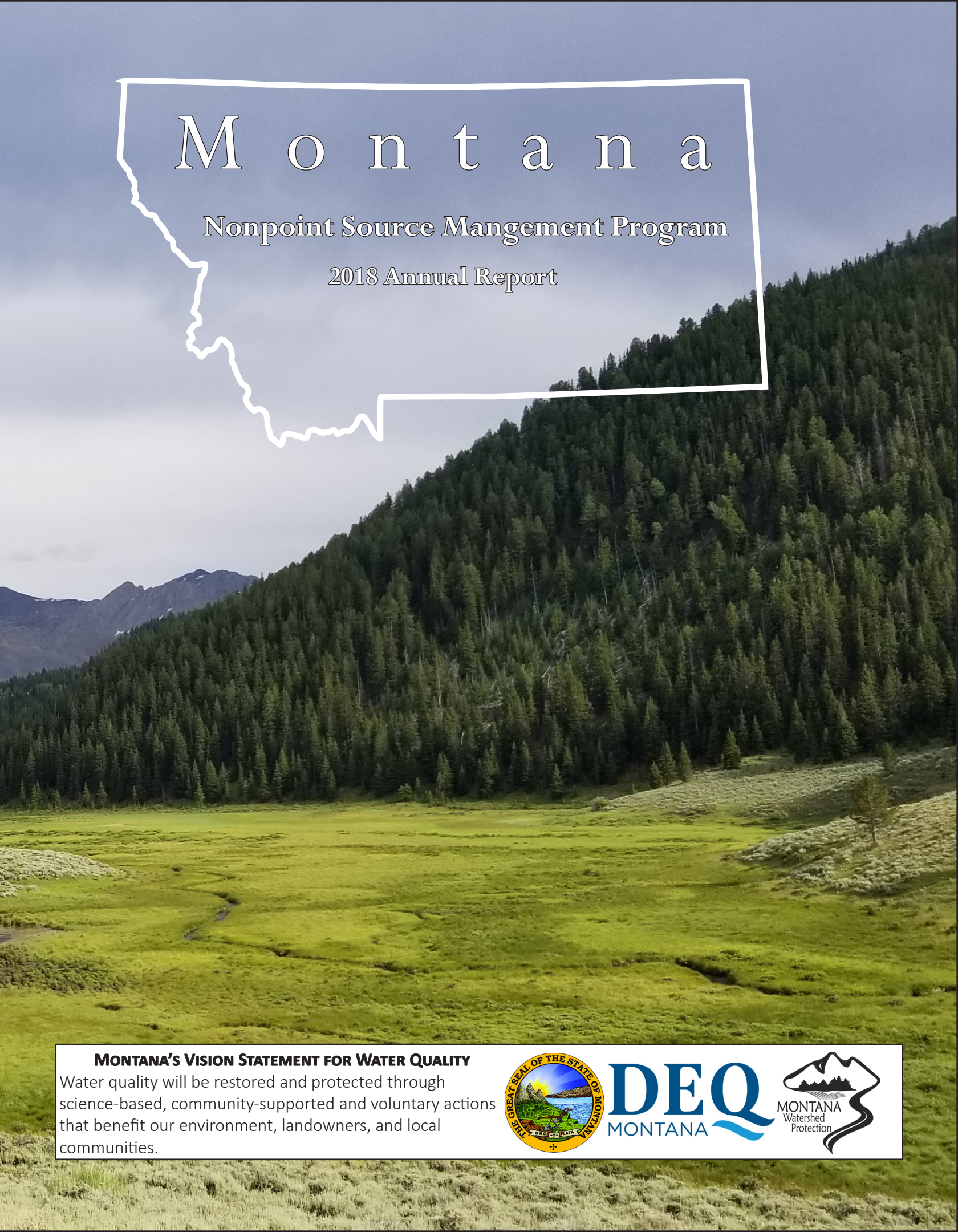

Montana

Nonpoint Source Mangement Program

2018 Annual Report

Montana's Vision Statement for Water Quality

Water quality will be restored and protected through science-based, community-supported and voluntary actions that benefit our environment, landowners, and local communities.

DEQ MONTANA

MONTANA Watershed Protection

Prepared By

Montana Department of Environmental Quality
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Acknowledgements

This report was prepared by Hannah Riedl, Water Quality Specialist with the Watershed Protection Section. Review was provided by staff in the Watershed Protection Section, Monitoring and Assessment Section, and Wetlands Program. Individual updates were provided by collaborating partners, Water Quality Division supervisors, and staff. Photos, maps, and other graphics were provided by DEQ staff and partners. Work accomplished in 2018 could not have been done without the support of our partners and the people of Montana.

Cover Photo: Nicholia Creek draining out of the Italian Peaks in southwest Montana. Photo by Steve Carpenedo.

Background photo: Saint Mary's Lake, Glacier National Park. Photo by Eric Regensburger.

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NPSAR-18

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Montana Nonpoint Source Pollution Management

Nonpoint Source (NPS) pollution is Montana's largest source of water quality impairment. Unlike pollution from industrial and sewage treatment plants (point sources), NPS pollution comes from widespread sources and can be generated by most land-use activities. NPS pollution is created when runoff water moves over and through the ground, delivering pollutants to lakes, rivers, wetlands, and groundwater. Common NPS pollutants include sediment, nitrogen, phosphorus, metals, pesticides, pathogens, petroleum products, and salts.

The goal of Montana's NPS Management Program is to protect and restore water quality from the harmful effects of NPS pollution. We believe this is best achieved through an approach 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 (Appendix F). This approach seeks to involve stakeholders through communication, cooperation, and common goals. Using this approach, DEQ, watershed groups, conservation districts, agencies, tribes, academia, and non-governmental organizations can effectively increase public understanding of and participation in addressing NPS pollution issues.

To demonstrate progress towards this goal, the NPS Management Program implements the NPS Management Plan. In 2017, DEQ staff worked with management and partners to update the 5-year plan, which was submitted to the EPA in November 2017. The Plan describes a set of focused, short term activities and measurable milestones to track progress. This Annual Report highlights accomplishments toward meeting the measurable milestones presented in the 2017 Plan (Appendix A). The 2017 Plan can be found on DEQ's website: http://deq.mt.gov/Water/SurfaceWater/nspollution

Each year, EPA awards federal Clean Water Act Section 319 funding to DEQ to address NPS pollution in Montana. Of the two grants received, one funds NPS Management Program staffing and support, and the other funds water quality restoration projects. In June 2018, the state fiscal year 2017 staffing and support grant completed and closed. This two year grant for $1,028,500 included a state match contribution of $685,667. This funding covered 17.65 staff position salaries in DEQ's Water Quality Division to implement the NPS Management Plan. Restoration project funding is managed by DEQ, but watershed groups, conservation districts, non-profits, and governmental agencies implement the projects. In June 2018, the fiscal year 2013 projects grant completed and closed. This five year grant for $804,544, allowed DEQ to support 29 NPS projects of varying size and their local sponsors between 2013 and 2018. The sponsors contributed $898,382 in non-federal funds resulting in 68% match—well above the required 40% match.

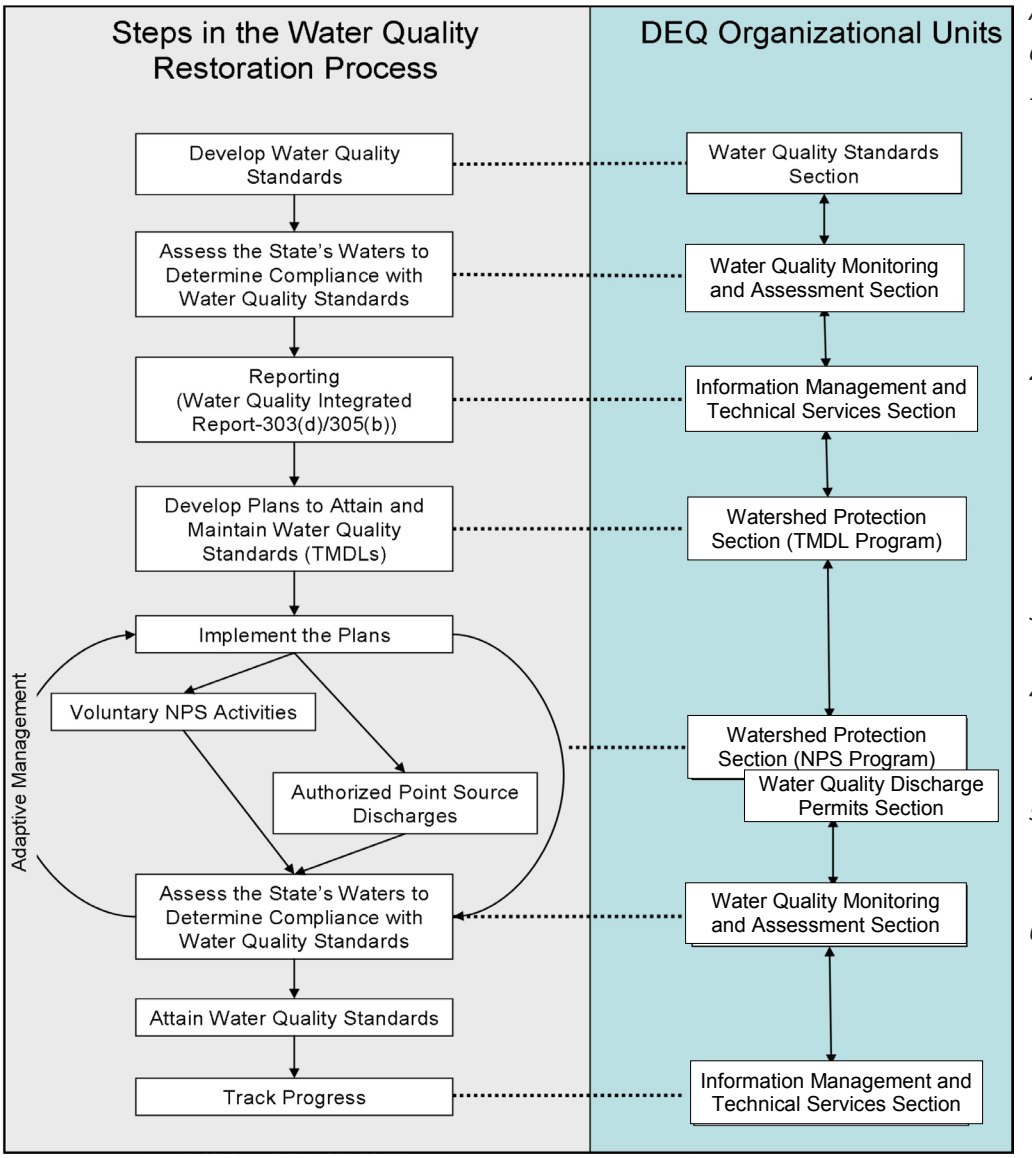
Beaverhead River near Dalys
Photo by Eric Trum

DEQ's Twenty-Year Vision for Improving Water Quality

Nonpoint source pollution comes from dispersed sources and their impacts are cumulative. To produce demonstrable improvements and sustainable momentum for local stakeholders' interest in water quality, the Water Quality Division outlined a twenty-year vision that prioritizes the use of resources across Montana within individual watersheds. In early 2019, stakeholder groups across the state will be asked to provide feedback on this process.

The twenty-year vision adds new approaches to some of the existing strategies currently employed by DEQ. The NPS Management Program works closely with DEQ programs (see figure below), particularly the Monitoring and Assessment (Page 5) and TMDL Programs (Page 7), to provide technical expertise and resources to partners across the state. The Monitoring and Assessment Program collects credible water quality data and uses it to evaluate and report water quality conditions over time. The TMDL Program defines water quality problems and solutions, makes public understanding of water quality easier, and smooths the transition from monitoring through project implementation. The NPS Management Program (Page 9) works with federal, state, and local government and nonprofit groups to implement voluntary actions that protect and restore water quality from NPS pollution.

The NPS Management Program continues to meet with stakeholder groups throughout the state to provide support. For 2-3 years, the NPS Management Program will concentrate technical and financial resources in highest priority watersheds. In late 2018, the NPS Program selected the Bitterroot watershed as the pilot high priority watershed and initiated meetings with key stakeholder groups to identify water quality concerns and opportunities for restoration projects.



An integrated appraoch to water quality planning and improvement.

1. *The Water Quality Standards Section defines the goals for a waterbody by designating its uses, setting criteria to protect those uses, and establishing provisions to protect waterbodies from pollutants.*
2. *The Water Quality Monitoring and Assessment Section monitors water quality conditions and trends statewide and assesses the sources and severity of pollution problems.*
3. *The Data Management Section reports assessment findings.*
4. *The Watershed Protection Section develops TMDL plans for waters not meeting standards.*
5. *The Watershed Protection Section supports the NPS implementation of TMDLs.*
6. *Water quality standards are used throughout DEQ, such as in the Montana Pollutant Discharge Elimination System program, to ensure clean water protection by all permitted point-source dischargers.*

2018 Nonpoint Source Management Program Highlights

Goal: Provide support for and promote watershed groups

The Nonpoint Source (NPS) Management Program remains committed to supporting local groups throughout the state with technical, financial, and capacity-building resources. In 2018, the NPS Management Program awarded $890,000 of Section 319 project funding to local groups for implementing restoration projects and providing education and outreach. Additionally, the NPS Management Program supported the Montana Watershed Coordination Council's (MWCC) Watershed Stories, which highlight local champions in five watersheds (for more information, see page 13).

Goal: Implement a long-term evaluation of Section 319 Project effectiveness

In 2018, NPS Management Program formalized a long-term Section 319 project effectiveness review (PER) process. The goals of PERs are to revisit Section 319-funded project sites at least five years after implementation, determine if projects are still achieving their intended goals, learn from project successes and failures, identify maintenance needs, and increase awareness of water quality improvement projects throughout watersheds. Results from PERs will be used to track TMDL implementation and support water quality reassessment efforts.

The NPS Management Program visited eight past Section 319 project sites and found that overall, projects are continuing to achieve their goals 4-13 years after implementation. The most successful projects embodied a compromise between land use and water quality goals (see Box 1 on Page 10). The least successful projects were compromised due to the unpredictable nature of streams and upland areas. Fire in uplands, or lateral or subsurface stream movement, may compromise revegetation efforts and structures designed to protect banks. These findings reinforce the idea that geomorphology and hydrology of a project site should be carefully weighed against design and construction costs.

We will continue evaluating past projects in 2019, and plan to partner more with other funding agencies and local stakeholders. Funding is limited for long-term monitoring. Therefore, sharing PER results is important for the effectiveness of all programs and partners interested in water quality and habitat.

Goal: Conduct Total Maximum Daily Load (TMDL) Implementation Evaluations

TMDL Implementation Evaluations (TIEs) summarize recommendations from TMDL documents, document water quality improvement activities implemented since publishing the TMDL document, and provide recommendations for future restoration and monitoring activities.

In 2018, the NPS Management Program published an addendum to the 2011 Cooke City TIE that recognized the completion of the Abandoned Mine Lands Program's remediation of the McLaren Mill site in 2014. Monitoring conducted between 2015 and 2018 demonstrated that Soda Butte Creek was meeting water quality standards for copper, iron, and lead. These findings make the McLaren Mill site the first Abandoned Mine Lands remediation project to result in a waterbody meeting its full suite of metals standards. Additionally, the NPS Management Program published a Lake Helena Watershed Nutrient TIE, and presented it to the legislative Water Policy Interim Committee.

TIEs for Big Spring Creek and Cramer Creek watersheds, as well as the Nutrient Water Quality Status and Trends Report for the Clark Fork River, will be completed in early 2019.

Goal: Support locally-led Watershed Restoration Plan (WRP) development

In 2018, DEQ accepted WRPs for the Flathead-Stillwater, Miller Creek, Rock Creek, and Thompson River watersheds. DEQ continues to provide technical assistance in support of WRP development. In 2018, staff provided feedback and support for WRPs in the Beaverhead, Central Clark Fork, Lower Clark Fork, Madison, and St. Regis River watersheds. Appendix F includes a map of existing and in-progress WRPs.

A detailed list of all NPS program accomplishments over the past 5 years under the 2017 Montana Nonpoint Source Mangement Plan is provided in Appendix A.

Water Quality Standards and Modeling

The Water Quality Standards and Modeling Section (WQSM) identifies the beneficial uses of stream, river, lake, and groundwater resources, and develops water quality criteria to protect those uses. Water quality beneficial uses include public water supplies, wildlife, fish and aquatic life, agriculture, industry, and recreation.

DEQ continues to work on developing nutrient criteria for Canyon Ferry Lake. Data collection for this project began in 2015 and ended in 2018. This project is a multi-agency work effort to collect the necessary data to develop nutrient criteria using a CE-QUAL-W2 model.

Additionally, development of site specific selenium standards for Lake Koocanusa continued in 2018. This multi-agency and stakeholder process includes research on the partitioning of selenium into the particulate phase in Lake Koocanusa and its movement through the food chain and into fish. In addition, routine sampling of selenium in the water column and other constituents of concern were monitored. DEQ plans to have draft numeric selenium standards for Lake Koocanusa by the end of 2019.

The 2015 Montana Legislature enacted Senate Bill 325, MCA 75-5-222, which directs DEQ not to apply water quality standards that are more stringent than natural and to adopt rules to issue variances from water quality standards under certain conditions. DEQ and a stakeholder workgroup is completing this work for naturally occurring arsenic in the Yellowstone River. In April 2018, the Board of Environmental Review adopted rules for the variance provision describing conditions under which variances from water quality standards may be issued.

DEQ continues to work on the reference site project and sampled 30 reference sites in 2018. DEQ has a rotational approach to re-visit these reference sites at least every three years since 2013. This project provides a long-term data set to determine if sites are still in a reference condition, enhance existing datasets and allow for long-term trend analysis. Reference site data is being used to refine or develop water quality standards, water quality assessments that have narrative criteria, and TMDL development.

DEQ is beginning data compilation for a dissolved oxygen project. This multi-agency and stakeholder process involved four counties in Eastern MT over 5 years. The aim of this long-term project is to evaluate if the current change in dissolved oxygen (DO) threshold of ≥5.3 mg/L is adequate for most of the wadeable prairie streams in Montana, and to modify if necessary the current DO numeric standard in prairie streams. In addition, periphyton data will be used to evaluate the periphyton nutrient increaser diatom metric performance that is currently used for prairie streams in the DEQ's nutrient assessment methodology.

Mike Suplee training field crew about the reference site project on Roaring Lion Creek. Photo by Colton Kyro

Water Quality Monitoring and Assessment

DEQ's Water Quality Monitoring and Assessment Section (WQMAS):

1. **Monitors surface water quality**
2. **Documents water quality over time and at different spatial scales (waterbody, region, state)**
3. **Tracks water quality change**
4. **Conveys water quality information and promotes water quality protection and improvement**
5. **Identifies impaired waters and evaluates sources and severity of pollution**
6. **Supports monitoring partners and volunteers**
7. **Develops protocols and manages water quality monitoring equipment and supplies**

In 2018, WQMAS focused monitoring efforts on evaluating water quality throughout the Red Rock River watershed, nutrients and metals in the Yellowstone River (from the national park boundary to the North Dakota border), nutrients in the Smith River, nutrients and turbidity in Clark Canyon Reservoir and the Beaverhead River, sediment in the Taylor Fork of the Gallatin River, selenium and other parameters in Lake Koocanusa, and sediment in streams near Cooke City. For the 2018 Integrated Reporting cycle, WQMAS completed 303(d)/305(b) assessments for 60 waterbody segments, including approximately 500 individual waterbody-pollutant combinations in the following project areas: Musselshell, Beaverhead, Madison, Tongue River, Armells Creek, Kootenai, and the New World Mining District.

WQMAS works at different spatial scales to assess status and trends in state water quality. WQMAS partnered with DEQ's wetlands staff to create a water quality report and pamphlet for streams, rivers, reservoirs, and wetlands in the Musselshell River Basin. WQMAS and NPS Management Program staff also completed monitoring across the Red Rock River watershed. Both of these multi-year, watershed-scale investigations occurred in advance of TMDL development to promote local engagement in water quality protection and restoration. WQMAS also funded coordination of the ongoing long-term nutrient trend monitoring partnership in the Clark Fork River and contributed funding for an associated 5-year trend report.

WQMAS supports DEQ's NPS Management Program in documenting water quality improvements and restoration success. In 2018, WQMAS and NPS Management Program staff monitored sediment in three streams in the historic New Work Mining District. Here, the US Forest Service implemented reclamation and restoration activities to address mining and road disturbances and this data will enable DEQ to determine if TMDL targets have been met and therefore demonstrate that restoration successfully improved water quality. Similarly, DEQ contracted with the Gallatin River Task Force to perform sediment monitoring in the Taylor Fork to evaluate restoration success.

In 2018, WQMAS also responded to several public inquiries about water quality changes. DEQ continued to study the Clark Canyon Reservoir and Beaverhead River where recreational and associated economic benefits have diminished due to increased nutrients and turbidity. WQMAS investigated causes of prolific algae growth observed in the Smith River in recent years. WQMAS and others supported trend monitoring for selenium, nutrients, common ions, and other metals in Lake Koocanusa in response to water quality threats in Canada.

WQMAS continued to support various monitoring partnerships with other DEQ programs, external entities, and volunteers by providing training, technical support, funding, and field equipment and supplies.

Collecting a grab sampling in the Smith River. Photo by Mike Lance

Information Management and Technical Services

The Information Management and Technical Services (IMTS) Section develops and manages database and information systems in support of multiple programs including Montana's NPS Management Program.

IMTS manages and administers multiple databases and information management applications, including the Water Quality Assessment, Reporting and Documentation (WARD) System that tracks Clean Water Act section 305(b) water quality assessment results, 303(d) listing decisions, and TMDL development information. Information contained in the WARD system is publicly available via Montana's Clean Water Act Information Center (CWAIC); an interactive web application. IMTS works with DEQ staff to update and improve WARD functionality and ensure its compatibility with EPA's Assessment, TMDL Tracking and Implementation System (ATTAINS).

IMTS also manages and administers MT-eWQX, an Environmental Quality Information System (EQuIS) database for water quality monitoring data that is compatible with EPA's national Water Quality Portal database. Data in MT-eWQX is collected by DEQ's Water Quality Division staff, contracted partners, and approved volunteer monitoring groups.

During 2018, IMTS processed data from over 174 monitoring events on 43 unique projects. These include DEQ monitoring projects for condition assessments (i.e., 305(b) reporting), water quality standards, watershed/water quality modeling, and projects from data providers outside DEQ.

Other IMTS activities in support of Montana's NPS Management Program include: providing technical support and guidance to DEQ and other programs that use EQuIS or WARD; maintaining a water quality library; preparing and publishing the state's biennial water quality Integrated Report (IR); and entering Section 319 contract information and load reduction estimates into EPA's Grant Reporting and Tracking System (GRTS).

Quaity Assurance and Quality Control

The Montana Department of Environmental Quality's quality system is the framework for planning, implementing, documenting, and assessing our program work as well as for executing the required quality assurance activities. Water quality projects under the guides of the Water Quality Division Quality Assurance and Quality Control Program (QAQC Program) are planned, implemented, and assessed to ensure quality data and decisions. Projects are supported by planning documents, which in turn are a product of systematic planning, SOPs, technical assessments, data verification and validation, and data quality assessments.

In 2018, the QAQC program continued to support DEQ processes used in the development of water quality criteria, reporting the condition of the state's waters, developing Total Maximum Daily Loads (TMDLs), implementing best management practices, and determining the effectiveness of implementation strategies.

DEQ receives data from local, state, and federal agencies; volunteer monitoring efforts; nonprofit organizations; private entities; and other groups or individuals who have an interest in water quality. This data must be defensible and its quality known before it is considered for use in DEQ projects that require a high level of rigor. Water Quality Division staff coordinate with other agencies, conservation districts, watershed groups, and other entities to ensure quality data that can be used in water quality assessments and TMDL development and implementation projects funded by Clean Water Act Section 319 grants administered by DEQ.

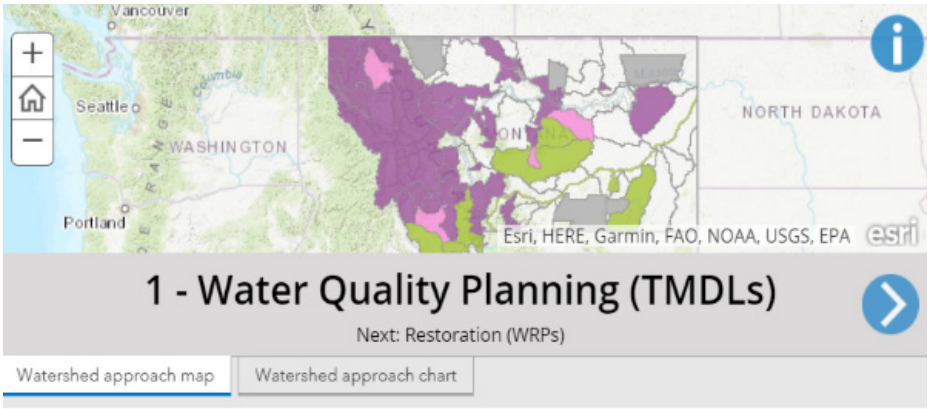
DEQ has established the minimum quality requirements for data to be considered for assessment purposes when soliciting data under the Call for Data. QAQC may review this external data to ensure it meets the requirements for use by DEQ. Project-specific QAPPs are developed for Section 319 grant-funded projects with particular monitoring goals and objectives.

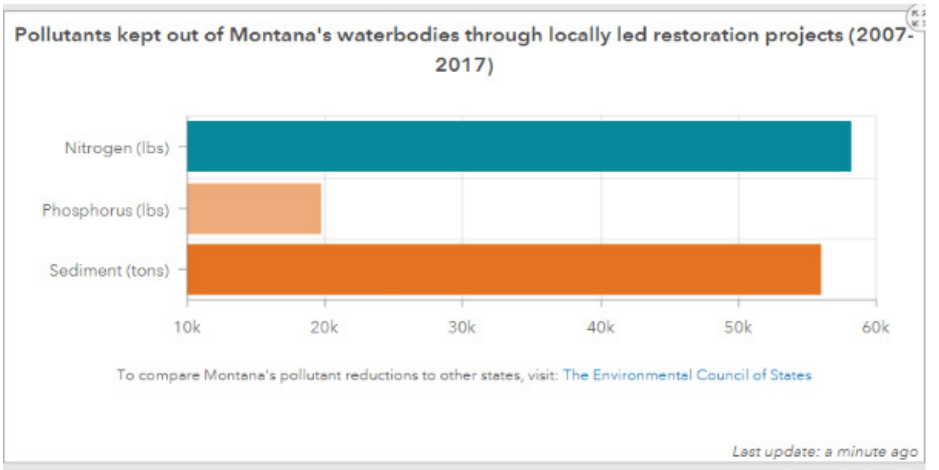
Watershed Protection

The Watershed Protection Section works to protect and restore water quality. Protection is largely achieved by informing the public about the importance of best management practices to minimize pollution. Restoration is achieved through the creation and implementation of Total Maximum Daily Loads, administration of Section 319 project funding, and partnering with organizations and agencies that share common goals.

TMDL Development

The Total Maximum Daily Load (TMDL) Program identifies sources of pollution to streams, rivers, and lakes in Montana and determines how much pollution those waters can sustain while still fully supporting designated uses (drinking water, recreation, aquatic life, etc.). Plans are then written that outline how to reduce pollution to those waters and offer ways to assist local communities with finding solutions to restore and maintain clean water. The TMDL process is an essential component for planning watershed restoration activities.



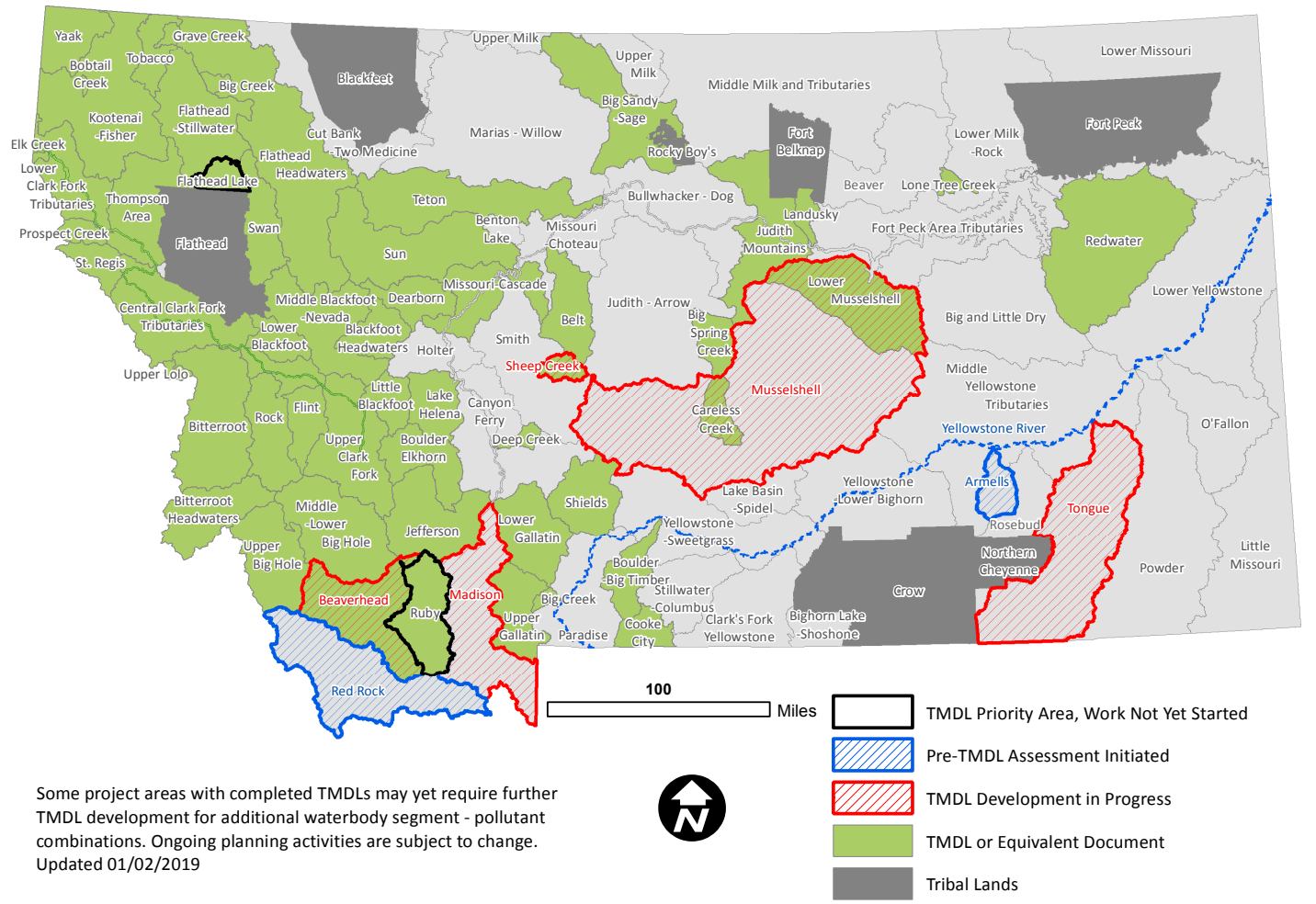


An example screen shot of the Water Quality Division's Dashboard, created by TMDL staff. Find the Dashboard at deq.mt.gov/Water

This year, the TMDL Program submitted the Madison Nutrient, *E.coli*, and Metals TMDLs and Water Quality Improvement Plan to the EPA for approval. Temperature and sediment TMDLs are nearing completion in the Madison watershed. TMDL development has begun for nutrients in the Musselshell watershed, aluminum in Sheep Creek, and nutrients and metals in the Beaverhead watershed (project areas are shown in the map on page 8). TMDL development continues for salinity in the lower Tongue River. TMDL planning and monitoring has begun for the Armells watershed and the Yellowstone River.

Part of the TMDL Program's work includes the determination and quantification of major sources of a pollutant. During the summers of 2017 and 2018, TMDL staff conducted field work in the Red Rock Project Area to collect streambank erosion and riparian condition data to estimate sediment loads from eroding streambanks. When TMDLs are developed, this information will help determine necessary sediment reductions from human-caused sources of eroding streambanks in the project area.

Members of the Monitoring and Assessment Section and the Watershed Protection Section teamed up to conduct



Some project areas with completed TMDLs may yet require further TMDL development for additional waterbody segment - pollutant combinations. Ongoing planning activities are subject to change. Updated 01/02/2019

sediment monitoring in the New World Mining District Response and Restoration Project area, north of Cooke City. This is a historical metals mining area, where extensive restoration has been conducted by the United States Forest Service with the goal to reduce pollutant loading to Daisy Creek, Fisher Creek, and the Stillwater River. The monitoring provided follow-up data for a TMDL Implementation Evaluation to see if sediment targets are being attained.

TMDL work includes providing technical support for nonpoint source water quality restoration projects across the state. TMDL staff assist with determining sediment load reductions achieved from restoration projects funded by federal Section 319 grants (Appendix C). This year, TMDL staff assisted the Water Quality Division by gathering, analyzing, and showcasing Water Quality Division data in an easy to interpret dashboard, which is now available to the public on DEQ's website (see graphic on the left).

Above: The map shows TMDL development areas with completed TMDLs and DEQ's focus areas for monitoring and assessing water quality.

Below: DEQ staff collect sediment data on Daisy Creek. Photo by Christina Staten.

Nonpoint Source Management Program

Partners at the local level implement Total Maximum Daily Loads (TMDLs). The NPS Management Program provides technical and financial assistance in the form of Section 319 funding for on-the-ground restoration projects, assistance estimating load reductions achieved by water quality improvements, support in watershed restoration planning, and long-term evaluation of project and program effectiveness.

NPS Management Program staff manage and distribute Clean Water Act Section 319 funding for water quality restoration projects and education and outreach efforts (see an example project in Box 1). Funding must go towards addressing nonpoint sources of pollution causing impairments identified in Montana's biennial Water Quality Integrated Report. Actions must be identified in the Montana Nonpoint Source Management Plan and a DEQ-accepted Watershed Restoration Plan. Each year, project proposals are solicited from local watershed groups, conservation districts, non-profit organizations, and governmental entities. Projects are competitively selected by program staff with support and guidance from an interagency review panel composed of state and federal partners.

In 2018, $892,250 was awarded to 10 projects (Appendix B). Contractors committed to $1,073,592 (55%) in non-federal match, exceeding the 40% match requirement set by the EPA. Throughout 2018, NPS Management Program staff managed 35 Section 319-funded contracts and closed 13 by the end of the year (Appendix C).

NPS Management Program staff continue to improve the effectiveness of the Section 319 program by evaluating the long-term success of past 319 projects. Although Section 319 projects include funding for effectiveness monitoring, this occurs within the contract window, often one year or less after the project completion. The NPS Management Program revisited eight Section 319 projects that had been completed for 4 – 13 years to determine if the projects were still achieving their intended goals, and to understand the potential sources of success or failure. Lessons learned from visiting past projects sites and collaborating with the Future Fisheries Improvement Program's monitoring program include:

- Landowner enthusiasm is essential for sustained project success.
- Oversight of contractors is crucial to ensure that expensive designs are properly installed.
- Context is everything: River restoration occurs on dynamic, unpredictable systems. Good understanding of local geomorphology and hydrology should inform investment in restoration design and implementation.
- Coordination is everything else: Resources are limited for long term project monitoring. Sharing results from lessons learned with funding partners and local stakeholders is essential for implementing more effective projects.

Demonstrating water quality improvement on a waterbody or watershed-scale is difficult given the size of discrete Section 319 projects and the time it takes for the project activities to take effect. To better demonstrate effectiveness of the NPS Management Program, the NPS Management Program is engaging in a "priority watersheds" approach in coordination with other DEQ Clean Water Act programs and external stakeholders. The majority of staff and project funding resources will be focused in up to three Level I Priority watersheds (see Page 2).

The NPS Management Program continues to evaluate the implementation of TMDLs and identify success stories where water quality is improving or has been restored. Staff published the Lake Helena Watershed Nutrient TMDL

Wetland dominated with Foxtail Barley in the Centennial Valley of Southwest Montana. Photo by Steve Carpenedo

Implementation Evaluation (TIE) and presented findings to the legislative Water Policy Interim Committee. The NPS Management Program also published an addendum to the Cooke City TIE in 2018.

The success of these activities and the NPS Management Program requires coordination between numerous internal and external partners, governmental and non-profit. Memoranda of Understanding with the US Forest Service and Bureau of Land Management support coordination with the NPS Management Program, land managers and resource specialists to identify successes and opportunities for projects and activities. Partnerships with the Montana Watershed Coordination Council and participation in events such as the Watershed Symposium and Annual Meeting allows the NPS Management Program to connect with a broad network of local watershed groups and resource professionals. Coordination with Soil and Water Conservation Districts of Montana provides the NPS Management Program the opportunity to engage with conservation district supervisors and staff at events such as their area meetings and annual convention. Through these and other partnerships, the NPS Management Program strives to ensure our work is useful and used for implementing NPS management activities that will help meet our long-term goal of protecting and restoring water quality.

Box 1 Section 319 Project Highlight

Content and photos provided by Ryen Neudecker, Trout Unlimited

The Stitt family has run a small cow-calf operation and raised hay along approximately three miles of Nevada Creek since 1976. Before purchasing the ranch, Nevada Creek had been pushed to the side of the valley and straightened to accommodate agricultural fields. Without willows and native riparian vegetation to hold the soils together, and without sinuosity to dissipate stream flow, Nevada Creek downcut and eroded streambanks. The Stitts were losing ground as fast as 160 dump truck loads of dirt per year.

The NPS Management Program began funding restoration projects in the Lower Nevada Creek watershed (below Nevada Reservoir) in 2008. Besides losing production land to streambank erosion, the Stitts were also fighting an ice jam every year on Braziel Creek, a tributary to Nevada Creek, less than 200 feet from their front door. Project funding replaced the undersized culvert causing the ice jam and an irrigation structure. These changes allowed the Stitts to manage their water diversion more efficiently. Additionally, riparian fencing, a water crossing, and a water gap was installed to better manage livestock grazing, and an instream water lease was negotiated to provide year-around flows for native fish.

Before and after photos showing stream restoration. Rather than using a tarp to divert water, a fish screen was installed that siphoned water to an irrigation ditch. This reduced the amount of time the Stitts spent managing their operations. Revegetation efforts were successful in part because the Stitts hand-watered the plantings.

The success of this first project led to future collaboration. To date, Big Blackfoot Chapter of Trout Unliminted (BBCTU) and the Blackfoot Challenge have obtained funding for three different phases of restoration along over three miles of Nevada Creek, in addition to the project on Braziel Creek. Monitoring indicates Westslope cutthroat trout populations have increased 600%.

Funding for projects along Nevada Creek were provided by numerous partners, as is typical on most restoration projects. Partners include: private landowners, DEQ's Nonpoint Source Program, the US Fish and Wildlife Service, MT Fish, Wildlife, and Parks, the National Fish and Wildlife Foundation, MT Trout Unlimited, Wildland Hydrology, and BBCTU.

Wetland Program

DEQ's Wetland Program is the lead state agency responsible for developing an effective, comprehensive Wetland Program for Montana and developing the capacity of state and local governments to conserve, protect, and restore wetlands for their water quality, water quantity, habitat, and flood risk reduction benefits. This work is guided by an EPA-approved Wetland Program Plan that references the State Wetland Plan and identifies the unique actions the Wetland Program takes to collectively achieve the state goal of "no overall loss of the state's remaining wetland resource base [as of 1989] and an overall increase in the quality and quantity of wetlands in Montana". The Wetland Program leads the Montana Wetland Council to develop and implement a revised State Wetland Plan for 2020 – 2025.

In 2018 DEQ's Wetland Program worked on five major topic areas. Accomplishments include:

Sustainable Financing and Effectiveness Actions

- Received a $222,500 US EPA Wetland Program Development Grant to support the Wetland Program's work.

Monitoring and Assessment

- Conducted 58 wetland assessments in the Red Rock watershed as part of DEQs watershed planning process.
- Developed a DEQ rapid wetland vegetation assessment methods for calculating wetland Floristic Quality Index.
- Developed an electronic data collection system and protocol for collecting and disseminating rapid wetland assessment data.

Voluntary Restoration and Protection

- Advised and collaborated with other DEQ programs on wetland restoration at brownfield sites in the Musselshell watershed.

Planning and Policy

- Continued to work with partners restructuring and revitalizing the Montana Wetland Council.

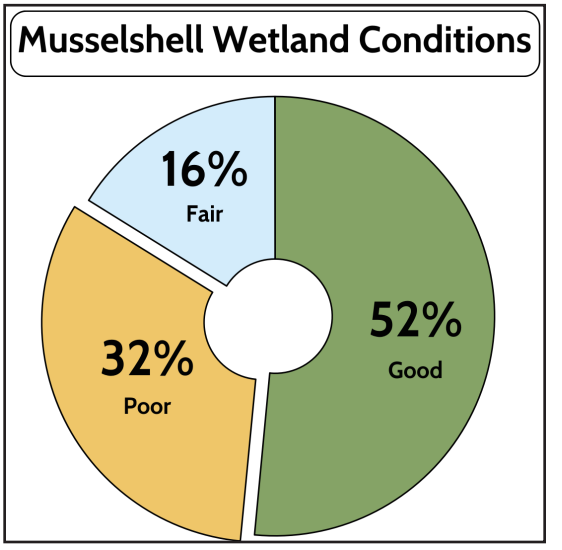
Vulnerable and Impacted Wetlands.

- Identified vulnerable and impacted wetlands, by wetland type and impacts to ecosystem service provided by wetlands, in the Musselshell watershed and Red Rock watersheds.

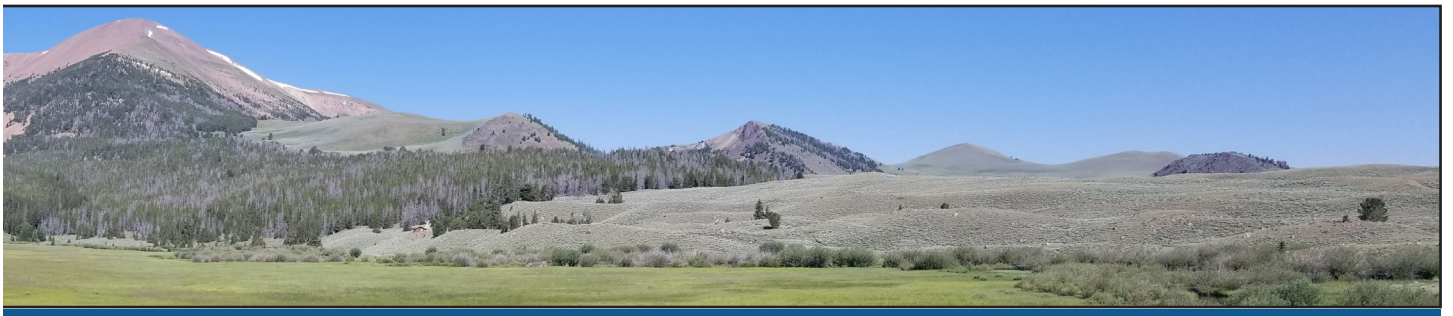
A copy of the Wetland Program Plan can be found at:
https://www.epa.gov/sites/production/files/2018-01/documents/amendments_to_montana_deq_wetland_program_plan_12.7.17_003.pdf

For more information visit the DEQ Wetland Program website at:
http://Wetlands.mt.gov

The infographic to the right and continued on the opposite page show key findings from the 2017 Musselshell Wetland Characterization Technical Report (Steve Carpenedo, 2017).



Above panorama: Wet meadow below Eighteenmile Peak and Cottonwood Mountain, photo by Steve Carpenedo



Partners and Highlights

Staff in the Water Quality Division work to meet Nonpoint Source Program goals by coordinating with and providing financial and technical resources to organizations such as the Montana Watershed Coordination Council, Montana Watercourse, Montana State University Extension Water Quality, Soil and Water Conservation Districts of Montana, Montana Wetland Council, and other federal and Montana state agencies.

MONTANA WETLAND COUNCIL

The Montana Wetland Council is an active network of diverse interests that works cooperatively to conserve and restore Montana's wetlands and riparian ecosystems. The Council meets two to three times per year, has an active listserv and website, and welcomes all to participate in the collaborative work of wetland and riparian protection, restoration, and management. The Montana Wetland Council and its partners have developed a State Wetland Plan titled "Priceless Resources: A Strategic Framework for Wetland and Riparian Area Conservation and Restoration in Montana 2013-2017". The State Wetland Plan is an action-oriented plan that prioritizes and directs collaborative efforts in conserving and restoring wetlands and riparian areas utilizing resources both internal and external to DEQ.

A copy of the 2013-2017 State Wetland Plan can be found at: http://deq.mt.gov/Portals/112/Water/WPB/Wetlands//StategicFramework2013-2017.pdf

For more information visit the Montana Wetland Council website at: http://Wetlands.mt.gov

Wetlands are important aquatic resources that provide numerous beneficial ecological and societal functions. These functions include; protecting and improving water quality, providing fish and wildlife habitat, storing and abating floodwaters, and maintaining surface water flow during low flow periods. Wetlands in poor condition are unable to provide their beneficial ecological and societal functions.

Altering the hydrology of a wetland was found to be the **dominant cause** of poor condition and a wetlands **inability** to provide a benefit to our communities, the economy, and the environment

Key Findings

19x

Times **more likely**, wetland will be in **poor condition** if the flow of water into or out of a wetland is altered

6x

Times **more likely**, wetland will be in **good condition** if cover of noxious weeds are **less than 3%**

Wetlands with high levels of grazing pressure were only **slightly more likely** to be in poor condition

Common Stressors Observed

53% of wetlands sampled had high grazing/haying pressure.

37% of wetlands sampled had the flow of water impacted by dams, berms, dikes, or levees.

13% of wetlands sampled had extensive soil compaction.

MONTANA **WATERSHED COORDINATION** COUNCIL

In January 2018, **100+ people gathered for the MWCC Annual Meeting** at Kleffner Ranch, near Helena, MT. They heard from Agency leadership and from Mark Haggerty of Headwaters Economics. They also evaluated the concept of the Watershed Approach and defined its principles in order to better communicate the work of local watershed organizations.

In general, the ***Watershed Approach:***

- Is tied to a distinct land area or hydrologic boundary
- Ensures broad stakeholder involvement and inclusivity
- Is community-based and community-driven
- Relies on local leadership
- Encourages collaboration with partners in the watershed
- Strives for consensus and avoids litigation as a conservation strategy

Big Sky Watershed Corp member and volunteers installing fencing. Photo by the Bitter Root Water Forum

13 Watershed Fund grants awarded. The Watershed Fund is a consortium of funding made available through MWCC for various initiatives: nonpoint source pollution management, aquatic invasive species response and prevention, and on-the-ground projects on private land. A function of Watershed Fund management is the coordination and information sharing among our partners and critical watershed funding programs, including the NPS Management Program.

Six watersheds highlighted through the MWCC Watershed Stories Campaign. We worked with six watershed and conservation organizations to share the personal stories of 18 Montanans whose livelihoods depend on water resources. We produced print materials for each organization, launched a new Watershed Stories page on the MWCC website, and got stories from the Musselshell and Bitterroot watersheds out into print, online, and broadcast media. In 2019, we look forward to media releases of the other four featured watersheds and to developing new stories. You can find an overview of all six 2018 watershed stories on the MWCC Website (https://mtwatersheds.org/app/watershed-stories/).

Nearly 200 attendees at the MWCC Symposium in Whitefish, Montana. The 2019 biennial gathering brought together state, federal, private, tribal, and local watershed professionals for peer to peer learning and technical assistance with a focus on "Enhancing Conservation Through Effective Communication." About 30% of attendees completed a survey which indicated attendees found the program valuable for networking and skill-building. Most attendees indicated that the Symposium will have a positive effect on their work.

MWCC also assisted in fee for service initiatives that resulted in s**trategic direction and capacity building for local watershed groups** in the Sun River and Upper Missouri watersheds.

Hundreds of watershed resources compiled within MWCC's new online Watershed Coordinators Handbook. The handbook, created in partnership with the Bureau of Land Management (BLM), includes a wide range of resources and materials vetted and compiled by MWCC and our partners. MWCC will continue to connect this handbook with our online training archive so that trainings made available through MWCC can be easily accessed in the future. Find our Watershed Coordinators Handbook here: https://mtwatersheds.org/app/building-capacity/mwcc-watershed-coordinators-handbook/

SOIL & WATER CONSERVATION DISTRICTS of MONTANA

Montana Association of Conservation Districts

For more than 40 years, the Soil and Water Conservation Districts of Montana (SWCDM) has contributed to the success of its constituent conservation districts (CDs) across the state. Created in 1972, SWCDM is a nonprofit association governed by a statewide board of directors who also serve as district supervisors in their own jurisdictions. CD have a decades-long history of conserving Montana's resources by matching the needs of local people with technical and financial resources, and initiating good conservation practices to benefit all Montanans. The resources SWCDM provides to CDs across Montana include grant funding, technical support, knowledge sharing, and more.

2018 was another productive year for SWCDM in supporting conservation and assisting with nonpoint source pollution issues across the state. Nonpoint source-related program activities included:

- Developed and expanded the Ranching for Rivers program in partnership with the Missouri River Conservation District Council. This program uses Section 319 funding to provide 50% cost share to ranchers to construct riparian pastures and establish improved grazing management plans along impaired waterbodies. Three landowners received funding for riparian fencing and stockwater tanks in spring 2018, and we anticipate awarding 5-7 additional projects in 2019.
- Coordinated the mini-grant program through Section 319 funding. Conservation districts, watershed groups, schools, and other organizations across the state addressed nonpoint source issues through education and outreach projects. In 2018, 11 mini-grants were awarded, totaling $28,881 (Appendix D). SWCDM will continue managing this program in 2019.
- Supported local capacity building through the Big Sky Watershed Corps (BSWC) program in partnership with Montana Conservation Corps and Montana Watershed Coordination Council. In 2018, 27 AmeriCorps members were placed with conservation districts, watershed groups, and other organizations. These members worked on local watershed issues and water quality improvement projects, including Watershed Restoration Plans and developing surface water monitoring programs. SWCDM will supporting the BSWC program in 2019.
- Administered an Irrigation Water Management program to help producers efficiently manage their water resources, which in turn improves water quality along Montana's waterbodies.
- Completed a program with DEQ funding to assist conservation districts, watershed groups, and other conservation entities with developing Watershed Restoration Plans (WRPs). Four new WRPs were completed and accepted by DEQ in 2018 (Appendix X).
- Supported a water resource specialist with assistance from DEQ and DNRC to work in the Upper Clark Fork basin providing technical and coordination assistance to local groups on water quantity and quality issues. This employee greatly expands the reach of nonpoint source outreach and projects. We look forward to further delivering technical capacity in this area in 2019 and hope to secure additional funding to extend this important position.
- Partnered with NRCS and others to host five soil health workshops across the state in January 2018. Hundreds of participants attended the workshops and many of the practices discussed will positively affect water quality by reducing need for and use of fertilizer and pesticides. SWCDM will continue to work with NRCS and conservation districts to bring more soil health workshops and resources to producers in 2019.

Additionally, conservation districts across the state continue to carry out Montana's Natural Streambed and Land Preservation Act (310 permit) program that minimizes soil erosion and loss, and protects and preserves streams in their

Volunteer Monitoring Partnership

Volunteer Monitoring (VM) is an increasingly common tool used by communities to investigate water quality issues and engage local people in addressing them. VM programs increase the amount of credible water quality information that is collected in Montana. They also heighten awareness of locally-relevant water resource priorities and provide meaningful educational opportunities for participants.

DEQ's Water Quality Monitoring and Assessment Section (WQMAS) supports VM efforts in Montana by providing financial and material support. In 2018, WQMAS awarded $13,722 through the Volunteer Monitoring Lab Analysis Support Program to six VM programs. These funds offset costs of having water quality samples analyzed by an accredited laboratory, and each project linked to nonpoint source pollution (see summaries in Appendix E). Each group developed a sampling and analysis plan and incorporated quality control elements to ensure their monitoring objectives were met and data quality was credible. WQMAS also expanded the inventory of monitoring equipment available for VM programs to borrow.

WQMAS also supports VM efforts in Montana by providing technical support. For example, in 2018, WQMAS and the Montana State Universtiy Extension Water Quality (MSUEWQ) participated in the Gallatin Stream Team's annual volunteer training. WQMAS trained the Bitterroot River Protection Association's VM program on monitoring methods, sampling planning and documentation, and data quality assurance. DEQ and MSUEWQ participated in a planning meeting to support the formation of a Beaver Creek VM program in Havre. WQMAS also supported a new VM program for Lake Mary Ronan. DEQ provided feedback on sampling and analysis plans for nine VM programs, and on standard operating procedures for two programs.

Far left: Monitoring on the Smith River. Photo by Chace Bell.

Left: Signage posted along the Smith River encouraging visitors to use the Smith River Algae App. Photo by Katie Makarowski.

Below: Sediment sampling on the Taylor's Fork with the Gallatin River Task Force and Confluence Consulting.

WQMAS sometimes administers volunteer monitoring opportunities directly. In 2018, DEQ partnered with Montana Fish, Wildlife & Parks and the Environmental Protection Agency to create and implement the Smith River Algae App for mobile devices. This involved a volunteer crowdsourcing approach to tracking algae conditions using photos submitted by the public as they float or visit the Smith River.

WQMAS sometimes coordinates directly with VM programs during specific investigations. For example, in 2018, WQMAS contracted with the Gallatin River Task Force to conduct sediment monitoring in the Taylor Fork of the Gallatin River. WQMAS also supported VM efforts to characterize salinity conditions in several tributaries to the Tongue River to inform local irrigation practices.

WQMAS also partners with other entities in the state that support volunteer monitoring. WQMAS provided funding in 2018 to bolster the Montana State University Extension Water Quality (MSUEWQ) program activities pertaining to VM. For example, DEQ supports MSUEWQ's efforts to develop a user-friendly, web-based platform for viewing and managing water quality data and photos collected by VM programs. DEQ and MSUEWQ are co-authoring a guidance document for selecting monitoring methods that align with VM program objectives. MSUEWQ is also working to support VM data analysis, identify VM resources relevant to Montana from other states, and plan an advanced training for volunteers and VM program coordinators. WQMAS also continued to actively participate in the Montana Watershed Coordination Council (MWCC) Water Committee as leader of the Monitoring Work Group. DEQ, MWCC, and MSUEWQ are collaborating to create and consolidate resources that support VM programs across Montana.

Appendices

Appendix A - Montana Nonpoint Source Management Program's 5-year Action Plan and Priorities (2017-2022)

The Montana Nonpoint Source (NPS) Management Program's goal is to provide a clean and healthy environment by protecting and restoring water quality from the effects of nonpoint sources of pollution. The short-term (five-year) goal of Montana's NPS Management Program is to demonstrate significant progress in protecting and restoring Montana's water quality from nonpoint sources of pollution. This is measured by achieving the actions outlined in the 2017 NPS Management Plan. The following table describes 2018 accomplishements towards each action.

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

No.	Key Partner(s)	Actions	Measurable Milestones	2018 Accomplishments
1	DEQ Standards and Modeling Section	Re-evaluate the chemical, physical, and biological condition of reference sites	At least 100 reference sites re-evaluated	DEQ continues the long-term project of re-visiting reference sites. In 2018, 30 reference sites were sampled. In 2013, DEQ established a rotational approach to re-visit sites at least every three years. The objective of this approach is to have a long-term data set to determine reference condition, enhance existing datasets, and allow for long-term trend analysis. Data are being used to refine or develop water quality standards, water quality assessments that have a narrative criteria and TMDL development. From 2012-2018, 154 established reference sites and 2 candidate reference sites have been visited using this approach.
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	DEQ is developing nutrient criteria for large rivers using QUAL-2K model. Data collection is complete on the upper Yellowstone River (Livingston to the confluence of the Big Horn River); Middle Missouri River (Wolf Creek to Loma) and upper Missouri River (Toston dam to Canyon Ferry Lake). Nutrient criteria development for the upper Yellowstone is expected to be completed in 2019 and Middle Missouri River is expected to be completed in 2020. Nutrient criteria for the upper Missouri River is expected to be developed after data collection has been completed.

Table 8-1: Interim Outcome - Water quality standards have been developed				
No.	**Key Partner(s)**	**Actions**	**Measurable Milestones**	**2018 Accomplishments**
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	A lake classification system is not yet in place. Standards work on Canyon Ferry Reservoir in 2015 will support a classification system in the future.
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	With each triennial review of Montana's water quality standards, existing and new pesticide human health advisories are updated/adopted. The previous triennial review was completed in 2017 and the next will be completed in 2020.
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**	**2018 Accomplishments**
5	DEQ Monitoring and Assessment	Conduct statewide water quality assessments.	Musselshell watershed, Beaverhead watershed, Big Creek and Jim Creek assessment projects completed for the 2018 Integrated report	Between 2016 and 2018, DEQ completed 303(d)/305(b) assessments for 60 waterbody segments (including segments identified as measurable milestones), totalling approximately 500 individual waterbody-pollutant combinations. These assessments are summarized in 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	DEQ funded the Clark Fork Coalition's coordination of the ongoing nutrient monitoring partnership implemented by the University of Montana Watershed Health Clinic, the City of Missoula Wastewater Treatment Plant, and Avista Corporation. DEQ also funded the development of a 5-year trend report on the Clark Fork River.
			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	Montana DEQ drafted the Musselshell Watershed Characterization Report and the Red Rock Watershed Characterization Report. These analyses helped to guide monitoring strategies for beneficial use assessments and enabled broad comparisons of water quality conditions across the basins.

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**	**2018 Accomplishments**
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	The Beaverhead TMDL Document, in production, and the Madison TMDL Document, submitted to EPA in December 2018, model septic influence.
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	The 2018 Integrated Report was submitted to the EPA in December.
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	IMTS continues to maintain the Clean Water Act Information Center (CWAIC), which provides information about the quality of Montana's surface waters, displays results of water quality assessments, and provides access to Montana's biennial Water Quality Integrated Report. CWAIC was the most popular DEQ webpage to view according to web analytics from April 2017-2018.
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	WARD was updated in conjuction with submitting the 2018 Integrated Report to EPA.
Table 8-3: Interim Outcome – TMDLs have been completed for required waterbodies				
No.	**Key Partner(s)**	**Actions**	**Measurable Milestones**	**2018 Accomplishments**
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	Staff submitted 15 pollutant-waterbody TMDLs for the Madison watershed to EPA in 2018. Additionally, 16 TMDLs are under development in the Madison, 39 in the Beaverhead, 19 in the Musselshell, 1 in Sheep Creek, and 1 in the Tongue River watershed.

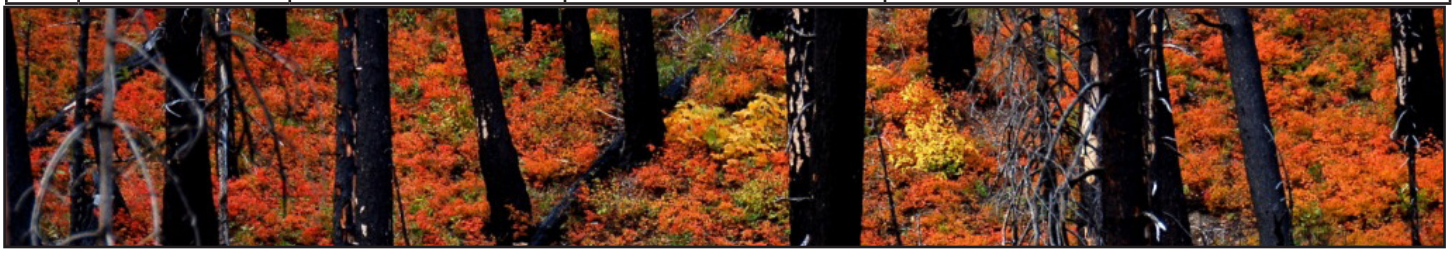
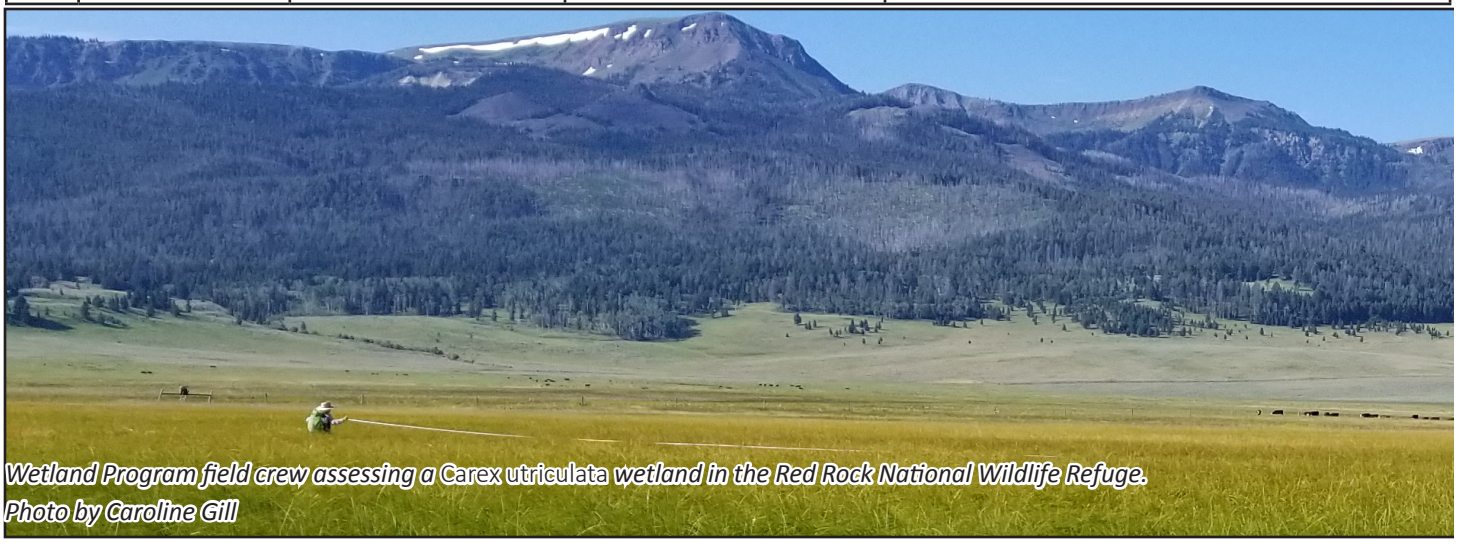


Table 8-4: Interim Outcome – Sources of pollutants identified are sufficient for local planning efforts				
No.	**Key Partner(s)**	**Actions**	**Measurable Milestones**	**2018 Accomplishments**
12	DEQ Watershed Protection Section, WRP sponsors	Support local efforts to refine pollutant source identification	Updated fine-scale source identification in at least 3 WRPs	The Watershed Protection Section began developing a method for identifying fine-scale nonpoint source pollution sources using aerial imagery. This process is intended to support prioritization of local projects. In addition, the Clark Fork Coalition assessed Miller Creek to guide restoration prorities and recommendations.
Table 8-5: Interim Outcome - Plans are in place to ensure efficient and effective implementation				
No.	**Key Partner(s)**	**Actions**	**Measurable Milestones**	**2018 Accomplishments**
13	DEQ Watershed Protection Section, WRP sponsors, MACD	Work with watershed groups to develop and revise Watershed Restoration Plans	12 new or updated DEQ accepted WRPs by 2022	DEQ accepted the Flathead-Stillwater, Miller Creek, Rock Creek, and Thompson River WRPs in 2018.
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	A Section 319 Project awarded funding in 2018 will revegetate streambanks along the Bitterroot River and post signage educating visitors about NPS pollution. The land will be transferred to the City of Hamtilon in 2019, and a landowner agreement will help ensure the park is managed to support proper stream function and condition.
15	DEQ Watershed Protection Section, WRP Sponsors	Encourage integration of wetland restoration into NPS WRPs	Specific wetland planning components are included in 2 WRPs	The Flathead-Stillwater, Rock Creek, and Thompson River WRPs, accepted in 2018, incorporate wetland protection, preventing wetland loss, and/or wetland restoration as important components of improving water quality.
16	DEQ, DNRC, CDs	Encourage the development of channel migration mapping statewide	Number of miles mapped	In 2018, 493 miles (79%) of CMZ in the Missouri River Headwaters was mapped.
			Number of waterbody segments mapped	8 rivers and streams in the Missouri River Headwaters were mapped.
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	All WRPs accepted in 2018 emphasized protecting high quality streams. Examples include protecting streams that may not be listed as impaired by DEQ, protecting existing riparian vegetation, and protecting stream reaches with high potential to recover naturally.

Table 8-6: Interim Outcome - Public has knowledge and resources to address NPS issues				
No.	**Key Partner(s)**	**Actions**	**Measurable Milestones**	**2018 Accomplishments**
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	The 2018 MWCC Symposium offered multiple options for watershed coordinator trainings. These included lessons about telling compelling stories, relaying clear messages, using infographics, building partnerships, and fundraising strategies.
			Annual watershed tour	The 2018 MWCC Symposium included two options for field trips. The first visited watershed protection initiatives in the Whitefish area, and the second visited three active restoration projects on private property.
			Bi-weekly newsletter	MWCC continues to publish and distribute a bi-weekly newsletter to over 1,000 people. The newsletter highlights news, career opportunities, training, and grants. Sign up for the newsletter here: https://mtwatersheds.org/app/watershed-news/
			Support development and maintenance of a water quality monitoring website	With funding from DEQ and DNRC, MWCC's Water Committee partnered with the State Library to launch their new water quality monitoring website in 2018. This (mtwatersheds.org/app/water-monitoring/) centralized hub of water monitoring resources includes an interactive map and profiles agencies and organizations conducting water monitoring in Montana, as well as a resource library with over 200 resources relevant to watershed work.



Wetland Program field crew assessing a Carex utriculata *wetland in the Red Rock National Wildlife Refuge.*
Photo by Caroline Gill

Table 8-6: Interim Outcome - Public has knowledge and resources to address NPS issues				
No.	**Key Partner(s)**	**Actions**	**Measurable Milestones**	**2018 Accomplishments**
19	DEQ	Support riparian and wetland buffer education campaigns	Support 3 distinct riparian and/or wetland buffer education campaigns	DEQ supported the Soil and Water Conservation District's (SWCDM) Riparian Grazing Workshops and participated in a volunteer willow planting event on Sevenmile Creek in the Lake Helena watershed. The Lake Helena Watershed Group also published a riparian health and restoration flyer using DEQ's support. SWCDM's mini-grant program supported the Yaak Valley Forest Council's Youth Watershed Education Camp where 5-12 year-olds learned about riparian vegetation and planted willow shoots.
20	DEQ	Participation and presentations at landuse planning meetings	Active participation in 5 events annually	The Watershed Protection Section presented information on the NPS Program at Water School and facilitated rulemaking for lagoon and water well setbacks.
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	Numerous partners were acknowledged for environmental stewardship in 2018. The Montana Stockgrowers Association awarded the Hahn Ranch their Environmental Stewardship Award (http://mtbeef.org/benefits-beyond-ranch-2/), MWCC recognized environmental stewards accross the state as part of their Watershed Stories Campaign (https://mtwatersheds.org/app/watershed-stories/), and MACD awarded exemplary Conservation District supervisors and staff at their annual convention. See also page 10.

Table 8-6: Interim Outcome - Public has knowledge and resources to address NPS issues				
No.	**Key Partner(s)**	**Actions**	**Measurable Milestones**	**2018 Accomplishments**
22	DEQ, SWCDM, MWCC	Support NPS Education and Outreach efforts at a local level	Fund at least 5 E&O mini-grants annually	$28,882 in Section 319 funding was awarded to 11 mini-grant recipients in 2018. This year, the maximum award amount increased from $2,000 to $3,000.
			Staff at least 2 watershed festivals annually	Watershed Protection Section staff participated in the Lake Helena Watershed Group's Watershed Festival and the Running for Water 5k. Staff also attended the Confederated Salish and Kootenai Tribe's River Honoring Festival.
			Support at least 5 BSWC activities annually	Section 319 funding supported professional development for Big Sky Watershed Corp members across the state, each of whom provided education and outreach on a local level. The Bitter Root Water Forum's BSWC member worked with volunteers to water and protect riparian revegetation installed during past projects from wildlife browse. This member also worked with students in the valley through the "Earth Stewardship" program and facilitated field tours with local irrigators. Additionally, Section 319 funds also supported BSWC members attending the Montana Association of Conservation District's Riparian Health and Grazing workshops, the MWCC Symposium.

A ranch tour via hayride as part of SWCDM's Riparian Grazing Workshop.

Photo by Hannah Riedl

Table 8-6: Interim Outcome - Public has knowledge and resources to address NPS issues				
No.	**Key Partner(s)**	**Actions**	**Measurable Milestones**	**2018 Accomplishments**
23	DEQ	Support NPS Education and Outreach efforts at a statewide level	Annual maintenance and updates to DEQ NPS Management Program webpages	In 2018, the Water Quality Division revamped its webpages to be more user friendly for the public by reorganizing pages based on web analytics.
			NPS Annual Report	This 2018 Annual Report was submitted to EPA in January 2019 and printed for public distribution.
			Support two Wetland Council meetings annually	The Montana Wetland Council Steering Committee met four times to discuss how the Council can transition to a leadership model that functions through collaborative partnerships.
			Assist with the creation or updates of NPS publications	Created the Water Quality Division's Dashboard; reported on nutrients in the Lake Helena valley to the Water Policy Interim Committee; supported MWCC's Watershed Stories.
			Distribute NPS publications at 5 events annually	Staff distributed NPS publications at the MWCC Annual Meeting and Symposium, the Stormwater Conference, the MACD Convention, the Ashley Creek Landowner meeting, and at Water School.

Nicholia Creek riparian area below the Italian Peaks cirque.
Photo by Steve Carpenedo

Table 8-6: Interim Outcome - Public has knowledge and resources to address NPS issues				
No.	**Key Partner(s)**	**Actions**	**Measurable Milestones**	**2018 Accomplishments**
24	DEQ, MSUEWQ, MWCC, Montana Watercourse	Support volunteer monitoring efforts	Create or update VM technical guidance documents	DEQ updated the VM Sampling and Analysis Plan and budget templates. DEQ and MSUEWQ are co-authoring a Monitoring Methods Selection Guidance document which includes standard operating procedures tailored to volunteers. With funding from DEQ, MSUEWQ continued developing a data and photo database and visualization tool, and is developing data analysis guidance for VM programs.
			Provide training and technical guidance to 5 VM groups annually	DEQ and MSUEWQ participated in the Gallatin Stream Team's annual volunteer training, and DEQ trained volunteers in the Bitterroot VM program. DEQ and MSUEWQ supported a new VM group in Havre, and DEQ supported a new VM group interested in Lake Mary Ronan. DEQ supported volunteers collecting salinity data in the Tongue River watershed. DEQ provided feedback on nine sampling and analysis plans and two standard operating procedures.
			Provide funding to support VM efforts	DEQ awarded $13,722 total to six VM programs through its Volunteer Monitoring Lab Analysis Support Program to offset analytical costs of water sampling. DEQ partnered with EPA and FWP to create and implement the Smith River Algae App, an innovative crowdsourcing platform where volunteer users submit photos for analysis of nuisance algae. DEQ contracted with the Gallatin River Task Force to conduct sediment monitoring in the Taylor Fork of the Gallatin River.
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	Coordinated with DNRC on their current real estate workshop modules. Supported Missouri River Conservation District Council (MRCDC) effort in developing a website for new stream side landowners called "Living on the Bank."
			Hold 2 workshops	No workshops in 2018.

Table 8-6: Interim Outcome - Public has knowledge and resources to address NPS issues				
No.	**Key Partner(s)**	**Actions**	**Measurable Milestones**	**2018 Accomplishments**
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	Interagency workgroup is finalizing an update of Montana Stream Permitting Guide to support implementation of policy. A draft guide informed an online storymap, "Living on the Bank" by the Missouri River Conservation District Council (to be finalized in early 2019).
27	MDT	Promote and support BMP training for road maintenance personnel	Provide 3 trainings for road maintenance personnel	52 MDT road maintenance personnel completed new Stormwater Pollution Prevention Plan online training in 2018. District Environmental Engineering Specialists met 9 times to discuss new BMP training and environmental issues. These employee trainings informs maintenance activities outside the geographic permitted MS4 boundaries.
28	DEQ	Support conferences that address stormwater pollution prevention and control strategies	Support 2 stormwater conferences	DEQ hosted the 2018 Montana Stormwater Conference in May. 310 people and 26 vendors attended from 10+ states and 50+ organizations.
29	DNRC	Promote and conduct forestry BMP and stewardship educational workshops and programs	Annual BMP/SMZ education workshops for loggers and landowners	145 loggers and foresters attended the annual Montana Logging Association's BMP/SMZ workshop. 40 loggers attended a Yellow Bay Stewardship workshop. DNRC published the 2018 BMP Field Review Biennial Report.
			Forest stewardship program targeting small landowners throughout Montana	139 non-industrial private forest landowners attended Stewardship workshops taught by MSU Extension Forestry. 200-300 private landowner visits by DNRC Service Foresters.
30	DEQ, DNRC	Increase awareness of regulatory requirements for nonpoint source pollutions	Factsheet of existing NPS regulatory requirements	DNRC revised the booklet, “A Guide to Stream Permitting in Montana” in 2018.
			New audiences reached through publications and presentations	The Soil and Water Conservation District’s Mini-grant program intends to award the Whitefish Lake Institute funding for scholarships for lake side landowners to attend the 2019 Lakes Conference.
31	DEQ	Increase number of applications for 319 funding	At least 20 applications received in 2022	Six Section 319 grant applications received in 2018.

Table 8-7: Interim Outcome - Projects and practices are implemented to address NPS issues				
No.	**Key Partner(s)**	**Actions**	**Measurable Milestones**	**2018 Accomplishments**
32	DEQ Engineering Bureau	Encourage stormwater quality improvement projects funded through the state revolving fund program	Fund at least 4 stormwater projects	Phase II of Great Fall's stormwater project used a SRF loan, which closed in 2018, to improve storm sewers and upsize the sewer mains on 18th Ave. A 2nd SRF loan went to the Shelby Stormwater Project. Construction began in September 2018, and the project will result in 158 catchment basins, wetland mitigation, and over a mile of other BMPs designed to improve stormwater quality.
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)	According to the Montana State Library's Conservation Easement geodatabase, 16.6 stream miles were protected under new conservation easements in 2018.
34	DEQ Watershed Protection Section	Fund WQIP and WRP-directed NPS watershed restoration projects	Fund on-the-ground watershed restoration activities	Project sponsors signed nine Section 319 grant contracts, and the NPS Management Program awarded six Section 319 grants.
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	Watershed Protection Section reviewed project proposals for the DNRC's Renewable Resource Grant and Loan and Watershed Management Grant Programs. Additionally, they provided comment on proposed actions in the Flathead and Bitterroot National Forests. DEQ serves as a management committee representative as part of the Clark Fork Settlement Agreement and participates on the Water Resources Technical Advisory Committee for the Clark Fork River.
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	Implementation of Section 319 projects in 2018 resulted in 4.2 miles of riparian buffer improvement on Ninemile Creek, the Tobacco River, Mud Creek, Nevada Creek, Miller Creek, and the East Fork Bitterroot River.
			Fund 10 acres of wetland enhancement through Section 319 contracts	Implementation of Section 319 projects in 2018 resulted in 5 acres of wetland enhancement.

Table 8-7: Interim Outcome - Projects and practices are implemented to address NPS issues				
No.	**Key Partner(s)**	**Actions**	**Measurable Milestones**	**2018 Accomplishments**
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	Staff modified boilerplate contract language to reflect federal outreach acknowledgement requirements, updated mini-grant calls for proposals to clarify refreshment request requirements, investigated contractor requirements necessitated by the Dark Money Governor Executive Order, and developed quality assurance documents for Section 319 project monitoring.
			Conduct contract initiation meetings for all new contracts	NPS Management Program staff arranged contract kick off meetings with all new or interested contractors.
			Ensure 75% of Section 319 contracts close within three years of contract award	100% of projects initiated in 2015 closed within 3 years.
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	DEQ hosted the annual MOU meeting with the Forest Service, used funds from BLM to conduct monitoring on BLM Lands, and continues to partipcate in the Watershed Advisory Working Group, which advises NRCS's EQIP Program
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	The FY2019 Call for Proposals states that eligible projects will be consistent with recommendations in the 2017 Montana Nonpoint Source Management Plan, which includes reductions in hydrologic modifications as a strategy for reducing NPS pollution. Two project proposals submitted address hydrologic modification.
			Encourage groups developing or updating a WRP to incorporate plans to address hydrologic modification and wetland protection/ restoration	The Flathead-Stillwater WRP, accepted in 2018, and the Lower Clark Fork and Central Clark Fork WRPs, under development, include hydrologic modification as a best management practice to reduce NPS pollution.

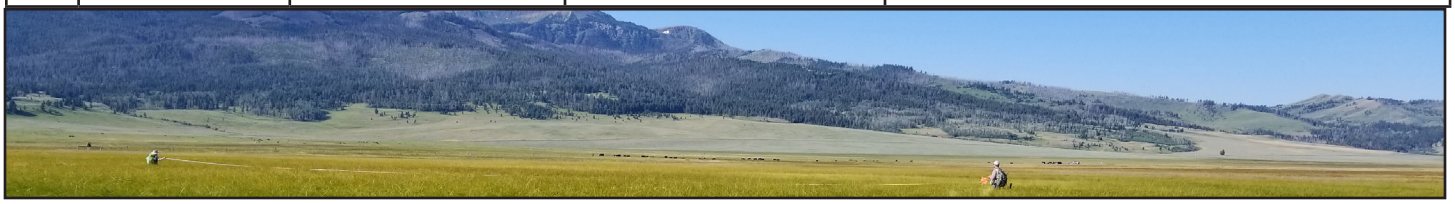


Table 8-7: Interim Outcome - Projects and practices are implemented to address NPS issues				
No.	**Key Partner(s)**	**Actions**	**Measurable Milestones**	**2018 Accomplishments**
40	DEQ, NRCS, CDs	Continue support for the National Water Quality Initiative (NWQI) under the EQIP program	Successful expenditure of all available funding in designated NWQI watersheds	NRCS had such success expending available fund that they are proposing to continue funding projects in the current NWQI watersheds (Camp and Godfrey Creeks) for at least 1 additional year.
			Ongoing water quality monitoring and technical support	DEQ published a monitoring report that used 2017 data in Camp and Godfrey watersheds. The report summarized baseline data and included recommendations for future monitoring locations, such as irrigation ditches.
			Identification and preparation of future NWQI watersheds	NRCS intends to continue work in the current NWQI watersheds (Camp and Godfrey Creeks) for 1-2 more years. In spring of 2019, the Watershed Activities Working Group will meet to solicit input and suggestions for future NWQI watersheds.
Table 8-8: Interim Outcome - Project implementation and effectiveness is tracked and reported				
No.	**Key Partner(s)**	**Actions**	**Measurable Milestones**	**2018 Accomplishments**
41	DEQ Watershed Protection Section	Conduct TMDL implementation evaluations	At least 15 reviews completed	The NPS Management Program finalized the Lake Helena Nutrient TIE and an addendum to the 2011 Cooke City TIE. TIEs are nearly complete for the Cramer Creek, Big Spring watershed, and the Clark Fork River.
42	DEQ Watershed Protection Section	Implement a long-term Section 319 project effectiveness evaluation program	Project effectiveness evaluation program in place by 2019	NPS Management Program staff established a method for evaluating the long term success of projects. Project Effectiveness Reviews (PERs) focus on photo-point monitoring and evaluating the function of the waterbody, banks, and riparian habitat. NPS Staff collaborated with the Future Fisheries Program and presented lessons learned from long term monitoring at the Montana Watershed Coordination Council meeting in October.
			Project sites are evaluated every 5 years	Eight project sites were evaluated during Project Effectiveness Reviews. These projects were completed between 2005 and 2016. The Nonpoint Source Program will continue revisiting past project sites in upcoming years, and older project sites will be given priority.

Table 8-8: Interim Outcome - Project implementation and effectiveness is tracked and reported				
No.	**Key Partner(s)**	**Actions**	**Measurable Milestones**	**2018 Accomplishments**
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	To be completed in 2019.
			Reports on SMZ and HCPs	42 new forestry sites and a total of 3,388 practices were evaluated for the 2018 BMP Monitoring Report. Of all practices evaluated, over 97% were properly applied according to BMP/SMZ standards. For all applied BMP/SMZ, over 97% were shown to be effective for all types of natural reource impacts. These high success rates are a tribute to the continuing efforts of landowners and loggers working in Montana's forests.
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	IMTS processed data from over 174 monitoring events on 43 unique projects. These include DEQ monitoring projects for condition assessments (i.e., 305(b) reporting), water quality standards, watershed/water quality modeling, and projects from data providers outside DEQ.

Bear grass blooming near Upper Holland Lake
Photo by Eric Regensburger

Appendix B - Fiscal Year 2018 Section 319 Project Awards

Project Name	Project Sponsor	Contract Number	DEQ Project Officer	319 Funds	Non-Federal Match Funds	Total Project Cost
FY 2018 Education and Outreach Mini-Grants	Soil and Water Conservation Districts of Montana	218012	Christina Staten	$30,000	$20,000	$50,000
Cow Creek Restoration Project	Flathead Conservation District	218013	Christina Staten	$72,000	$49,412	$121,412
Upper Ninemile Placer Reclamation	Trout Unlimited	217010	Eric Trum	$100,000	$65,000	$165,000
Tramway Creek Mine Reclamation and Metals Reduction	Trout Unlimited	218014	Lou Volpe	$240,000	$595,000	$835,000
Dry Creek Restoration and Fish Bypass	Trout Unlimited	218015	Robert Ray	$50,000	$33,334	$83,334
Muddy Creek Headwaters Animal Waste Management	Sun River Watershed Group	218016	Mark Ockey	$12,000	$8,700	$20,700
Granite Creek Sediment Reduction Project	Clark Fork Coalition	218017	Hannah Riedl	$90,000	$60,496	$150,496
Big Sky Watershed Host Site Support	Montana Watershed Coordination Council	217009	Robert Ray	$20,000	$16,650	$36,650
Big Hole Watershed	Big Hole Watershed Committee	218018	Eric Trum	$240,000	$199,000	$439,000
Fencing and Riparian Improvements on Miller Creek	Bitter Root Water Forum	218019	Hannah Riedl	$38,250	$26,000	$64,250
				$892,250	**$1,073,592**	**$1,965,842**

Appendix C - Section 319 Projects Closed in 2018

Project Name	Contractor	Contract Number	319 Funds Expended	Non-Federal Match Funds Expended	Final Payment Date	Load Reductions Achieved
Montana Stream Permitting Update: A Guide for Conservation District Supervisors & Others	WGM Group	216018	$9,000	$0	1/19/2018	-
Upper West Fork Nitrogen & Sediment Reduction Project	Gallatin River Task Force	216001	$130,000	$110,012	2/5/2018	664 lbs/year nitrogen 171 tons/year sediment
French Creek & Moose Creek Restoration	Big Hole Watershed Committee	216003	$225,000	$195,493	2/9/2018	450 tons/year sediment
Lily Orphan Boy Reclamation & Telegraph Creek Restoration	Trout Unlimited	216035	$32,000	$29,000	2/9/2018	1 lbs/year arsenic 10 lbs/year copper 60 lbs/year zinc
Story Mill and Camp Creek Restoration	Great Gallatin Watershed	216002	$125,000	$98,772	2/16/2018	71 lbs/year nitrogen 93 lbs/year phosphorus
Water Monitoring Resource Website Development	MT Watershed Coordination Council Inc	217002	$20,000	$9,210	2/16/2018	-
Planning for Success: Watershed Restoration Plan Development Through Conservation Districts	Soil & Water Conservation Districts of Montana	216009	$72,000	$58,047	5/14/2018	-
Upper Lolo Creek Sediment Reduction Project Phase 2: Implementation	Clark Fork Coalition	216033	$122,510	$85,500	6/25/2018	-
Flathead Ripples of Change--Phase 2	Flathead Lakers	216005	$35,000	$27,643	7/3/2018	31 lbs/year nitrogen 18 lbs/year phosphorus 40 tons/year sediment
Temperature and Sediment Reduction on the East Fork of the Bitterroot at Lazy J Cross	Bitter Root Water Forum	217007	$30,000	$24,139	7/10/2018	7 tons/year sediment
FY 2016 Education and Outreach Mini-Grants	Soil & Water Conservation Districts of Montana	216034	$30,000	$53,656	7/31/2018	-
Dry Creek and Bull River Sediment Reduction and Revegetation Project	Green Mountain Conservation District	214012	$210,175	$570,184	8/21/2018	-
Upper Ninemile Creek Mine Reclamation	Trout Unlimited	216004	$225,000	$202,500	10/10/2018	630 tons/year sediment

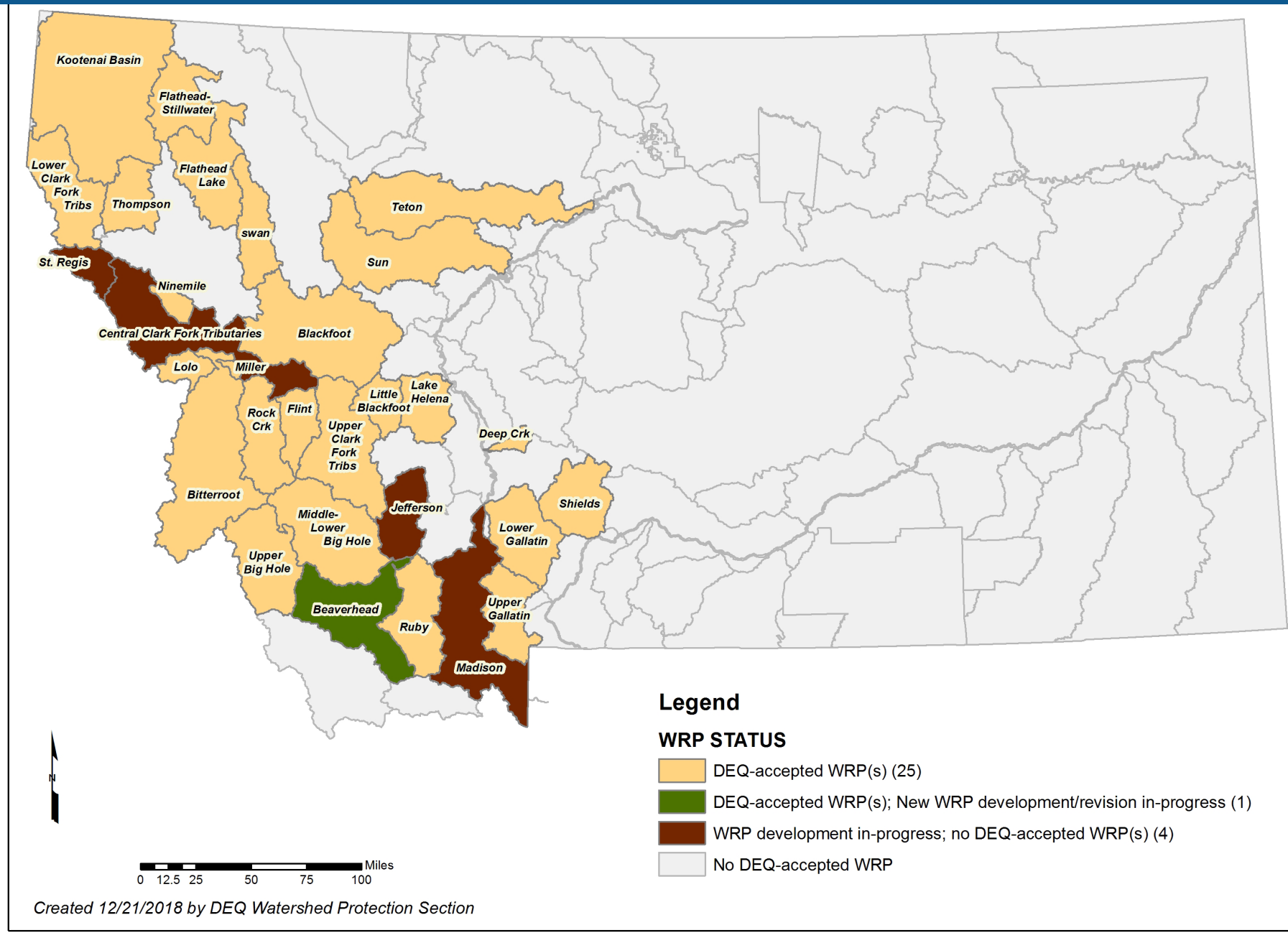
Appendix D - 2018 Section 319 Mini-grant Projects Awarded

Sponsor	Title	Award
Mini-grants Awarded in Spring 2018		
Big Hole Watershed Committee	Water Quality & Pearlshell Mussels	$2,000
Greater Gallatin Watershed Council	Lower Gallatin Watershed Restoration Project Inventory	$2,533
Lewis & Clark CD	Living on the Bank	$2,874
Lower Clark Fork Watershed Group	Lower Clark Fork Watershed Outreach and Story Map	$3,000
Mini-Grants Awarded in Fall 2018		
Bitter Root Water Forum	Macroinvertebrate Educational Tools	$2,500
Gallatin CD	East Gallatin River High School Study	$2,872
Helena School Age Child Care Program	Helena Valley Flooding and Nonpoint Source Pollution Field Tours	$3,000
Missoula Valley WQD	Clean Suds Car Wash Kit	$1,139
Ruby Valley CD	Twin Bridges High School Macro Sampling	$2,964
Whitefish Lake Institute	Montana Lakes Conference Scholarships	$3,000
Yaak Valley Forest Council	Youth Watershed Education Camp	$3,000
	Total Awarded in 2018	**$28,882**

Appendix E - 2018 Volunteer Monitoring Lab Analysis Support Grants

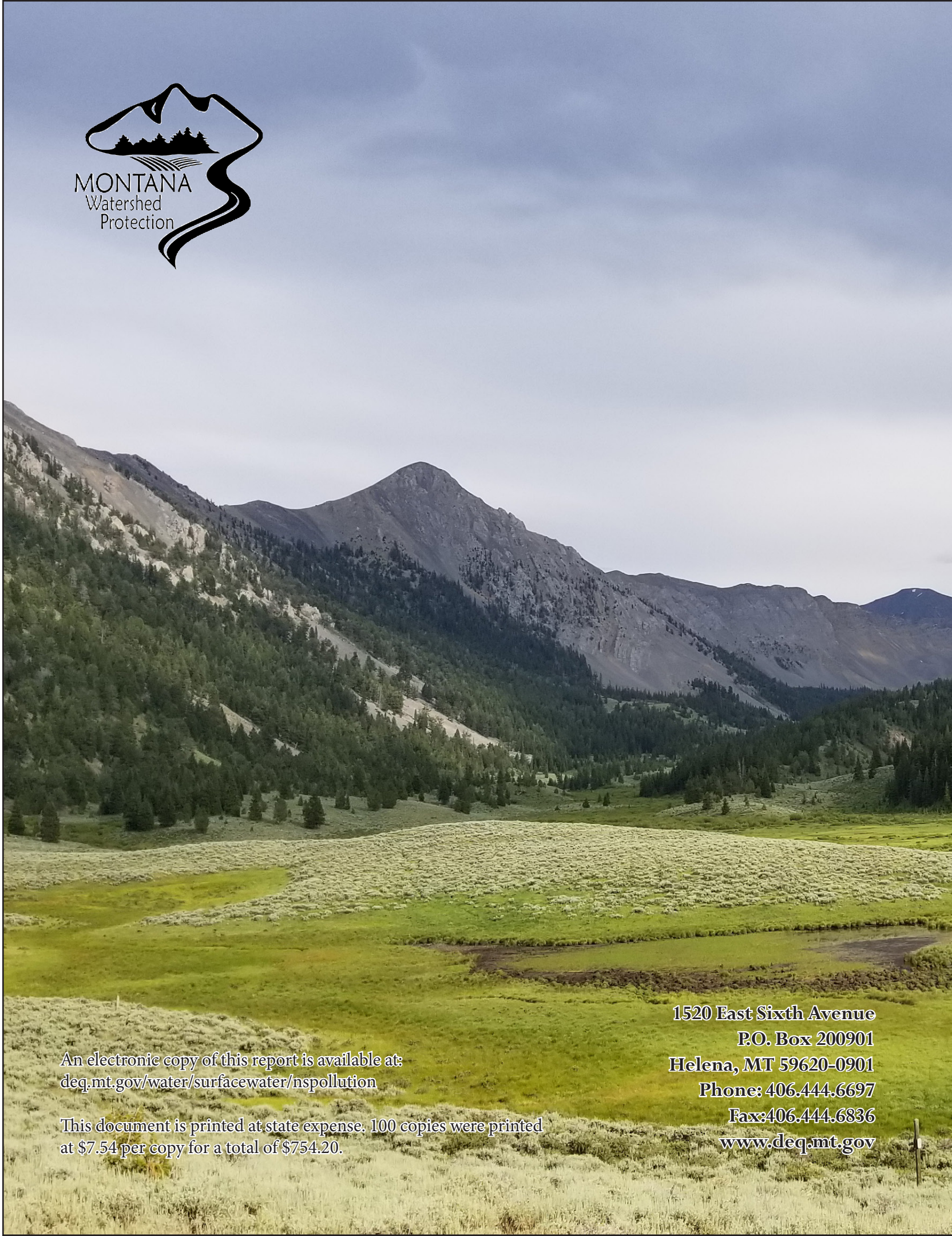
Sponsor	Project	Project Description	Award
Sun River Watershed Group	Volunteer Monitoring Project	This project expands the long-term dataset used to evaluate water quality trends, to track progress towards reaching the goals of the Sun River TMDL and the Sun River Watershed Restoration Plan, to determine the effects of water quality improvement projects, and to evaluate progress towards meeting water quality standards. Water quality data is collected from the Sun River and select tributaries.	$2,667
Greater Gallatin Watershed Council	Gallatin Stream Teams	This project is a partnership between the Gallatin Local Water Quality District (GLWQD) and the Greater Gallatin Watershed Council (GGWC). Data is collected on three tributaries to the East Gallatin River: Bozeman, Matthew Bird and Mandeville Creeks. It expands a long-term dataset and is incorporated into GLWQD's Surface Water Trend Monitoring Plan. Urban impacts on water quality are considered as Gallatin County is one of the fastest growing counties in Montana.	$1,068
Little Bitterroot Lake Association	Little Bitterroot Lake Eutrophicaltion Study	This project is a partnership between the Little Bitterroot Lake Association and Water & Environmental Technologies. It involves evaluating 1) variabillity in algae and nutrients relative to surrounding land uses, 2) long-term water quality trends, 3) effects of silviculture activities, and 4) water quality conditions relative to aquatic invasive species (e.g., zebra and quagga mussels).	$2,812
Smith River Habitat Project	Volunteer Water Monitoring Program	This project collects baseline data to enable future comparisons and determine impacts of herbicide treatments, variation in riparian vegetation, grazing , recreational uses, and resource development to the Smith River. The project incorporates sites along the Smith River from above Sheep Creek to below Hound Creek, and considers potential influences of major tributaries.	$2,375
Upper Missouri Watershed Alliance	Upper Missouri River Water Monitoring Project	This project focuses on the Missouri River from Holter Dam to Cascade, one of the most popular fishing destinations in Montana. Water quality is colleced concurrently with macroinvertebrate samples to show how water quality varies spatially or seasonally, and to help understand differences in community structure of benthic macroinvertebrates and aquatic plants.	$2,118
Gallatin River Task Force	Community Water Quality Monitoring Program	This project establishes baseline data, evaluates trends relative to water quality issues included in the Upper Gallatin TMDL, and monitors successes/failures of stream restoration efforts, particularly those targeting nutrient and sediment reductions. The program is responsive to unforeseen events such as nuisance algal growth, elevated chloride, and effluent spills. The project also investigates whether winter road maintenance activities impact water quality.	$2,682
		Total Awarded in 2018	**$13,772**

Appendix F - Watershed Restoration Plan Status Map



Created 12/21/2018 by DEQ Watershed Protection Section

Dearborn River
Photo by Hannah Riedl



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