coordination
- Resource value
- Magnitude of impact to use

DEQ's TMDL priority areas for the next several years and completed TMDL documents are identified in available on the Watershed Plan Viewer.

DEQ's stakeholder participation process during TMDL development includes consulting with watershed advisory groups and appropriate technical personnel and a public comment period on the draft

document. This approach sets the stage for implementing the nonpoint source components of a TMDL via local leadership, as discussed further in **Section 1.5**.

TMDL documents developed with support of CWA Section 319 funding must meet the TMDL guidelines contained within EPA's 2024 *Nonpoint Source Program and Grants Guidelines for States and Territories*. This includes providing adequately detailed information about nonpoint source load reductions. Additionally, the EPA encourages states to coordinate their TMDL and CWA Section 319 programs to align priorities to ensure that a proper balance exists between funding the development and implementation of WRPs and TMDLs, as these plans may become outdated before they can be implemented.

1.5 WATER QUALITY RESTORATION

The end goal of the Montana DEQ's adaptive water quality improvement process (**Figure 1-1**) is to restore water quality to meet the developed standards. Point source discharges are regulated through Montana Pollutant Discharge Elimination System (MPDES) discharge permits. Nonpoint sources, the focus of this Nonpoint Source Management Plan, rely primarily on voluntary actions.

1.5.1 Water Quality Restoration Planning

DEQ provides staff support, CWA Section 319 funding, and other funding as available to local organizations for local entities to develop WRPs. WRPs serve as roadmaps to achieve nonpoint source pollution reduction and protecting and restoring wetlands. Critical steps in WRP development include community engagement, partnership building, watershed characterization, project identification, prioritization and implementation, and monitoring. EPA has identified the nine minimum elements of a WRP that are necessary to ensure creation of a realistic plan that will achieve water quality standards.

WRPs are often developed following TMDLs in part because these documents inform elements 1-3 (**Figure 1-2**). WRPs refine the water quality improvement strategy provided in TMDL documents by focusing on locally identified, salient activities in high-priority areas within the watershed, and empowering local individuals and organizations to act. Where TMDLs have not been published, it is still possible to develop a WRP designed to protect or improve water quality. The plan sponsor should work closely with DEQ throughout this process, and the WRP should be modified as appropriate to be consistent with any subsequent TMDLs or major changes in the watershed.

There are often efficiencies in incorporating WRP development with other planning documents. For example, Drought Management Plans, Hazard Mitigation Plans, and Watershed Assessments by NRCS or USFS may already contain many of the minimum WRP elements, and with some extra coordination, could meet the requirements of a WRP.

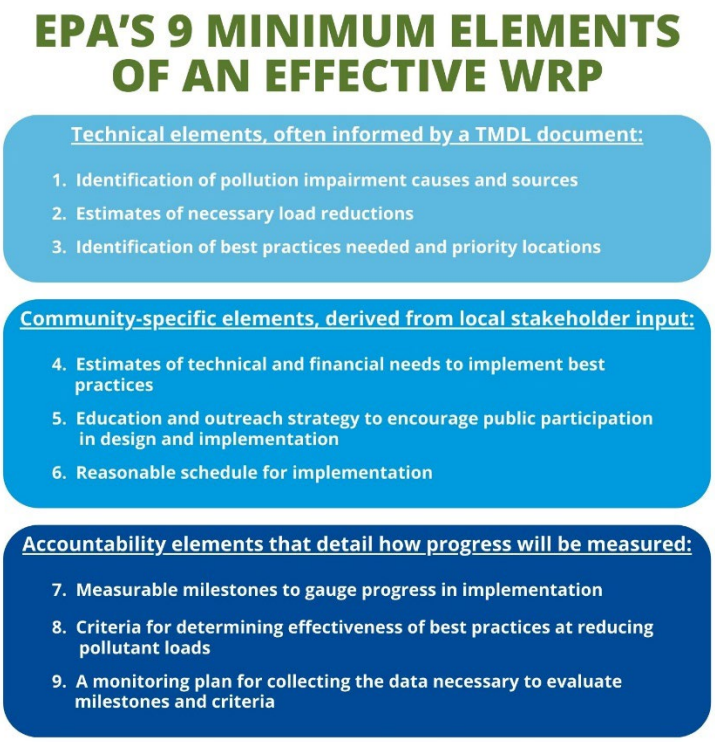


Figure 1-2: EPA's nine minimum elements of an effective WRP grouped by topic and highlighting the critical role that local organizations play in implementing water quality restoration practices.

In certain circumstances, a complete nine-element WRP can be unnecessary. Scenarios include but are not limited to:

- When the impairment is caused by a habitat change that is not pollutant-specific, such as fish passage barriers or flow alterations
- When addressing an isolated, small-scale water quality problem
- When addressing only agricultural nonpoint sources in a Natural Resource Conservation Service (NRCS) National Water Quality Initiative (NWQI) watershed
- When implementing an EPA-approved Tribal Nonpoint Source Management Plan

These "Alternative" Restoration Plans must include the following elements:

- Description of watershed project goal(s) and how they will be achieved
- Identification of pollution impairment causes and sources
- Identification of best practices needed and priority locations
- A reasonable schedule for implementation
- A monitoring plan for collecting the data necessary to evaluate milestones and success

DEQ's Watershed Plan Viewer provides a map showing WRP development status in Montana's watersheds.

1.5.2 Implementing Water Quality Restoration

In Montana, nonpoint source pollution is primarily addressed via voluntary best practices pursued by landowners, land managers, recreationists, and businesses. DEQ supports a voluntary program to achieve compliance with water quality standards for most activities that create nonpoint source pollution, while recognizing that there are also important regulatory elements related to nonpoint source pollution control (**Section 6**). Although DEQ is the lead agency for the State's nonpoint source program, many other agencies, entities, and individuals play critical partnership roles (**Section 5** and **Appendix C**).

The Montana Watershed Coordination Council (MWCC; see **Appendix C** and **Section 5.1**) helps sustain watershed organizations in Montana by streamlining communication among local organizations and coordinates technical and financial support through Watershed Fund grants, online information clearinghouses, training workshops, and networking opportunities. DEQ considers MWCC to be a centralized information hub that plays a critical role in leading local efforts to build the capacity needed to develop and implement sustainable watershed restoration and protection.

Federal and state agencies own and manage approximately 1/3rd of land in Montana (over 32 million acres) that includes impaired and unimpaired waterbodies resulting from current or historical management practices. These agencies usually have multiple management objectives, planning processes and land management activities that contribute to TMDL or WRP implementation. DEQ has developed several interagency agreements (i.e., memoranda of understanding) that provide additional mechanisms to inform, coordinate, and cooperate on nonpoint source pollution reduction and TMDL implementation.

1.5.3 Restoration Prioritization and Focused Watershed Restoration

DEQ relies on voluntary action by the public and landowners to reduce nonpoint source pollution and strategically invests limited funding to help incentivize this. The Nonpoint Source and Wetlands Section annually receives approximately $2,000,000 of CWA Section 319 funding. Half of each year's allocation goes towards projects and the other half to support staff in the Nonpoint Source and Wetlands, Standards and Modeling, Monitoring and Assessment, TMDL, and Fiscal Sections. Over the past 5 years of Calls for Applications, funding requested exceeds funding available by an average of 30%. This factors in an extra $1.5 million of state funds available from the 2023 legislative session for the Nonpoint Source and Wetlands Section to distribute. Estimates of the costs required to address the 845 river and lake assessment units that are impaired by nonpoint source pollution, or implement existing WRPs, range from $18 million to $2.8 billion (DEQ, 2021; EPA, 2024). To make efficient use of limited funding, the Nonpoint Source and Wetlands Section prioritizes water quality restoration through a series of eligibility and prioritization factors to most effectively improve water quality.

First, a restoration project is only *eligible* for project funding when it:

- Implements a DEQ-accepted watershed restoration plan (WRP; **Section 1.5.2**) or an EPA-approved Tribal Nonpoint Source Management Plan
- Implements natural, self-sustaining processes and conditions that significantly reduce nonpoint source pollution by addressing the root cause
- Is consistent with recommendations in this Nonpoint Source Management Plan

Second, restoration project funding is *prioritized* where the project:

- Addresses impairments identified on Montana's List of Impaired Waters (DEQ, 2021)
- Will benefit disadvantaged communities
- Has appropriate landowner and partner investment, especially if the project will be protected by a long-term or perpetual agreement with the landowner
- Builds resiliency to extreme weather such as drought and flooding
- Benefits downstream communities and drinking water sources
- Has high nonpoint source pollution reduction relative to low project costs

Even within the bounds of these eligibilities and priorities, available funding must be further optimized to effectively reduce nonpoint source. In 2019, the Nonpoint Source and Wetlands Section began a "Focus Watershed" strategy, where approximately half of the section's financial and technical resources are directed towards one 8-digit HUC-sized watershed for three years. By concentrating planning, implementation, and outreach efforts in a smaller geography, the goals are to increase sustainable capacity of local organizations to continue the work, generate momentum to implement restoration by the local community, and create demonstrable improvements in water quality. Natural Resource Conservation Service's National Water Quality Initiative (NWQI) watersheds are automatically considered Nonpoint Source and Wetlands Section focus watersheds because of the inherent opportunities to generate momentum in landowner interest and leverage available funding. In addition to NRCS's NWQI watersheds, DEQ uses a public process to select each focus watershed based on the follow attributes:

- One or more DEQ- or EPA-accepted WRPs are in place
- Resources and capacity exist through active watershed groups, agencies, or other entities that are already promoting water quality and/or habitat protection
- Local citizens, stakeholders, and visitors are interested in and value the co-benefits of clean water
- The extent to which DEQ resources can provide increased momentum for water quality improvement actions on the ground
- DEQ's ability to track changes in water quality and/or key water quality indicators through time.
- The degree of overlap with the priorities of other agency or DEQ program priorities
- The extent of nonpoint source pollution issues and related impairment conditions that can be addressed via traditional best practices
- The presence of opportunities to reduce municipal wastewater or other point source water treatment costs by reducing upstream nonpoint sources of pollution

Examples of expanded support and resources provided to Nonpoint Source and Wetlands Section focus watersheds include:

- An increased level of constructive feedback on locally led efforts to address nonpoint source pollution by completing TMDL Implementation Evaluations and highlighting good examples of landowner successes
- Support monitoring activities to track water quality improvement trends and nonpoint source successes. Monitoring support can include volunteer monitoring actions and tracking important indicators such as riparian health
- Assist watershed groups, conservation districts, and other groups with building relationships with landowners to increase the number and quality of projects within priority watersheds
- Facilitate nonpoint source nutrient pollution reductions above point sources dischargers to help economically achieve water quality standards upstream and downstream of applicable point sources

For local organizations, the **Nonpoint Source and Wetlands Section recommends the following framework to help prioritize restoration within a watershed:**

- **Focus on the land use type that contributes a majority of nonpoint source pollution.** Even if initial restoration projects do not address the most egregious pollution location, these projects will help demonstrate the co-benefits of water quality improvement to engage adjacent landowners in similar activities.

- **Ensure the proposed restoration treatment(s) can address the root cause of nonpoint source pollution and results in self-sustaining, natural processes.** Addressing the root cause of pollution is a pre-requisite to ensuring the project is a worthwhile investment. Self-sustaining, natural processes will provide ecosystem co-benefits such as flood attenuation, drought mitigation, wildlife food and habitat, and recreation opportunities.
- **Work with committed landowners.** When evaluating long-term effectiveness of past restoration projects, the most successful projects consistently involved landowners who actively watered, weeded, or otherwise had a hands-on role in the restoration process.
- **Err on the side of passive restoration techniques** (such as riparian fencing, revegetation, off-stream watering facilities, and woody debris matrices or beaver dam analogs) instead of active restoration (such as bank or channel reconstruction). Passive techniques will help make limited funding resources go farther and better guarantee that natural, self-sustaining processes will take effect. Active restoration may be required for scenarios where passive restoration will not result in water quality improvements (such as addressing historical mining impacts or groundwater pollution from septic systems).

Recommendations for prioritizing restoration within a watershed:

- Focus on the land use type that contributes most of the nonpoint source pollution.
- Ensure the proposed restoration treatment(s) can address the root cause of nonpoint source pollution and results in self-sustaining, natural processes.
- Work with committed landowners.
- Err on the side of passive restoration techniques.

1.6 TMDL Implementation Evaluation and Adaptive Management

DEQ's monitoring program (required by Title 75, Chapter 5, Part 7, MCA) to assess TMDL implementation and water quality improvement for waters without TMDLs includes one or more of the following products:

- Project effectiveness reviews (PERs)
- TMDL implementation evaluations (TIEs)
- Working with local partners to evaluate milestones identified in their watershed restoration plan
- Conducting updated monitoring and assessment
- Water quality success stories

DEQ's Nonpoint Source and Wetlands Program conducts project effectiveness reviews (PERs) on projects funded by the program after they have been complete for 5 or more years. Staff, project partners, and landowners walk the project reach, evaluate whether specific best practices and the overall project are continuing to achieve their goals, and collect updated photos at photo point monitoring locations. Results are compiled into a dashboard that allows the NPSW Section to report on the success rate of projects and practices. Recommendations to improve future restoration projects are compiled in annual reports. The NPSW Section can use PER data to recommend that the TMDL Section publish a TIE for the area or recommend that the Monitoring and Assessment Section conduct updated monitoring and assessment.

DEQ's TMDL Section works with local stakeholders to publish TIEs, which provide feedback on TMDL implementation, are used to identify success stories, acknowledge significant progress in best practice

implementation, and recommend further action. For each TMDL evaluated, the TIE will recommend (1) a new or improved phase of voluntary conservation practices are necessary; (2) more time is needed for existing conservation practices to result in compliance with water quality standards; or (3) revisions to the TMDL are necessary. The Cooke City TIE (Ockey, 2011) for example, resulted in the Soda Butte Creek Success Story and current effort to complete a Use Attainability Analysis on Miller Creek. Additionally, TIEs will guide DEQ's monitoring and assessment strategy for impaired waters delistings.

TIEs can be performed at the same watershed scale addressed by a TMDL or WRP document. DEQ has completed 13 TIE documents that include over 100 individual pollutant/waterbody combinations and continues to prioritize TIE development to support and engage with local organizations' efforts to improve water quality. The following prioritization factors guide future TIE development:

- Areas where TMDLs have been in place longer
- Areas where more land, soil, and water conservation practices have been implemented
- Monitoring data is available to evaluate water quality conditions
- Opportunity for success stories
- Areas with greater stakeholder/partner interest
- Nonpoint Source and Wetlands focus watersheds
- Potential need for TMDL revisions
- Value of TIE feedback toward inspiring additional implementation of nonpoint source or point source implementation

1.7 PROTECTION OF HEALTHY WATERSHEDS

In most years, healthy waters initiatives will consume less than 10% of DEQ's nonpoint source program funding resources. DEQ considers healthy waters to be waterbodies that have been assessed by DEQ as unimpaired by a certain pollutant or non-pollutant; or are otherwise demonstrated to be largely functional and intact with respect to their physical, chemical and biological integrity. Note that many of Montana's waterbodies have not been fully assessed by DEQ. DEQ can consider water quality and watershed studies conducted by external agencies as an indicator of whether that waterbody is healthy or in need of restoration. DEQ will prioritize efforts to protect healthy waters based on the following criteria:

- The risk of the waterbody becoming impaired if no action is taken
- The potential risk to public health if no action is taken
- The potential risk to threatened or endangered species if no action is taken
- The potential for widespread economic impact if no action is taken
- The viability and sustainability of a proposed solution

2.0 MONTANA'S WATER RESOURCES

While water and riparian areas cover only 4% of Montana's land area, the Treasure State is home to some notable water features. The country's largest freshwater spring (Giant Springs in Great Falls) pumps out 7.9 million gallons of water per hour, becoming the source of the Roe River – the world's shortest river at just over 200 feet. Montana one of four U.S. states with a triple divide – a mountain peak that directs melting snow and rain to the Pacific, Atlantic, and Arctic Oceans. Other unique water resources include the Yellowstone River, the longest free-flowing river in the lower 48 states; Flathead Lake, the largest natural freshwater lake in the U.S. west of the Mississippi River; and the prairie pothole wetlands of the northern great plains. Montana ranks third in the conterminous United States as having the most stream miles, sixth for the highest number of lakes, and eighth for highest total lake acreage (Montana Watercourse, 1996).

Montana's surface waters sustain the wildlife the state is known for. Montana is home to 91 species of fish, 57 of which are native to the state (FWP, 2023). More than half of the bird species breeding in Montana use riparian areas as their primary nesting habitat (MT Audubon, 2011).

Rivers, lakes and wetlands also provide important economic benefits. Montana's $5.45 billion/year tourist economy relies on water quality sufficient to support boating, floating, and fishing (Weddell, 2024). Approximately 72 million acre-feet of water pass through Montana's hydroelectric facilities each year – enough water to cover the State of Nevada in a foot of water (DNRC, 2015).

Nonpoint source pollution is Montana's most pervasive threat to water quality, and it must be understood and managed effectively so that all current and future beneficial uses are supported. This section summarizes information found in the State's Integrated Report, called for under Clean Water Act sections 305(b) and 303(d) (DEQ, 2021), and describes Montana's water resources to provide context for the strategies and recommendations contained within the rest of this Nonpoint Source Management Plan.

2.1 STREAMS AND LAKES

Montana has approximately 59,400 miles of perennial streams, 307,800 miles of intermittent and ephemeral streams, 12,900 miles of ditches and canals, and 726,800 acres of lakes and reservoirs (**Table 2-1**). DEQ is responsible for protecting and addressing water quality concerns for most of the water resources listed in **Table 2-1**. EPA is responsible for working with federally recognized Tribes on nonpoint source program development, including monitoring and assessment, TMDL development, and associated restoration plans for all waters located within Tribal lands.

Table 2-1: Montana's surface waters based on high resolution (1:24,000) NHD. Montana's surface water also includes approximately 307,800 miles of intermittent and ephemeral streams and 12,900 miles of ditches and canals.

RIVER BASINS	Perennial Streams (Miles)	Lakes & Reservoirs* (Acres)
Columbia	17,300	167,900
Upper Missouri	14,800	94,900
Lower Missouri	8,900	321,200
Yellowstone	8,700	14,600
Outstanding Resource Waters	6,300	39,400
Tribal	3,400	88,800
Montana Total	**59,400**	**726,800**

** Named waters at least 5 acres in area. Size estimates of all waters derived by DEQ from 1:24,000-scale National Hydrography Dataset (NHD).*

The state has three major and two minor river basins (Montana Watercourse, 1996) (**Figure 2-1**). The three major river basins are:

- Two tributaries of the Columbia River, the Clark Fork and Kootenai Rivers, drain 26 million acre-feet of surface water from a land area totaling 25,125 square miles. This drainage area represents only 17% of the state's land area but accounts for 53% of the annual surface flow.
- The Missouri River and its tributaries drain 56% of the state, across 82,000 square miles, yet only contribute 17% of the annual surface flow (8 million acre-feet).
- The Yellowstone River drains 36,000 square miles (24% of the state) and carries 9.5 million acre-feet (21%) at its confluence with the Missouri River near the Montana–North Dakota border.

The two minor river basins are:

- The Little Missouri River, in the southeast corner of the state, drains just 2% of the land area in Montana.
- The St. Mary's River flows north toward the Arctic Ocean from Glacier National Park, draining 2% of the water from 1% of Montana's land area.

Figure 2-1: Montana's Major and Minor River Basins

These five river basins are divided into 16 major sub-basins, which are further divided into about 90 watershed planning areas. DEQ's water quality planning, protection, and restoration programs have primarily adopted a watershed approach for managing streams and lakes, meaning that an entire drainage area is assessed for the potential effects on water quality. Because few watershed boundaries fall entirely within administrative boundaries (e.g., Counties), collaboration among various public and private entities within a watershed is essential for reducing nonpoint source pollution.

2.2 WETLANDS

Montana's 2,500,000+ acres of wetlands play critical roles in protecting water quality. Wetlands are transitional lands between terrestrial and aquatic systems that have hydrologic connectivity, hydric vegetation, and/or hydric soil conditions. This transitional area can be difficult to define because water levels change and the distinction between wet and dry environments lies along a continuum (**Figure 2-2**). There are many wetland types, and wetlands can be defined as areas that are inundated or saturated by surface water or groundwater at a frequency and duration that supports a prevalence of vegetation adapted for life in saturated soils. Certain wetlands also fall under the jurisdiction of the Clean Water Act (CWA) and are afforded federal protection (i.e., "jurisdictional wetlands"). All wetlands, regardless of their jurisdictional status, perform a range of vital functions including providing aquatic habitat, flood control, groundwater recharge, and pollutant attenuation.

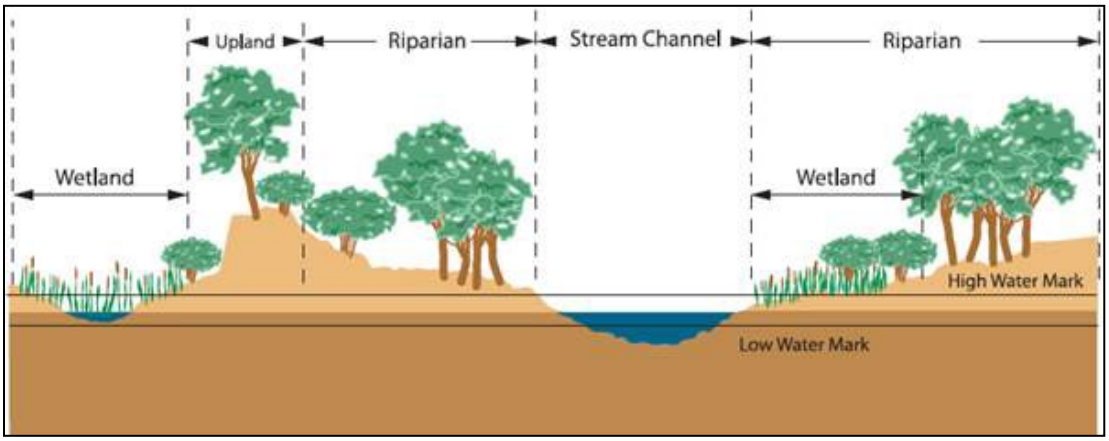


Figure 2-2: Relationship between Wetlands, Uplands, Riparian Areas, and the Stream Channel

Wetlands support, maintain, and improve the quality and quantity of water entering our streams, rivers, and lakes. Therefore, it is important to protect and restore wetlands to maintain the functions they provide in a watershed. Artificial or constructed wetlands often never achieve the same level of chemical and biological processes. Although wetlands can help process pollutants, natural wetlands should not be used intentionally as a treatment system for nonpoint source pollutants because it may negatively impact their condition and impair their ability to function properly. Artificial wetlands or constructed wetlands can be an effective tool for capturing and preventing nonpoint source pollution from entering streams, lakes, and natural wetlands; however, these constructed wetlands must be managed and maintained so that they can continue to effectively attenuate pollutants.

In Montana, the state and federal agencies involved in wetland regulatory programs are Montana DEQ, EPA, the U.S. Army Corps of Engineers (USACE) and the U.S. Natural Resources Conservation Service (NRCS) (**Section 6**). The USACE regulates dredging or placement of fill material into jurisdictional wetlands through the CWA Section 404 permitting program. DEQ is responsible for certifying that the actions permitted under CWA Section 404 will comply with state water quality standards through CWA Section 401 certification. The CWA Section 404 and 401 certification wetland permitting processes only applies to CWA jurisdictional wetlands. DEQ and EPA regulate the point source discharge of pollutants to a wetland through the Montana Pollutant Discharge Elimination System. The NRCS, through the Farm Bill "Swamp Buster" provisions, maintains the integrity of wetlands located on private agricultural lands by ensuring that all producers enrolled in Farm Bill programs comply with current wetland regulations.

2.2.1 Riparian Areas

Montana has various types of riparian areas, ranging from cottonwood galleries and willow forests to high-altitude fens. Riparian areas are typically vegetated zones along a waterbody through which energy, materials, and water pass. Riparian areas characteristically have a high water table and are subject to periodic flooding and influence from the adjacent waterbody. Not all areas within a riparian zone will necessarily have the characteristics to be classified as jurisdictional wetlands. Similar to wetlands, definitions

Riparian buffers are one of the most effective best practices for preventing nonpoint source pollution.

for riparian area can vary. For uniform identification, classification, and mapping, the U.S. Fish and Wildlife Service define riparian areas as: "plant communities contiguous to and affected by surface and subsurface hydrologic features of perennial or intermittent lotic and lentic waterbodies" (i.e., rivers, streams, and lakes, or drainage ways). Riparian areas have one or both of the following characteristics:

1. Distinctly different vegetative species than adjacent areas.
2. Species similar to adjacent areas but exhibiting more vigorous or robust growth forms.

Figure 2-3: Intact riparian area, with diverse age classes of trees and shrubs, amidst agricultural land in the Deep Creek watershed. Fencing is used to manage livestock access.

Riparian areas are usually transitional areas between waterbodies and upland habitat and perform similar functions to wetlands (e.g., pollutant filtration, bank stabilization, wildlife habitat). To maintain their function, riparian areas must be protected from loss of vegetation, over-grazing, cropping, urban development, and rip-rapping (e.g., bank and shore stabilization using rock, concrete, or rubble).

Montana established the Streamside Management Zone law in 1991, which protects riparian areas during commercial timber harvest. This law limits timber harvest within a 50- or 100-foot buffer of streams, depending on slope and stream class, to maintain intact riparian areas and adjacent wetlands.

2.2.2 Floodplains

Figure 2-4: Flooding on the Musselshell River (2011). Photo credit: Kestrel Aerial

Floodplains are the areas adjacent to streams, and sometimes lakes and reservoirs, which are subject to periodic flooding. Where extensive development has not occurred, riparian areas are typically contained within floodplains. The size of a floodplain is defined by whether it would be inundated during a flood with a given probability of occurrence. For example, a 100-year flood has a 1% chance of happening in any given year. Floodplain management can have a profound effect on nonpoint source pollution. Floodplains that are adequately

vegetated are better able to withstand the erosive forces of floodwaters. The wider the floodplain, the more easily floodwaters can dissipate energy that would otherwise erode banks and add sediment to streams.

Avoiding or removing development in floodplains is one of the most effective best practices for preventing nonpoint source pollution.

Development in a floodplain can prevent proper functioning and dissipation of excess stream energy. This can lead to excessive bank erosion and damage to infrastructure and personal property. Houses, buildings, livestock, wells, or anything located in a floodplain will one day be flooded, and their contents will contribute pollution during a flood (**Figure 2-4**).

In Montana, floodplain regulations are administered by local cities, towns and counties with support and oversight from state and federal agencies. Some of the state and federal agencies involved in floodplain management include:

- Montana Department of Natural Resources and Conservation (DNRC)
- Montana Disaster and Emergency Services (DES)
- Federal Emergency Management Agency (FEMA)
- United States Army Corps of Engineers (USACE)
- United States Geological Survey (USGS)
- Natural Resources Conservation Service (NRCS)
- NOAA/National Weather Service

At the state level, the DNRC Floodplain Management Program has statutory responsibilities to delineate and designate floodplains and provide technical assistance to local floodplain administrators. DNRC ensures communities have regulatory authority and establishes minimum state regulatory requirements. Local governments are charged with adopting land use regulations that meet or exceed the minimum federal and state standards. Local floodplain administrators implement locally adopted floodplain ordinances, which are necessary for obtaining federal flood insurance and federal financial assistance following a flood event.

2.3 GROUNDWATER

Montana's groundwater is a key source of surface water recharge, drinking water for rural domestic water supply and public water systems, irrigation for crops, and water for stock water. Groundwater is also important because it can supply sustaining baseflows to perennial streams and rivers during seasonally dry periods and throughout longer periods of drought. Montana state law defines all groundwater, regardless of its connection to surface water, as state waters (75-5-103(32), MCA).

Groundwater is stored beneath the ground surface in bodies of porous rock and sediment called aquifers. Montana's groundwater resources include alluvial aquifers and deep aquifers (**Table 2-2**).

Table 2-2: Montana's groundwater resources (adapted from Montana Watercourse, 1996)

Alluvial Aquifers	Deep Aquifers
Found in valley bottoms.	Underlying all of Montana.
Composed of stream-deposited cobbles, gravel, sand, silt, and clay.	Composed of fractured bedrock, porous stone (e.g., sandstone/siltstone), gravel, or coal.
Recharged by precipitation and streamflow.	Recharged by deep percolation of surface water.
Productivity and water level often fluctuates seasonally and in direct response to surface water management activities.	Productivity and water level may or may not be affected by seasonal changes but are nearly always affected by long-term changes in surface water management and groundwater withdrawals.
Source of most of the groundwater used by Montanans.	Important source of groundwater for some agricultural and industrial operations and for drinking water in many rural areas.
Once polluted, they are difficult, but usually not impossible, to clean up.	Once polluted, they are often impossible to clean up.

Groundwater, even in deep aquifers, is mobile. Rates of travel are highly variable, ranging from a few inches per year in deep aquifers to hundreds of feet per day in alluvial aquifers. Exchanges between groundwater and surface water systems are always occurring (**Figure 2-5**). In any typical stream, there are sections where a higher groundwater table is pushing water into the channel (called a "gaining" stream reach), and others where stream water is leaving the channel and entering groundwater (called a "losing" stream reach).

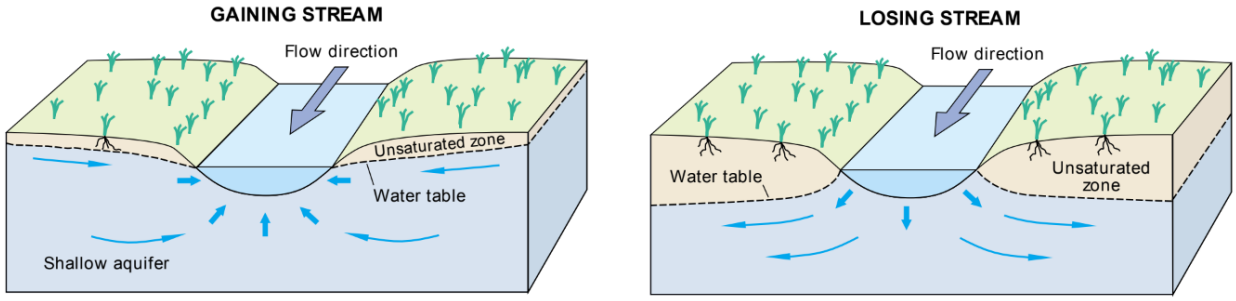


Figure 2-5: Gaining and losing stream reaches. Lakes and wetlands can also be gaining or losing (Wallace et al., 2024).

Because of this ongoing movement and exchange, nonpoint source pollution in surface water has the potential to find its way into groundwater aquifers, or vice versa. Common nonpoint sources of pollution in groundwater include:

- Improper application of fertilizer or pesticides
- Areas of livestock confinement
- Individual household septic systems
- Groundwater recharge from contaminated surface waters
- Oil, gas, and mineral extraction

However, there are many natural processes that have the potential to reduce the concentration of pollutants as water moves throughout the water cycle. These natural attenuation processes include:

- **Dilution:** addition of clean water.

- **Adsorption:** binding of pollutants to soil particles, taking them out of solution as the water as it passes through soil layers.
- **Biodegradation:** break down of pollutants by microorganisms.
- **Sedimentation:** settling of heavier pollutants in slower moving water, removing them from the water column.
- **Volatilization:** evaporation of lighter pollutants from water into the atmosphere.

Appendix D provides additional information on Montana's approach to groundwater management, including activities that protect or remediate groundwater resources and provide protection for interconnected surface waters.

3.0 MONTANA'S NONPOINT SOURCE POLLUTION CONTROL STRATEGY

Montana's primary strategy for addressing nonpoint source pollution is empowering people to take voluntary actions to protect and restore clean water through technical and financial support, facilitating partnerships, and statewide education and outreach activities that promote sustainable behaviors. Local investment in the value of water resources, often with the development and implementation of science-based, locally supported watershed restoration plans (WRPs), drives water quality improvement (**Section 1.5**). While most best practices are voluntarily implemented, there are programs that provide regulatory protection for activities that can generate nonpoint source pollution (**Section 6**). This section articulates specific strategies for addressing nonpoint source pollution and who might implement them.

Best Practices

Best practices reduce nonpoint source pollution and protect or improve water quality. Best practices can include management methods (e.g., protecting native streamside vegetation rather than mowing or cutting it down) and actual physical structures (e.g., fencing to protect native streamside vegetation from human or animal impacts). Best practices must be designed on a site-specific basis, considering factors such as the desired level of improvement, the cost and availability of materials, long-term maintenance needs, the acceptable level of risk, and the unique physical characteristics of the land and water.

Best practices are referred to as "reasonable land, soil, and water conservation practices" in ARM 17.30.702 and defined as "methods, measures, or practices that protect present and reasonably anticipated beneficial uses. These practices include structural and nonstructural controls and operation and maintenance procedures. Appropriate practices may be applied before, during, or after pollution-producing activities."

See **Appendix A** for a description of best practices supported by DEQ to address water quality for various land uses in Montana. See **Appendix C** for a list of partners and resources that may be able to provide additional information on best practices.

Section 7 presents the long-term and interim outcomes established to track progress toward meeting this goal. Further, **Section 8** lays out short-term (5-year) actions and related milestones, determined to be necessary to achieve the stated outcomes.

3.1 SPECIFIC STRATEGIES BY LAND USE

DEQ identified seven major land uses that contribute significantly to nonpoint source pollution and water quality impairment: agriculture, forestry, hydrologic modification, mining and industry, recreation, transportation, and urban and suburban development. These land uses may result in the named sources of impairment (e.g., grazing in riparian or shoreline zones) in Montana's Water Quality Integrated Reports and completed TMDL documents. Each land use is discussed in the following sections. **Section 3.2** discusses three additional stressors related to water quality and nonpoint source pollution in Montana: aquatic invasive species, pollutant loading via atmospheric deposition, and harmful algal blooms.

3.1.1 Agriculture

Farming and ranching are essential parts of Montana's culture and environment and a $4.5 billion dollar industry (USDA, 2022; **Table 3-1**). Farmers and ranchers are the primary stewards of 62% of lands in Montana, and some of the oldest farms and ranches in Montana date back to the mid-1800s. Farmers and ranchers have an intimate understanding of and need to protect soil and water resources to maintain their operations. Therefore, it is important for DEQ to understand and address key barriers preventing increased and broadscale implementation of water quality best practices.

Table 3-1: Value of sales by commodity group in 2022

Commodity Group	Value of Sales	U. S. Rank
Grains, oilseeds, dry beans, and dry peas	$1,952,925,000	17th
Cattle and Calves	$1,756,421,000	13th
Other crops and hay	$395,154,000	17th
Hogs and pigs	$98,586,000	22nd
Milk from cows	$54,100,000	38th
Vegetables, melons, potatoes and sweet potatoes	$81,850,000	35th
Sheep, goats, wool, mohair, and milk not from cows	$36,852,000	10th
Nursery, greenhouse, floriculture and sod	$46,357,000	41st
Horses, ponies, mules, burros, and donkeys	$28,097,000	13th
Fruit, tree nuts, and berries	$6,948,000	42nd
Aquaculture	$5,208,000	38th
Cultivated Christmas trees and short rotation woody crops	$222,000	41st

Montana supports voluntary implementation of projects to reduce nonpoint source pollution from agriculture-related sources. Montana also recognizes the effectiveness of water quality protection conditions in grazing leases, permits, and funding agreements. Without best practices in place, agriculture can impair state waters' ability to support human consumption, fish and wildlife production, irrigation, recreation, and industrial processing. Many best practices can improve a producer's bottom line. For example, streambank stabilization can reduce land loss from erosion; installing off-stream water provides a clean and consistent water source; and reconnecting floodplains can increase subirrigation, restore riparian pasture, and improve forage production.

Approximately 35% of Montana's impaired waterbodies (2,963 stream segments or lakes) are identified as impaired at least in part from agriculture-related activities (DEQ, 2021). Common pollutants associated with agricultural operations include sediment, nitrogen, phosphorus, salinity, and pathogens. Certain agricultural practices can also lead to significant changes in water temperature, and a loss of riparian and aquatic habitat.

Direct discharges from confined animal feeding operations are considered point source discharges and are controlled by the permit conditions issued by the MPDES program.

Pollution Reduction Strategies

Strategy 1: Protect and restore a minimum 35-foot buffer of native streamside vegetation
This practice is paramount for all streamside land uses; however, it is covered in this section because agriculture is Montana's largest streamside land use, and it often relies on stream access for livestock water. Thirty-five feet is a minimal buffer width for benefitting water. Most literature recommends well over 100 feet depending on stream size (e.g., NRCS, 2020; Ellis, 2008). However, DEQ recognizes that best practices will only be implemented if they are in balance with land use needs.

Figure 3-1: Restoration of a streamside vegetation buffer, using fencing to manage livestock access to the stream channel. Photo credit: MWCC

Buffers are best established by eliminating impacts like plowing or grazing in the streamside zone, then replanting or protecting existing native deep-rooted vegetation. In agricultural settings, fencing is generally required to manage livestock access to the stream channel. Other best practices such as off-stream water systems and hardened water crossing can support operations. After rigorous vegetation of all growth classes (i.e., seedlings, saplings, and mature growth) has been established, riparian pastures can be effectively grazed under a high-density, short-duration rotation.

Strategy 2: Build relationships and partner on projects with key agriculture organizations
NRCS, Montana Stockgrowers Association, Bureau of Land Management, and DNRC State Lands are primary partners working with the agricultural community—the community on the front lines of conservation. Regular (ideally face-to-face) coordination of projects and education programs are essential for leveraging resources to improve water quality *and* increase the productivity of farming and ranching lands. Building these relationships will help DEQ better understand the barriers of implementing best practices on agricultural lands and cooperatively change behaviors to meet water quality and production goals.

Strategy 3: Foster mentorship opportunities amongst farmers and ranchers
Land management practices that improve water quality are most likely to be adopted when they are promoted neighbor-to-neighbor or peer-to-peer. Supporting social diffusion activities, such as project tours and mentorship programs, that increase knowledge sharing amongst producers about best practice implementation and associated co-benefits to production efficiency not only improves education saliency but can also help address social and economic disadvantages associated with Montana's rural communities.

Strategy 4: Support conservation of agricultural land through permanent easements
Numerous programs exist to support conservation easements, which are broadly defined as a long-term (e.g., 30 year) or permanent agreement between a landowner and a public trust to restrict land use. NRCS's Agricultural Land Easement program, for example, transfers development rights to the easement holder in exchange for compensation. Montana Freshwater Partners' Channel Migration Easement program similarly compensates landowners who enter into agreements not to prevent natural channel

movement. These types of easements support Montana's farming and ranching culture, protect food supplies, and help prevent unsustainable residential development.

3.1.2 Forestry

Montana's forests provide valuable resources, such as wood products, fish and wildlife habitat, outdoor recreation, grazing, and aesthetic value. They also hold the headwaters for many streams and rivers that provide drinking water throughout the state and the nation. For forestry activities, the Nonpoint Source and Wetlands Section relies on regulatory and voluntary approaches.

Forest lands cover 19.8 million acres in Montana, nearly a quarter of the state's total lands. The state's largest forest-land holder is the U.S. Forest Service, followed by non-industrial private landowners (**Figure 3-2**). Most timber harvested comes from National Forests (38%). In 2018, the forest products industry contributed $364 million in labor earnings and $553 million in sales to the state's economy (Hayes *et al.*, 2021).

Pollution from forestry and silviculture operations can include nutrients, sediment, temperature, riparian habitat alterations, and flow alterations resulting from historical and ongoing activities like timber harvest, road construction, and wildfire. Almost half (48%) of all forested watersheds contain at least one impaired stream reach or waterbody (DNRC, 2010). Approximately 5% of Montana's impaired waterbodies (424 stream segments or lakes) are identified as impaired at least in part from forest roads, silviculture, and other forestry-related activities (DEQ, 2021).

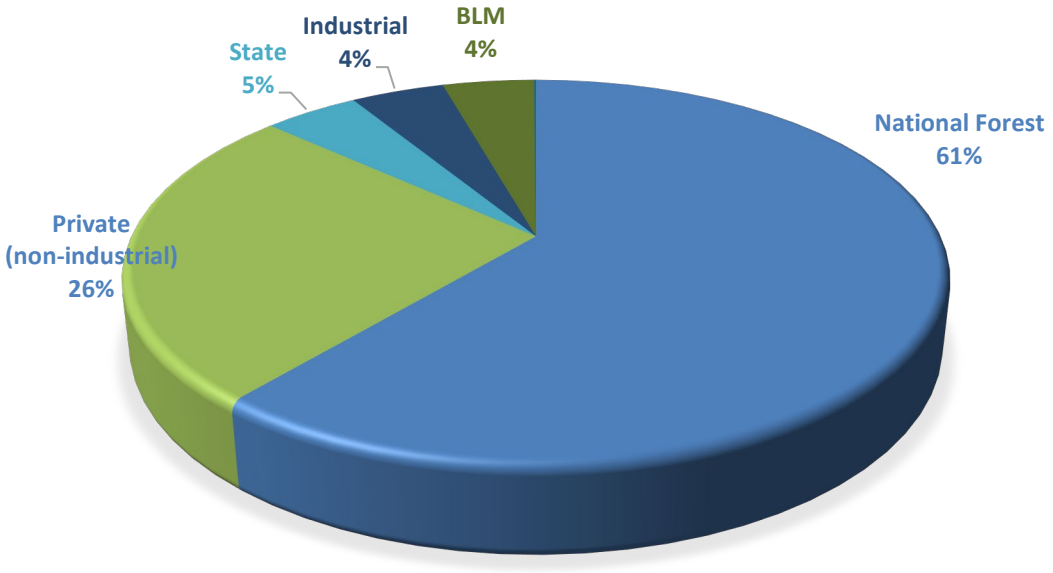


Figure 3-2: Timberland ownership in Montana in 2018 (Hayes *et al.*, 2021). The percent of acreages shown do not include federal lands unavailable for timber harvest or "reserved," such as those in National Parks, wilderness areas, or other special management areas.

Forest Road Construction and Use

Forests roads running adjacent to streams were built decades ago before modern best practices. Stream crossings and unpaved roads are the primary source of sediment in forested watersheds (Al-Chokhachy *et al*., 2016; DNRC, 2015). Additionally, they can impact the natural functioning of streams by limiting the stream's capacity to access its floodplain, creating more catastrophic flood conditions at regular occurrence intervals.

Figure 3-3: An unused forest road through a wet meadow decommissioned as part of the Upper Lolo Basin-wide Restoration Project, a partnership between the Lolo National Forest and Clark Fork Coalition. Photo credit: Clark Fork Coalition

While there is no established threshold road density that will protect water quality, guidelines for minimizing impacts include:

- Limit the road footprint to the minimum required to accommodate use
- Maintain and improve drainage features and other best practices (DNRC, 2015)
- Decommission roads made obsolete due to lack of use or the construction of new roads

Silvicultural Harvesting in Riparian Areas

Timber harvesting in riparian areas can adversely affect riparian functions, harming water quality and biological integrity. Riparian functions threatened by indiscriminate streamside harvesting include shading (affecting water temperature), large woody debris recruitment (affecting fish habitat, sediment storage, and bank stabilization), nutrient cycling, streambank stability, sediment filtration, and flood-flow attenuation. Montana's Streamside Management Zone (SMZ) law (Title 77, Chapter 5, Part 3, MCA) was passed by the 1991 State Legislature and specifically addresses the protection of these water quality functions within the streamside zones. SMZs have been effective in protecting streams from sediment, nutrient, and temperature pollution and alterations to fish populations and biomass (Pratt and Fox, 2009; Sugden *et al*., 2019; Bowker *et al*., 2020). However, the effects of historical riparian harvests may be long lasting.

Pollution Reduction Strategies

Strategy 1: Communicate and implement lessons learned from interdisciplinary review programs

The Forestry Division of Montana DNRC organizes voluntary forest practices field reviews via an interdisciplinary team that evaluates forest harvest activities of participating landowners. Since 1990, assessment teams have examined the use of forestry best practices biennially across four ownership types (state, federal, industrial, and non-industrial private landowner). Since 2000, field reviews have found that forestry best practices for new forestry operations are effectively applied around 98% of the time (DNRC, 2024; Ziesak, 2016; Sugden *et al.*, 2012). Major departures from best practice are discussed in biennial reports and communicated back to the forestry community.

The U.S. Forest Service also conducts interdisciplinary effectiveness monitoring of best practices in watersheds identified as high priority for restoration. Restoration activities typically include reducing the effects of old roads, reducing fire risk, and improving the structure and function of riparian areas.

Land managers should implement all best practices, with special attention paid to lessons learned from best practice effectiveness monitoring (DNRC, 2024).

Strategy 2: Implement best practices to restore and maintain water quality conditions
Historical forestry practices, such as poor road design and placement and riparian timber harvesting, have increased sediment loads and instream temperatures to varying degrees. Maintaining, decommissioning or relocating the streamside portions of legacy roads, minimizing stream crossings, properly locating new roads, and restoring buffers of woody streamside vegetation are best practices that land managers should implement to protect and improve water quality.

Strategy 3: Thin fuels to prevent catastrophic wildfires and associated sediment delivery
Changing precipitation regimes have created drought-stricken and dry forests. Longer, warmer growing seasons have increased the range of insect pests and frequency of their reproductive cycles, resulting in widespread tree mortality. These factors, plus decades of fire suppression have left Montana's forested landscape thick with fire fuels (Dennison *et al.*, 2014; Whitlock *et al.,* 2017; Allen *et al*., 2010). Land managers should consider fuels management, both thinning and prescribed fire, a proactive water quality protection strategy. When thinning or conifer encroachment reduction projects occur, consider using woody debris for stream bank stabilization and instream habitat improvement treatments if appropriate.

Strategy 4: Ensure private forest lands are protected with easements to maintain surface, groundwater, and drinking water quality
Protecting private forest lands with easements ensures their permanent ability to support the timber industry and fish and wildlife habitat, while continuing to provide clean groundwater or surface water for drinking water supplies and the public with recreational opportunities (Walker *et al.*, 2017).

3.1.3 Hydrologic Modification

Hydrologic modification can be defined as changes in the amount, location, timing, or energy of water in a river or lake. Hydrologic modification consists of four primary activities:

1. Storage: Examples include dams, reservoirs, fish and stock ponds.
2. Water withdrawal: For uses such as irrigating crops, stock watering, municipal water supply, and industrial applications. This can include groundwater withdrawal.
3. Transfer: Diversion of water at an upstream location and later returning flows further downstream; diversion of water from one stream and returning flow to a different stream; inter-basin transfers.
4. Physical alterations in floodplain, riparian, wetland, and channel structure: Streambank armoring; filling wetlands for development and construction; flood control dikes; road and railroad grades; bridges; dams; diversion structures; channelization; dredge/placer mining.

Dams, reservoirs, stock ponds, diversions, and other impoundments are integral to Montana's economy and way of life. This infrastructure provides water for hydroelectric power, crops and livestock, domestic water supplies, industrial applications, recreational opportunities, and flood protection. Seasonal releases below dams provide some of the highest quality fisheries in the state. Subsurface return flows and dam releases can contribute to late season base flow if the return flows are greater than concurrent water withdrawals or diversions. However, these structures and practices can have negative consequences on water quality and aquatic life by limiting flow, causing excessive flow, and/or reducing riparian vegetation. This can lead to increased bank erosion and stream incision, channel migration, water temperature, sediment deposition, and habitat loss. These structures and practices may also take resources from other communities, especially if they were not involved in development or the project or continue to be excluded from management decision.

Figure 3-4: Before (left) and after (right) the Rattlesnake Creek dam was removed to restore hydrologic regime and fish passage. Photo credit: project partners - City of Missoula and Trout Unlimited.

Approximately 8% of Montana's impaired waterbodies (652 stream segments or lakes) are identified as impaired at least in part from diversions, impoundments, and other hydrologic-related activities (DEQ, 2021). Many of these waters are also identified by Montana Fish, Wildlife and Parks as chronically dewatered (FWP, 2022). Reducing the prevalence of hydrologic modification will have profound implications for adapting changing drought and flood regimes. For example, of 160 sampled wetlands in the Musselshell River watershed, 37% showed high levels of disturbance due to hydrologic modification, and wetlands were 19 times more likely to be in poor condition if the flow of water into or out of the wetland was altered.

The 2017 Montana Climate Assessment (Whitlock *et al.*, 2017) reports that "rising temperatures will reduce snowpack, shift historical patterns of streamflow… particularly during summer and early fall." Under a changing climate, snowpack is predicted to develop later and melt earlier, causing peak runoff to come earlier in the spring. This could result in decreased stream flows and reduced groundwater levels in summer and fall (Barnett *et al.*, 2005; Halofsky *et al.*, 2018). More precipitation is predicted in the form of rain in future decades, not snow. This would also speed melting of the snowpack, increase the likelihood of winter floods, and increase severe erosion events. Periodic droughts may affect the way water is stored and used, diminishing the amount available for late summer release to maintain

flows needed for optimal stream temperatures and aquatic habitat (Halofsky *et al.*, 2018). Isaak *et al*. (2015) delineated existing and predicted cold water fishery habitat and projected a 40% decline in native western cutthroat and bull trout between 1989 and 2040 due to increased stream temperatures.

Pollution Reduction Strategies

Strategy 1: Minimize or avoid development within floodplains, along streambanks, within wetlands and adjacent to lakes

Conduct education and outreach to landowners, developers and other decision makers about the water quality impacts and property risks associated with development and other activities that alter the amount, location, timing, and energy of water in streams or lakes. Support existing regulations that help avoid or minimize this type of development. Where development is necessary, promote stream and wetland mitigation banking, channel migration easements, and other types of efforts to advance restoration and mitigation science.

Strategy 2: Restore natural hydrologic conditions

Provide financial and technical (e.g., geomorphology and flow data) resources to restore floodplain connectivity and stream function. Implementing this strategy involves promoting and applying numerous best practices that can minimize negative impacts from hydrologic modifications, including:

- Supporting resiliency efforts described in Montana's Drought Management Plan (DNRC, 2023)
- Encouraging development of long-term strategies for water use, water conservation, and water lease agreements to maintain optimal flows for desirable temperature aquatic habitat
- Promoting water diversion monitoring where water commissioners don't already fill this role
- Ensuring that Clean Water Act and other water resource improvement funding sources used toward irrigation efficiency projects result in improved instream flows
- Reconnecting rivers with their floodplains, providing space to dissipate floodwater energy and percolate into groundwater for late season storage
- Restore fish passage by removing relict dams and replacing undersized culverts with open-bottomed culverts or wide-spanning bridges. Stream crossing width should be within 10% of stream bankfull width and slope within 1% of stream grade (DNRC, 2024)
- Using "soft" bank armoring (riparian vegetation, brush-toe) and limiting the use of "hard" bank armoring (riprap, rock, and log bulwarks) to the minimum amount necessary to protect critical infrastructure
- Allowing beaver recolonization where feasible and encouraging their recolonization through the implementation of beaver dam analog projects

Strategy 3: Implement comprehensive projects that build drought and flood resiliency

Additional financial resources may be available for nonpoint source pollution reduction actions that concurrently act to build drought and flood resiliency (e.g., the Federal Emergency Management Agency's Building Resilient Infrastructure and Communities grant program).

3.1.4 Extractive Industry

Montana's extractive industry includes extraction of natural resources like hard rock minerals, coal, gravel, oil and gas; as well as the refinement and manufacturing of tangible products, from semiconductors to drill bits.

Discharges from industrial operations are controlled by the permit conditions issued by the MPDES program, DEQ's Mining Bureau, or the Board and Oil and Gas. In many cases, they must also post a bond covering liability for reclamation. Some of the state and federal "crossover" regulatory programs that address pollution from mining and industrial sources are described in **Section 6.0.**

Pollution sources from abandoned mines are not typically covered under MPDES permits, leaving control and abatement to nonregulatory programs and the efforts of various agencies and private entities. Nonpoint source pollution from abandoned mines is typically the result of one or more of the following processes:

- Acid mine drainage (when the mineral remnants of mining are left exposed to air and water)
- Direct erosion (when mine tailings are left in or near the stream channel)
- Stormwater runoff (when pollutants are carried to surface water via rain and melting snow)

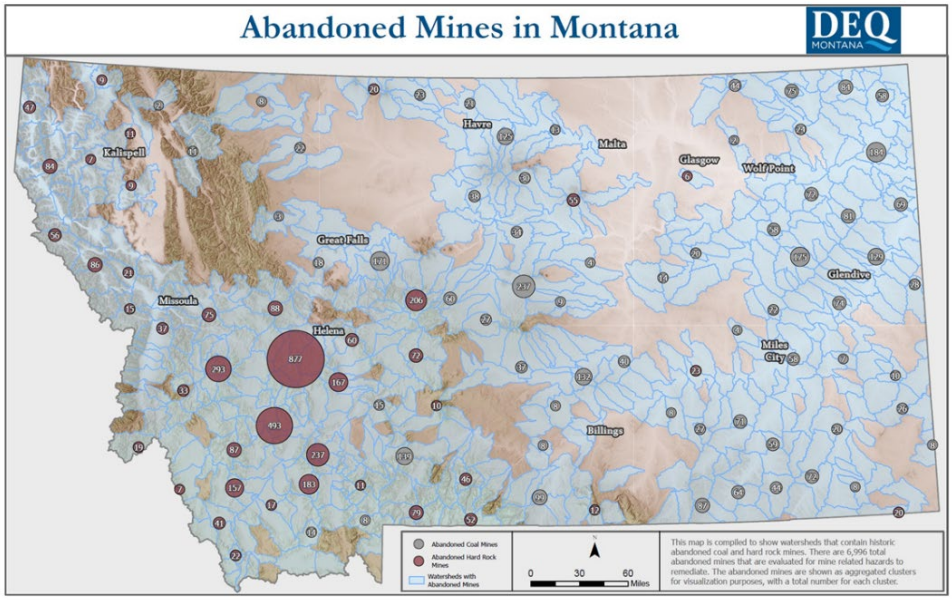


Figure 3-5: Clustered locations of Montana's abandoned mines

Inventory of abandoned mines helps to identify hazardous mine openings and their potential impacts to surface water and groundwater. DEQ's Abandoned Mines Lands (AML) Section has documented 3,155 abandoned coal sites and 3,481 historic hard rock sites impacting 544 watersheds across Montana (**Figure 3-5**).

The AML Section has addressed 713 mine issues since the passage of Surface Mining Construction Reclamation Act in 1977. Because program funding limits its use for hard rock projects, this work has focused on coal projects. The AML Section is updating their inventory to provide data on known mine hazards and their impacts, which is important to prioritize projects. The AML Section prioritizes hard rock sites with a watershed scale approach. This includes cross referencing known impairments with mine data to determine which sites have the most negative impacts to Montana waters. The AML Section maximizes their impact by collaborating with partners like DNRC, the U.S. Forest Service, the local chapters of national organizations like Trout Unlimited, and county governments. Approximately 11% of Montana's impaired waterbodies (978 stream segments or lakes) are identified as impaired at least in part from diversions, impoundments, and other hydrologic-related activities (DEQ, 2021).

Figure 3-6: The Lilly Orphan Boy Mine Reclamation Project showcases collaboration between DEQ's AML and Nonpoint Source and Wetlands Programs. Photo credit: Trout Unlimited

Pollution Reduction Strategies

Strategy 1: Leverage appropriate funds for stream remediation at historical mining sites
The federal coal tax dollars that fund the AML Section allow for stream remediation associated with coal mine operations conducted prior to August 1977. CWA Section 319 funds can cover water quality improvement projects at abandoned mine sites in cases where the project activities do not address a point source discharge and or implement a MPDES permit. AML and Nonpoint Source and Wetlands Section staff will identify and prioritize projects that will remove waste and restore stream function.

Strategy 2: Choose restoration techniques that protect streams and wetlands from mobilization of mine waste materials in areas with legacy mining and industry impacts
Stream restoration often involves work within the stream channel and riparian areas that can disturb channel substrate and riparian soils. While the Nonpoint Source and Wetlands Section generally promotes low-tech, process-based restoration for its cost effectiveness, former mining and industrial sites can require extra care and heavier-handed techniques to restore natural function while also preventing the mobilization of mine waste and other pollutants.

Stream restoration practitioners should implement all best practices, with special attention paid to lessons learned from previous projects in areas with historical mining and industrial uses.

3.1.5 Recreation

Outdoor recreation is an important and growing industry in Montana, generating over $1.6 billion in wages and salaries annually and employing over 30,000 people (BEA, 2023). This sector brings over 620,000 visitors to Montana each year, contributing 4.6% of the state's gross domestic product.

Figure 3-7: Boat wakes on the Flathead River mainstem cause wave action that contributes to shoreline erosion. Photo credit: Flathead Conservation District

Outdoor recreation commonly involves activities based in and around streams, lakes and riparian areas. Water quality issues like *E. coli* contamination and harmful algal blooms can prevent water-focused recreators from doing so safely. Intensive or inappropriate recreational activities can harm the water quality these very activities rely on. Water quality degradation can be associated with recreation in the form of aquatic invasive species transport and the release of bilge water, petroleum products and trash into state waters. Boat wakes and ingress/egress outside of designated stream and lake access areas can increase bank erosion.

Upland activities can also contribute to nonpoint source pollution. Unpaved roads on public lands can contribute sediment to headwater streams (**Section 3.1.2**). Unauthorized travel off designated roads and trails by motorized vehicles, mountain bikes or hikers can contribute to riparian damage. Golf courses can contribute to water quality impairments when nutrient-rich irrigation water finds its way to nearby streams. Less than 1% of Montana's impaired waterbodies (13 stream segments or lakes) are identified as impaired due to recreation, primarily golf courses (DEQ, 2021).

Pollution Reduction Strategies

Figure 3-8: Fencing along the Blackfoot River directs recreationists to one river access point, which is stabilized by step structures out of view.

Strategy 1: Redirect unnecessary or redundant recreational trails away from sensitive lands
Where stream and riparian crossings are necessary, minimize water quality impacts by properly siting and designing trails that concentrate users and prevents excessive vegetation trampling and bank erosion (**Figure 3-8**). Work with decision makers on public lands to identify and implement appropriate projects. Conduct education outreach to landowners and managers about the water quality impacts associated with development of recreational trails in and through streams and wetlands. Support policies that help prevent or minimize this type of trail development.

Strategy 2: Direct boat and vehicle traffic to streams and lakes through properly designed and designated access areas
Work with agencies that manage the land surrounding streams and lakes (e.g., FWP, USFS, BLM) to design boat launches, picnic areas, and campsites with an intent to reduce erosion and improve disposal of trash and human waste. Responsible OHV use can be promoted through educational campaigns, materials, and signage.

Strategy 3: Educate and engage the recreation community about responsible water-based recreation
Promote recreationists as important stewards of Montana's water resources. Activities under this strategy could include:

- Create and disseminate consistent statewide messaging to ensure the recreation community understands their potential impacts to and role in protecting water quality
- Engage the fishing and waterfowl hunting communities in stream and wetland restoration and habitat improvement projects
- Educate golfers and golf course managers about the connections between golf course management and water quality

3.1.6 Transportation

The Montana Department of Transportation (MDT) and counties are the primary agencies that deal with transportation issues in Montana. MDT has maintenance responsibilities for 12,916 miles of roadway and 4,996 bridges statewide; local governments maintain additional roads and bridges. Montana has approximately 3,135 miles of active railroad track owned and operated primarily by BNSF Railway, 125 public-use airports, and another 175 private-use airports. Transportation is a significant source of jobs and economic development in local communities. Transportation construction and maintenance projects employ approximately 16,000 people every year. Between 2018 and 2028, MDT awarded 366 construction projects totaling over $1.4 billon (MDT, 2022).

Many of the transportation routes in Montana are in floodplains adjacent to lakes, wetlands, rivers, and streams. Approximately 4% of Montana's impaired waterbodies (311 stream segments or lakes) are identified as impaired at least in part from highways, roads, bridges, and other transportation

infrastructure (DEQ, 2021). If not properly managed, transportation routes (e.g., roads, highways, railroads) can be a significant source of nonpoint source pollution, especially where bridges cross water. Litter from vehicles, oils and gasoline, pesticides, and traction sand and road salt all accumulate in transportation corridors, potentially ending up in surface waters. In 2022, MDT crews applied 159,250 cubic yards of sand (25,079 less than the prior year's reporting) and 6,387,454 gallons of chemical de-icer (1,554,425 less than the prior year's reporting; MDT, 2022). Transportation routes alongside streams and rivers can further limit lateral migration and floodplain function, affecting sediment transport and increasing bank erosion.

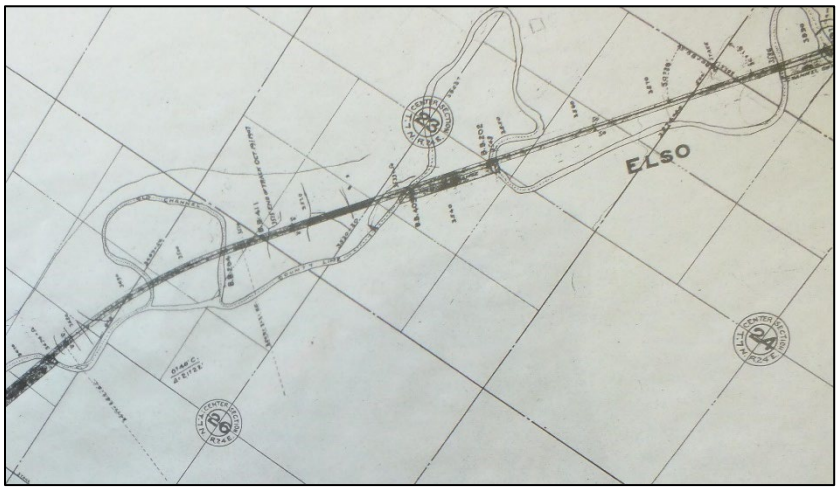


Figure 3-9: Map shows a small portion of the Musselshell River and the historic meanders that were cut off by the Milwaukee Railroad. Photo credit: Lower Musselshell Conservation District

Pollution Reduction Strategies

Strategy 1: Communicate and collaborate on projects that reduce nonpoint source pollution from transportation sources

DEQ and other natural resource organizations should provide comment during MDT and county project scoping to increase awareness of nonpoint source pollution and best practices. DEQ will support partners implementing projects than reduce nonpoint source pollution from transportation networks, such as relocating or removing roads and relict railroads immediately adjacent to streams and improving poorly designed culverts and bridges. These types of projects are increasingly critical for infrastructure investments and water quality as Montana experiences greater frequency and intensity of floodwaters.

Strategy 2: Increase nonpoint source pollution awareness for road maintenance personnel

Road maintenance personnel can have the biggest effect on transportation-related sources of nonpoint source pollution. DEQ will support training road maintenance personnel and work to raise awareness about their roles in preventing nonpoint source pollution. Specifically, DEQ promotes:

- Calibration of equipment and site-specific research to ensure that the correct quantities of sand and chemical deicers are used to provide safe roadways for traveling
- Implementation of stormwater best practices on transportation construction sites to reduce sediment delivery to waterways

3.1.7 Urban and Suburban Development

Montana's population reached 1,084,225 in the 2020 census—a population increase of 9.6% since 2010. About 55% of people live in urban areas. Higher population densities result in higher concentrations of pollutants in waters draining from these areas. Water quality protection can be challenging in more densely populated urban and suburban areas because it often relies on the collective actions of a greater number of people in areas with relatively more intensive land use. For example, individual homeowners may use higher volumes of pesticides and fertilizers per acre than business-minded farmers.

Higher percentages of impervious surfaces in these areas can also alter hydrology. Water that would otherwise infiltrate soils, providing moisture for vegetation and recharging groundwater, is quickly routed to waterbodies after snowmelt or rain events. This altered hydrology can have consequences for local aquatic and riparian habitats, and it increases the risk of property damage from flooding and eroding streambanks.

Although complete elimination of urban and suburban nonpoint source pollution is impossible, Montanans should work to ensure that preventable pollution does not contribute to water quality impairments**.** Nonpoint pollution from urban and suburban sources is generated by a broad range of activities associated with domestic, municipal, industrial, and commercial land uses, including stormwater runoff, waste disposal, and alteration of riparian areas. Approximately 3% of Montana's impaired waterbodies (226 stream segments or lakes) are identified as impaired at least in part from urban and suburban development (DEQ, 2021).

Figure 3-9: The City of Missoula is one example of an MS4.

Stormwater

Snowmelt and rainfall that does not infiltrate into the ground runs off the landscape as stormwater. In urban areas, where a large portion of land is covered with impervious surfaces (e.g., streets, parking lots, roofs), stormwater pollutant concentrations increase and contribute to waterbody impairments. Urban stormwater pollutants include nutrients (e.g., fertilizers), sediment, increased water temperature,

oil and grease, polychlorinated biphenyls (PCBs), metals, and pathogens. Polluted stormwater can harm aquatic organisms and their habitat, contaminate drinking water supplies, and render waterbodies unfit for recreational activities.

Figure 3-10: Impervious surfaces such as asphalt prevent rain and snow from infiltrating through soils and into groundwater. Instead, precipitation runs off over the land, picking up pollutants along the way. Storm drains offer some level of treatment before discharging the runoff as surface water.

DEQ issues MPDES general permits for stormwater discharges associated with small municipal separate storm sewer systems (small MS4s), construction activity, and industrial activity. MS4 permits apply to jurisdictions defined in ARM 17.30.1102(23). Most municipalities in Montana do not require MS4 permit coverage and stormwater from their municipal boundaries are considered nonpoint source pollution.

The MS4 permit requires permittees to develop a stormwater management program that includes six minimum control measures: (1 and 2) public education and participation, (3) illicit discharge detection and elimination, (4 and 5) management of construction and post-construction site run off, and (6) good housekeeping. Permittees must then implement best practices consistent with these control measure to ensure that the discharge of pollutants to waterbodies from stormwater is reduced "to the maximum extent practicable." Additional voluntary practices can be implemented by urban residents in permitted areas to reduce stormwater pollution, such as reducing lawn fertilization and pesticide use; maintaining riparian buffers between lawns and ditches, streams, lakes, and wetlands; and cleaning up pet waste.

Waste Disposal

Residential and commercial waste comes from a variety of sources, including pet waste, solid waste disposed in landfills, and septic systems.

Regulations put in place in the 1960s subject new septic systems to size, location, and treatment requirements. Old systems installed prior to these regulations are of concern, especially since they have likely met the end of their lifespan. Additionally, one an approved system is underground, there is typically little oversight regarding how they are maintained unless local governments adopt and enforce policy.

Figure 3-11: High nutrient levels in lakes and streams can contribute to excessive or harmful algal blooms.

A properly functioning and sited septic system will effectively treat pathogens, and the surrounding soils will have enough capacity to attenuate nutrients released. If septic systems are undersized or improperly sited, there may be insufficient treatment capacity between the drainfield and surface water. Attenuation of nutrients

occurs as the effluent migrates through soils and groundwater to surface water (**Section 2.3**). A properly designed and approved septic system should be installed as far away from surface water as possible, but at least 100 feet (Regensberger, 2014). Not only is a properly designed and functioning septic systems important for environmental and drinking water quality, it also ensures septage won't back up into the home or yard (Boer, 2002; Suplee & Watson, 2013).

Very little is known about the effectiveness of septic systems in treating PPCPs, and treatment is likely compound specific. However, many studies from across the country, including Montana, have detected PPCPs in groundwater and surface water (e.g., Miller and Meek, 2006). Maximum contaminant levels for individual PPCPs, as well as the synergistic effects of PPCPs, have not been documented.

Landfills, particularly older unpermitted and unlined facilities, pose a threat to water quality because of carcinogenic and toxic substances that may leach into aquifers or surface waters. For example, bisphenol-A (BPA) and plastics, which can be toxic and/or carcinogenic, have been found in groundwater leachate across the nation (Masoner, *et al*., 2016). As of 2025, there were 89 licensed landfills in Montana. This number includes 25 Class III facilities that are not lined because they only accept inert materials such as rock, brick, and untreated lumber.

Alteration of Urban and Suburban Riparian and Wetland Areas

Riparian and wetland systems provide a variety of important services in water quality protection. Their diverse plant communities filter sediment, nutrients, bacteria, and other pollutants out of the water. Dense root systems stabilize soils, preventing erosion and property loss. Streamside vegetation slows water as it flows through, which encourages percolation into groundwater and water storage to support late, cool summer stream flows.

Three types of alteration to urban and suburban riparian areas that are of greatest concern include:

1. The alteration of native vegetation, soils, and/or hydrology of riparian and wetland areas.
2. Residential and commercial development within riparian and wetland areas, floodplains, and channel migration zones.
3. The cumulative effects on watersheds by heavy riparian area usage from domesticated animals on suburban small acreages.

Pollution Reduction Strategies

Strategy 1: Work collaboratively with regulatory and non-regulatory programs to protect water quality from stormwater pollution

For rural communities managing stormwater, the Nonpoint Source and Wetlands Section can provide technical and financial support. For urban areas, CWA Section 319 funds cannot be used to address pollution sources regulated by MPDES permits. The Nonpoint Source and Wetlands Section encourages municipalities and regulated industries to seek State Revolving Fund loans or other eligible grants.

Figure 3-12: An example of poor stormwater management.

Since stormwater-related discharges from MS4s are point sources and are adequately controlled if the permittee is in compliance with the conditions of their permit, it is the policy of DEQ that state and federal funds administered through grants for the purpose of preventing nonpoint source pollution shall not be used to fund projects that address point source discharges. DEQ is aware that current EPA guidelines allow states to use CWA Section 319 grant funds to address point source discharges that go "above and beyond" the conditions of an MS4 discharge permit. However, applicants to the CWA Section 319 grant program express a lack of clarity about what constitutes "above and beyond" MS4 permit requirements. Additionally, MS4s, unlike most nonpoint sources of pollution, can raise money through their tax base if they decide they would like to treat stormwater to a condition beyond what is required to achieve and maintain water quality standards.

To ensure that the limited funds available for addressing nonpoint source pollution continue to be available to address nonpoint source pollution, and to provide clarity and certainty for potential funding applicants, DEQ is adopting the following eligibility requirements for using CWA Section 319 and other nonpoint source funds for projects within MS4 permit boundaries.

- Projects physically located within a municipal separate stormwater sewer are not eligible for nonpoint source funding. This includes all projects within a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that discharges to surface waters.
- Projects, including on-the-ground projects, education and outreach activities, management practices and monitoring efforts designed to reduce or prevent stormwater from reaching or leaving a municipal separate stormwater sewer, are not eligible for nonpoint source funding.
- Neither of these eligibility criteria should be construed as preventing the funding of projects that address non-stormwater related sources and causes of impairment. For example, activities that address a loss of riparian habitat or discharges from septic systems.

Strategy 2: Maintain and improve programs that address residential septic systems, solid waste disposal, land-applied bio-solids, and hazardous household wastes

Proper disposal of residential waste is essential to protect human health and water quality. DEQ will continue to assess contributions of septic systems to surface water quality impairments by developing mapping tools and TMDLs that quantify pollutant loading from septic systems. Multiple funding programs (see mtconservationmenu.org) can provide technical and financial assistance for projects that focus on reducing septic systems that impact water quality through upgrades or municipal sewer connection for residential systems. Septic systems farther than 500 feet from surface water are unlikely to affect surface water quality. Additionally, simply replacing conventional septic systems near surface water will not address the water quality issue; upgrades or municipal sewer connections are required to improve water quality (Regensburger, 2014).

Strategy 3: Encourage the adoption of local regulations that protect the functions of floodplains, riparian, and wetland areas to address the cumulative effects of nonpoint source pollution from urban and suburban development on water quality
DEQ supports local organizations participating in their county planning process, which can inform or mandate lower impact development in these areas. Updated channel migration zone maps are an important educational and decision-making tool in this effort.

Strategy 4: Participate in programs that teach proper application of fertilizer and pesticides
While fertilizers and pesticides are also used in rural and non-urban environments, these products are suspected to be applied more than necessary in residential or municipal settings. In residential and municipal settings, fertilizers and pesticides are often used to support aesthetics—contrasted with agricultural lands where profit margins are top of mind.

The Montana Department of Agriculture, MSU Extension, UM's Flathead Biological Station and DEQ implement programs for preventing, monitoring, and remediating pesticide pollution in groundwater and surface water. The Department of Agriculture and MSU Extension reviews pesticide registrations, trains and licenses applicators and dealers, provides technical and compliance assistance to applicators and landowners (using enforcement authority when necessary), and hosts waste disposal and pesticide container recycling events. The Department of Agriculture monitors groundwater throughout the state, and UM's Flathead Biological Station monitors surface water throughout the Columbia River basin, to detect and quantify contamination from pesticides. DEQ develops and maintains water quality standards for individual pesticides, provides oversight and remediation of sites known to be contaminated with pesticides, and issues the Pesticide General Permit.

Strategy 5: Coordinate hazard mitigation planning with watershed restoration planning
Urban and suburban land use have exacerbated the effects of drought and flood on a watershed scale. By straightening streams to protect urban and suburban infrastructure, floodwaters do not dissipate over floodplains and recharge groundwater. By growing impervious surface coverage in urban and suburban areas, precipitation cannot soak through soils before reaching groundwater. The Montana Department of Emergency Services provides funding for hazard mitigation that can support nonpoint source pollution reduction projects. To be eligible, projects must implement the Multi-Hazard Mitigation Plan (Department of Military Affairs, 2023). WRPs should include projects that include the co-benefit of hazard mitigation.

3.2 OTHER WATER QUALITY CONCERNS

Aquatic invasive species (AIS), atmospheric deposition, and harmful algal blooms can have negative effects on Montana's waterbodies and efforts to control the impacts of nonpoint source pollution. These water quality threats are often generated outside of the state, and even country, and therefore are difficult to control. Nevertheless, Montana has strategies for reducing some of the potential contributing sources and water quality effects.

3.2.1 Aquatic Invasive Species

AIS are organisms that invade aquatic ecosystems beyond their historical range and pose a threat to the environment and economic way of life. These species include non-native fish, mussels, clams, plants, and disease-causing pathogens.

AIS can overwhelm lakes, rivers and wetlands, kill or displace native animals and plants, and damage the ecosystems that keep waters clean and abundant. They can damage boats and gear, clog water pipes and hydropower facilities, obstruct community water sources, and constrict irrigation systems. AIS can impact aquatic life beneficial uses of surface waters and contribute to nonpoint source pollution by altering sediment transport dynamics. Once an invasive species is established, it can be extremely costly or logistically impossible to eradicate. Every water user in the state has an interest in protecting Montana's water resources from the effects of AIS.

Several state agencies collectively implement the Montana AIS Management Plan. The goal of this plan is to minimize the harmful impacts of AIS by limiting or preventing the spread of AIS into, within, and out of Montana. This goal is achieved through prevention of new AIS introductions, early detection and monitoring, control and eradication of new and established AIS populations, and outreach and education efforts. This includes coordination among relevant agencies and stakeholder groups, including the Nonpoint Source and Wetlands Section. This coordination benefits both programs by increasing stakeholder awareness of actions they can take to control both AIS and nonpoint source pollution.

3.2.2 Atmospheric Contributions

Atmospheric contributions of pollutants like mercury and other metals, nutrients, PCBs, PFAS (per- and polyfluoroalkyl substances) and other chemicals are identified as a primary category of nonpoint source pollution in Montana's 2020 Water Quality Integrated Report (DEQ, 2021). Large forest fires can contribute significant amounts of particulates and nutrients over landscapes via smoke, precipitation, and deposition. Mercury is widespread in the environment and low concentrations naturally occur in soils. Geological deposits and emissions from industry such as coal-fired power plants have led to elevated levels of mercury in fish in many areas of Montana. Information regarding mercury- and PCB-contaminated fish populations can be found in the Montana Sport Fish Consumption Guidelines published by FWP.

Controlling atmospheric deposition requires coordination among state, regional, national, and international agencies because sources may be far removed from affected waters. Given the resource constraints of the Nonpoint Source and Wetlands Section, and the large-scale, often distant nature of atmospheric pollution sources, DEQ has not prioritized actions to address this source. Montana's nonpoint source pollution control strategy for atmospheric deposition is to:

- Restore landscapes impacted by historical smelting operations
- Collaborate with DEQ's Air Quality Bureau to identify atmospheric nonpoint source pollution in Montana and recommend actions to reduce sources if feasible
- Promote EPA's nation-wide air quality monitoring efforts, which include long-term monitoring sites in Montana

3.2.3 Harmful Algal Blooms

Nonpoint source pollution and extreme weather events can create hazardous living conditions, economic hardship, and human health impacts. For example, toxic blooms of cyanobacteria (also known as HABs or harmful algal blooms) are increasing in frequency, duration, distribution, and toxicity worldwide (Smucker *et al*., 2021). These blooms are caused by longer growing seasons, hotter days, nutrient pollution, and increased residence time in reservoirs during drought conditions. It is difficult to predict when toxin production will occur. Water quality testing is required to evaluate the human and animal health risk, and HAB conditions can change rapidly. The Nonpoint Source and Wetlands Section

leads the Montana State HAB Program and efforts to increase public awareness of the health risks associated with HABs and actions that can be taken to help reduce their prevalence.

4.0 ENGAGING MONTANANS IN ADDRESSING NONPOINT SOURCE POLLUTION

Nonpoint source pollution in Montana is a statewide issue that can adversely and significantly impact the water quality of streams, lakes, and wetlands. Due to the voluntary nature of many nonpoint source pollution reduction and prevention practices, education and outreach efforts are essential to:

- Raise awareness about nonpoint source pollution, its sources and effects, and actions that can be taken throughout a watershed to improve water quality
- Foster actions and sustainable behavior changes that protect and restore water quality from the effects of nonpoint source pollution

In Montana, nonpoint source pollution education and outreach is conducted by a broad network of partners, including conservation districts, local and regional watershed groups, water quality districts, nonprofit organizations, tribal communities, state and federal agencies, universities, schools, community members and landowners. Partner efforts and collaboration are essential for addressing water quality issues at local, regional and state levels. DEQ works directly with local partners as well as state and regional groups, including the Montana Watershed Coordination Council, Montana Association of Conservation Districts, MSU Extension Water Quality, and the Western Montana Conservation Commission.

This Nonpoint Source Management Plan focuses on statewide education and outreach messaging and actions to address nonpoint source pollution. DEQ supports easily understood, action-inspiring, and locally driven education and outreach efforts that incorporate key statewide messaging with local priorities, needs, and messages. Integral to education and outreach efforts are learning what barriers stand in the way for stakeholders to take action, and to raise awareness of the benefits they experience when they do.

4.1 TARGET AUDIENCES

Education and outreach messaging and efforts are most effective when tailored to specific audiences:

- Landowners: Those who live on or manage land near waterbodies who implement best management practices can have the largest impact on improving water quality.
- Watershed Groups, Conservation Districts and Water Professionals: Those who manage, promote, or influence water resources (e.g., professionals from watershed groups, nonprofit organizations, federal and state agencies, Tribes, and universities). These groups usually have direct and local connections to landowners, stakeholders and citizens in their communities.
- Politicians, Legislators, and Local Governments: Those who have a direct impact on regulations and funding that can impact nonpoint source pollution.
- Public: Those who are directly use water resources or engage in activities that can impact water resources (e.g., recreationists, tourists, real estate agents, outfitters, small miners, and special interests).
- Education Audiences: K-12 or college students who can learn and share information with others, have the potential to influence other audiences, and can research outstanding questions to help address nonpoint source pollution.

DEQ uses and supports credible water quality science geared towards different audiences and recognizes the need to work with partners to ensure information is relevant to local social and economic needs.

4.2 KEY MESSAGES

Scientific, social, and economic factors influence how Montana's water resources are used and valued by different audiences. Messages should be tailored to address the values or concerns of a target audience. For example, some audiences may value water resources as a source of biological diversity or clean drinking water, some may depend on water resources for their economic livelihood, while others may view them as sources for recreation opportunities.

Key messages about nonpoint source pollution:

- Nonpoint source pollution is the largest overall contributor of pollutants to Montana's lakes and streams.
- Common nonpoint source pollutants include sediment, nutrients (nitrogen and phosphorus), temperature, metals, pesticides, pathogens, and salinity.
- Nonpoint source pollution comes from diffuse sources including agriculture, forestry, hydrologic modification, mining and industry, recreation, transportation, and urban and suburban development.
- Nonpoint source pollution can enter lakes, rivers and wetlands via surface runoff from rain or snowmelt, or via subsurface flows.
- Nonpoint source pollution occurs when runoff water moves over and through the ground, moving sediment, nutrients, metals, pesticides, pathogens, petroleum products, and salts into wetlands, streams, lakes, and groundwater.
- Nonpoint source pollution can harm aquatic life, recreation, agriculture, industry, and human health.
- Nonpoint source pollution reduction activities and projects can have co-benefits of improving wildlife habitat, lessening flood damage, reducing land loss, increasing groundwater storage and mitigating drought, improving crop and forage production, building climate resiliency, and enhancing recreation opportunities.
- Everyone plays a role in reducing and preventing nonpoint source pollution.
- Best practices and everyday individual actions can reduce nonpoint source pollution. Best practices and actions make a difference—collectively they add up.
- Common best practices include:
    - Riparian buffers
    - Riparian fencing and grazing management
    - Stream and wetland restoration
    - Erosion control practices
    - Stormwater management practices

Best practices should be identified and prioritized by land use, pollutant source, and overall effect. **Appendix A** includes a detailed table of DEQ-approved best practices and additional information. Watershed restoration plans and community-based social marketing concepts can help identify and prioritize best practices to locally focus on to maximize effectiveness (McKenzie-Mohr, 2011).

4.3 OBJECTIVES AND STRATEGIES

Objective 1: Raise awareness about nonpoint source pollution, effects on water quality, and actions that can be taken to address nonpoint source pollution

Strategies

- Provide topic-specific nonpoint source pollution resources and materials for the public and partners to access (e.g., factsheets, videos, web content, social media posts). Resources may be DEQ-produced or shared from partners. Example topics include:
    - Riparian vegetation and buffers
    - Lawn maintenance, fertilizers, pesticides
    - Stormwater runoff
    - Nutrients, nutrient impacts, Harmful Algal Blooms
    - Livestock fencing and grazing practices
    - Septic systems
    - Wetland functions and benefits
- Support and participate in presentations, workshops, trainings, watershed tours, watershed festivals, and other activities to increase general awareness of nonpoint source issues.
- Support and participate in youth educational events and programs to increase awareness of nonpoint source issues.
- Table at conferences and events with nonpoint source materials and hands-on activities.
- Use social media platforms and multi-media applications to promote nonpoint source messages and educational campaigns. Develop and support riparian buffer and wetland education campaigns.
- Support locally led education and outreach efforts through annual CWA Section 319 education outreach project grants.
- Coordinate and maintain a recreation advisory program for harmful algal blooms that educates the public about HAB causes, prevention, health risks and advisories.
- Partner with agencies to provide and support nonpoint source-related trainings (e.g., MDT, DNRC forestry, DEQ stormwater).
- Promote and encourage best practices, especially best practices chosen to maximize effectiveness and prioritized using community-based social marketing concepts.
- Showcase success stories.

Objective 2: Foster sustainable actions and behavior changes that protect and restore water quality from the harmful effects of nonpoint source pollution

Information and education strategies are essential for raising awareness and changing public attitudes. Sustainable actions and behavior changes, however, are not typically achieved through providing information and education. Social science research continues to find that behavior changes are more often achieved through community level initiatives that focus on removing barriers to an activity and promoting the activity's benefits (McKenzie-Mohr, 2011).

Strategies

DEQ will implement and support other organizations in:

- The use of community-based social marketing concepts to prioritize best practices (statewide and locally) that will reduce and prevent nonpoint source pollution.

- The use of data, research, and observations to identify the barriers and benefits of implementing the selected best practices and behaviors. Understanding the actual barriers and benefits for a particular target audience to implement a best practice or behavior is a critical step in developing effective strategies.
- The development and piloting of strategies that overcome barriers and promote benefits of the best practices and behaviors.
- Needed revision of strategies and the large-scale implementation of successful pilots.

Specific education and outreach milestones can be found in **Section 8**.

5.0 WORKING PARTNERSHIPS

5.1 COORDINATING WITH AGENCIES AND ORGANIZATIONS

Montana's Nonpoint Source and Wetlands Section relies on active partnerships with agencies and local organizations that work to protect and restore watersheds and water quality in Montana. **Section 8** and **Appendix C** provide an overview of each partner organization and their role in meeting the goal of this Nonpoint Source Management Plan. These organizations include federal, state, local, and tribal agencies; universities; nonprofit organizations; private companies; and other entities that contribute to the stewardship of watersheds and water quality in Montana. Conservation districts, water quality districts, watershed groups, and other local organizations are best attuned to local issues and have better saliency to educate citizens and implement projects in their areas. The purpose of **Appendix C** is to develop awareness of the opportunities that can lead to voluntary water quality improvement projects. The inclusion of an organization does not imply a requirement on the part of the collaborating entity.

Nonpoint Source and Wetlands Section staff play a critical role in facilitating interagency and partner organization outreach, communication, and coordination. Most staff have liaison duties that provide essential representation for the Section. As examples, several staff currently serve or have served in a leadership role with Montana Watershed Coordination Council and the Montana chapter of the American Water Resources Association.

5.2 FUNDING AND RESOURCES FOR NPS MANAGEMENT PLAN IMPLEMENTATION

A primary funding source for implementing this Nonpoint Source Management Plan is CWA Section 319 federal funding, which Congress provides to DEQ for program development and project implementation. This federal funding requires a 40% non-federal match. Match for CWA Section 319 program funds used by DEQ for staff support comes from Montana's general fund allocations to the Water Quality Planning Bureau. Additionally, external CWA Section 319-funded projects are required to provide a 40% local match to these federal funds. CWA Section 319 project funding for nonpoint source control activities are summarized in annual reports located at https://deq.mt.gov/water/Programs/nonpoint.

Other EPA and DEQ agency funds are instrumental in funding activities that reduce nonpoint source pollution under the authority of the CWA and Safe Drinking Water Act. These include federally funded CWA Sections 104, 106, and 604, Wetland Program Development, and Overflow Sewer Grant programs, and Montana's general fund support.

In Montana there are many other funding sources, in addition to CWA Section 319 grants, available to address nonpoint source pollution. The Montana Conservation Menu (mtconservationmenu.org) contains information on funding available for nonpoint source pollution management.

As discussed in the **Introduction** and in **Section 3**, the Nonpoint Source and Wetlands Section relies heavily upon other federal, state, and local entities to implement this Nonpoint Source Management Plan. Primary partners include those who manage state and federal public lands (e.g., Bureau of Land Management, Forest Service, and DNRC); those whose mission, goals and resources overlap with DEQ (e.g., DNRC, FWP, NRCS, MACD, MWCC); and those who have salience with private landowners (e.g., watershed groups and conservation districts). It is important to note that despite this reliance, the Nonpoint Source and Wetlands Section does not have authority over the organizations or the funds they manage.

6.0 ENFORCEABLE REGULATORY PROGRAMS

As directed in the Montana Water Quality Act, DEQ supports "a voluntary program of reasonable land, soil, and water conservation practices to achieve compliance with water quality standards for nonpoint source activities for water bodies that are subject to a TMDL" (75-5-703, MCA). However, state, local, and federal laws include some exceptions to the state's voluntary approach. Existing regulatory programs for controlling nonpoint source pollution are described below.

6.1 GENERAL PROHIBITION AGAINST CAUSING POLLUTION

Montana's water pollution control law includes some provisions that may be used to take enforcement action against nonpoint source pollution discharges. A general provision prohibits discharges or placement of wastes that cause pollution, including pollution from nonpoint sources (75-5-605, MCA). The law makes it illegal to "cause pollution ... of any state waters or to place or cause to be placed any wastes where they will cause pollution of any state waters." "Pollution" is defined broadly and clearly includes pollution from nonpoint sources.

6.2 OTHER REGULATORY PROGRAMS

Numerous local, state, and federal regulatory programs reduce, eliminate, or prevent nonpoint source pollution. The following is a summary of these programs. A more in-depth discussion of many of these programs can be found on the Montana Department of Natural Resources and Conservation (DNRC) Stream Permitting website (https://dnrc.mt.gov/licenses-and-permits/stream-permitting/) or in DNRC's *Montana Stream Permitting: A Guide for Conservation District Supervisors and Others*, available for download at https://dnrc.mt.gov/_docs/permits-services/StreamPermittingBinderBook2020.pdf.

Agricultural Chemical Ground Water Protection Act
Title 80, Chapter 15, MCA
Monitoring and assessment of pesticide discharges to groundwater; development and implementation of water quality standards for specific pesticides; development and implementation of site-specific management plans to mitigate existing impacts of agricultural chemicals found in groundwater.

Clean Water Act §404 Permit Program and §401 Certification
Federal Clean Water Act, §404 and §401
Permit requirements for discharge of dredged or fill material into waters of the United States, including jurisdictional wetlands. Permit conditions are generally designed to prevent, minimize, or mitigate adverse impacts to navigation, public health and safety, and the environment. Through the §401 certification program, the State of Montana may certify, condition, or deny §404 permit authorizations in order to prevent violations of state water quality standards.

Coal and Uranium Mine Reclamation Program
Title 82, Chapter 4, Part 2, MCA
Permit required for all coal and uranium mining operations. Permit conditions include requirements for reclamation of mined areas and restoration of impacted water resources. Permitting and compliance is conducted by DEQ, in partnership with the U.S. Department of the Interior's Office of Surface Mining Reclamation and Enforcement.

Conservation District Law
Title 76, Chapter 15, MCA
Conservation districts may adopt land use regulations in the interest of conserving soil and water resources and preventing and controlling erosion, subject to approval by referendum.

Good Samaritan Remediation of Abandoned Hardrock Mines Act
This federal Act enables Good Samaritans to remediate abandoned hard rock mine sites by applying to obtain investigative and/or remediation permits and implement remediation projects at eligible abandoned hard rock mine sites. The Good Samaritan is shielded from certain liability risks while voluntarily implementing the remediation of an abandoned hard rock mine within the terms of their permit.

Hazardous Waste Act
Title 75, Chapter 10, Part 4, MCA
Montana uses authority under this act to provide technical assistance and regulate hazardous waste and used oil handling through registration, permitting, inspections and facility-wide corrective action. The program also supports recycling and other waste reduction activities.

Lakeshore Protection Permit Program
Title 75, Chapter 7, Part 2, MCA
Permit requirement for any project that will “alter or diminish the course, current, or cross-sectional area of a lake or its lakeshore.” Permits are issued by a board of county commissioners or the governing authority of a city or town according to state statute and local regulations. The purpose of the permit program is to conserve and protect lakes, and maintain public health, welfare, and safety.

Local Water Quality District Law
Title 7, Chapter 13, Part 45, MCA
Allows for the creation of local water quality districts "to protect, preserve, and improve the quality of surface water and ground water." County commissions and/or city councils may establish such districts, whose directors can then develop a local water quality program that is implemented through local ordinances. Specific focuses of the programs developed by the districts include onsite wastewater disposal, stormwater runoff, and engine lubricants. Currently, water quality districts have been established surrounding the urban areas of Bozeman, Helena, Missoula, and Butte-Silver Bow.

Metal Mine Reclamation Act
Title 82, Chapter 4, Part 3, MCA
Rules, policies, and procedures governing reclamation of mined lands; the basic objective of reclamation under the act is “to establish, on a continuing basis, the vegetative cover, soil stability, water condition, and safety condition appropriate to any proposed subsequent use of the [disturbed] area” (82-4-302, MCA). It includes permitting, licensing, and bonding requirements for mining exploration, development, and operation. It regulates the mining of all ore, rock, or substances except oil, gas, bentonite, clay, coal, sand, gravel, peat, soil materials, and uranium.

Montana Natural Streambed and Land Preservation Act (310 Law)
Title 75, Chapter 7, Part 1, MCA
Process for permitting physical alterations or modifications that result in a change in the state of a natural, perennial-flowing stream or river, its bed, or its immediate banks. The intent of the program is

to minimize soil erosion and sedimentation and prevent unreasonable depletion and degradation of natural resources; program applies to all non-governmental entities.

Montana Streambed Protection Act (SPA 124)
Title 87, Chapter 5, Part 5, MCA
Permit program for state, county, or city government projects that may affect the bed or banks of any stream in Montana. It is the state and local government equivalent of the 310 law; designed to protect and preserve fish and wildlife resources, and to maintain streams and rivers in their natural or existing state.

Opencut Mining Act
Title 82, Chapter 4, Part 4, MCA
Permit required for the mining of bentonite, clay, scoria, soil materials, peat, sand, or gravel when the operation will result in the removal of a total of 10,000 cubic yards or more of materials and overburden. A plan of operation must be submitted, and DEQ cannot accept a plan unless the plan provides that surface water and groundwater will be given appropriate protection, consistent with state law, from deterioration of water quality and quantity.

Phosphorus Ban Act
Title 75, Chapter 5, Part 9, MCA
With some exceptions, household cleaning products that contain phosphorus in concentrations in excess of a trace quantity may not be distributed, sold, offered, or exposed for sale in counties in which one or more surface water bodies exceed the numeric algal biomass or total phosphorus water quality standards. The ban has effectively eliminated the sale of phosphorus containing household cleaning products throughout Montana.

Solid Waste Management Program
Solid Waste Plans, Funds & Administration (75-10-101, MCA); Montana Solid Waste Management Act (75-10-201, MCA); Ground Water Monitoring (75-10-207, MCA); Integrated Waste Management (75-10-801, MCA); Infectious Waste Management Act (75-10-1001, MCA); Septic Disposal and Licensing (75-10-1201, MCA); ARM Title 17, Chapter 50, Subchapters 1, 4, 5-15
Technical review and licensing of solid waste treatment and disposal facility design and operational plans; inspections and compliance assistance for solid waste management facilities; licensing of septic tank pumpers; inspections of disposal sites for septic tank and sump wastes; technical review and licensing of motor vehicle recycling and disposal facilities.

Streamside Management Zone Law (SMZ law)
Title 77, Chapter 5, Part 3, MCA
Regulation and prohibition of certain forest management activities within certain distances of forest streams; standards and conditions designed to protect the quality and integrity of forest streams.

Sanitation in Subdivisions Act
Title 76, Chapter 4, MCA
Review of divisions of land comprising less than 20 acres, as well as condominiums and recreational camping vehicle and mobile home parks, regardless of the size of the parcel on which they are located. Review is limited to sanitation facilities, including the water supply, sewage disposal, solid waste disposal, and storm drainage systems. Proposed subdivision designs are compared against established design standards and minimum separation distances between water supply sources and potential

contamination sources such as wastewater treatment systems, surface waters, and floodplains. The regulations and review are structured to prevent pollution problems through the proper design, location, operation, and maintenance of sanitation facilities.

Superfund Program (State and Federal)

Comprehensive Environmental Cleanup and Responsibility Act, or CECRA (Title 75, Chapter 10, Part 7, MCA); federal Comprehensive Environmental Response, Compensation, and Liability Act, or CERCLA (42 U.S.C. sections 9601-9657); federal Superfund Amendments and Reauthorization Act, or SARA (Public Law No. 99-499 stat. 1613 et seq).

Montana uses CECRA to investigate and clean up hazardous substances at sites not addressed by federal Superfund. Historical waste disposal activities at these sites caused contamination of air, surface water, groundwater, sediments, and/or soils with hazardous or deleterious substances. Under CECRA, sites are ranked based on potential risks to human health and the environment. Potentially liable persons investigate and clean up contamination that poses an unacceptable risk to human health and the environment. Some funding may be available through the State's orphan share account to assist with investigation and cleanup of eligible sites. EPA, often in coordination with DEQ, uses CERCLA and its associated funding to investigate and clean up hazardous substances.

Underground Storage Tank Laws

Montana Underground Storage Tank Act (Title 75, Chapter 11, Part 5, MCA); Montana Petroleum Storage Tank Cleanup Act (Title 75, Chapter 11, Part 3, MCA), and the federal Leaking Underground Storage Tank Trust Fund Program.

The Petroleum Tank Cleanup Section uses these laws to investigate and clean up unpermitted releases from petroleum storage tanks. Approximately 50 petroleum releases are confirmed at mines that extract gold, platinum, talc, vermiculite, coal, sapphires, and other precious and industrial. Funding to assist tank owners and operators to remediate petroleum releases at these sites is potentially available from Montana's Petroleum Tank Release Cleanup Fund.

Groundwater Remediation Program

Montana Water Quality Act (Title 75, Chapter 5, MCA)

The Groundwater Remediation Program requires responsible parties to investigate and cleanup non-permitted releases that potentially impact state waters. Approximately 70 releases of petroleum and other contaminants are confirmed at a variety of sites, including: pipelines, trucking accidents, maintenance shops, and farms/ranches. Responsible parties investigate and clean up contamination that poses an unacceptable risk to human health and the environment.

Water Use Law

Title 85, Chapter 2, MCA; Title 44, Chapter 4, Part 11, MCA

Program for granting and enforcing water rights; designed to regulate the use of state water resources and "provide for the wise utilization, development, and conservation of the waters of the state for the maximum benefit of its people with the least possible degradation of the natural aquatic ecosystems" (85-2-101, MCA).

7.0 EVALUATING SUCCESS

Discrete actions, such as individual riparian restoration projects, are necessary steps towards successfully meeting the long-term goal of protecting and restoring water quality from the harmful effects of nonpoint source pollution. However, it takes years for those projects to mature to their intended effects, and the geographic scale of each project is too small compared to the overall issue to measurably improve water quality on its own. Therefore, it is necessary to track interim outcomes and achievements along the path toward meeting long-term goal. Interim outcomes that signify this Nonpoint Source Management Plan is on track to achieve the long-term goal include:

1. Water quality standards are established
2. Montana's waters are assessed to determine compliance with water quality standards and compiled in an updated Integrated Report
3. TMDLs are completed for required waterbodies with pollutant sources identified sufficiently for local planning efforts
4. Local plans ensure efficient and effective implementation of best practices
5. Public has awareness that nonpoint source pollution is an issue and understands what actions are needed to address nonpoint sources
6. Public is taking sustainable actions and changing behaviors to reduce or prevent nonpoint source pollution
7. Projects and practices are implemented to address nonpoint source pollution
8. Progress on implementation is tracked and reported

Note that these interim outcomes directly relate back to Montana's water quality management process, outlined in **Section 1.1** and illustrated in **Figure 1-1**.

Within each of these interim outcomes, discrete and measurable actions must be taken by the Nonpoint Source and Wetlands Section, DEQ more broadly, and all partners (**Section 5.0**). **Section 8** defines these actions, appropriate partners, and measures of success specific to each action.

7.1 REPORTING ON MEASURES OF SUCCESS

DEQ uses the following mechanisms for reporting the progress toward meeting interim outcomes and actions laid out in **Section 8**:

- The Water Quality Integrated Report, submitted to EPA biennially, tracks the success of the Nonpoint Source Management Plan regarding the number of waterbodies that are partially or fully supporting beneficial uses
- EPA's Grant Reporting and Tracking System documents CWA Section 319 project information
- Nonpoint Source and Wetland Section annual reports
- TMDL implementation evaluations track progress of water quality restoration efforts in watersheds that have completed TMDLs and provide recommendations for next steps
- Success stories that highlight landowner, project, waterbody and/or watersheds successes

These mechanisms bring together information from private and public partners who play a critical role implementing actions and meeting outcomes and provide EPA with necessary information to meet its own program activity measures.

7.2 EVALUATING EDUCATION AND OUTREACH EFFORTS

Taking action to address nonpoint source pollution is often voluntary, so prioritizing education and outreach (E&O) is critical to meeting the long-term goal of the Nonpoint Source Management Plan. Measuring the success of E&O efforts can be challenging because they don't necessarily result in on-the-ground, tangible results. If they do, it can be difficult to associate that result with E&O. **Section 8.0** defines measures of success appropriate for E&O under this Nonpoint Source Management Plan. They include examples of evaluation tools used to gage success of raising awareness and inspiring action, such as:

- **Pre- and post-evaluations –** to measure changes in knowledge, behavior, and attitudes toward nonpoint source pollution resulting from an E&O campaign
- **Interviews and focus groups –** to identify barriers to and benefits of behavior change
- **On-the-ground or map-based observation –** to measure widespread adoption of different behaviors (e.g., riparian buffers)

7.3 EVALUATING WATER QUALITY IMPROVEMENT

In Montana, many different entities collect credible water quality data, which DEQ uses to determine if water quality is improving and if water quality standards are being achieved (see **Section 1**). While documenting measurable water quality improvement takes time and cumulative action, water quality monitoring is an essential tool for evaluating the success of this Nonpoint Source Management Plan. Three types of monitoring are used to evaluate success:

1. **Project effectiveness monitoring** evaluates how well a practice or project reduces pollution at the site scale. This information ensures that effective practices are implemented and maintained. Project effectiveness monitoring can include qualitative data collection (e.g., time series photo points and professional observation), modelled pollutant load reduction estimation useful for tracking progress toward TMDL targets, and site-specific data collection. Effectiveness of discrete projects is not necessarily transferable to water quality effects on a broader scale. However, their effectiveness can inform and encourage future work necessary for broad scale water quality improvements. Short-term effectiveness monitoring is required for projects funded with CWA Section 319 grant contracts.
2. **Trend monitoring** evaluates how well cumulative practices or projects reduce nonpoint source pollution at the stream scale. Trend monitoring can include qualitative data collection (e.g., reviews of multiple projects' effectiveness), and periodic or routine quantitative water quality data collection. The results of this broader scale monitoring can be published as a TMDL Implementation Evaluation (see **Section 1.6**).
3. **Standards attainment monitoring** requires sufficient data for a formal assessment of water quality standards attainment and a determination of beneficial-use support. It can inform potential updates to TMDLs and standards or targets. Under the CWA, formal assessments of water quality standards attainment are intended to accurately characterize water quality and assess beneficial-use support of the nation's rivers, streams, and lakes.

8.0 MONTANA'S NONPOINT SOURCE ACTION PLAN AND PRIORITIES

The goal of Montana's Nonpoint Source Management Plan is to protect and restore water quality from the harmful effects of nonpoint source pollution. This section identifies key interim outcomes, actions, and milestones necessary to demonstrate significant progress toward meeting this goal. It also provides information on the Nonpoint Source and Wetlands Section's approach for implementation and expectations for partners.

Tables 8-1 through **8-8** describes DEQ's 5-year action plan for addressing nonpoint source pollution. These tables are arranged in a stepwise order based on Montana DEQ's water quality management process (see **Figure 1-1**) and interim outcomes (**Section 7.0**). Each table lists actions, milestones, and key partners for evaluating success in achieving the interim outcomes. While the interim outcomes are listed in a stepwise management process order, individual actions are not listed by priority. DEQ's highest priority actions are those identified in **Table 8-6: Public is taking sustainable actions and changing behaviors to reduce or prevent nonpoint source pollution** and **Table 8-7: Projects and practices are implemented to address nonpoint source pollution**.

Accomplishments under the 2017 Montana Nonpoint Source Management Plan are summarized in annual reports located at https://deq.mt.gov/water/Programs/nonpoint. Accomplishments under this Nonpoint Source Management Plan will be summarized in future annual reports.

Table 8-1: Interim Outcome - Water quality standards have been developed

No.	*Actions*	*Measurable Milestones*	*Key Partner(s)*
1	Develop or refine water quality standards	Demonstrate progress toward review, adoption, or modification of water quality standards, including nutrients and other national priorities.	DEQ Standards and Modeling Section
2	Collect chemical, physical, and biological data from reference sites across Montana	Sample at least 100 reference sites within 5 years.	DEQ Standards and Modeling Section
3	Develop models to support standards development for priority waterbodies	Develop models for at least 2 priority waterbodies within 5 years.	DEQ Standards and Modeling Section
4	Adopt numeric standards for pesticides identified in Montana groundwater and surface waters	Adopt of numeric standards for pesticides within 4 years of DEQ notification of detection in state waters. Notify the Pesticide Stewardship Partnership Program to raise awareness of any new detection and standards development.	DEQ Standards and Modeling Section, MT Dept of Agriculture, Flathead BioStation

Table 8-2: Interim Outcome - Montana's waters have been assessed to determine compliance with water quality standards and compiled in updated Integrated Report

No.	*Actions*	*Measurable Milestones*	*Key Partner(s)*
5	Conduct water quality assessments.	Complete volunteer monitoring data review, sediment success stories, Clarks Fork of Yellowstone, Upper Blackfoot, Yellowstone River, Upper Missouri River within 5 years.	DEQ Monitoring and Assessment Section
6	Assess water quality status and trends in priority areas through fixed station monitoring	Continue long-term trend monitoring on the Clark Fork River, Bitterroot River, and Tongue River and five-year snapshots on Yellowstone River and Upper Missouri River.	DEQ Monitoring and Assessment Section
7	Address septic influence on surface water quality	Characterize septic influence in 3 TMDL or other water quality protection documents within 5 years.	DEQ Water Quality Division

No.	*Actions*	*Measurable Milestones*	*Key Partner(s)*
8	Update the program's WQ assessment, TMDL, and implementation tracking system (WARD) and Clean Water Act Information Center (CWAIC)	Submit the Integrated Report to EPA and update CWAIC.	DEQ Monitoring and Assessment Section
9	Use the best available science to establish assessment methods that protect water quality in Montana's streams, rivers and lakes	Publish ammonia and pH assessment methods and, as feasible, new assessment methods requested by stakeholders in upcoming Integrated Reports.	DEQ Monitoring and Assessment Section
10	Generate more credible data through support of water quality monitoring partnerships	Serve on at least 1 external volunteer monitoring grant program advisory panel annually to ensure data meets DEQ's data quality standards for beneficial use assessments.	DEQ Monitoring and Assessment Section
		Use volunteer monitoring data for at least 1 waterbody-pollutant combination assessment in each Integrated Report.	
		Support at least 3 water quality monitoring partnerships across the state each year.	DEQ Monitoring and Assessment Section
11	Conduct water quality assessments to support nationally recognized success stories and progress in focus watersheds	At least 1 waterbody-pollutant combination from both within and outside the current or previous Nonpoint Source and Wetlands Section focus watersheds is included in each Integrated Report.	DEQ Monitoring and Assessment Section, NRCS
12	Provide public access to water quality monitoring project information through project webpages and the Clean Water Act Information Center (CWAIC)	Post information about all DEQ-funded water quality projects for the public each year.	DEQ Standards, Monitoring and Assessment, TMDL, and NPSW Sections

Table 8-3: Interim Outcome – TMDLs have been completed for required waterbodies with pollutant sources identified sufficiently for local planning efforts

No.	*Actions*	*Measurable Milestones*	*Key Partner(s)*

13	Complete Water Quality Improvement Plans and necessary total maximum daily load (TMDL) documents	Complete at least 70 additional TMDL pollutant-waterbody combinations within 5 years.	DEQ TMDL Section
14	Support local efforts to refine pollutant source identification	Provide fine-scale riparian and wetland restoration and protection information to local organizations in at least 2 different project areas within 5 years.	DEQ Water Quality Planning Bureau, WMCC, watershed restoration plan sponsors

Table 8-4: Interim Outcome – Local plans ensure efficient and effective implementation of best practices

No.	*Actions*	*Measurable Milestones*	*Key Partner(s)*
15	Work with local organizations to update or develop nine-element or alternative watershed restoration plans (WRPs)	Publish or update 4 DEQ-accepted WRPs or alternative plans within 5 years.	DEQ Nonpoint Source and Wetlands Section, WRP Sponsors
16	Increase access to Nonpoint Source and Wetlands Section resources	Provide CWA Section 319 funding and technical support for WRP, or similar alternative, development to at least 1 underserved market annually.	DEQ Nonpoint Source and Wetlands Section
17	Watershed plans incorporate protection of unimpaired/high quality waters	A majority of watershed plans published (9-element, alternative, or protection plans) identify priority waters and approaches for protection.	DEQ TMDL and Nonpoint Source and Wetlands Sections

Table 8-5: Interim Outcome – Public has awareness that nonpoint source pollution is an issue and understands what actions are needed to address it

No.	*Actions*	*Measurable Milestones*	*Key Partner(s)*
18	Support nonpoint source education and outreach efforts at a statewide level	Create tools and topic-specific materials (for local organizations) that generate consistent messaging and includes products like factsheets, graphics, social media posts, and/or hands-on-models.	DEQ Nonpoint Source and Wetlands Section
		Share nonpoint source education tools and materials at no fewer than 5 events annually.	

No.	*Actions*	*Measurable Milestones*	*Key Partner(s)*
		Support trainings and conferences on nonpoint source topics (e.g., stormwater, forestry BMPs, construction).	
		Provide at least 1 opportunity to engage and share information about nonpoint source pollution with legislators annually.	
		Coordinate the vision of high-quality natural resource improvement projects by convening at least 1 Natural Resources Grant Work Group meeting per year.	DEQ, DNRC, FWP, BoR, BLM, NRCS, FEMA, NFWF, MACD, MWCC, USFWS
19	Support local nonpoint source education and outreach efforts	Fund E&O through at least 5 MACD mini-grants or DEQ grants annually.	DEQ Nonpoint Source and Wetlands Section
		Staff at least 2 local watershed festivals or educational events annually (support locations without current capacity).	DEQ Nonpoint Source and Wetlands Section
20	Support and promote the development and coordination of watershed groups through MWCC activities, training, workshops, advertising campaigns, etc.	Host annual watershed coordinators meeting and biennial watershed tours.	MWCC
		Distribute available Watershed Funds to local organizations each year to build capacity and implement projects.	MWCC
		Fund cost share for at least 5 Big Sky Watershed Corp (BSWC) members' host sites and at least 5 BSWC members' nonpoint source projects each year.	MWCC
		Distribute biweekly newsletters and maintain an online water quality monitoring resource library.	MWCC
21	Raise awareness of the connections between nonpoint source issues and human health	Coordinate and maintain a recreation advisory program (i.e., for harmful algal blooms) that educates the public about the health risks and current advisories.	DEQ Water Quality Planning Bureau

Table 8-6: Interim Outcome – Public is taking sustainable actions and changing behaviors to reduce or prevent nonpoint source pollution

No.	*Actions*	*Measurable Milestones*	*Key Partner(s)*
22	Support the use of community-based social marketing concepts to reduce and prevent nonpoint source pollution (statewide and locally)	Identify sector-specific behavior changes that will significantly reduce nonpoint source pollution.	Nonpoint Source and Wetlands Section, E&O project sponsors
		Conduct research and observations to identify barriers and benefits of implementing selected best practices and behaviors.	Nonpoint Source and Wetlands Section, E&O project sponsors
		Pilot strategies that overcome barriers and promote benefits of the best practices and behaviors.	Nonpoint Source and Wetlands Section, E&O Project sponsors
		As needed, revise pilot programs and implement on a larger scale.	Nonpoint Source and Wetlands Section, E&O project sponsors
23	Publish or distribute accounts of exemplary environmental stewardship and success stories	Acknowledge and share landowner and water quality successes through awards and storytelling.	DEQ, EPA, Wetland Council, MWCC, NRCS, MACD, Montana Stockgrowers Association

Table 8-7: Interim Outcome - Projects are implemented to address nonpoint source issues

No.	*Actions*	*Measurable Milestones*	*Key Partner(s)*
24	Complete TMDL- and WRP-directed nonpoint source water quality improvement projects, leveraging diverse funding sources whenever possible, to maximize nonpoint source reduction benefits	Initiate agreements that implement at least 6 distinct water quality improvement projects in focus watersheds per year.	DEQ Nonpoint Source and Wetlands Section, local organizations
		Complete agreements that implement a total of 3 miles of riparian buffer improvement per year.	
		Complete agreements that implement a total of 10 acres of wetland improvement per year.	
		Distribute funding from at least 1 non-CWA Section 319 funding source (e.g., RRGL, OSG, PSPP).	

		Complete at least 4 nonpoint source stormwater quality improvement projects funded through State Revolving Fund and other sources annually.	DEQ Engineering Bureau, DEQ Nonpoint Source and Wetlands Section, local municipalities
25	Comment on external agency proposed projects, and serve on external grant review panels, that may impact nonpoint source pollution	Comment on project scoping and serve on grant panels.	DEQ Nonpoint Source and Wetlands Section
26	Expand usage of public and private channel migration zone and riparian conservation easements	Report annual increase in stream miles covered under a conservation easement, as reported by Montana State Library.	DEQ, Montana Freshwater Partners, NRCS, FWP, MT State Library
27	Work with agencies to implement water quality improvement activities; ensure high-quality natural resource improvement projects in Montana are funded	Develop, revise, and implement MOUs with agencies.	DEQ, USFS, BLM, MDT, NRCS, FWP
28	Support the National Water Quality Initiative (NWQI) program	DEQ and NRCS collaborate to identify and prepare future NWQI watersheds.	DEQ, NRCS, CDs

Table 8-8: Interim Outcome - Project implementation and effectiveness are tracked and reported

No.	***Actions***	***Measurable Milestones***	***Key Partner(s)***
29	Monitor the effectiveness of nonpoint source projects funded by DEQ or otherwise and share project results	Each year, revisit at least 5 CWA Section 319 projects that have been complete for >5 years and complete project effectiveness reviews (PERs).	DEQ Nonpoint Source and Wetlands Section, project partners
		Collect pre- (at least 1 year) and post- (at least 2 years) restoration nutrient and sediment data from at least 2 wetland restoration projects.	
		Reanalyze fine-scale riparian information after 10+ years to track progress resulting from riparian restoration efforts (e.g., Bitterroot in 2030 and Gallatin in 2032).	DEQ Nonpoint Source and Wetlands Section

		Make all PERs and wetland restoration effectiveness monitoring results available to project partners and the public, and share lessons learned for incorporating into future projects.	
30	Conduct TMDL implementation evaluations	Publish TIEs for at least 8 pollutant-waterbody combinations within 5 years.	DEQ TMDL Section
31	Participate in DNRC Forestry Assistance to assess the effectiveness of forestry best practice, streamside management zone, and habitat conservation plan implementation	DEQ participation included in biannual reports on forestry BMP audits and reports on SMZ	DEQ Nonpoint Source and Wetlands Section, DNRC, Montana Logging Association
32	Assess water quality status and trends in focus watersheds	Publish at least 2 trend analyses for priority areas within 5 years.	DEQ Monitoring and Assessment and Nonpoint Source and Wetlands Section, NRCS, local organizations
33	Publish EPA-approved and nationally recognized success stories	Publish at least 1 success story each year.	DEQ Monitoring and Assessment and Nonpoint Source and Wetlands Section

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