2017 Montana Nonpoint Source Management Plan

Steve Bullock, Governor
Tom Livers, Director, DEQ

Prepared by:
Water Protection Bureau
Watershed Protection Section

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Cover photos (clockwise from upper left): Tryan Project, Prickly Pear Creek, Lewis and Clark County Water Quality Protection District; Broadwater Conservation District's "Stream Team" students in Deep Creek; Irrigated fields in Broadwater County; Trask Lakes, Beaverhead-Deerlodge National Forest.

Montana Department of Environmental Quality
Water Protection Bureau
1520 E. Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901

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NONPOINT SOURCE MANAGEMENT PLAN OVERVIEW

This 2017 Nonpoint Source Management Plan (Plan) describes Montana's Nonpoint Source Management Program, which is focused on protecting water quality from nonpoint sources of pollution throughout the state. The Montana Department of Environmental Quality (DEQ) expects this Plan to be useful, informative, and most of all a tool for positive change in protecting and improving water quality.

WHAT IS NONPOINT SOURCE POLLUTION?

Nonpoint source (NPS) pollution comes from a variety of land-use activities and is typically transported via runoff or subsurface percolation to streams (rivers or creeks), lakes, reservoirs, wetlands, and groundwater. NPS pollution can also come from pollutants that erode or otherwise directly enter surface waters including those that are aerially transported. Common nonpoint pollutants include sediment, nutrients (nitrogen and phosphorus), temperature changes, metals, pesticides, pathogens, and salinity. Point source pollution is distinctively different from nonpoint source pollution in that point source pollution, as defined under the federal Clean Water Act (CWA), includes those pollutants that enter surface water via any discernible, confined and discrete conveyance. Agricultural stormwater discharges and return flows from irrigated agriculture are considered nonpoint sources by definition under the CWA.

NPS pollution is the largest contributor of water quality problems on a statewide basis when compared to point sources of pollution (Montana Department of Environmental Quality, 2016).

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. Section 208 of the CWA directed states to develop "Areawide Waste Treatment Management Plans" to address nonpoint source of pollution. In Montana, the DEQ protects water quality from these point source discharges via the Montana Pollutant Discharge Elimination System (MPDES) and acts as the planning agency for 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. Section 319 also provides cost-share grants to states for a wide variety of NPS control activities contingent upon EPA approval of a state's NPS Management Plan.

As authorized by the state legislature and directed by the governor, the Montana Department of Environmental Quality (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 over Montana's NPS Management Program and for updating this Plan on a five year basis. This Plan is an update to the 2012 NPS Management Plan, reflecting improvements in many of Montana's NPS Management Program activities.

GOAL OF THE NONPOINT SOURCE PROGRAM

The goal of Montana's NPS Management Program is to protect and restore water quality from the harmful effects of nonpoint source pollution. This Plan helps accomplish this goal by:

- Informing Montana citizens about the sources of NPS pollution and effects on water quality and identifying actions that citizens can take to reduce NPS pollution (**Appendix A - Best Management Practices**).
- Identifying how NPS pollution is being addressed by local, state and federal programs as well as other partners such as watershed groups.
- Describing how the Department of Environmental Quality will continue to work with program partners and provide statewide leadership toward implementing this Plan.
- Identifying strategies, programs and resources for protecting and restoring water quality affected by NPS pollution.

The twenty-year vision of the NPS Management Program is that Montana's citizens understand the consequences of nonpoint source pollution and are addressing concerns in a proactive manner. Watershed groups around the state are actively engaging local landowners and partners to address nonpoint source pollution in socially acceptable and economically beneficial projects and programs. Montana's riparian areas, floodplains and wetlands are healthy and managed in ways that protect our creeks, streams, rivers, ponds and lakes. Montana's indigenous fish and other aquatic life are sustainable through generations by well-managed and citizen-supported natural resource programs and conservation.

The program goal and information contained within this Plan are consistent with the required NPS Management Program objectives defined within EPA's Nonpoint Source Program and Grants Guidelines for States and Territories (US Environmental Protection Agency April 12, 2013). These EPA objectives are contained within **Appendix B**, along with a cross-walk on where each objective is addressed within this Plan.

IMPLEMENTING THE NPS MANAGEMENT PLAN

In Montana, NPS pollution is primarily addressed via application of voluntary management practices pursued by landowners and other citizens within the state. The approaches and resources described in this Plan are the state's primary vehicle for engaging Montana's citizens in implementing voluntary management practices, and fostering stewardship of our water resources.

Although DEQ is the lead agency for the state's NPS 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 effects of NPS pollution.

1.0 MONTANA'S NPS POLLUTION MANAGEMENT PROGRAM FRAMEWORK

Montana's Nonpoint Source Pollution Management Program is housed within the state's water quality management program in the Water Quality Division at the Montana Department of Environmental Quality (DEQ). The goal of this program is to protect and restore water quality from the harmful effects of nonpoint source pollution. This is best achieved through a process that integrates water quality standards, monitoring and assessment, development and implementation of total maximum daily loads (TMDLs), and the voluntary implementation of best management actions outlined in Watershed Restoration Plans. Throughout this process DEQ seeks to involve all stakeholders through communication, cooperation, common goals, and consensus. Using this approach, DEQ, watershed groups, conservation districts, agencies, tribes, academia, and non-governmental organizations can work together to effectively increase public understanding and participation in NPS pollution reduction.

1.1 THE WATER QUALITY MANAGEMENT PROCESS

A schematic of DEQ's water quality management planning process is shown in **Figure 1-1.** This process follows the outline and requirements of the Montana Water Quality Act (MCA Ref 75-5-701 thru 704) as well as Clean Water Act Sections 303(d) and 319.

To implement the process steps defined in Figure 1.1, DEQ's NPS Management Program integrates with multiple other programs within the Water Quality Division. These programs include water quality standards development, monitoring and assessment, information management, TMDL development, and TMDL implementation.

Achieving and protecting clean water begins with identifying water quality indicators and establishing water quality standards for those indicators. 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 2 years in DEQ's Water Quality Integrated Report (IR). For those waters not meeting standards, total maximum daily loads (TMDLs) are developed, followed by implementation of best management practices (BMPs) 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.

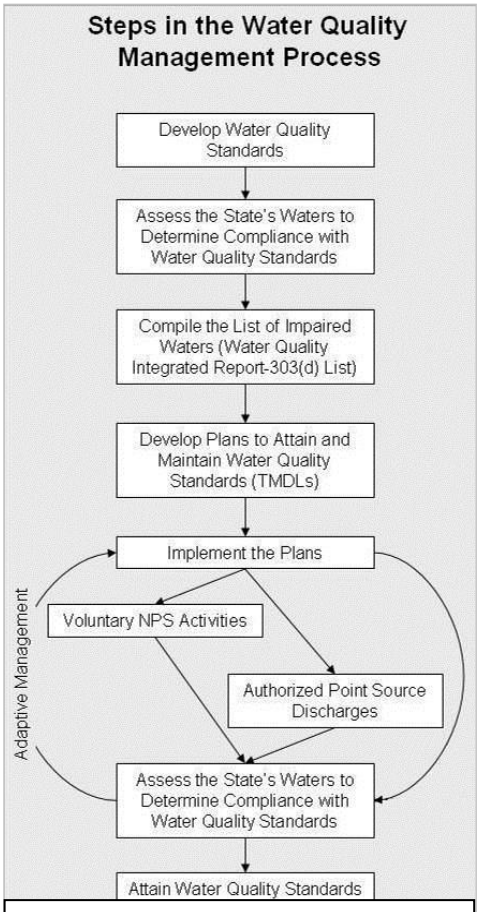


Figure 1-1: Schematic of Montana DEQ's Adaptive Water Quality Management Process

1.2 WATER QUALITY STANDARDS

Water quality standards can be referred to as the foundation for DEQ's NPS and other water quality programs. Montana's water quality standards include a water 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 protect beneficial uses and existing high quality water. Water quality standards and use classification systems for surface water and groundwater are defined in the Administrative Rules of Montana, Title 17, Chapter 30, Subchapters 6 and 10.

Montana relies primarily on a watershed-based classification system. As a result, all waters of the state are classified and have designated beneficial uses and supporting standards. For most rivers, lakes, and streams "beneficial uses" are those which the waterbody has supported in the past, as well as future beneficial uses that the waterbody should be capable of supporting. Beneficial uses generally include agriculture, aquatic life support, recreation, and drinking water.

Consistent with the Montana Water Quality Act, DEQ works with stakeholders and lawmakers to develop new water quality standards. DEQ also defines point source discharge permit requirements that satisfy water quality standards and nondegradation requirements.

DEQ's water quality standards program provides assistance with interpreting and applying existing standards as well as developing new standards as authorized by legislation. Existing priorities include continued numeric nutrient standards development for large rivers and Flathead Lake, updates to application of nutrient standards to point source dischargers, selenium standards development for Lake Koocanusa, and providing a process to integrate natural background conditions into existing numeric standards.

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. Monitoring is essentially step 2 of the assessment process. DEQ supports both internal and external monitoring and assessment efforts to address the many different data needs associated with the NPS Management Program. **Appendix C** provides a summary of monitoring objectives that can be associated with various aspects of DEQ's NPS Management Program, as well as information on monitoring partnerships, volunteer monitoring, and quality assurance and control processes.

In order 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 waterbodies, also referred to as waterbody segments, are assigned varying levels of beneficial use support as follows:

1. **Fully Supporting:** The waterbody meets all of its 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 is limiting the waterbody's beneficial uses, and the source. All assessed waters information, including the state's list of impaired waters, is summarized every two years within Montana's Water Quality Integrated Report (IR), which undergoes EPA review and approval consistent with section 303(d) of the CWA. In preparation of the state's Water Quality IR, DEQ solicits data and information from local, state, and federal agencies, volunteer monitors, 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 waterbody segment, also referred to as an assessment unit (AU) are available on the web via DEQ's Clean Water Act Information Center (CWAIC). Note that DEQ often separates larger streams into smaller segments.

In addition to developing and updating assessment methods, DEQ's monitoring and assessment program monitors state surface waters and applies formal assessment methods in order to: identify causes and sources of NPS pollution; track trends in water quality; establish baseline data; evaluate whether or not water quality standards are being attained and beneficial uses are being supported; support standards development; support TMDL development; and to evaluate the success of TMDL implementation. DEQ often uses water quality data collected by others, and in specific circumstances, provides stakeholders with information on monitoring methods, data analysis, and quality assurance to help ensure broad applicability of data collected throughout Montana.

Monitoring and assessment program priorities include supporting standards development, updating and developing assessment methods, monitoring and assessing waterbodies in high priority watersheds, supporting TMDL development, and evaluating the success of TMDL implementation across the state. It is also a priority to expand the current statewide monitoring program focused on baseline monitoring at reference sites, lakes, rivers, and streams across the state using different monitoring designs according to the needs and priorities of the programs using the collected information.

1.4 THE TMDL DEVELOPMENT PROCESS AND WATER QUALITY PLANNING

DEQ is responsible for developing TMDLs consistent with both state and federal requirements. A total maximum daily load (TMDL) is the identification of pollutant loading from all sources established at a level that meets applicable surface water quality standards. TMDLs inherently involve a watershed scale analysis of pollutant loading from both point and nonpoint sources of pollution. Although TMDLs apply to pollutants (**Section 1.3**), the TMDL planning document, also referred to as a Water Quality Implementation Plan (WQIP) typically addresses both pollutant and non-pollutant impairment causes in a watershed.

In practical terms, 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 and to evaluate the waterbody's condition in relation to the standards. This links TMDL development to water quality standards, monitoring and assessment activities identified in **Sections 1.2** and **1.3**.
2. Defining the allowable load rate (which equates to the TMDL).
3. Quantifying the pollutant contributions from significant sources, often relying on collection of water quality monitoring data.
4. Allocating the allowable loading rate among the significant pollutant sources. Most of these allocations apply to nonpoint sources.

In Montana, TMDLs are typically developed for all streams impaired by a certain pollutant, or set of pollutants, within a given watershed. The scale of the watershed is generally based on U.S. Geological Survey Hydrologic Unit Code (HUC – 4th-5th code) boundaries. Although not required, Montana's TMDL documents generally include a conceptual restoration or implementation strategy. This strategy identifies land management practices, such as the best management practices (BMPs) in **Appendix A**, for achieving TMDL allocations.

DEQ's TMDL priority areas for the next several years are identified in **Appendix D**, which includes criteria Montana uses to prioritize TMDL development as well as a list of completed TMDL documents. The prioritization approach for TMDL development has always been heavily focused in areas of significant stakeholder interest in NPS management. TMDL development priorities will continue to consider stakeholder interests in implementing NPS activities, as well as addressing other point and nonpoint source considerations. (Wolh 2005)Achieving these TMDL priorities will require significant monitoring and assessment support (**Section 1.3)**. Combined, these programs provide the primary means through which DEQ will continue to conduct site-specific and watershed-scale assessments of NPS effects since Montana's streams and lakes are impaired mostly from nonpoint sources.

DEQ's stakeholder participation process during TMDL development includes consulting with watershed advisory groups and appropriate technical personnel as well as providing for public comment on a final draft of each TMDL document. This approach sets the stage for implementing the NPS components of a TMDL via local leadership, as discussed further in **Section 1.5**.

1.5 Implementing TMDLs to Restore Water Quality

DEQ's NPS Management Program focuses on restoring impaired waterbodies by implementing TMDLs. The rationale is that the TMDL documents provide a science-based strategy for identifying pollutant causes of impairment, pollutant sources, and necessary pollutant reductions that will lead to meeting state water quality standards. The TMDL documents also identify land management practices and BMPs that can be applied to sources contributing to both pollutant and non-pollutant causes of impairment.

In Montana, NPS pollution is primarily addressed via application of voluntary management practices pursued by landowners and others. DEQ's longstanding policy has been to support a voluntary program to achieve compliance with water quality standards for most activities that create NPS pollution, recognizing that there are also important regulatory elements related to NPS control in Montana as described in **Section 6**. Although DEQ is the lead agency for the state's NPS Management Program,

many other agencies, entities, and individuals play critical partnership roles as identified in **Appendix E** and further discussed in **Section 5**.

DEQ encourages and supports the efforts of local watershed groups and conservation districts to develop Watershed Restoration Plans (WRPs) that will achieve these objectives. DEQ provides staff support and federal Clean Water Act 319 funding to local watershed efforts that pursue NPS controls and are implementing WRPs. WRPs can be viewed as a locally developed "road map" to meeting water quality standards, complete with identified priority areas and/or activities, resource needs, and timelines for meeting milestones. These plans must be integrated with DEQ's TMDL development efforts wherever possible. Critical steps in developing a WRP include education and outreach, partnership building, watershed characterization, and project identification, prioritization and implementation. **Appendix D** provides a map showing areas of WRP development in Montana.

EPA has identified the elements of a WRP (listed below) necessary for ensuring that realistic plans are developed, and standards can be met:

1. Identification of Pollution Impairment Causes and Sources
2. Estimates of Necessary Load Reductions
3. Identification of Management Measures and Critical Locations
4. Estimates of Technical and Financial Needs to Implement Measures
5. Public Information, Engagement and Involvement Component
6. Implementation Schedule for Management Measures
7. Measurable Milestones for Management Measures
8. Short-Term Criteria for Evaluating Effectiveness
9. Monitoring Component to Evaluate Effectiveness of Management Measures

The Montana Watershed Coordination Council (MWCC, see **Appendix E** and **Section 5.1**) provides significant support to local watershed groups through online information sharing, training workshops, and networking opportunities. MWCC is able to streamline communication and help sustain watershed organizations in Montana. DEQ considers MWCC to be a critical clearinghouse and information hub that plays a lead role in supporting local efforts to build the capacity needed to develop WRPs and sustainable watershed restoration and protection.

Montana has many impaired waterbodies located on lands managed by federal and state agencies. These agencies usually have multiple management objectives, planning processes and land management activities that contribute to TMDL implementation, consistent with many of the WRP elements. DEQ has developed several interagency agreements (e.g., memoranda of understanding) that provide additional mechanisms to inform, coordinate, and cooperate on NPS pollution reduction and TMDL implementation. One main objective of this Plan is to identify practices that should be applied to meet TMDLs on state and federally managed lands in a timely manner.

1.6 TMDL Implementation Evaluation and Adaptive Management

Once the watershed restoration measures have been implemented, DEQ can systematically work with partners such as watershed groups and land management agencies to assess the short- and long-term outcomes and begin to identify collaborative adjustments based on new understandings, monitoring results, and lessons learned (see **Figure 1-2** for details). Assessment of progress and adaptive management should include:

- Information assessment—review and evaluation

- Interagency collaboration and shared results
- Reporting back to stakeholders and others
- Adjustments to the program

Figure 1-2: Diagram of Adaptive Management Approach for Montana Watershed Restoration Plans

DEQ's NPS Management Program performs TMDL Implementation Evaluations (TIEs) as a key component of adaptive management. TIEs provide important feedback on TMDL implementation progress and are also used to identify success stories or other significant examples of progress. The TIEs satisfy requirements under state law (MCA 75-5-703) by identifying waters where all appropriate management practices are in place and prioritizing those waters for subsequent beneficial use assessments. Working with stakeholders on TIE development provides additional opportunity to define priority locations for further TMDL implementation and also identify situations where WRP and/or TMDL document modifications would be helpful.

TIEs can be effectively performed at the same watershed scale addressed by a TMDL or WRP document. DEQ has completed seven TIEs and is committed to expanding TIE activity to provide feedback to the many watershed groups implementing WRPs and to expand DEQ's education and outreach activity (**Section 8**). To accomplish this goal, DEQ will develop a prioritization approach for future TIE development. This priority approach will include consideration of the number of years since TMDL

completion, the extent to which TMDL implementation is occurring in a watershed, watershed group or other stakeholder interest in receiving feedback on water quality improvement activities, and the availability of data or other information to help evaluate progress and success.

1.7 STATEWIDE NONPOINT SOURCE PROGRAM EMPHASIS ON POLLUTION PREVENTION

Montana values its waterbodies, whether in need of restoration to meet water quality standards or continued protection to maintain an existing high quality. To maintain and protect these waters, the NPS Management Program emphasizes education and outreach efforts through many different forms and venues. These efforts emphasize the importance of high-quality water, pollution prevention, appropriate best management practices, and individual responsibility. The NPS Management Program supports integrated watershed and community education and outreach on NPS pollution prevention. Because Montana is geographically large but has a population of about one million people, coordination and integration of various partners' resources is most effective. Working with the many organizations identified in **Appendix E**, the nonpoint source program is able to leverage technical and financial resources.

Montana laws address water quality protection from an array of potential NPS pollution concerns, such as individual sewage disposal systems (septic systems), forestry practices and pesticide application. Several state and local agencies have delegated authority to address these issues. For example, the Department of Natural Resources & Conservation (DNRC) enforces the Streamside Management Act; the Department of Fish, Wildlife & Parks (FWP) implements the Stream Protection Act; the Department of Agriculture develops and implements regulations and programs regarding the appropriate application of pesticides; and conservation districts administer the Natural Streambed and Land Preservation Act. **Section 6** describes most of the important state regulatory authorities that control NPS pollution. There is an obvious need to coordinate the various elements of NPS pollution control both within DEQ and among other local, state, and federal agencies.

Adaptive management also plays an integral role in pollution prevention by addressing emerging and new potential threats to clean water. Nevertheless, Montana is highly dependent upon individual landowners and "ordinary citizens" using voluntary best management practices (BMPs) to reduce nonpoint source pollution to protect our waterbodies, wetlands and riparian areas. Education and outreach to targeted audiences, providing clear concise information on sources of pollution, BMPs, and examples of successful NPS pollution reduction outcomes are critical to our goal of protecting and restoring water quality.

1.8 PROTECTING HEALTHY WATERSHEDS

DEQ recognizes the importance of protecting high quality waters and preventing impairments in waters currently meeting standards, particularly when new threats emerge or water quality is declining. To help accomplish an enhanced water quality protection approach, the Nonpoint Source Program intends to implement EPA's Healthy Watersheds Initiative in Montana (information can be found on EPA's website). Montana DEQ anticipates identifying and prioritizing state waters worthy of and needing protection in coordination with watershed groups and land management agencies. Specific protection management practices could be incorporated in DEQ-accepted Watershed Restoration Plans and subsequently potentially eligible for NPS Management Program funding **(Section 5).**

Protecting healthy waters where water quality standards are being achieved is already an inherent component of many TMDL restoration activities because:

- Watershed scale TMDL allocations and resulting implementation goals are based on the assumption that land management practices in healthy tributaries will be maintained, and
- Even in healthy tributary watersheds, there is often potential for improved practices that could contribute to the TMDL pollutant reduction goals for a receiving waterbody.

Once a waterbody has been restored to meet water quality standards, DEQ encourages continued water quality improvements to buffer against potential future pollutant loading increases that might occur due to a lapse in voluntary controls or changes in land use. Furthermore, continued NPS reductions in areas upstream of a point source discharge could result in significant economic efficiencies toward meeting water quality standards below the point source discharge.

The NPS Management Plan, through the combined strategies of TMDL implementation and pollution prevention, will meet the NPS Program's goal to protect and restore water quality from the harmful effects of nonpoint sources of pollution.

2.0 MONTANA'S WATER RESOURCES

Montana's water resources are critical to the future of the Treasure State. Waters of adequate quantity and quality are necessary to sustain the state's economies as well as to meet basic biological needs. Nonpoint Source (NPS) pollution is Montana's most pervasive water quality problem, and it must be understood and managed effectively so that all current and future beneficial uses of the state's waters are supported. This section describes Montana's water resources to provide a context for the strategies and recommendations contained within the rest of this Plan. Most of the information for this Section is provided by the State's "Integrated Report" called for under Clean Water Act sections 305(b) and 303(d), and the 2016 Integrated Report is incorporated by reference in this Plan.

2.1 STREAMS AND LAKES

Montana has approximately 69,200 miles of perennial streams; 307,800 miles of intermittent and ephemeral streams; 12,900 miles of ditches and canals; and 846,500 acres of lakes, reservoirs, and more than 2,500,000 acres of wetlands (**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 individual tribes on NPS Management Program development, including developing TMDLs 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 Department of Environmental Quality, 2012)

RIVER BASINS	Perennial Streams (Miles)	Intermittent & Ephemeral Streams (Miles)	Ditches & Canals (Miles)	Lakes & Reservoirs* (Acres)
Columbia	20,300	29,900	1,800	271,500
Upper Missouri	17,600	38,300	3,900	110,000
Lower Missouri	17,800	142,300	3,800	417,300
Yellowstone	13,500	97,300	3,400	47,200
Montana Total	**69,200**	**307,800**	**12,900**	**846,000**

** 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).*

Montana ranks third in the conterminous United States as having the most stream miles, sixth in the number of lakes, and eighth in total lake acreage (Montana Watercourse, 1996). Montana has been called the "Headwaters of the Continent" because it is the only state that sends water to three oceans—Arctic, Atlantic, and Pacific. A few of Montana's most 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; the highly productive Missoula Valley Aquifer, a designated sole-source aquifer; and the prairie pothole wetlands of the northern great plains. Waters within national parks and wilderness areas are designated outstanding resource waters (ORW) (no degradation allowed).

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

- Two tributaries of the Columbia—the Clark Fork and the Kootenai—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. Many of the state's water pollution control programs have adopted a watershed approach for managing streams and lakes, so that an entire drainage area is assessed for the potential effects on water quality. DEQ's Water Quality Division (WQD) uses the watershed approach to guide water quality planning, protection, and restoration activities. Managing water resources from a watershed perspective presents challenges because few administrative boundaries fall entirely within a watershed. This underscores the need for collaboration among the various public and private entities within a watershed to protect and restore water resources, particularly in the case of NPS pollution.

2.2 WETLANDS, RIPARIAN AREAS, AND FLOODPLAINS

Wetlands, riparian areas, and floodplains play critical roles in protecting water quality. A discussion of each follows.

2.2.1 Wetlands

Wetlands are transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. This transitional area can sometime be difficult to define because there is a diversity of wetland types, and the distinction between wet and dry environments lies along a continuum (**Figure 2-2**). Wetlands are typically defined as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils. Certain wetlands also fall under the jurisdiction of the Clean Water Act (CWA). All wetlands, regardless of their jurisdictional status, perform a range of vital functions (e.g., aquatic habitat, flood control, groundwater recharge, and pollutant attenuation); yet only jurisdictional wetlands are afforded federal protection under the CWA. Ecological or functional wetlands can perform the same range of functions and pollution control, yet may not meet all of the criteria in the above definition.

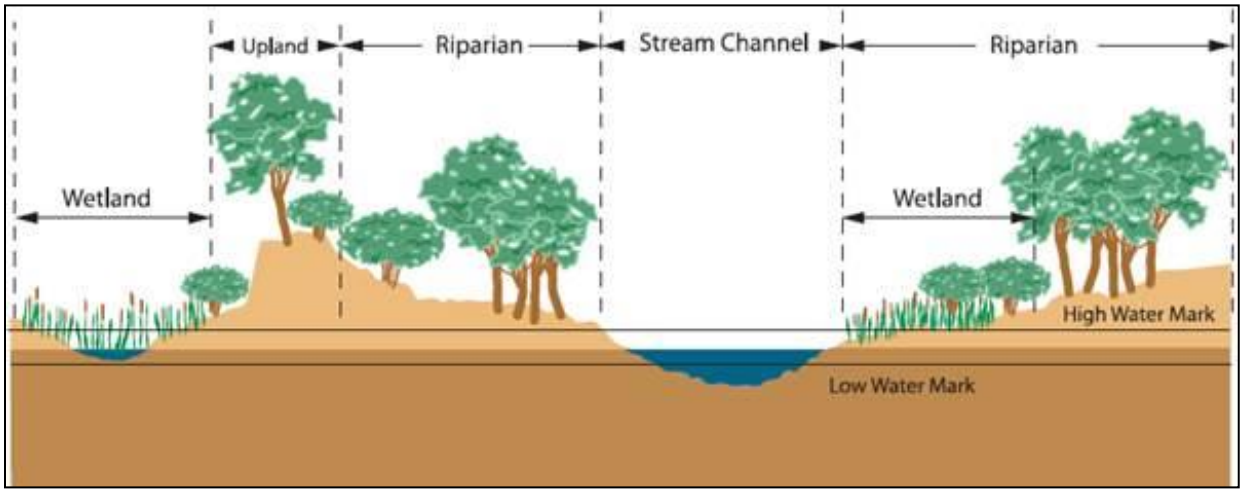


Figure 2-2: Relationship between Wetlands, Uplands, Riparian Areas, and the Stream Channel

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. Natural wetlands provide chemical and biological processes that take more time to develop in artificial or constructed wetlands; therefore it is important to protect and maintain the existing functions of natural wetlands. Although wetlands can capture pollutants, natural wetlands should not be used to treat nonpoint source pollutants, as 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 should be managed and maintained so that they can continue to effectively capture pollutants.

In Montana, the state and federal agencies involved in wetland regulatory programs are the Montana Department of Environmental Quality (DEQ), the United States Environmental Protection Agency (EPA), the United States Army Corps of Engineers (USACE) and the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS). The USACE regulates the dredging or placement of fill material into jurisdictional wetlands through the CWA §404 permitting program. DEQ is responsible for certifying that the actions permitted under CWA §404 will comply with state water quality standards through CWA §401 certification. The CWA §404 permitting process (dredge and fill permits) only applies to CWA jurisdictional wetlands as described above. The DEQ and EPA regulate the point source discharge of pollutants to a wetland through the Montana Pollutant Discharge Elimination System (MPDES) and the National Pollutant Discharge Elimination System (NPDES). 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.

2.2.2 Riparian Areas

Montana has a tremendous variety 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 wetlands. Similar to wetlands, definitions 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.

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

*Riparian buffers are one of **the most effective** best management practices (BMPs) for preventing NPS pollution.*

The State of Montana established the Streamside Management Zone (SMZ) 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.

2.2.3 Floodplains

Floodplains are the areas adjacent to streams, and sometimes lakes and reservoirs, which are subject to periodic flooding. Often they are defined by whether they would be inundated during a flood with a given probability of occurrence, such as a 100-year flood, which has a 1% chance of happening in any given year. Floodplain management can have a profound effect upon NPS pollution. Floodplains that are adequately vegetated are better able to withstand the erosive forces of floodwaters. The wider the floodplain, the more easily floodwaters are able to dissipate energy that would otherwise erode banks and add sediment to streams.

Development in a floodplain can prevent a floodplain from functioning properly to dissipate excess stream energy. This can lead to excessive bank erosion and/or damage to infrastructure and personal property. Consider that anything located in a floodplain will one day be flooded.

This means houses, buildings, livestock, wells, or other objects in a floodplain will be flooded with a certain degree of frequency **(Figure 2-3**). If feedlots, barns, houses, and businesses are located in a floodplain, their contents can contribute pollution during a flood.

Figure 2-3: East Gallatin May 24, 2008 Flooding

In Montana floodplain management is directed through federal, state, and local laws. Federal agencies involved in floodplain management and/or floodplain development include:

- Federal Emergency Management Agency
- United States Army Corps of Engineers
- United States Geological Survey
- Natural Resources Conservation Service
- NOAA/National Weather Service

At the state level, the Department of Natural Resources & Conservation (DNRC) Floodplain Management Program has statutory responsibilities to delineate and designate floodplains and floodways, and provides 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

Groundwater is a critical source of drinking water and irrigation water for many of Montana's rural communities. Montana state law defines all groundwater as State Waters, regardless of its connection to surface water (75-5-103(34), MCA). Montana's groundwater resources include alluvial aquifers and deep aquifers. **Table 2-2**, adapted in part from information in Montana Watercourse 1996, describes some of the general characteristics of these two aquifer types.

Table 2-2: Montana's Groundwater Resources

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.

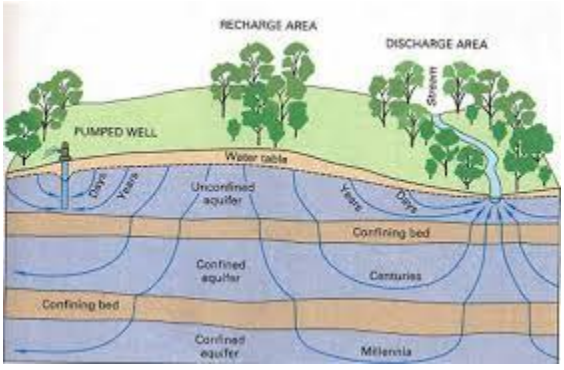


Figure 2-4. Groundwater schematic

Groundwater frequently comes in contact with surface water (**Figure 2-4)**, and sustains baseflow for many streams throughout the state. In any given stream, there are typically some sections where stream water is leaving the stream and entering groundwater (called a "losing stream reach"), and other sections where groundwater is entering the stream (gaining stream reach). Groundwater (even in deep aquifers) is mobile. Rates of travel are highly variable, ranging from a few inches per year to hundreds of feet per day.

NPS pollution can enter groundwater via infiltration/ percolation or through sub-surface flow (**Figure 2-4**). This pollution may ultimately reach surface water, although not all pollutants that enter groundwater will ultimately reach surface water due to natural attenuation. Thus, groundwater pollution does not always result in surface water pollution, or in many cases the amount of pollution entering groundwater will be significantly diminished before reaching interconnected surface water.

Common sources of NPS 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

Appendix F provides additional information on Montana's approach to groundwater management. This appendix provides information on NPS and other management activities that protect or remediate groundwater resources and provide protection for interconnected surface waters.

3.0 MONTANA'S NPS POLLUTION CONTROL STRATEGY

Montana's strategy for addressing NPS pollution includes protecting clean water through appropriate management practices, also referred to as best management practices (BMPs), and statewide education and outreach activities. For surface waters that are not meeting standards the strategy is to restore those waters by developing and implementing science-based, locally-supported watershed restoration plans.

In the case of impaired waters, simply applying BMPs may be insufficient to restore all beneficial uses. The Water Quality Improvement Plans (WQIPs) and associated TMDLs identify the wasteload allocations (point-source pollutant loads) and load allocations (NPS pollutant loads) necessary to meet water quality standards. The NPS load allocations are expected to be met by applying reasonable land, soil, and water conservation practices identified in the WQIPs/TMDLs and Watershed Restoration Plans.

Montana's water quality programs are integrated to ensure success at the program level and to achieve overall water quality protection and restoration goals. The Nonpoint Source Program has, and continues to rely on, DEQ and other agency programs to achieve its goals of attaining and maintaining water quality standards. **Section 6** discusses programs that provide regulatory protection for activities that can generate nonpoint source pollution.

Best Management Practices

Best Management Practices (BMPs) can be implemented to reduce nonpoint source pollution and improve water quality. BMPs are designed and implemented for a specific purpose and include management methods as well as actual physical structures. In the case of water quality, BMPs are practices designed to protect or improve the physical, chemical, or biological characteristics of surface water and groundwater resources. BMPs are often chosen and applied on a site-specific basis. Consideration must be given to 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.

BMPs can be applied to nonpoint sources to achieve "reasonable land, soil, and water conservation practices." The Administrative Rules of Montana (ARM) define these 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." Note that these practices "protect present and reasonably anticipated beneficial uses." The TMDL process is designed to provide guidance to implement all reasonable land, soil, and water conservation practices.

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

The goal of Montana's NPS Management Program is to protect and restore water quality from the harmful effects of nonpoint source pollution.

NPS Management Program Goal

The goal of Montana's NPS Management Program is to protect and restore water quality from the harmful effects of nonpoint source pollution. **Section 7** presents the long-term and interim outcomes established to track progress toward meeting this goal. Further, **Section 8** lays out short-term actions (5-year) and related milestones, determined to be necessary to achieve the stated outcomes. This section articulates specific strategies for addressing the impacts of different land uses and sources of water quality impairment. In order to implement these strategies and accomplish the goal of the NPS Management Program, DEQ will use the following principles:

- Support local conservation activities and organizations
- Complete comprehensive assessments through the TMDL development process
- Improve collaboration with other programs, agencies, and organizations
- Improve the connection between planning and implementation
- Use adaptive management to achieve program goals

3.1 SPECIFIC STRATEGIES BY LAND USE

DEQ has identified the seven major land uses that contribute significantly to NPS pollution and water quality impairment: agriculture, forestry, hydrologic modification, mining and industry, recreation, transportation, and urban and suburban development. These land uses result in the named sources of impairment (e.g., grazing in riparian or shoreline zones) in Montana's 2016 Water Quality Integrated Report and completed TMDL documents.

Each land use is discussed in the following sections. Section 3.2 discusses three additional stressors affecting water quality and NPS pollution in Montana. These are aquatic invasive species, pollutant loading via atmospheric deposition, and the effects that climate change can have on water quality.

3.1.1 Agriculture

Farming and ranching are essential parts of Montana's culture, economy, and environment. Some of the oldest farms and ranches in Montana date back to the mid-1800's. Agriculture is Montana's leading industry, with an estimated $4.6 billion dollar impact on the economy (**Table 3-1**); $1.5 billion greater than the next leading industry, travel (2015, USDA National Agricultural Statistics Service).

Table 3-1. Value of Sales By Commodity Group

Commodity Group	Value of Sales	U. S. Rank
Grains, oilseeds, dry beans, and dry peas	$1,787,162,000	17th
Cattle and Calves	$1,783,908,000	11th
Other crops and hay	$403,251,000	14th
Hogs and pigs	$54,091,000	23rd
Milk from cows	$44,671,000	38th
Vegetables, melons, potatoes and sweet potatoes	$33,199,000	38th
Sheep, goats, wool, mohair, and milk not from cows	$31,233,000	10th
Nursery, greenhouse, floriculture and sod	$28,566,000	43rd

Horses, ponies, mules, burros, and donkeys	$22,824,000	18th
Fruit, tree nuts, and berries	$3,658,000	43rd
Aquaculture	$3,172,000	43rd
Cut Christmas trees and short rotation woody crops	$160,000	42nd

(Source: USDA, NASS, 2012 Census of Agriculture)

Farming and ranching are essential parts of Montana's culture, economy, and environment. Farmers and ranchers are the primary day-to-day stewards of millions of acres of public and private lands in Montana. Without their support, thousands of streams, lakes, and wetlands, along with much of Montana's groundwater resources, cannot—and will not—be protected from NPS pollution. Montana supports voluntary implementation of site-specific BMPs as an effective method of addressing NPS pollution from agriculture-related sources. Montana also recognizes that water quality protection conditions in grazing leases, permits, and funding agreements can be an effective method of encouraging people to implement BMPs.

Nonpoint source pollution from agricultural practices alters water quality in many of Montana's lakes, streams, wetlands, and groundwater aquifers. It can impair the usefulness of state waters for human consumption, fish and wildlife production, irrigation, recreation, and industrial processing. 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, a loss of riparian and aquatic habitat, and other serious problems. In Montana, state waters are a shared resource among all citizens. Care must be taken to effectively balance agricultural uses with the needs of other beneficial uses, such as drinking water, fish and wildlife production, and recreation.

Strategy

The Montana NPS Management Program will focus on four strategies to promote, facilitate, and create reductions in NPS pollution from agricultural sources.

Strategy 1: Improve communication on NPS pollution issues among Montana's agricultural community.

Farmers, ranchers, educators, agencies, and consumers alike should be familiar with, and feel comfortable discussing, NPS pollution issues as frequently as necessary. The NPS Management Program will encourage open participation in efforts to reduce and prevent NPS pollution.

- Face-to-face communication. The program will encourage, support, and facilitate face-to-face meetings. Farmers, ranchers, state and federal agency staff, trade organization representatives, and other members of the agricultural community will meet in person to help build relationships of trust and understanding of one another's needs and interests.
- Clear, user-friendly information. Federal, state, and local governments will provide farmers, ranchers, and others with clear and concise information about water quality laws, permitting

requirements, cost-share opportunities, TMDLs, conservation initiatives, and other policies and programs.

- Mutual respect. Government agencies, agricultural producers, trade organizations, and environmentalists will work to improve mutual respect, support, and cooperation.
- Continuing education. Agency staff, educators, and watershed group members will continually seek new methods and opportunities to discuss NPS pollution with farmers and ranchers, and farmers and ranchers will provide feedback on agency and watershed group activities.

Strategy 2: Connect agricultural producers with the technical and financial resources necessary to reduce nonpoint source pollution from farming and livestock operations.
Local, state, and federal government agencies, private consultants, and nonprofit organizations will work with ranchers, farmers, and rural communities to identify and supply relevant information, processes, technology, and financial incentives for addressing nonpoint source pollution.

Strategy 3: Evaluation and adaptive management.
Montana's NPS Management Program will evaluate the success of NPS pollution reduction programs and projects. Open communication and adaptive management will facilitate continual improvement in the tools and resources used to address NPS pollution from agricultural sources.

Strategy 4: Maintain existing programs that address contamination of groundwater from improper application of pesticides.
The Montana Department of Agriculture (DOA) and the Montana Department of Environmental Quality (DEQ) will continue to work together to implement established programs for preventing, monitoring, and remediating pesticide pollution in groundwater. The DOA Agricultural Services Bureau will review pesticide registrations, train and license applicators and dealers, provide technical and compliance assistance to applicators and landowners (using enforcement authority when necessary), and provide opportunities for waste pesticide disposal and pesticide container recycling. The Agricultural Services Bureau will also continue to monitor groundwater throughout the state in order to detect and quantify contamination from pesticides. The DEQ, Water Quality Planning Bureau, Standards and Modeling Section will develop and maintain water quality standards for individual pesticides, and the DEQ Groundwater Remediation Program will provide oversight and remediation of sites known to be contaminated with pesticides.

3.1.2 Forestry

Forest lands cover 22.5 million acres in Montana, nearly a quarter of the state's total lands. These forests are divided about equally between forests east and west of the Continental Divide. For forestry and forestry-related activities, the NPS Management Program relies on a combination of regulatory and voluntary approaches.

Montana's forests provide valuable uses, 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. The state's largest forest-land holder is the U.S. Forest Service, followed by non-industrial private land owners (**Figure 3-1**). The majority of timber harvested

comes from private lands (both industrial and non-industrial). "Currently, Montana's forest products industry is one of the largest components of manufacturing in the state and employs roughly 7,700 workers earning about $335 million in compensation annually." (Morgan et al. 2015). The forest products industry accounts for approximately 32% of the total manufacturing jobs in Montana, which contribute $1.1 billion in labor earnings and $14 billion in sales to the state's economy (Montana Wood Products Association, 2015). In 2014, forest lands produced approximately $600 million in wood and paper products (Morgan et al., 2015).

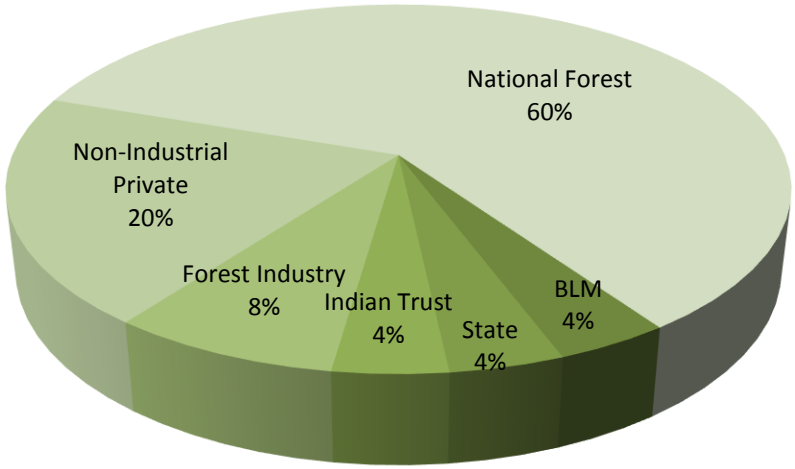


Figure 3-1: Forest Land Ownership in Montana in Year 2015

(Montana Wood Products Association, 2015). 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.

Pollution from forestry and silviculture operations can include nutrients, sediment, and temperature (pollutants), or streamside (riparian) habitat alterations and flow alterations (non-pollutants). Almost half (48%) of all forested watersheds contain at least one impaired stream reach or waterbody (Montana Department of Natural Resources and Conservation, 2010). Montana has 157 waterbodies (stream segments or lakes) identified as impaired (at least in part) from forestry-related activities; forest roads and silviculture are the primary sources of impairment.

Forest Road Construction and Use

Unpaved roads are the primary source of sediment in forested watersheds (Sugden and Woods, 2007). Forests roads running adjacent to streams are often called "legacy roads". These are roads originally built decades ago before modern BMPs were developed. Stream crossings and/or legacy roads can act as a direct source of sediment delivery and may impact the natural functioning of streams by limiting the stream's capacity to flood at regular occurrence intervals or move across the floodplain. Implementing contemporary BMPs, where roads are properly located, well designed, and well maintained (including keeping stream crossings to a minimum), can dramatically reduce the negative impacts on water quality.

Silvicultural Harvesting in Riparian Areas

Timber harvesting in riparian areas has the potential to 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, nutrient cycling, streambank stability, sediment filtration, and flood-flow attenuation. Montana's Streamside

Management Zone (SMZ) law (77-5-301 et seq. 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 riparian buffers, and therefore streams, but the effects of historical riparian harvests (e.g., erosion; loss of source for large woody debris) may in some cases be long lasting.

Strategies

Forested lands cover close to 25% of Montana. Therefore, strategies for reducing the effects of NPS pollution from forestry activities must be effectively implemented across forest lands and management agencies. Montana forestry professionals have developed strategies for reducing forestry-related NPS pollution. In addition to these, the U.S. Forest Service has developed a National Best Management Practices (BMP) Program to improve management of water quality consistent with the CWA and state programs. **Appendix A** describes the most commonly used forestry BMPs. **Appendix E** lists partners and resources that may be able to provide additional information on forestry BMPs.

Strategy 1: Maintain and improve Montana's Forestry Best Management Practices program.
The Forestry Division of the Montana Department of Natural Resources & Conservation (DNRC) organizes voluntary forest practices field reviews via an interdisciplinary team that reviews recent forest harvest activities of participating landowners. Since 1990, assessment teams have examined the use of forestry best management practices biennially across four ownership types (state, federal, industrial, and non-industrial private landowner) and have shown that forestry BMPs for new forestry operations are effectively applied across ownership types (Sugden et al., 2012). In 2016, assessments showed forestry BMPs were properly applied 97.5% of the time. On sites where BMPs were inadequately applied, only one site had a major departure, resulting in sediment delivery to a waterbody (Ziesak, 2016).

Strategy 2: Support implementation of best management practices and actions to restore and maintain water quality conditions
Historical forestry practices, such as poorly designed or located roads and removal of stream-side forests, have increased sediment loads and instream temperatures to varying degrees. Waterbodies impaired from past forestry practices can benefit from BMPs that relocate or reconstruct roads with effective drainage and enhanced buffers of woody streamside vegetation.

Strategy 3: Improve collaboration to implement and monitor BMPs.
In order to minimize NPS pollution from forest sources and improve water quality, it is essential that federal, state, and local agencies, as well as private landowners, collaborate to identify and implement BMPs on forested lands. Montana's NPS Management Program supports collaborative forestry BMP through individual implementation and through development and implementation of Habitat Conservation Plans (HCPs) that outline forest-riparian habitat policies and standards for fish and wildlife. These plans can include: reducing sediment delivery from existing roads; monitoring the effectiveness of road BMPs; measuring riparian and canopy cover; identifying the effects of changes in water temperature; and monitoring riparian conditions. DNRC and Weyerhaeuser are currently implementing HCPs in cooperation with the U.S. Fish and Wildlife Service. Individual private landowners have worked to address water quality concerns through cooperative efforts with local, state and federal agencies.

Another form of collaboration is to support and participate in Forest Service interdisciplinary reviews, including BMP implementation and effectiveness monitoring, 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 functioning of riparian areas.

3.1.3 Hydrologic Modification

Dams, reservoirs, stock ponds, diversions, etc. are vital and 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. However, these structures and practices can have negative consequences on water quality and aquatic life.

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.
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 of wetlands for development and construction; flood control dikes; road and railroad grades; bridges; dams; diversion structures; channelization; dredge/placer mining.

Some of the negative water quality impacts from hydrologic modification include:

- Reduction in riparian vegetation along streams which can lead to increased bank erosion, increased channel migration, increased water temperature and habitat loss
- Increased water temperature from reduced streamflow
- Increased bank erosion rates from water transfers that result in unnaturally high stream flows
- Increased sediment deposition from a lack of stream flushing flows
- Reduction in pollutant dilution capacity

Under Montana's NPS Management Program, hydrologic modification is often identified as a source of elevated pollutant loading consistent with many of the above listed water quality impacts. Hydrologic modification can also be identified as a cause of impairment, often due to late season flow reductions that negatively impact aquatic life habitat. Montana DEQ has identified more than 300 waterbodies or stream segments that are impaired due to some type of flow alteration. Many of these waters are also identified by Montana Department of Fish, Wildlife and Parks (FWP) as being chronically dewatered.

In some instances, hydrologic modifications may actually help protect or benefit beneficial uses, such as fisheries and aquatic life. 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 any concurrent irrigation diversions. Dams often reduce flooding impacts and provide hydroelectric power. Furthermore, reservoirs created by dams often provide high quality fishing, boating and other recreational opportunities.

Strategies

Where appropriate, the negative water quality impacts from hydrologic modifications will be reduced through a combination of strategies discussed below. These strategies will be implemented while ensuring water rights are respected.

Strategy 1: Support efforts to minimize or avoid development within floodplains, along streambanks, within wetlands and adjacent to lakes.

This strategy will be pursued primarily through 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. It will also be pursued by supporting existing regulations that help avoid or minimize this type of development.

Strategy 2: Support efforts to restore natural hydrologic conditions

This strategy will be pursued by supporting actions that restore floodplain connectivity and function and improve natural stream processes. It also involves implementing BMPs and endorsing land use modifications that minimize disturbance within floodplains, riparian areas, wetlands and along streambanks. Efforts to improve stream flows during critical low flow periods will be supported, while at the same time ensuring no harm to water rights. Montana recognizes that it is ultimately up to local users, agencies, and entities to voluntarily improve instream flows through water and land management, which may include irrigation efficiency improvements and/or instream water leases.

This strategy includes restoring fish passage where appropriate. FWP, Trout Unlimited, and other partners will be encouraged to continue efforts to retrofit diversion and other structures to improve fish passage.

Strategy 3: Promote practices and activities that help minimize the impacts of hydrologic modifications

Implementing this strategy involves promoting and applying many of the numerous BMPs and other practices and activities that can help minimize negative impacts from hydrologic modifications, including:

- Promoting practices and projects that minimize changes in the amount, location, timing, and energy of water in streams and lakes
- Supporting Department of Natural Resources and Conservation's Water Management Division drought resilience planning
- Ensuring that Clean Water Act and other environmental improvement funding sources used toward irrigation efficiency projects are designed to ensure that water savings will result in improved instream flows
- Promoting the use of open-bottomed culverts or wide-spanning bridges instead of traditional corrugated metal pipe
- Promoting the use of "soft" bank armoring (riparian vegetation, brush-toe), and limiting the use of "hard" bank armoring (rip-rap, rock, and log bulwarks) to the minimum amount necessary to protect critical infrastructure
- Providing geomorphic and flow- contextually appropriate guidance and recommendations to parties engaged in stream restoration

Strategy 4: Mitigate hydrologic modifications where possible

Mitigation activities will be encouraged and supported where hydrologic modification cannot be avoided. This includes promoting public and private support for wetland, streambank and other types of mitigation banking and efforts to advance restoration and mitigation science.

3.1.4 Mining and Industry

In Montana, mining includes activities associated with the removal of hard rock minerals, ore, coal, sand and gravel. Industry includes activities associated with the manufacturing of tangible products, and extraction and refinement of oil and gas. Frequently, state and federal regulatory programs that address pollution from mining also address pollution from industrial sources. Some of these "crossover" programs are identified below and described in greater detail in **Section 6.0** Enforceable Regulatory Programs.

- State Superfund (CECRA)
- Federal Superfund (CERCLA and SARA)
- Montana Hazardous Waste Act

Figure 3-2, below, depicts CECRA and CERCLA sites throughout Montana. These sites represent significant land and/or water contamination from mining, industry, and a small number of livestock operations.

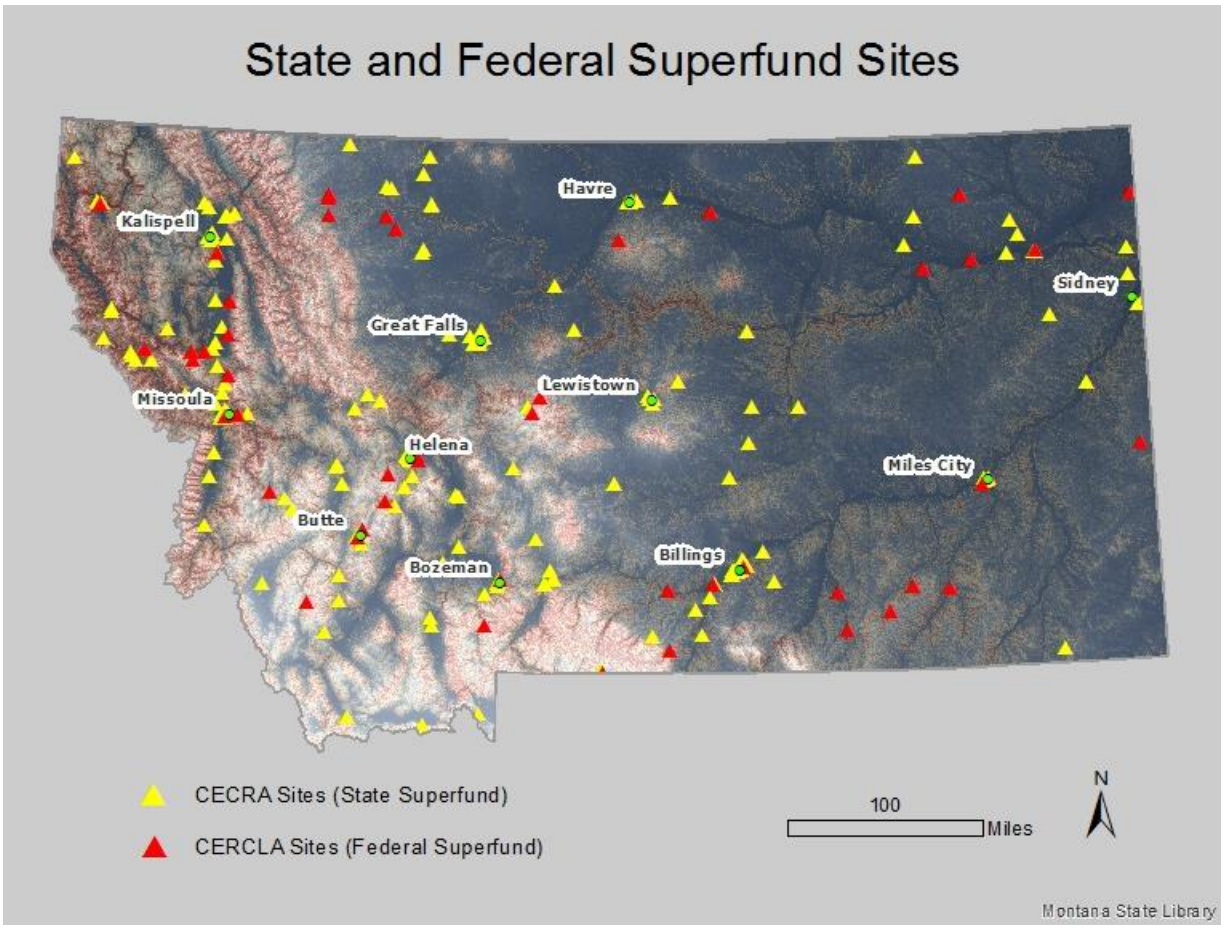


Figure 3-2. Montana CECRA and CERCLA sites

Contribution to Nonpoint Source Pollution from Mining

NPS pollution from mining is typically the result of one or more of the following processes:

- stormwater runoff (sediment, metals, salts, petrochemicals)
- acid mine drainage (acid, lead, copper, zinc, cadmium, other heavy metals)
- direct additions of waste rock, spoil piles, or placer piles (riparian and wetland habitat loss, sediment, metals)

Strategies

Working mines are regulated under federal and state permits and laws (see Section 6). Discharges from active mine sites are considered point-source discharges and are controlled by the permit conditions issued under the Montana Pollutant Discharge Elimination System (MPDES). In order to obtain a permit, mine operators must pay a fee and agree to maintain mine site conditions that protect water quality. In many cases, they must also post a bond covering liability for cleanup and restoration.

Abandoned mines often include point sources and nonpoint sources of pollution. Discharges from abandoned mines are not typically covered under MPDES permits, leaving their control and abatement up to non-regulatory programs and the efforts of various agencies, private organizations, and individuals often in collaboration with DEQ.

DEQ's Abandoned Mine Lands Program (AML) has identified approximately 3,000 abandoned or inactive hardrock mine and milling sites in Montana. Approximately 128 priority hardrock mines were incorporated into a priority site list (**Figure 3-4 and Table 3-2**). AML has addressed many long abandoned mine and mill sites. Montana is also home to approximately 3,200 abandoned coal mines. Hundreds of these mines have been reclaimed since the passing of the Surface Mining Construction Reclamation Act (SMCRA) in 1977.

The map in **Figure 3-3** depicts the locations of the 128 abandoned mine sites that are currently on the State of Montana's prioritized short list of sites needing to be addressed. Some, though not all, of these sites contribute pollution to state waters. The tables below indicate how many of the 128 sites are located within each county. If a county is not included in the tables, then no prioritized sites exist within that county.

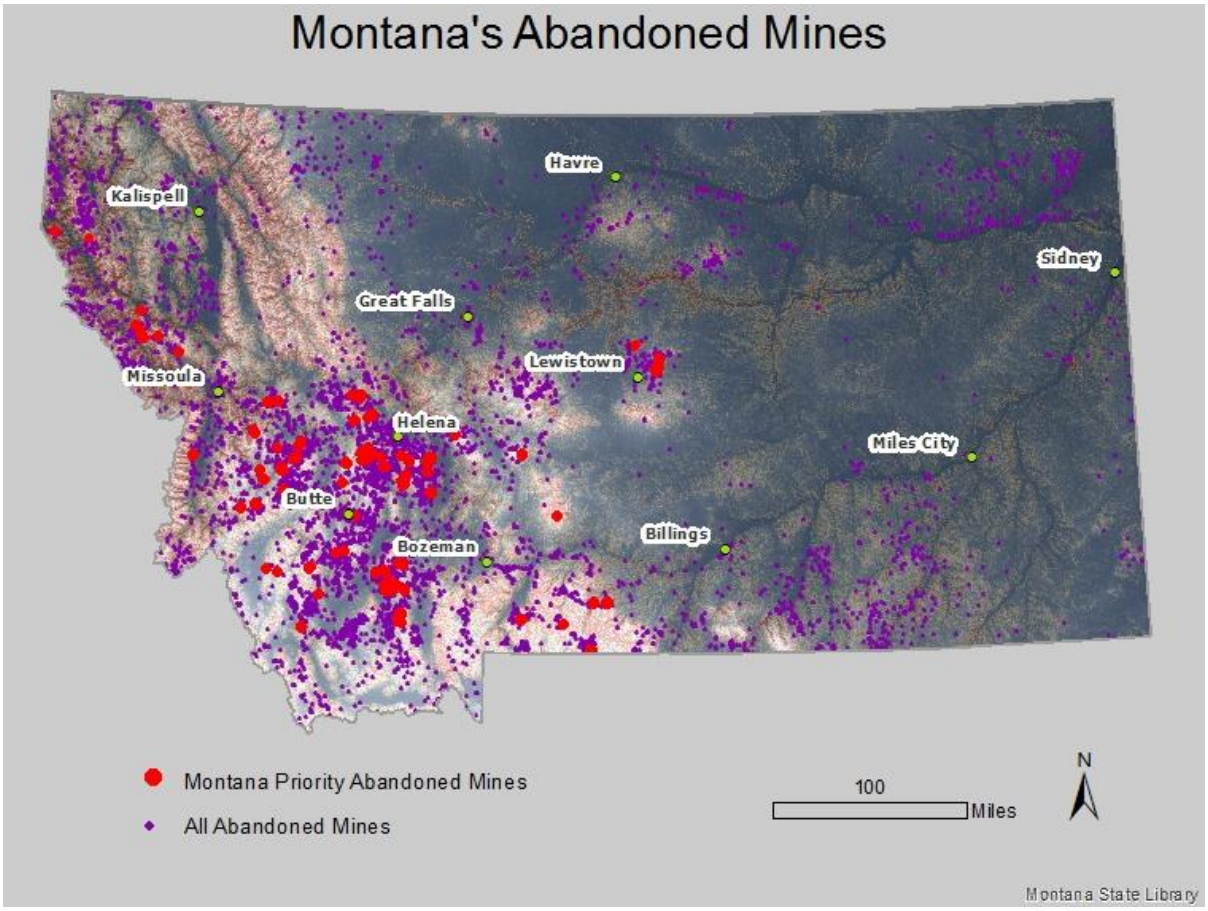


Figure 3-3 Locations of Montana's Abandoned Mines

Table 3-2. Montana's Counties with Prioritized Abandoned Mine Sites

COUNTY	# Sites
Beaverhead	8
Broadwater	9
Deer Lodge	2
Fergus	6
Granite	21
Jefferson	11
Lewis & Clark	10
Lincoln	1
Madison	19
Meagher	3

COUNTY	# Sites
Mineral	4
Missoula	5
Park	4
Powell	13
Ravalli	2
Sanders	4
Silver Bow	3
Stillwater	2
Sweet Grass	1
Total	**128**

Continuous inventory of abandoned mines identifies hazardous mine openings and impacts to surface water and groundwater. These issues are addressed through a combination of Office of Surface Mine Reclamation and Enforcement (OSMRE) funds, Orphan Share funds, and in collaboration with DNRC, U.S. Forest Service, local chapters of national organizations (e.g., Trout Unlimited), and county governments that also contribute funds through grants, direct and in-kind contributions.

Strategy: Improve collaboration between the DEQ Watershed Protection Section (WPS) and the DEQ Abandoned Mine Lands (AML) program to address non-permitted pollution from mining-related sources.

As funding for mine reclamation becomes increasingly scarce, agencies and organizations face an ever-increasing need to pool technical and financial resources in order to complete mine reclamation projects. The DEQ may use Section 319(h) funds to pay for abandoned mine site reclamation projects designed to protect water quality if those activities meet both of the following conditions: (1) the activities are not specifically required by a draft or final NPDES/MPDES permit and (2) the activities do not directly implement a draft or final NPDES/MPDES permit. DEQ will:

- design, fund, implement, and monitor on-the-ground projects to remediate water pollution from abandoned mines or portions of abandoned mines
- educate landowners, land managers, conservation districts, watershed groups, and others seeking to address pollution from abandoned mines

Contribution to Nonpoint Source Pollution from Industry

Pollution from industrial sources (manufacturing, oil refining, chemical production) is typically the result of direct discharge, stormwater runoff, seepage of chemicals into groundwater (which may come into contact with surface water), or erosion of contaminated sediments. Pollution from active, industrial facilities is typically regulated under a point source discharge permit. Pollution from inactive facilities, and in rare cases pollution from some active facilities, is addressed through application of the site remediation programs identified below and described in greater detail in Section 6.0 Enforceable Regulatory Programs.

- Federal Superfund (CERCLA and SARA)
- State Superfund (CECRA)
- State Water Quality Act (WQA) Groundwater Remediation Program (GRP)

- State and federal underground storage tank release laws
- Montana Hazardous Waste Act
- Montana Solid Waste Management Program

Strategies

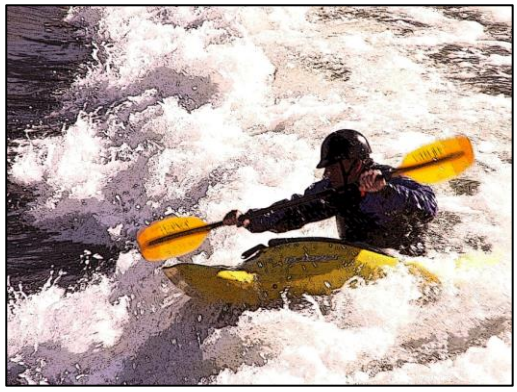
Montana will use the following regulatory and voluntary methods to address nonpoint source pollution from industrial sources.

Strategy 1: Using the authorities and funding sources described above, DEQ's Waste Management and Remediation Division will continue to investigate and remediate NPS pollution from industrial sources.

Strategy 2: DEQ's Waste Management and Remediation Division will continue to collaborate, where appropriate, with EPA to investigate and remediate pollution from federal Superfund sites.

Strategy 3: Collaborate with others to address pollution from industry-related sources.
Other state and federal agencies, as well as private individuals, may become involved in efforts to reduce pollution from industrial sources. The NPS Management Program will work with these stakeholder groups as needed and as resources permit.

3.1.5 Recreation



According to the Outdoor Industry Association, outdoor recreation generates $1.5 billion in wages and salaries, $403 million in state and local tax revenue, and 64,000 direct jobs in Montana (Montana Department of Fish, Wildlife and Parks, 2014). Approximately 95% of Montanans feel that outdoor recreation is important to their quality of life. Approximately 88% of Montana residents participated in some form of outdoor recreation in the past 12 months with high participation in water-based activities (Montana Fish, Wildlife and Parks, 2014). Water-based recreation includes activities on lakes and rivers; along the shores of rivers, streams, and lakes; and in riparian areas. Intensive or inappropriate recreational activities can harm water quality, and poor water quality can degrade recreational activities.

Many recreational activities in Montana are directly related to surface water, and those activities can contribute to nonpoint source pollution and negatively affect water quality. There is a high potential for water quality degradation associated with boating activities from aquatic invasive species, contaminated bilge water, petroleum products, trash, and solvents being released into state waters. In addition, boat wakes can increase bank erosion. If improperly designed, marinas can cause water quality problems by destroying habitat and restricting water flows. Recreational uses, such as swimming, water skiing, fishing, and others, are adversely affected by water quality degradation.

In addition to water-based recreational activities, activities on upland areas can also contribute to NPS pollution. Many of the unpaved roads on public lands (**Section 3.1.2**) remain open to sustain recreational activities. Repeated and unauthorized travel off of designated roads by vehicles, ATVs,

motorcycles, and mountain bikes contribute to riparian damage and excess sediment runoff into nearby streams and lakes.

Strategies

The Montana NPS Management Program will support the following strategies be used to increase implementation of water quality-based BMPs for recreational activities.

Strategy 1: Educate and engage Montana's recreation community.

Quality outdoor recreation relies on a clean and healthful environment. Montana Fish, Wildlife and Parks presented a vision for recreation management in Montana that encourages coordinated management that crosses agency boundaries and develops partnerships across jurisdictions at all levels. One of their priorities is to promote stewardship and sustainability that engages users as stewards of land and water resources through volunteer opportunities and citizen science programs (Fish, Wildlife, and Parks, 2014).

- Enhance agency coordination to ensure the recreation community understands their potential impacts to water quality
- Engage the fishing community in ongoing stream restoration and fish habitat improvement projects
- Promote responsible boating through educational campaigns, materials, and signage

Strategy 2: Promote and support responsible water-based recreation.

In order to promote responsible water-based recreation, the NPS Management Program supports the proper development and maintenance of marinas, fishing access sites, and other recreational facilities. These facilities can provide essential services for safe and effective disposal of wastes, particularly sewage and petroleum products.

- Properly site and establish boat ramps to minimize bank erosion and habitat loss
- Address unofficial trails to and along the water
- Properly site, place, and maintain vault latrines
- Promote responsible boating through educational campaigns, materials, and signage

Strategy 3: Support off-highway travel planning and promote responsible OHV use.

Motor vehicles are a legitimate and appropriate way for people to enjoy public lands with responsible use and proper management. Local, state, and federal agencies can proactively address effects from off highway vehicles (OHV) by developing polices and BMPs to monitor, minimize, and prevent NPS pollution from OHV use. In general, this can be done through the U.S. Forest Service's and Bureau of Land Management Travel Management Plans. These plans provide guidance for the appropriate use of public lands and will help ensure the protection of water quality in Montana. In watersheds where water quality is impaired, agencies can evaluate the current extent of OHV access, work to reduce access near impaired waters, and improve and maintain degraded routes.

- Review federal public land Travel Management Plans for addressing water quality protection
- Support responsible OHV use through educational campaigns, materials, and signage

3.1.6 Transportation

The Montana Department of Transportation (MDT) is the primary agency that deals with transportation issues in Montana. MDT has maintenance responsibilities for 12,946 miles of roadway and 4,510 bridges statewide. Additionally, Montana has approximately 3,125 miles of active main-line track owned and operated primarily by BNSF Railway. Local governments maintain additional roads and bridges throughout the state. Transportation is also a significant source of jobs and economic development in local communities. Transportation construction and maintenance projects employ approximately 16,000 people every year. Between 2012 and 2016, MDT awarded 449 construction projects totaling nearly $1.2 billion (Montana Department of Transportation, 2016).

Contribution to Nonpoint Source Pollution

Many of the transportation routes in Montana are located in floodplains adjacent to lakes, wetlands, rivers, and streams. If not properly managed, these transportation routes (roads, highways, railroads, etc.) can be a significant source of NPS pollution, especially where bridges cross over water. Litter from vehicles, oils and gasoline, and traction sand and road salt all accumulate in transportation corridors, potentially ending up in surface waters. In 2016, MDT crews applied 170,640 cubic yards of traction sand and 8,793,620 gallons of chemical deicer and brine (Montana Department of Transportation, 2016). Transportation routes that travel directly along streams and rivers can further limit lateral migration and floodplain function, affecting sediment transport and bank erosion.

Strategies

There are a variety of programs and practices that limit the potential effects of NPS pollution from transportation sources, including stormwater permitting and construction BMPs, the MS4 Program, wetland and stream mitigation procedures, corridor planning, and the Adopt-A-Highway program. For more information on the specifics of these programs and partners see **Appendix E and A**.

Strategy 1: Increase collaborative efforts to manage NPS pollution from transportation sources.
In order to minimize NPS pollution from transportation sources and improve water quality, it is important for DEQ and other natural resource agencies to work with MDT to increase information sharing and project planning.

- Work with MDT to identify opportunities and priorities to reduce NPS pollutants from Montana's surface transportation system.

Strategy 2: Increase nonpoint source pollution awareness for road maintenance personnel.
Because road maintenance personnel work on site, they can have the biggest effect on transportation-related sources of NPS pollution. An effective management tool for limiting NPS pollution from transportation sources is to develop and/or

distribute educational materials and trainings specifically for road maintenance personnel. The tools would raise awareness about NPS pollution and workers' roles in preventing and limiting it. Specifically, DEQ will work to:

- Continue efforts of training personnel and equipment calibration to ensure that the correct quantities of sand and chemical deicers are used to provide safe roadways for traveling
- Proper implementation of stormwater runoff BMPs on transportation construction sites to reduce sediment delivery to waterways

3.1.7 Urban and Suburban Development

Montana surpassed a population of one million people in 2012 with urban areas experiencing the highest population growth. A total of 56% of Montanans are now living in urban areas (Montana Fish, Wildlife and Parks, 2014). According to the 2010 Census, 41.7% of Montana's population lives in urban areas with over 25,000 people. NPS pollution from urban and suburban sources is generated by a broad range of activities associated with domestic, municipal, industrial, and commercial land development and uses. Population density and intensity of land use in urban and suburban areas results in inherently higher concentrations of pollutants in waters draining from these areas. Adequate water quality protection is more challenging to achieve in urban and suburban areas because it depends upon the collective actions of a greater number of people relative to more sparsely populated areas.

Because individuals and businesses continually generate waste, their cooperation and stewardship is essential for preventing water quality degradation. Although complete elimination of NPS pollution generated from urban and suburban land uses is impossible, Montanans must make substantial progress to ensure that preventable and controllable sources of NPS pollution do not cause water quality impairments.

Contribution to Nonpoint Source Pollution

Rapid development and growth require specific attention in order to protect water quality. Stormwater runoff, residential waste disposal, and alterations of riparian areas are major sources of nonpoint source pollution in Montana's urban and suburban areas.

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, PCBs, metals, bacteria, and viruses. Polluted stormwater can harm aquatic organisms and their habitat, contaminate drinking water supplies, and render waterbodies unfit for recreational activities.

As the percentage of impervious surfaces in a watershed increases, so does the volume of stormwater and pollutant loads delivered to waterbodies. The DEQ issues a Montana Pollutant Discharge Elimination

System (MPDES) general permit for stormwater discharges associated with small municipal separate storm sewer systems (small MS4s), construction activity, and industrial activity. MS4 permits apply to Montana's seven largest cities - Billings, Missoula, Great Falls, Bozeman, Helena, Butte, and Kalispell. This general permit requires permitted municipalities to develop a stormwater management program that includes six minimum control measures. Permittees must then implement best management practices consistent with these control measure for ensuring 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 to reduce stormwater pollution, such as reducing lawn fertilization, pet waste removal, and installing rain barrels or rain gardens to temporarily store runoff.

Suspended sediments tend to be the largest pollutant loads to receiving waters in urban and suburban areas. Soils eroding from construction sites and traction material (road sanding) are major source of suspended sediment. Higher percentages of impervious surfaces can also drastically 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. Not only does altered hydrology have severe consequences for local aquatic and riparian habitats, but it also increases the risk of property damage by flooding and eroding streambanks.

Waste Disposal

Residential and commercial waste disposal includes a variety of pollutant sources, such as septic systems, pet wastes, solid waste disposed in landfills, and hazardous chemicals and materials.

"Sediment runoff rates from construction sites are typically 10 to 20 times greater than those from agricultural lands and 1,000 to 2,000 times greater than those of forest lands. During a short period of time, construction activity can contribute more sediment to streams than was previously deposited over several decades."

(American Society of Civil Engineers, Urban Water Resources Research Council, 1992)

The primary water quality concerns with septic systems include the contamination of groundwater and surface water by nutrients (nitrogen and phosphorus), pathogens (bacteria, parasites, and viruses), household chemicals, and chemicals derived from pharmaceutical and personal care products (PPCPs). A properly functioning septic system can significantly reduce levels of nutrients and bacteria in wastewater; however, with conventional designs even a properly functioning septic system will release fairly high amounts of nitrogen in the form of nitrate, with estimates ranging from 26 to 75 mg/L (U.S. EPA, 2002). In some surface waters, total nitrogen levels as low as 0.25 mg/L and nitrate levels as low as 0.1 mg/L can contribute to nuisance algae blooms that harm aquatic life and degrade recreational uses. Under some circumstances, septic systems that may impact surface waters due to nutrient discharges are evaluated for conformance with the state nondegradation rules and numeric water quality standards.

Based on scientific literature, a properly designed and approved septic system should be installed as far away from water as possible, but at least 100 feet. Most platted lots have a pre-approved location where the leach field must be constructed. The effectiveness of septic systems in treating PPCPs is not known and is likely to be compound specific. However, many studies across the country, and several studies in Montana, have detected PPCPs in both groundwater and surface water. Maximum contaminant levels for individual PPCPs, as well as the synergistic effects of PPCPs, are largely unknown.

Landfills, particularly historical facilities, which were unpermitted and unlined, pose a threat to surface water and groundwater quality because carcinogenic and toxic substances may leach into aquifers or surface waters. For example, bisphenol-A, fire retardants, and plasticizers, which can be toxic and/or carcinogenic have been found in groundwater and/or streams across the nation (National Capital Poison Center, 2012). As of 2017, there were 69 licensed landfills in Montana, which includes 34 Class III facilities. Class III landfills are not lined but do not pose a threat because they accept only inert materials such as rock, brick, and untreated lumber.

Alteration of Urban and Suburban Riparian and Wetland Areas

When complex riparian systems are simplified or reduced in size by changing the vegetation, soils, and/or water-flow patterns, their ability to serve as "sinks" for pollutants (i.e., areas that filter pollutants from upland runoff) can be greatly diminished. Substantially degraded riparian areas do not filter pollutants from upland runoff and the riparian area itself becomes a source for pollutants. For example, as riparian soils erode, they begin to export sediment and nutrients to waterbodies.

Riparian areas that have been converted to lawns or small acreage pastures for domestic livestock can contribute to: higher levels of instream nutrients, sediment, bacteria, and algae; higher summer water temperatures and lower dissolved oxygen; greater amounts of channel erosion; and greater damage to property by flooding.

Three types of alteration to urban and suburban riparian areas are currently of greatest concern to the NPS Management Program:

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

Strategies

DEQ intends to use and promote the following strategies to increase implementation of water quality-based BMPs for urban development practices. For BMPs related to stormwater see **Appendix A**.

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

Many stormwater sources of pollution are regulated by discharge permits issued under the Montana Pollution Discharge Elimination System (MPDES). The three types of stormwater MPDES permits that apply to urban and suburban areas are industrial, construction, and municipal separate storm sewer systems (MS4). Montana also addresses stormwater through the state's subdivision permitting process and local government development regulations.

Stormwater that is not addressed by an MPDES or subdivision permit can be managed through voluntary BMPs.

- Characterize and assess the effects of stormwater pollution on the quality of state waters
- Provide technical and financial assistance to local stakeholders for educational and outreach campaigns that address stormwater pollution prevention and control
- Increase the effectiveness of Montana's stormwater permitting program
- Increase the effectiveness of Montana's subdivision permitting program
- Provide technical and financial assistance to plan and implement voluntary BMPs by public and private entities for reducing and controlling stormwater pollution
- Promote low impact development
- Participate in EPA's revised stormwater rule-making

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 protecting water quality from NPS pollution.

- Continue to assess contributions of septic systems to surface water-quality impairments, develop TMDLs that address pollutant loading from septic systems, and provide technical and financial assistance for projects that focus on specific septic system issues
- Increase monitoring at closed landfills to detect groundwater contamination
- Continue to provide technical assistance to solid waste professionals

Strategy 3: Encourage the adoption of local regulations that protect the functions of floodplains, riparian, and wetland areas to address the cumulative effects of NPS pollution from urban and suburban development on water quality.

Functioning riparian areas in urban and suburban areas are important in protecting water quality. They maintain the integrity of stream functions and act as natural filters for stormwater runoff. Impacts from public and private infrastructure can limit the extent of riparian areas and the degree to which streams can access their floodplains. Maintaining and improving the health and extent of native vegetation and soils is key to ensuring that riparian areas can function properly. The soils, vegetation, and hydrological characteristics of intact riparian areas help maintain water quality standards.

- Support the development and adoption of guidelines and regulations addressing urban and suburban development near waterbodies
- Support channel migration zone mapping as an educational and decision-making tool

3.2 STRATEGIES FOR OTHER WATER QUALITY CONCERNS

Aquatic invasive species, atmospheric deposition, and climate change can have negative effects on Montana's waterbodies and efforts to control the impacts of NPS pollution. The contributing sources can be generated at a scale outside the ability of a single state, or even country, to control. Nevertheless, Montana has strategies for reducing some of the potential contributing sources and water quality effects from these three water quality concerns.

3.2.1 Aquatic Invasive Species

Aquatic Invasive Species (AIS), (also referred to as exotic, non-indigenous or non-native species), are organisms that invade aquatic ecosystems beyond their natural, historic range. These species include non-native fish, mussels, clams, plants, and disease-causing pathogens.

AIS can overwhelm lakes and rivers, kill or displace native animals and plants, and damage the ecosystems that keep our waters clean and abundant. They can damage boats and gear, clog water pipes and hydropower facilities, obstruct community water sources, and constrict irrigation systems. Once an invasive species is established, it can be extremely costly and/or logistically impossible to eradicate. Every water user in the state has a vested interest in protecting Montana's water resources from the effects of AIS. Prevention, early detection, and education are the best strategies to combat this problem.

Several state agencies collectively implement the Montana Aquatic Invasive Species 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 coordination and collaboration between partner agencies and stakeholder groups; prevention of new AIS introductions; early detection and monitoring; control and eradication of new and established AIS populations; and outreach and education efforts.

Montana also developed the "*Montana Invasive Species Strategic Framework"* in January 2017, available from the Department of Natural Resources and Conservation's Conservation and Resource Development Division. Since the detections of invasive mussels in fall 2016, Montana has ramped up its efforts to prevent and control the spread of aquatic invasive species. This includes enhanced outreach coordination among relevant programs including the NPS Management Program. This coordination benefits both programs by increasing stakeholder awareness of actions they can take to control both AIS and NPS pollution. Inclusion of AIS within this Plan represents one component of this coordination.

3.2.2 Atmospheric Contributions

Montana's 2016 Water Quality Integrated Report identifies atmospheric deposition as a probable source of impairment for five of Montana's largest lakes and reservoirs (Flathead Lake, Fort Peck Reservoir, Medicine Lake, Hauser Lake, and Holter Lake) and five stream/river segments. Pollutants attributed to atmospheric deposition in Montana include mercury and other metals, nitrogen, phosphorus, and chemicals such as PCBs. Large forest fires can contribute significant amounts of particulates as well as nutrients over landscape-scale and larger areas via smoke, precipitation and deposition. Mercury is widespread in the environment and low concentrations naturally occur in soils. Geological deposits as well as other sources, such as emissions from coal-fired power plants, have led to elevated levels of mercury in fish in many areas of Montana. Further information regarding mercury and PCBs in Montana fish populations can be found in the Montana Sport Fish Consumption Guidelines published by the Montana Department of Fish, Wildlife and Parks. Controlling atmospheric deposition requires significant coordination among state, regional, national, and international agencies because sources may be far removed from affected waterbodies.

Given the resource constraints of the NPS Management Program, and the large-scale, often remote and/or diffuse nature of the sources of atmospheric contributions, DEQ has not yet prioritized actions from this source. When other more immediate and direct nonpoint source pollution sources are well controlled and addressed, DEQ may consider additional strategies to reduce atmospheric pollutants.

Montana's NPS pollution control strategy for atmospheric deposition is to:

- Assess sources of water quality pollution in the state

- Collaborate with DEQ's Air Quality Bureau (AQB) to identify atmospheric sources of NPS pollution in Montana and recommend actions to reduce sources where possible
- Support EPA's nation-wide air quality monitoring efforts, which include long-term monitoring sites in Montana
- Increase public awareness of atmospheric deposition on water quality using educational and outreach activities through work with DEQ's AQB

3.2.3 Climate Change Contributions

Recognizing the profound implications that climate change has on Montana's water quality and aquatic ecosystems is an important component in planning for the future. While the scope of this plan is limited in its ability address the sources of human caused climate change, the practices articulated can help mitigate some of the causes and their effects on water quality. These practices, while intended to improve water quality, can also improve other factors such as the economic and social well-being of Montana into the future. The 2017 Montana Climate Assessment (C. Whitlock et al. 2017) reports that "rising temperatures will reduce snowpack, shift historical patterns of streamflow in Montana and likely result in additional stress on Montana's water supply, particularly during summer and early fall."

Specific to water quality, climate change could result in higher stream temperatures and more intense watershed disturbances (e.g., rain events, flooding, high stream flows, landslides, large forest fires), which would likely lead to negative affects to aquatic life, including native fish populations. In the mountainous regions of Montana, high-elevation snowpack serves as a natural water storage system, slowly releasing water into streams and groundwater throughout spring and summer and recharging in the fall and winter. As air temperatures warm, the snowpack is predicted to develop later and melt earlier, causing peak runoff to come earlier in the winter and spring. This could result in decreased streamflows and reduced groundwater levels in summer and fall (Kinsella, 2005). More precipitation is predicted in the form of rain in future decades, not snow, which could also speed melting of the snowpack. This would increase the likelihood of winter floods resulting in increased streambed scouring and streambank erosion. Periodic droughts may affect the way water is stored and used, diminishing the amount available for release to maintain flows needed for optimal stream temperatures and aquatic habitat (Kinsella, 2005). Isaak, et al. (2015) delineated existing and predicted cold water fishery habitat, showing a significant decline in native western cutthroat and bull trout distribution and populations by 2040 due to increased stream temperatures.

The actions already outlined in this Plan will help mitigate many of these effects while also addressing some of the causes. These actions include:

- Supporting local planning efforts that address water quality impacts associated with climate change
- Supporting temperature and flow monitoring efforts in Montana watersheds
- Protecting and restoring riparian areas with native vegetation, which provides shade and stabilizes banks
- Reconnecting rivers with their floodplains, providing additional groundwater storage
- Protecting and restoring wetland areas with natural vegetation, providing water storage, wildlife habitat, pollutant attenuation and contributing to groundwater recharge to streams and rivers
- Protecting and restoring cold water refuges, including deep pool habitat and cool spring and groundwater return flows to rivers and streams
- Encouraging development of long-term strategies for water use, water conservation, and water lease agreements to maintain optimal flows for desirable temperature aquatic habitat

- Supporting local and statewide efforts to increase drought resiliency
- Increasing public awareness of water quality problems associated with climate change

4.0 ENGAGING MONTANANS IN ADDRESSING NONPOINT SOURCE POLLUTION

[Restoration] science advances by improving our understanding of ecosystem operation, whereas implementation advances by energizing stakeholder demand for restoration (and so, for the science informing that restoration) (Wohl et al., 2005).

NPS pollution in Montana is a statewide issue that spans both public and private lands, and is generated by most land uses. Because implementation of this Plan is voluntary, Montanans play a key role in addressing NPS pollution. A principal goal of the Plan is to inform Montana's citizens about the causes and effects of, and solutions to NPS pollution. Through education and outreach to targeted audiences, this information can be used to increase knowledge and change behaviors that will produce a benefit to water quality. This proactive approach can foster stewardship of water resources, inform policy, and guide management decisions. Since there is no single authority in the state designated to provide education and outreach (E&O) for NPS pollution, a collaborative effort is essential for addressing water quality issues at the state and watershed levels. Nonpoint source E&O can be initiated by DEQ and state and federal agencies, local water quality districts, conservation districts, watershed groups, nonprofit organizations, tribal communities, universities, schools, citizens, and landowners.

Education and outreach efforts should be tailored to fit a variety of needs that best address specific NPS pollution topics. These efforts should have carefully-considered goals, strategies to achieve the goals, and appropriate tools that meet the needs and interests of individual communities or stakeholders. This Plan directs these efforts through three main objectives:

- enhance awareness
- improve knowledge
- develop skills

These objectives are interrelated and build upon each other. Through the identification of targeted audiences and by using an adaptive management approach, achieving E&O goals can effectively change behaviors to protect and restore our water resources.

4.1 TARGETED AUDIENCES

Scientific, social, and economic factors all influence how Montana's water resources are used. Some people recognize Montana's water as a source of biological diversity or clean drinking water, others view it as a source for first-rate recreational opportunities, while still others depend on it for their economic livelihood. Identification of these factors at the statewide and local level can help to find priority areas where E&O can have the greatest benefit to water quality.

E&O efforts broadly target three major audiences:

- **General:** Members of the public who have the ability to affect water quality (e.g., land owners, land managers, recreationists, individuals)
- **Professional:** Those who manage, promote, or influence water resources (e.g., professionals from tribes, universities, federal and state agencies, local governments, watershed groups, nonprofit organizations, private businesses, and real estate agents)

- **Educational:** Educators and school administrators who have a direct influence on students (e.g., K–12 teachers, secondary education professors, curriculum developers)

DEQ works to ensure the scientific credibility of water quality information provided to the above audiences and recognizes the need to work with local stakeholders to ensure that information and decisions are also relevant to their social and economic needs. Ultimately, change is managed and accomplished by the people who live within each watershed. And due to the voluntary nature of many nonpoint source prevention and protection practices, reaching the first audience listed above is essential. Fitting with the diffuse nature of nonpoint source pollution, DEQ relies on a broad network of locally based organizations including watershed groups, conservation districts, and large nonprofit organizations to engage stakeholders at the community and individual levels. DEQ works directly with these groups and through the Montana Watershed Coordination Council (MWCC) and the Soil and Water Conservation Districts of Montana (SWCDM). Engaging Montanans in addressing nonpoint source pollution is not a discrete action, but rather an integral part of all the work DEQ does. MWCC and SWCDM provide critical assistance toward to ensuring that DEQ is responding and proactively providing the necessary tools and information to the needs of all Montanans.

Figure 4.1 illustrates different levels of public engagement. Although all of the levels are used by DEQ, the ultimate goal is to use education and outreach to empower the public in the decision making process, especially at the watershed level.

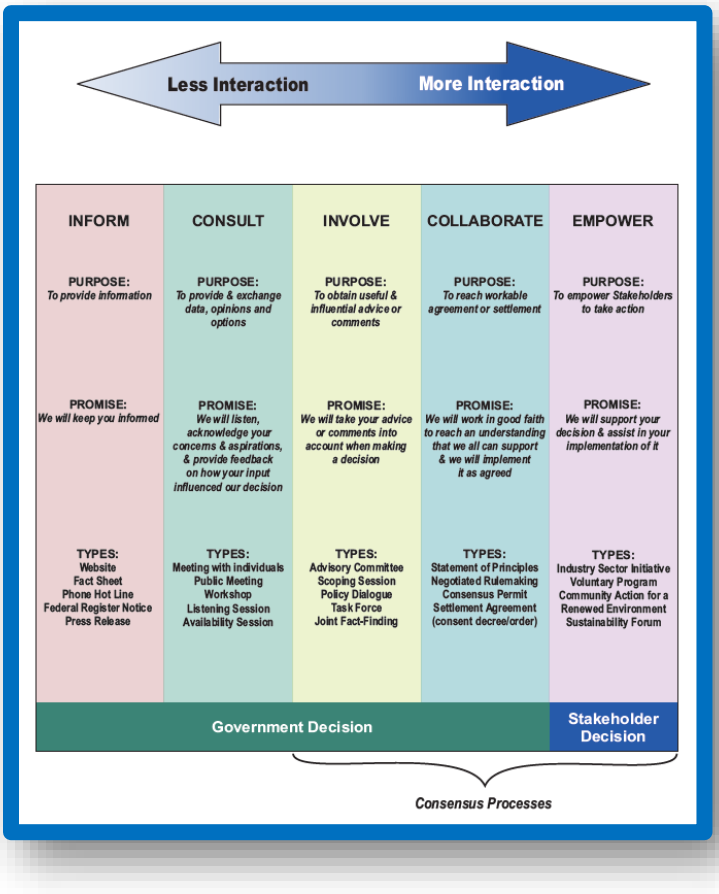


Figure 4.1. Engagement Process Spectrum

4.2 OBJECTIVES AND STRATEGIES

The strategies outlined in this section can be used to create awareness of NPS pollution issues and share solutions with targeted audiences with the ultimate goal of changing behaviors. Many of these strategies support creation and enhancement of locally-led watershed groups as a critical step to implementing many aspects of the state's NPS Management Program. Specific E&O action items can be found in **Section 8**.

Objective 1: Enhance awareness of NPS pollution issues at a statewide and local level.

Strategies:

- Share water quality information through the Clean Water Act Information Center (CWAIC) online
- Develop TMDLs and restoration planning documents for waters not meeting standards and engage the public and stakeholders throughout the process through stakeholder meeting and presentations
- Support locally led education and outreach efforts to targeted audiences through Montana's Education and Outreach Mini-Grant program administered by Soil and Water Conservation Districts of Montana
- Collaborate across professional fields to spread NPS pollution awareness
- Support and promote partnerships with entities such as MWCC, Montana Watercourse, and MSU Extension Water Quality that are committed to providing E&O
- Promote the Nonpoint Source Program and "success stories"

Objective 2: Increase knowledge of NPS pollution issues and solutions in order to foster engagement and empowerment.

Strategies:

- Provide conceptual restoration or implementation strategy details in TMDL documents
- Support the creation and implementation of locally led Watershed Restoration Plans
- Provide citizens with opportunities to acquire knowledge, values, attitudes, commitment, and the skills needed to protect water resources from NPS pollution
- Promote leadership and community collaboration for problem-solving
- Use multi-media applications to promote targeted NPS educational campaigns (riparian and wetland protection, urban growth and development issues)
- Support trainings, presentations, workshops, watershed tours, watershed festivals, and other NPS educational activities
- Engage local watershed groups and the public in evaluating the effectiveness of TMDL implementation activities

Objective 3: Develop skills that will lead to responsible actions taken to decrease NPS pollution. Increase the frequency and magnitude of these actions.

Strategies:

- Turn awareness and knowledge into on-the-ground activities
- Identify and reduce barriers to responsible action and encourage Montanans to take action to protect water resources
- Promote the use of knowledge, skills, and assessments as a basis for responsible decision making and for taking action

4.3 ADAPTIVE MANAGEMENT

Adaptive management allows for change by identifying new priorities and shifting the focus of actions as E&O goals are being met (or not met). Monitoring and evaluating E&O efforts will highlight areas where goals may need to be changed, or actions adjusted. This approach is essential since issues, priorities, and concerns change over time.

5.0 WORKING PARTNERSHIPS

Montana's NPS Management Program relies on many relationships with agencies and organizations that work to protect and restore watersheds and water quality in Montana.

5.1 COORDINATING WITH AGENCIES AND ORGANIZATIONS

One of EPA's requirements for this Plan is to describe how the program will work with other agencies and programs to achieve water quality objectives. To address this requirement, DEQ has prepared an extensive appendix describing the partner organizations and activities with which it collaborates on NPS control activities.

Appendix E provides a brief overview of each of the various cooperating entities and its role and activities in NPS management. These 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. This information is followed by a list of coordination and collaboration opportunities that DEQ's NPS Management Program may pursue within the watershed framework. In many of these descriptions, both long- and short-term goals of the NPS Management Program are addressed. The listing of an opportunity does not imply a commitment or requirement on the part of the collaborating entity. The purpose of the list is to develop an awareness of the opportunities that may lead to voluntary coordination or collaboration between organizations.

It is DEQ's policy to create working partnerships with local agencies and organizations. Conservation districts, water quality districts, watershed groups, and other groups working at a more local level are generally more in tune with problems and are often in a better position to educate citizens and implement projects in their areas. DEQ intends to rely on the information presented in **Appendix E** to guide its efforts to coordinate and collaborate with other agencies and organizations whenever and wherever feasible in order to leverage resources and minimize duplication of effort. DEQ anticipates that the Montana Watershed Coordination Council (MWCC) will be a lead partner for facilitating these opportunities as they arise.

The mission of the MWCC is "uniting and supporting Montana's watershed communities to promote healthy and productive landscapes". Since first formalized in a 1995 MOU signed by over 20 state and federal agencies, MWCC has served as a forum for "hands on" coordination, and sharing of expertise and other resources to local management teams to facilitate development and implementation of management strategies. MWCC sponsors biennial watershed symposiums, provides training opportunities for watershed groups and conservation and supports several committees and work groups (Education, Water Monitoring, Water Activities). As an example of promoting working partnerships, MWCC's Water Monitoring Work Group supports monitoring activities at many different levels (see **Appendix C**). Often, the water monitoring activities themselves are supported through partnerships, such as: U.S. Geological Survey, irrigation companies and conservation districts; local water quality districts, DEQ and NRCS; and volunteer monitoring efforts, DEQ and Montana State University Extension Water Quality.

DEQ's Watershed Protection 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 nonpoint source program. As examples, several staff serve as workgroup leaders or in a leadership role with the Montana Watershed Coordination Council (MWCC).

5.2 FUNDING AND OTHER RESOURCES FOR NPS MANAGEMENT PROGRAM IMPLEMENTATION

Funding resources for implementing this Plan include CWA Section 319 federal funding, which is provided to DEQ for program development and implementation. This federal funding requires a 40% non-federal match. Match for Section 319 program funds used by DEQ for internal NPS Management Program support comes from Montana's general fund support for the Water Quality Planning and Water Protection Bureaus. Additionally, external Section 319-funded projects are required to provide a 40% local match to these federal funds. Section 319 grant project funding levels for NPS control activities during the period 2012–2017 are summarized in **Appendix G**.

Other EPA and DEQ agency funds are instrumental in funding activities that are related to Montana's NPS Management Program. These include federally funded CWA Sections 104, 106, and 604 and Montana's general fund support to carry out work related to DEQ's responsibilities under the CWA and Safe Drinking Water Act dealing with NPS pollution.

In Montana there are many other funding sources, in addition to Section 319 grants, available to address NPS pollution. **Appendix H** contains information on funding available through Montana state agencies for NPS management.

As previously discussed in the **Introduction** and in **Section 3**, the NPS Management Program relies heavily upon other federal, state, and local agencies and entities to implement the this Plan. It is important to note that in spite of this reliance, the Section 319 program does not have authority over either the programs or the funds that these agencies manage. Listed below are some of the federal agencies, state agencies, and local government entities that provide a variety of important resources toward NPS management in Montana. Our most important partners are those who manage state and federal public lands (Bureau of Land Management, Forest Service, and Department of Natural Resources and Conservation) and those agencies whose mission, goals and resources overlap with DEQ (DNRC, FW&P, NRCS).

Federal Agencies:

- U.S. Environmental Protection Agency
- U.S. Department of Agriculture
  - Forest Service
  - Natural Resources Conservation Service (NRCS)
- U.S. Geological Survey
- U.S. Army Corps of Engineers
- U.S. Bureau of Land Management
- U.S. Bureau of Reclamation

State Agencies:

- Department of Natural Resources & Conservation
  - Conservation and Resource Development

  - Forestry
  - Trust Lands
  - Water Resources
- State Library
  - Natural Resources Information System
  - Natural Heritage Program
- Department of Fish, Wildlife & Parks
- Department of Transportation
- Department of Agriculture

Local Governmental Entities:

- city and county planning
- public health departments
- public works departments
- conservation districts
- irrigation districts
- local water quality protection districts

In addition to the above, local watershed groups and other non-profit organizations, as previously identified, are critical partners in Montana's NPS Management Program. They are often the lead organization in developing and implementing watershed restoration plans. These organizations integrate local, state and federal agency resources to implement on-the- ground water quality improvement projects.

Finally, numerous non-governmental organizations' resources assist in implementing this Plan. Montana's university system, industry (e.g. Avista, Northwestern Energy, ditch companies, Weyerhaeuser), land trusts, the MWCC, and other organizations (e.g. River Network, Sonoran Institute, Trout Unlimited, etc.) all devote resources to address NPS pollution in Montana.

A vast amount of nonpoint source pollution prevention information is currently available on the internet from federal and state agencies, tribes, universities, local communities, nonprofit groups, private companies, and volunteer groups. Topics range from BMPs to news events, informative articles, and interactive educational materials. Many other informative links can be found just by reading and working through the various websites.

However, the tremendous wealth of resources is not enough to address all the NPS Management Program needs in a 5-year timeframe. Therefore, DEQ must prioritize many of the actions and activities of the NPS Management Program to maximize available resources to accomplish the goal of protecting and improving Montana's water quality. Priorities and criteria for setting priorities are discussed in **Sections 8.1, 8.2 and Appendix D.**

6.0 ENFORCEABLE REGULATORY PROGRAMS

As directed in the Montana Water Quality Act, the Department of Environmental Quality 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 NPS pollution are described below.

6.1 DISCHARGE PROHIBITIONS

Montana's water pollution control law includes some provisions that may be used to take enforcement action against NPS pollution discharges. A general provision prohibits discharges or placement of wastes that cause pollution, including pollution from nonpoint sources (75-5-605, MCA). This state 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. However, exempt from the prohibition is "any placement of materials that is authorized by a permit issued by any state or federal agency ... if the agency's permitting authority includes provisions for review of the placement of materials to ensure that it will not cause pollution of state waters."

6.2 OTHER REGULATORY PROGRAMS

Numerous local, state, and federal regulatory programs reduce, eliminate, or prevent NPS pollution.

Agricultural Chemical Ground Water Protection Act
Law/Rule: Title 80, Chapter 15, MCA
Program Description: 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.
Contact 1
Montana Department of Agriculture, Agricultural Sciences Division, Agricultural Services Bureau, Natural Resource Program
Phone: (406) 444-3790
Contact 2
DEQ, Water Quality Division, Water Quality Planning Bureau, Standards and Modeling Section
Phone: (406) 444-6697
Contact 3
DEQ, Waste Management and Remediation Division, Contaminated Site Cleanup Bureau, Groundwater Remediation Program
Phone: (406) 444-6444

Clean Water Act Section 404 Permit Program and 401 Certification
Law/Rule: Federal Clean Water Act, Sections 404 and 401
Program Description: 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.
Contact 1
USACE, Omaha District
Phone: Billings Office (406) 657-5910; Helena Office (406) 441-1375; Missoula Office (406) 541-4845
Contact 2
DEQ, Water Quality Division, Water Protection Bureau
Phone: (406) 444-6697

Coal and Uranium Mine Reclamation Program
Law/Rule: Title 82, Chapter 4, Part 2, MCA
Program Description: 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 (OSMRE).
Contact 1
DEQ, Air, Energy and Mining Division, Coal and Opencut Mining Bureau
Phone: (406) 444-4970
Contact 2
U.S. Department of the Interior, Office of Surface Mining Reclamation and Enforcement, Denver Field Division
Phone: (307) 261-6555

Conservation District Law
Law/Rule: Title 76, Chapter 15, MCA
Program Description: 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. The Rosebud Conservation District has enacted a land use ordinance to protect soil and water resources from impacts from coal bed methane development. Among other requirements, the ordinance requires monthly monitoring of groundwater and quarterly monitoring of surface water in the vicinity of all coal bed methane produced water impoundments. It also contains design standards for impoundments and rules for proper use or disposal of all produced water.
Contact 1
DNRC, Conservation and Resource Development Division, Conservation Districts Bureau
Phone: (406) 444-6669
Contact 2
Rosebud Conservation District
Phone: (406) 346-7479

Hazardous Waste Act
Law/Rule: Title 75, Chapter 10, Part 4, MCA
Program Description: Montana uses authority under the Act to provide technical assistance, and to 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.
Contact
DEQ, Waste Management and Remediation Division, Waste and Underground Tank Management Bureau
Phone: (406) 444-5300

Lakeshore Protection Permit Program
Law/Rule: Title 75, Chapter 7, Part 2, MCA
Program Description: 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 crafted and 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.
Contact
Local county and city governing bodies

Local Water Quality District Law
Law/Rule: Title 7, Chapter 13, Part 45, MCA
Program Description: 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 in the urban areas of Bozeman, Helena, and Missoula.
Contact 1
Gallatin Local Water Quality District
Phone: (406) 582-3168
Contact 2
Lewis and Clark County Water Quality Protection District
Phone: (406) 457-8926
Contact 3
Missoula Valley Water Quality District
Phone: (406) 258-4890

Metal Mine Reclamation Act (MMRA)
Law/Rule: Title 82, Chapter 4, Part 3, MCA
Program Description: 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); includes permitting, licensing, and bonding requirements for mining exploration, development, and operation; regulates the mining of all ore, rock, or substances except oil, gas, bentonite, clay, coal, sand, gravel, peat, soil materials, and uranium.
Contact
DEQ, Air, Energy and Mining Division, Hard Rock Mining Bureau
Phone: (406) 444-4953

Natural Streambed and Land Preservation Act (310 Law)
Law/Rule: Title 75, Chapter 7, Part 1, MCA
Program Description: 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.
Contact 1

Local conservation districts
Contact 2
DNRC, Conservation and Resource Development Division, Conservation Districts Bureau
Phone: (406) 444-6669

Opencut Mining Act
Law/Rule: Title 82, Chapter 4, Part 4, MCA
Program Description: 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.
Contact
DEQ, Air, Energy and Mining Division, Coal and Opencut Mining Bureau
Phone: (406) 444-4970

Phosphorus Ban Act
Law/Rule: Title 75, Chapter 5, Part 9, MCA
Program Description: 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; for all intents and purposes, the ban has eliminated the sale of phosphorus containing household cleaning products throughout Montana.

Solid Waste Management Program
Law/Rule: 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
Program Description: 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.
Contact
Montana Department of Environmental Quality, Waste Management and Remediation Division, Waste and Underground Tank Management Bureau
Phone: (406) 444-5300

Streambed Protection Act (SPA 124)
Law/Rule: Title 87, Chapter 5, Part 5, MCA
Program Description: Permit program for state, county, or city government projects that may affect the bed or banks of any stream in Montana; 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.
Contact
FWP, Fisheries Division, Fisheries Habitat Bureau
Phone: (406) 444-2449

Streamside Management Zone Law (SMZ law)
Law/Rule: Title 77, Chapter 5, Part 3, MCA
Program Description: 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.
Contact
DNRC, Forestry Division, Forestry Assistance Bureau
Phone: (406) 542-4300

Subdivision Review Program
Law/Rule: Title 17, Chapter 36, ARM; DEQ Circular 8
Program Description: 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.
Contact
DEQ, Water Quality Division, Engineering Bureau
Phone: (406) 444-6697

Superfund Program (State and Federal)
Law/Rule: 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).
Program Description: 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 and eligible sites. EPA, often in coordination with DEQ, uses CERCLA and its associated funding to investigate and clean up hazardous substances.
Contact 1
DEQ, Waste Management and Remediation Division, Contaminated Site Clean-up Bureau, State Superfund Unit
Phone: (406) 444-6444
Contact 2
DEQ, Waste Management and Remediation Division, Federal Superfund and Construction Bureau
Phone: (406) 444-6444

Underground Storage Tank Laws
Law/Rule: 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 (LUST) Trust Fund Program.
Program Description: The Petroleum Tank Cleanup Section uses these programs to investigate and cleanup 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.
Contact
DEQ, Waste Management and Remediation Division, Contaminated Site Cleanup Bureau, Petroleum Tank Cleanup Section
Phone: (406) 444-6444

Water Quality Law
Law/Rule: Montana Water Quality Act (Title 75, Chapter 5, Part 6, MCA)
Program Description: The Groundwater Remediation Program requires responsible parties to investigate and cleanup non-permitted releases that potentially impact state waters. Approximately 90 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 cleanup contamination that poses an unacceptable risk to human health and the environment.
Contact
DEQ, Waste Management and Remediation Division, Contaminated Site Cleanup Bureau, Groundwater Remediation Program
Phone: (406) 444-6444

Water Use Law
Law/Rule: Title 85, Chapter 2, MCA; Title 44, Chapter 4, Part 11, MCA
Program Description: 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).
Contact
DNRC, Water Resources Division, Water Rights Bureau
Phone: (406) 444-6610

7.0 EVALUATING SUCCESS

The success of Montana's NPS Management Program is based on meeting our goal of protecting and restoring water quality from the harmful effects of nonpoint source pollution. Montana's NPS Management Program is responsible for articulating a pathway toward this goal, coordinating specific steps along this pathway, and defining the environmental and functional measures of success for these steps. This Plan establishes specific outcomes and actions in **Section 8** that define the pathway and steps most likely to result in restoration and protection of all applicable beneficial uses for the state's waterbodies, regarding nonpoint sources. Measuring the success of this plan in achieving our goal is accomplished in two primary ways: measuring the milestones for the actions within the pathway and measuring the extent to which these actions have accomplished related outcomes.

Outcomes are observable and measureable results achieved through sustained actions. Measuring the long term outcomes (i.e., water quality improvements) related to discrete actions (e.g., a single riparian restoration project) is difficult given the time necessary for those actions to take effect and the geographic scale of the actions in comparison to the overall issue. This presents significant challenges for planning and adaptive management. Planning for and measuring success is further complicated by the fact that many different public and private entities play significant roles in implementing the actions identified in **Section 8**. Therefore, it is appropriate and necessary to track interim outcomes, which DEQ considers necessary achievements along the pathway toward meeting our long term outcomes and goal. Actions taken, with annual milestones, within each interim outcome provide the necessary mechanisms for reaching these outcomes. The extent to which we have achieved these interim outcomes can be measured over the next five years.

Interim Outcomes:

- Water quality standards have been developed
- Montana's waters have been assessed to determine compliance with water quality standards and compiled in an updated Integrated Report
- TMDLs have been completed for required waterbodies
- Sources of pollutants identified are sufficient for local planning efforts
- Plans are in place to ensure efficient and effective implementation
- Public has knowledge and resources to address NPS issues
- Projects and practices are implemented to address NPS issues
- 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**.

Long Term Outcomes:

- All Montanans are aware of their contributions to nonpoint source pollution and taking actions to reduce them
- All reasonable land, soil, and water conservation practices are in place to protect water quality
- Montana's waterbodies are meeting beneficial uses

This Section identifies some of the appropriate measures for success and the steps to evaluate the success of actions and outcomes.

7.1 INTERIM MEASURES OF SUCCESS

As noted, attainment of water quality standards or demonstrable improvement to water quality can be long-term achievements. The interim outcomes are intended to serve as evidence that the NPS Management Program is making progress along the pathway toward meeting water quality standards. Appropriate measures of success of the interim outcomes and actions in Montana's NPS Management Program cannot in most cases be accomplished through direct measures of water quality. However, we expect that these cumulative actions will lead to improvements in water quality at the watershed-to-state level over time.

DEQ currently has several mechanisms for measuring and reporting the progress toward meeting interim outcomes and actions laid out in **Section 8**. These mechanisms provide an opportunity to bring together information from private and public partners, who play a critical role in implementing actions and meeting outcomes. These mechanisms also provide EPA with necessary information to meet its own strategic targets and program activity measures, including beneficial use support, pollutant load reductions, and water quality trends.

- DEQ uses its Water Quality Integrated Report, submitted to EPA biennially, to track the success of the NPS Management Program regarding the number of waterbodies that are partially or fully supporting beneficial uses.
- DEQ uses EPA's Grant Reporting and Tracking System to document project level information that addresses progress achieved through the expenditure of Section 319 funding provided by EPA to the state of Montana.
- DEQ documents progress in achieving NPS Management Program goals within annual reports provided to EPA, as well as in 5-year Project Grant Final Reports to EPA.
- DEQ uses TMDL Implementation Evaluations for tracking progress of water quality restoration efforts in watersheds that have completed TMDLs.
- DEQ identifies success stories that highlight watersheds and/or waterbody/pollutant combinations that are no longer impaired, are improving water quality trends, and are protecting healthy waters through good land management and restoration work.

7.2 EVALUATING EDUCATION AND OUTREACH EFFORTS

Education and Outreach (E&O) is a necessary activity to ensure that the public has knowledge and resources to address NPS issues and actions are being taken. Given that actions for addressing NPS pollution are voluntary, an informed and empowered public is critical to meeting long term outcomes of the NPS Management Program. Evaluation mechanisms ensure a successful E&O strategy on the state and local scales. Various indicators can be used to measure and monitor effectiveness of E&O efforts. After an evaluation, the goals and actions can be adjusted as needed, consistent with adaptive management.

Evaluation mechanisms can measure both the qualitative and quantitative elements of E&O efforts. Programs must have an evaluation strategy at the beginning and implement checks to ensure goals are being met. The intent of E&O efforts should be to improve on-the-ground environmental conditions as

well as changes in behavior. Future E&O funding should focus on interim outcomes, while collectively these outcomes will address DEQ's long-term goals of reducing NPS pollution.

Various evaluation tools used by grant funded programs toward implementation include:

- **Pre- and post-evaluations –** to measure changes in knowledge, behavior, and attitudes toward NPS pollution
- **Interviews –** to measure audience perception, attitudes, and beliefs at a local level
- **Focus groups –** to measure knowledge, behavior, and attitudes of NPS pollution issues either before, during, and/or after a particular E&O effort
- **Questionnaire/survey –** phone or Web surveys to measure knowledge, behavior, or attitudes toward NPS pollution or particular issues
- **Observation –** to measure behavior and attitudes toward a particular NPS pollution issue
- **Mapping analysis –** to use GIS to illustrate spatial and temporal differences

7.3 EVALUATING WATER QUALITY IMPROVEMENT

Water quality monitoring is an essential tool for evaluating the long term success of the NPS Management Program. However, improvements to water quality can take a long time and the success of individual projects or actions may be better evaluated against interim outcomes. In Montana, many different entities collect water quality data, which DEQ uses to determine if water quality is improving and water quality standards are being achieved (see **Section 1 and Appendix C**). One of the NPS Management Program's interests is to improve the coordination of sampling efforts among organizations that collect credible data. However, DEQ will be responsible for long-term evaluations by assessing the effects of NPS pollution changes over time.

Three types of monitoring can be used to evaluate program success:

1. **Project effectiveness monitoring** addresses how well a practice or project reduces pollution at the site scale. This information ensures that effective practices are being implemented and informs maintenance activities necessary for long term effectiveness. In many cases, monitoring is completed in order to populate a model to demonstrate effectiveness of project (e.g., pollutant load reductions). However, it is important to note that effectiveness of discrete projects is not necessarily transferable to water quality effects on a broader scale.
2. **Trend monitoring** evaluates progress toward attaining water quality standards at the reach scale and informs broad scale restoration activities (e.g., road BMP implementation, multiple instream restoration projects).This requires consistent and long term data collection.
3. **Standards attainment monitoring** provides sufficient data for a formal assessment of water quality standards attainment and a determination of beneficial-use support. It also informs potential updates the TMDLs and standards/targets.

Effectiveness monitoring is required for implementation projects funded with Section 319 grant contracts. This information is useful for tracking progress toward TMDL targets and is provided to EPA for tracking on a national level. Montana law requires an evaluation of TMDL implementation effectiveness (see **Section 1.6**) and DEQ's NPS website has examples of these evaluations. Lastly, under the federal CWA, formal assessments of water quality standards attainment are intended to accurately characterize the 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 NPS Management Program is to protect and restore water quality from the harmful effects of NPS pollution. This section identifies the key interim-term outcomes, actions, and milestones necessary to demonstrate significant progress toward meeting this goal. It also provides information on DEQ's NPS Management Program's approach for implementing this Plan. Success is measured by reaching the milestones outlined in this Plan and moving closer to achieving the interim outcomes.

8.1 FIVE-YEAR ACTION PLAN

Tables 8-1 through **8-8** describes DEQ's 5-year action plan for addressing NPS 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**), listing key partners, actions, and milestones for evaluating success in achieving the interim outcomes. This five year timeframe for implementing actions meets EPA's NPS Management Program guidance requiring explicit short-term goals. While the interim outcomes are listed in a stepwise management process order, individual actions are not listed by priority.

Montana's NPS Management Program highest priority actions are those that directly move Montana towards achieving its vision (**Overview – Goal of the Nonpoint Source Program**). Most of these are identified in **Table 8-6: Public has knowledge and resources to address NPS Issues** and **Table 8-7: Projects and practices are implemented to address NPS issues**.

8.2 DEQ NPS PRIORITIES

Montana's Governor has designated DEQ as the state agency responsible for developing and implementing many aspects of Montana's NPS Management Program. The program has made great strides over the past 20 years, but the scale of NPS pollution across the state requires a targeted approach to demonstrate measurable improvements. Over the next two years, working with internal and external partners, DEQ will develop a 20-year strategic vision. This vision will prioritize watersheds where DEQ will focus of their NPS support activities.

8.2.1 NPS Support Activities

DEQ NPS support activities for the next five years will continue to revolve around the process steps identified in **Section 1** and achieving the outcomes identified in **Tables 8.1** through **8.8**. This includes continued NPS project funding via the 319 grant program as well as continued outreach and coordination with our NPS partners. DEQ will emphasize riparian protection since it is DEQ's view that the most effective nonpoint source pollution reduction approach is the protection and restoration of healthy riparian zones. DEQ will also evaluate and promote wetland health within and beyond riparian zones in recognition of the many additional benefits provided by wetlands, including water storage and nutrient cycling.

8.2.2 Priority Watersheds

DEQ's NPS Management Program currently prioritizes support activities where watershed restoration plans (WRPs) have been developed (**Appendix D**). This provides multiple opportunities for DEQ

assistance and project funding in many locations. Yet, it is difficult to fully implement many of DEQ's NPS support activities in all watersheds with WRPs. Therefore, a component of DEQ's 20-year vision will be to focus resources to accomplish a higher level of DEQ NPS support in watersheds where WRPs are in place and DEQ will likely have the most influence in implementing, or helping others implement, the goals of this Plan. By focusing on particular high priority watersheds, DEQ is not eliminating support for other areas of Montana. Instead, DEQ is working to improve our approach for achieving and demonstrating NPS program successes within Montana. DEQ's 20-year strategic vision will identify the process for identifying high priority NPS support watersheds. Within these watersheds, DEQ will additionally pursue the following NPS support activities.

- Provide an increased level of constructive feedback on locally led efforts to address NPS pollution via completion of TMDL Implementation Evaluations and highlighting good examples of landowner NPS management practices.
- Support enhanced monitoring activities to track water quality improvement trends and NPS management successes. Monitoring support can include volunteer monitoring actions and tracking important indicators such as riparian health.
- Assist watershed groups, conservation districts, and other groups on developing and expanding relationships with landowners. The goal of this work will be to help develop and expand the number and quality of projects within priority watersheds.
- Facilitate nutrient NPS reductions above point sources dischargers to help economically achieve water quality standards upstream and downstream of applicable point sources.

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

No.	***Key Partner(s)***	***Actions***	***Measurable Milestones***
1	DEQ Standards and Modeling Section	Re-evaluate the chemical, physical, and biological condition of reference sites	• At least 100 reference sites re-evaluated
2	DEQ Standards and Modeling Section	Develop nutrient models for large rivers (e.g., Missouri, Yellowstone)	• Models developed for at least 2 large river segments
3	DEQ Standards and Modeling Section	Develop technical basis for a lake classification system based on nutrient status	• Demonstrated progress in developing numeric nutrient and transparency lake water quality standards
4	DEQ Standards and Modeling Section, MT Department of Agriculture	Develop and circulate numeric standards for all pesticides identified in Montana groundwater and surface waters	• Adoption of numeric standards for all pesticides within 4 years of DEQ notification of detection in state waters

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.	***Key Partner(s)***	***Actions***	***Measurable Milestones***
5	DEQ Monitoring and Assessment	Conduct statewide water quality assessments.	• Musselshell watershed, Beaverhead watershed, Big Creek and Jim Creek assessment projects will be completed for the 2018 Integrated report
6	DEQ Monitoring and Assessment Section, watershed groups	Assess water quality status and trends in priority areas through fixed station monitoring	• Fixed station monitoring continues on the Clark Fork River through contracted efforts and annual reports are provided on the Clark Fork Coalition website • Fixed station reports will be completed by DEQ for the Musselshell River and the Red Rock River during 2017 and shared with each watershed group and other DEQ programs
7	DEQ Standards and Modeling Section	Address septic influence on surface water quality	• Septic influence characterized in 3 TMDL or other water quality protection documents
8	DEQ Information Management and Technical Services Section	Review/update Water Quality Integrated Report (305(b)/303(d))	• Updated reports in 2018, 2020, and 2022
9	DEQ Information Management and Technical Services Section	Develop, maintain, and enhance Clean Water Act Information Center (CWAIC online) to provide public access to water quality assessment information.	• System operable and available to public
10	DEQ Information Management and Technical Services Section	Update the program's WQ assessment, TMDL, and implementation tracking system (WARD)	• Integrated Report submitted to EPA in a timely manner

Table 8-3: Interim Outcome – TMDLs have been completed for required waterbodies			
No.	***Key Partner(s)***	***Actions***	***Measurable Milestones***
11	DEQ Watershed Protection Section, EPA	Complete Water Quality Improvement Plans (WQIPs) and necessary TMDLs	• At least 150 additional TMDL pollutant-waterbody combinations completed by 2022

Table 8-4: Interim Outcome – Sources of pollutants identified are sufficient for local planning efforts			
No.	***Key Partner(s)***	***Actions***	***Measurable Milestones***
12	DEQ Watershed Protection Section, WRP sponsors	Support local efforts to refine pollutant source identification	• Updated fine-scale source identification in at least 3 WRPs

Table 8-5: Interim Outcome - Plans are in place to ensure efficient and effective implementation			
No.	***Key Partner(s)***	***Actions***	***Measurable Milestones***
13	DEQ Watershed Protection Section, WRP sponsors, MACD	Work with watershed groups to develop and revise Watershed Restoration Plans (WRPs)	• 12 new or updated DEQ accepted WRPs by 2022
14	DEQ Watershed Protection Section, Cities and Counties	Incorporate NPS pollution prevention into city and county planning processes	• Provide information on NPS pollution prevention to 3 community planning entities
15	DEQ Watershed Protection Section, WRP Sponsors	Encourage integration of wetland restoration into NPS WRPs	• Specific wetland planning components are included in 2 WRPs
16	DEQ, DNRC, CDs	Encourage the development of channel migration mapping statewide	• Number of miles mapped • Number of waterbody segments mapped

Table 8-5: Interim Outcome - Plans are in place to ensure efficient and effective implementation			
17	DEQ Watershed Protection Section, WRP sponsors	Incorporate protection of unimpaired/high quality waters into watershed restoration plans	• Number of Watershed Restoration Plans incorporating protection of healthy waters

Table 8-6: Interim Outcome - Public has knowledge and resources to address NPS issues			
No.	***Key Partner(s)***	***Actions***	***Measurable Milestones***
18	DEQ, MWCC	Provide support and promote the development and coordination of watershed groups through MWCC activities, training workshops, advertising campaigns, etc.	• Annual watershed coordinator training • Annual watershed tour • Bi-weekly newsletter • Support development and maintenance of a water quality monitoring website
19	DEQ	Support riparian and wetland buffer education campaigns	• Support 3 distinct riparian and/or wetland buffer education campaigns
20	DEQ	Participation and presentations at landuse planning meetings	• Active participation in 5 events annually
21	DEQ, EPA, Wetland Council, MWCC, NRCS, MACD, Montana Stockgrowers Association	Publish or distribute accounts of exemplary environmental stewardship	• Environmental stewardship awards and recognition highlighted in annual report
22	DEQ, SWCDM, MWCC	Support NPS Education and Outreach efforts at a local level	• Fund at least 5 E&O mini-grants annually • Staff at least 2 watershed festivals annually • Support at least 5 BSWC activities annually
23	DEQ	Support NPS Education and Outreach efforts at a statewide level	• Annual maintenance and updates to DEQ NPS Management Program webpages • NPS Annual Report • Support two Wetland Council meetings annually • Assist with the creation or updates of NPS publications • Distribute NPS publications at 5 events annually

Table 8-6: Interim Outcome - Public has knowledge and resources to address NPS issues			
No.	***Key Partner(s)***	***Actions***	***Measurable Milestones***
24	DEQ, MSUEWQ, MWCC, Montana Watercourse	Support volunteer monitoring efforts	• Create or update VM technical guidance documents • Provide training and technical guidance to 5 VM groups annually • Provide funding to support VM efforts
25	DEQ	Develop and conduct riparian and streamside land management workshop and education tools for the real estate industry	• Develop workshop syllabus and course materials for continuing education credits • Hold 2 workshops
26	DEQ, FWP, DNRC, DOJ, USACE, USFS, NRCS, BLM, DNRC, USFWS, CDs	Develop and implement an interagency policy for river restoration work, emphasizing restoration of natural processes	• Interagency policy in place and supported by a wide range of government, nonprofit, and private entities
27	MDT	Promote and support BMP training for road maintenance personnel	• Provide 3 trainings for road maintenance personnel
28	DEQ	Support conferences that address stormwater pollution prevention and control strategies	• Support 2 stormwater conferences
29	DNRC	Promote and conduct forestry BMP and stewardship educational workshops and programs	• Annual BMP/SMZ education workshops for loggers and landowners • Forest stewardship program targeting small landowners throughout Montana
30	DEQ, DNRC	Increase awareness of regulatory requirements for nonpoint source pollutions	• Factsheet of existing NPS regulatory requirements • New audiences reached through publications and presentations
31	DEQ	Increase number of applications for 319 funding	• At least 20 applications received in 2022

Table 8-7: Interim Outcome - Projects and practices are implemented to address NPS issues			
No.	***Key Partner(s)***	***Actions***	***Measurable Milestones***
32	DEQ Engineering Bureau	Encourage stormwater quality improvement projects funded through the state revolving fund program	• Fund at least 4 stormwater projects
33	DEQ, MARS, NRCS, FWP, other organizations	Support for and involvement in public and private channel migration zone and riparian conservation easement programs	• Annual report on increases in the number of stream miles covered under a conservation easement (based on available Montana cadastral data)

Table 8-7: Interim Outcome - Projects and practices are implemented to address NPS issues			
No.	***Key Partner(s)***	***Actions***	***Measurable Milestones***
34	DEQ Watershed Protection Section	Fund WQIP and WRP-directed NPS watershed restoration projects	• Fund on-the-ground watershed restoration activities
35	DEQ	Provide reviews and comment on outside agency proposed projects that may have an effect on NPS pollution	• Reviews completed and comments provided as appropriate
36	DEQ Watershed Protection Section	Protect, restore, and create riparian and wetland buffers designed to prevent or reduce NPS pollution	• Fund 10 miles of riparian buffer enhancement through Section 319 contracts • Fund 10 acres of wetland enhancement through Section 319 contracts
37	DEQ Fiscal, Watershed Protection Section	Manage and implement the NPS Management Program in efficient and effective manner, including fiscal management	• Review and update guidance annually to reflect state and federal reporting requirements • Conduct contract initiation meetings for all new contracts • Ensure 75% of 319 contracts are closed within three years of contract award
38	DEQ, USFS, BLM, MDT, NRCS, FWP	Work with agencies to encourage water quality improvement actions	• Develop, revise, or implement DEQ water quality improvement MOUs with agencies, including USFS, BLM, MDT, NRCS, and FWP
39	DEQ, DNRC, NRCS, FWP, irrigation districts, CDs, watershed groups, private landowners	Support efforts to restore and protect wetlands, natural channel migration, and natural hydrologic regimes	• Encourage submittal of requests for funding for projects that will make substantive, sustainable reductions in hydrologic modification • Encourage groups that are developing or updating a WRP to incorporate plans to address hydrologic modification and wetland protection/restoration
40	DEQ, NRCS, CDs	Continue support for the National Water Quality Initiative (NWQI) under the EQIP program	• Successful expenditure of all available funding in designated NWQI watersheds • Ongoing water quality monitoring and technical support • Identification and preparation of future NWQI watersheds

Table 8-8: Interim Outcome - Project implementation and effectiveness is tracked and reported			
No.	***Key Partner(s)***	***Actions***	***Measurable Milestones***
41	DEQ Watershed Protection Section	Conduct TMDL implementation evaluations	• At least 15 reviews completed
42	DEQ Watershed Protection Section	Implement a long-term 319 project effectiveness evaluation program	• Project effectiveness evaluation program in place by 2019 • Project sites are evaluated every 5 years
43	DNRC	(US Environmental Protection Agency April 12, 2013)Work with forest agency partners (especially DNRC Forestry Assistance) to ensure effective forestry BMP and SMZ activities, and assess the effectiveness of SMZ and HCPs	• Biannual reports on forestry BMP audits • Reports on SMZ and HCPs
44	DEQ Information Management and Technical Services Section	Administer MT-eWQX water quality database system to track and provide public access to water quality monitoring data	• Upload all ambient water quality monitoring data collected by DEQ, its contractors, or data partners to EPA National STORET/WQX water quality data warehouse

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