WQPBDMSRPT-02-F

MONTANA 2008

Final
Water Quality
Integrated Report

Prepared in accordance with the requirements of
Sections 303(d) and 305(b) of the federal Clean Water Act

October 2009

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ACRONYMS

ACR	Annual Compliance Report
ADB	Assessment Database
ALUS	Aquatic Life Use Support
ARM	Administrative Rules of Montana
BER	Board of Environmental Review
BMP	Best Management Practice
BPJ	Best Professional Judgment
CAFO	Concentrated Animal Feeding Operations
CASRN	Chemical Abstracts Service Registry Number
CBM	Coal Bed Methane
CERCA	Comprehensive Environmental Cleanup and Responsibility Act
CFL	Cycle First Listed
CW	Cold Water (fisheries)
CWA	Clean Water Act
CWAIC	Clean Water Act Information Center
DEQ	Department of Environmental Quality
DEQ-7	Circular DEQ-7, Montana Water Quality Standards
DFWP	Montana Department of Fish, Wildlife, and Parks
DNRC	Department of Natural Resources
DPHHS	Montana Department of Public Health and Human Services
DQO	Data Quality Objectives
DW	Drinking Water
DWSRF	Drinking Water State Revolving Fund
EA	Environmental Assessment
EC	Electrical Conductivity
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
EQC	Montana Environmental Quality Council
FBC	Flathead Basin Commission
FERC	Federal Energy Regulation Commission
FLBS	Flathead Lake Biological Station
FNF	Flathead National Forest
FWP	Montana Fish Wildlife and Parks
FY	Fiscal Year
GIS	Geographic Information System
GWAP	Groundwater Assessment Program
GWIC	Groundwater Information Center
GWUDISW	Groundwater Under Direct Influence of Surface Water
HA	Health Advisory

HHS	Human Health Standard
HUC	Hydrologic Unit Code
IOC's	Inorganic Chemicals
IR	Integrated Report
ISA	Intensive Site Assessment
IUP	Intended Use Plan
LUSTs	Leaking Underground Storage Tanks
LWQD	Local Water Quality District
MBMG	Montana Bureau of Mines and Geology
MCA	Montana Code Annotated
MCL	Maximum Contaminated Levels
MDT	Montana Department of Transportation
MOU	Memorandum of Understanding
MPDES	Montana Pollutant Discharge Elimination System
MWCB	Mine Waste Clean-up Bureau
NHD	National Hydrography Dataset
NPDES	National Pollution Discharge Elimination System
NPS	Non-Point Source pollution
NRWQC	National Recommended Water Quality Criteria
NTNC	Non-transient non-community systems
NWIS	National Water Information System
PCBs	Polychlorinated bi-phenyls
POR	Period of Record
PPL	Project Priority List
PS	Point Source "pollution or pollutant"
PWS	Public Water Supply
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
SAR	Sodium Absorption Ratio
SCD	Sufficient Credible Data
SDWA	Safe Drinking Water Act
SOC	Synthetic Organic Chemicals
SOP	Standard Operating Procedure
STORET	EPA's storage and retrieval database
SWDAR	Source Water Delineation and Assessment Report
SWM	Statewide Fixed Station Monitoring
SWAP	Source Water Assessment Program
SWP	Source Water Protection
SWPP	Source Water Protection Plan
SWTR	Surface Water Treatment Rule

TMDL	Total Maximum Daily Load
TNC	Transient non-community systems
TPA	TMDL Planning Area
USGS	United States Geological Survey
VOC's	Volatile Organic Chemicals
WMS	Watershed Management Section
WPCAC	Water Pollution Control Advisory Council
WPCSRF	Water Pollution Control State Recovery Fund
WQMS	Water Quality Monitoring Section
WQPB	Water Quality Planning Bureau (DEQ)
WQRP	Water Quality Restoration Plan
WQS	Water Quality Standards
WQSA	Water Quality Standards Attainment
WW	Warm Water (fisheries)

SECTION 1.0
INTRODUCTION

The Montana Department of Environmental Quality (DEQ) is the state agency responsible for implementing delegated components of the Federal Water Pollution Control Act (commonly referred to as the "Clean Water Act" (CWA) for waters under state jurisdiction. As required under sections 303(d) and 305(b) of the CWA, DEQ conducts and/or coordinates ongoing water quality assessments and compiles reports on the status and trends of water quality. To satisfy the requirements of sections 303(d) and 305(b), this report includes:

- A description of Montana's water resources;
- A description of Montana's water quality standards;
- A report on water pollution control programs;
- Watershed planning priority for waters not meeting water quality standards;
- Cost/Benefit analysis;
- A description of water quality monitoring programs;
- Water quality standards attainment (i.e., use-support) decisions for assessed waters;
- List of waters with completed and approved Total Maximum Daily Loads allowable to meet water quality standards and support beneficial uses;
- A general assessment of water quality for Montana's waters;
- A discussion of public health concerns;
- A description of ground and drinking water programs; and
- A description of updates to Montana's assessment database during this reporting cycle.

The Appendices contain listings of the surface waters in Montana that have been assessed and found to have one or more beneficial use that is impaired (**Appendix A**), all required Total Maximum Daily Loads (TMDLs) in need of development, i.e., 303(d) List (**Appendix B**), water bodies assessed during the 2008 reporting cycle (**Appendix C**), pollutant causes "de-listed" from the 303(d) List (**Appendix D**), changes to beneficial use support (**Appendix E**), EPA-approved TMDLs (**Appendix F**), the program's monitoring and assessment schedule for 2008-2010 (**Appendix G**), and pollutants with corrected cycle first listed (CFL) dates (**Appendix H**). For a list of terms used throughout this report, refer to the Glossary on page 163.

SECTION 2.0
BACKGROUND INFORMATION

The DEQ reports on the surface waters of the state by hydrologic basins and uses current geographic information systems (GIS) to facilitate spatial analysis, mapping, and reporting on water quality assessments. This section provides a discussion of how the surface waters are organized for administrative purposes, the types and amount (size) of surface waters, and the size of waters that the state has jurisdiction or management authority over.

2.1 State Overview

Montana contains headwater streams within three major river basins: the Clark Fork and Flathead rivers in the Columbia basin, the Missouri and Yellowstone rivers in the Mississippi Basin, and the St. Mary River in the Saskatchewan-Nelson basin, Canada. For administrative purposes, the Montana DEQ has grouped the state's 16 sub-major basins into four administrative basins (**Figure 2-1**):

- Columbia – all Montana's waters west of the continental divide, including the Clark Fork, Flathead, and Kootenai rivers
- Upper Missouri – the Missouri River basin from its headwaters downstream to the confluence with the Marias River
- Lower Missouri – the Missouri River basin from the Marias River confluence to the North Dakota border, including the Marias, Musselshell, and Milk rivers; the Montana headwaters of the St. Mary basin
- Yellowstone – all waters of the Yellowstone River within Montana; the Little Missouri watershed in southeast Montana

2.2 Description of Surface Waters

The stream and lake size estimates used in this report come from the National Hydrography Dataset (NHD). Total length of streams, ditches, and canals are calculated from all linear waters in the NHD. Due to the substantial variation in lake number and size estimates between various NHD dataset editions, the total lake area for the state is based on named waters having an area of at least 5 acres (**Table 2-1**).

Because the primary data source used to develop the NHD were USGS topographical maps produced over many decades, the coverage detail and accuracy varies across the state. The consistency and accuracy of mapping for perennial streams and the larger lakes is considered good; thus, their size estimates are considered reliable. However, variability in mapping intermittent and ephemeral streams makes their size estimates less reliable.

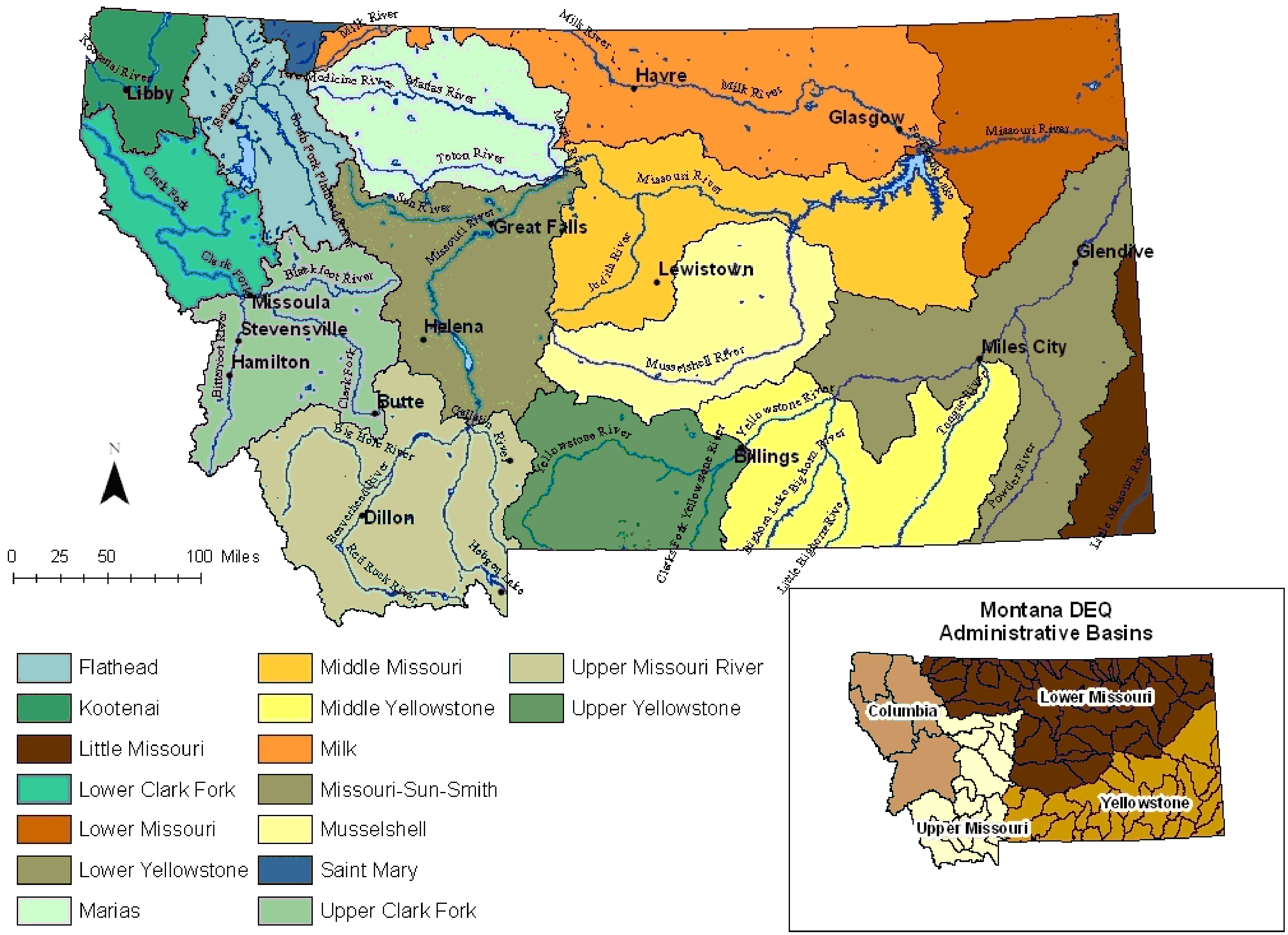

Figure 2-1. Montana's Sub-Major Basins and Montana DEQ Administrative Basins

Table 2-1. Montana Surface Waters

RIVER BASINS	Perennial Streams (Miles)	Intermittent & Ephemeral Streams (Miles)	Ditches & Canals (Miles)	Lakes & Reservoirs* (Acres)
Columbia	16,997	12,522	1,022	226,986
Upper Missouri	14,603	17,858	2,504	101,613
Lower Missouri	8,872	47,713	1,637	344,163
Yellowstone	9,171	38,972	1,951	22,064
Montana Total	49,643	117,065	7,094	691,826

*Named waters ≥ 5 acres. Size estimates of all waters derived by DEQ staff from 1:100,000 scale NHD.

2.2.1 Streams

Streams belong to one of three general categories dependent upon their flow characteristics and relative position of their streambed to the local shallow ground water table.

- Ephemeral streams are always above the local shallow ground water and flow only in response to snowmelt or rainfall. They are dry most of the year and are typically found in the semi-arid and mountain headwater regions of Montana.
- Intermittent streams are below the local shallow ground water table during part of the year and flow in response to ground water recharge and precipitation. Most of the stream miles in Montana are small ephemeral or intermittent streams.
- Perennial streams are always below the local shallow ground water table and typically flow on the surface throughout the year.

A stream-ordering technique, like that described by Strahler (Strahler, 1957)categorizes stream reaches by the relative drainage density of the contributing watershed. First-order streams do not have tributaries and are commonly ephemeral or intermittent. Stream orders change at the confluence of two like-order streams (i.e., a second-order stream begins at the confluence of two first-order streams; a third-order stream begins at the confluence of two second-order streams, and so on).

2.2.2 Lakes

All lakes and reservoirs are part of the state's water resources, but most of the assessment emphasis has been focused on significant publicly-owned lakes, which have public access and recreation potential. Unfortunately, the NHD does not identify lake ownership. Therefore, in this report, only named perennial lakes ≥ 5 acres are considered significant publicly-owned lakes.

This subset of the total lake acreage may contain private reservoirs or may exclude some small alpine or pothole lakes on public lands. Until resources are available to undertake a statewide lakes ownership survey, DEQ will identify significant, publicly-owned lakes for section 305(b) reporting as described above.

2.2.3 Waters Within State Jurisdiction and Management

Montana's water quality management program does not have authority over all of the waters described in **Table 2-1**. The EPA or tribal governments (which are treated as states) are responsible for assessing the condition of all waters located entirely within officially recognized tribal reservations. In addition, waters within national parks and wilderness areas are not subject to state management. Thus, **Table 2-2** presents a more clear picture of the waters that are the primary focus of the Montana water quality management program. However, with the exception of tribal land waters, the Montana water quality management program takes a direct and vested interest in the quality of all waters in the state.

Table 2-2. State Waters Exclusive of Tribal Lands, National Parks, and Wilderness Areas

RIVER BASINS	Perennial Streams (Miles)	Intermittent & Ephemeral Streams (Miles)	Ditches & Canals (Miles)	Lakes & Reservoirs* (Acres)
Columbia	13,389	977	548	193,449
Upper Missouri	13,686	17,532	2,504	100,185
Lower Missouri	6,973	41,999	1,223	318,904
Yellowstone	6,778	35,342	1,812	26,928
Montana Total	40,826	95,850	6,087	639,466

*Named waters ≥ 5 acres. Size estimates of all waters derived by DEQ staff from 1:100,000 scale NHD.

SECTION 3.0
WATER POLLUTION CONTROL PROGRAMS

DEQ has delegated federal authority to implement several Clean Water Act programs in Montana. These programs, collectively, are designed to facilitate the achievement of the Clean Water Act's broad goal of fishable and swimmable, i.e., attaining water quality standards. Section 3 provides an overview of the status of these programs, which include water quality standards, point and non-point source controls, water pollution control revolving fund, Total Maximum Daily Loads (TMDL), and a cost-benefit analysis of program implementation.

3.1 Water Quality Standards

Water quality standards define the water quality goals of a water body, or portion thereof, by designating the use or uses that the water is expected to be able to support, by setting criteria that define the water quality necessary to protect the uses, and by preventing degradation of water quality through non-degradation provisions. States adopt water quality standards to protect public health or welfare, enhance the quality of water, and serve the purposes of the Clean Water Act.

3.1.1 Standards Review and Rulemaking Process

The DEQ reviews Montana's water quality standards (WQS) on an ongoing basis and updates or modifies existing standards as needed. State law provides authority to the DEQ and the Board of Environmental Review (BER) to adopt standards into the Administrative Rules of Montana (ARM). This rulemaking process includes the Water Pollution Control Advisory Council (WPCAC), the governor's office, the EPA, and the public. Listed below are the steps in the rule-making process.

1. DEQ develops and drafts a rule proposal, which is reviewed by senior management for agency priority.

2. If the rule is a priority, WPCAC reviews the proposal, which could include stakeholder discussions to resolve issues. Rule language or concept is part of WPCAC official records (minutes) posted on the Web.

3. Following completion of satisfactory rule proposal, the governor's office reviews.

4. Draft is modified as necessary and sent back to WPCAC to review at least 30 days before the proposal is published by the secretary of state in the Montana Administrative Register (MAR).

5. DEQ presents proposal to BER; if approved, proposed rule is published in the MAR within 14 days. The date that it appears in the MAR is the proposal's official publication date, beginning a six-month deadline for final adoption by BER.

6. Public hearing set for 30 days after publication in the MAR. A legal ad in major newspapers, run for three consecutive weeks, informs public of proposed rule.

7. After public hearing, DEQ responds to comments and makes necessary changes. DEQ submits draft response to comments, including any changes, to BER, who chooses to adopt, not adopt, or adopt with modification.

8. Final notice for the rule adoption is published in the MAR; DEQ notifies interested parties.

9. DEQ completes final rule and sends to secretary of state; DEQ enters final rule on Web site.

10. New rule takes effect under state law when the secretary of state publishes it in the MAR.

11. Montana submits rule as a standards change to EPA for approval. Following EPA approval, new standard becomes effective under the federal CWA.

3.1.2 Numeric and Narrative Criteria

Montana water quality criteria include both (beneficial) use-specific components and general provisions. Standards are either numeric or narrative (i.e., based on measured levels of pollutants or other measurable factors compared against reference condition[1] for that class of water). Criteria can also be specific to beneficial uses, such as human health, aquatic life, or agriculture. For the protection of aquatic life, Montana denotes numeric standards as both “acute” and “chronic.”

Montana’s numeric water quality criteria not specific to use classification are found in Circular DEQ-7. DEQ developed these criteria using guidance from the EPA, which includes human health advisories, National Recommended Water Quality Criteria (NRWQC), and drinking water criteria referred to as Maximum Contaminant Levels (MCL). Examples of numeric water quality standards include the electrical conductivity (EC) criteria and the numeric criteria for specific metals.

Narrative criteria and the provisions defined by nondegradation (ARM 17.30.701–718) provide a minimum level of protection to state waters. DEQ may use these standards to limit the discharge of pollutants or the concentration of pollutants in waters not covered under numeric standards. Montana narrative criteria prohibit activities that would result in nuisance aquatic life (ARM 17.30.637). Montana defines some standards for pollutants (such as pH, temperature, and sediment) in terms of change from what would naturally exist.

[1] See also Section 3.1.4

3.1.2.1 Circular DEQ-7

Circular DEQ-7 contains numeric non-classification specific WQS for Montana's surface and ground waters. These criteria include pollutants categorized as toxic, carcinogenic, bioconcentrating, radioactive, a nutrient, or otherwise harmful. The circular contains ground water criteria for pesticides developed in compliance with the Montana Agricultural Chemical Ground Water Protection Act (80-15-201, MCA).

DEQ-7 also contains the primary synonyms of each parameter; the Chemical Abstracts Service Registry Number (CASRN) for each chemical; the categorization of each parameter according to type of pollutant; the bioconcentration factor, if known; trigger values used to determine "significance" under Montana's nondegradation policy; and required reporting values.

3.1.3 Montana Water Classification System

3.1.3.1 Beneficial Uses

In the 1950s Montana classified its water bodies according to the present and future beneficial uses they should be capable of supporting (75-5-301 MCA). The State Water-Use Classification System (ARM 17.30.604-629) identifies the following beneficial uses:

Drinking, culinary, and food processing
Aquatic life support for fishes and associated aquatic life, waterfowl, and furbearers
Bathing, swimming, recreation, and aesthetics
Agricultural water supply
Industrial water supply

3.1.3.1.1 Drinking Water, Culinary, and Food Processing

Human health criteria address toxins and carcinogens. Criterion for carcinogens, such as arsenic, are set to a specific level of increased cancer risk resulting from lifelong exposure through drinking contaminated water and consuming fish from the same waters. For all carcinogens except arsenic, the Montana Legislature has determined the acceptable risk level as one case of cancer per 100,000 persons exposed. For arsenic, the acceptable level is one cancer per 1,000 persons exposed (MCA 75-5-301(2)(b)).

3.1.3.1.2 Aquatic Life and Fishes

Aquatic life support is a broad term intended to protect fish and other aquatic animals and plants normally associated with a healthy ecosystem. Aquatic life can be impaired by chemical pollutants, sediments, temperature changes, riparian habitat degradation, stream channel modifications, excessive water withdrawal, irrigation return flows, and other actions that disrupt the naturally occurring hydrological conditions or biological integrity of the water body.

The beneficial use for fish is defined as either cold-water (salmonid) or warm-water (non-salmonid). Mountain, foothill, and intermontane streams and lakes typically support cold-water fish, such as trout and associated game and nongame fish. Eastern prairie streams and lakes, and the lower Missouri and Yellowstone rivers, typically support warm-water fish. These waters are naturally warm and have higher suspended sediment and total dissolved solids. They typically support sauger, catfish, and a wide variety of nongame fish.

3.1.3.1.3 Recreation

Recreation includes primary and secondary contact recreation. Swimming and wading are examples of primary contact recreation, while boating is a type of secondary contact recreation. Noxious algae growth or health concerns associated with *E. coli* bacteria can impair the use of a water body for swimming.

3.1.3.1.4 Agriculture and Industry

Generally, if a water body supports drinking water, culinary and food processing, recreation, and aquatic life beneficial uses, then the state assumes it will also support agricultural and industrial uses. However, additional salinity and toxicity information may be required to determine suitability for agricultural use. Specific numeric water quality criteria for EC and Sodium Adsorption Ratio (SAR) have been set to protect irrigated agriculture in the Rosebud Creek, Tongue, Powder, and Little Powder river basins, including their tributaries (ARM 17.30.670).

3.1.3.2 Surface Water Classification System

Montana's surface water use classification system assigns a class primarily based on water temperature, fish, and associated aquatic life (**Table 3-1**). Each class has an associated beneficial use (**Table 3-2**). A water body supports its beneficial uses when it meets the WQS established to protect those uses. A water body is impaired when a WQS established to protect a beneficial use is violated. The decision about whether or not a specific use is supported is independent of all other designated uses. For example, a water body may partially support aquatic life because of excess nutrients, not support drinking water because of arsenic, but fully support agriculture and industrial uses.

The three most common classes are A, B, and C. Class I was a temporary category assigned to three streams that were grossly impaired when the system was established. The A-Closed and A-1 waters are high quality whose principal beneficial use is public water supply. The A-Closed class may invoke watershed protection and use restrictions to protect drinking water.

B and C classes are divided according to whether they support cold-water or warm-water aquatic life. B-1, B-2 and C-1, C-2 support cold-water aquatic life; B-3 and C-3 support warm-water aquatic life. B and C waters have identical use classifications, except that B waters specify drinking water as a beneficial use and C waters do not.

C-3 streams are suitable for warm-water aquatic life and recreation activities. Because these streams often contain naturally high total dissolved solids (salinity), their quality is marginal for drinking water and agricultural and industrial uses.

In August 2003 Montana added four additional classes: D, E, F, and G. The classes include ephemeral streams (E-1 and E-2), ditches (D-1 and D-2), seasonal or semi-permanent lakes and ponds (E-3, E-4, E-5); and waters with low or sporadic flow (F-1). G-1 waters must be maintained as suitable for watering wildlife and livestock, aquatic life not including fish, secondary contact recreation, and marginally suitable for irrigation after treatment or with mitigation measures. G-1 includes "holding water" from coal bed methane (CBM) development.

Note: The classification system designates uses per water body, even though the waters may have other undesignated uses. In these cases, the water body may be reclassified to reflect existing uses. Conversely, existing uses *cannot* be removed from a water body. To date, Montana has not added any waters in these four new classes; rather they are placeholders for future use.

Table 3-1. Montana Surface Water Classifications

Classification	Description
A-CLOSED	Suitable for drinking, culinary and food processing purposes after simple disinfection.
A-1	Suitable for drinking, culinary and food processing purposes after conventional treatment for removal of naturally present impurities.
B-1	Suitable for drinking, culinary and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; agricultural/industrial water supply.
B-2	Suitable for drinking, culinary and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; agricultural/industrial water supply.
B-3	Suitable for drinking, culinary and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl and furbearers; agricultural/industrial water supply.
C-1	Suitable for bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; agricultural/industrial water supply.
C-2	Suitable for bathing, swimming and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; agricultural/industrial water supply.
C-3	Suitable for bathing, swimming and recreation; growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl, and furbearers. Quality is naturally marginal for drinking, culinary and food processing purposes, agricultural/industrial water supply. Degradation that impacts existing or established uses is prohibited.
I	The goal is to have these waters fully support the following uses: drinking, culinary and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and propagation of fishes and associated aquatic life, waterfowl and furbearers; agricultural/industrial water supply.
D-1	Suitable for agricultural purposes and secondary contact recreation.
D-2	Suitable for agricultural purposes and secondary contact recreation. Because of conditions resulting from flow regulation, maintenance of the ditch, or geomorphological and riparian habitat conditions, quality is marginally suitable for aquatic life.
E-1	Suitable for agricultural purposes, secondary contact recreation and wildlife.
E-2	Suitable for agricultural purposes, secondary contact recreation, and wildlife. Because of habitat, low flow, hydro-geomorphic, and other physical conditions, waters are marginally suitable for aquatic life.
E-3	Suitable for agricultural purposes, secondary contact recreation, and wildlife.
E-4	Suitable for aquatic life, agricultural purposes, secondary contact recreation, and wildlife.
E-5	Suitable for agricultural purposes, secondary contact recreation, saline tolerant aquatic life, and wildlife.
F-1	Suitable for secondary contact recreation, wildlife and aquatic life not including fish.
G-1	To be maintained suitable for watering wildlife and livestock, aquatic life not including fish, secondary contact recreation, and marginally suitable for irrigation after treatment or with mitigation measures.

Table 3-2. Designated Beneficial Uses by Water Body Class

Beneficial Uses	Water Use Classification							
	A-Closed	A-1	B-1	B-2	B-3	C-1	C-2	C-3
Aquatic Life	X	X	X	X	X	X	X	X
Fishes (salmonid)	X	X	X	X		X	X	
Fishes (non-salmonid)					X			X
Agriculture	X	X	X	X	X	X	X	M
Industry	X	X	X	X	X	X	X	M
Drinking Water (human health)	X	X	X	X	X			M
Recreation	X	X	X	X	X	X	X	X

X = Beneficial use
M= Marginal Use (may exist)

3.1.3.2.1 Waters in need of Water Use Classification Review

The Department believes that water body segments identified in **Table 3-3** are in need of review for appropriate classification. When the use-classification system was established in 1955, these waters were impacted to the point that uses typical of otherwise similar waters were not supported. The state's goal is to improve the quality of these water bodies so that they will fully support all appropriate beneficial uses.

Table 3-3. Montana Surface Waters with Unique Use Classifications

Water Body	Classification
Rainy Creek (main stem from the W.R. Grace Company water supply intake to the Kootenai River)	C-1
Clark Fork River (from Warm Springs Creek to Cottonwood Creek)	C-2
Clark Fork River (from Cottonwood Creek to the Little Blackfoot River)	C-1
Ashley Creek (main stem from bridge crossing on Airport Road to the Flathead River)	C-2
Prickly Pear Creek (below East Helena – Upper Missouri Basin)	I
Silver Bow Creek (Upper Clark Fork Basin)	I
Muddy Creek (Sun River Basin)	I

3.1.3.3 Ground Water Classification System

Ground water is classified according to its actual quality and use as of October 1982. They are broken into four classes: I, II, III, and IV (**Table 3-4**).

Table 3-4. Montana Ground Water Classifications

Classification	Description
I	Ground water has a specific conductance less than 1,000 µS/cm at 25ºC and is suitable for public and private water supplies, food processing, irrigation, drinking water for livestock and wildlife, and commercial and industrial purposes with little or no treatment required.
II	Ground water has a specific conductance range of 1,000 to 2,500 µS/cm at 25ºC. Public and private water supplies may use Class II ground water where better quality water is not available. The primary use is irrigation, stock water, and industrial purposes.
III	Ground water has a specific conductance range of 2,500 to 15,000 µS/cm at 25ºC. Its primary use is stock water and industrial purposes. It is marginally suitable for some salt-tolerant crops.
IV	Ground water has a specific conductance greater than 15,000 µS/cm at 25ºC. Used primarily for industrial purposes.

3.1.4 Reference Condition

The reference condition concept asserts that for any group of water bodies there are relatively undisturbed examples that represent the natural biological, physical, and chemical integrity of a region; therefore, reference sites are those that represent the naturally occurring "baseline" condition. A number of Montana's narrative criteria require that water quality be compared to "naturally occurring," and DEQ uses reference sites to help define this.

DEQ continues to work on developing and expanding a robust reference site dataset, building from of the original work conducted in the early 1990s (Bahls et al., 1992). Field work was re-initiated in 2000 to locate and sample reference stream sites, and in 2003, to locate and sample reference lakes. In 2004 DEQ began to assemble an extensive list of potential stream and lake reference sites and their associated data and have also developed a process for consistent evaluation of candidate stream reference sites (Suplee et al., 2005). Some established reference sites that had already been thoroughly reviewed using similar techniques did not go through this process. DEQ automatically classified these as final reference sites.

Using a set of criteria and best professional judgment (BPJ), the evaluation process for streams consists of quantitative watershed and water quality analyses for each site, as well as qualitative assessments of stream health and condition. Each quantitative analysis or BPJ criterion evaluated some aspect of stream or watershed condition that could potentially affect water quality and aquatic life. The screening tests checked for:

- cumulative impacts from multiple causes
- site-specific data sufficiency
- impacts from land use based on the proportion of agriculture
- high concentrations of heavy metals (i.e., above numeric standards)
- impacts from mines
- road density (cold-water streams only)

- timber harvest intensity (cold-water streams only)

To make the final list a site had to pass each applicable screen. DEQ considered sites that passed all applicable screens general purpose reference sites, since DEQ did not find their condition impacted for any categories.

The process described above was used to identify a group of Montana reference stream sites. However, DEQ still needs to ensure that the reference sites are sufficiently similar to the stream sites against which they are compared. In general, Omernik's level-III ecoregions (Omernik, 2000) have shown themselves to be an excellent tool for the initial partitioning of Montana reference streams. However, in certain cases more specific geospatial characteristics than level III ecoregions alone may need to be determined for the reference site and the comparison site. What those geospatial characteristics will be varies according to the parameter of interest. For example, elevation is important when considering aquatic insect (macroinvertebrate) populations, watershed area is important when considering prairie stream fish populations, and nutrient concentrations are best explained by level IV (fine-scale) ecoregions. It is likely that some water quality parameters and biological assessment metrics can be referenced at a coarse scale (e.g. level III ecoregions), while others cannot.

3.2 Point-source Control Programs

Montana's Point Source Program (PS) was established as a result of the 1972 amendments to the CWA that established the National Pollutant Discharge Elimination System (NPDES) authorizing EPA to issue discharge permits and to delegate to states "many of the permitting, administrative, and enforcement aspects of the NPDES program" (U.S. Environmental Protection Agency, 2005a). The goal of the NPDES program was to control point source pollutant discharges and subsequently protect water quality in the nation's waters. Point sources, as defined in 40CFR Part 122.23 – 122.27, include the following: concentrated animal feeding operations; concentrated aquatic animal production facilities; discharges into aquaculture projects; discharges of storm water; and silvicultural point sources.

In 1974 and 1981 EPA authorized states to implement the NPDES program and regulate federal facilities, respectively. In 1983 EPA authorized states to implement the General Permits Program (U.S. Environmental Protection Agency, 2005b). DEQ is the delegated authority for these CWA programs.

3.2.1 Discharge Permit System

The goal of the Montana Pollutant Discharge Elimination System (MPDES) program is to control point-source discharges of wastewater to protect water quality in receiving streams. The state's WQS establish the levels of water quality required to maintain the designated beneficial uses of the receiving streams (Montana Department of Environmental Quality, 2006; Administrative Rules of Montana 17.30.606-629, 2006).

All point sources of wastewater discharge are required to obtain and comply with MPDES permits. The effluent limitations and other conditions contained in MPDES permits are based upon preservation of the WQS, with certain categories of wastewaters requiring treatment to a federally specified minimum level (technology-based treatment) in addition to WQS requirements. The state calculates WQS requirements for pollutant levels in the discharge at the average design wastewater flow and the seven-day, ten-year low stream flow (7Q10) in the receiving stream. At stream flows below the 7Q10, the WQS and MPDES do not give further protection from pollutant discharges.

The Nondegradation Rules (ARM 17.30.701–718) are a part of the WQS that apply to new or increased sources of pollution. These rules prohibit increases in the discharge of toxic and deleterious materials to state waters, unless a permit applicant demonstrates that a change is justifiable because of necessary economic or social development, and that it will not preclude present and anticipated use of these waters.

Common pollutants limited under nondegradation include nutrients, heavy metals, and toxic organic pollutants. These same pollutants could also be limited under the WQS in the existing discharger's permits. The difference might be that the WQS levels would be calculated to achieve less than chronic toxicity levels instream at the 7Q10, whereas nondegradation limits in new or enlarged point-source discharges would be set at baseline instream concentrations plus a "trigger level" amount that would define the "significance" threshold.

DEQ designs each MPDES permit issued to protect the quality of the receiving stream at the point of discharge. In addition, due to the dynamic nature of streams and the potential additive or cumulative effects of pollutants, MPDES permits also address stream reach or basin-wide pollution problems. DEQ uses a calculation process called TMDL (see Section 3.5.1) to apportion allowable pollutant discharge levels among the various dischargers. If a reduction of a given pollutant in a stream reach or basin are necessary to meet WQS, the state uses the TMDL to apportion the reductions among the dischargers in that reach or basin (Montana Department of Environmental Quality, 2006).

Application and annual permit fees fund the state's MPDES program. Activities of program staff include educating the public, reviewing applications, determining effluent limits and best management practices (BMPs), conducting environmental assessments, encouraging public participation and retrieving information, reviewing and managing effluent and instream data, conducting field inspections, enforcing regulations, preparing regulations and offering guidance, planning programs, and administrating the program.

3.2.2 Storm Water Program

Storm water is surface runoff from snow melt and rainfall. Storm water runoff may carry high levels of pollutants, such as sediments, oil and grease, suspended solids, nutrients, heavy metals, pathogens, toxins, and trash. Industry activity, mining, construction, and municipality and other regulated facilities or activities can introduce these pollutants into storm water, and ultimately into state waters, potentially threatening the environment or public health.

DEQ has broad statutory and regulatory authority to address storm water discharges under the Montana Water Quality Act (MWQA) (75-5-101 et seq. MCA) and ARM (17.30, Subchapters

11, 12, and 13). DEQ permits storm water discharges, as defined in 17.30.1102, through the use of MPDES permits. Through permit compliance, technical assistance, and training, the storm water program is intended to reduce the amount of pollutants entering waters as a result of runoff from residential, commercial, and industrial sources.

3.2.3 Concentrated Animal Feeding Operations (CAFOs)

Confined livestock can be a source of pollutants and are, therefore, subject to the provisions of Montana's water quality laws. The MWQA (75-5-101 et seq. MCA) governs the discharge of pollutants to state waters; specifically Section 605 states that it is unlawful to cause pollution of any state waters, or to put waste where it will cause pollution (75-5-605(1)(a) MCA). It is also unlawful to discharge sewage, industrial waste, or other wastes into any state waters without a valid permit from DEQ (75-5-605(2)(c) MCA). State waters are defined as a body of water, irrigation system, or drainage system, either surface or underground (75-5-103(25) MCA).[2] Surface waters that flow periodically in ephemeral and intermittent channels are also considered state waters. The definition excludes non-discharging, waste containment or treatment ponds, and irrigation or land application systems having no return flow to state waters.

The MPDES permit program regulates animal feeding operations, which are defined as those in which animals are stabled, confined, and fed or maintained for a total of 45 days or more in any 12-month period. And, no portion of the facility can be used to sustain crops, forage growth, or post-harvest residues in the normal growing season.

Animal feeding operations that discharge, or have the potential to discharge, storm water or process wastewater to any water bodies are defined as CAFOs and must obtain a discharge permit from DEQ. The Code of Federal Regulations (40CFR, Part 122, Appendix B) defines a CAFO as an animal feeding operation that:

- contains more than 1,000 animal units, or
- contains between 301 and 1,000 animal units and a discharge occurs through a man-made conveyance; or pollutants are discharged directly into state waters that originate outside of the facility and pass over, across, or through the facility, or
- DEQ has designated as a CAFO.

An animal unit is calculated by adding together the following:

- Slaughter and feeder cattle multiplied by 1.0
- Mature dairy cattle multiplied by 1.4
- Swine weighing 55 pounds or more multiplied by 0.4
- Sheep multiplied by 0.1
- Horses multiplied by 2.0

Before designating an operation with less than 301 animal units as a CAFO, DEQ must conduct a site inspection that considers the operation's size, runoff volume, distance to surface or ground water, slope, ground cover conditions, and the likelihood and frequency of a discharge (ARM

[2] The term "state waters" serves only to identify what is protected under the law. The term conveys no right of ownership.

17.30.1330(5)).Other considerations could include proximity to public water supplies or public complaints. A CAFO operator applies for a permit by completing Form 2B, a nutrient management plan, and submitting a $600 annual fee. The application form requests information on facility ownership, location, size, physical surroundings, and waste control and land application practices.

3.2.4 Regulatory Programs Related to Wetlands

3.2.4.1 Wetland Definitions and Delineation

According to Montana's Water Quality Act, the definitions of "state waters" and "surface waters" do not explicitly include wetlands but broadly cover "bodies of water." State waters include any "body of water, irrigation system, or drainage system, either surface or underground."[3] Surface waters are "any waters on the Earth's surface, including, but not limited to, streams, lakes, ponds, and reservoirs; and irrigation and drainage systems discharging directly into a stream, lake, pond, reservoir, or other surface water."[4]

Montana delineates wetlands in accordance with the criteria outlined in the U.S. Army Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987).

3.2.4.2 Section 401 Certification Program

Montana relies on the Federal CWA Section 401 water quality certification as its primary form of wetlands regulation. The Section 401 program is administered by Montana DEQ. For wetlands that have a surface water component, state water permits are used in conjunction with Section 401 permits.[5] DEQ makes few formal certifications each year because Section 401 certification is usually waived on projects posing minimal impact or those that require a Section 318 permit, a short-term permit for turbidity. Between 200 and 250 authorizations with conditions are issued per year, and virtually all are approved.

Approval decisions are based on a combination of quantitative methodology, qualitative assessment, and BPJ. The overall size of a wetland or water body, as well as a project's impact on erosion, are all important considerations.[6]

3.2.4.3 Wetland Mitigation

Montana does not have specific regulation, policy, or legislation that guides wetland mitigation; however, a Mitigation Banking Review Team does operate in the state.[7] From the early 2000's

[3] The term does not include (i) ponds or lagoons used solely for treating, transporting, or impounding pollutants; or (ii) irrigation waters or land application disposal waters when the waters are used up within the irrigation or land application disposal system and the waters are not returned to state waters. (Montana Code Annotated 75-5-103(29)(a)-(b), 2007)

[4] Water bodies used solely for treating, transporting, or impounding pollutants are not considered to be surface waters. (17.30.602(32), 2006)

[5] Turbidity permits may include, but are not limited to, wetlands (J. Ryan, personal communication, 2005).

[6] J. Ryan, personal communication, 2005

[7] A recent prospectus submitted to the U.S. Army Corps of Engineers for a private wetland mitigation bank in the Blackfoot Valley, near Ovando, Montana, prompted the Corps to request the formation of a Mitigation Banking Review Team (MBRT). The MBRT is comprised of federal and state agencies that have an interest in wetland protection, including DEQ (J. Ryan, personal communication, 2005).

until 2006 the voluntary Montana Wetlands Legacy partnership operated an in-lieu fee program to mitigate impacts on wetlands (see Section 4.4.3 Restoration and Partnerships).

3.2.4.4 Wetlands Tracking System

Montana does not have a system for tracking permits or mitigation. However, with the assistance of an EPA grant, the state implemented a pilot program to track net loss and gain of wetlands in three watersheds, conducting a wetland inventory using remote sensing. This is a three-year program that began in January 2006.[8]

3.3 Nonpoint Source Pollution Control Program

Montana established its Nonpoint Source Pollution (NPS) program shortly after Congress added Section 319, "Management of Nonpoint Sources of Pollution," to the CWA in 1987. Under Section 319, the state receives grant money for supporting a wide variety of activities, including technical and financial assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific NPS projects.

In compliance with the 319 grant funding, DEQ conducts water quality standards attainment assessments and prepares a biennial status and trends assessment report (i.e., Integrated Report). Additionally, DEQ developed and maintains a nonpoint source management plan to address nonpoint source issues identified in the assessment report. The state's Nonpoint Source Management Plan is revised every five years, with the most current plan submitted to EPA in 2007. The 2007 Nonpoint Source Management Plan (Montana Department of Environmental Quality, 2007b) contains information on Montana's water resources assessment, the state's framework for NPS pollution management and control strategies, and its five-year action plan. Specific land-use strategies cover agriculture, animal feeding operations, forestry, urban/suburban development, resource extraction, hydrologic modification, and recreation. The plan also presents strategies for addressing atmospheric deposition and climate change.

3.4 Water Pollution Control Revolving Fund

The Water Pollution Control State Revolving Fund (WPCSRF) program was established by the 1987 Amendments to the Federal CWA, which provided the authority for EPA to make capitalization grants to states. The grants, along with state matching funds, provide financial assistance for the construction of water pollution control projects.

Under Title 75, Chapter 5, Part 11, Montana Code Annotated (MCA), the 1989 Montana State Legislature passed the enabling legislation, titled "Wastewater Treatment Revolving Fund Act," giving authority to DEQ and DNRC to adopt administrative rules for implementing the program. Legislation also granted these departments with the ability to generate state matching funds through the sale of State General Obligation Bonds. In 1991, 1995, 1997, 1999, 2001, and 2003, the Montana Legislature passed amendments to the Wastewater Treatment Revolving Fund Act. The 1997 amendments changed the title of the act from the "Wastewater Treatment Revolving Fund Act" to the WPCSRF" and added NPS projects to the eligible project definition.

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[8] Randy Apfelbeck, personal communication, 2007

The long-term goal of the WPCSRF is to maintain, restore, and enhance the chemical, physical, and biological integrity of Montana's waters for the benefit of the overall environment and the protection of public health while maintaining a long-term, self-sustaining program.

Each year, the WPCSRF program prepares an Intended Use Plan (IUP) and Project Priority List (PPL). The program ranks projects for the PPL using several criteria, including impacts to water quality resulting from the current project situation, the likelihood of improving water quality (restoring designated uses) as a result of implementing the proposed project, pollution prevention efforts of the project sponsor, and readiness to proceed. The result is a relatively realistic prioritized list of eligible point and nonpoint projects for which to use the funds.

The WPCSRF program has an estimated funding capacity of approximately $10 million per year for the next several years, assuming a consistent federal capitalization effort. At this time, the supply of funds exceeds demand; therefore, the program funds all potential projects. Since the inception of the program in 1989, it has predominately funded municipal wastewater treatment and collection projects totaling approximately $170 million. Other funded projects have included agricultural BMPs, landfills, and storm water projects totaling approximately $32 million.

With the use of CWA Section 106 funds from EPA, the WPCSRF program also provides technical assistance to municipal wastewater treatment facilities around Montana, including operation and maintenance inspections, as well as comprehensive performance evaluations to optimize treatment performance of these facilities. In addition, the program funds training of wastewater operators and technical assistance to engineers and the public in wastewater treatment.

3.5 Total Maximum Daily Load Program (TMDL)

3.5.1 TMDL Definition and Regulatory Requirements

The TMDL is the allowable loading from all pollutant sources (point, nonpoint, and natural background) established at a level necessary to achieve compliance with applicable surface WQS (75-5-103 (32)). Montana law (MCA 75-5-703) directs DEQ to develop TMDLs for impaired or threatened water bodies. TMDL development is also required for those water bodies under the federal CWA. Montana code specifically defines an impaired water body as "a water body or stream segment for which sufficient credible data shows that the water body or stream segment is failing to achieve compliance with applicable water quality standards" (MCA 75-5-103 (11)). A threatened water body is defined as "a water body or stream segment for which sufficient credible data and calculated increases in loads show that the water body or stream segment is fully supporting its designated uses but threatened for a particular designated use because of (a) proposed sources that are not subject to pollution prevention or control actions required by a discharge permit, the nondegradation provisions, or reasonable land, soil, and water conservation practices; or (b) documented adverse pollution trends" (MCA 75-5-103 (31)).

DEQ submits TMDLs developed for pollutant-caused impairments to EPA for approval. A Water Quality Restoration Plan (WQRP) that includes TMDLs may also address pollution-caused impairments or threats; however, those are not considered by EPA in their TMDL approval process. Impaired water bodies are placed in Category 5 of the Integrated Report if impairment includes at least one pollutant (e.g., metals, nutrients, sediment). The 303(d) list, specifically, are the water body/pollutant combinations in Category 5 that require TMDL development. Water bodies impaired only by causes deemed pollution[9] (e.g., alterations in wetland habitats or physical substrate habitat alterations) are placed in Category 4C of the Integrated Report.

3.5.2 Program Overview

DEQ uses a watershed-based approach to develop TMDLs and these watersheds are called TMDL Planning Areas (TPAs). TPAs follow USGS Hydrologic Unit Code 4th field (HUC4) boundaries in most cases; however, some TPAs are subsets within an HUC4 boundary. Additionally, the Clark Fork, Missouri, and Yellowstone rivers have been defined as unique large river TPAs for planning purposes. Using this approach, TMDLs are developed for all streams impaired by a given pollutant or set of pollutants within a given TPA.

A large percentage of waters within Montana have impairments that put them in the “pollution” category. Water quality restoration plans are developed to include both TMDLs for pollutant-caused impairments, as well as restoration goals and objectives for pollution-caused impairments. This allows staff to identify and recommend water quality improvements via a planning process that addresses all situations where water bodies do not attain WQS within a watershed.

3.5.3 TMDL Prioritization Process

DEQ considers many factors when assessing a TMDL’s development priority. However, at present, the main factor driving TMDL priority for DEQ is satisfying the terms of a 2004 settlement agreement and court-imposed planning schedule, with critical milestone dates in December 2007 and 2012. By December 31, 2007 DEQ needed to have demonstrated significant progress TMDL development in the Blackfoot Headwaters, Middle Blackfoot, Yaak, Swan, St. Regis, Bitterroot Headwaters, Flathead Headwaters, and Nine Mile TPAs. This requirement was satisfied. By December 31, 2012 all remaining water body/pollutant combinations from the 1996 303(d) List that remained on the 2006 303(d) List must be developed.

TMDL development priority status for all pollutants on the 303(d) list is reported in **Appendix B**.[10] Water bodies in TPAs where the TMDLs are scheduled for completion by 2010 are high priority. Water bodies with pollutants first listed during the 1996 reporting cycle or earlier (i.e., cycle first listed or CFL), and not a high priority, are a medium priority. These represent TMDLs specifically identified as priorities via the above reference settlement agreement. All remaining water bodies have causes with CFLs more recent than 1996 and have a low priority status. There are some situations a pollutant added to the 303(d) list after 1996 has been identified as a high

[9] An impairment cause on the Assessment Database Cause list of values is considered pollution if it can not be described in terms of a “mass/unit load” (i.e., lbs/day). The exceptions to this are bioassessment-related causes.
[10] Appendix B has 94 pollutants listed that have received EPA approval prior to the release of this report. Those waters body/pollutant TMDLs are reported in **Section 6**, **Table 6-6**.

priority. In these situations TMDL development is underway, with a scheduled completion date between 2008 and 2010 as part of a watershed scale TMDL development approach.

The high priority pollutants identified in **Appendix B** are within TPAs where TMDL development was given a high priority to satisfy the court ordered December 2007 milestone referenced above. Additional high priority waters reflect DEQ's goal of implementing a rotating basin approach for TMDL development. For efficiency, DEQ will complete all TMDLs located within a major basin before developing TMDLs in other basins. Major basins include the Clark Fork River, the Upper Missouri, the Middle Missouri, the Lower Missouri, the Upper/Middle Yellowstone, the Lower Yellowstone, and the Kootenai. Although TMDL development work is ongoing in most other basins, priority is being given to the Clark Fork River and the Upper Missouri basins due to a combination of the following factors:

Stakeholder Interest. TMDL development has historically focused on areas of significant stakeholder interest. There is benefit to completing TMDLs in areas where stakeholders will use the TMDL and water quality restoration planning process to help guide and assist with locally led water quality implementation activities.

Funding Availability. Section 319 NPS program funds from EPA have been a major source of funding for TMDL development; therefore, DEQ focuses on TPAs that can use 319 funding. These areas tend to have high stakeholder interest as defined above.

Significant New Pollutant Sources. Many areas have water quality problems or concerns linked to significant population growth and are often associated with wastewater discharges. Other new pollutant sources can arise from proposed industrial or energy development activities, such as coal bed methane development. Addressing these concerns through a water quality planning process, such as a TMDL, makes this an important criterion for scheduling TPAs.

Linkage to Discharge Permits. Pollutant levels within an MPDES permit comprise a portion of the TMDL allocation. Therefore, TMDL development at a watershed scale is a critical component in determining appropriate permit requirements. This is particularly true when new permits are proposed or permits are being renewed. This criterion is often linked to the New Pollutant Sources criterion above.

Upstream to Downstream Staging. Upstream watershed TMDL development often is necessary to facilitate a TMDL in downstream watersheds; therefore, TPAs in headwaters areas are often scheduled before downstream areas.

Data Availability. Work is often focused in areas where existing knowledge can facilitate TMDL development and data can be readily obtained by access to the water body. Existing knowledge includes available reference data, knowledge of aquatic resource and pollutant impacts, source loading data, and data about existing conditions and capabilities. For this reason, TMDL development is currently focused more western Montana and/or for the TPAs where water bodies have cold-water fish.

Existing Resource Commitments. TPAs having significant efforts already made toward TMDL development tend to have higher priority over those that do not.

Additional Factors. Additional factors apply when the above criteria either do not apply or have similar applicability to a given TPA. Additional factors include the number of TMDLs within the watershed, the ability to correct existing problems, the importance of water quality to local economies, and the ability to positively impact native species.

3.6 Cost Benefit Assessment

Section 305(b) of the CWA requires states to "report on the economic and social benefits of actions necessary to achieve the objective of the CWA" (U.S. Environmental Protection Agency, 1997a). Several state, federal, and private entities implement water quality improvements in the state. Details regarding the expense of these efforts is complex and not readily available for preparing a comprehensive cost-benefit assessment. Furthermore, most benefits are non-monetary and are, thus, hard to calculate. The following provides a summary of the program costs and benefits associated primarily with DEQ's point source and NPS's efforts at achieving the objectives of the CWA. Costs are estimated for state fiscal years (July 1 – June 30) 2006 and 2007. Due to the way DEQ collects data, benefits are estimated for calendar years 2005 and 2006.

3.6.1 Point Source Program Costs

In fiscal years (FY) 2006 and 2007 Montana spent roughly $33 million on municipal wastewater treatment and the construction of collection systems, an average of $16.5 million per year to address point-source pollution.[11] The estimate includes money spent by all funding agencies in the state and some federal programs.

The $33 million includes money from the Water Pollution Control State Revolving Fund (WPCSRF). Capitalization grants the state receives from EPA (CWA Title VI Federal funds) for the WPCSRF, along with state matching funds, provide financial assistance for water pollution control projects that target mostly point sources. In addition, the program provides training for wastewater operators and technical assistance (using CWA Section 106 funds) to operators, engineers, and the public in wastewater treatment.

Since 1991 the WPCSRF program has funded predominately municipal wastewater treatment and collection projects, which totaled approximately $171 million. This averages to about $10 million per year and is a part of the $16.5 million annual figure for all point-source costs during the last two years. Thus, WPCSRF funding makes up about two-thirds of the total funding for addressing point-source issues in Montana. If the federal capitalization grant funding remains consistent, the WPCSRF program will have an estimated funding capacity of approximately $10 million per year for the next several years.[12]

[11] Paul Levigne, personal communication, 2007
[12] Paul Levigne, personal communication, 2007

3.6.2 Nonpoint Source Program Costs

Most of Montana's NPS program budget comes from the federal government as CWA Section 319 grant funds provided by EPA. Annual 319 grant funds pay 60% of NPS project grants in Montana and DEQ's NPS-related program costs.

During the 2006 grant cycle (FY 2006), DEQ received grant requests totaling $711,000 for competitive grants and $900,000 in TMDL negotiated grants. DEQ awarded $425,700 to seven competitive watershed projects and two information and education projects. Additionally, DEQ awarded $900,000 in TMDL grants to ten grantees for a total of $1,325,700 in grant awards to watershed groups and local governments.

In the 2007 grant cycle (FY 2007), DEQ received grant requests for $1,461,212 for competitive watershed, ground water, and information/education projects. Additionally, DEQ received requests for $700,000 in TMDL negotiated grants. DEQ awarded $674,590 to seventeen watershed restoration, groundwater and education projects throughout Montana, plus $558,410 to TMDL negotiated grants for a total of $1,233,000. Thus, the average annual amount of NPS funds that went to restoration, planning, and education projects averaged about $1.3 million over FY06 and FY07. The average annual amount of 319 funds spent in Montana from 1995 to 2007 was about $1.5 million.

In the past, 319 grants were largely awarded to watershed restoration projects rather than TMDL or watershed planning projects (Rung, 2007). The current trend is for the restoration project funds and TMDL/watershed planning projects funds to come out to approximately the same. As DEQ works toward completion of TMDL plans, the funds will shift more toward restoration activities in the future.

In addition to an average of $1.3 million a year for project grants, DEQ has received about $1.5 million annually from EPA over the last two years for staffing and support. Therefore, over the past two years, the DEQ has been receiving $2.8 million per year in 319 funds for staffing and support and projects grants. When DEQ's 40% matching share is added to this figure (usually from the state general fund), the average total amount spent on the NPS program over the last three years has been about $4.5 million per year. Compared to recent years, approximately $65,000 has been cut from EPA's Montana appropriation for FY06 and again in FY07. DEQ expects funds in FY08 to be about the same as in FY07.

In addition to these NPS monies, since 1996 the WPCSRF program has also funded NPS projects, including agricultural BMP, landfills, and storm water projects. WPCSRF funds for NPS projects have averaged approximately $2.3 million per year over FY05 and FY06. It is assumed that this average is the same for FY07 and FY08. This amount is above and beyond the $10 million annual average for WPCSRF-funded point-source control projects.

3.6.3 Summary of Montana's Clean Water Costs

The average annual cost for Montana's point and NPS pollution programs from all funding sources is approximately $23.3 million (**Table 3-5**). This figure, however, does not include the cost of enforcement, permitting, or public drinking water programs, which are quite small compared to the $23.3 million in total costs.

Table 3-5. Summary of Average Annual Costs for CWA Programs (FY 2006 and 2007)

Activity	Total (Millions of Dollars)
NPS Control Programs	6.8
NPS Staffing and Support	1.5
NPS Restoration, Planning, and Information/Education Projects	1.3
WPCSRF NPS Funds	2.3
DEQ Matching Funds	1.7
Point Source Control Programs	16.5
WPCSRF Funds	10.0
Other State and Federal Agency Programs	6.5

3.6.4 Benefits of Complying with the CWA in Montana

The benefits of maintaining and improving the quality of Montana's waters through the CWA include the following:

- Preserving or improving the quality of Montana's water-related recreational activities, including both commercial and non-commercial boating, water skiing, swimming, whitewater rafting, and river floating. In addition, fishing is one of the most popular and income generating water-related activities in Montana. State waters include several blue ribbon trout rivers and streams, which benefit from high-level water quality.
- Protecting aquatic wildlife and its associated ecological value. Several fish species are federally listed as endangered or threatened, or as a state species of concern.
- Protecting aquatic and terrestrial habitats that rely on high-quality waters.
- Protecting water quality for industrial, commercial, and municipal uses, thereby reducing or eliminating the cost of treatment and protecting human health.
- Preserving or improving the quality of water for states downstream of Montana.

3.6.4.1 Point Source Program Benefits

The long-term goal (or benefit) of the WPCSRF is to maintain, restore, and enhance the chemical, physical, and biological integrity of the state's waters for the benefit of the overall environment and the protection of public health, while maintaining a long-term, self-sustaining program. With CWA Section 106 funds, the WPCSRF program also provides technical assistance to municipal wastewater treatment facilities around Montana. This assistance includes training, operation, and maintenance inspections and comprehensive performance evaluations to optimize the treatment performance of these facilities.[13]

The beneficial economic impacts of Montana's WPCSRF loan program on water quality and public health in calendar years 2005 and 2006 are as follows:

[13] Paul Levigne, personal communication, 2007

- Upgraded, expanded, or replaced nine inadequate secondary treatment systems for the benefit of improved water quality in the various state waters those systems empty into.
- Improved water quality and reduced operating expenses of 21 projects related to municipal wastewater plants by reducing infiltration and inflow in the collection systems and by replacing leaky pipes to prevent storm water runoff or ground water to enter the system.
- Improved ground water quality and addressed potential public health hazards by replacing septic systems with community collection and treatment systems on 14 projects. Improved ground water quality leads to higher quality well water that can be used for various activities, such as municipal water supply and irrigation.
- Reduced nutrient loading to state waters by constructing two nutrient removal treatment systems helping to maintain or improve those waters for their beneficial designated uses.
- Protected water quality by funding approximately 27 NPS projects helping state waters maintain or improve their capacity for designated uses.

Lewistown, in Central Montana, is one city that has benefited from the state's point-source programs. Lewistown used Water Pollution Control State Revolving Fund money to upgrade its conventional secondary treatment facility to a biological nutrient removal oxidation ditch facility. The new treatment plant significantly increases the removal of nitrogen and phosphorous from its discharge. This project was initiated to aid the restoration of the aquatic life beneficial use per the department-issued TMDL.

3.6.4.2 Nonpoint Source Program Benefits

The long-term goal (or benefit) of the state's NPS program is to reduce and manage nonpoint source pollutants so that Montana's water quality, where impaired, improves sufficiently to support all designated beneficial uses. During calendar years 2006 and 2007, DEQ activities targeting NPS-related issues included: ongoing development and implementation of water quality plans containing TMDLs; development and maintenance of the state's water quality standards; improved data management and reporting tools; management of the 319 grant program; water quality standards attainment assessments; and monitoring of key water bodies.

Highlights:

- Completed water quality plans (including 147 TMDLs) for eight watershed TMDL Planning Areas:
  - Lake Helena
  - Prospect Creek (metals)
  - Ruby River
  - Lake Helena
  - Bitterroot Headwaters
- Provided $1,809,340 in CWA section 319 grant funds to local entities to assist in TMDL development.
- Provided $874,625 for local watershed restoration, ground water, and education and outreach projects to 15 conservation districts, watershed groups, and other project sponsors. Examples of benefits from water quality restoration projects include:

  - Estimated reduction (Tetra Tech, Inc., 2005) of 18,090 tons of sediment per year[14] from new projects in 2005 and 2006 in streams impaired by sediment;
  - Estimated reduction of 31,220 pounds of nitrogen per year[15] from new projects in 2005 and 2006 in streams impaired by high nutrient concentrations;
  - Estimated reduction of 12,480 pounds of phosphorus per year[16] from new projects initiated in 2005 and 2006 in streams impaired by high nutrient concentrations.
- Conducted triennial review of Montana's WQS.
- Continued development of numeric nutrient standards and biological criteria for periphyton and macroinvertebrates.
- Conducted water quality assessments the on 497 remaining waters from the Reassessment List (Table 3-E) of Montana's 2000 303(d) List (Montana Department of Environmental Quality, 2000).
- Conducted field monitoring of reference sites for streams and lakes.
- Completed field sampling for the Environmental Monitoring Assessment Program (EMAP).
- Prepared the 2006 Integrated 305(b) and 303(d) Water Quality Report (EPA approved).
- Enhanced the state's NPS data management and reporting systems with development of:
  - Clean Water Act Information Center (CWAIC) Web application for public access to the Integrated Report;
  - Water Quality Assessment Reporting and Documentation (WARD) database system for managing water quality standards attainment decisions;
  - Water Quality Planning Bureau Library database (integrated with WARD);
  - Contracts Database for management of contracts issued by the Water Quality Planning Bureau.
- Revised Montana's Nonpoint Source Management Plan in 2007 and received EPA Approval.
- Implemented a Quality Assurance (QA) Section, raising the visibility and enhancing the authority of the QA Program. Activities included:
  - Recruited a quality control position to support the QA Section;
  - Provided direct support on 25 Quality Assurance Project Plans (QAPPs) and Sampling and Analysis Plans (SAPs);
  - Revised two major program Standard Operating Protocols (SOPs);
  - Conducted performance audits of field teams and analytical laboratories.

[14] These reductions are based on Spreadsheet Tool for Estimating Pollutant Load (STEPL) modeling and in-stream source reduction estimates and are expected to continue to provide the same benefits in the future.
[15] Ibid.
[16] Ibid.

SECTION 4.0
SURFACE WATER MONITORING AND ASSESSMENT

Under delegated authority to implement Clean Water Act programs, DEQ directly monitors the surface waters of the state or works in collaboration with other agencies and organizations to collect water quality data and observations. DEQ conducts assessments of the state's surface water quality and makes determinations of beneficial use support. **Section 4** provides a reporting on status and trends of Montana's surface waters and surface water-related programs.

4.1 Monitoring Program

4.1.1 Purpose of the Monitoring Program

The Water Quality Planning Bureau (WQPB) is responsible for:

- The collection and analysis of physical, chemical, and biological data to ensure that water quality standards are met, and the reporting of this information to the public. The WQPB uses the water quality Integrated Report to report this information. (Clean Water Act § 40 CFR 100-40 CFR 135, 2007).
- The development and review of Water Quality Standards (WQS), Total Maximum Daily Loads (TMDLs), and implementation strategies associated with TMDLs.

4.1.1.1 Monitoring Goals

The monitoring goals for 2006-2008 were:

- To complete sampling for the EPA Nation's Lakes project.
- To continue and expand a baseline lake monitoring program in collaboration with the University of Montana.
- To continue and expand a baseline reference stream monitoring program in collaboration with the University of Montana.
- To continue and expand biological monitoring to support biocriteria development.
- To continue and support water quality standards development.
- To develop and support special monitoring projects.

4.1.1.2 Monitoring Objectives and Design

The WQPB designs each monitoring project to ensure that each project meets its objectives, thus satisfying the monitoring goals. The majority of the monitoring designs are targeted, while others are based on probabilistic design, such as the EPA Nation's Lakes Survey. A brief summary of each project is provided in **Section 4.1.3**.

4.1.2 Coordination and Collaboration

As indicated in the 2005 monitoring strategy (Montana Department of Environmental Quality, 2005b), the need to coordinate and collaborate with other entities to continue monitoring projects is critical and implicit in Clean Water Act (CWA) programs. Thus, the WQPB has developed partnerships and cooperative agreements with the following: Bureau of Land Management, U.S. Forest Service, University of Montana, and the United States Geological Survey. Additionally, the bureau has agreements with several conservation districts, watershed groups, and nonprofit organizations. **Sections 4.1.2.1 – 4.1.2.6** provide brief discussions of these agreements.

4.1.2.1 Bureau of Land Management (BLM)
The objective of the BLM's water quality monitoring program is to determine if waters that flow through BLM-administered land meet state WQS. To achieve this goal, the Water Quality Monitoring Section (WQMS) and BLM established a Memorandum of Understanding (MOU). For the last six years, five to seven candidate reference sites have been sampled (three times per year) within or adjacent to BLM land. BLM provides a portion of the funds for this monitoring effort.

4.1.2.2 Forest Service (USFS)
The USFS monitors waters within national forest lands. WQPB uses data provided by USFS in its water quality assessment process and for the development of watershed restoration plans.

4.1.2.3 Tri-State Water Quality Council
The nonprofit Tri-State Water Quality Council is a partnership of diverse community interests working together to improve and protect water quality throughout the 26,000-square-mile Clark Fork-Pend Oreille watershed. The watershed includes the Clark Fork River in western Montana, Pend Oreille Lake in northern Idaho, and the Pend Oreille River in eastern Washington. The Tri-state's long-term monitoring program tracks the effectiveness of the Clark Fork-Pend Oreille Basin water quality management plan in addressing interstate nutrient and eutrophication issues. A council member, DEQ provides financial support for some of the monitoring program's components.

4.1.2.4 United States Geological Survey (USGS)
Data collected by the USGS is available to the public via the National Water Information System (NWIS) Web site. WQPB provides financial support for several surface water monitoring projects conducted by the USGS. The majority of these efforts are in the Powder-Tongue River, Bitterroot, and Flathead basins. USGS also assists DEQ in monitoring the United States portion of the Poplar River and East Fork of the Poplar River as part of an agreement with Canada.

4.1.2.5 University of Montana (UM)
WQPB contracts with the Watershed Health Clinic of the Environmental Studies Program at the University of Montana (UM) to continue the state's reference and lake projects. Under these contracts, UM graduate students perform field sampling and laboratory analyses. WQPB provides financial support, training, and most of the necessary field supplies for monitoring.

4.1.2.6 Conservation Districts (CDs), Watershed Groups, and Nonprofit Organizations
Partnerships with CDs, local watershed groups, and nonprofit organizations with an interest in water quality issues vary. Some simply require informing them of monitoring events in their

area, while others assist with stream access through private lands, and still others are fully involved in sampling efforts. These partnerships continue through TMDL development and implementation projects funded by CWA section 319 grants administered by WQPB.

4.1.3 Monitoring Networks and Projects

During 2006-2008 the WQPB Monitoring Program was involved in five long-term or significant monitoring projects and several short-term projects, discussed briefly under Other Monitoring (**Section 4.1.3.6**). The long-term or significant projects are:

- Reference Site Monitoring
- Lakes and Reservoirs Monitoring
- Large Rivers Monitoring
- Flathead Lake Watershed Monitoring
- Other Monitoring

4.1.3.1 Reference Site Monitoring Project

Using a targeted design, DEQ has been working for nearly 20 years to locate and characterize wadeable streams that have little or no human disturbance. Some work was completed in the early 1990s and involved collecting water quality and biological data at stream sites considered by regional land managers to be minimally disturbed (Bahls et al., 1992). In 2000 this project re-initiated and continues with refined and more rigorous screening methods compared to the earlier undertaking (Suplee et al., 2005). The main objectives are to establish a network of reference sites, to define reference conditions for use in water quality standards attainment assessments and establishment of TMDL endpoints, and to aide in developing water quality standards. In 2006 and 2007 a total of 35 candidate reference sites were sampled three times per summer (**Figure 4.1**). Protocols used in the reference project are described in the Quality Assurance Project Plan Reference Addendum (Montana Department of Environmental Quality, 2005e).

4.1.3.2 Lakes and Reservoirs Monitoring

Since 2003 WQPB has been sampling lakes using a targeted design. The main objectives are to collect nutrient, chlorophyll *a*, and shoreline impact data to identify lake characteristics that can be used to predict appropriate trophic status for lakes on a regional scale. The data will form a baseline for future lake classification to assess beneficial use-support status of lakes and to provide data for trend analysis. WQPB works with UM to conduct the field sampling. A complete description of the lake sampling protocols can be found in the Quality Assurance Project Plan Lakes Addendum (Montana Department of Environmental Quality, 2005d). In 2006, 17 lakes (**Figure 4.2**) were sampled using the standard lake objectives and sampling protocols as described above. In 2007 WQMS sampled 35 lakes and re-sampled five of them (**Figure 4.2**) as part of EPA's National Lakes Survey to assess the conditions of the Nation's waters. Project details, objectives, and protocols can be found in EPA's National Lakes Manual (U.S. Environmental Protection Agency, 2007).

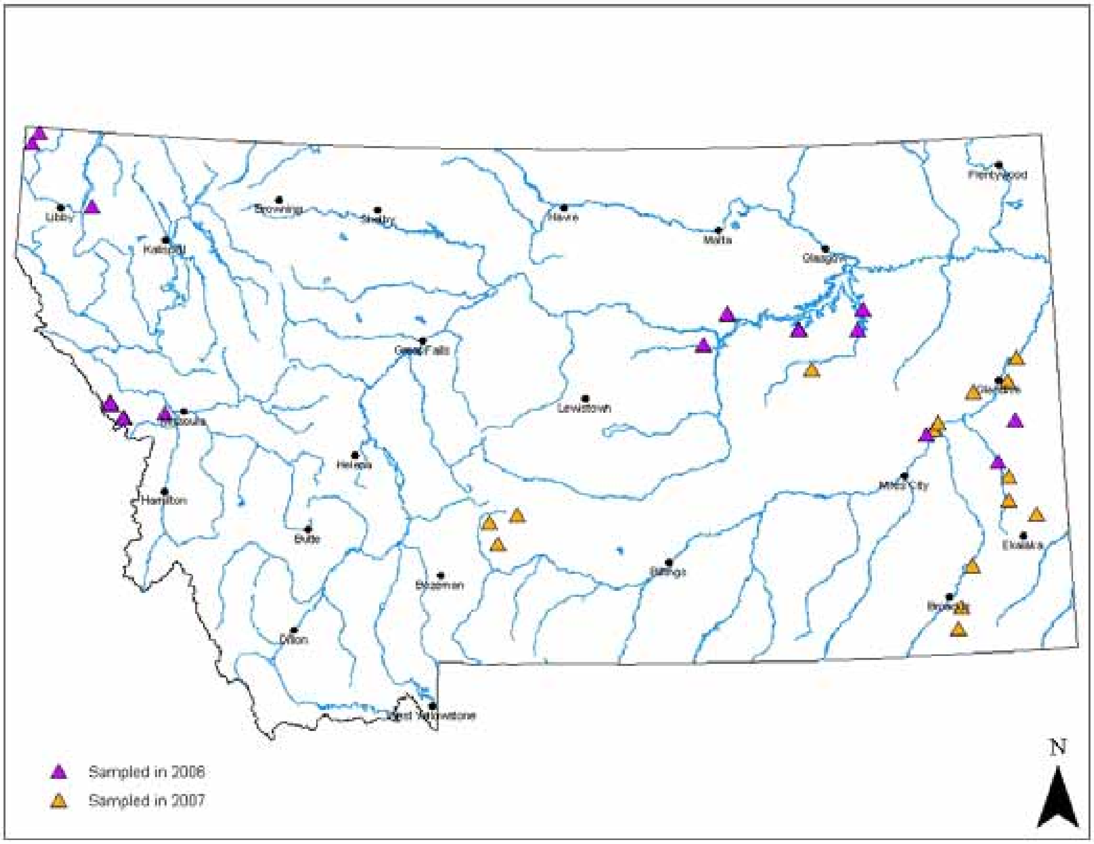

Figure 4-1 Candidate Reference Sites sampled in 2006-2007

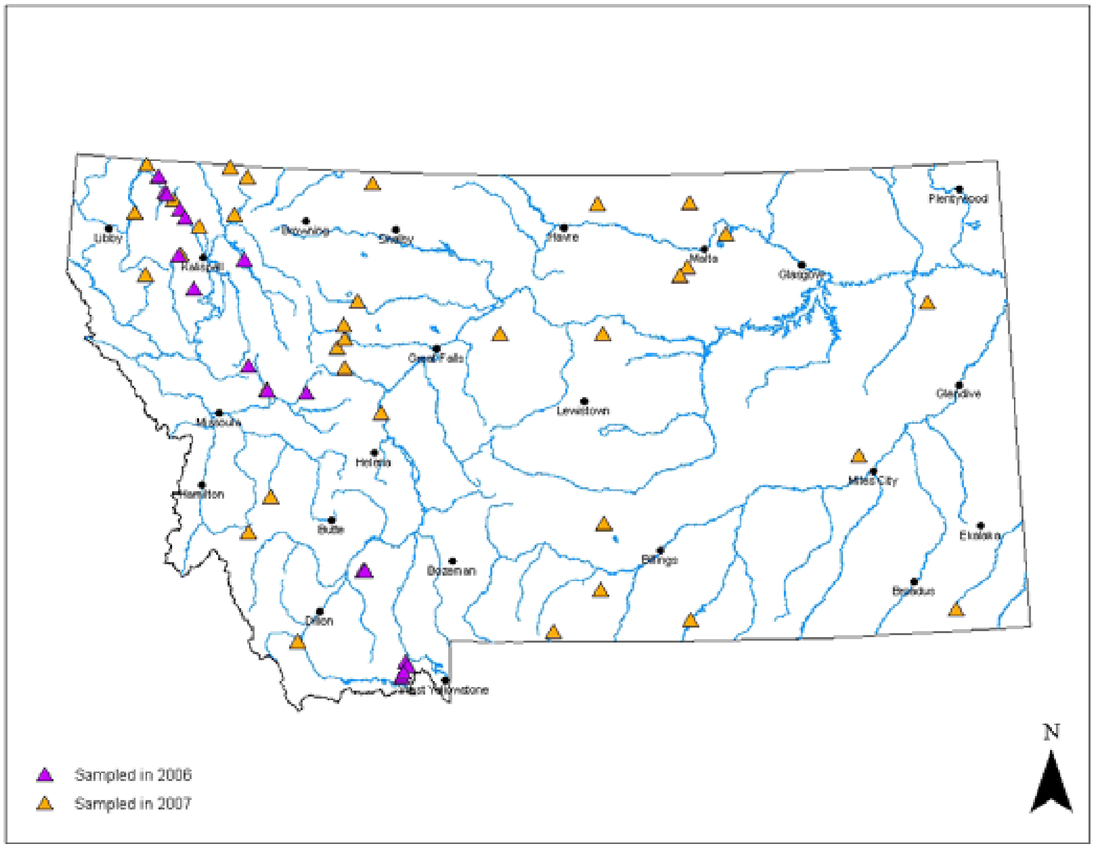

Figure 4-2 Lakes and Reservoirs sampled in 2006 and 2007

4.1.3.3 Large Rivers Monitoring

In 2007 the Yellowstone Nutrient Modeling Project was initiated in support of developing nutrient criteria for a segment of a large Montana river. The pilot project on the lower Yellowstone River (**Figure 4.3**) is designed around the QUAL2K water-quality model (Chapra et al., 2007). The monitoring component was designed and implemented to collect high-quality data that supports development of a robust QUAL2K computer model for this segment of the Yellowstone River (Suplee and Flynn, 2008). Once developed, inputs of nutrients (nitrogen and phosphorus) can be adjusted, and the effects on water quality parameters simulated by the model can be observed. Simulated water quality parameters of interest, as they relate to beneficial use-support, are dissolved oxygen, pH, total dissolved gas, and algae growth.

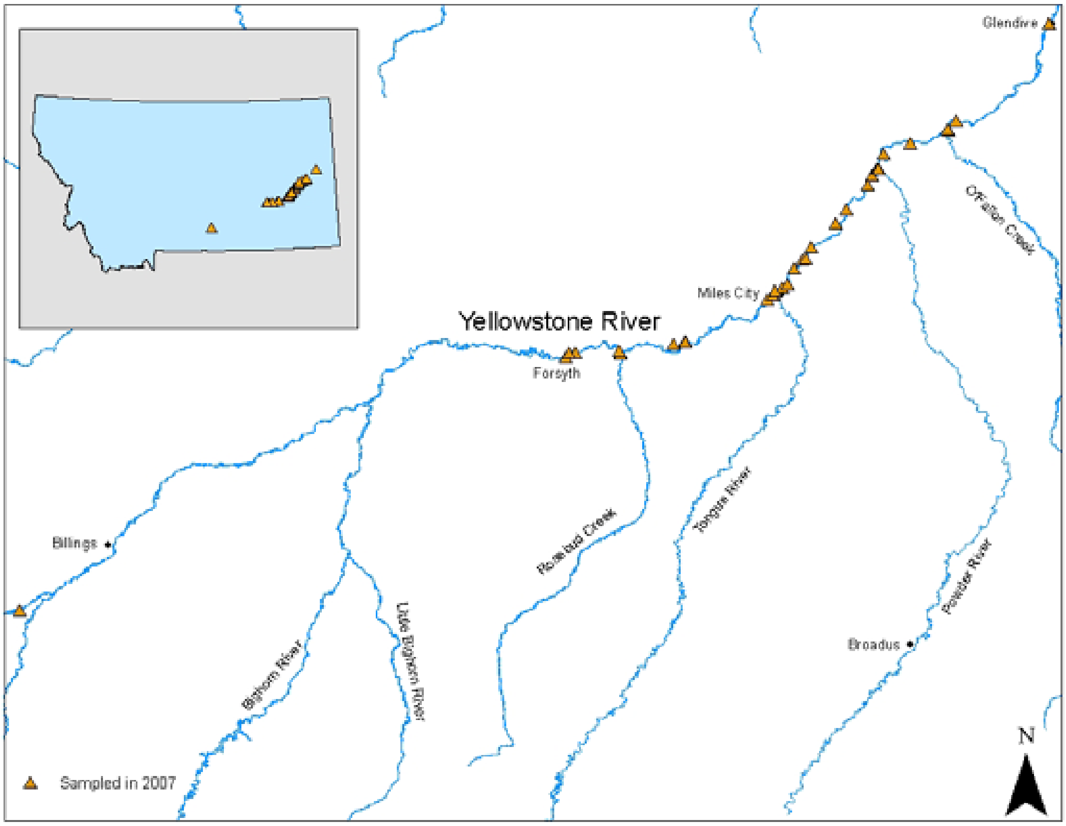

Figure 4-3 Yellowstone River Sites sampled in 2007

4.1.3.4 Flathead Lake Watershed Monitoring

DEQ developed a comprehensive monitoring program to support watershed and water quality model development in the Flathead Lake watershed, as part of the TMDL program during water years 2007 and 2008. The program is a cooperative effort involving the USGS, UM, and private sector contractors. The project also coordinated activities with DNRC and the Flathead Basin Commission (FBC). General activities completed include: 1) monitoring of rivers and tributaries for watershed model calibration and validation purposes; 2) monitoring of lake and reservoir profiles for characterization of pollutant fate and transport; and 3) water quality assessment to support TMDL analysis in the basin (**Figure 4.4**). Specifically, data will be used to develop watershed models in order to define the relationship of pollutant loadings and to decide how to reduce pollutants and formulate TMDL implementation plans in the watershed. Deterministic lake and/or reservoir response models are also being developed to predict lake outflows as a function of precipitation, upstream changes in land use, or other engineering controls (in order to establish boundary conditions for the watershed modeling effort).

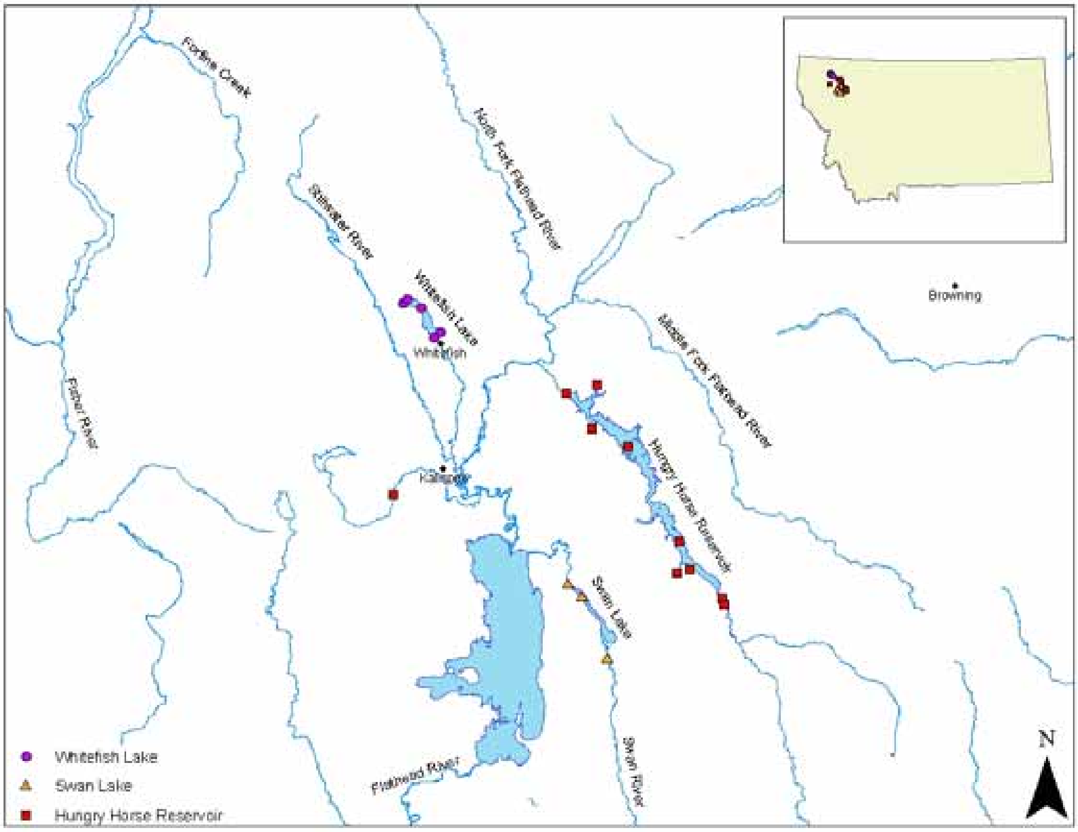

Figure 4-4 Sites sampled in 2007 and 2008 for the Flathead Watershed Project

4.1.3.5 Other Monitoring

4.1.3.5.1 Periphyton Monitoring

As part of the assessment process DEQ uses biological assemblages to assess the level of beneficial use-support. The main objective is to develop metrics and assessment tools for interpreting biological data. A current study to refine periphyton metrics will evaluate metrics and their possible refinement using a targeted monitoring design. As a result, new periphyton metrics have been developed for the Middle Rockies Ecoregion (Teply and Bahls, 2006). Other Montana ecoregions require more data to be able to validate and develop the metrics. In 2006-2007 WQMS sampled 78 sites (**Figure 4.5**) to determine the required number of periphyton samples per ecoregion. Protocols to collect the periphyton samples are described in the 2005 field procedures manual (Montana Department of Environmental Quality, 2005a).

4.1.3.5.2 Uniform Nutrient Monitoring

DEQ has assembled a database with all nutrient data collected from Montana reference stream sites. The main objective was to collect a sufficient number of additional nutrient samples to reduce, for any given nutrient, the width of the confidence intervals around the mean (or any specified percentile) in each ecoregion-stratified frequency distribution. In 2007 approximately 80 established reference stream sites were sampled twice in a targeted manner for a suite of nutrients constituents that included total nitrogen (TN), total phosphorus (TP), total Kjehldahl nitrogen (TKN), nitrate-nitrite as N (NO_{2+3}), soluble reactive phosphorus (SRP), and ammonia

(NH_{3+4}) (**Figure 4.6**). The intent was to make each site a significant contributor to the aggregate nutrient dataset.

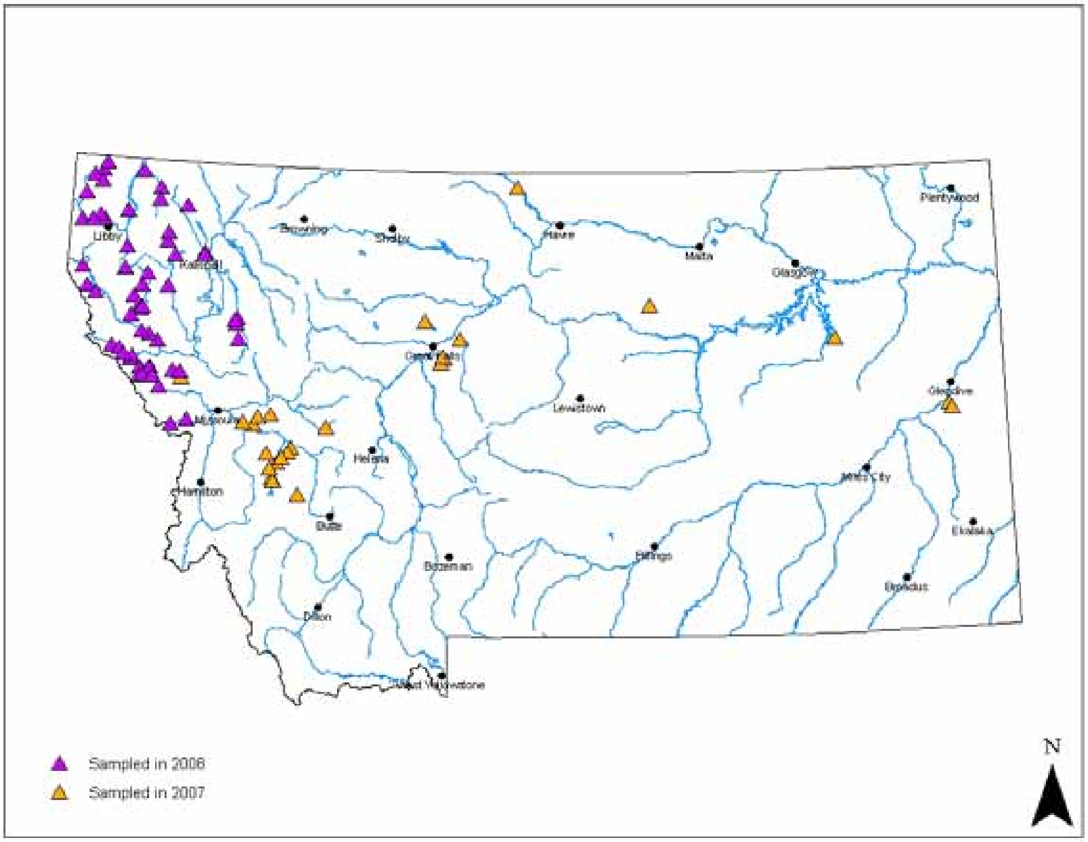

Figure 4-5 Periphyton sites sampled in 2006-2007

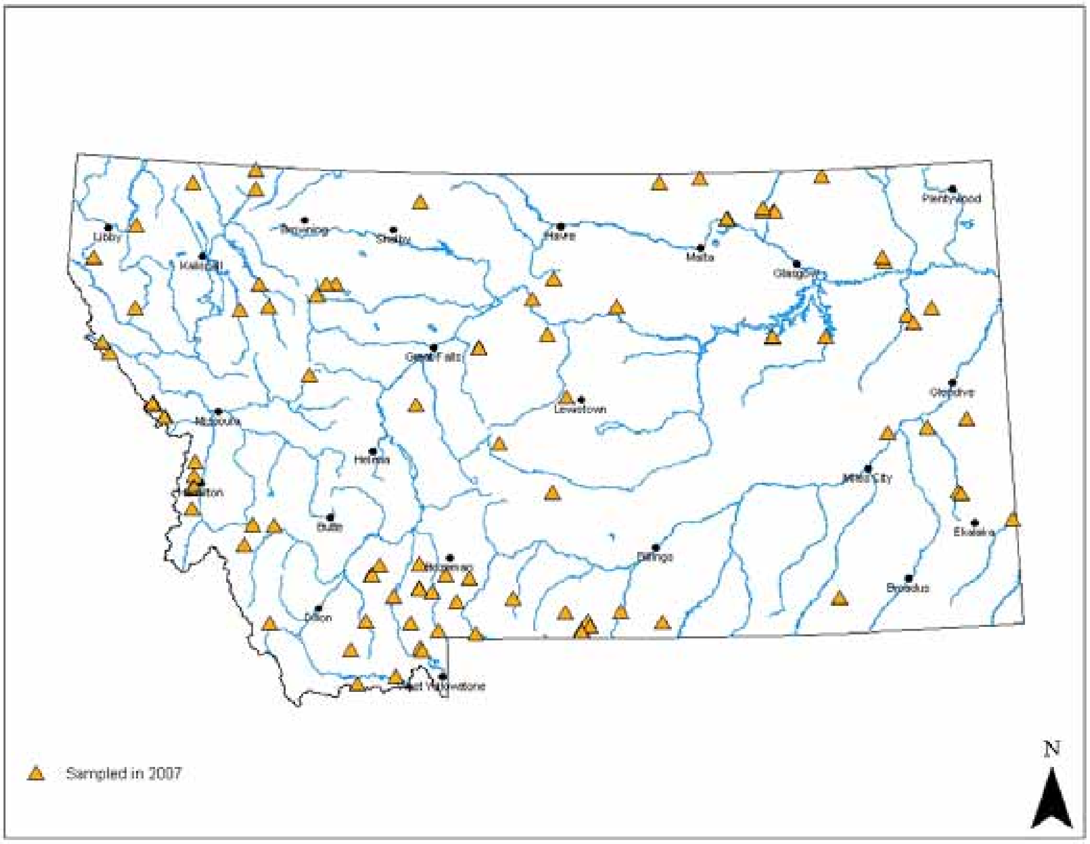

Figure 4-6 Nutrient sites sampled in 2006-2007

4.1.3.5.3 Outstanding Fisheries Monitoring

This project had two phases. The main objective of the pilot phase (2006) was to characterize, in an unbiased way, the range of algae and aquatic plant levels found in the Outstanding Fishery Resource (OFR; class 1) Fish and Wildlife class streams only, and to compare those with the DEQ reference streams. Approximately 30 OFR streams were selected randomly and sampled once for chlorophyll *a* and periphyton (**Figure 4.7**). In the final phase (2007) DEQ randomly sampled streams from three FWP stream classes (Outstanding, Substantial, Limited). The objective was to compare the level of algae and aquatic plant in the three classes and their fishery health. Approximately 60 OFR streams were sampled once for chlorophyll *a* and periphyton (**Figure 4.7**). A summary report will be available in 2009.

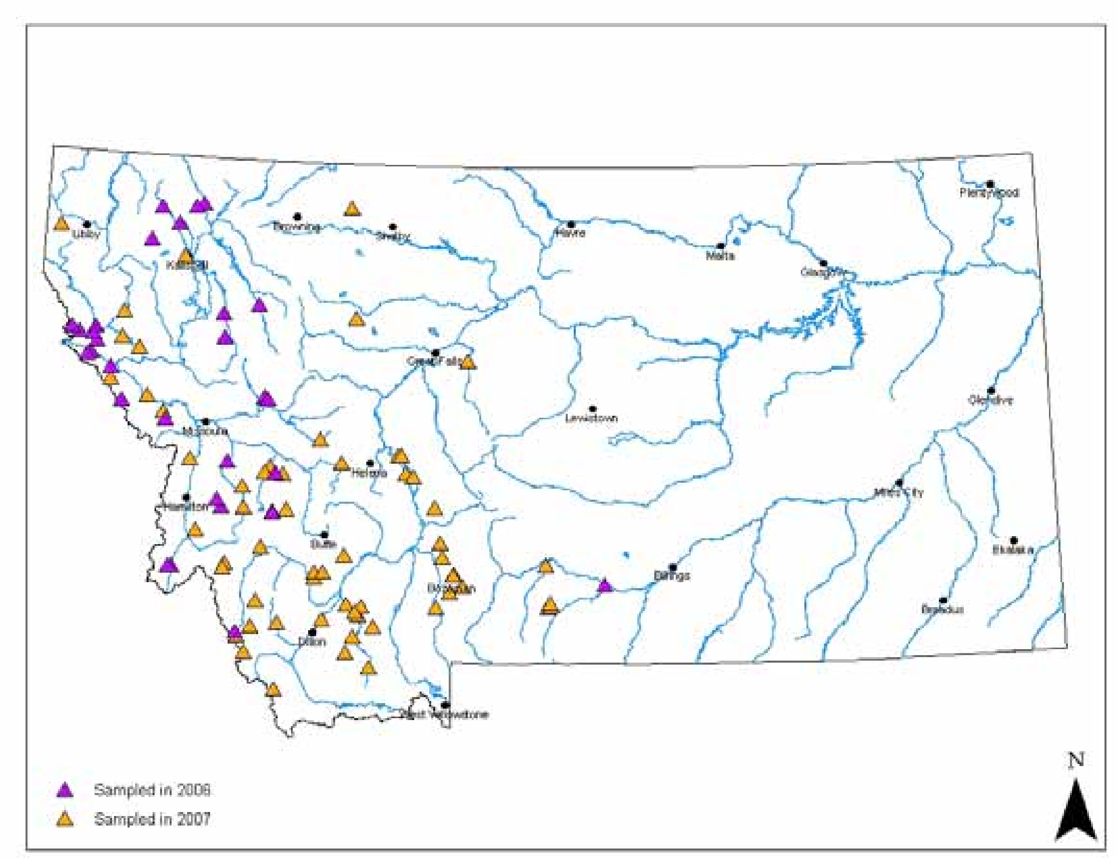

Figure 4-7 Sites sampled in 2007 and 2008 for the Outstanding Fisheries Project

4.1.3.5.4 Wetlands Monitoring

During 2006 and 2007 the Montana Natural Heritage Program (MT NHP) focused on refining and testing assessment tools and performing rapid assessments. As part of an EPA grant, MT NHP has been developing a GIS-based assessment tool that can identify a given wetland's likely condition class (e.g., excellent, very good, fair, poor) based on landscape-level factors. The tool is built on assessments carried out with the DEQ rapid assessment method from 2005–2007. A final report is expected in December 2008.

In 2006, crews monitored for the presence of amphibians and assessed more than 800 sites using the DEQ rapid assessment method. In 2007 crews and wetland staff assessed approximately 950 sites.

4.2 Assessment Methodology

4.2.1 Overview

At 40 CFR Part 130.4(b) the CWA requires that, "[t]he state's water monitoring program shall include collection and analysis of physical, chemical, and biological data, and quality assurance and control programs to assure scientifically valid data." At 40 CFR Part 130.7(b)(5) the CWA requires that, "[e]ach state shall assemble and evaluate all existing and readily available water quality-related data and information to develop the list."

In following with the CWA, MWQA [MCA 75-5-702(5)] requires that the department "shall develop and maintain a data management system that can be used to assess the validity and reliability of the data used in the listing and priority ranking process."

The following is a synopsis of DEQ's assessment methodology used to satisfy both the CWA and MWQA. The entire method is available online[17] as a WQPB Standard Operating Procedure. (Bostrom, 2006)

DEQ's Water Quality Assessment Methodology is used to assess the validity and reliability of data, as well as the process for performing a beneficial use-support determination. This two-step assessment process was adapted by DEQ from a model presented by EPA in a 1997 publication, *Guidelines for the Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates: Supplement* (U.S. Environmental Protection Agency, 1997b). Using these guidelines as the basic framework for an assessment process, DEQ adapted it to address the sufficient credible data requirements in the MWQA (MCA 75-5-702), beginning with the year 2000 listing cycle.

4.2.2 Identification of Available Water Quality Data

For each reporting cycle, DEQ mails requests for information to several hundred individuals, organizations, and agencies that have an interest in water quality monitoring and management. Data and information received is documented, cataloging submissions as appropriate in the program's Water Quality Library. The Water Quality Monitoring Section is informed of the new data, and information that is available for water quality assessments.

In addition, DEQ takes data collected from its own monitoring efforts, as well as that collected by other organizations that operate monitoring programs, and stores it in publicly accessible databases. DEQ may also consider predictive watershed and water quality models and data or information from the MPDES permitting program as part of water quality assessments. Most data collected by (or for) DEQ ambient water quality programs is archived in the EPA STORET (storage and retrieval) database. Databases operated by USGS (NWIS Web database) and the Montana Bureau of Mines and Geology (MBMG – GWIC database) are used to compile available and credible data to conduct water quality assessments.

The combined sources form a collection of data and information with varying technical rigor, data collection and quality objectives, specificity to DEQ water body assessment unit, overall quality, and currency. The first step in the Water Quality Assessment Method is to categorize the data into types so that each can be reviewed as an assemblage to determine whether there is sufficient credible data to proceed with the assessment.

[17] http://deq.mt.gov/wqinfo/QAProgram/SOP%20WQPBWQM-001.pdf

4.2.3 Data Quality Evaluation

The Montana Water Quality Act directs DEQ to conduct a data quality evaluation to determine where it has sufficient credible data for an assessment. The Act defines sufficient credible data (SCD) as "chemical, physical, or biological monitoring data, alone or in combination with narrative information that supports a finding as to whether a water body is achieving compliance with applicable water quality standards" (MCA 75-5-103). The data evaluation is simply a quality assessment that considers the technical, representativeness, quality, and time components of data and information that is available. It establishes a measure of each assemblage's rigor, which, in turn, translates to a qualitative statement of confidence for the beneficial use assessment.

As noted in the overview of this section, DEQ used an EPA model for its data quality evaluation tools. However, the overall acceptance level (i.e., data quality score) required to achieve SCD was a decision made by DEQ based on comments received from stakeholders during a public outreach and participation period (1999).

To assist in determining the data quality score, a table was constructed with statements representing various levels of technical, spatial/temporal coverage, data quality, and data currency for each of the data assemblages (biology, chemical/physical, and habitat). These statements are grouped by numbers from 1 to 4 as follows:

- Statements representing poor data rigor are grouped with the number 1.
- Statements representing fair data rigor are grouped with the number 2.
- Statements representing good data rigor are grouped with the number 3.
- Statements representing excellent data rigor are grouped with the number 4.

The assessor marks statements that are "true" regarding the assemblage being reviewed. When all relevant statements are noted, the assessor evaluates both the general trend of rigor per marks and each data quality component (technical, spatial/temporal, quality, and currency) to determine the most limiting factor of the assemblage. If the general consensus of where the checkmarks are placed is negated by the most limiting factor, the score of the most limiting factor is selected. Otherwise, the general consensus is used as the score. This exercise is performed for each data assemblage. Assemblages scoring 1 are considered too limited to be used for water quality assessment decisions. The total of all assemblages scoring 2 or more are summarized.

The minimum score for proceeding with a beneficial use-support decision for aquatic life and fisheries was set at 6. Other uses that rely upon one data type, such as drinking water, agriculture, and industry, are simply judged as either sufficient or insufficient, depending on the rigor of associated chemistry data. Recreation use is also determined sufficient or insufficient based on the existence and rigor of bacteriological, algae, and data pertaining to the aesthetic qualities of the water body. All measures of data rigor are documented in the assessment record, allowing users to understand the assessor's basis (i.e., level of underlying information) supporting the use-support decisions.

4.2.4 Beneficial Use-Support

Once the state determines that sufficient credible data exists for a water body, beneficial-use support may be assessed. During this process, the level of use-support is assigned for each beneficial use based on whether or not state WQS are met. Decisions are recorded in the water body's assessment record and into EPA's water quality assessment program (Assessment Database – ADB version 2.2), which is used to manage assessment unit information and decisions, and support the various tables and appendices included in this report.

4.2.4.1 Levels of Use-Support

Six levels are used in beneficial-use support determinations:

1. Full Support – The beneficial use is found in its natural condition, or best practical condition, and WQS are attained.
2. Full Support (Threatened) – The beneficial use is fully supported but observed trends, or proposed new sources of pollution not subject to permitting, indicate a high probability of future impairment.
3. Partial Support – One or more data types indicate impairment. The beneficial use only partially supports its uses based on the nature and rigor of the data, as well as site-specific conditions.
4. Non-Support – One or more WQS for the beneficial use are not attained.
5. Insufficient Information – Data is insufficient in technical, spatial/temporal, quality, or currency to represent conditions or is not comparable to state WQS, preventing assessment.
6. Not Assessed – A beneficial-use support determination has not been initiated.

4.2.5 Assessing Aquatic Life and Fisheries Use Support

Because of the amount and variety of information that might be needed to make decisions, making aquatic life and fisheries use-support determinations can be a complex process. In some cases the assessor will evaluate, compare, and weigh various physical, biological, chemical, and habitat data for a water body. In other cases only one or two of the aquatic life data categories (habitat/physical, biology, or chemistry) provide clear evidence of use-support or impairment. Three ways to assess beneficial use support for aquatic life and fisheries are overwhelming evidence, independent evidence, and weight-of-evidence.

By definition, overwhelming evidence provides a clear indication that the beneficial use is or is not being supported. Evidence often comes from a single data type. Examples of non-support determinations include documented fish kills, fish consumption closures (e.g., Tenmile Creek near Helena), and swimming restrictions due to bacteria. Cases of overwhelming evidence of full support are rare but can be noted in water bodies found in wilderness areas, for example. Because these determinations represent extreme and obvious conditions, the overwhelming evidence approach overrides the need to achieve a set SCD score. This allows extreme conditions to be identified for the public and control and corrective actions to begin without delay.

Independent evidence is used when overwhelming evidence is not clear. It is often used when there are three or fewer available data types (biology, habitat, chemical) or fewer than two biological assemblages represented. Usually, independent evidence is declared when DEQ receives external data from one or two focused studies, with little other data, but the SCD score is six or higher. In such a case, independent evidence may not cover all aspects of the beneficial use but is singularly rigorous to make a determination of non-, partial-, or full-use support. DEQ uses independent evidence exclusively for aquatic life and fisheries use-support determinations.

The weight-of-evidence approach is used when there are three data types (biology, habitat, chemical) and at least two biological assemblages. Because these multiple lines of evidence often cause conflicting results that can cancel each other out, the assessor weighs the evidence and selects the use-support decision from the most rigorous, prevalent indicator. Weight-of-evidence is applied only to aquatic life and fisheries uses, and the SCD score must be six or higher.

Beneficial-use support determinations for drinking water, agricultural, industrial, and recreational uses are assessed using an independent-type[18] approach. Because the WQS for these uses are primarily numeric, once data is determined to be sufficient, they are assessed based upon direct comparison to WQS.

When all beneficial uses with SCD are assessed, the decisions are documented. Uses without SCD are noted as having insufficient information.

4.2.6 Assessment Records

For the period 2000 to 2008, assessments are documented in an electronic spreadsheet. Once completed, a copy is printed and put in the water body's assessment record, which is catalogued and retained in the WQPB Library.

The state's water quality assessments consist of the following parts:

1. Water Quality Assessment Records for each assessment unit. DEQ presently documents the assessment of each water body in an electronic spreadsheet. These Assessment Record Sheets (ARS) document data sources used, data quality evaluation performed (SCD), and how the data was used to reach an assessment decision. A hard copy of the record sheet for each water body segment is included in the assessment unit files described below.
2. Hard copy data files for each assessment unit evaluated. These files may contain water quality data, maps, photographs, references to relevant documents, and references to electronic information sources. Assessment record files may be reviewed in person at the DEQ, WQPB office in Helena.
3. Assessment Database (ADB v2.2). Staff enter the assessment decisions recorded in the Assessment Record Sheets into the state's version of EPA's Assessment Database. The

[18] Although not technically an "Independent Evidence" approach as is used for aquatic life and fisheries, these other assessments have similarities because there is typically only one relevant data type, which is compared against numeric standards (DEQ-7) or numeric recommendations presented in reference condition data.

ADB contains the majority of the data used to develop the tables and reports comprising the state's Water Quality Integrated Report. As required by law, Montana submits a copy of this database, along with the supporting assessment records, to EPA for approval.
4. Geographic (reach) indexing of all assessment units on the 1:100,000 National Hydrography Dataset (NHD) for display and mapping using Geographic Information Systems (GIS).

Public access to all electronic data, information, and maps is available via DEQ's Clean Water Act Information Center (CWAIC) Web application at: http://cwaic.mt.gov/. The CWAIC site allows for interactive queries of the state's Assessment Database from the 2000-2008 reporting cycles, viewing of the 303(d) Lists 1996 to present (1998 excluded) and 305(b) reports for the 1996 – 2008 period (1998 included). Access to the electronic Assessment Records and on-line mapping for each assessment unit is also available.

4.2.7 Quality Assurance and Quality Control Program

Within DEQ, the WQPB operates under an EPA-approved Quality Management Plan (QMP) (Montana Department of Environmental Quality, 2008b). The QMP establishes a quality system for all bureau activities, including, but not limited to, monitoring state surface waters and producing this Water Quality Integrated Report.

The QMP requires the bureau to plan projects, document the planning, and to provide for independent assessment and oversight to assure scientifically valid processes and data used for decision-making. For water quality monitoring, the bureau plans and documents proposed activities in Quality Assurance Project Plans (QAPPs), or equivalent planning documents. The surface water monitoring program is guided by the QAPP established for sampling and water quality assessments (Montana Department of Environmental Quality, 2005c).

Under the Quality Assurance (QA) program, a two-tiered system of review was initiated for water quality assessments, beginning with the 2004 Integrated Report. The Bureau SOP WQPBDMS-002 describes the review process used, beginning with the 2006 listing cycle (Bostrom, 2005).

The two-tiered review begins with an administrative checklist, completed for all assessments. A DEQ assessor completes the checklist at the end of an assessment to verify that all information necessary for a complete and valid entry to the ADB is included.

From the completed assessments submitted for ADB entry, a minimum of 10% are randomly selected for technical review. Additionally, any assessment that includes a delisting of an impairment cause (pollutant), except those de-listed for EPA approval of its TMDL, is subject to a technical review. Technical reviews are performed by senior staff in the Water Quality Standards Section.

4.3 Assessment Results

4.3.1 Categorizing Surface Waters

For integrated reporting purposes, water bodies (referred to as Assessment Units (AUs)), included in the Assessment Database are assigned to categories. There are five core reporting categories, one of which has three subcategories (Category 4). Also, the state has added two custom subcategories (user defined) to Category 2. The categories are:

Category 1: Waters for which all applicable beneficial uses have been assessed and all uses are determined to be fully supported.

Category 2A: Available data and/or information indicate that some, but not all of the beneficial uses are supported.[19]

Category 2B: Available data and/or information indicate that a water quality standard is exceeded due to an apparent natural source in the absence of any identified manmade sources.[20]

Category 3: Waters for which there is insufficient data to assess the use-support of any applicable beneficial use; no use-support determinations have been made.

Category 4A: All TMDLs needed to rectify all identified threats or impairments have been completed and approved.

Category 4B: Water bodies are on lands where "other pollution control requirements required by local, state, or federal authority" [see 40 CFR 130.7(b)(1)(iii)] are in place, are expected to address all water body-pollutant combinations, and attain all WQS in a reasonable period of time. These control requirements act "in lieu of" a TMDL, thus no actual TMDLs are required.

Category 4C: Identified threats or impairments result from pollution categories such as dewatering or habitat modification and, thus, a TMDL is not required.

Category 5: Waters where one or more applicable beneficial uses are impaired or threatened, and a TMDL is required to address the factors causing the impairment or threat.

The majority of the 1,104 AUs whose water quality attainments have been assessed are listed in Category 5, impaired and in need of a TMDL (**Table 4-1**). A list of all waters in subcategory 2B is provided in **Table 4-2**.

[19] State of Montana user defined category that is identical to the EPA's Category 2 definition provided in the Assessment Database. Waters assigned a 2A category listing will appear as 2(2A) in the Integrated Report.
[20] State of Montana user defined category. Waters assigned a 2B category listing may carry a 2, 3, 4C, or 5 per database rules and would appear as a subcategory, e.g.: 2(2B), 3(2B), 4A(2B), 4B(2B), 4C(2B), or 5(2B), in the Integrated Report.

Table 4-1. Size and Count of Assessment Units Assigned to Reporting Categories

Category	River		Ephemeral Stream		Lake / Reservoir		Total
	Miles	Count	Miles	Count	Acres	Count	Count
1	2,124.8	122	11.6	1	63,639.5	15	138
2 (2A)	473.3	24	82.8	7	10,842.7	11	42
2 (2B)	124.1	3					3
3	1,584.6	73			23,829.7	9	87
4A	962	65			4,580	3	68*
4C	1,832.5	101			39,258	4	105
4C (2B)	21.5	1					1
5	12,347.1	613	6.5	1	461,212	24	633*
5 (2B)	987.1	27					27
Total	**20,457**	**1,029**	**100.9**	**9**	**603,361.9**	**66**	**1,104**

***Note:** during the 2008 reporting cycle, an additional 40 Category 5 AUs have had TMDLs developed and approved by EPA (94 total AU/Pollutant TMDLs) on 39 rivers and one lake. These AUs have not been moved to Category 4A because the TMDLs have not been recorded in EPA's National TMDL Tracking System (NTTS) by the time of this report. Data entry into the NTTS is a pre-requisite for the state to apply a 4A De-listing[21] for any AU/pollutant cause listed in Category 5. Thus, the actual total AU count for Category 5 is 594 and Category 4A is 98. A complete listing of these 94 TMDLs approved for this reporting cycle is provided in Table 6-6; all other approved TMDLs to date are reported in **Appendix F**.

Table 4-2. Category 2B Assessment Units

2008 305(b) AU ID	Water Body Name, Description	Category	Size (mi. or ac.)
MT40A002_020	ANTELOPE CREEK, headwaters to the mouth (Musselshell River)	2,2B	31.2
MT43F002_030	KEYSER CREEK, headwaters to the mouth (Yellowstone River)	2,2B	22.0
MT41P001_022	MARIAS RIVER, county road crossing in T29N R6E Sec17 to mouth (Missouri River)	2,2B	70.9
MT42K002_170	EAST FORK ARMELLS CREEK, headwaters to Colstrip	4C,2B	21.5
MT41R001_020	ARROW CREEK, Surprise Creek to the mouth (Missouri River)	5,2B	64.8
MT40O002_040	BEAVER CREEK, confluence of Little Beaver Creek and South Fork Beaver Creek (headwaters) to mouth (Willow Creek) south of Glasgow	5,2B	14.7
MT40Q002_010	BUTTE CREEK, headwaters to the mouth (Poplar River)	5,2B	36.6
MT43F002_022	CANYON CREEK, headwaters to highway 532	5,2B	11.7
MT42M002_142	CEDAR CREEK, 26 to 45 miles above the mouth	5,2B	19.0
MT40O002_010	CHERRY CREEK, headwaters to the mouth (Milk River)	5,2B	38.3

[21] EPA and DEQ use "de-listing" to refer to a change in water quality category from 5 to 4a or 4b, 5 to 1 or 2, or removal of a cause from impaired water bodies (AUs).

Table 4-2. Category 2B Assessment Units

2008 305(b) AU ID	Water Body Name, Description	Category	Size (mi. or ac.)
MT40J005_020	COTTONWOOD CREEK, Black Coulee to the mouth (Milk River)	5,2B	54.1
MT43D002_140	COTTONWOOD CREEK, headwaters to the mouth (Clarks Fork of Yellowstone)	5,2B	16.8
MT41M002_110	DUPUYER CREEK, North & South Forks to the mouth (Birch Creek)	5,2B	37.6
MT40Q002_020	EAST FORK POPLAR RIVER, international border to the mouth (Poplar River)	5,2B	20.4
MT43D002_010	ELBOW CREEK, headwaters to the mouth (Clarks Fork)	5,2B	32.0
MT42B002_031	HANGING WOMAN CREEK, Stroud Creek to the mouth (Tongue River)	5,2B	18.5
MT42B002_032	HANGING WOMAN CREEK, the Wyoming border to Stroud Creek	5,2B	28.7
MT40M002_020	LARB CREEK, headwaters to mouth (Beaver Creek)	5,2B	73.8
MT40C004_020	LODGEPOLE CREEK, North & Middle Fork Lodgepole Creeks to the mouth (Musselshell River)	5,2B	27.0
MT41Q001_021	MISSOURI RIVER, Little Prickly Pear Creek to Sheep Creek	5,2B	21.3
MT41I001_011	MISSOURI RIVER, headwaters to Toston Dam	5,2B	21.0
MT42J005_010	MIZPAH CREEK, headwaters to the mouth (Powder River)	5,2B	149.8
MT41L001_010	OLD MAIDS COULEE, headwaters to the mouth (Cutbank Creek)	5,2B	16.4
MT42C002_020	OTTER CREEK, headwaters to the mouth (Tongue River)	5,2B	103.6
MT40Q001_010	POPLAR RIVER & MIDDLE FORK POPLAR RIVER, Canada to the Fort Peck Reservation	5,2B	66.6
MT42C002_060	PUMPKIN CREEK, headwaters to the mouth (Tongue River)	5,2B	171.9
MT41D004_230	SAWLOG CREEK, headwaters to mouth (Big Hole River)	5,2B	5.0
MT43D002_100	SILVERTIP CREEK, state line to the mouth (Clarks Fork)	5,2B	18.4
MT43D002_180	SOUTH FORK BRIDGER CREEK, tributary to Bridger Creek	5,2B	7.8
MT42J004_010	STUMP CREEK, tributary to Powder River below Powderville	5,2B	27.5
MT39F001_010	THOMPSON CREEK, State line to mouth	5,2B	35.9

4.3.2 Summary of Water Quality Assessments

DEQ has defined 1,104 Assessment Units in its database, which consists of 1,038 rivers and streams and 66 lakes and reservoirs. Montana's 2008 303(d) List includes 1,847[22] specific pollutant listings on 662 assessment units (**Appendix B**).

DEQ reports all waters that do not meet WQS as impaired whether the impairment includes pollutants (listed in Category 5), is impaired only from pollution (listed in Category 4C), or those with all necessary TMDLs completed (listed in Category 4A). There are a total of 3,221 AU/cause combinations identified as impairing Montana's surface waters (**Appendix A**).

Impaired waters are listed with identified causes and their sources (**Appendix A**). Of the 78 specific causes listed in 2008, the two most common were sediment-related (pollutant) and alterations of stream-side vegetative covers (pollution). The top 10 most common causes include sediment, nutrients, and metals-related pollutants and habitat or stream flow-related pollution listings **(Table 4.3)**.

Table 4-3. Top 10 Causes of Impairment – All Assessment Units

Cause Name	# of AUs
Sedimentation/Siltation	416
Alteration in stream-side or littoral vegetative covers	409
Low flow alterations	232
Phosphorus (Total)	221
Lead	162
Physical substrate habitat alterations	155
Copper	145
Total Kjehldahl Nitrogen (TKN)	112
Arsenic	109
Cadmium	102

[1] These causes are "pollution" or non-pollutants and, thus, TMDLs can not be developed

Grazing in riparian or shoreline zones is the most common confirmed source associated with impairments **(Table 4-4)**. Other common sources that have been confirmed include irrigated crop production, road-related, water management, mines and mining-related, siliviculture, channelization, and natural sources. Of the 2,654 identified AU/source combinations listed, 534 (20%) are confirmed.

[22] This number includes the 98 TMDLs that have been approved by EPA during the 2008 reporting cycle (Table 6-6).

Table 4-4. Top 10 Confirmed Sources of Impairment – All Assessment Units

Source Name	# of AUs
Grazing in Riparian or Shoreline Zones	119
Irrigated Crop Production	51
Forest Roads (Road Construction and Use)	37
Unspecified Unpaved Road or Trail	28
Flow Alterations from Water Diversions	26
Silviculture Harvesting	19
Impacts from Abandoned Mine Lands (Inactive)	19
Channelization	18
Natural Sources	17
Mine Tailings	16

4.3.2.1 Category 5 AU/Pollutant De-listings

During the 2008 reporting cycle, 271 AU/pollutant cause combinations were de-listed from Category 5 (Appendix D). Of these, 167 were approved for TMDLs (4A), 95 were identified as impaired from pollution (4C), six were delisted for flaws identified with the original listings, and three were removed (delisted) as new data indicated they no longer exceed water quality standards.

4.3.3 Designated Use-Support Summaries

All waters are assigned a use class, which designates between three and six beneficial uses (refer to Section 3.1.3.2 & Table 3-2). When a water quality assessment is conducted, each beneficial use is evaluated to determine whether water quality standards are attained and the beneficial use is supported.

4.3.3.1 Assessments of Rivers and Streams

To date, the state's water quality program has defined just more than 20,000 miles of rivers and streams in its copy of the EPA Assessment Database. The majority of the rivers and streams the state has assessed are not supporting the aquatic life or fisheries uses, which reflects the prominence of sediment and flow related impairment listings. Conversely, most waters assessed do support their drinking water, recreation, agriculture, and industrial uses (**Table 4-5**).

Table 4-5. Beneficial Use-Support Summary – Rivers and Streams ONLY

CWA Goals	Beneficial Use	Total a	Fully Supporting	Fully Supporting and Threatened	Not Supporting b	Not Assessed	Insufficient Info
		(Miles)	(Miles)	(Miles)	(Miles)	(Miles)	(Miles)
Protect & Enhance Ecosystem	Aquatic Life	20,557	3,160	0	14,273	2,890	236
	Cold-Water Fishery	11,857	1,673	0	8,608	1,083	493
	Warm-Water Fishery	8,901	1,150	0	5,802	1,674	275
Protect & Enhance Public Health	Drinking Water	14,725	7,943	0	3,465	2,976	341
	Primary Contact Recreation	20,558	9,047	136	5,606	4,537	1,232
Social & Economic	Agricultural	15,566	11,303	0	2,139	1,887	237
	Industrial	14,774	11,406	0	1,393	1,756	218

[a] Total size (miles) of rivers or streams defined in the Assessment Database with this assigned beneficial use.
[b] Includes waters that are partially supporting their beneficial uses.

There are 78 identified causes of impairment to Montana's rivers and streams. The most common are sediment-related (pollutant) and alterations of stream-side vegetative covers (pollution). The top 10 most common include sediment, nutrients, and metals-related pollutants and habitat or stream-flow-related pollution listings **(Table 4.6)**.

Table 4-6. Top 10 Causes of Impairment – Rivers and Streams ONLY

Cause Name	# of AUs
Sedimentation/Siltation	410
Alteration in stream-side or littoral vegetative covers	408
Low flow alterations	231
Phosphorus (Total)	216
Lead	157
Physical substrate habitat alterations	153
Copper	143
Cadmium	100
Arsenic	105
Zinc	97

[1] These causes are pollution or non-pollutants and, thus, TMDLs cannot be developed.

There were 46 confirmed sources of impairment to Montana's rivers and streams. The most common confirmed source was riparian, or shoreline, grazing **(Table 4-7)**. Other sources are related to irrigated crop production, roads, water management, mining, siliviculture, channelization, and natural sources.

Table 4-7. Top 10 Confirmed Sources of Impairment – Rivers and Streams ONLY

Source Name	# of AUs
Grazing in Riparian or Shoreline Zones	119
Irrigated Crop Production	49
Forest Roads (Road Construction and Use)	37
Unspecified Unpaved Road or Trail	28
Flow Alterations from Water Diversions	26
Silviculture Harvesting	19
Impacts from Abandoned Mine Lands (Inactive)	19
Channelization	18
Natural Sources	17
Mine Tailings	16

4.3.3.2 Assessments of Lakes and Reservoirs

To date, the state's water quality program has defined just over 603,362 acres of lakes and reservoirs in its copy of the EPA Assessment Database. The majority of the lakes and reservoirs the state has assessed are not supporting the aquatic life, drinking water, or recreation uses. Conversely, most waters assessed do support the cold water fishery, agriculture, and industrial uses. Half of the assessed warm water lakes and reservoirs support a warm water fishery and half are not supporting (**Table 4-8**).

Table 4-8. Beneficial Use-Support Summary - Lakes and Reservoirs ONLY

CWA Goals	Beneficial Use	Total a	Fully Supporting	Fully Supporting & Threatened	Not Supporting b	Not Assessed	Insufficient Info
		(Acres)	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Protect & Enhance Ecosystem	Aquatic Life	603,362	114,859	6,030	213,340	269,133	0
	Cold Water Fishery	542,341	219,814	6,030	52,281	264,216	0
	Warm Water Fishery	61,021	25,940	0	25,981	9,101	0
Protect & Enhance Public Health	Drinking Water	587,811	227,239	0	304,690	52,383	3,500
	Primary Contact Recreation	603,362	250,888	0	311,355	37,619	3,500
Social & Economic	Agricultural	586,202	250,733	0	54,300	277,669	3,500
	Industrial	586,202	301,716	0	7,422	273,564	3,500

[a] Total size (acres) of lakes or reservoirs defined in the assessment database with this assigned beneficial use.
[b] Includes waters that are partially supporting their beneficial uses.

There are 36 identified causes of impairment to Montana's lakes and reservoirs. The most common causes are mercury (pollutant), other flow regime alterations (pollution), and salinity (pollutant). The remaining top 10 causes include sediment, nutrients, and metals-related pollutant listings **(Table 4.9)**.

Table 4-9. Top 10 Causes of Impairment – Lakes and Reservoirs ONLY

Cause Name	# of AUs
Mercury	7
Other flow regime alterations	7
Salinity	7
Sedimentation/Siltation	6
Lead	5
Phosphorus (Total)	5
Selenium	5
Arsenic	4
Nitrogen (Total)	3
Oxygen, Dissolved	3

[1] These causes are "pollution" or non-pollutants and thus TMDLs can not be developed

Of 33 identified impairment sources identified for Montana's lakes and reservoirs, six are confirmed **(Table 4-10)**. These include agricultural, point-source/urban, and climate-related sources.

Table 4-10. Confirmed Sources of Impairment – Lakes and Reservoirs ONLY

Source Name	# of AUs
Irrigated crop production	2
Agriculture	1
Municipal point source discharges	1
Unspecified urban storm water	1
Atmospheric deposition - nitrogen	1
Drought-related Impacts	1

4.3.4 CWA Section 314 (Clean Lakes Program)

1994 was the last year DEQ received Federal CWA Section 314 funds for the Clean Lakes Program. Since 1998, when the grant was closed, Montana has been unable to support the Clean Lakes Program due to lack of funding.

4.3.4.1 Trophic Status and Trend Analysis

DEQ has limited data to evaluate lakes in the state. Nonetheless, some assessment of lake trophic status and water quality trends were entered into DEQ's ADB. Of the 62 (604,579 acres) lake assessment units represented in the ADB, 60 have been assessed for trophic status (**Table 4-11**). Similarly, of the 62 lakes, only 11 have been assessed for trends (**Table 4-12)**.

Table 4-11. Trophic Status of Lakes and Reservoirs

Trophic Status	Number of Lakes	Total Size (Acres)
Dystrophic	0	0
Eutrophic	10	35,892
Hypereutrophic	0	0
Mesotrophic	16	319,106
Oligotrophic	10	207,428
Unknown	24	39,207

Table 4-12. Water Quality Trends for Lakes and Reservoirs

Trend	Number of Lakes	Total Size (Acres)
Stable	4	22,410
Unknown	7	269,844
Total Assessed for Trends	**11**	**292,254**

4.4 Wetlands Program

4.4.1 Montana Wetlands Program Overview

DEQ's wetlands program has adopted a statewide conservation strategy as its guide: *Priceless Resources – A Strategic Framework for Wetland and Riparian Area Conservation and Restoration in Montana 2008-2012*.[23] The strategy is endorsed by the governor and directors of the state Department of Environmental Quality; Fish, Wildlife and Parks; and Natural Resources and Conservation.

The strategy was developed by the Montana Wetlands Council, an active network of diverse interests that works to conserve and restore Montana's wetland and riparian ecosystems. Numerous organizations were involved in developing the strategy, which reached out to more than 700 Montanans representing local, state, federal, and tribal agencies, as well as the agricultural community, biology and environmental conservation groups, consultants, land trusts, industry (e.g. mining, wood products) representatives, real estate and land development interests, recreation and sportsmen, the educational sector, and other water- and wetland-related groups.

Montana's overarching wetland goal is no net 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. Eight strategic directions guide wetland protection for DEQ and the Montana Wetland Council: 1) public education; 2) professional training; 3) mapping, monitoring, and assessment; 4) restoration; 5) assisting local governments; 6) vulnerability of wetlands; 7) public policy; and 8) Montana Wetland Council effectiveness. Five working groups are being established to implement the 5-year strategic framework.

[23] Montana Wetlands Council. (2008). Available at *http://www.deq.mt.gov/wqinfo/Wetlands/StrategicPlan08-12.pdf*

4.4.2 Monitoring and Assessment

Since 2002 the Montana wetland monitoring and assessment program has held several workgroup meetings to solicit input from state, federal, and tribal agencies. The state coordinates closely with the Montana Natural Heritage Program (MTNHP) to develop an efficient and effective monitoring and assessment strategy that meets multiple objectives and that could be implemented jointly by state and federal agencies. MTNHP and DEQ are actively preparing for the 2011 National Wetland Condition Assessment for Montana. In addition, the state coordinates with the Montana Department of Transportation and USDA Natural Resource Conservation Service to provide wetland assessment training.[24]

4.4.3 Restoration and Partnerships

The Montana Wetlands Legacy Partnership (Legacy) is a voluntary, incentive-based partnership that focuses on wetland conservation and private landowners. Legacy provides a point of contact for landowners looking for technical and financial assistance from state, federal, tribal, and local governments, as well as from private conservation organization programs.[25]

From 2004 to 2006 Legacy also administered the In-Lieu-Fee (ILF) Aquatic Resource Mitigation Program[26] with funds managed by Montana Fish, Wildlife and Parks (MFWP). MFWP decided to end the program that year because not enough funds were generated to ensure long-term monitoring and protection of the sites. In the 2.5 years that the program was in operation, $500,000 were generated, of which only 15% could be used to cover the department's administrative costs per U.S. Army Corps of Engineer (COE) requirements. There were not enough funds to allow for a permanent long-term position to oversee the mitigation sites. The unused receipts are being applied toward a mitigation project in the upper Missouri watershed. MFWP is responsible for monitoring the site per COE requirements.[27] Other entities are actively exploring the possibility of establishing an in-lieu-fee program for all aquatics to satisfy CQA 404 mitigation requirements for impacts to jurisdictional streams, wetlands, and other aquatic resources.

[24] Apfelbeck, R. 2005. Personal communication. Montana Department of Environmental Quality, Helena, MT.
[25] Saul, L. 2005. Personal communication. Montana Department of Environmental Quality, Helena, MT.
[26] Payment to the ILF program is one option for satisfying Section 404 mitigation requirements, as well as for settling some enforcement cases. Participants in the program typically included landowners, commercial and residential developers, transportation organizations, and others. Fees were calculated on a per-acre basis to include all costs of planning, design, and construction and costs for acquisition or permanent protection of the site through easements. ILF funds were used to restore, enhance, and protect aquatic habitats and resources throughout the state, which may include land acquisition, purchase of permanent easements, purchase of water rights, in-stream flow leasing, development of mitigation and monitoring plans, physical mitigation and monitoring, long-term management of mitigation parcels, and covering of administrative costs for the ILF program. Programmatic goals included the protection of 50,000 acres of ecologically important wetlands, riparian areas, and associated uplands annually. Hinz, T. 2005. Personal communication. Montana Wetlands Legacy Partnership. Bozeman, MT.

[27] Hinz, T. 2006. Personal communication. Montana Wetlands Legacy Partnership. Bozeman, MT.

4.5 Public Health Issues

4.5.1 Fish Kills

Three fish kills were reported to the Montana Department of Fish Wildlife and Parks (FWP) from 2006 through mid-2007:[28]

- Homestake Lake (Continental Divide on I-90 east of Butte), fish kill in entire lake on either August 13 or 14, 2006. FWP reported approximately 236 dead rainbow trout along the shoreline. FWP believe the cause was neurotoxins released from decaying *Aphanizomenon flos-aqua*. FWP based this determination on the presence of this alga species and bioassays conducted on *Ceriodaphnia*.[29]
- Ruby River (below the mouth of Warm Springs Creek), September 28, 2006. FWP reported 30 to 40 dead young-of-year rainbow trout (3-4 inches) and 2 to 3 dead yearlings (6-7 inches). FWP presumed the cause was high water temperatures.[30]
- Rogers Lake (west of Kalispell), began on July 13, 2007. FWP reported at least 1,000 dead arctic grayling. FWP presumed the cause was high water temperatures.[31]

4.5.2 Fish Consumption Advisories

In 2007 the Montana Department of Public Health and Human Services issued fish consumption advisories for certain Montana waters where testing confirmed elevated levels of contaminants, specifically mercury and polychlorinated biphenyls (PCBs), which are harmful to human health **(Table 4-13)**. Most waters in the state, however, have not been tested for contaminants (Montana Department of Health and Human Services et al., 2007). Additional fish consumption guidelines are available from FWP.

Table 4-13. Montana Waters with Fish Consumption Advisories in 2007

Bair Reservoir	Georgetown Lake	Noxon Rapids Reservoir
Big Spring Creek	Hauser Reservoir	Park Lake (SW of Helena)
Bighorn Lake	Hebgen Reservoir	Petrolia Reservoir
Bynum Reservoir	Holter Reservoir	Prickly Pear Creek
Canyon Ferry Reservoir	Island Lake (SE of Libby)	Seeley Lake
Clark Canyon Reservoir	Lake Francis	Silver Creek
Clear Lake (south of Alberton)	Lake Koocanusa	Swan Lake
Cooney Reservoir	Lake Mary Ronan	Tenmile Creek (near Helena)
Crystal Lake (east of Twin Bridges)	Leigh Lake (S of Libby)	Tiber Reservoir
Dailey Lake	Lower Stillwater Lake	Tongue River Reservoir
East Fork Reservoir	Martinsdale Reservoir	Upper Cold Lake (Mission Mountains)
Flathead Lake	Milltown Reservoir	Whitefish Lake
Fort Peck Reservoir	Mystic Lake (S of Bozeman)	Willow Creek Reservoir
Fresno Reservoir	Nelson Reservoir	

[28] Skaar, D. (2007) RE: Request for Information related to fish kills, dewatered streams, and fish consumption advisories. Message to: Staci Stolp. 2007 July 30, 12:21 pm.
[29] Ibid.
[30] Oswald, Dick. (2006). Ruby River fish kill reported by the Montana Fish Wildlife, and Parks, 2006 September 28.
[31] Vashro, Jim. Homestake Lake fish kill reported by the Montana Fish Wildlife, and Parks, 2007 July 13.

From 2005 to 2007, catch-and release fishing regulations were in affect for Silver Creek because of mercury contamination. Guidance for the level of contamination found is to not eat any fish from Silver Creek. The source of mercury is probably from the historic use of the heavy metal to recover gold from ore taken from nearby mines. Current regulations prohibit the harvesting and/or eating of fish from Silver Creek, the only fish-consumption-related closure in the state.

4.5.3 Public Water Supplies

In 1974 Congress passed the Safe Drinking Water Act (SDWA), the first national legislation for drinking water. The SDWA, and its revisions, required the EPA to adopt regulations establishing minimum requirements for drinking water quality and treatment. Public water systems must meet these requirements before public water supplies can be used for public consumption. SDWA also requires owners of public water systems to notify their customers when violations of the regulations occur.

In response to growing concern over contamination of drinking water, Congress amended the SDWA in 1986 to significantly increase monitoring and treatment requirements. Although the 1986 amendments resolved many shortcomings in the original legislation, to better prioritize and address health risks associated with drinking water required additional revisions. In August 1996 Congress again amended the SDWA to address these issues.

Included in the 1996 amendments was a requirement that states prepare an annual compliance report (ACR) that describes the status of compliance of public water systems with the SDWA. In Montana, DEQ implements these requirements under an agreement with EPA. The Public Water Supply (PWS) Section in DEQ regulates approximately 2,078 public water systems in Montana. DEQ has completed the ACR for calendar year 2006 that describes the status of compliance with the SDWA in Montana. The report lists and explains the number of SDWA requirement violations according to drinking water standards, water treatment requirements, or a water quality monitoring/reporting requirement. DEQ also lists violations according to the violated rule.

4.5.3.1 Public Water Systems in Montana

The SDWA defines a public water system as one that provides drinking water to at least 15 service connections or serves at least 25 people for at least 60 days of the calendar year. As required by the SDWA, DEQ's PWS Section regulates three types of public water systems:

- **Community (CWS) systems.** Public water systems that serve the same resident population every day, such as cities, towns, subdivisions, and trailer courts.
- **Non-transient non-community (NTNC) systems.** Public water systems serving the same nonresident population for at least six months of the calendar year, such as schools and places of business.
- **Transient non-community (TNC) systems.** Public water systems serving a transient population, such as restaurants, campgrounds, and taverns.

As of June 2005, there were 664 active community water systems, 248 NTNC systems, and 1,166 TNC systems in Montana. They serve drinking water to approximately one million people daily. Since 1967 the Montana Water and Wastewater Operator Certification Law has required that every community public water system retain at least one individual that is fully certified and in compliance with state regulations. Similar requirements apply to operators of public wastewater treatment systems. The 1997 Montana Legislature amended this law, to take effect in July 1998, requiring the certification of operators of NTNC public water systems. In order to remain fully certified, Montana's water and wastewater system operators must have appropriate experience, pass specialized examinations, and obtain continuing education credits.

4.5.3.2 Drinking Water Quality in Montana

Most Montana residents have safe, potable drinking water. Many springs, wells, streams, and lakes that supply public drinking water receive flow from naturally protected mountain watersheds. Federal and state laws further protect surface water and ground water sources against significant degradation. Some surface water sources serving the public are so pristine that disinfection is the only required treatment prior to consumption. Most ground water sources are naturally protected against contamination and do not require treatment before use.

Because sight or smell cannot detect most contaminants in drinking water, owners of public water systems regularly submit water samples for extensive testing by certified laboratories. DEQ requires public water system owners to treat their water when they detect natural or man-made contaminants in water samples, or when natural barriers do not adequately protect sources.

Since the establishment of SDWA in 1974, Montana residents have experienced a dramatic improvement to the quality of their drinking water. Further, the 1986 and 1996 amendments required increasingly stringent monitoring and treatment, resulting in drinking water that is much safer than in 1974. The public's increased awareness of water contamination, and its associated health effects, has helped to focus attention on public water supply issues.

4.5.3.3 Drinking Water Contaminants

Four general categories of contaminants are found in drinking water:

- **Microbiological.** These contaminants are primarily disease-causing microorganisms, or microorganisms that indicate that other disease-causing organisms are present. Contaminated drinking water can transmit certain disease-causing organisms, such as viruses, bacteria, and protozoa to humans. Although such problems are relatively rare, serious water-borne disease outbreaks still occur in the United States from improper disposal of human or animal wastes and from inadequate treatment of drinking water. All public water systems must sample regularly for coliform bacteria. Although coliform bacteria are not always a health risk, their presence in drinking water indicates that disease-causing microorganisms may be present. Public water systems must treat surface water sources before the water is suitable for human consumption. They may also treat ground water sources for microbiological contaminants when lack of natural protection, or improper disposal of human or animal wastes, compromises the water sources.
- **Inorganic chemicals (IOCs).** IOCs contain no carbon. Examples of regulated IOCs are arsenic, fluoride, lead, and nitrate. Inorganic contaminants can cause a wide variety of health effects, depending upon the contaminant, the concentration, and the length of

exposure. Potential health effects include toxic (poisonous) effects and cancer. High nitrate levels in drinking water can impair the transfer of oxygen to the blood in infants. High lead levels can impair intellectual development in children. Most of the inorganic Maximum Contaminant Level (MCL) violations in Montana are fluoride and nitrate violations.

- **Organic chemicals.** Organic chemicals contain carbon. They fall into two broad categories: volatile organic chemicals (VOCs) and synthetic organic chemicals (SOCs). Aerating or heating water can remove VOCs from water. Examples of VOCs are solvents like perchloroethylene, toluene, and xylene. More complex technologies involving filtration or adsorption typically remove SOCs. Examples of SOCs are insecticides, herbicides, and polychlorinated bi-phenyls (PCBs). Organic contaminants can cause a wide variety of health effects, depending upon the contaminant, the concentration, and the length of exposure. Potential health effects include toxic (poisonous) effects and cancer. Fortunately, DEQ has found few MCL violations for VOCs and SOCs.
- **Radionuclides.** Radionuclides are radioactive contaminants found in drinking water, soils, and rocks as trace elements. These contaminants, such as radium, may occur naturally. Radionuclides in drinking water can cause cancer or toxic effects, again depending upon the concentration and time of exposure. There are no current MCL violations for radionuclides in Montana.

4.5.3.3.1 Surface Water Systems

Filtration and disinfection of surface waters are the most dramatic drinking water treatment improvements since 1974. Surface water is generally more susceptible to contamination than ground water. Historically, public water suppliers inadequately treated many surface water sources because they lacked awareness of water-borne diseases, chemical contaminants, and contaminant health effects. The study of water-borne disease outbreaks, such as giardiasis and cryptosporidiosis, improved the collective knowledge and ultimately resulted in surface water treatment technology improvements.

The primary objective in treating surface water is to remove or inactivate microbiological contaminants that can cause disease (e.g., viruses, bacteria, and protozoa). Water contaminated with animal or human waste can transmit diseases to humans; therefore, adequate treatment of microbiological contaminants is essential in order to avoid acute health effects. People with compromised immune systems, such as infants, the elderly, the ill, and HIV-positive individuals may be especially vulnerable to water-borne disease.

Montana has 230 public water systems that use surface water as a primary or secondary source (**Figure 4-8**).[32] Ground Water under Direct Influence of Surface Water (GWUDISW) is the source for 27 of these systems. For regulatory purposes, SDWA considers GWUDISW systems as surface waters. Of the 230 systems, 148 are “purchased,” meaning they rely on other water systems for their primary, or supplemental, water supply. Although relatively few in number, the largest public water systems in Montana use surface water and serve more than 400,000 people daily.

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[32] Montana Department of Environmental Quality (N.d.). Safe Drinking Water Information System (SDWIS) Website. Available at: http://www.epa.gov/enviro/html/sdwis/sdwis_query.html. Accessed 2007 April 18.

4.5.3.3.2 Ground Water systems

Regular prescriptive sampling of ground water (GW) sources serving the public in Montana has occasionally detected unacceptable levels of microbiological, inorganic, organic, and radiological contaminants. Natural flushing of contaminants through a ground water aquifer can take many tens or hundreds of years. Microbiological contaminants can enter ground water from leaking sewers and poorly constructed sewage lagoons or septic systems. Some inorganic and radiological contaminants (e.g., arsenic and radium) are naturally occurring. Most organic contaminants (e.g., solvents and pesticides) are manmade. Usually, organic contaminants in ground water are the result of improper use or disposal of chemicals.

Most public water systems in Montana use ground water as a primary or secondary source. There are 1,848 public water systems in Montana that use ground water as their primary source (**Figure 4-8**). These ground water sources serve more than 500,000 people daily which is about 61% of Montana's population. Because of this fact it is important that this critical resource be allocated and managed properly to conserve and protect it for current and future populations.

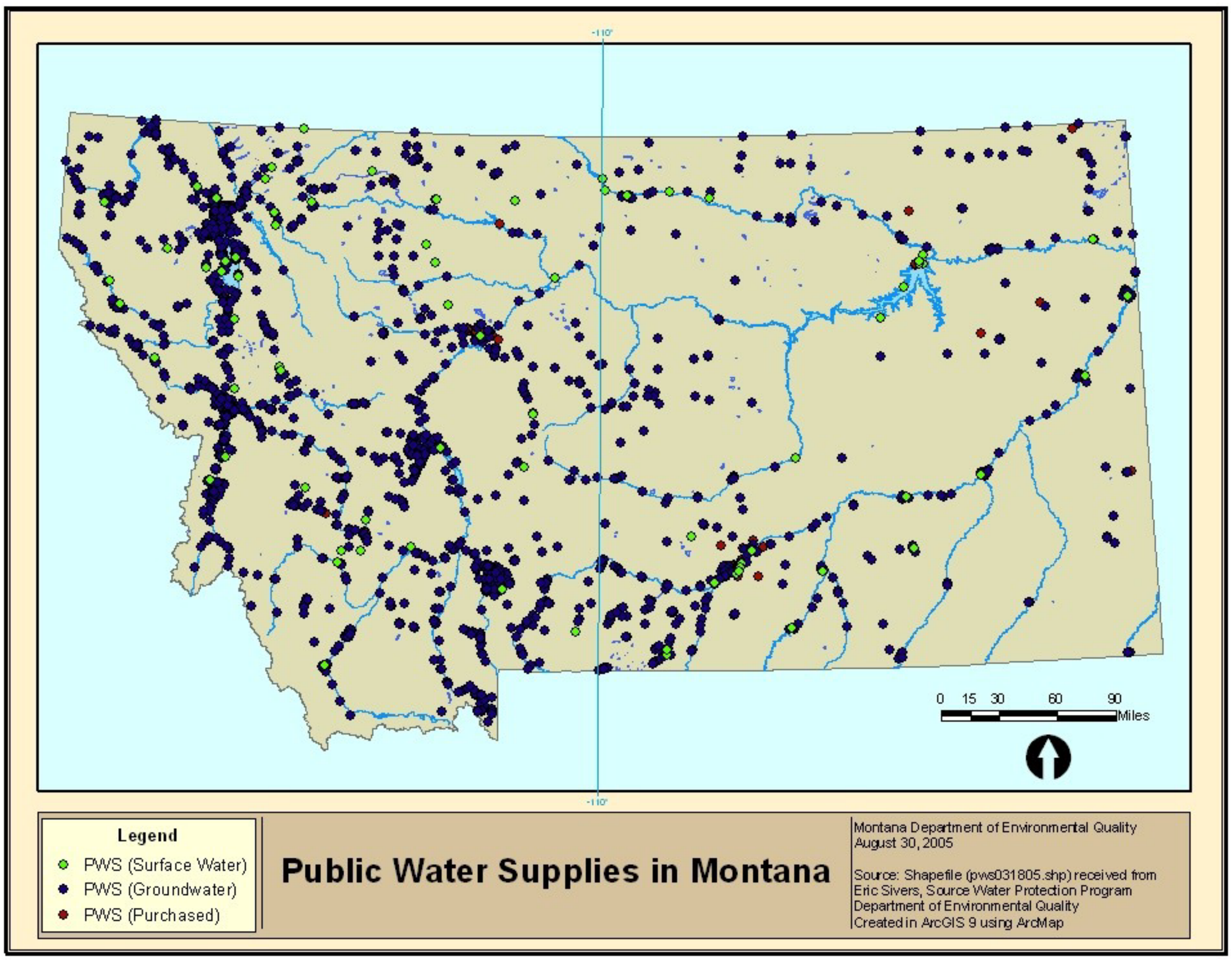


Figure 4-8. Distribution of Public Water Supply Sources in Montana

4.5.3.3.3 Regulations and Enforcement

Most water system owners are willing to comply with EPA and DEQ water quality monitoring regulations. Unfortunately, because of the complexity and comprehensiveness of the regulations, they confuse water system owners. Since 1989 monitoring and treatment requirements have increased significantly. In 1993 several regulations nearly simultaneously became effective that imposed complex new requirements. Many monitoring violations resulted, often simply due to a lack of understanding of the regulations. In 2006 a few additional regulations became effective, imposing even more requirements upon water systems.

When public water system owners detect contaminants at unacceptable levels, or when they find their water treatment methods to be inadequate, they are required to notify the public. DEQ then requires appropriate corrective action to treat or abandon the affected water source(s). The owner must also notify the public when they don't take required water samples.

When possible, DEQ's PWS Section staff or DEQ contractors resolve violations informally, which could involve making phone calls, field visits, or on-site technical assistance. In these situations the Montana Rural Water Systems, or the Midwest Assistance Program, also provides technical assistance. DEQ resolves most violations informally by the willing cooperation of the water system owner. When violations are not able to be resolved, DEQ may initiate formal enforcement actions, such as administrative orders to ensure public health protection.

Most water systems are in compliance with regulations, and typically, violations result from late or missed water samples. The most significant public water system violations in 2006 were those resulting from inadequately treated surface water, coliform bacteria contamination, and corrosive water conditions that accelerated lead leaching from brass and solder in home plumbing.

All community water systems are required to provide consumer confidence reports to the state and their users annually by July 1. These reports contain water system data for the previous calendar year. The information must reflect general system logistics; any MCLs, exceedences or contaminant detections; variances or exemptions; violations incurred; compliance actions taken; system updating (e.g., to treatment plants or service lines); and information on how to stay aware of drinking water quality.

4.5.3.4 Violations in 2006

Section 1413 of the amended SDWA requires states to prepare annual compliance reports (ACRs) for public water systems. DEQ prepared its first ACR for calendar year 1996. Subsequent ACRs are due annually on July 1. Included in the report are the following violations types for national primary drinking water regulations:

- **MCLs.** MCLs are maximum levels of contaminants that are permitted in drinking water. According to federal and state regulations, drinking water containing contaminants at levels below the MCLs are safe for human consumption.
    - **Treatment Requirements.** DEQ imposes treatment requirements when a public water system exceeds MCLs or when natural protection against contamination is inadequate to ensure safe drinking water without treatment.

- **Variances and Exemptions.** DEQ may issue variances when a public water system owner has installed treatment but those technologies are not effective in meeting MCLs. Variances impose further requirements for meeting the MCL or for installing alternative treatment. DEQ issues exemptions to allow additional time for the operator to meet an MCL or treatment requirement. Public health impacts and affordability are considered with variances and exemptions. In addition to imposing deadlines for system improvements, variances and exemptions require public notification. DEQ did not record any violations of variances or exemptions in 2006.
  - **Monitoring Requirements.** As previously discussed, new regulatory requirements include extensive water sampling and testing. When a public water system owner does not sample the water or does not submit test results to DEQ, a violation is issued. Most monitoring violations are resolved when sampling resumes, or when a public notice is posted, or when reports are finally submitted.
  - **Reporting Requirements.** All community water system owners are required to provide a consumer confidence report to the state and its users each year. The owner remains in violation until they appropriately distribute the report.

4.5.3.4.1 Phase 2/5 Rule
Monitoring frequency for VOCs, IOCs, SOCs, and nitrates/nitrites for community and non-transient non-community public water systems varied widely in calendar year 2006. Owners of all public water systems were required to sample for nitrate in 2006. No systems reported MCL violations for VOCs; 2 systems had a violation for SOCs (**Table 4-14)**; and 1 system had an MCL violation for IOCs (**Table 4-14)**. Fifteen systems violated the MCL for nitrate (**Table 4-14)**. Some of these were associated with naturally occurring contaminants, but most of the nitrate violations are likely the result of contamination from improper sewage disposal or agricultural practices.

Forty four water systems were in violation of the monitoring requirements for VOCs, 18 for SOCs, 18 for IOCs, and 276 for nitrate (**Table 4-14**). VOC and IOC monitoring violations included monitoring requirements due by the end of calendar year 2006, but were not filed by the due date. Monitoring violations resulted from late samples, missed samples, improper sampling procedures, or confusion over complex monitoring requirements. Most of the PWS that received nitrate-monitoring violations simply failed to mail their sample results to DEQ.

Table 4-14. Violations of Phase 2 and Phase 5 Rules

Phase II and Phase V	MCL (mg/l)	MCLs		Significant Monitoring/Reporting	
		Number Of Violations	Number of Systems with Violations	Number of Violations	Number of Systems with Violations
VOCs		0	0	947	44
SOCs		2	2	78	18
IOCs		4	1	59	18
NO3/NO2	10	29	15	319	276
Subtotal		**35**	**18**	**1403**	**356**

4.5.3.4.2 Total Coliform Rule (TCR)
In 2005, 148 public water systems exceeded the MCL violations for total coliforms (**Table 4-15**). Ten MCL violations resulted when a routine, or a repeat sample, showed the presence of fecal

coliform bacteria (**Table 4-15**). Fecal coliforms are a specific subgroup of total coliforms that grow only at the body temperature of warm-blood mammals. They indicate if fecal contamination of water is more likely to have recently occurred.

There are two types of TCR MCL violations: 1) a Boil Water Order (acute), issued when coliform bacteria with fecal contamination is present; and 2) a Health Advisory (non-acute), issued coliform bacteria is present but without fecal contamination. The system's routine and repeat samples provide the basis for the MCLs. Common MCL violations include inadequately protected water sources or bacteria growth.

In 2006, 549 water systems were in violation of the routine monitoring requirements (**Table 4-15**). The violations resulted when owners did not submit monthly or quarterly samples.

Table 4-15. Violations of the Total Coliform Rule

SDWIS Codes	Total Coliform Rule	MCL	MCLs		Significant Monitoring/Reporting	
			Number of Violations	Number of Systems with Violations	Number of Violations	Number of Systems with Violations
21	Acute MCL Violation	Fecal Coliform Bacteria Present	10	9		
22	Non-Acute MCL Violation	No Fecal Coliform Bacteria Present	135	115		
23, 25	Routine Monitoring				922	549
	Subtotal		**145**	**124**	**922**	**549**

4.5.3.4.3 Surface Water Treatment Rule

Thirteen water systems failed to meet treatment technique requirements (filtration and disinfection), and four failed to install filtration treatment as required by DEQ (**Table 4-16**). Treatment technique violations are typically the result of inadequate filtration or disinfection during times of high demand for water.

Table 4-16. Violations of the Surface Water Treatment Rule

SDWIS Codes	Surface Water Treatment Rule	Treatment Techniques		Significant Monitoring/Reporting	
		Number Of Violations	Number Of Systems With Violations	Number Of Violations	Number Of Systems With Violations
	Filtered Systems				
36,38	Monitoring, Routine/Repeat			77	17
41, 43, 44	Treatment Techniques	53	13		
	Unfiltered Systems				
01	Turbidity MCL Single			0	0
02	Turbidity MCL Average			0	0
03	Turbidity Significant M/R			0	0
31	Monitoring, Routine/Repeat			5	3
42	Failure To Filter	4	4		
	Subtotal	**57**	**17**	**82**	**20**

4.5.3.4.4 Disinfection Byproducts Rule

The Stage 1 Disinfections Byproducts Rule went into effect on January 1, 2002, for surface water systems and ground water systems that are under the direct influence of surface water serving populations ≥10,000. All surface and ground water systems, including ground water systems under the direct influence of surface water, that serve <10,000 people must comply with this rule effective January 1, 2006. Currently 363 systems are monitoring under this rule. Because of staffing vacancies, DEQ has not fully tracked the monitoring and reporting data **(Table 4-17)**.

Table 4-17. Violations of the Disinfection Byproducts Rule

SDWIS codes	Disinfection Byproducts Rule	MCL	MCLs		Significant Monitoring/Reporting	
			Number of Violations	Number of Systems with Violations	Number of Violations	Number of Systems with Violations
27	Monitoring, Routine/Repeat				NA	NA
11	Chlorine (0999) or Chloramines (1006) MRDL	4.0 mg/l	0	0		
11	Chlorine Dioxide M&R				0	0
02	DBP MCL Average (Total TTHMs 2950)	0.08 ug/l	1	1		
02	DBP MCL Average (Total HAA5s, 2456)	0.06 ug/l	2	2		
	Subtotal		**3**	**3**	**NA**	**NA**

4.5.3.4.5 Lead and Copper Rule

No water systems violated the treatment technique requirements in 2006 (**Table 4-18**). Fifty five water systems violated the Lead and Copper Rule monitoring requirements in 2006 (**Table 4-18**). Most of the violations resulted from late or missed samples or from confusion over complex monitoring requirements. No systems failed to provide required educational materials to the public about lead exceedences nor failed to notify DEQ that they had provided the required public education materials.

Table 4-18. Violations of the Lead and Copper Rule

SDWIS Codes	Lead and Copper Rule	Treatment Techniques		Significant Monitoring/Reporting	
		Number of Violations	Number of Systems with Violations	Number of Violations	Number of Systems with Violations
51	Initial lead and copper tap M/R			37	37
52	Follow-up or routine lead and copper tap M/R			18	18
58, 62	Treatment Installation	0	0		
65	Public Education	0	0		
	Subtotal	**0**	**0**	**55**	**55**

4.5.3.4.6 Radionuclide Rule

Only community water systems were required to sample for radionuclides every four years, until changes to the rule took effect on December 7, 2003. At that time, DEQ adjusted schedules according to three, six, or nine-year compliance periods based on the historical data and/or the results received during the initial monitoring period. No water systems exceeded the MCL during 2006 (**Table 4-19**).

Table 4-19. Violations of the Radionuclide Rule

SDWIS Codes	Radionuclide MCLs	MCL (pCi/l)	MCLs		Significant Monitoring/Reporting	
			Number Of Violations	Number Of Systems With Violations	Number Of Violations	Number Of Systems With Violations
4010	Combined Radium 226/228		0	0	0	0
4000	Gross Alpha	15 pCi/l	0	0	0	0
4006	Uranium	30 mg/L	5	2	2	2
	Subtotal		**5**	**2**	**2**	**2**

4.5.3.4.7 Consumer Confidence Report Rule

Only community water systems must comply with the Consumer Confidence Report Rule. During 2005, 118 systems didn't meet the requirements of this rule or had open violations from previous years (**Table 4-20**).

Table 4-20. Violations of the Consumer Confidence Report Rule

SDWIS codes	Consumer Confidence Report Rule	Significant Monitoring/Reporting	
		Number of Violations	Number of Systems with Violations
71, 72	Consumer Notification	118	118
	Subtotal	**118**	**118**

4.5.3.5 Summary and Conclusions

The violations referenced in the previous sections occurred during the period between 1/1/2006 and 12/31/2006, and DEQ may have followed with enforcement or assistance actions. Typical enforcement actions include follow-up phone calls, violation notification letters, administrative orders, and/or violation and closure/resolution actions. There are currently no Variances or Exemptions (as defined by the SDWA) in effect in Montana.

In 2000 DEQ adopted EPA's Safe Drinking Water Information System (SDWIS) for maintaining regulatory and compliance monitoring data. Since then, SDWIS modernization has improved DEQ's ability to detect and respond to violations, a trend that will result in improved compliance over time.

A significant portion of violations were a result of an incomplete understanding of the requirements, or were technical violations that did not result in public health risks. However, more attention must be devoted to reducing violations.

DEQ's PWS Section continuously coordinates efforts with owners of public water systems to address the most significant violations. The most serious public health risks receive the highest priority. The DEQ notifies owners when violations occur and informs them of corrective measures necessary for compliance. Through formal enforcement actions, PWS and DEQ's Enforcement Division work together when necessary to return difficult violators to compliance.

In 1997 the Planning, Prevention, and Assistance Division at DEQ implemented a program that offers low-interest loans to owners in need of water system improvements. Many systems have taken advantage of this funding program, and DEQ anticipates that these loans will assist in addressing many noncompliance issues. Interested parties may direct questions to DEQ's Technical and Financial Assistance Bureau.

4.5.4 Source Water Protection Program

Under the 1996 Federal Safe Drinking Water Act, Montana is required to carry out a Source Water Assessment Program (SWAP). With public participation and input from public water suppliers (PWS) and other stakeholders, DEQ developed a Source Water Assessment Program, which is implemented by the Source Water Protection section (SWP). EPA formally approved Montana's SWAP in November 1999.

DEQ's Source Water Assessment Program is intended to be a practical and cost-effective approach to protect public drinking water supplies from contamination. Its major components are delineation and assessment. Delineation is a process of identifying areas that contribute water to aquifers or surface waters used for drinking water, called Source Water Protection (SWP) areas. Program staff evaluate geologic and hydrologic conditions in order to delineate SWP areas. Assessment involves identifying businesses, activities, or land uses that generate, use, store, transport, or dispose of certain contaminants in SWP areas. The potential for contamination from these sources if then determined.

Delineation and assessment identifies significant threats to drinking water supplies and provides public water supplies with the information they need to protect their source(s) of water. In Montana, implementation of the SWAP is based on a watershed approach that: 1) identifies implementation priorities within each major watershed; 2) assigns oversight responsibilities to program staff for source water assessments within each of the major watersheds; and 3) tracks program implementation within each watershed.

4.5.4.1 Authority, Funding, and Program Requirements

4.5.4.1.1 Authority

The Federal Safe Drinking Water Act requires each state with primacy to assess the source water of every public water system. Additionally, the Montana Source Water Protection Program adopted the goals stated in the Montana Constitution and the MWQA. The constitution states: “The state and each person shall maintain and improve a clean and healthful environment in Montana for present and future generations... [including] the protection of the environmental life support system from degradation...”(Article IX, Section 1). Further, the MWQA states: “It is the policy of this state to conserve water by protecting, maintaining, and improving the quality and potability of water for public water supplies...”(MCA) 75-5-101).

4.5.4.1.2 Funding

A one-time set-aside from the State Revolving Fund (SRF) initially funded much of SWAP. This set-aside was approximately $1.5 million (10% of the FY97 capitalization grant dollars). The Drinking Water State Revolving Fund (DWSRF) set-asides earmarked specifically for wellhead and source water protection have provided subsequent funding to the program.

4.5.4.1.3 Program requirements

Section 1453 of the Safe Drinking Water Act (42 U.S.C. Section 300j-13) requires the state program to:

- **Identify the source(s) of water used by PWSs**
  This process delineates capture zones for wells or stream buffer areas for surface water sources, called source water protection areas.

- **Identify and inventory potential contaminant sources**
  DEQ identifies potential significant contaminant sources within the source water protection area. Contaminants of concern generally include nitrate, microbial contaminants, solvents, pesticides, and metals—contaminants for which EPA has established MCLs. Potential sources of these contaminants include septic systems, animal feeding operations, underground storage tanks, floor drains, sumps, and certain land-use activities.

- **Assess the susceptibility of the PWS to those identified potential contaminant sources**
  A susceptibility assessment considers the hazard rating of a potential contaminant source against potential barriers between the contaminant source and the well or intake. The susceptibility assessment provides a rating of the likelihood for contamination of the drinking water source. DEQ determines susceptibility for each identified potential contaminant source within a source water protection area.

- **Make the results of the delineation and assessment available to the public**
  DEQ provides a source water assessment delineation and assessment report (SWDAR) to each public water supply, which are also available to the public. SWDARs can be issued as consumer confidence reports, posted on the SWP Web site, made available at public libraries, or posted at local health departments and other places. DEQ provides delineations and assessments on maps and in text for each PWS. DEQ's Source Water Protection section assists PWSs in using the delineation and assessment report to develop local source water protection plans. Participation in this part of the program is voluntary. The program is applicable to all public water systems.

4.5.4.2 Source Water Assessment Implementation

Beginning in 1999 the SWP section staff assigned priority ratings to PWSs based on source water sensitivity. The assessment process will first complete high priority community systems and work its way toward low priority systems. Student interns were used to complete non-community system assessment reports using the hydrogeologic model provided by a SWP section hydrogeologist.

Montana has more than 2,200 PWSs, and EPA granted an extension to the period allotted for the assessment program. SWP staff completed assessments by the end of FY06. Completion was noted as "effective" since the PWS roster is dynamic. New systems come online and inactive systems become reactivated.

In addition to providing project support to other DEQ programs in matters related to protection of drinking water sources, SWP staff continue to complete assessments for new systems and have transitioned to SWP implementation. Source water protection implementation takes several forms, ranging from recognizing a PWS's protection strategy to formal certification of a source water protection plan (SWPP). When a PWS concurs with their SWDAR, the SWP section recognizes the established protection strategy. In such cases, the PWS has acknowledged the assessed level of susceptibility and recognizes management actions needed to reduce susceptibility. If a PWS needs to act in order to reduce susceptibility, they have acknowledged by their concurrence that they are susceptible, and they have acknowledged the existence of, or need for, barriers. Where susceptibility is low, a PWS may not need to take protective action, yet DEQ considers them to have a protection strategy in place. When a PWS's susceptibility to all significant potential contaminant sources identified in the source water assessment is moderate or less, SWP considers that PWS to be "substantially" implementing a strategy.

The SWP program developed these implementation definitions since they relate directly to susceptibility assessments (hazard ratings tempered by barriers). Implementation is measurable, and is reportable through a database query. Using SWP's definitions, DEQ may consider a PWS to be implementing a protection strategy without taking additional action. This is acceptable in some Montana settings where well field location or aquifer conditions are such that the PWS achieves protection when the well is constructed. The SWP program includes a 5-year inventory update to address changing conditions affecting susceptibility.

Additionally, a PWS may elect to complete a SWPP and ask the DEQ SWP section to certify the plan. This enlarges the scope of the SWDAR and incorporates elements, such as emergency and contingency planning. Due to the voluntary nature of the program, and the considerable time and expense required to complete a plan, DEQ has certified relatively few SWPPs. Currently, DEQ's primary incentive for completing a SWPP is to eliminate the filtration requirement for a spring or surface water source. DEQ is currently considering a requirement for a certified SWPP in advance of granting PWS water quality-monitoring waivers. Several communities have become interested in SWPPs in response to real and perceived threats to their water sources. In these cases, a SWPP is a planning step that local communities can use to help protect water sources.

4.5.5 Drinking Water State Revolving Fund

The 1995 Montana Legislature created the Drinking Water State Revolving Fund (DWSRF) with the passage of HB493. In 1997 the Legislature amended the program with HB483 to make Montana law consistent with the reauthorization of the Safe Drinking Water Act passed in 1996. This legislation, now codified as MCA 75-6-201, et seq., authorizes the DEQ and DNRC to develop and implement the program, and it established the DWSRF Advisory Committee.

The advisory committee consists of one state representative, one senator, and one representative from each of the following: the Montana League of Cities and Towns, DNRC, DEQ, and a county commissioner from the Montana Association of Counties. The committee advises DEQ and DNRC on policy decisions that arise in developing and implementing the DWSRF and it reviews the program's IUP. DEQ and DNRC administer the DWSRF, which is similar to the Water Pollution Control SRF.

EPA approved and awarded the DWSRF Program its first capitalization grant on June 30, 1998, for FY97. Since then, EPA has awarded DEQ capitalization grants through FY07.

The program offers below-market loans for construction of public health-related infrastructure improvements and provides funding for other activities related to public health and compliance with the Safe Drinking Water Act (SDWA). These other activities, or set-asides, include administration of the DWSRF program, technical assistance to small communities (as well as financial and managerial assistance), source water assessment and delineation, operator certification, and assistance with administration of activities in the Public Water Supply Program (PWSP).

As the primary agency responsible for implementation of the SWDA, DEQ is also responsible for the oversight of the SRF Program. In this role DEQ provides technical expertise, while

DNRC provides financial administration of project loans and oversees the sale of state general obligation bonds. The majority of the funds for come to Montana as EPA capitalization grants. Montana provides the required 20% matching funds by issuing state general obligation bonds. Interest on the loans pay for general obligation bonds, thus, no state general funds are used to operate the program. Repaid principal on the loans is used for rebuilding the DWSRF fund and to fund future projects. However, Congress only authorized the federal capitalization grants through federal FY03, though they continue to appropriate funding for the program. Federal and state laws require the state to operate the DWSRF in perpetuity.

The 1996 Amendments to SDWA include requirements for each state to prepare an annual IUP for each capitalization grant application. This is the central component of the capitalization grant application and describes how the state will use the DWSRF to meet SDWA objectives and further the protection of public health. The IUP contains the following elements:

- Short- and long-term goals of the program;
- Priority list of projects, including description and size of community;
- Criteria and methods used for distribution of funds;
- Description of the financial status of the Drinking Water SRF Program;
- Amounts of funds transferred between the Drinking Water SRF and the Wastewater SRF;
- Description of the set-aside activities and percentage of funds that will be used from the Drinking Water SRF capitalization grant, including Drinking Water SRF administrative expenses allowance, PWSP support, technical assistance, and other things;
- Description of how the program defines a disadvantaged system and the amount of Drinking Water SRF funds that will be used for this type of loan assistance.

4.5.5.1 Anticipated Funding List

DEQ became eligible to apply for the FY07 federal capitalization grant on October 1, 2006, and EPA subsequently awarded DEQ this grant. The DEQ anticipates applying for the federal FY08 grant later in the state FY08.

The Drinking Water SRF program identified 23 projects for funding with the federal FY07 and previous capitalization grants, in conjunction with the 20% state match **(Table 21)**. The list represents those projects most likely to proceed, starting from the highest ranked projects on the comprehensive priority list (Montana Department of Environmental Quality, 2007a). If other projects are ready to proceed before those on this list, it is possible that the projects actually funded will vary from those on this list. This did occur during calendar years 1998 through 2006. DEQ expects it to happen again due to the high variability in project schedules, needs, other funding sources, among other things.

Table 4-21. Drinking Water SRF Projects Identified for Funding

Project #	Project Name	Population	Project Cost	Description of Project
1	Upper/Lower River Road W&SD IIA (Cascade Co.)	1,075	$180,000	Distribution system and connection to city of Great Falls water system
2	Essex W&SD	35	$100,000	Abandon surface supply, develop ground water source, construct transmission main
3	Dry Prairie Regional Water System	35,551	Approx. $230,000; expected SRF portion approximately $10 million; SFY07 amount: $500,000.	Continue construction of extensive distribution system
4	City of Kalispell	14,223	$1,500,000	Construct new well, storage tank, and transmission main
5	North Central Regional Water System	16,652	Approx. $218,000,000; expected SRF portion approx. $7,720,000; SFY07 amount: $500,000.	Begin construction of extensive distribution system
6	Lockwood	6,500	$1,100,000	Construct new intake, booster station, purchase backup generator for WTP
7	Lorraine South WD (Missoula Co.)	28	$143,000	Construct transmission main and connect to city water system (Mountain Water Co. – Missoula)
8	City of Shelby	3,216	Approx. $650,000	Construct distribution system improvements.
9	Town of Eureka	1,287	$532,000	Consolidation of Midvale W&SD system, connect to city system, payoff outstanding debt.
10	Lewis and Clark Co. – Woodlawn Park	150	$150,000	Install new distribution mains and connect to the city of Helena system, abandon private individual wells
11	Miles City	8,487	$2,300,000	Northeast distribution system improvements
12	City of Laurel	6,255	$950,000	Filter upgrades and high service pump station improvements
13	Sunny Meadows WD	130	$604,000	Construct new well, storage reservoir, and distribution system improvements
14	City of Cut Bank	3,105	$229,000	Distribution system improvements
15	Loma Co. W&SD	400	$2,200,000, expected SRF portion of project:$150,000	Install water meters, rehabilitate storage reservoir, and construct distribution system improvements
16	Jette Meadows W&SD	300	$250,000	Construct new well and transmission main
17	Town of Manhattan	1,396	Approx. $1,000,000	New elevated storage reservoir, controls, and connection to distribution system

Table 4-21. Drinking Water SRF Projects Identified for Funding

Project #	Project Name	Population	Project Cost	Description of Project
18	Billings Heights WD	11,375	$1,038,000	Construct storage reservoir, booster pump station, and distribution system improvements
19	Town of Columbus	1,748	$320,000	Construct new well and transmission main.
20	RAE W&SD	819	$150,000	Construct distribution system improvements.
21	Bainville	153	$326,000	Refinance existing debt, in conjunction with joining Dry Prairie Regional Water System (no.2 above).
22	Froid	195	$250,000	Refinance existing debt, in conjunction with joining Dry Prairie Regional Water System (no.2 above).
23	Medicine Lake	269	$250,000	Refinance existing debt, in conjunction with joining Dry Prairie Regional Water System (no.2 above).

4.5.5.2 Criteria and Method Used for Distribution of Funds

The Safe Drinking Water Act amendments of 1986 and 1996 imposed many new regulatory requirements upon public water suppliers. Public health and compliance problems related to these requirements, affordability, consolidation of two or more systems, and readiness to proceed all are criteria in developing Montana's project ranking.

DEQ initially proposed balancing these factors, with slightly more emphasis placed on health and compliance and less on affordability and readiness to proceed. In discussions with EPA and with the DWSRF Advisory Committee, it became clear that DEQ needed to give even more emphasis to health risks and compliance issues, and that DEQ could eliminate and handle readiness to proceed through by-pass procedures (Montana Department of Environmental Quality, 2007a).

DEQ ranks high those projects that address acute risks that are an immediate threat to public health, such as inadequately treated surface water. DEQ ranks low those proposals that would address lower-risk public health threats, such as chemical contaminants present at low levels. DEQ also gives credit to proposals that intend to address existing or future regulatory requirements before noncompliance occurs, but they rank these projects lower than projects with significant health risks.

Financial impact of the proposed project on system users is one of the ranking criteria. The communities most in need of low-interest loans are awarded points under the affordability criterion (Montana Department of Environmental Quality, 2007a).

In addition to the limitations on financing for individual projects, DEQ is required annually to use at least 15% of all funds credited to the Drinking Water SRF account to provide loan assistance to systems serving fewer than 10,000 people, to the extent there are a sufficient number of eligible projects to fund.

4.5.5.3 Financial Status

The discussion and table on the following pages summarize the DWSRF expenditures to date and outline financial projections and assumptions for the future. The narrative addresses the project loan fund and the table summarizes the set-aside or non-project activities. The individual capitalization grants and corresponding state match for each fiscal year are listed below (**Table 4-22**).

Table 4-22. Summary of DWSRF Grants from 1997 - 2007

FFY	Federal Grant	State Match
1997	$14,826,200	$2,965,240
1998	$7,121,300	$1,424,260
1999	$7,463,800	$1,492,760
2000	$7,757,000	$1,551,400
2001	$7,789,100	$1,557,820
2002	$8,052,500	$1,610,500
2003	$8,004,100	$1,600,820
2004	$8,303,100	$1,660,620
2005	$8,285,500	$1,657,100
2006	$8,229,300	$1,645,860
2007	$8,229,000	$1,645,800
TOTAL	**$94,060,900**	**$18,812,180**

A financial overview of the DWSRF through FY08 shows the actual income and expenses (inflows and outflows), by broad category, to the DWSRF through FY07 and the projected inflows and outflows through FY08 (**Table 4-23**). The first column lists broad categories of inflows and outflows and the second column lists actual amounts for those categories through FY07. The third column lists projected amounts for FY08.

Table 4-23. Drinking Water State Revolving Fund Program Status

Source of Funds	Projected thru SFY 2007	Projected for SFY 2008	Total
Federal Cap. Grants	$94,060,900	$8,229,000*	
Set-Asides	($12,065,552)	($1,304,160)	
Total to Loan Fund	**$81,995,348**	**$6,924,840**	**$88,920,188**
State Match			
Bond Proceeds	$18,812,180	$1,645,800	$20,457,980
Loan Loss Reserve Sweeps	$1,844,970	$200,000	$2,044,970
Loan Repayments	$12,700,000	$3,000,000	$15,700,000
Interest on Fund Investments	$2,750,000	$100,000	$2,850,000
Transfer to CWSRF	$8,782,486	$0	$8,782,486
TOTAL SOURCE OF FUNDS			**$138,755,624**
Use of Funds			
Loans Executed			
Direct Loans	$101,200,000		$101,200,000
Transfer to CWSRF	$11,130,213	$0	$11,130,213
TOTAL USES			**$112,660,213**
Funds Available for Loan			**$26,425,411**
Projected IUP Loans			
Future Potential Projects (SFY09)			**$27,433,225**
Projected Balance Remaining			**($11,863,186)**

*FFY08 capitalization grant estimated amount

SECTION 5.0
GROUND WATER MONITORING AND ASSESSMENT

Monitoring and assessment of Montana's ground water resources is conducted by several state and federal agencies, including the Montana Bureau of Mines and Geology; MT Departments of Environmental Quality, Agriculture, and Natural Resources and Conservation; and the United States Geological Survey. **Section 5.1** is a reporting of the monitoring and assessment work conducted by the Montana Bureau of Mines and Geology (MBMG). **Sections 5.2** and **5.3** provide a report on other state and local ground water protection programs in place under federal delegated authorities or state laws.

5.1 Ground Water Resources in Montana

The quality and availability of ground water varies greatly across Montana. Aquifers in western Montana are typically in unconsolidated, alluvial valley-fill materials within intermontane valleys. The intermontane valley aquifers often yield relatively large quantities of high-quality water to relatively shallow wells. Because many wells are being constructed in these aquifers as development encroaches, fractured bedrock aquifers surrounding the intermontane valleys are becoming important.

Residents in eastern Montana commonly get their ground water from aquifers consisting of unconsolidated, alluvial valley-fill materials, glacial outwash, or consolidated sedimentary rock formations. Aquifers that residents most commonly use in eastern Montana include the Fort Union, Hell Creek, Fox Hills, Judith River, and Eagle consolidated formations. In some areas east of the Rocky Mountains, near-surface thick shale deposits such as those of the Colorado Group and Bearpaw (Pierre) Shale severely limit the economic availability of water to wells, or provide water of quality too poor for most uses. Eastern Montana aquifers typically yield less water and produce more salty, or mineralized, water compared to those in western Montana. The water in some eastern aquifers is suitable only for livestock consumption.

5.1.1 Ground Water Use

Montana's population relies heavily on ground water. The Montana Ground Water Information Center (GWIC) application documents more than 210,000 wells. Since 1975 Montanans have constructed more than 93,200 wells listed as for domestic use, 14,400 wells listed as for livestock use, and about 7,600 wells listed as for irrigation use. About 61% of Montana's population uses ground water for drinking; about 32% get their drinking water from private wells.

Ground water sources provide 2% to 3% (about 272 million gallons per day (mgpd)) of the 10,479 mgpd of water used in Montana (Cannon and Johnson, 2004). The largest uses of ground water are for:

- drinking – 87 mgpd
- irrigation – 140 mgpd
- industrial – 32 mgpd
- livestock – 12 mgpd

Ground water use is highest in western Montana. The predominant uses in western Montana are domestic wells and high-yielding aquifers supporting irrigation. Use for livestock is common throughout Montana but is most prevalent in eastern counties where ranching is an important industry.

5.1.2 Ground Water Characterization and Monitoring

The 1991 Montana Legislature established the Montana Ground-Water Assessment Program (GWAP), directing the Montana Bureau of Mines and Geology (MBMG) to characterize Montana's hydrogeology and to monitor long-term water level conditions and water chemistry. The characterization and monitoring programs allow MBMG to systematically evaluate Montana's aquifers and collect long-term water level and water quality data. The GWIC database (http://mbmggwic.mtech.edu) maintains and distributes data generated by the characterization and monitoring programs, as well as data generated by many other ground water projects.

Through the Ground-Water Characterization (GWC) program, specialists have visited more than 7,600 wells in 20 Montana counties. The site visits provide high-quality inventory information about the ground water resource within each study area. MBMG has released the GWC atlases for the Lower Yellowstone River (Dawson, Fallon, Prairie, Richland, and Wibaux counties) and the Flathead Lake (Lake and Flathead counties) areas. The atlases include descriptive overviews of aquifers and 21 maps describing the ground water resources. Characterization atlases in preparation include the Lolo-Bitterroot (Mineral, Missoula, and Ravalli counties), for which MBMG has released 10 maps (the atlas manuscript is in review), and the Middle Yellowstone River (Treasure and Yellowstone counties outside of the Crow Reservation), for which MBMG has released six maps. MBMG has completed field work in the Upper Clark Fork River (Deer Lodge, Granite, Powell, and Silver Bow counties), the Carbon-Stillwater County area, and the Cascade-Teton County area. Field work will begin in the Gallatin-Madison County area in early 2008. The Ground-Water Assessment Steering Committee has scheduled the Sweet Grass-Park County area for future work.

The monitoring program's statewide network contains 910 wells in which MBMG staff measure static water levels quarterly. Within the network there are 96 water level recorders that provide hourly to daily water level records. New water level data for any network well is generally available from GWIC about ten days after collection.

5.1.3 Ground Water Contaminants and Contamination Sources

Even within the characterization and monitoring programs, there is no comprehensive statewide set of water chemistry data collected between July 1, 2005, and June 30, 2007. However, data was collected at a subset of existing ground water monitoring well and spring locations via the statewide monitoring program, ground water characterization projects, or other MBMG projects during this period (**Figure 5-1**). The Ground-Water Assessment program accounted for nearly half (304 of 643) of the samples evaluated for this report. The Cascade-Teton Ground-Water Characterization study produced 152 samples and 30 samples came from selected wells in older study areas. The monitoring program collected another 122 samples from statewide monitoring network wells. MBMG projects in the Helena valley, Stillwater County, and in the Yellowstone controlled ground water area, among others, added 339 samples to the data set, bringing the total number of sites to 643. Of all the monitoring data evaluated for this report, 57% came from unconsolidated aquifers (**Figure 5-2**).

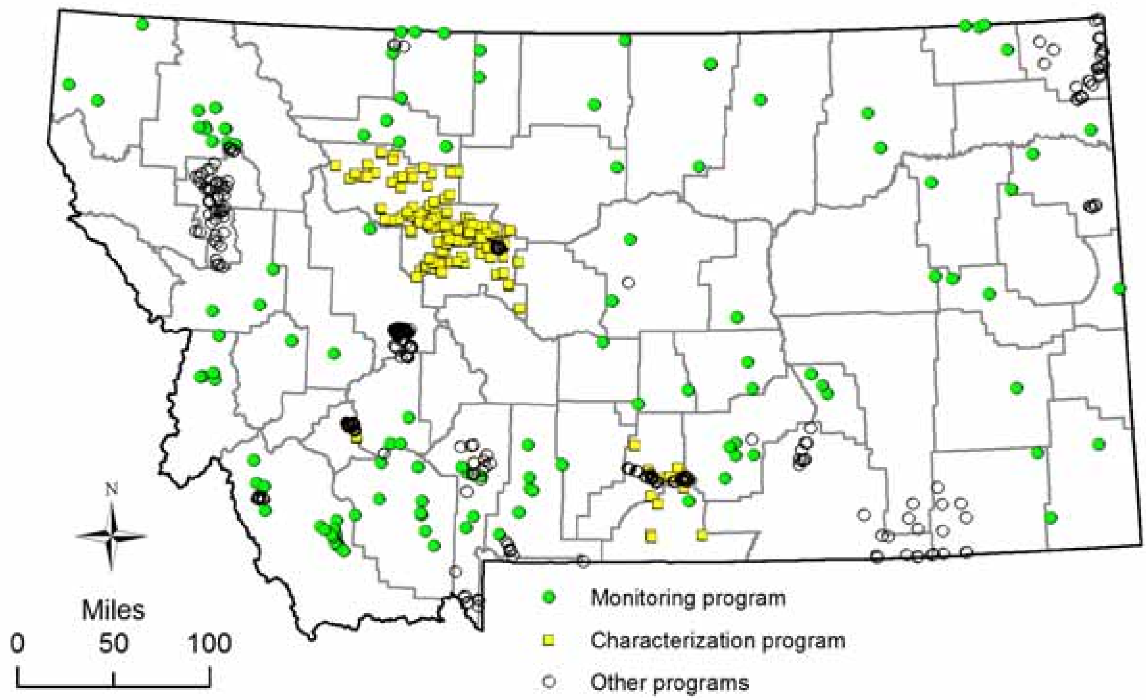


Figure 5-1. Ground Water monitoring well and spring locations and data source

To be included in the data set the water quality analysis must have met these criteria:

- The sample must have been collected between July 1, 2005, and June 30, 2007.
- The sample must represent "ambient" water quality (i.e., not collected as part of an effort to determine the extent of contamination by the evaluated parameter) and have an identifiable geologic source.
- The sample must have come from a well or spring.

If a well or spring was sampled more than once between July 2005 and June 2007, data either from the most recent or the most complete analysis was evaluated. For example, if a well was sampled for common ions (including nitrate) and trace metals, but later sampled only for nitrate, the complete analysis was retained and the single nitrate result discarded. Numerous samples collected from closely spaced wells also received special treatment. For example, MBMG sampled 24 sites from an alluvial aquifer at the Montana Pole site in Butte for common ions and trace metals. The site covers an area of less than 2 mi^2, and the number of samples over-represents the area in the unconsolidated aquifer group. The data were sorted by location and then by total dissolved solids. The analysis selected was that containing the median dissolved solids for the groups located in sections 23 and 24 of Township 3 North, Range 8 West.

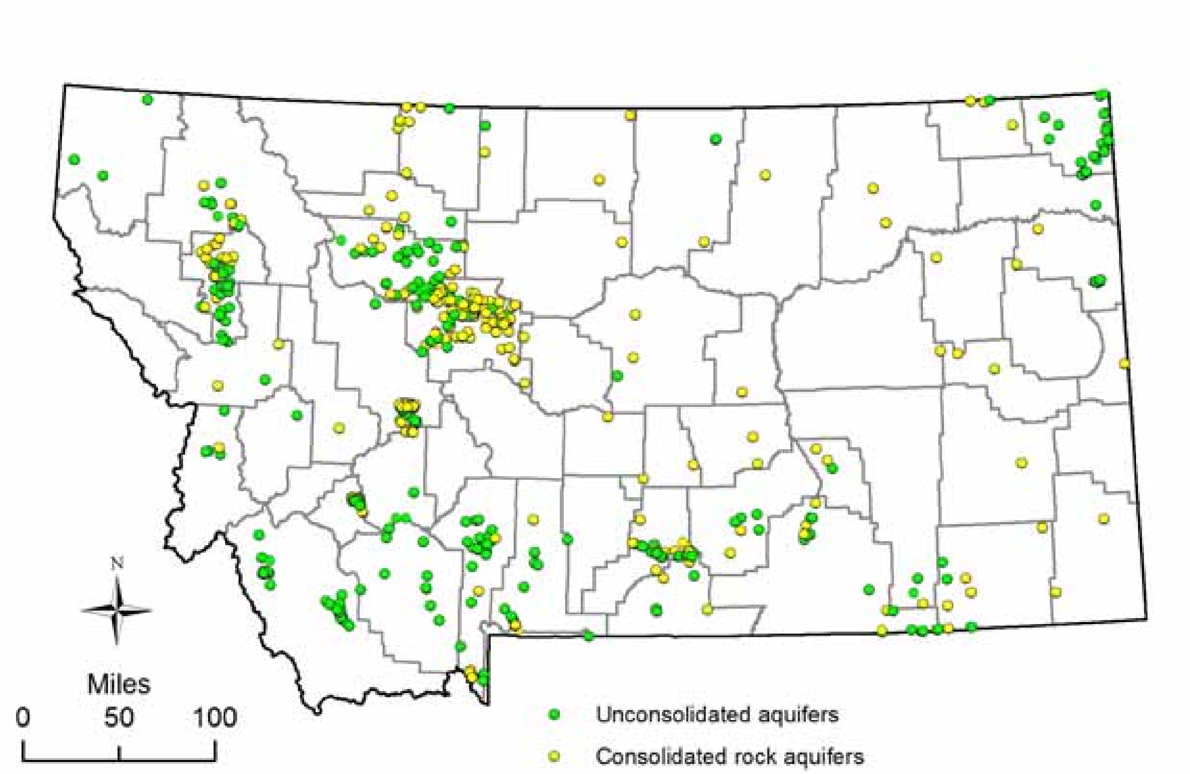


Figure 5-2. Distribution of ground water monitoring wells and springs in unconsolidated and consolidated aquifers

The actual number of analytical results available depended on the parameter. For example, there were 476 complete analyses for which total dissolved solids could be calculated and trace metal data extracted. However, 620 samples were collected for nitrate and about 530 samples for chloride. Parameters were often reported as "less than detection" at various detection limits, and 50% of the reported detection limit was used in data evaluation.

Maximum contaminant levels (MCLs) or secondary maximum contaminant levels (SMCLs) are cited for various parameters below. MCLs refer to the maximum level of a constituent allowed in public drinking water supplies as established by EPA (see http://www.epa.gov/safewater/contaminants/index.html#primary) and are set to ensure that the contaminant does not pose significant risk to public health. MCLs are legally enforceable standards that apply to public water systems. SMCLs are non-enforceable guidelines for contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water.

Total Dissolved Solids: About half of the 476 samples for which total dissolved solids were reported contained concentrations greater than 500 mg/L. One hundred twenty-five of these samples were from consolidated rock aquifers located east of the Rocky Mountains and around the edges of intermontane valleys in western Montana; 107 samples were from unconsolidated aquifers in western Montana valleys and along major drainages in eastern Montana. More than 60% of samples from unconsolidated aquifers contained less than 500 mg/L, and 11% contained more than 2,000 mg/L total dissolved solids. In contrast, only about 40% of the samples from consolidated rock aquifers contained less than 500 mg/L total dissolved solids. Only 10% of samples from consolidated aquifers with total dissolved solids had concentrations greater than 2,000 mg/L.

Nitrate: The nitrate (as N, nitrate-nitrogen) data represents results from 620 water samples taken between June 2005 and June 2007 (**Table 5-1**). About 12% of all samples contained nitrate concentrations of less than 0.25 mg/L; about 80% of all samples contained concentrations of less than 2 mg/L. About 90% of all samples contained less than 5 mg/L. However, 6%t of the samples contained concentrations greater than 10 mg/L. The median nitrate concentration for all samples was 0.6 mg/L. The median concentration in samples from unconsolidated aquifers was 0.72 mg/L, and the median concentration for samples from consolidated aquifers was 0.5 mg/L.

Table 5-1. Nitrate-nitrogen concentrations in 620 samples

Nitrate-nitrogen mg/L	**Unconsolidated aquifers**	**%**	**Consolidated aquifers**	**%**	**All aquifers**	**%**
<0.25	46	13	31	11	77	12
≥ 0.25 and < 2.0	219	64	183	66	402	65
≥ 2.0 and < 5.0	42	12	24	9	66	11
≥ 5.0 and < 10.0	18	5	19	7	37	6
≥ 10.0	19	6	19	7	38	6
Totals	**344**	**100**	**276**	**100**	**620**	**100**

There were 344 nitrate-nitrogen results available for samples from unconsolidated aquifers and 276 results from consolidated rock aquifers. There was little difference in nitrate concentrations between unconsolidated and consolidated aquifers at all levels.

Fluoride: Analytical results for fluoride in 454 samples showed that concentrations were between 0.1 and 2.0 mg/L in about 90% of the samples. However, at concentrations greater than 2 mg/L (50% of the MCL), water from consolidated rock aquifers generally contained more fluoride than did water from unconsolidated aquifers. Eleven percent of the samples from consolidated rock aquifers exceeded 2.0 mg/L, whereas only about 6% of the water samples from unconsolidated aquifers contained similar concentrations. Exceeding the MCL were 1% of the samples from unconsolidated aquifers and 2% of the samples from consolidated rock aquifers.

Sulfate: Sulfate is rarely absent in ground water. Only about 3% of the samples did not contain detectable concentrations. About 30% of the 475 samples contained sulfate concentrations greater than the secondary drinking water standard of 250 mg/L. Fifty-five percent of the samples contained sulfate concentrations of less than 125 mg/L (50% of the secondary standard).

Water samples from unconsolidated aquifers had lower sulfate concentrations than did samples from consolidated rock aquifers. Sixty-six percent of the samples from unconsolidated aquifers contained sulfate concentrations of less than 125 mg/L, whereas only 40% of the water samples from consolidated rock aquifers contained sulfate concentrations below that level. Twenty-five percent of the samples from unconsolidated aquifers contained sulfate concentrations greater than 250 mg/L, but 43% of the samples from consolidated aquifers exceeded the secondary standard.

Chloride: In about 90% of the 531 samples, chloride concentrations were less than 63 mg/L (25% of the secondary standard of 250 mg/L), but only about 2% of the samples did not contain detectable chloride. Only 3% of the samples from unconsolidated aquifers and 4% of the samples from consolidated rock aquifers contained greater than 250 mg/L chloride. Chloride is commonly present at low concentrations in natural water, and the secondary standard is high compared to chloride concentrations in most of the samples.

About 50% of the samples contained chloride concentrations of less than 10 mg/L. About 45% of the samples contained more than 10 mg/L but less than 63 mg/L of chloride. The median concentration of chloride for all the samples was 11.1 mg/L. The median concentration in unconsolidated aquifers was 10.9 mg/L, and the median concentration in consolidated rock aquifers was 11.9 mg/L.

Metals: Between 452 and 456 samples were analyzed for trace metal concentrations. The distribution of trace metal concentration relative to primary or secondary MCLs was evaluated where MCLs or SMCLs are established (**Table 5-2**). Aluminum, cadmium, lead, nickel, selenium, thallium, and uranium were present in concentrations above their MCLs, but generally in only 1% to 3% of the samples. Arsenic was the exception with about 12% of the samples containing more than 10 µg/L. The percentage of samples that contained concentrations of any metal between the detection limit and 50% of the MCL or SMCL ranged from 75% for arsenic to 100% for antimony, barium, beryllium, chromium, silver, and zinc.

Table 5-2. Distribution of trace metal sample concentrations based on MCLs or SMCLs established in public drinking water supplies

	MCL µg/L	Total Samples	Samples with either a reported value or a non-detect ≤ the MCL or SMCL	Percent samples below 50% MCL	Percent >50% MCL and <100% MCL	Percent >100% MCL
Aluminum*	50 (s)	452	421	91.0	6.7	2.4
Antimony	6 (p)	452	377	100.0	0.0	0.0
Arsenic	10 (p)	456	454	74.7	13.2	12.1
Barium	2,000 (p)	452	452	100.0	0.0	0.0
Beryllium	4 (p)	452	407	100.0	0.0	0.0
Cadmium	5 (p)	452	427	93.9	5.4	0.7
Chromium	100 (p)	452	448	100.0	0.0	0.0
Copper	1,000 (s)	454	454	99.8	0.2	0.0
Lead	10 (p)	454	425	87.3	11.5	1.2
Nickel	100 (p)	452	452	99.8	0.0	0.2
Selenium	50 (p)	452	452	97.1	0.9	2.0
Silver	100 (s)	453	453	100.0	0.0	0.0
Thallium	2 (p)	452	106	98.1	0.0	1.9
Uranium	30 (p)	452	451	90.5	6.9	2.7
Zinc	5,000 (s)	452	449	100.0	0.0	0.0

*Aluminum has been associated with discoloration of drinking water following treatment, and the SMCL is sometimes given as a range between 50 and 200 µg/L to allow states to address local conditions. The 50 µg/L minimum was used here for comparison purposes. (p) = primary drinking water standard. (s) = secondary drinking water standard. Detection limits were as follows (µg/L): Al = 10-50, As = 2-10, Ba = 2-20, Be = 0.1-2.0, Cd = 0.1-5.0, Cr = 2-100, Cu = 2-50, Pb = 2-10, Ni = 2-40, Se = 1-20, Ag = 1-5, Tl = 0.1-1.0, U = 0.5-5.0, and Zn = 2-40. Non-detect results with detection limits above the MCL or SMCL were not included.

Arsenic: Based on 454 samples, almost all of Montana's ground water contains arsenic, but 88% of the samples contain arsenic concentrations of less than 10 µg/L. The distribution of arsenic concentration does not vary widely between consolidated and unconsolidated aquifers (**Table 5-3**). Additionally, 39% of the samples from unconsolidated aquifers and 24% of the samples from consolidated aquifers contained concentrations greater than 3 µg/L.

Table 5-3. Arsenic concentrations in 454 samples

Arsenic µg/L	Unconsolidated aquifers	%	Consolidated aquifers	Percent	All aquifers	%
< 1	77	30	69	34	146	32
≥ 1 and < 3	78	31	83	41	161	35
≥ 3 and < 10	62	25	30	15	92	20
≥ 10 and < 25	30	12	13	6	43	9
≥ 25 and < 50	5	2	1	0	6	1
≥ 50	1	0	5	2	6	1
Total	**253**	**100**	**201**	**100**	**454**	**100**

Radon: Analytical results from samples collected between August 1992 and October 2006 provide data for radon concentrations in ground water. One hundred seventy-seven of the 682 samples were collected since July 1, 2001. Between 80% and 90% of the samples contained radon in concentrations exceeding 300 pCi/L but less than 2,000 pCi/L. The frequency distribution did not vary widely between consolidated rock and unconsolidated aquifers, although the highest radon concentrations were in water from igneous intrusive rock aquifers, such as the Boulder Batholith in southwestern Montana. Frequency distributions for the radon results compared to proposed MCLs of 300 and 4,000 pCi/L are in **Table 5-4** and **Table 5-5**.

Table 5-4. Radon concentration distribution based on a 300 pCi/L proposed MCL

Radon pCi/L	Unconsolidated aquifers	%	Consolidated aquifers	%	All aquifers	%
< 50	5	1	6	2	11	2
≥ 50 and < 150	8	2	23	9	31	5
≥ 150 and < 300	40	9	36	14	76	11
≥ 300	369	87	195	75	564	83
Total	**422**	**100**	**260**	**100**	**682**	**100**

Table 5-5. Radon concentration distribution based on a 4,000 pCi/L proposed MCL

Radon pCi/L	Unconsolidated aquifers	%	Consolidated aquifers	%	All aquifers	%
< 500	115	27	106	41	221	32
≥ 500 and < 2000	274	65	112	43	386	57
≥ 2000 and < 4000	24	6	19	7	43	6
≥ 4000	9	2	23	9	32	5
Total	**422**	**100**	**260**	**100**	**682**	**100**

5.2 Ground Water Protection Programs

5.2.1 Ground Water Management Strategy

5.2.1.1 Protection Strategy

DEQ allocates fewer resources for ground water protection through public awareness and education than it does for surface water and wetlands. This is a concern because ground water supplies drinking water for most public and private users in Montana and because contaminated ground water is difficult to clean up. The rate and scale of ground water impacts are increasing for several reasons, including the increasing use of septic systems associated with growth and development and increased agricultural use of ground water for irrigation and livestock watering due to basin closures for surface water rights. Increased ground water use for irrigation and livestock can potentially reduce recharge and increase the impacts from fertilizers, pesticides, and animal wastes to ground water as these pollutants move through the soil and ultimately end up in ground water.

For at least the past two decades, the need to develop a management strategy to protect Montana's ground water has been widely recognized. A planning committee has met at various times during the past 15 years to discuss management strategies for protecting and conserving ground water Wide-ranging scope, goals, agency reorganizations, and personnel changes have complicated this process. In 1992 the Department of Natural Resource Conservation (DNRC) released the Montana Water Plan. DNRC, with the assistance of other state agencies, elaborated on one of the key sections, Integrated Water Quality & Quantity Management, resulting in the Montana Ground Water Plan, which DNRC released in 1999.

As part of their daily business, several DEQ bureaus and other state agencies address many of the strategies laid out in the 1999 ground water plan. One major recommendation was for state agencies with ground water programs to regularly evaluate the adequacy and effectiveness of their protection programs and submit their evaluations to the Environmental Quality Council. Beginning in 2001 the Environmental Quality Council should review these evaluations and publish a summary report every four years.

As of 2007 there was no overall coordination of ground water stewardship and protection activities within Montana. Multiple agencies are responsible for implementing various ground water protection strategies. In 2005 DNRC began efforts to identify stakeholders, update the ground water plan, and coordinate a strategy. The process is ongoing.

5.2.1.2 Remediation Strategy

The DEQ Remediation Division is responsible for overseeing investigation and cleanup activities at state and federal Superfund sites; reclaiming abandoned mine lands; implementing corrective actions at sites with leaking underground storage tanks; and overseeing ground water remediation at sites where agricultural and industrial chemicals have caused ground water contamination. These activities are intended to protect human health and the environment; to prevent exposure to hazardous or harmful substances that these sites release to soil, sediment, surface water, or ground water; and to ensure compliance with applicable state and federal regulations.

The Ground Water Remediation Program regulates these sites under the MWQA. These sites typically require long-term soil, surface water, and/or ground water remediation and monitoring. The program addresses sites that the Leaking Underground Storage Tank Program, Comprehensive Environmental Cleanup and Responsibility Act (CECRA) Program, Permitting and Compliance Division, or other state authorities do not address.

The program has overseen remediation at sites contaminated with petroleum, pesticides, metals, nutrients, and solvents. These sites range in scale from small (not on National Priority List (NPL)) to large (on NPL). The program ranks them as maximum, high, medium, or low priority sites, or as operation and maintenance sites (Montana Department of Environmental Quality, 1996). Currently, the Ground Water Remediation Program is actively working on 88 sites, coordinating remediation activities with the Montana Department of Agriculture when pesticides affect ground water.

5.2.2 Source Water Protection

This program is discussed in detail in **Section 4.6.4** of this document.

5.2.3 Local Water Quality Districts

Communities establish Local Water Quality Districts (LWQD) to protect, preserve, and improve the quality of surface water and ground water within their districts. Currently, there are four in Montana. Lewis & Clark County established the state's first LWQD in 1992 covering the Helena valley watershed. A year later, Missoula County set up an LWQD covering the Missoula Valley Sole Source Aquifer. Butte/Silver Bow established an LWQD in 1995. Gallatin County formed an LWQD covering the Gallatin Valley at Bozeman in 1997. Additionally, local groups in Yellowstone, Flathead, and Ravalli counties have expressed interest in forming LWQDs.

LWQDs are formed by county governments pursuant to 7-13-4501 et. Seq., MCA. This legislation describes district organization and specifies local-level authorities. DEQ provides support to LWQD programs but does not have an active management role in their activities. These groups serve as local government districts with a governing board of directors. They are funded by fees collected annually with county taxes, similar to funding mechanisms for other county districts.

Each district must prepare a report to summarize yearly activities. Reports provide a review of the ongoing activities and allow for an assessment of each LWQD in meeting their program objectives established during formation of the districts. A DEQ SWP section staff member coordinates LWQD activities and reviews the annual reports.

A significant component of selected district programs is the ability to participate in the enforcement of the MWQA and related rules. Districts may develop and implement local water quality protection ordinances, activities they perform in conjunction with DEQ's Enforcement Division.

DEQ works with the districts to support SWP implementation at PWS systems within district boundaries. All the districts meet annually to review programs and activities, and generally share ideas about how each district approaches and manages local water quality related issues. DEQ's LWQD coordinator participates in planning for these meetings.

5.2.4 Prevention of Agriculture Chemical Pollution

Under the Montana Department of Agriculture (MDA), the ground water program is designed to protect ground water and the environment from impairment or degradation from the use or misuse of agricultural chemicals (e.g., pesticides and fertilizers).

The program ensures the proper and correct use of agricultural chemicals; the management of agricultural chemicals to prevent, minimize, and mitigate their presence in ground water; and provides education and training to agricultural chemical applicators, dealers, and the public on ground water protection, agricultural chemical use, and the use of alternative agricultural methods. The program was formed in 1989 and is composed of ground water monitoring, education, management plan development, and enforcement.

The MDA is also responsible for the state's Generic Management Plan (GMP). The GMP is an umbrella plan that provides guidance for the state to prevent ground water impairment from agricultural chemicals, including pesticides and fertilizers not directly related to agriculture. Anyone can obtain copies from the Agricultural Sciences Division of the MDA by request.

5.2.4.1 Ground Water Monitoring & Education

The MDA conducts ambient ground water monitoring for agricultural chemicals. The program determines whether or not residues of agricultural chemicals are present in ground water and assesses the likelihood of an agricultural chemical entering ground water. If MDA finds agricultural chemicals in ground water, they will verify, investigate, and determine an appropriate response. The department also has an education program under which they conduct initial and re-certification training for commercial and government pesticide applicators. The department staff is available to provide or assist in training and education for the public regarding pesticides.

5.2.4.2 Ground Water Monitoring

Permanent monitoring wells serve as the foundation from which MDA looks for current and new agricultural chemicals. MDA selects sites to represent agricultural crops and cropping, as well as their associated pesticide usage. Monitoring wells are located in the following counties: Beaverhead, Blaine, Broadwater, Carbon, Chouteau, Daniels, Dawson, Glacier, Hill, Judith Basin, Lake, McCone, Pondera, Richland, Teton, Valley, Wheatland, and Yellowstone. The department also evaluates new chemicals when labeled for use in Montana as analytical methods are established.

5.2.4.3 Statewide Ground Water/Pesticide Projects

The MDA Ground Water Program is in its second year of performing statewide ground water/pesticide characterization projects. The MDA will prioritize watersheds around the state in which to conduct one-year monitoring projects. Sites are selected based on agricultural setting, soil type, ground water table, and sampling availability of the wells. These projects provide a snapshot of pesticide and nitrate levels in the ground water, usually associated with a surface water source such as a river system. In 2005 MDA received a grant from EPA to sample the ground water along the Yellowstone River valley for pesticides and nitrates (Bamber and Mulder, 2006). Twice during 2005, 22 wells from Stillwater County to Richland County were sampled. The wells are predominantly located within 2 miles of the Yellowstone River. In 2006 MDA completed the Gallatin Valley Project, which consisted of 26 ground water wells and three surface water sites in the Belgrade, Bozeman, Manhattan, and the surrounding area.[33]

5.2.4.4 Ground Water Enforcement Program

MDA is responsible for primary enforcement of the Montana Agriculture Chemical Ground Water Protection Act, while DEQ is responsible for adopting WQS for agricultural chemicals (pesticides and fertilizers). MDA ensures compliance by conducting statewide comprehensive inspections at agricultural chemical users, dealers, and manufacturers; by collecting ground water and soil samples; and by investigating and monitoring incidents and spills that could cause impairment. Where necessary, MDA implements compliance actions and orders to prevent or remediate agricultural chemical ground water problems.

5.3 Ground Water, Surface Water Interactions

The 1986 provisions of the Federal Safe Drinking Water Act introduced the Surface Water Treatment Rule (SWTR). The rule requires the application of filtration and treatment techniques for public water systems that use surface water or ground water under the direct influence of surface water (GWUDISW). The SWTR requires each state to assess all PWS that use ground water to determine if the sources are GWUDISW. DEQ performs these assessments under the GWUDISW program.

The SWTR defines surface water under the influence of ground water as:

- Significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens such as *Giardia lamblia*, or Cryptosporidium; or
- Significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH that closely correlates to climatological or surface-water conditions.

The initial step in the GWUDISW program is completion of a Preliminary Assessment (PA) pursuant to DEQ Circular PWS-5 (Montana Department of Environmental Quality, 2008a). The PA evaluates and assigns a score to the source based on the location of the source relative to surface water and information on the driller's log. Consequently, sources often fail the PA (scores ≥ 40) because of substandard or unknown well construction. DEQ completes a further assessment of the source after it has failed the PA. In some cases DEQ has exercised the option of contracting MBMG to perform a detailed hydrogeologic assessment, which is often associated with spring sources or complex hydrogeologic situations.

[33] Bamber, A. (2006). Personal Communication. Discussion to clarify the Department of Agriculture's comments on the 2006 Montana Integrated 303(d)/305(b) Water Quality Report (14 November 2006).

DEQ's database does not currently provide discrete tracking of the GWUDISW program. As of 2007, DEQ has completed roughly 90% of the PAs. MBMG completed approximately 45 hydrogeologic assessments on systems that failed the PA.

SECTION 6.0
REVIEW OF MONTANA'S ASSESSMENT PROCESS AND ASSESSMENT DATA

The DEQ water quality program has been working to improve it's assessment, data management, and reporting abilities and systems since after the 2004 reporting cycle. The following sections describe the current state of program improvements. Additionally reported are all cases where errant data was discovered and corrected and where certain activites have occurred but have not been recored in the state's data system at the time of this report (e.g, recent EPA TMDL approvals).

6.1 Water Quality Assessment Method - Quality Assurance Program Review

The Montana Department of Environmental Quality (DEQ) did not make any changes to Montana's Water Quality Assessment Process and Methods for the 2008 Integrated 303(d)/305(b) Water Quality Reporting cycle. This process has been used for four reporting cycles with only minimal changes to capture revisions to Water Quality Standards (e.g., DEQ-7, ARM) and minor edits resolving ambiguous language (e.g., replacing "and/or" with either "and," or "or").

During the past decade many states have made advancements in the processes and methods employed for 305(b) and 303(d) decision-making. These advancements are a result of periodic review and, if necessary, restructuring of the assessment process as a whole, or revision of the methods used within it.

With this in mind, DEQ solicits comments and feedback from stakeholders regarding the assessment process and methods (Bostrom, 2006) to initiate a periodic review. In addition to comments during the public review period for the 2008 IR, DEQ intends to solicit public comments on any revisions to the assessment methodology before employing a revised method for subsequent water quality assessments.

DEQ anticipates that the review *will* result in changes to the assessment process. DEQ will summarize stakeholder comments pertaining to the assessment method and present these at the next meeting of the State TMDL Advisory Group (STAG).

If major changes are warranted, DEQ will work with STAG to form a smaller technical working group with representatives of major stakeholder interests to assist with the revision. The group will then propose changes to the STAG.

For information on DEQ's current assessment method, EPA guidance for assessment and listing, or information on other state's assessment and listing processes, please contact the Water Quality Planning Bureau QA Officer, Mark Bostrom, at (406) 444-2680 or mbostrom@mt.gov.

6.2 Data Management Activities in the Assessment Data Base (ADB)

As result of new and improved data management systems for Clean Water Act section 305(b) reporting activities, the program is better able to visualize assessment data and their relationships. The program has identified inconsistencies or data entry errors that need to be resolved and corrected to better represent water quality assessment decisions. The program goal is to improve reporting abilities, clarify assessment data and related information, and make transparent the assessment process for interested parties and stakeholders.

6.2.1 New Location Types

For the 2008 reporting cycle, DEQ added two new location types to Montana's instance of EPA's Assessment Database (ADB): HUC Name (4th field hydrologic unit name) and TMDL Planning Area. The intent is to assist DEQ staff and stakeholders in various analyses they may perform on the data available in the ADB.

6.2.2 Assessment Unit Metadata and Data Entry Errors Corrected

During data management activities and 2008 report generation, DEQ discovered and corrected some basic data entry and GIS indexing errors related to EPA-approved TMDLs, Assessment Unit location descriptions, and mapping data (**Table 6.1**).

Table 6-1. General data QC and corrections for 2008 Cycle in the Assessment Database (ADB)

305(b) ID	Waterbody Name	Data Corrected	Correction
MT41O001_020	Teton River	TMDL Completion Date	**Salinity** changed from 11/26/3003 to 11/26/2003
MT41Q003_020	Middle Fork Dearborn River	TMDL Completion Date	**Sediment** changed from 05/25/3005 to 5/25/2005
MT41I006_070	Golconda Creek	TMDL Completion Date	**Cadmium** changed from 09/27/2007 to 09/27/2006
MT41C002_050	Ramshorn Creek	TMDL Completion Date	**Lead** changed from 05/09/2006 to 05/09/2007
MT41C003_030	Cottonwood Creek	TMDL Completion Date	**Sedimentation/Siltation** changed from 05/09/2006 to 05/09/2007
MT76F002_020	Willow Creek	TMDL Completion Date	**Sedimentation/Siltation** changed from 11/26/2003 to 05/19/2004
MT76F001_010	Blackfoot River	TMDL Completion Date and Comment	**Cadmium** changed from 10/1/2003 to 10/10/2003
MT76F001_010	Blackfoot River	TMDL Completion Date and Comment	**Copper** changed from 10/1/2003 to 10/10/2003
MT76F001_010	Blackfoot River	TMDL Completion Date and Comment	**Iron** changed from 10/1/2003 to 10/10/2003
MT76F001_010	Blackfoot River	TMDL Completion Date and Comment	**Iron** changed from 10/1/2003 to 10/10/2003

Table 6-1. General data QC and corrections for 2008 Cycle in the Assessment Database (ADB)

305(b) ID	Waterbody Name	Data Corrected	Correction
MT76F001_010	Blackfoot River	TMDL Completion Date and Comment	**Lead** changed from 10/1/2003 to 10/10/2003
MT76F001_010	Blackfoot River	TMDL Completion Date and Comment	**Manganese** changed from 10/1/2003 to 10/10/2003
MT76F001_010	Blackfoot River	TMDL Completion Date and Comment	**Zinc** changed from 10/1/2003 to 10/10/2003
MT41Q002_010	Lake Creek	Watershed Location	Removed Marias watershed from location description; original assignment from inaccurate GIS boundaries
MT76M002_190	Rock Creek	Watershed Location	Changed Watershed location to Lower Clark Fork from original assignment to Middle Missouri.
MT42K001_020	Yellowstone River	Watershed Location	Changed Watershed location to Lower Yellowstone from original assignment to Middle Yellowstone
MT42K002_090	Sarpy Creek	Watershed Location	Changed Watershed location to Lower Yellowstone from original assignment to Middle Yellowstone
MT42K002_110	East Fork Armells Creek	Watershed Location	Changed Watershed location to Lower Yellowstone from original assignment to Middle Yellowstone
MT42K002_170	East Fork Armells Creek	Watershed Location	Changed Watershed location to Lower Yellowstone from original assignment to Middle Yellowstone
MT42K002_160	Little Porcupine Creek	Watershed Location	Changed Watershed location to Lower Yellowstone from original assignment to Middle Yellowstone
MT40E002_130	Fargo Coulee	Watershed Location	Removed Musselshell watershed from location description; original assignment from inaccurate GIS boundaries
MT41G002_040	Little Pipestone Creek	Watershed Location	Removed Upper Clark Fork watershed from location description; original assignment from inaccurate GIS boundaries
MT41E002_040	High Ore Creek	Watershed Location	Incorrectly listed in two watersheds; correct designation is only Upper Missouri Tribs
MT41K004_030	Freezeout Lake	Watershed Location	Incorrectly listed in Marias watershed; corrected designation to Missouri-Sun-Smith
MT41H003_110	Bridger Creek	Watershed Location	Incorrectly listed in two watersheds; correct designation is only Upper Missouri Tribs
MT41D003_070	California Creek	HUC Location	The waterbody was assigned to the wrong HUC. Changed HUC from 10020003 to 10020004.
MT41D004_010	North Fork Big Hole River	GIS Indexing	Removed extraneous line segments from assessment unit.
MT41D004_070	Trail Creek	HUC Location	The waterbody was assigned to the wrong HUC. Changed HUC from 10040201 to 10020004.
MT41D004_100	Ruby Creek	GIS Indexing & TPA Location	Added missing NHD reach segments to this AU. Added TMDL Planning Area (North Fork Big

Table 6-1. General data QC and corrections for 2008 Cycle in the Assessment Database (ADB)

305(b) ID	Waterbody Name	Data Corrected	Correction
			Hole) Information to waterbody record.
MT41D004_120	Rock Creek	GIS Indexing	Removed extraneous line segments from assessment unit.
MT41I002_050	Crow Creek	GIS Indexing	Removed extraneous line segments from assessment unit.
MT41I002_120	Sixteenmile Creek	GIS Indexing	Removed extraneous line segments from assessment unit.
MT43B003_100	Basin Creek Lake	Use Class and waterbody size	Basin Creek was listed as a B-1 lake, but it is actually an A-1 lake. The lake size was also corrected from 8 to 7.41 acres.
MT43E001_010	Pryor Creek	GIS Indexing & TPA Location	Added missing NHD reach segments to this AU. Added TMDL Planning Area (Yellowstone - Lower Bighorn) Information to waterbody record.
MT43F001_012	Yellowstone River	GIS Indexing	Removed extraneous line segments from assessment unit.
MT43F003_010	Big Lake	Use Class and waterbody size	Big Lake was listed as a B-1 lake, but it is actually a B-2 lake. The lake size was also corrected from 3,081 to 2,806 acres.
MT43P001_010	Bighorn Lake	Use Class and waterbody size	Bighorn Lake was listed as a B-1 lake, but it is actually a C-3 lake. The lake size was also corrected from 8,245.1 to 5,591.5 acres.
MT41H003_010	East Gallatin River	GIS Indexing and Location Description	Corrected GIS delineation, corrected the waterbody length from 7 to 7.3 mi. and updated the segment description
MT41H003_020	East Gallatin River	GIS Indexing and Location Description	Corrected GIS delineation, corrected the waterbody length from 14.6 to 25.5 mi. and updated the segment description
MT41H003_030	East Gallatin River	GIS Indexing and Location Description	Corrected GIS delineation, corrected the waterbody length from 18.9 to 13.5 mi., and updated the segment description
MT41H003_060	Smith Creek	GIS Indexing and Location Description	Corrected GIS delineation, corrected the waterbody length from 7.5 to 6.8 mi., updated the segment description, and corrected TMDL Planning Area to Lower Gallatin
MT41H003_070	Reese Creek	GIS Indexing and Location Description	Corrected GIS delineation, corrected the waterbody length from 10.4 to 8.3 mi., updated the segment description, and corrected TMDL Planning Area to Lower Gallatin
MT41H003_080	Rocky Creek	GIS Indexing and Location Description	Corrected GIS delineation, corrected the waterbody length from 7.5 to 7.9 mi., updated the segment description, and corrected TMDL Planning Area to Lower Gallatin
MT41H003_131	Hyalite Creek	GIS Indexing and Location Description	Corrected GIS delineation and corrected the waterbody length from 14.5 to 17.1 mi.
MT41H003_132	Hyalite Creek	GIS Indexing and Location Description	Corrected GIS delineation and corrected the waterbody length from 20.4 to 21 mi.

6.2.3 Assessment Unit (AU) Changes

During the 2008 reporting cycle DEQ added or modified five water bodies for assessment purposes. This included designating two new AUs and modifying three existing AUs. A modified AU may have been split into multiple AUs or merged into a single unit with another AU (**Table 6-2**).

Table 6-2. Assessment Unit Changes during the 2008 Reporting Cycle

Pre-2008 305(b) ID	2008 305(b) ID	Current Water Body Description	Type	Comments
NA	MT40I002_010	SWIFT GULCH CREEK, headwaters to mouth	New	This water body could not be reach indexed because it does not exist on the 1:100k NHD.
NA	MT43B005_010	BASIN CREEK, headwater tributary to the Boulder River (MT43B004_010)	New	NA
MT42B001_020	MT42B001_020	TONGUE RIVER, Tongue River Dam to Prairie Dog Creek	Split	MT42B001_020 had multiple classifications. An upstream B-2 segment from the Tongue River Dam to Prairie Dog Creek was split from the downstream B-3 segment from Prairie Dog Creek to Hanging Woman Creek.
MT42B001_020	MT42B001_021	TONGUE RIVER, Prairie Dog Creek to Hanging Woman Creek	Split	MT42B001_020 had multiple classifications. An upstream B-2 segment from the Tongue River Dam to Prairie Dog Creek was split from the downstream B-3 segment from Prairie Dog Creek to Hanging Woman Creek.
MT43F001_010	MT43F001_010	YELLOWSTONE RIVER, City of Billings PWS to Huntley Diversion Dam	Merge	Merged MT43F001_010 and MT43Q001_012 as a single B-3 water body. Two side channel reaches removed from indexing. New description.
MT43Q001_012	MT43F001_010	YELLOWSTONE RIVER, City of Billings PWS to Huntley Diversion Dam	Merge	Merged MT43F001_010 and MT43Q001_012 as a single B-3 water body.

6.2.4 Cycle First Listed Date Corrections

For the 2008 reporting cycle in the ADB, DEQ corrected the Cycle First Listed (CFL) dates for water body/pollutant combinations to the date the pollutant was originally identified for that water body in a state water quality assessment report or 303(d) list. Only those pollutants that were identified on the 2006 303(d) List were subject to a review of CFL date. Historical reports and lists that were reviewed included the Nonpoint Source Reports from 1988 and 1990 and 303(d) lists from 1992, 1994, 1996, 2000, 2002, 2004, and 2006. The data review process parsed these listing dates into two groups, 1998-1994 and 1996-2006, and determined the earliest year in which a listing occurred for each group. The end result was the earliest listing date with a consistent cause listing, thereafter being recorded as the CFL date for that water body/pollutant combination in the ADB for the 2008 reporting cycle. Out of the 2,230 pollutant causes on the 2006 303(d) List, 1,625 had their CFL dates corrected, and 605 did not change (**Table 6.3**).

Decision rules for determining the pollutant (cause) CFL date during this data review were as follows:

1. If the cause was never listed between 1988 and 1994, the 1988-1994 CFL date will be N/A.
2. If the cause was listed during non-consecutive years, the 1988-1994 CFL date will indicate which years the cause was listed. For example, if a cause was listed in 1988 and 1992, the 1988 -1994 CFL date would be 1998, 1992.
3. If the cause was listed and remained listed through 1994, the 1988-1994 CFL date will be the first year the cause was listed. For example, if a cause was listed in 1992 and 1994, the 1988-1994 CFL date would be 1992.
4. The 1996-2004 CFL date is the first year the cause was listed between 1996 and 2004.
5. If the cause was listed in 1996, the 1996-2004 CFL date will be 1996, even if the cause was not listed after 1996.
6. The CFL date entered into the ADB for the 2008 reporting cycle is the first year the cause was listed continuously between 1988 and 2004 as determined by applying rules 1-5 above.

Table 6-3. Count of CFL dates corrected in 2008 Cycle ADB

2006 ADB CFL Date	**2008 ADB CFL Date***										
	1988	**1990**	**1992**	**1994**	**1996**	**2000**	**2002**	**2004**	**2006**	**n/a[#]**	**Grand Total**
1990					1						1
1992	53	18	**4**	2	18	44	9	3	1		152
1994	2	20	20	**21**	6	50	5				124
1996	5	1		2	**6**	11		2			27
1998						3	1				4
2000						**3**	3				6
2002	7	3	5	1			**12**				28
2004	119	34	42	12	8	100	14	**12**		4	345
2006	236	162	154	42	115	129	25	9	**547**	97	1,516
Grand Total	422	238	225	80	154	340	69	26	548	101	2,203

* Bolded values did not have their CFL dates changed.
[#] These are waterbody/cause delistings due to the identified cause was a "non-pollutant," e.g., excessive algal growth. Refer to **Appendix D - Impairment Causes De-Listed from the 2006 303(d) List (Category 5)** for a complete accounting of these delisting, where Delisting Reason is provided as "Impairment due to non-pollutant (4C)."

Complete listing of all water body/pollutant causes with corrected CFL dates is reported in **Appendix H**.

6.2.5 Previously Approved TMDLs

During the course of conducting QC on data entered into Montana's ADB, 16 TMDLs that had been approved before 2006 were identified as missing from the ADB. To enable tracking of TMDL implementation and listing status, these TMDLs were entered into the ADB (**Table 6-4**). Additionally, DEQ received EPA approval for 115 TMDLs in the Bitterroot Headwaters and Lake Helena TMDL Planning Areas during the 2006 reporting cycle (**Table 6-5**). However, those approvals were received too late for data entry and inclusion in the 2006 Integrated Report. These have also been added to the ADB during this current reporting cycle, and all of these approved TMDLs are included in Appendix F, EPA Approved TMDLs.

Table 6-4. TMDLs approved prior to the 2006 Reporting Cycle entered into ADB during 2008 Reporting Cycle

TMDL Planning Area	305(b) ID	Waterbody Name	Cycle First Listed	Cause Name
Big Springs	MT41S004_020	Big Spring Creek	2008	Nitrogen (Total)
Clark Fork River	MT76E001_010	Clark Fork River	1994	Nitrogen (Total)
Clark Fork River	MT76E001_010	Clark Fork River	1994	Phosphorus (Total)
Clark Fork River	MT76G001_010	Clark Fork River	1996	Nitrogen (Total)
Clark Fork River	MT76G001_010	Clark Fork River	1996	Phosphorus (Total)
Clark Fork River	MT76G001_030	Clark Fork River	1990	Nitrogen (Total)
Clark Fork River	MT76G001_030	Clark Fork River	1990	Phosphorus (Total)
Clark Fork River	MT76G001_040	Clark Fork River	1990	Nitrogen (Total)
Clark Fork River	MT76G001_040	Clark Fork River	1990	Phosphorus (Total)
Clark Fork River	MT76M001_010	Clark Fork River	2008	Nitrogen (Total)
Clark Fork River	MT76M001_010	Clark Fork River	2000	Phosphorus (Total)
Clark Fork River	MT76M001_020	Clark Fork River	1988	Chlorophyll-a
Clark Fork River	MT76M001_020	Clark Fork River	1990	Nitrogen (Total)
Clark Fork River	MT76M001_020	Clark Fork River	1990	Organic Enrichment (Sewage) Biological Indicators
Clark Fork River	MT76M001_020	Clark Fork River	1990	Phosphorus (Total)
Clark Fork River	MT76M001_030	Clark Fork River	2000	Nutrient/Eutrophication Biological Indicators
Swan	MT76K002_010	Swan Lake	2008	BOD, sediment load (Sediment Oxygen Demand)

Table 6-5. TMDLs approved in the 2006 Reporting Cycle entered into ADB during 2008 Reporting Cycle

TMDL Planning Area	305(b) ID	Waterbody Name	Cycle First Listed	Cause Name
Bitterroot Headwaters	MT76H002_010	East Fork Bitterroot River	1992	Sedimentation/Siltation
Bitterroot Headwaters	MT76H002_010	East Fork Bitterroot River	2006	Temperature, water
Bitterroot Headwaters	MT76H002_020	Reimel Creek	1992	Sedimentation/Siltation
Bitterroot Headwaters	MT76H002_070	Laird Creek	1992	Sedimentation/Siltation
Bitterroot Headwaters	MT76H002_080	Gilbert Creek	1992	Sedimentation/Siltation
Bitterroot Headwaters	MT76H003_010	West Fork Bitterroot River	1988	Sedimentation/Siltation
Bitterroot Headwaters	MT76H003_010	West Fork Bitterroot River	2008	Temperature, water
Bitterroot Headwaters	MT76H003_020	Nez Perce Fork Bitterroot River	1996	Temperature, water
Bitterroot Headwaters	MT76H003_040	Hughes Creek	1988	Sedimentation/Siltation
Bitterroot Headwaters	MT76H003_040	Hughes Creek	1990	Temperature, water
Bitterroot Headwaters	MT76H003_050	Overwhich Creek	1992	Temperature, water
Bitterroot Headwaters	MT76H003_060	Ditch Creek	1992	Sedimentation/Siltation
Lake Helena	MT41I006_020	Prickly Pear Creek	1988	Arsenic
Lake Helena	MT41I006_020	Prickly Pear Creek	1988	Cadmium
Lake Helena	MT41I006_020	Prickly Pear Creek	1988	Copper
Lake Helena	MT41I006_020	Prickly Pear Creek	1988	Lead
Lake Helena	MT41I006_020	Prickly Pear Creek	1990	Nitrate/Nitrite (Nitrite + Nitrate as N)
Lake Helena	MT41I006_020	Prickly Pear Creek	2008	Phosphorus (Total)
Lake Helena	MT41I006_020	Prickly Pear Creek	1988	Sedimentation/Siltation
Lake Helena	MT41I006_020	Prickly Pear Creek	1988	Zinc
Lake Helena	MT41I006_030	Prickly Pear Creek	1988	Arsenic
Lake Helena	MT41I006_030	Prickly Pear Creek	1988	Cadmium
Lake Helena	MT41I006_030	Prickly Pear Creek	1988	Copper
Lake Helena	MT41I006_030	Prickly Pear Creek	1988	Lead
Lake Helena	MT41I006_030	Prickly Pear Creek	2008	Nitrogen (Total)
Lake Helena	MT41I006_030	Prickly Pear Creek	2008	Phosphorus (Total)
Lake Helena	MT41I006_030	Prickly Pear Creek	1988	Sedimentation/Siltation
Lake Helena	MT41I006_030	Prickly Pear Creek	1988	Zinc
Lake Helena	MT41I006_040	Prickly Pear Creek	1988	Arsenic
Lake Helena	MT41I006_040	Prickly Pear Creek	1988	Cadmium

Table 6-5. TMDLs approved in the 2006 Reporting Cycle entered into ADB during 2008 Reporting Cycle

TMDL Planning Area	305(b) ID	Waterbody Name	Cycle First Listed	Cause Name
Lake Helena	MT41I006_040	Prickly Pear Creek	1988	Copper
Lake Helena	MT41I006_040	Prickly Pear Creek	1988	Lead
Lake Helena	MT41I006_040	Prickly Pear Creek	2000	Sedimentation/Siltation
Lake Helena	MT41I006_040	Prickly Pear Creek	1988	Zinc
Lake Helena	MT41I006_050	Prickly Pear Creek	2000	Cadmium
Lake Helena	MT41I006_050	Prickly Pear Creek	2000	Lead
Lake Helena	MT41I006_050	Prickly Pear Creek	1988	Sedimentation/Siltation
Lake Helena	MT41I006_050	Prickly Pear Creek	2000	Zinc
Lake Helena	MT41I006_060	Prickly Pear Creek	1992	Lead
Lake Helena	MT41I006_060	Prickly Pear Creek	2008	Total Suspended Solids (TSS)
Lake Helena	MT41I006_070	Golconda Creek	1992	Cadmium
Lake Helena	MT41I006_070	Golconda Creek	1992	Lead
Lake Helena	MT41I006_080	Spring Creek	1988	Arsenic
Lake Helena	MT41I006_080	Spring Creek	1988	Cadmium
Lake Helena	MT41I006_080	Spring Creek	1988	Copper
Lake Helena	MT41I006_080	Spring Creek	1988	Lead
Lake Helena	MT41I006_080	Spring Creek	2008	Nitrogen (Total)
Lake Helena	MT41I006_080	Spring Creek	2008	Phosphorus (Total)
Lake Helena	MT41I006_080	Spring Creek	2008	Total Suspended Solids (TSS)
Lake Helena	MT41I006_080	Spring Creek	1988	Zinc
Lake Helena	MT41I006_090	Corbin Creek	1988	Arsenic
Lake Helena	MT41I006_090	Corbin Creek	1988	Cadmium
Lake Helena	MT41I006_090	Corbin Creek	1988	Copper
Lake Helena	MT41I006_090	Corbin Creek	1988	Lead
Lake Helena	MT41I006_090	Corbin Creek	1988	Solids (Suspended/Bedload)
Lake Helena	MT41I006_090	Corbin Creek	1988	Zinc
Lake Helena	MT41I006_100	Middle Fork Warm Springs Creek	1988	Arsenic
Lake Helena	MT41I006_100	Middle Fork Warm Springs Creek	2008	Cadmium
Lake Helena	MT41I006_100	Middle Fork Warm Springs Creek	2008	Lead
Lake Helena	MT41I006_100	Middle Fork Warm Springs Creek	1990	Sedimentation/Siltation
Lake Helena	MT41I006_100	Middle Fork Warm Springs Creek	1988	Zinc
Lake Helena	MT41I006_110	Warm Springs Creek	1990	Arsenic
Lake Helena	MT41I006_110	Warm Springs Creek	1990	Cadmium
Lake Helena	MT41I006_110	Warm Springs Creek	1990	Lead
Lake Helena	MT41I006_110	Warm Springs Creek	1990	Sedimentation/Siltation

Table 6-5. TMDLs approved in the 2006 Reporting Cycle entered into ADB during 2008 Reporting Cycle

TMDL Planning Area	305(b) ID	Waterbody Name	Cycle First Listed	Cause Name
Lake Helena	MT41I006_110	Warm Springs Creek	2008	Zinc
Lake Helena	MT41I006_120	Clancy Creek	1988	Arsenic
Lake Helena	MT41I006_120	Clancy Creek	2008	Cadmium
Lake Helena	MT41I006_120	Clancy Creek	1988	Copper
Lake Helena	MT41I006_120	Clancy Creek	1988	Lead
Lake Helena	MT41I006_120	Clancy Creek	1988	Sedimentation/Siltation
Lake Helena	MT41I006_120	Clancy Creek	2008	Zinc
Lake Helena	MT41I006_130	Lump Gulch	1990	Cadmium
Lake Helena	MT41I006_130	Lump Gulch	1990	Copper
Lake Helena	MT41I006_130	Lump Gulch	1990	Lead
Lake Helena	MT41I006_130	Lump Gulch	2008	Total Suspended Solids (TSS)
Lake Helena	MT41I006_130	Lump Gulch	1990	Zinc
Lake Helena	MT41I006_141	Tenmile Creek	1988	Arsenic
Lake Helena	MT41I006_141	Tenmile Creek	1988	Cadmium
Lake Helena	MT41I006_141	Tenmile Creek	1988	Copper
Lake Helena	MT41I006_141	Tenmile Creek	1988	Lead
Lake Helena	MT41I006_141	Tenmile Creek	1988	Zinc
Lake Helena	MT41I006_142	Tenmile Creek	1988	Arsenic
Lake Helena	MT41I006_142	Tenmile Creek	1988	Cadmium
Lake Helena	MT41I006_142	Tenmile Creek	1988	Copper
Lake Helena	MT41I006_142	Tenmile Creek	1988	Lead
Lake Helena	MT41I006_142	Tenmile Creek	1988	Sedimentation/Siltation
Lake Helena	MT41I006_142	Tenmile Creek	1988	Zinc
Lake Helena	MT41I006_143	Tenmile Creek	1988	Arsenic
Lake Helena	MT41I006_143	Tenmile Creek	1988	Cadmium
Lake Helena	MT41I006_143	Tenmile Creek	1988	Copper
Lake Helena	MT41I006_143	Tenmile Creek	1988	Lead
Lake Helena	MT41I006_143	Tenmile Creek	2008	Nitrogen (Total)
Lake Helena	MT41I006_143	Tenmile Creek	2002	Nutrient/Eutrophication Biological Indicators
Lake Helena	MT41I006_143	Tenmile Creek	2008	Phosphorus (Total)
Lake Helena	MT41I006_143	Tenmile Creek	1988	Sedimentation/Siltation
Lake Helena	MT41I006_143	Tenmile Creek	1988	Zinc
Lake Helena	MT41I006_150	Silver Creek	1988	Arsenic
Lake Helena	MT41I006_160	Sevenmile Creek	2008	Arsenic
Lake Helena	MT41I006_160	Sevenmile Creek	2008	Copper
Lake Helena	MT41I006_160	Sevenmile Creek	2002	Lead
Lake Helena	MT41I006_160	Sevenmile Creek	2008	Nitrogen (Total)
Lake Helena	MT41I006_160	Sevenmile Creek	2002	Phosphorus (total)

Table 6-5. TMDLs approved in the 2006 Reporting Cycle entered into ADB during 2008 Reporting Cycle

TMDL Planning Area	305(b) ID	Waterbody Name	Cycle First Listed	Cause Name
Lake Helena	MT41I006_160	Sevenmile Creek	1992	Sedimentation/Siltation
Lake Helena	MT41I006_180	North Fork Warm Springs Creek	2002	Arsenic
Lake Helena	MT41I006_180	North Fork Warm Springs Creek	2008	Cadmium
Lake Helena	MT41I006_180	North Fork Warm Springs Creek	2002	Sedimentation/Siltation
Lake Helena	MT41I006_180	North Fork Warm Springs Creek	2008	Zinc
Lake Helena	MT41I006_210	Jennies Fork	1994	Lead
Lake Helena	MT41I006_210	Jennies Fork	1994	Sedimentation/Siltation
Lake Helena	MT41I006_220	Skelly Gulch	1994	Sedimentation/Siltation
Lake Helena	MT41I007_010	Lake Helena	1994	Arsenic
Lake Helena	MT41I007_010	Lake Helena	1994	Lead
Lake Helena	MT41I007_010	Lake Helena	2008	Nitrogen (Total)
Lake Helena	MT41I007_010	Lake Helena	2008	Phosphorus (Total)
Prospect Creek	MT76N003_020	Prospect Creek	2000	Antimony
Prospect Creek	MT76N003_020	Prospect Creek	2000	Lead
Prospect Creek	MT76N003_020	Prospect Creek	2000	Zinc
Prospect Creek	MT76N003_021	Antimony Creek Drainage	2008	Antimony
Prospect Creek	MT76N003_021	Antimony Creek Drainage	2004	Arsenic
Prospect Creek	MT76N003_021	Antimony Creek Drainage	2004	Lead
Prospect Creek	MT76N003_022	Cox Gulch	2004	Lead

6.2.6 EPA-Approved TMDLs Not Yet Entered in ADB

DEQ has also received EPA approval for 94 TMDLs in the Middle Blackfoot-Nevada Creek (83), St. Regis (8), and Yaak (3) TMDL Planning Areas during the 2008 reporting cycle (**Table 6-6**). However, those approvals were received too late in the reporting cycle for data entry and inclusion in the 2008 Integrated Report. These will be added to the ADB during the next reporting cycle. NOTE: These 94 TMDLs are not included in Appendix F, EPA Approved TMDLs, and are presently listed in Appendix B, Waters In Need of TMDLs [303(d) List] and TMDL Priority Schedule.

Table 6-6. TMDLs Approved during 2008 Cycle not entered in ADB

TMDL Planning Area	305(b) ID	Water Body Name	Cycle First Listed	Cause Name
Middle Blackfoot-Nevada Creek	MT76F001_031	Blackfoot River	1996	Total Nitrogen (TN)
Middle Blackfoot-Nevada Creek	MT76F001_031	Blackfoot River	1996	Total Phosphorus (TP)
Middle Blackfoot-Nevada Creek	MT76F001_031	Blackfoot River	Not Listed	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F001_032	Blackfoot River	1996	Total Nitrogen (TN)
Middle Blackfoot-Nevada Creek	MT76F001_032	Blackfoot River	1996	Total Phosphorus (TP)
Middle Blackfoot-Nevada Creek	MT76F001_032	Blackfoot River	Not Listed	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F003_011	Nevada Creek (upper)	2000	Lead
Middle Blackfoot-Nevada Creek	MT76F003_011	Nevada Creek (upper)	Not Listed	Iron
Middle Blackfoot-Nevada Creek	MT76F003_011	Nevada Creek (upper)	Not Listed	Copper
Middle Blackfoot-Nevada Creek	MT76F003_011	Nevada Creek (upper)	1996	Solids (Suspended/Bedload)
Middle Blackfoot-Nevada Creek	MT76F003_011	Nevada Creek (upper)	1996	Total Kjehldahl Nitrogen (TKN)
Middle Blackfoot-Nevada Creek	MT76F003_011	Nevada Creek (upper)	Not Listed	Phosphorus (Total)
Middle Blackfoot-Nevada Creek	MT76F003_011	Nevada Creek (upper)	Not Listed	Temperature
Middle Blackfoot-Nevada Creek	MT76F003_012	Nevada Creek (lower)	1996	Phosphorus (Total)
Middle Blackfoot-Nevada Creek	MT76F003_012	Nevada Creek (lower)	1996	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F003_012	Nevada Creek (lower)	1996	Total Kjehldahl Nitrogen (TKN)
Middle Blackfoot-Nevada Creek	MT76F003_012	Nevada Creek (lower)	Not Listed	Temperature, water
Middle Blackfoot-Nevada Creek	MT76F003_021	Jefferson Creek	1990	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F003_022	Jefferson Creek	2006	Aluminum
Middle Blackfoot-Nevada Creek	MT76F003_022	Jefferson Creek	2006	Iron
Middle Blackfoot-Nevada Creek	MT76F003_022	Jefferson Creek	2006	Phosphorus (Total)
Middle Blackfoot-Nevada Creek	MT76F003_022	Jefferson Creek	Not Listed	Nitrogen (Total)
Middle Blackfoot-Nevada Creek	MT76F003_022	Jefferson Creek	1988	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F003_022	Jefferson Creek	1988	Solids (Suspended/Bedload)

Table 6-6. TMDLs Approved during 2008 Cycle not entered in ADB

TMDL Planning Area	305(b) ID	Water Body Name	Cycle First Listed	Cause Name
Middle Blackfoot-Nevada Creek	MT76F003_030	Gallagher Creek	2006	Phosphorus (Total)
Middle Blackfoot-Nevada Creek	MT76F003_030	Gallagher Creek	2006	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F003_030	Gallagher Creek	2006	Total Kjehldahl Nitrogen (TKN)
Middle Blackfoot-Nevada Creek	MT76F003_040	Braziel Creek	1988	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F003_040	Braziel Creek	2006	Phosphorus (Total)
Middle Blackfoot-Nevada Creek	MT76F003_040	Braziel Creek	Not Listed	Nitrogen (Total)
Middle Blackfoot-Nevada Creek	MT76F003_050	McElwain Creek	2006	Nitrate/Nitrite (Nitrite + Nitrate as N)
Middle Blackfoot-Nevada Creek	MT76F003_050	McElwain Creek	2006	Phosphorus (Total)
Middle Blackfoot-Nevada Creek	MT76F003_050	McElwain Creek	1988	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F003_060	Black Bear Creek	1988	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F003_060	Black Bear Creek	1988	Solids (Suspended/Bedload)
Middle Blackfoot-Nevada Creek	MT76F003_060	Black Bear Creek	2006	Phosphorus (Total)
Middle Blackfoot-Nevada Creek	MT76F003_060	Black Bear Creek	2006	Total Kjehldahl Nitrogen (TKN)
Middle Blackfoot-Nevada Creek	MT76F003_071	Washington Creek (Upper)	Not Listed	Sediment
Middle Blackfoot-Nevada Creek	MT76F003_072	Washington Creek (lower)	1988	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F003_072	Washington Creek (lower)	Not Listed	Iron
Middle Blackfoot-Nevada Creek	MT76F003_081	Douglas Creek	1990	Nitrate/Nitrite (Nitrite + Nitrate as N)
Middle Blackfoot-Nevada Creek	MT76F003_081	Douglas Creek	1990	Phosphorus (Total)
Middle Blackfoot-Nevada Creek	MT76F003_081	Douglas Creek	1990	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F003_081	Douglas Creek	1990	Temperature, water
Middle Blackfoot-Nevada Creek	MT76F003_081	Douglas Creek	1990	Total Kjehldahl Nitrogen (TKN)
Middle Blackfoot-Nevada Creek	MT76F003_082	Douglas Creek	1990	Phosphorus (Total)
Middle Blackfoot-Nevada Creek	MT76F003_082	Douglas Creek	1990	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F003_082	Douglas Creek	1990	Temperature, water
Middle Blackfoot-Nevada Creek	MT76F003_082	Douglas Creek	1990	Total Kjehldahl Nitrogen (TKN)

Table 6-6. TMDLs Approved during 2008 Cycle not entered in ADB

TMDL Planning Area	305(b) ID	Water Body Name	Cycle First Listed	Cause Name
Middle Blackfoot-Nevada Creek	MT76F003_090	Cottonwood Creek	Not Listed	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F003_090	Cottonwood Creek	Not Listed	Temperature, water
Middle Blackfoot-Nevada Creek	MT76F003_100	Nevada Spring Creek	1992	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F003_120	Murray Creek	2006	Nitrate/Nitrite (Nitrite + Nitrate as N)
Middle Blackfoot-Nevada Creek	MT76F003_120	Murray Creek	2006	Phosphorus (Total)
Middle Blackfoot-Nevada Creek	MT76F003_120	Murray Creek	1994	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F003_120	Murray Creek	1994	Temperature, water
Middle Blackfoot-Nevada Creek	MT76F003_120	Murray Creek	2006	Total Kjehldahl Nitrogen (TKN)
Middle Blackfoot-Nevada Creek	MT76F003_130	Buffalo Gulch	2002	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F004_010	Frazier Creek	2006	Sedimentation/siltation
Middle Blackfoot-Nevada Creek	MT76F004_010	Frazier Creek	2006	Total Kjehldahl Nitrogen (TKN)
Middle Blackfoot-Nevada Creek	MT76F004_010	Frazier Creek	2006	Phosphorus (Total)
Middle Blackfoot-Nevada Creek	MT76F004_040	Cottonwood Creek	Not Listed	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F004_050	Wales Creek	2006	Nitrate/Nitrite (Nitrite + Nitrate as N)
Middle Blackfoot-Nevada Creek	MT76F004_050	Wales Creek	2006	Phosphorus (Total)
Middle Blackfoot-Nevada Creek	MT76F004_050	Wales Creek	1992	Sedimentation/siltation
Middle Blackfoot-Nevada Creek	MT76F004_060	Ward Creek	2002	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F004_070	Warren Creek	Not Listed	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F004_080	Yourname Creek	2006	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F004_080	Yourname Creek	2006	Phosphorus (Total)
Middle Blackfoot-Nevada Creek	MT76F004_080	Yourname Creek	Not Listed	Nitrogen (Total)
Middle Blackfoot-Nevada Creek	MT76F004_090	Rock Creek	1992	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F004_100	Monture Creek	Not Listed	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F004_110	Kleinschmidt Creek	2000	Temperature, water
Middle Blackfoot-Nevada Creek	MT76F004_110	Kleinschmidt Creek	2006	Sedimentation/Siltation

Table 6-6. TMDLs Approved during 2008 Cycle not entered in ADB

TMDL Planning Area	305(b) ID	Water Body Name	Cycle First Listed	Cause Name
Middle Blackfoot-Nevada Creek	MT76F005_020	Richmond Creek	1992	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F005_030	Deer Creek	1992	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F005_040	West Fork Clearwater River	Not Listed	Total Nitrogen (TN)
Middle Blackfoot-Nevada Creek	MT76F005_040	West Fork Clearwater River	Not Listed	Total Phosphorus (TP)
Middle Blackfoot-Nevada Creek	MT76F005_040	West Fork Clearwater River	Not Listed	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F005_060	Blanchard Creek	1990	Sedimentation/Siltation
Middle Blackfoot-Nevada Creek	MT76F007_020	Nevada Lake	1996	Oxygen, Dissolved
Middle Blackfoot-Nevada Creek	MT76F007_020	Nevada Lake	1996	Phosphorus (Total)
Middle Blackfoot-Nevada Creek	MT76F007_020	Nevada Lake	1996	Total Kjehldahl Nitrogen (TKN)
St. Regis	MT76M003_010	St. Regis River	1990	Sedimentation/Siltation
St. Regis	MT76M003_010	St. Regis River	2002	Temperature, water
St. Regis	MT76M003_020	Twelvemile Creek	1992	Sedimentation/Siltation
St. Regis	MT76M003_020	Twelvemile Creek	2002	Temperature, water
St. Regis	MT76M003_040	Big Creek	1992	Temperature, water
St. Regis	MT76M003_040	Big Creek	2002	Sedimentation/Siltation
St. Regis	MT76M003_070	Little Joe Creek	1992	Sedimentation/Siltation
St. Regis	MT76M003_080	North Fork Little Joe Creek	1992	Sedimentation/Siltation
Yaak	MT76B002_010	Seventeen Mile Creek	1992	Sedimentation/Siltation
Yaak	MT76B002_020	Lap Creek	2006	Sedimentation/Siltation
Yaak	MT76B002_080	South Fork Yaak River	1992	Sedimentation/Siltation

6.3 Assessment Records in Need of Update After TMDL Development

During the past three years, the program has been focused on resource-intensive project work to (1) monitor and assess the approximately 450 waters that remained on the 2000 Reassessment List after the 2004 reporting cycle (Montana Department of Environmental Quality, Planning, Prevention and Assistance Division, Water Quality Planning Bureau, 2004, Appendix B); and (2) greatly increase the pace of TMDL development. During this time, several waters (assessment units) have had their beneficial use-support decisions updated using more recent data and information collected and generated during the TMDL development process. However, in some cases the official Assessment Records have not been fully updated to reflect new water quality information documented in an approved TMDL document (**Table 6.7**), even though these TMDLs (i.e., 4A delistings) have been included in the Assessment Data Base. The intent is to reduce this backlog of assessment documentation in the official assessment records.

Table 6-7. Assessment Unit documentation in need of update per approved TMDL documents

TMDL Planning Area	305(b) ID	Water Body Name	Document Name/Title
Big Creek (Columbia)	MT76Q002_050	BIG CREEK, tributary to the North Fork Flathead River	Watershed Restoration Plan
Big Creek (Yellowstone)	MT43B004_111	BIG CREEK, national forest oundary to mouth (Yellowstone River)	Flow Restoration Plan (TMDL)
Big Sandy Creek	MT40H001_010	BIG SANDY CREEK, Lonesome Lake Coulee to mouth (Milk River)	Salinity TMDL and Water Quality Restoration Plan
Big Spring	MT41S004_010	BIG SPRING CREEK, East Fork Big Spring Creek to Casino Creek	Water Quality Assessment and TMDLs for the Big Spring Planning Area
Big Spring	MT41S004_020	BIG SPRING CREEK, East Fork to mouth (Judith River)	Water Quality Assessment and TMDLs for the Big Spring Planning Area
Big Spring	MT41S004_030	BEAVER CREEK, headwaters to mouth (Cottonwood Creek)	Water Quality Assessment and TMDLs for the Big Spring Planning Area
Big Spring	MT41S004_040	CASINO CREEK, headwaters to mouth (Big Spring Creek)	Water Quality Assessment and TMDLs for the Big Spring Planning Area
Big Spring	MT41S004_052	COTTONWOOD CREEK, County Road Bridge At T14N R18E Sec18 to mouth (Big Spring Creek)	Water Quality Assessment and TMDLs for the Big Spring Planning Area
Bitterroot Headwaters	MT76H002_010	EAST FORK BITTERROOT RIVER, Anaconda-Pintlar Wilderness boundary to mouth (Bitterroot River)	Water Quality Restoration Plan and TMDLs for the Bitterroot Headwaters Planning Area
Bitterroot Headwaters	MT76H002_020	REIMEL CREEK, headwaters to mouth (East Fork Bitterroot River)	Water Quality Restoration Plan and TMDLs for the Bitterroot Headwaters Planning Area
Bitterroot Headwaters	MT76H002_070	LAIRD CREEK, headwaters to mouth (East Fork Bitterroot River) T1N R20	Water Quality Restoration Plan and TMDLs for the Bitterroot Headwaters Planning Area
Bitterroot Headwaters	MT76H002_080	GILBERT CREEK, headwaters to mouth (Laird Creek) T1N R20W	Water Quality Restoration Plan and TMDLs for the Bitterroot Headwaters Planning Area
Bitterroot Headwaters	MT76H003_010	WEST FORK BITTERROOT RIVER, headwaters to mouth (Bitterroot River)	Water Quality Restoration Plan and TMDLs for the Bitterroot Headwaters Planning Area
Bitterroot Headwaters	MT76H003_020	Bitterroot River, Nez Perce Fork, headwaters to mouth (West Fork Bitterroot River)	Water Quality Restoration Plan and TMDLs for the Bitterroot Headwaters Planning Area
Bitterroot Headwaters	MT76H003_040	HUGHES CREEK, headwaters to the mouth (West Fork Bitterroot River)	Water Quality Restoration Plan and TMDLs for the Bitterroot Headwaters Planning Area

Table 6-7. Assessment Unit documentation in need of update per approved TMDL documents

TMDL Planning Area	305(b) ID	Water Body Name	Document Name/Title
Bitterroot Headwaters	MT76H003_050	OVERWHICH CREEK, headwaters to mouth (West Fork Bitterroot River)	Water Quality Restoration Plan and TMDLs for the Bitterroot Headwaters Planning Area
Bitterroot Headwaters	MT76H003_060	DITCH CREEK, headwaters to mouth (West Fork Bitterroot River)	Water Quality Restoration Plan and TMDLs for the Bitterroot Headwaters Planning Area
Bitterroot Headwaters	MT76H003_070	BUCK CREEK, tributary to the West Fork Bitterroot T1N R22W Sec 36	Water Quality Restoration Plan and TMDLs for the Bitterroot Headwaters Planning Area
Blackfoot Headwaters	MT76F001_010	BLACKFOOT RIVER, headwaters to Landers Fork	Water Quality and Habitat Restoration Plan and TMDLs for Sediment and Metals
Blackfoot Headwaters	MT76F001_020	BLACKFOOT RIVER, Landers Fork to Nevada Creek	Water Quality and Habitat Restoration Plan and TMDLs for Sediment and Metals
Blackfoot Headwaters	MT76F002_020	WILLOW CREEK, Sandbar Creek to mouth, T15N R7W (Blackfoot River)	Water Quality and Habitat Restoration Plan and TMDLs for Sediment and Metals
Blackfoot Headwaters	MT76F002_030	POORMAN CREEK, headwaters to mouth (Blackfoot River)	Water Quality and Habitat Restoration Plan and TMDLs for Sediment and Metals
Blackfoot Headwaters	MT76F002_040	BEARTRAP CREEK, Mike Horse Creek to mouth (Blackfoot River)	Water Quality and Habitat Restoration Plan and TMDLs for Sediment and Metals
Blackfoot Headwaters	MT76F002_060	SANDBAR CREEK, forks to mouth (Willow Creek)	Water Quality and Habitat Restoration Plan and TMDLs for Sediment and Metals
Blackfoot Headwaters	MT76F002_070	ARRASTRA CREEK, headwaters to mouth (Blackfoot River)	Water Quality and Habitat Restoration Plan and TMDLs for Sediment and Metals
Blackfoot Headwaters	MT76F003_010	MIKE HORSE CREEK, headwaters to mouth (Beartrap Creek)	Water Quality and Habitat Restoration Plan and TMDLs for Sediment and Metals
Bobtail Creek	MT76D002_080	BOBTAIL CREEK, headwaters to mouth (Kootenai River)	Water Quality Protection Plan and TMDLs for the Bobtail Creek Watershed
Careless Creek	MT40A002_050	CARELESS CREEK, junction eith Deadmans Basin Canal to mouth (Musselshell River)	Water Quality Restoration Plan MT DEQ
Clark Fork River	MT76E001_010	CLARK FORK RIVER, Blackfoot River to Flint Creek	Voluntary Nutrient Reduction Program
Clark Fork River	MT76G001_010	CLARK FORK RIVER, Flint Creek to the Little Blackfoot River	Voluntary Nutrient Reduction Program

Table 6-7. Assessment Unit documentation in need of update per approved TMDL documents

TMDL Planning Area	305(b) ID	Water Body Name	Document Name/Title
Clark Fork River	MT76G001_030	CLARK FORK RIVER, Little Blackfoot River to Cottonwood Creek	Voluntary Nutrient Reduction Program
Clark Fork River	MT76G001_040	CLARK FORK RIVER, Cottonwood Creek to Warm Springs Creek	Voluntary Nutrient Reduction Program
Clark Fork River	MT76M001_010	CLARK FORK RIVER, Flathead River to Fish Creek	Voluntary Nutrient Reduction Program
Clark Fork River	MT76M001_020	CLARK FORK RIVER, Fish Creek to Rattlesnake Creek	Voluntary Nutrient Reduction Program
Clark Fork River	MT76M001_030	CLARK FORK RIVER, Rattlesnake Creek to the Blackfoot River	Voluntary Nutrient Reduction Program
Cooke City	MT43B002_031	SODA BUTTE CREEK, Mclaren Tailings to the Montana border	Water Quality Restoration Plan for the Cooke City TMDL Planning Area
Cooke City	MT43B002_032	SODA BUTTE CREEK, headwaters to the Mclaren Tailings	Water Quality Restoration Plan for the Cooke City TMDL Planning Area
Cooke City	MT43B002_040	MILLER CREEK, headwaters to mouth (Soda Butte Creek)	Water Quality Restoration Plan for the Cooke City TMDL Planning Area
Cooke City	MT43C001_010	STILLWATER RIVER, headwaters to Flood Creek	Water Quality Restoration Plan for the Cooke City TMDL Planning Area
Cooke City	MT43C002_140	DAISY CREEK, headwaters to mouth (Stillwater River)	Water Quality Restoration Plan for the Cooke City TMDL Planning Area
Cooke City	MT43D001_020	CLARKS FORK YELLOWSTONE RIVER, headwaters to the Montana border	Water Quality Restoration Plan for the Cooke City TMDL Planning Area
Cooke City	MT43D002_110	FISHER CREEK, headwaters to mouth (Clarks Fork Yellowstone River)	Water Quality Restoration Plan for the Cooke City TMDL Planning Area
Dearborn	MT41Q003_010	DEARBORN RIVER, Falls Creek to mouth (Missouri River)	Water Quality Assessment and TMDLs for the Dearborn River Planning Area
Dearborn	MT41Q003_020	MIDDLE FORK OF THE DEARBORN RIVER, headwaters to mouth (Dearborn River)	Water Quality Assessment and TMDLs for the Dearborn River Planning Area
Dearborn	MT41Q003_030	SOUTH FORK OF THE DEARBORN RIVER, headwaters to mouth (Dearborn River)	Water Quality Assessment and TMDLs for the Dearborn River Planning Area
Dearborn	MT41Q003_040	FLAT CREEK, Henry Creek to mouth (Dearborn River)	Water Quality Assessment and TMDLs for the Dearborn River Planning Area
Deep Creek	MT41I002_070	DEEP CREEK, national forest boundary to mouth (Missouri River)	Development of a TMDL to Reduce Nonpoint Source Sediment Pollution in Deep Creek, Montana

Table 6-7. Assessment Unit documentation in need of update per approved TMDL documents

TMDL Planning Area	305(b) ID	Water Body Name	Document Name/Title
Elk Creek	MT76N003_060	ELK CREEK, headwaters to mouth (Cabinet Gorge Reservoir)	Elk Creek Restoration Project Survey
Flathead Lake	MT76O003_010	Flathead Lake	Water Quality Assessment and TMDLs for the Flathead River Headwaters Planning Area, Montana
Flathead River Headwaters	MT76I002_010	GRANITE CREEK, confluence of Dodge Creek & Challenge Creek to mouth (Middle Fork Flathead)	Water Quality Assessment and TMDLs for the Flathead River Headwaters Planning Area, Montana
Flathead River Headwaters	MT76I002_050	MORRISON CREEK, headwaters to mouth (Middle Fork Flathead River)	Water Quality Assessment and TMDLs for the Flathead River Headwaters Planning Area, Montana
Flathead River Headwaters	MT76Q002_020	RED MEADOW CREEK, headwaters to mouth (North Fork Flathead River)	Water Quality Assessment and TMDLs for the Flathead River Headwaters Planning Area, Montana
Flathead River Headwaters	MT76Q002_030	WHALE CREEK, headwaters to mouth (North Fork Flathead River)	Water Quality Assessment and TMDLs for the Flathead River Headwaters Planning Area, Montana
Flathead River Headwaters	MT76Q002_040	SOUTH FORK COAL CREEK, headwaters to mouth (Coal Creek)	Water Quality Assessment and TMDLs for the Flathead River Headwaters Planning Area, Montana
Flathead River Headwaters	MT76Q002_070	COAL CREEK, headwaters to South Fork	Water Quality Assessment and TMDLs for the Flathead River Headwaters Planning Area, Montana
Flathead River Headwaters	MT76Q002_080	COAL CREEK, South Fork to mouth (North Fork Flathead)	Water Quality Assessment and TMDLs for the Flathead River Headwaters Planning Area, Montana
Grave Creek	MT76D004_060	GRAVE CREEK, Foundation Creek to mouth (Fortine Creek)	Grave Creek Watershed Water Quality and Habitat Restoration Plan and Sediment Total Maximum Daily Load
Lake Helena	MT41I006_020	PRICKLY PEAR CREEK, Helena WWTP Discharge Ditch to Lake Helena	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I006_030	PRICKLY PEAR CREEK, Highway 433 (Wylie Dr.) crossing to Helena WWTP Discharge	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I006_040	PRICKLY PEAR CREEK, Lump Gulch to Montana Highway 433 (Wylie Dr.) crossing	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I006_050	PRICKLY PEAR CREEK, Spring Creek to Lump Gulch	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II

Table 6-7. Assessment Unit documentation in need of update per approved TMDL documents

TMDL Planning Area	305(b) ID	Water Body Name	Document Name/Title
Lake Helena	MT41I006_060	PRICKLY PEAR CREEK, headwaters to Spring Creek	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I006_070	GOLCONDA CREEK, headwaters to mouth (Prickly Pear Creek) T 7N, R3W	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I006_080	SPRING CREEK, Corbin Creek to mouth (Prickly Pear Creek)	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I006_090	CORBIN CREEK, headwaters to mouth (Spring Creek)	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I006_100	MIDDLE FORK WARM SPRINGS CREEK, headwaters to mouth (Warm Springs Creek-Prickly Pear Creek)	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I006_110	WARM SPRINGS CREEK, Middle Fork to mouth (Prickly Pear Creek)	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I006_120	CLANCY CREEK, headwaters to mouth (Prickly Pear Creek)	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I006_130	LUMP GULCH, headwaters to mouth (Prickly Pear Creek)	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I006_141	TENMILE CREEK, headwaters to Helena PWS intake above Rimini	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I006_142	TENMILE CREEK, Helena PWS intake above Rimini to Helena WT plant	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I006_143	TENMILE CREEK, Helena WT plant to mouth (Prickly Pear Creek)	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I006_150	SILVER CREEK, headwaters to mouth (Lake Helena)	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I006_160	SEVENMILE CREEK, headwaters to mouth (Tenmile Creek)	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I006_180	NORTH FORK WARM SPRINGS CREEK, headwaters to mouth (Warmsprings Creek-Prickly Pear)	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II

Table 6-7. Assessment Unit documentation in need of update per approved TMDL documents

TMDL Planning Area	305(b) ID	Water Body Name	Document Name/Title
Lake Helena	MT41I006_210	JENNIES FORK, headwaters to mouth (Silver Creek-Missouri River)	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I006_220	SKELLY GULCH tributary of Greenhorn Creek-Sevenmile Creek, T10N R5W Sec 2	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lake Helena	MT41I007_010	Lake Helena	Water Quality Restoration Plan TMDLs for the Lake Helena Planning Area Volume I and II
Lone Tree Creek	MT40O002_050	LONE TREE CREEK, headwaters to mouth at Willow Creek	Lone Tree Creek TMDL Addressing Riparian Habitat Degradation, Flow Alteration & Nutrient Enrichment
Middle Blackfoot-Nevada Creek	MT76F001_031	BLACKFOOT RIVER, Nevada Creek to Monture Creek	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F001_032	BLACKFOOT RIVER, Monture Creek to Belmont Creek	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F003_011	NEVADA CREEK, headwaters to Nevada Lake	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F003_012	NEVADA CREEK, Nevada Lake to mouth (Blackfoot River)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F003_021	JEFFERSON CREEK, headwaters to 1 mile above Madison Gulch; segment lies entirely within coniferous forest	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F003_022	JEFFERSON CREEK, 1 mile above Madison Gulch to mouth (Nevada Creek)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs

Table 6-7. Assessment Unit documentation in need of update per approved TMDL documents

TMDL Planning Area	305(b) ID	Water Body Name	Document Name/Title
Middle Blackfoot-Nevada Creek	MT76F003_030	GALLAGHER CREEK, headwaters to mouth (Nevada Creek)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F003_040	BRAZIEL CREEK, 2.8 miles upstream from mouth (Nevada Creek) T12N R10W Sec 22	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F003_050	MCELWAIN CREEK, 2 miles upstream from mouth (Nevada Creek) T13N R12W Sec 27-28	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F003_060	BLACK BEAR CREEK, headwaters to mouth (Bear Creek), T12N R12W SEC 22SE	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F003_071	WASHINGTON CREEK, headwaters to Cow Gulch	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F003_072	WASHINGTON CREEK, Cow Gulch to mouth (Nevada Creek)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F003_081	DOUGLAS CREEK, headwaters to Murray Creek	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F003_082	DOUGLAS CREEK, Murray Creek to mouth (Nevada-Cottonwood Creeks)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs

Table 6-7. Assessment Unit documentation in need of update per approved TMDL documents

TMDL Planning Area	305(b) ID	Water Body Name	Document Name/Title
Middle Blackfoot-Nevada Creek	MT76F003_090	COTTONWOOD CREEK, South Fork Cottonwood Creek to mouth (Douglas Creek)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F003_100	NEVADA SPRING CREEK, Hheadwaters to mouth (Nevada Creek)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F003_120	MURRAY CREEK, headwaters to mouth (Douglas Creek) T12N R12W Sec 6	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F003_130	BUFFALO GULCH, headwaters to mouth (Nevada Creek)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F004_010	FRAZIER CREEK, headwaters to mouth (Blackfoot River) T14N R12W Sec 28 (mouth)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F004_040	COTTONWOOD CREEK, 10 miles upstream to mouth (Blackfoot River)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F004_050	WALES CREEK, reservoir outlet to mouth (Blackfoot River)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F004_060	WARD CREEK, headwaters to Browns Lake	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs

Table 6-7. Assessment Unit documentation in need of update per approved TMDL documents

TMDL Planning Area	305(b) ID	Water Body Name	Document Name/Title
Middle Blackfoot-Nevada Creek	MT76F004_080	YOURNAME CREEK, headwaters to mouth (Blackfoot River)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F004_090	ROCK CREEK, headwaters to mouth (North Fork Blackfoot River)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F004_100	MONTURE CREEK, headwaters to mouth (Blackfoot River)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F004_110	KLEINSCHMIDT CREEK, mouth 1.5 miles upstream to mouth (North Fork Blackfoot River)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F004-070	WARREN CREEK, headwaters to mouth (Blackfoot River)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F005_020	RICHMOND CREEK, headwaters to mouth (Lake Alva)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F005_030	DEER CREEK, headwaters to mouth (Seeley Lake)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F005_040	WEST FORK CLEARWATER RIVER, headwaters to mouth (Clearwater River)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs

Table 6-7. Assessment Unit documentation in need of update per approved TMDL documents

TMDL Planning Area	305(b) ID	Water Body Name	Document Name/Title
Middle Blackfoot-Nevada Creek	MT76F005_060	BLANCHARD CREEK, North Fork to mouth (Clearwater River)	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Middle Blackfoot-Nevada Creek	MT76F007_020	NEVADA LAKE, Nevada Creek Reservoir T12N, R9W Section 13 and 10W Sections 18 &19	Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan Sediment, Nutrient, Trace Metal and Temperature TMDLs
Ninemile	MT76M004_010	NINEMILE CREEK, headwaters to mouth (Clark Fork River)	Water Quality Restoration Plan and TMDLs for the Ninemile Planning Area
Ninemile	MT76M004_020	STONY CREEK, headwaters to mouth (Ninemile Creek)	Water Quality Restoration Plan and TMDLs for the Ninemile Planning Area
Ninemile	MT76M004_040	JOSEPHINE CREEK, headwaters to mouth (Ninemile Creek)	Water Quality Restoration Plan and TMDLs for the Ninemile Planning Area
Ninemile	MT76M004_060	CEDAR CREEK, headwaters to mouth (Ninemile Creek)	Water Quality Restoration Plan and TMDLs for the Ninemile Planning Area
Ninemile	MT76M004_070	KENNEDY CREEK, headwaters to mouth (Ninemile Creek)	Water Quality Restoration Plan and TMDLs for the Ninemile Planning Area
Ninemile	MT76M004_080	LITTLE MCCORMICK CREEK, headwaters to mouth (Mccormick Creek)	Water Quality Restoration Plan and TMDLs for the Ninemile Planning Area
Prospect Creek	MT76N003_020	PROSPECT CREEK, headwaters to mouth (Clark Fork River)	Total Maximum Daily Loads for Metals in Prospect Creek Watershed
Prospect Creek	MT76N003_021	ANTIMONY CREEK DRAINAGE, headwaters to mouth (Prospect Creek)	Total Maximum Daily Loads for Metals in Prospect Creek Watershed
Prospect Creek	MT76N003_022	COX GULCH, headwaters to mouth (Prospect Creek)	Total Maximum Daily Loads for Metals in Prospect Creek Watershed
Ruby	MT41C001_010	RUBY RIVER, Ruby Dam to mouth (Beaverhead River)	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C001_020	RUBY RIVER, East, West, and Middle Forks to Ruby Reservoir	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C002_010	WISCONSIN CREEK, headwaters to mouth (Ruby River)	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan

Table 6-7. Assessment Unit documentation in need of update per approved TMDL documents

TMDL Planning Area	305(b) ID	Water Body Name	Document Name/Title
Ruby	MT41C002_020	MILL CREEK, headwaters to mouth (Ruby River)	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C002_030	INDIAN CREEK, headwaters to mouth (Mill Creek-Ruby River)	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C002_040	ALDER GULCH, headwaters to mouth (Ruby River)	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C002_050	RAMSHORN CREEK, headwaters to mouth (Ruby River)	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C002_060	CURRANT CREEK, headwaters to mouth (Ramshorn Creek) T4S R4W S35	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C002_090	CALIFORNIA CREEK, headwaters to mouth (Ruby River) T5S R4W	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C002_100	GARDEN CREEK, headwaters to mouth (Ruby Reservoir)	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C002_110	MORMON CREEK, headwaters to mouth (upper dnd of Ruby River Reservoir)	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C003_020	COAL CREEK, headwaters to mouth (Middle Fork Ruby River)	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C003_030	COTTONWOOD CREEK, headwaters to mouth (Ruby River)	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C003_040	EAST FORK RUBY RIVER, headwaters to mouth (Ruby River)	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C003_050	WARM SPRINGS CREEK, headwaters to mouth (Ruby River)	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C003_060	SWEETWATER CREEK, headwaters to mouth (Ruby River)	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C003_080	WEST FORK RUBY RIVER, headwaters to mouth (Ruby River)	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan

Table 6-7. Assessment Unit documentation in need of update per approved TMDL documents

TMDL Planning Area	305(b) ID	Water Body Name	Document Name/Title
Ruby	MT41C003_090	MIDDLE FORK RUBY RIVER, Divide Creek to mouth (Ruby River)	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C003_110	POISON CREEK, headwaters to mouth (Ruby River) T11S R3W	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C003_120	BASIN CREEK, headwaters to mouth (Middle Fork Ruby River) T11S R3W	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C003_130	BURNT CREEK, headwaters to mouth (Ruby River) T10S R3W	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Ruby	MT41C003_150	SHOVEL CREEK, headwaters to mouth (Cabin Creek-Middle Fork Ruby River)	Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan
Sage Creek	MT40G001_011	SAGE CREEK, Laird Creek to section line between 1 & 12 T36N R6E	Salinity TMDL for Sage Creek, Montana
Sage Creek	MT40G001_012	SAGE CREEK, section line between 1 & 12 T36N R6E to mouth	Salinity TMDL for Sage Creek, Montana
St. Regis	MT76M003_010	St. Regis River, headwaters to mouth (Clark Fork River)	EPA submittal document St. Regis Watershed Total maximum Daily Loads and Framework Water Quality Restoration Assessment Sediment and Temperature TMDLs
St. Regis	MT76M003_020	TWELVEMILE CREEK, headwaters to mouth (St. Regis River)	EPA submittal document St. Regis Watershed Total maximum Daily Loads and Framework Water Quality Restoration Assessment Sediment and Temperature TMDLs
St. Regis	MT76M003_040	BIG CREEK, East and Middle Forks to mouth (St. Regis River)	EPA submittal document St. Regis Watershed Total maximum Daily Loads and Framework Water Quality Restoration Assessment Sediment and Temperature TMDLs
St. Regis	MT76M003_070	LITTLE JOE CREEK, North Fork to mouth (St. Regis River)	EPA submittal document St. Regis Watershed Total maximum Daily Loads and Framework Water Quality Restoration Assessment Sediment and Temperature TMDLs

Table 6-7. Assessment Unit documentation in need of update per approved TMDL documents

TMDL Planning Area	305(b) ID	Water Body Name	Document Name/Title
St. Regis	MT76M003_080	NORTH FORK LITTLE JOE CREEK, headwaters to mouth (Little Joe Creek)	EPA submittal document St. Regis Watershed Total maximum Daily Loads and Framework Water Quality Restoration Assessment Sediment and Temperature TMDLs
Sun	MT41K001_010	SUN RIVER, Gibson Dam to Muddy Creek	Water Quality Protection Plan and TMDLs for the Sun River Watershed
Sun	MT41K001_020	SUN RIVER, Muddy Creek to mouth (Missouri River)	Water Quality Protection Plan and TMDLs for the Sun River Watershed
Sun	MT41K002_010	MUDDY CREEK, headwaters to mouth (Sun River)	Water Quality Protection Plan and TMDLs for the Sun River Watershed
Sun	MT41K002_020	FORD CREEK, from mouth 2 miles upstream (Smith Creek-Elk Creek-Sun River)	Water Quality Protection Plan and TMDLs for the Sun River Watershed
Sun	MT41K004_030	Freezeout Lake	Water Quality Protection Plan and TMDLs for the Sun River Watershed
Swan	MT76K002_010	Swan Lake	Water Quality Protection Plan and TMDLs for the Swan Lake Watershed
Swan	MT76K003_010	JIM CREEK, West Fork to Mouth (Swan River)	Water Quality Protection Plan and TMDLs for the Swan Lake Watershed
Swan	MT76K003_031	GOAT CREEK, headwaters to Squeezer Creek	Water Quality Protection Plan and TMDLs for the Swan Lake Watershed
Swan	MT76K003_032	GOAT CREEK, Squeezer Creek to mouth (Swan River)	Water Quality Protection Plan and TMDLs for the Swan Lake Watershed
Swan	MT76K003_040	ELK CREEK, road crossing in T20N R17W Sec 16 to mouth (Swan River)	Water Quality Protection Plan and TMDLs for the Swan Lake Watershed
Swan	MT76K003_061	PIPER CREEK, headwaters to Moore Creek	Water Quality Protection Plan and TMDLs for the Swan Lake Watershed
Swan	MT76K003_062	PIPER CREEK, Moore Creek to Mouth (Swan River)	Water Quality Protection Plan and TMDLs for the Swan Lake Watershed
Teton	MT41O001_010	TETON RIVER, Muddy Creek to mouth (Marias River)	Water Quality Protection Plan and TMDLs for the Teton River Watershed
Teton	MT41O001_020	TETON RIVER, Deep Creek to Muddy Creek	Water Quality Protection Plan and TMDLs for the Teton River Watershed
Teton	MT41O001_030	TETON RIVER, North and South Forks to Deep Creek	Water Quality Protection Plan and TMDLs for the Teton River Watershed
Teton	MT41O002_010	WILLOW CREEK, headwaters to mouth (Deep Creek)	Water Quality Protection Plan and TMDLs for the Teton River Watershed
Teton	MT41O002_020	DEEP CREEK, Willow Creek to mouth (Teton River)	Water Quality Protection Plan and TMDLs for the Teton River Watershed
Teton	MT41O002_030	Mcdonald CREEK, headwaters to mouth (Teton River)	Water Quality Protection Plan and TMDLs for the Teton River Watershed

Table 6-7. Assessment Unit documentation in need of update per approved TMDL documents

TMDL Planning Area	305(b) ID	Water Body Name	Document Name/Title
Teton	MT41O002_041	BLACKLEAF CREEK, headwaters to Cow Creek	Water Quality Protection Plan and TMDLs for the Teton River Watershed
Teton	MT41O002_042	BLACKLEAF CREEK, Cow Creek to mouth (Muddy Creek)	Water Quality Protection Plan and TMDLs for the Teton River Watershed
Teton	MT41O002_060	TETON SPRING CREEK, town of Choteau to mouth (Teton River)	Water Quality Protection Plan and TMDLs for the Teton River Watershed
Teton	MT41O002_070	TETON SPRING CREEK, headwaters to town of Choteau	Water Quality Protection Plan and TMDLs for the Teton River Watershed
Teton	MT41O002_080	CLARK FORK OF MUDDY CREEK, headwaters to mouth (Muddy Creek)	Water Quality Protection Plan and TMDLs for the Teton River Watershed
Teton	MT41O003_010	Bynum Reservoir	Water Quality Protection Plan and TMDLs for the Teton River Watershed
Teton	MT41O003_020	Eureka Reservoir	Water Quality Protection Plan and TMDLs for the Teton River Watershed
Teton	MT41O004_020	Priest Butte Lake	Water Quality Protection Plan and TMDLs for the Teton River Watershed
Upper Lolo	MT76H005_030	GRANITE CREEK, headwaters to mouth (Lolo Creek)	Water Quality Restoration Plan and Total Maximum Daily Loads for the Upper Lolo Creek TMDL Planning Area
Upper Lolo	MT76H005_040	EAST FORK LOLO CREEK, headwaters to mouth (confluence with Lolo Creek)	Water Quality Restoration Plan and Total Maximum Daily Loads for the Upper Lolo Creek TMDL Planning Area
Upper Lolo	MT76H005_050	WEST FORK LOLO CREEK, headwaters to mouth (Lolo Creek)	Water Quality Restoration Plan and Total Maximum Daily Loads for the Upper Lolo Creek TMDL Planning Area
Upper Lolo	MT76H005_060	LOST PARK CREEK, headwaters to mouth (confluence with East Fork Lolo Creek)	Water Quality Restoration Plan and Total Maximum Daily Loads for the Upper Lolo Creek TMDL Planning Area
Upper Lolo	MT76H005_070	LEE CREEK, headwaters to mouth (West Fork Lolo Creek)	Water Quality Restoration Plan and Total Maximum Daily Loads for the Upper Lolo Creek TMDL Planning Area
Yaak	MT76B002_010	SEVENTEEN MILE CREEK, headwaters to mouth (Yaak River)	EPA submittal document Yaak River Watershed Sediment Total Maximum Daily Loads
Yaak	MT76B002_020	LAP CREEK, headwaters to mouth (Yaak River)	EPA submittal document Yaak River Watershed Sediment Total Maximum Daily Loads
Yaak	MT76B002_080	SOUTH FORK YAAK RIVER, headwaters to mouth (Yaak River)	EPA submittal document Yaak River Watershed Sediment Total Maximum Daily Loads

6.4 Montana-Specific Cause Groups

The ADB puts causes in multiple groups, which can be problematic for reporting and analysis purposes because of over-counting. Therefore, for reporting purposes, DEQ created Montana specific cause groups. A cause may only exist in one Montana cause group (**Table 6-8**).
The groups will be used in future assessments and reporting *after* the 2008 Integrated Report.

Table 6-8. Montana Cause Groups and associated causes

MT Cause Groups	Causes
MT BIOASSAYS	Ambient Bioassays -- Acute Aquatic Toxicity
MT BIOASSAYS	Ambient Bioassays -- Chronic Aquatic Toxicity
MT BIOASSAYS	Sediment Bioassays -- Acute Toxicity Freshwater
MT BIOASSAYS	Sediment Bioassays -- Chronic Toxicity Freshwater
MT BIOASSAYS	Sediment Bioassays for Estuarine and Marine Water
MT BIOASSAYS	Whole Effluent Toxicity (WET)
MT BIOLOGIC INTEGRITY (BIOASSESSMENTS)	Aquatic Macroinvertebrate Bioassessments
MT BIOLOGIC INTEGRITY (BIOASSESSMENTS)	Aquatic Plant Bioassessments
MT BIOLOGIC INTEGRITY (BIOASSESSMENTS)	Benthic-Macroinvertebrate Bioassessments
MT BIOLOGIC INTEGRITY (BIOASSESSMENTS)	Combination Benthic/Fishes Bioassessments
MT BIOLOGIC INTEGRITY (BIOASSESSMENTS)	Combined Biota/Habitat Bioassessments
MT BIOLOGIC INTEGRITY (BIOASSESSMENTS)	Estuarine Bioassessments
MT BIOLOGIC INTEGRITY (BIOASSESSMENTS)	Fishes Bioassessments
MT BIOLOGIC INTEGRITY (BIOASSESSMENTS)	Habitat Assessment (Lakes)
MT BIOLOGIC INTEGRITY (BIOASSESSMENTS)	Habitat Assessment (Streams)
MT BIOLOGIC INTEGRITY (BIOASSESSMENTS)	Lack of a coldwater assemblage
MT BIOLOGIC INTEGRITY (BIOASSESSMENTS)	Lake Bioassessments
MT BIOLOGIC INTEGRITY (BIOASSESSMENTS)	Nutrient/Eutrophication Biological Indicators
MT BIOLOGIC INTEGRITY (BIOASSESSMENTS)	Organic Enrichment (Sewage) Biological Indicators
MT BIOLOGIC INTEGRITY (BIOASSESSMENTS)	Periphyton (Aufwuchs) Indicator Bioassessments
MT BIOTOXINS	Amnesic shellfish poisoning (ASP) biotoxins
MT BIOTOXINS	Ciguatera fish poisoning (CFP) biotoxins
MT BIOTOXINS	Cyanobacteria hepatotoxic microcystins
MT BIOTOXINS	Cyanobacteria hepatotoxic nodularins
MT BIOTOXINS	Cyanobacteria neurotoxic anatoxins
MT BIOTOXINS	Cyanobacteria neurotoxic saxitoxins
MT BIOTOXINS	Diarrhetic shellfish poisoning (DSP) biotoxins
MT BIOTOXINS	Neurotoxic shellfish poisoning (NSP) biotoxins
MT BIOTOXINS	Paralytic shellfish poisoning (PSP) biotoxins
MT FLOW ALTERATIONS	High Flow Regime
MT FLOW ALTERATIONS	Low flow alterations
MT FLOW ALTERATIONS	Other flow regime alterations
MT HABITAT ALTERATIONS (INCLUDING WETLANDS)	Alteration in stream-side or littoral vegetative covers
MT HABITAT ALTERATIONS (INCLUDING WETLANDS)	Alterations in wetland habitats
MT HABITAT ALTERATIONS (INCLUDING WETLANDS)	Fish-Passage Barrier
MT HABITAT ALTERATIONS (INCLUDING WETLANDS)	Other anthropogenic substrate alterations
MT HABITAT ALTERATIONS (INCLUDING WETLANDS)	Physical substrate habitat alterations
MT HARMFUL ALGAL BLOOMS (HABs)	Aquatic Algae

Table 6-8. Montana Cause Groups and associated causes

MT Cause Groups	Causes
MT HARMFUL ALGAL BLOOMS (HABs)	Chlorophyll-a
MT HARMFUL ALGAL BLOOMS (HABs)	Excess Algal Growth
MT HARMFUL ALGAL BLOOMS (HABs)	Suspended Algae
MT METALS	Alum (aluminum Sulfate)
MT METALS	Aluminum
MT METALS	Antimony
MT METALS	Arsenic
MT METALS	Barium
MT METALS	Beryllium
MT METALS	Boron
MT METALS	Cadmium
MT METALS	Cesium
MT METALS	Chromium (total)
MT METALS	Chromium, hexavalent
MT METALS	Chromium, trivalent
MT METALS	Cobalt
MT METALS	Copper
MT METALS	Gold
MT METALS	Iron
MT METALS	Lead
MT METALS	Manganese
MT METALS	Mercury
MT METALS	Mercury in Fish Tissue
MT METALS	Mercury in Water Column
MT METALS	Molybdenum
MT METALS	Nickel
MT METALS	Selenium
MT METALS	Silver
MT METALS	Strontium
MT METALS	Thallium
MT METALS	Tin
MT METALS	Trivalent Arsenic (Arsenic III)
MT METALS	Vanadium (fume or dust)
MT METALS	Zinc
MT MINERALIZATION	Alkalinity, Carbonate as CaCO3
MT MINERALIZATION	Chloride
MT MINERALIZATION	Fluoride
MT MINERALIZATION	Salinity
MT MINERALIZATION	Silica
MT MINERALIZATION	Silicate
MT MINERALIZATION	Sodium
MT MINERALIZATION	Specific Conductance
MT MINERALIZATION	Sulfates
MT MINERALIZATION	Total Dissolved Solids
MT NUISANCE EXOTIC SPECIES	Eurasian Water Milfoil, Myriophyllum spicatum
MT NUISANCE EXOTIC SPECIES	Non-Native Aquatic Plants
MT NUISANCE EXOTIC SPECIES	Nonnative Fish, Shellfish, or Zooplankton
MT NUISANCE EXOTIC SPECIES	Zebra mussel, Dreissena polymorph
MT NUISANCE NATIVE SPECIES	Aquatic Plants (Macrophytes)
MT NUISANCE NATIVE SPECIES	Aquatic Plants - Native
MT NUISANCE NATIVE SPECIES	Atlantic Sea Lamprey, Petromyzon marinus

Table 6-8. Montana Cause Groups and associated causes

MT Cause Groups	Causes
MT NUTRIENTS (Macronutrients/Growth Factors)	Ammonia (Total)
MT NUTRIENTS (Macronutrients/Growth Factors)	Ammonia (Un-ionized)
MT NUTRIENTS (Macronutrients/Growth Factors)	Nitrate/Nitrite (Nitrite + Nitrate as N)
MT NUTRIENTS (Macronutrients/Growth Factors)	Nitrates
MT NUTRIENTS (Macronutrients/Growth Factors)	Nitrogen (Total)
MT NUTRIENTS (Macronutrients/Growth Factors)	Nitrogen, Nitrate
MT NUTRIENTS (Macronutrients/Growth Factors)	Nitrogen, Nitrite
MT NUTRIENTS (Macronutrients/Growth Factors)	Phosphate
MT NUTRIENTS (Macronutrients/Growth Factors)	Phosphorus (Total)
MT NUTRIENTS (Macronutrients/Growth Factors)	Total Kjehldahl Nitrogen (TKN)
MT NUTRIENTS (Macronutrients/Growth Factors)	Total Organic Carbon (TOC)
MT OIL AND GREASE	Diesel Fuel
MT OIL AND GREASE	Fuel Oil No. 4
MT OIL AND GREASE	Fuel Oil No. 5
MT OIL AND GREASE	Fuel Oil No. 6
MT OIL AND GREASE	Gasoline
MT OIL AND GREASE	Kerosene
MT OIL AND GREASE	Oil and Grease
MT OIL AND GREASE	Petroleum Hydrocarbons
MT OTHER	Abnormal Fish deformities, erosions, lesions, tumors (DELTS)
MT OTHER	Abnormal Fish Histology (Lesions)
MT OTHER	Bacterial Slimes
MT OTHER	Cause Unknown
MT OTHER	Color
MT OTHER	Debris/Floatables/Trash
MT OTHER	Dissolved Gas Supersaturation
MT OTHER	Fish Advisory - No Restriction
MT OTHER	Fish Kills
MT OTHER	Foam/Flocs/Scum/Oil Slicks
MT OTHER	Odor threshold number
MT OTHER	Other
MT OTHER	Partial pressure of dissolved gases
MT OTHER	Secchi disk transparency
MT OTHER	Single Sample Toxic Exceedence
MT OTHER	Taste and Odor
MT OTHER	Tropic State Index
MT OTHER	Turbidity
MT OXYGEN DEPLETION	BOD, Biochemical oxygen demand
MT OXYGEN DEPLETION	BOD, carbonaceous
MT OXYGEN DEPLETION	BOD, nitrogenous
MT OXYGEN DEPLETION	BOD, sediment load (Sediment Oxygen Demand)
MT OXYGEN DEPLETION	Chemical oxygen demand (COD)
MT OXYGEN DEPLETION	Dissolved oxygen saturation
MT OXYGEN DEPLETION	Oxygen, Dissolved
MT PATHOGENS	Cryptosporidium
MT PATHOGENS	Enterococcus
MT PATHOGENS	Escherichia coli
MT PATHOGENS	Fecal Coliform
MT PATHOGENS	Giardia lamblia
MT PATHOGENS	Streptococcus, fecal

Table 6-8. Montana Cause Groups and associated causes

MT Cause Groups	Causes
MT PATHOGENS	Total Coliform
MT PATHOGENS	Viruses (enteric)
MT PESTICIDES	.alpha.-BHC
MT PESTICIDES	.alpha.-Endosulfan(Endosulfan 1)
MT PESTICIDES	.beta.-BHC
MT PESTICIDES	.beta.-Endosulfan (Endosulfan 2)
MT PESTICIDES	.delta.-BHC
MT PESTICIDES	1,2-Dibromo-3-chloropropane
MT PESTICIDES	1,2-Dibromo-3-chloropropane (DBCP)
MT PESTICIDES	1,2-Dichloropropane
MT PESTICIDES	1,3-Dichloropropene
MT PESTICIDES	2,4,5-TP (Silvex)
MT PESTICIDES	2,4,5-Trichlorophenol
MT PESTICIDES	2,4-D
MT PESTICIDES	2-Methylnaphthalene
MT PESTICIDES	Acetochlor
MT PESTICIDES	Acrolein
MT PESTICIDES	Alachlor
MT PESTICIDES	Aldicarb
MT PESTICIDES	Aldrin
MT PESTICIDES	Amitrole
MT PESTICIDES	Atrazine
MT PESTICIDES	Captan
MT PESTICIDES	Carbaryl
MT PESTICIDES	Carbofuran
MT PESTICIDES	Chloramben
MT PESTICIDES	Chlordane
MT PESTICIDES	Chlordane in Fish Tissue
MT PESTICIDES	Chlorobenzilate
MT PESTICIDES	Chlorothalonil
MT PESTICIDES	Chlorpyrifos
MT PESTICIDES	Dacthal
MT PESTICIDES	Dalapon
MT PESTICIDES	DDD
MT PESTICIDES	DDE
MT PESTICIDES	DDT
MT PESTICIDES	DDT in Fish Tissue
MT PESTICIDES	DEHP (Di-sec-octyl phthalate)
MT PESTICIDES	Demeton
MT PESTICIDES	Diallate
MT PESTICIDES	Diazinon
MT PESTICIDES	Dichlorvos
MT PESTICIDES	Dicofol
MT PESTICIDES	Dieldrin
MT PESTICIDES	Dinitro-o-cresol
MT PESTICIDES	Dinoseb
MT PESTICIDES	Diquat
MT PESTICIDES	Disulfoton
MT PESTICIDES	Diuron
MT PESTICIDES	Dyfonate (Fonofos or Fonophos)
MT PESTICIDES	Endosulfan

Table 6-8. Montana Cause Groups and associated causes

MT Cause Groups	Causes
MT PESTICIDES	Endosulfan sulfate
MT PESTICIDES	Endothall
MT PESTICIDES	Endrin
MT PESTICIDES	Endrin aldehyde
MT PESTICIDES	EPTC
MT PESTICIDES	Ethelyne dibromide
MT PESTICIDES	Fipronil
MT PESTICIDES	Fluometuron
MT PESTICIDES	Formaldehyde
MT PESTICIDES	Glyphosate
MT PESTICIDES	Guthion
MT PESTICIDES	Heptachlor
MT PESTICIDES	Heptachlor epoxide
MT PESTICIDES	Hexachlorobenzene
MT PESTICIDES	Hexachlorocyclohexane
MT PESTICIDES	Hexachlorophene
MT PESTICIDES	Kepone
MT PESTICIDES	Lindane
MT PESTICIDES	Linuron
MT PESTICIDES	Malathion
MT PESTICIDES	Methoxychlor
MT PESTICIDES	Methyl bromide
MT PESTICIDES	Methyl Parathion
MT PESTICIDES	Mirex
MT PESTICIDES	Molinate
MT PESTICIDES	Naphthalene
MT PESTICIDES	Nitrofen
MT PESTICIDES	Oxadiazon
MT PESTICIDES	Oxamyl (Vydate)
MT PESTICIDES	Parathion
MT PESTICIDES	Phenol
MT PESTICIDES	Phenols
MT PESTICIDES	Photomirex
MT PESTICIDES	Picloram
MT PESTICIDES	Prometon (Prometone)
MT PESTICIDES	Pronamide
MT PESTICIDES	Propanil (DCPA mono- and di-acid degrad
MT PESTICIDES	Propoxur
MT PESTICIDES	Quintozene
MT PESTICIDES	Simazine
MT PESTICIDES	Terbacil
MT PESTICIDES	Terbufos
MT PESTICIDES	Tetrachlorvinphos
MT PESTICIDES	Toxaphene
MT PESTICIDES	Trichlorfon
MT PESTICIDES	Trifluralin
MT PESTICIDES	Zineb
MT pH/ACIDITY/CAUSTIC CONDITIONS	Acidity (Cold Titration)
MT pH/ACIDITY/CAUSTIC CONDITIONS	Acidity, Hot (Hot Titration)
MT pH/ACIDITY/CAUSTIC CONDITIONS	Chlorine
MT pH/ACIDITY/CAUSTIC CONDITIONS	Hydrochloric acid

Table 6-8. Montana Cause Groups and associated causes

MT Cause Groups	Causes
MT pH/ACIDITY/CAUSTIC CONDITIONS	pH
MT pH/ACIDITY/CAUSTIC CONDITIONS	pH, High
MT pH/ACIDITY/CAUSTIC CONDITIONS	pH, Low
MT RADIATION	Alpha particles
MT RADIATION	Beta particles and photon emitters
MT RADIATION	Gross Alpha
MT RADIATION	Radium
MT RADIATION	Radium 226
MT RADIATION	Radium 228
MT RADIATION	Uranium
MT SEDIMENTATION	Bottom Deposits
MT SEDIMENTATION	Particle distribution (Embeddedness)
MT SEDIMENTATION	Sediment Screening Value (Exceedence)
MT SEDIMENTATION	Sedimentation/Siltation
MT SEDIMENTATION	Solids (Suspended/Bedload)
MT SEDIMENTATION	Total Suspended Solids (TSS)
MT THERMAL IMPACTS	Temperature, water
MT TOXIC INORGANICS	Asbestos
MT TOXIC INORGANICS	Chlorine dioxide (as ClO2)
MT TOXIC INORGANICS	Chlorine, Residual (Chlorine Demand)
MT TOXIC INORGANICS	Cyanide
MT TOXIC INORGANICS	Cyanide (as free cyanide)
MT TOXIC INORGANICS	Hydrogen cyanide
MT TOXIC INORGANICS	Phosphorus, Elemental
MT TOXIC INORGANICS	Sulfide-Hydrogen Sulfide
MT TOXIC ORGANICS	1,1,1,2-Tetrachloroethane
MT TOXIC ORGANICS	1,1,1-Trichloroethane
MT TOXIC ORGANICS	1,1,2,2-Tetrachloroethane
MT TOXIC ORGANICS	1,1,2-Trichloroethane
MT TOXIC ORGANICS	1,1-Dichloro-1,2,2-trifluoroethane
MT TOXIC ORGANICS	1,1-Dichloroethane
MT TOXIC ORGANICS	1,2,3,4-Tetrachlorobenzene
MT TOXIC ORGANICS	1,2,4,5-Tetrachlorobenzene
MT TOXIC ORGANICS	1,2,4-Trichlorobenzene
MT TOXIC ORGANICS	1,2,4-Trimethylbenzene
MT TOXIC ORGANICS	1,2-Butylene oxide
MT TOXIC ORGANICS	1,2-Dichloroethane
MT TOXIC ORGANICS	1,2-Dichloroethylene
MT TOXIC ORGANICS	1,2-Diphenylhydrazine
MT TOXIC ORGANICS	1,3-Butadiene
MT TOXIC ORGANICS	1,4-Dioxane
MT TOXIC ORGANICS	2,2'-Dichlorodiethyl ether
MT TOXIC ORGANICS	2,2'-Dichlorodiisopropyl ether
MT TOXIC ORGANICS	2,3,7,8-Tetrachlorodibenzo-p-dioxin (only)
MT TOXIC ORGANICS	2,3,7,8-Tetrachlorodibenzofuran
MT TOXIC ORGANICS	2,3-Dichloropropene
MT TOXIC ORGANICS	2,4,6-Trichlorophenol
MT TOXIC ORGANICS	2,4-Diaminotoluene
MT TOXIC ORGANICS	2,4-Dichlorophenol
MT TOXIC ORGANICS	2,4-Dimethylphenol
MT TOXIC ORGANICS	2,4-Dinitrophenol

Table 6-8. Montana Cause Groups and associated causes

MT Cause Groups	Causes
MT TOXIC ORGANICS	2,4-Dinitrotoluene
MT TOXIC ORGANICS	2,5-Dichlorophenol
MT TOXIC ORGANICS	2,6-Dinitrotoluene
MT TOXIC ORGANICS	2-Acetylaminofluorene
MT TOXIC ORGANICS	2-Chloroethyl vinyl ether
MT TOXIC ORGANICS	2-Chloronaphthalene
MT TOXIC ORGANICS	2-Chlorophenol
MT TOXIC ORGANICS	2-Ethoxyethanol
MT TOXIC ORGANICS	2-Methoxyethanol
MT TOXIC ORGANICS	2-Methylpyridine
MT TOXIC ORGANICS	2-Nitrophenol
MT TOXIC ORGANICS	3,3'-Dichlorobenzidine
MT TOXIC ORGANICS	3,3'-Dimethoxybenzidine
MT TOXIC ORGANICS	3,3'-Dimethylbenzidine
MT TOXIC ORGANICS	3,4-Dichlorophenol
MT TOXIC ORGANICS	3-Chlorophenol
MT TOXIC ORGANICS	4,4'-Isopropylidenediphenol
MT TOXIC ORGANICS	4,4'-Methylenebis
MT TOXIC ORGANICS	4,4-Dichloro-2-butene
MT TOXIC ORGANICS	4-Aminobiphenyl
MT TOXIC ORGANICS	4-Bromophenylphenyl ether
MT TOXIC ORGANICS	4-Chloro-3-methylphenol (3-Methyl-4-Chlorophenol)
MT TOXIC ORGANICS	4-Chlorophenol
MT TOXIC ORGANICS	4-Dimethylaminoazobenzene
MT TOXIC ORGANICS	4-Methylphenol
MT TOXIC ORGANICS	4-Nitrophenol
MT TOXIC ORGANICS	5-Nitro-o-toluidine
MT TOXIC ORGANICS	Acenaphthene
MT TOXIC ORGANICS	Acenaphthylene
MT TOXIC ORGANICS	Acetaldehyde
MT TOXIC ORGANICS	Acetamide
MT TOXIC ORGANICS	Acetonitrile
MT TOXIC ORGANICS	Acrylamide
MT TOXIC ORGANICS	Acrylonitrile
MT TOXIC ORGANICS	Alkylbenzene
MT TOXIC ORGANICS	Allyl alcohol
MT TOXIC ORGANICS	Allyl chloride
MT TOXIC ORGANICS	alpha-Naphthylamine
MT TOXIC ORGANICS	Aniline
MT TOXIC ORGANICS	Anthracene
MT TOXIC ORGANICS	Benzal chloride
MT TOXIC ORGANICS	Benzene
MT TOXIC ORGANICS	Benzidine
MT TOXIC ORGANICS	Benzo(a)pyrene (PAHs)
MT TOXIC ORGANICS	Benzo[a]anthracene
MT TOXIC ORGANICS	Benzo[b]fluoranthene
MT TOXIC ORGANICS	Benzo[g,h,i]perylene
MT TOXIC ORGANICS	Benzo[k]fluoranthene
MT TOXIC ORGANICS	Benzoic Acid
MT TOXIC ORGANICS	Benzoyl chloride
MT TOXIC ORGANICS	Benzyl chloride

Table 6-8. Montana Cause Groups and associated causes

MT Cause Groups	Causes
MT TOXIC ORGANICS	beta-Naphthylamine
MT TOXIC ORGANICS	Biphenyl
MT TOXIC ORGANICS	Bis(2-chloro-1-methylethyl)
MT TOXIC ORGANICS	Bis(2-Chloroethoxy)methane
MT TOXIC ORGANICS	Bis(n-octyl) phthalate
MT TOXIC ORGANICS	Bromoform
MT TOXIC ORGANICS	Butyl benzyl phthalate
MT TOXIC ORGANICS	Butyraldehyde
MT TOXIC ORGANICS	Carbon Disulfide
MT TOXIC ORGANICS	Carbon tetrachloride
MT TOXIC ORGANICS	Chloramines
MT TOXIC ORGANICS	Chloroacetic acid
MT TOXIC ORGANICS	Chlorobenzene (mono)
MT TOXIC ORGANICS	Chlorodibromomethane
MT TOXIC ORGANICS	Chlorodifluoromethane
MT TOXIC ORGANICS	Chloroethane
MT TOXIC ORGANICS	Chloroform
MT TOXIC ORGANICS	Chloromethyl methyl ether
MT TOXIC ORGANICS	Chlorophenyl-4 phenyl ether
MT TOXIC ORGANICS	Chloroprene
MT TOXIC ORGANICS	Chrysene (C1-C4)
MT TOXIC ORGANICS	cis-1,2-Dichloroethylene
MT TOXIC ORGANICS	Creosote
MT TOXIC ORGANICS	Cresol (mixed isomers)
MT TOXIC ORGANICS	Cumene
MT TOXIC ORGANICS	Cyclohexanamine, N-ethyl-1-phenyl-
MT TOXIC ORGANICS	Cyclohexane
MT TOXIC ORGANICS	Di(2-ethylhexyl) adipate
MT TOXIC ORGANICS	Diaminotoluene (mixed isomers)
MT TOXIC ORGANICS	Dibenz[a,h]anthracene
MT TOXIC ORGANICS	Dibenzofuran
MT TOXIC ORGANICS	Dibutyl phthalate
MT TOXIC ORGANICS	Dichlorobenzene (mixed isomers)
MT TOXIC ORGANICS	Dichlorobromomethane
MT TOXIC ORGANICS	Dichlorodifluoromethane
MT TOXIC ORGANICS	Dichloromethane
MT TOXIC ORGANICS	Dichlorotrifluoroethane
MT TOXIC ORGANICS	Diethyl phthalate
MT TOXIC ORGANICS	Dimethyl phthalate
MT TOXIC ORGANICS	Dioxin (including 2,3,7,8-TCDD)
MT TOXIC ORGANICS	Dodecylbenzene
MT TOXIC ORGANICS	Epichlorohydrin
MT TOXIC ORGANICS	Ether, bis Chloromethyl
MT TOXIC ORGANICS	Ethylbenzene
MT TOXIC ORGANICS	Ethylene
MT TOXIC ORGANICS	Ethylene Glycol
MT TOXIC ORGANICS	Ethylene oxide
MT TOXIC ORGANICS	Ethylene thiourea
MT TOXIC ORGANICS	Fluoranthene
MT TOXIC ORGANICS	Fluorene
MT TOXIC ORGANICS	Formic acid

Table 6-8. Montana Cause Groups and associated causes

MT Cause Groups	Causes
MT TOXIC ORGANICS	Furan Compounds
MT TOXIC ORGANICS	Hexachlorobutadiene
MT TOXIC ORGANICS	Hexachlorocyclohexane (mixture)
MT TOXIC ORGANICS	Hexachlorocyclopentadiene
MT TOXIC ORGANICS	Hexachloroethane
MT TOXIC ORGANICS	Hexamethylphosphoramide
MT TOXIC ORGANICS	Hydrazine
MT TOXIC ORGANICS	Hydroquinone
MT TOXIC ORGANICS	Indeno[1,2,3-cd]pyrene
MT TOXIC ORGANICS	Isobutyraldehyde
MT TOXIC ORGANICS	Isophorone
MT TOXIC ORGANICS	Isopropanol
MT TOXIC ORGANICS	Isosafrole
MT TOXIC ORGANICS	m-Cresol
MT TOXIC ORGANICS	m-Dichlorobenzene
MT TOXIC ORGANICS	m-Dinitrobenzene
MT TOXIC ORGANICS	m-Xylene
MT TOXIC ORGANICS	Maleic anhydride
MT TOXIC ORGANICS	Methacrylonitrile
MT TOXIC ORGANICS	Methanol
MT TOXIC ORGANICS	Methyl chloride
MT TOXIC ORGANICS	Methyl ethyl ketone
MT TOXIC ORGANICS	Methyl hydrazine
MT TOXIC ORGANICS	Methyl iodide
MT TOXIC ORGANICS	Methyl isobutyl ketone
MT TOXIC ORGANICS	Methyl methacrylate
MT TOXIC ORGANICS	Methyl Tertiary-Butyl Ether (MTBE)
MT TOXIC ORGANICS	Methylene bromide
MT TOXIC ORGANICS	Methylmercury
MT TOXIC ORGANICS	n-Butyl alcohol
MT TOXIC ORGANICS	N-Nitroso-N-ethylurea
MT TOXIC ORGANICS	N-Nitroso-N-methylurea
MT TOXIC ORGANICS	N-Nitrosodimethylamine
MT TOXIC ORGANICS	N-Nitrosodiphenylamine
MT TOXIC ORGANICS	N-Nitrosodipropylamine
MT TOXIC ORGANICS	N-Nitrosomorpholine
MT TOXIC ORGANICS	N-Nitrosopiperidine
MT TOXIC ORGANICS	n-Nonylbenzene
MT TOXIC ORGANICS	Nitrilotriacetic acid
MT TOXIC ORGANICS	Nitrobenzene
MT TOXIC ORGANICS	Nitrodibutylamine,N
MT TOXIC ORGANICS	Nitroglycerin
MT TOXIC ORGANICS	Nitrosamines
MT TOXIC ORGANICS	Nitrosodiethylamine,N
MT TOXIC ORGANICS	o-Cresol (2-Methylphenol)
MT TOXIC ORGANICS	o-Dichlorobenzene
MT TOXIC ORGANICS	o-Toluidine
MT TOXIC ORGANICS	o-Toluidine hydrochloride
MT TOXIC ORGANICS	o-Xylene
MT TOXIC ORGANICS	Octachlorostyrene
MT TOXIC ORGANICS	Octochloronaphthalene

Table 6-8. Montana Cause Groups and associated causes

MT Cause Groups	Causes
MT TOXIC ORGANICS	p-Dichlorobenzene
MT TOXIC ORGANICS	p-Phenylenediamine
MT TOXIC ORGANICS	p-Xylene
MT TOXIC ORGANICS	Paraldehyde
MT TOXIC ORGANICS	PCB in Fish Tissue
MT TOXIC ORGANICS	PCB in Water Column
MT TOXIC ORGANICS	PCB-1242
MT TOXIC ORGANICS	PCB-1248
MT TOXIC ORGANICS	PCB-1254
MT TOXIC ORGANICS	PCB-1260
MT TOXIC ORGANICS	Pentachlorobenzene
MT TOXIC ORGANICS	Pentachloroethane
MT TOXIC ORGANICS	Pentachlorophenol (PCP)
MT TOXIC ORGANICS	Perchlorate
MT TOXIC ORGANICS	Perfluorooctane Sulfonate (PFOS)
MT TOXIC ORGANICS	Perfluorooctane Sulfonate (PFOS) in Fish Tissue
MT TOXIC ORGANICS	Phenanthrene
MT TOXIC ORGANICS	Phthalic anhydride
MT TOXIC ORGANICS	Picric acid
MT TOXIC ORGANICS	Polybrominated Biphenyls
MT TOXIC ORGANICS	Polychlorinated biphenyls
MT TOXIC ORGANICS	Polycyclic Aromatic Hydrocarbons (PAHs) (Aquatic Ecosystems)
MT TOXIC ORGANICS	Propionaldehyde
MT TOXIC ORGANICS	Propylene Glycol
MT TOXIC ORGANICS	Propylene oxide
MT TOXIC ORGANICS	Pyrene
MT TOXIC ORGANICS	Pyridine
MT TOXIC ORGANICS	Quinoline
MT TOXIC ORGANICS	Quinone
MT TOXIC ORGANICS	RDX
MT TOXIC ORGANICS	Safrole
MT TOXIC ORGANICS	sec-Butyl alcohol
MT TOXIC ORGANICS	Styrene
MT TOXIC ORGANICS	Styrene oxide
MT TOXIC ORGANICS	tert-Butyl alcohol
MT TOXIC ORGANICS	Tetrachloroethylene
MT TOXIC ORGANICS	Thiourea
MT TOXIC ORGANICS	Toluene
MT TOXIC ORGANICS	Total Benzofluoranthenes
MT TOXIC ORGANICS	Total Trihalomethane (TTHM)
MT TOXIC ORGANICS	trans-1,2-Dichloroethylene
MT TOXIC ORGANICS	Tributylin TBT (Tributylstanne)
MT TOXIC ORGANICS	Trichloroethylene
MT TOXIC ORGANICS	Trichlorofluoromethane (CFC-11)
MT TOXIC ORGANICS	Triethylene Glycol Dichloride
MT TOXIC ORGANICS	Vinyl acetate
MT TOXIC ORGANICS	Vinyl bromide
MT TOXIC ORGANICS	Vinyl chloride
MT TOXIC ORGANICS	Vinylidene chloride
MT TOXIC ORGANICS	Xylenes (total) (mixed)

6.5 Montana-Specific Source Groups

The ADB puts sources in multiple groups, which can be problematic for reporting and analysis purposes because of over-counting. Therefore, for reporting purposes, DEQ created Montana specific source groups (**Table 6.9**). The groups will be used in future assessments and reporting after the 2008 Integrated Report.

Table 6-9. Montana Source Groups and associated sources

Source Group Name	Sources
MT AGRICULTURE	Agriculture
MT AGRICULTURE	Animal Feeding Operations (NPS)
MT AGRICULTURE	Animal Shows and Racetracks
MT AGRICULTURE	Aquaculture (Not Permitted)
MT AGRICULTURE	Aquaculture (Permitted)
MT AGRICULTURE	Auction Barns and Off-farm Animal Holding/Management Area
MT AGRICULTURE	Crop Production (Crop Land or Dry Land)
MT AGRICULTURE	Crop Production with Subsurface Drainage
MT AGRICULTURE	Dairies (Outside Milk Parlor Areas)
MT AGRICULTURE	Grazing in Riparian or Shoreline Zones
MT AGRICULTURE	Irrigated Crop Production
MT AGRICULTURE	Livestock (Grazing or Feeding Operations)
MT AGRICULTURE	Managed Pasture Grazing
MT AGRICULTURE	Manure Runoff
MT AGRICULTURE	Non-irrigated Crop Production
MT AGRICULTURE	Permitted Runoff from Confined Animal Feeding Operations (CAFOs)
MT AGRICULTURE	Pesticide Application
MT AGRICULTURE	Rangeland Grazing
MT AGRICULTURE	Speciality Crop Production
MT AGRICULTURE	Unrestricted Cattle Access
MT AGRICULTURE	Wet Weather Discharges (Non-Point Source)
MT ATMOSPHERIC DEPOSITION	Atmospheric Deposition - Acidity
MT ATMOSPHERIC DEPOSITION	Atmospheric Deposition - Nitrogen
MT ATMOSPHERIC DEPOSITION	Atmospheric Deposition - Toxics
MT COMMERCIAL HARBOR AND PORT ACTIVITIES	Ballast Water Releases
MT COMMERCIAL HARBOR AND PORT ACTIVITIES	Cargo Loading/Unloading
MT COMMERCIAL HARBOR AND PORT ACTIVITIES	Commercial Ferries
MT COMMERCIAL HARBOR AND PORT ACTIVITIES	Other Shipping Releases (Wastes and Detritus)
MT COMMERCIAL HARBOR AND PORT ACTIVITIES	Seafood Processing Operations
MT COMMERCIAL HARBOR AND PORT ACTIVITIES	Sediment Resuspension (Clean Sediment)
MT COMMERCIAL HARBOR AND PORT ACTIVITIES	Sediment Resuspension (Contaminated Sediment)
MT COMMERCIAL HARBOR AND PORT ACTIVITIES	Shipbuilding, Repairs, Dry-docking

Table 6-9. Montana Source Groups and associated sources

Source Group Name	Sources
MT GROUNDWATER LOADINGS	Contaminated Groundwater
MT GROUNDWATER LOADINGS	Industrial Land Treatment
MT GROUNDWATER LOADINGS	Land Application of Wastewater (Non-agricultural)
MT GROUNDWATER LOADINGS	Land Application of Wastewater Biosolids (Non-agricultural)
MT GROUNDWATER LOADINGS	Landfills
MT GROUNDWATER LOADINGS	Leaking Underground Storage Tanks
MT GROUNDWATER LOADINGS	Septage Disposal
MT GROUNDWATER LOADINGS	UIC Wells (Underground Injection Control Wells)
MT GROUNDWATER LOADINGS	Unpermitted Discharge (Domestic Wastes)
MT GROUNDWATER LOADINGS	Unpermitted Discharge (Industrial/commercial Wastes)
MT GROUNDWATER WITHDRAWALS	Baseflow Depletion from Groundwater Withdrawals
MT GROUNDWATER WITHDRAWALS	Impacts from Geothermal Development
MT GROUNDWATER WITHDRAWALS	Saltwater Intrusion from Groundwater Overdrafting
MT HABITAT ALTERATIONS (NOT DIRECTLY RELATED TO HYDROMODIFICATION)	Clean Sediments
MT HABITAT ALTERATIONS (NOT DIRECTLY RELATED TO HYDROMODIFICATION)	Golf Courses
MT HABITAT ALTERATIONS (NOT DIRECTLY RELATED TO HYDROMODIFICATION)	Habitat Modification, Other than Hydromodification
MT HABITAT ALTERATIONS (NOT DIRECTLY RELATED TO HYDROMODIFICATION)	Littoral/Shore Area Modifications (Non-riverine)
MT HABITAT ALTERATIONS (NOT DIRECTLY RELATED TO HYDROMODIFICATION)	Loss of Riparian Habitat
MT HYDROMODIFICATION	Channel Erosion/Incision from Upstream Hydromodifications
MT HYDROMODIFICATION	Channelization
MT HYDROMODIFICATION	Dam Construction (Other than Upstream Flood Control Projects)
MT HYDROMODIFICATION	Dam or Impoundment
MT HYDROMODIFICATION	Drainage/Filling/Loss of Wetlands
MT HYDROMODIFICATION	Dredging (e.g., for Navigation Channels)
MT HYDROMODIFICATION	Flow Alterations from Water Diversions
MT HYDROMODIFICATION	Forced Drainage Pumping
MT HYDROMODIFICATION	Highways, Roads, Bridges, Infrastructure (New Construction)
MT HYDROMODIFICATION	Hydrostructure Impacts on Fish Passage
MT HYDROMODIFICATION	Impacts from Geothermal Development
MT HYDROMODIFICATION	Impacts from Hydrostructure Flow Regulation/Modification
MT HYDROMODIFICATION	Transfer of Water from an Outside Watershed
MT HYDROMODIFICATION	Upstream Impoundments (e.g., Pl-566 NRCS Structures)
MT INDUSTRIAL PERMITTED DISCHARGES	Airports
MT INDUSTRIAL PERMITTED DISCHARGES	Coal Mining Discharges (Permitted)
MT INDUSTRIAL PERMITTED DISCHARGES	Cooling Water Intake Structures (Impingement or Entrainment)
MT INDUSTRIAL PERMITTED DISCHARGES	Hardrock Mining Discharges (Permitted)
MT INDUSTRIAL PERMITTED DISCHARGES	Industrial Point-source Discharge
MT INDUSTRIAL PERMITTED DISCHARGES	Industrial Thermal Discharges
MT INDUSTRIAL PERMITTED DISCHARGES	Non-metals Mining Discharges (Permitted)
MT INDUSTRIAL PERMITTED DISCHARGES	Permitted Silvicultural Activities

Table 6-9. Montana Source Groups and associated sources

Source Group Name	Sources
MT INDUSTRIAL PERMITTED DISCHARGES	Petroleum/Natural Gas Production Activities (Permitted)
MT INDUSTRIAL PERMITTED DISCHARGES	RCRA Hazardous Waste Sites
MT INDUSTRIAL PERMITTED DISCHARGES	Wet Weather Discharges (Point-source and Combination of Stormwater, SSO or CSO)
MT LAND APPLICATION/WASTE SITES	Discharges from Biosolids (SLUDGE) Storage, Application or Disposal
MT LAND APPLICATION/WASTE SITES	Illegal Dumping
MT LAND APPLICATION/WASTE SITES	Illegal Dumps or Other Inappropriate Waste Disposal
MT LAND APPLICATION/WASTE SITES	Impacts from Land Application of Wastes
MT LAND APPLICATION/WASTE SITES	Inappropriate Waste Disposal
MT LAND APPLICATION/WASTE SITES	Industrial Land Treatment
MT LAND APPLICATION/WASTE SITES	Land Application of Wastewater (Non-agricultural)
MT LAND APPLICATION/WASTE SITES	Land Application of Wastewater Biosolids (Non-agricultural)
MT LAND APPLICATION/WASTE SITES	Landfills
MT LAND APPLICATION/WASTE SITES	Leaking Underground Storage Tanks
MT LAND APPLICATION/WASTE SITES	On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems)
MT LAND APPLICATION/WASTE SITES	RCRA Hazardous Waste Sites
MT LAND APPLICATION/WASTE SITES	Releases from Waste Sites or Dumps
MT LAND APPLICATION/WASTE SITES	Septage Disposal
MT LAND APPLICATION/WASTE SITES	Total Retention Domestic Sewage Lagoons
MT LEGACY/HISTORICAL POLLUTANTS	Brownfield (Non-NPL) Sites
MT LEGACY/HISTORICAL POLLUTANTS	CERCLA NPL (Superfund) Sites
MT LEGACY/HISTORICAL POLLUTANTS	Contaminated Sediments
MT LEGACY/HISTORICAL POLLUTANTS	Erosion from Derelict Land (Barren Land)
MT LEGACY/HISTORICAL POLLUTANTS	Historic Bottom Deposits (Not Sediment)
MT MILITARY BASES	NPS Pollution from Military Base Facilities (Other than Port Facilities)
MT MILITARY BASES	NPS Pollution from Military Port Facilities
MT MUNICIPAL PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Combined Sewer Overflows
MT MUNICIPAL PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Commercial Districts (Industrial Parks)
MT MUNICIPAL PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Commercial Districts (Shopping/Office Complexes)
MT MUNICIPAL PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Discharges from Municipal Separate Storm Sewer Systems (MS4)
MT MUNICIPAL PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Municipal (Urbanized High Density Area)
MT MUNICIPAL PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Municipal Point Source Discharges
MT MUNICIPAL PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Municipal Point Source Impacts from Inadequate Industrial/Commercial Pretreatment
MT MUNICIPAL PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Package Plant or Other Permitted Small Flows Discharges
MT MUNICIPAL PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Residential Districts
MT MUNICIPAL PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Sanitary Sewer Overflows (Collection System Failures)
MT MUNICIPAL PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Wet Weather Discharges (Point Source and Combination of Stormwater, SSO or CSO)

Table 6-9. Montana Source Groups and associated sources

Source Group Name	Sources
MT NATURAL	Changes in Ordinary Stratification and Bottom Water Hypoxia/Anoxia
MT NATURAL	Drought-related Impacts
MT NATURAL	Freshettes or Major Flooding
MT NATURAL	Internal Nutrient Recycling
MT NATURAL	Natural Conditions - Water Quality Standards Use Attainability Analyses Needed
MT NATURAL	Natural Sources
MT NATURAL	Naturally Occurring Organic Acids
MT NATURAL	Sediment Resuspension (Clean Sediment)
MT NATURAL	Sediment Resuspension (Contaminated Sediment)
MT NATURAL	Upstream/Downstream Source
MT NATURAL	Waterfowl
MT NATURAL	Watershed Runoff following Forest Fire
MT NATURAL	Wildlife Other than Waterfowl
MT OTHER	Introduction of Non-native Organisms (Accidental or Intentional)
MT OTHER	Lake Fertilization
MT OTHER	Low Water Crossing
MT OTHER	Salt Storage Sites
MT OTHER	Source Unknown
MT OTHER	Sources Outside State Jurisdiction or Borders
MT OTHER	Unspecified Land Disturbance
MT OTHER	Unspecified Unpaved Road or Trail
MT OTHER	Upstream Source
MT OTHER	Upstream/Downstream Source
MT OTHER	Watershed Runoff following Forest Fire
MT OTHER	Wet Weather Discharges (Non-Point Source)
MT RECREATION AND TOURISM (NON-BOATING)	Animal Shows and Racetracks
MT RECREATION AND TOURISM (NON-BOATING)	Impacts from Resort Areas (Winter and Non-winter Resorts)
MT RECREATION AND TOURISM (NON-BOATING)	Low Water Crossing
MT RECREATION AND TOURISM (NON-BOATING)	Off-road Vehicles
MT RECREATION AND TOURISM (NON-BOATING)	Other Recreational Pollution Sources
MT RECREATION AND TOURISM (NON-BOATING)	Pollutants from Public Bathing Areas
MT RECREATION AND TOURISM (NON-BOATING)	Runoff from Forest/Grassland/Parkland
MT RECREATIONAL BOATING AND MARINAS	Internal Nutrient Recycling
MT RECREATIONAL BOATING AND MARINAS	Marina Boat Construction
MT RECREATIONAL BOATING AND MARINAS	Marina Boat Maintenance
MT RECREATIONAL BOATING AND MARINAS	Marina Dredging Operations
MT RECREATIONAL BOATING AND MARINAS	Marina Fueling Operations
MT RECREATIONAL BOATING AND MARINAS	Marina/Boating Pumpout Releases
MT RECREATIONAL BOATING AND MARINAS	Marina/Boating Sanitary On-vessel Discharges
MT RECREATIONAL BOATING AND MARINAS	Marina-related Shoreline Erosion
MT RECREATIONAL BOATING AND MARINAS	Other Marina/Boating On-vessel Discharges

Table 6-9. Montana Source Groups and associated sources

Source Group Name	Sources
MT RECREATIONAL BOATING AND MARINAS	Sediment Resuspension (Clean Sediment)
MT RECREATIONAL BOATING AND MARINAS	Sediment Resuspension (Contaminated Sediment)
MT RESOURCE EXTRACTION	Acid Mine Drainage
MT RESOURCE EXTRACTION	Coal Mining
MT RESOURCE EXTRACTION	Coal Mining (Subsurface)
MT RESOURCE EXTRACTION	Coal Mining Discharges (Permitted)
MT RESOURCE EXTRACTION	Dredge Mining
MT RESOURCE EXTRACTION	Hardrock Mining Discharges (Permitted)
MT RESOURCE EXTRACTION	Heap-leach Extraction Mining
MT RESOURCE EXTRACTION	Impacts from Abandoned Mine Lands (Inactive)
MT RESOURCE EXTRACTION	Mill Tailings
MT RESOURCE EXTRACTION	Mine Tailings
MT RESOURCE EXTRACTION	Mountaintop Mining
MT RESOURCE EXTRACTION	Non-metals Mining Discharges (Permitted)
MT RESOURCE EXTRACTION	Open Pit Mining
MT RESOURCE EXTRACTION	Petroleum/Natural Gas Activities
MT RESOURCE EXTRACTION	Petroleum/Natural Gas Production Activities (Permitted)
MT RESOURCE EXTRACTION	Placer Mining
MT RESOURCE EXTRACTION	Potash Mining
MT RESOURCE EXTRACTION	Reclamation of Inactive Mining
MT RESOURCE EXTRACTION	Sand/Gravel/Rock Mining or Quarries
MT RESOURCE EXTRACTION	Subsurface (Hardrock) Mining
MT RESOURCE EXTRACTION	Surface Mining
MT RURAL-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Animal Shows and Racetracks
MT RURAL-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Dry Weather Flows with NPS Pollutants
MT RURAL-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Golf Courses
MT RURAL-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Highway/Road/Bridge Runoff (Non-construction Related)
MT RURAL-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Post-development Erosion and Sedimentation
MT RURAL-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Rural (Residential Areas)
MT RURAL-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Site Clearance (Land Development or Redevelopment)
MT RURAL-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Wet Weather Discharges (Non-Point Source)
MT SILVICULTURE	Forest Roads (Road Construction and Use)
MT SILVICULTURE	Permitted Silvicultural Activities
MT SILVICULTURE	Siliviculture, Fire Suppression
MT SILVICULTURE	Silviculture - Large Scale (Industrial) Unpermitted Forestry
MT SILVICULTURE	Silviculture Activities
MT SILVICULTURE	Silviculture Harvesting
MT SILVICULTURE	Silviculture Plantation Management
MT SILVICULTURE	Silviculture Reforestation
MT SILVICULTURE	Watershed Runoff Following Forest Fire
MT SILVICULTURE	Woodlot Site Clearance
MT SILVICULTURE	Woodlot Site Management

Table 6-9. Montana Source Groups and associated sources

Source Group Name	Sources
MT SPILLS AND UNPERMITTED DISCHARGES	Above Ground Storage Tank Leaks (Tank Farms)
MT SPILLS AND UNPERMITTED DISCHARGES	Accidental release/Spill
MT SPILLS AND UNPERMITTED DISCHARGES	Cargo Loading/Unloading
MT SPILLS AND UNPERMITTED DISCHARGES	Illegal Dumping
MT SPILLS AND UNPERMITTED DISCHARGES	Illicit Connections/Hook-ups to Storm Sewers
MT SPILLS AND UNPERMITTED DISCHARGES	Inappropriate Waste Disposal
MT SPILLS AND UNPERMITTED DISCHARGES	Other Spill Related Impacts
MT SPILLS AND UNPERMITTED DISCHARGES	Pipeline Breaks
MT SPILLS AND UNPERMITTED DISCHARGES	Septage Disposal
MT SPILLS AND UNPERMITTED DISCHARGES	Sewage Discharges in Unsewered Areas
MT SPILLS AND UNPERMITTED DISCHARGES	Spills from Trucks or Trains
MT SPILLS AND UNPERMITTED DISCHARGES	Unpermitted Discharge (Domestic Wastes)
MT SPILLS AND UNPERMITTED DISCHARGES	Unpermitted Discharge (Industrial/commercial Wastes)
MT SPILLS AND UNPERMITTED DISCHARGES	Unspecified Domestic Waste
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Airports
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Animal Shows and Racetracks
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Auction Barns and Off-farm Animal Holding/Management Area
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Commercial Districts (Industrial Parks)
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Commercial Districts (Shopping/Office Complexes)
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Construction Stormwater Discharge (Permitted)
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Discharges from Biosolids (SLUDGE) Storage, Application or Disposal
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Dry Weather Flows with NPS Pollutants
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Highway/Road/Bridge Runoff (Non-construction Related)
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Highways, Roads, Bridges, Infrasturcture (New Construction)
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Industrial/Commercial Site Stormwater Discharge (Permitted)
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Municipal (Urbanized High Density Area)
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	RCRA Hazardous Waste Sites
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Residential Districts
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Salt Storage Sites
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Site Clearance (Land Development or Redevelopment)
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Unspecified Urban Stormwater
MT STORMWATER PERMITTED DISCHARGES (DIRECT AND INDIRECT)	Wet Weather Discharges (Point-source and Combination of Stormwater, SSO or CSO)
MT TURF MANAGEMENT	Golf Courses
MT TURF MANAGEMENT	Other Turf Management

Table 6-9. Montana Source Groups and associated sources

Source Group Name	Sources
MT TURF MANAGEMENT	Pesticide Application
MT URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Animal Shows and Racetracks
MT URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Commercial Districts (Industrial Parks)
MT URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Commercial Districts (Shopping/Office Complexes)
MT URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Dry Weather Flows with NPS Pollutants
MT URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Golf Courses
MT URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Highway/Road/Bridge Runoff (Non-construction Related)
MT URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Impervious Surface/Parking Lot Runoff
MT URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Municipal (Urbanized High Density Area)
MT URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Post-development Erosion and Sedimentation
MT URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Residential Districts
MT URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Rural (Residential Areas)
MT URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Site Clearance (Land Development or Redevelopment)
MT URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Urban Runoff/Storm Sewers
MT URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Wastes from Pets
MT URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Wet Weather Discharges (Non-point Source)
MT URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Wet Weather Discharges (Point-source and Combination of Stormwater, SSO or CSO)
MT URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)	Yard Maintenance

6.6 Application of Observed Effects

Pollutants or pollution in a water body may create conditions observably different than the known or expected natural condition of the water. These conditions are called "observed effects." EPA defines an observed effect as:

> Direct manifestations of an undesirable effect on water body conditions. For example, fish kills, fish lesions, depressed populations of certain aquatic species, and bioassessment scores are observed effects indicating changes in aquatic communities. Major algal blooms, undesirable taste and odor in raw and finished drinking water, and increased incidences of gastroenteritis and other waterborne diseases among swimmers are also observed effects. Depending on a state's *water quality standards* and specific water body conditions, *observed effects* may form the basis of an impairment decision. For example, depending on

> the magnitude and cause of a fish kill, this observed effect may or may not result in an assessment of "impaired." Generally speaking, pollutants and pollution are not considered *observed effects* (e.g., lead, pesticides, phosphorus); rather, they are causes of *observed effects* (Environmental Protection Agency, 2005).

EPA guidance provides additional language regarding the use, definition, and application of observed effects within a state's water quality assessment and reporting program:

> Jurisdictions should document and report any observed effects of pollution for each segment-designated use combination. Observed effects may include fish lesions, fish kills, streambottom deposits, and low combined biota/habitat bioassessment. How jurisdictions use observed effects to make attainment decisions is dependent upon a jurisdictions' interpretation of their water quality standards and should be documented in their assessment methodology (Environmental Protection Agency, 2005, Appendix A, pg. A-6).

DEQ will be implementing observed effects listings in future assessments (**Table 6.10**). The effect of a pollutant or pollution, specificially identified or not, will be added to a water body's assessment documentation, recorded in the ADB, and reported via the Integrated Report processes for the state. The designations of "impairment" and "observed effect" are not mutually exclusive; thus, a condition can be listed in the database as both an impairment to a beneficial use as well as an observed effect.

Table 6-10. ADB Causes inlcuded on Montana's list of Observed Effects

Abnormal Fish Deformities, Erosions, Lesions, Tumors (DELTS)	Fishes Bioassessments
Abnormal Fish Histology (Lesions)	Foam/Flocs/Scum/Oil Slicks
Aquatic Algae	Habitat Assessment (Lakes)
Aquatic Macroinvertebrate Bioassessments	Habitat Assessment (Streams)
Aquatic Plant Bioassessments	Lack of a Cold-water Assemblage
Bacterial Slimes	Lake Bioassessments
Benthic-Macroinvertebrate Bioassessments	Nutrient/Eutrophication Biological Indicators
Chlorophyll-a	Odor Threshold Number
Color	Organic Enrichment (Sewage) Biological Indicators
Combination Benthic/Fishes Bioassessments	Periphyton (Aufwuchs) Indicator Bioassessments
Combined Biota/Habitat Bioassessments	Secchi Disk Transparency
Estuarine Bioassessments	Sediment Screening Value (Exceedence)
Excess Algal Growth	Single Sample Toxic Exceedence
Fish Advisory - No Restriction	Suspended Algae
Fish Kills	Tropic State Index

SECTION 7.0
PUBLIC PARTICIPATION

Federal and state laws require managing agencies to consult with the public when developing procedures or processes for assessing water quality and setting priorities for TMDL planning. Additionally, state law requires a sixty-day public comment period for its draft water quality report mandated by the CWA. This section describes DEQ's communication with the public.

7.1 Public Consultation for 2008 303(d) List Development

The 2000 303(d) List was first developed using procedures adopted to respond to the 1997 amendments to state water quality law. These procedures, especially the state's proposed assessment methodology, received careful public review. During the 2000 303(d) List development, DEQ obtained assistance and reviews from a wide array of state, regional, and national water quality assessment experts; consulted the **S**tatewide **T**MDL **A**dvisory **G**roup (STAG); and discussed the proposals with a number of stakeholder groups around the state. Since the 2000 cycle, the assessment methodology has been incorporated into the bureau's Quality Assurance Program as a Standard Operating Procedure (SOP) (Bostrom, 2006). DEQ consulted with the STAG prior to adoption of the assessment process as a SOP.

Since its incorporation as an SOP, the assessment method has undergone only one revision, which was in August 2006. The DEQ made this revision to reflect recent changes to state WQS, which themselves were subject to public review and BER approval. Therefore, incorporation of these new WQS into the assessment method did not warrant additional public participation.

Congress and the Montana legislature recognized the challenge of determining the extent of nonpoint source water quality impairments in both 40 CFR part 130.7(5) and MCA 75-5-701(2). That is, federal and state law require DEQ to assemble and evaluate all existing and readily available water quality data and information as an efficient means of augmenting the data collected under the DEQ ambient water quality monitoring program.

In compliance with this requirement, on February 5, 2007, DEQ sent nearly 600 letters to stakeholders (local watershed groups; federal, state, and local agencies; state university programs; private groups; and individuals with water quality interests) requesting water quality information they might have that could be useful for updating water quality assessments noted in this report. The DEQ received three responses from to this "call for data" (**Table 7.1**). Data received after June 22, 2007, has been cataloged and saved for future assessments and reports.

Table 7-1 Responses to the "Call for Data"

Organization	Reference
Montana Fish Wildlife and Parks	Ostovar, Kayhan (2007) Montana Native Prairie Fish Survey and Inventory.
The Nature Conservancy	Buckley, Steve (2007) A Report on Water Quality Monitoring: Murdock Property 2000 - 2006, Whitefish Montana
Garfield County Conservation District	Takala, Rachel (2007) Garfield County Water Monitoring Data from 2004 to Present, Jordan, MT.

Publication of the Draft 2008 Water Quality Integrated Report initiated a sixty-day **comment period** from **April 10 to June 10, 2009** for public review on DEQ's updated listing determinations and planning schedule. DEQ also held an open house **public information meeting on May 13, 2009** in the Director's Conference Room (Room 111) at DEQ's Helena office (Metcalf Building) located at 1520 East Sixth Ave on the state capital campus.

Legal notices were placed in five major Montana newspapers, giving formal notice of the comment period. The comment period was also made public via press releases issued to Montana's media outlets; posted to the DEQ Web site; notices mailed to 562 water quality stakeholders; and emailed to the Montana Watershed Listserv, which is hosted by the Montana Watercourse.

DEQ submits materials for the 2008 Integrated Report to the EPA via electronic database, document text, Geographic Information System (GIS) map files, and an electronic version of assessment files. To accommodate members of the public without sophisticated computer software, the files are available via the DEQ's Clean Water Act Information Center (CWAIC) found at http://www.cwaic.mt.gov, which can be viewed by anyone with Internet access. Through the CWAIC site, the public was able to submit comments to DEQ electronically or they could still send comments through the mail.

All comment period announcements identified both the standard mailing address (below) and the CWAIC Web site (http://www.cwaic.mt.gov) for submitting comments to DEQ.

Department of Environmental Quality
2008 Integrated Report Comments
WQPB, DMS
PO Box 200901
Helena, MT 59620-0901

7.2 Public Comments

Comments received within the comment period were copied, filed internally, reviewed by the Integrated Report Coordinator, and distributed to appropriate staff or managers to address and respond to the commenter's questions and comments.

For the 2008 comment period there were twelve comments received via electronic submittal (CWAIC), and standard mail methods. DEQ has respectfully removed names of individuals with the intent to protect their privacy, but have included agency or organization information where feasible. Table 7.2 lists each commenter and date received.

Table 7-2 List of comments

Comment Number	Commenter	Date
1	Private Citizen	April 14, 2009
2	Private Citizen	April 21, 2009
3	Missoula BLM	May 13, 2009
4	Private Citizen	June 4, 2009
5	Flathead National Forest	June 5, 2009
6	City of Billings Public Works	June 9, 2009
7	Private Citizen	June 9, 2009
8	US Environmental Protection Agency	June 9, 2009
9	MT Chapter of the American Fisheries Society	June 10, 2009
10	Lolo National Forest	June 10, 2009
11	Private Citizen	June 10, 2009
12	MT Fish & Wildlife Parks	June 10, 2009

7.3 DEQ Actions in Response to Public Comments

In response to comments received DEQ determined that a review of use support assessments for some specific waterbodies was reasonable and appropriate to conduct at this time. Use support assessments have been modified/updated for the following waterbody assessment units:

MT42I001_010 Little Powder River
MT42J001_010 Powder River
MT42J003_010 Powder River
MT42J004_010 Stump Creek
MT42J005_010 Mizpah Creek
MT76P003_020 Swift Creek
MT76P003_030 East Fork Swift Creek
MT76P003_040 West Fork Swift Creek

7.4 DEQ Responses to Public Comments

Comment #: 1

Type: I am providing information, which could affect assessments and/or priority rankings.
Commenter: Private Citizen
Received: April 14th, 2009

Comment Text:
I live in Sun Prairie and the water price goes up like 2$ a year. It wouldn't be so bad if you could drink the water but the water is so bad that you can't even fill up a swimming pool because there is so much chlorine and other chemicals in the water. I have to haul drinking water from Great Falls. I would appreciate it if something could be done to improve the quality of the water to where we can at least drink it.

DEQ Response:
In reviewing the water quality data for your water supply it is evident that the water is high in sulfates, sodium, conductivity, and other constituents. Unfortunately these are all secondary contaminants and not regulated under the Safe Drinking Water Act as primary contaminants. The water is considered safe to consume, but the high levels make the water unpalatable.

The water could be treated to remove sodium, sulfates, and other salts as well as filtered to remove chlorine taste. A treatment option is a home reverse osmosis (RO) filter system available from commercial water conditioning services. Home RO systems cost around $900 to purchase and require annual maintenance to change filters or may be rented for about $33/month which includes filter changes and maintenance. Filters cost about $40/year and an annual service may cost around $150 (filters included). The RO membrane typically lasts five years and costs around $80 to replace. Additionally, RO systems include a charcoal filter that is effective in removing adverse tastes and odors from the water.

Due to the high level of salts in the Sun Prairie water, an RO system would work better and last longer if the water was pre-conditioned with a water softener. DEQ recommends contacting a water conditioning services for more explicit analysis of your water quality and treatment options.

Comment #: 2

Type: Other
Commenter: Bureau of Land Management
Received: April 21st, 2009

Water body ID: MT41D002_060

Comment Text:
This reach is shown as an unnamed tributary of the Big Hole River on the 124,000 Earls Gulch Quadrangle. Identifying the reach as Grose Creek was confusing and resulted in its omission in the recent East Pioneer Watershed Assessment Report Dillon Field Office January 12, 2009. http://www.blm.gov/mt/st/en/fo/dillon_field_office/eastpioneer.html

DEQ Response:
DEQ uses the National Hydrography Dataset (NHD), which uses the names listed in the Geographic Name Information System (GNIS) for all mapped features where names exist or are established. Many waterbody features are unnamed in the national databases. When a waterbody is unnamed and is defined by DEQ as a waterbody requiring assessment, DEQ made use of any pre-existing reach name in its records or labeled the reach based on it's characteristics and location relative to the nearest main stem body of water or other notable mapped feature. In the case of Grose Creek, it appears DEQ assigned that name due to its traverse of the Grose Ranch, as depicted on the 1:24,000 scale topographic map. Grose Creek appeared on Montana's 1988, 1990, 1992, 1994,

1996, and 2006 303d Lists for sediment/siltation. In 2006 Total Phosphorus was added to the list of impairment causes.

Comment #: 3

Type: Other
Commenter: Bureau of Land Management – Missoula Field Office
Received: May 13, 2009

Comment Text:
Thank you for the opportunity to comment on the 2008 Draft Water Quality Integrated Report. The enclosure contains comments on some listed streams occurring on Bureau of Land Management (BLM) administered lands. In order for the BLM to most effectively manage water quality and meet water quality objectives, it is important for us to have an accurate assessment of the causes and sources of water quality impairment. In this we can focus on specific design features, mitigations, and Best Management Practices for our land management activities and permitted uses.

Section 4.3 of your Report describes the assessment process. It is our concern that there may be insufficient effort in evaluating pollutant sources in the field. It appears that sources are often determined by their mere presence in a stream drainage rather than evaluating any actual physical linkage between a land use and the water quality parameter or pollutant of concern.

The BLM's role in water quality management in Montana is defined under a Memorandum-of-Understanding with DEQ wherein the bulk of our responsibility is to manage land uses toward meeting State water quality standards. Our water quality management efforts therefore focus on the linkage cause and effect, and thus managing pollutant sources, causes, and modes of delivery.

It is encouraging to read in Section 6.1 of the Report that advancements in assessment methods and processes occur as a result of periodic review with stakeholders.

Comment Attachment:
Arrastra Creek
- *For aquatic life support, consideration should be given to the fact that a long segment of the stream is naturally intermittent and dries up for about half the year. This seems like it would affect productivity and result in low values for aquatic life metrics.*
- *High road densities and modeled sediment production are not validated with actual instream sediment, nor is any mode of conveyance. Actual causes and sources of sediment are what is important.*

Braziel Creek
- *Future reassessments should more carefully evaluate the dominating effect that natural landsliding is having on this system. It is an inherently and naturally unstable system.*

Cramer Creek

- *The Linton Mine reach should be reassessed. This reach underwent an extensive restoration effort over the past few years to remove mine tailings and restore stream and riparian function.*

Flat Gulch

- *The waterbody location is listed as "FLAT GULCH, headwaters to the mouth (Rock Creek)". The lower reaches of Flat Gulch are on private land and the landowners have commented that Flat Gulch does not have a mouth at Rock Creek. Surface flow disappears at the top of the ancient alluvial fan. If it is important for 303d listing or TMDL development it should be verified in your next field evaluation.*
- *The probable sources for sedimentation/siltation list forest roads and silviculture. Our surveys in 2005-2007 revealed no significant sediment contribution from silvicultural activities or forest roads. The only noted sediment sources were from stream and bank trampling.*
- *Cold Water Fishery is listed as a beneficial use. There is no fishery or fishes present. The system is too small to support fishes and is disconnected from Rock Creek.*

Miners Gulch

- *The sandy granitic parent material tends to produce particle size distributions heavy toward sands. Natural parent geology should be understood during field assessments. Field assessments focus heavily on "evidence of logging" without ever specifically noting or evaluating any cause and effect or identifiable source for pollutants.*

Mulkey Creek

- *Not a fishery-should be categorized as "N/A" for cold water fishery. Most of the system is ephemeral and rarely flows any water.*

Rattler Gulch

- *Not a fishery over most of its length-should be categorized as "N/A" for cold water fishery. Most of the system is ephemeral and rarely flows any water. Should also be segmented into fishery and non-fishery portions. Past evaluations did not recognize that lack of a stream channel was due to limestone geology.*

Scotchman Gulch

- *The probable sources for sedimentation/siltation list forest roads, silviculture, and placer mining. Our surveys in 2005-2007 revealed no significant sediment contribution from silvicultural activities or forest roads. Also, there has been no mining activity near or in the stream for over 50 years and we found no current 'legacy' impacts. Sediment levels were comparable with those found in ungrazed and unmined reaches in the headwaters. The sandy granitic parent materials tends to produce particle size distributions heavy toward sands. There are noted sediment sources from stream and bank trampling however.*

DEQ Response:
The Water Quality Planning Bureau Monitoring Section is currently conducting assessments in Flat and Scotchman Gulches in coordination with the BLM Missoula field office and private landowners.

Regarding the other creeks and gulches, DEQ will consider BLM's comments in the next assessment of those streams, which should be done between 2010 and 2012.

Comment #: 4

Type: Other
Commenter: Private Citizen
Received: June 4th, 2009

Comment Text:
Why are Martin Cr (MT76H002_050) and Moose Cr (MT76H002_040) showing up on the 303(d) list when they are supporting all beneficial uses?

DEQ Response:
Martin Creek (MT76H002_050) and Moose Creek (MT76H002_040) are not on DEQ's 303(d) list (i.e., Category 5). Martin Creek is in Category 1 – "All uses assessed and fully supported," and Moose Creek is in Category 2A – "Available data and/or information indicate that some, but not all of the beneficial uses are supported." This can be verified by accessing the CWAIC site (http://cwaic.mt.gov/default.aspx). Select the Summary Report option in Step 3 for the waterbody of interest and look for the "Water Quality Category" at the bottom of the first report block "Water Information."

Note that the CWAIC web application provides public access to the state's Assessment Database, which contains all waters that have been defined as an assessment unit by DEQ, regardless of assessment status, and reports the listing category based on the assessment conclusions. Please refer to Section 4.3.1 for the descriptions of the various listing categories used.

Comment #: 5

Type: I am providing information, which could affect assessments and/or priority rankings.
Commenter: Private Citizen
Received: June 5th, 2009

Water body ID: MT76I002_040

Comment Text:
You currently have Challenge Creek listed for phosphorus in Appendix B. The Flathead River Headwaters TPA identified Challenge Creek as "fully supporting its designated uses" (page 115). This creek was removed from the list in 2002 based on water quality data. Please check the headwaters TPA document and ensure your most recent data is accurate.

DEQ Response:
When TMDLs were developed for the Flathead Headwaters TMDL Planning Area, the only pollutant listed on Challenge Creek was siltation, which was a carry-over from the 1996 303(d) List and was the sole focus of that TMDL. The analysis conducted at that time determined that Challenge Creek was not impaired by siltation. The Flathead Headwaters TMDL document was approved in December 2004. A subsequent assessment of Challenge Creek was conducted in November 2006.

That assessment included the 2004 TMDL document in its evaluation, as well as other more recent data, and its findings were that the aquatic life and fisheries beneficial uses on Challenge Creek were impaired by phosphorus. This assessment is considered accurate and up-to-date.

The listing history for this waterbody is as follows:

1996: Aquatic Life, Cold Water Fish impaired (Siltation, Other Habitat Alterations)
2000: all uses fully supported, except Drinking Water (not assessed)
2002: all uses fully supported, except Drinking Water (not assessed)
2004: all uses fully supported, except Drinking Water (not assessed)
2006: Aquatic Life, Cold Water Fish impaired (Total Phosphorus), all other uses fully supported.
2008: Aquatic Life, Cold Water Fish impaired (Total Phosphorus), all other uses fully supported.

Comment #: 6

Type: I am providing information, which could affect assessments and/or priority rankings.
Commenter: City of Billings
Received: June 9th, 2009

Comment Text:
Comments included in separate upload file named "Comments on 2008 303(d) List-City of Billings."

Comment Attachment:
COMMENTS ON 2008 303(d) LIST/WATER QUALITY ASSESSMENT
CITY OF BILLINGS
YELLOWSTONE RIVER – MT43F001_010

We disagree with the 150 mg/m^2 criteria used in the DEQ public survey. No cost information was included in the survey that would allow the respondents to fairly assess the cost-benefit of their responses.

*The **Segment Impairment Level** comments indicate there is no indication of problems with TDS/salinity/chloride. However, it appears that the stream is still listed for these parameters and suggest these be delisted for lack of credible data.*

*The **Segment Impairment Level** comments indicate that the suspended sediment data is inconclusive and infers that for this reason TSS will remain listed. We suggest that TSS be delisted for lack of credible data.*

*The **Segment Impairment Level** comments indicate that all ammonia samples were well below toxicity levels. However, it appears the stream is still listed for unionized ammonia and we suggest this be delisted for lack of credible data.*

*The **Segment Impairment Level** comments indicate that N and P "have been implicated" as causal factors in eutrophication in various studies. However, the **Credible Data Scoring Tables*** *assign a low 3 score to the Biology and a 2 to the Habitat criteria. While there may be evidence of such eutrophication occurring, it appears that the strength and credibility of the data does not support the proposed listing at this time.*

*The data references the USGS NAWQA study that identified higher than normal fish lesions. The **Segment Impairment Level** comments imply that this factor may have been considered in the overall assessment while the **Data Matrix** information says the cause of these anomalies is unknown. We suggest there is no credible data supporting any consideration of this issue in the assessment.*

DEQ Response:
Regarding public survey comment. The study referred to is being used to develop numeric nutrient water quality standards for Montana, however, since these standards have not yet been adopted, the algae perception study was not used in developing this list. Also, note that economics is being addressed as an integral component of Montana's nutrient standards approach. DEQ's development approach includes working with a diverse stakeholder work group. Please visit DEQ's nutrient standards web page for further information:
http://www.deq.state.mt.us/wqinfo/NutrientWorkGroup/index.asp

Regarding segment impairment level comments. This segment of the Yellowstone River was listed in 1996 for salinity/TDS/chlorides, suspended solids, and unionized ammonia. State's cannot "delist" impairment causes (pollutants) after a listing has been submitted and approved by EPA without "good cause" for delisting the pollutant. The list of good causes for delisting a pollutant employed by DEQ and accepted by EPA include: 1) State determines water quality standard is being met; 2) Flaws in original listing; 3) Other point source or nonpoint source controls are expected to meet water quality standards (4B); 4) Impairment due to non-pollutant (4C); 5) EPA approval of TMDL (4A); 6) Waterbody not in state's jurisdiction; and 7) Other. Until good cause is satisfied, an existing pollutant cause must remain on the list. Thus, based on the current available information reflected in the 2008 Assessment Record, TDS/salinity/chloride and ammonia have been delisted from this segment. However, there is not enough information based on the available chemistry, habitat, and biological data to delist TSS. Thus, TSS remains as a listed cause of impairment. This segment is not listed for nutrients, but it is listed for oxygen depletion and excess algal growth based on available chemistry and biological data. Summer time diel dissolved oxygen (DO) data showed exceedences of the acute aquatic life standard for both total dissolved gas (TDG) and the minimum daily dissolved oxygen standard (5 mg DO/L). When the DO concentrations are converted to total dissolved gas, the TDG standard of 110% saturation was exceeded during the day time. Thirty three percent of the DO measurements on 8/23/2000 were above the TDG standard. In addition, benthic algal biomass (800 mg Chl a/m^2), macroinvertebrate, and diatom population data indicated degraded and eutrophic conditions relative to other parts of the river.

The fish data from the USGS NAWQA study (Peterson et al., 2004) was used to suggest that populations in this reach are stressed, due to the large proportion of anomalies (eroded fins and lesions) found on their bodies in this river reach. Macroinvertebrates and periphyton also indicated stress conditions as described above.

Comment #: 7

Type: I am providing information, which could affect assessments and/or priority rankings.
Commenter: Plum Creek Timber Company
Received: June 9th, 2009

Comment Text:
In reviewing the draft 2008 Integrated Report for Montana, I noted that the Assessment Records for Swift Creek (MT76P003_020) and its tributaries (MT76P003_030, MT76P003_040) are dated 6-9-2006, but do not reflect the substantial and readily available data collected during 2003. This work was done under contract to DEQ by PBS&J via the Swift Creek coalition, as well as additional water chemistry data collected by the Flathead Lake Biological Station and DNRC.

Before the 2008 list is finalized, I respectfully request that the Department update these assessment records to reflect this new information, and refine the beneficial use support determinations as necessary.

DEQ Response:
Assessments have been updated based on the available data for Swift Creek, East Fork Swift Creek, and West Fork Swift Creek. These changes are reflected in the Final 2008 Water Quality Integrated Report.

Comment #: 8

Type: I am providing information, which could affect assessments and/or priority rankings.
Commenter: US Environmental Protection Agency
Received: June 9th, 2009

Comment Text:
Attached are EPA's comments on Montana's 2008 IR.

Comment Attachment:
EPA has completed review of the Montana 2008 Draft Water Quality Integrated Report (IR) (dated April 2009), including the appendices and the associated Assessment Records for waters assessed in the 2008 IR cycle. Our review of water quality assessments completed for the 2008 cycle focused on DEQ's Assessment Records. Assessment Records are Microsoft Excel worksheets that document the data and information used by DEQ to reach an impairment determination including: an evaluation of data sufficiency for the individual designated uses; summary comments describing each dataset or report reviewed for the assessment; notes on water quality standards violations; and conclusion on the final attainment determination for each designated use. In this letter, we refer to these documents as "Assessment Records".

Our comments focus first on specific comments on the Tongue River Watershed Assessments followed with specific comments on waters assessed in the 2008 IR cycle. We conclude with general comments pertaining to the main body of the document. The comments are organized as identified by the outline below.

<u>Tongue River Watershed Assessment Comments</u>

1. Data Sufficiency for Agricultural Beneficial Use Determinations
2. Exclusion of Data
   Assessment Methodology for Electrical Conductivity (EC) and Sodium Adsorption Ratio (SAR)
3. Calculation of EC and SAR Monthly Average
4. Exceedence Frequency
5. Natural Sources and EC and SAR Criteria
6. Sulfate Impairments
7. Sediment Impairment Determinations

<u>Specific 2008 Assessment Record Comments</u>

8. Powder River Watershed Assessments
9. Hanging Woman Creek Assessment
10. Category 2b Waters: Identification of Natural Sources
11. Draft List of Use Attainability Analysis (UAA) Waters
12. Keyser Creek

<u>Additional Comments</u>

13. General Comments on the IR
14. Exceptions to DEQ's Classification System
15. Public Water Supply (PWS) General Comments
16. PWS Violations
17. Ground Water
18. Observed Effects

TONGUE RIVER WATERSHED ASSESSMENT COMMENTS

Our review of water quality assessments completed for the 2008 cycle focused on DEQ's Assessment Records. Assessment Records are Microsoft Excel worksheets that document the data and information used by DEQ to reach an impairment determination including: an evaluation of data sufficiency for the individual designated uses; summary comments describing each dataset or report reviewed for the assessment; notes on water quality standards violations; and conclusion on the final attainment determination for each designated use. In this letter, we refer to these documents as "Assessment Records". A summary of the 2008 impairments for the mainstem Tongue River and tributaries is provided below.

Table 1. Summary of Tongue River Watershed Assessments

Waterbody	2006 Impairments[1]	Draft 2008 Impairments[1]
Tongue River – WY Border to Tongue River Reservoir	Not Assessed	Low Flow Alterations Iron
Tongue River Reservoir	Chlorophyll-a	Dissolved Oxygen Solids (Suspended/Bedload) Chlorophyll-a Agriculture: Category 3
Tongue River - Dam to Prairie Dog Creek	Not Assessed	Low Flow Alterations
Tongue River – Prairie Dog Creek to Hanging Woman Creek	Not Assessed	Low Flow Alterations Agriculture: Category 3
Tongue River – Hanging Woman Creek to T&Y Diversion Dam	Not Assessed	Low Flow Alterations Solids (Suspended/ Bedload) Iron
Tongue River – T&Y Diversion Dam to Mouth	Low Flow Alterations	Low Flow Alterations Salinity Copper Zinc Lead Cadmium Nickel Iron Sulfates Solids (Suspended/ Bedload)
Hanging Woman Creek: WY border to Stroud Creek	Siltation	Salinity Low Flow Alterations Iron
Hanging Woman Creek: Stroud Creek to the mouth	Siltation	Salinity Low Flow Alterations Sedimentation
Otter Creek – headwaters to the mouth	Not Assessed	Salinity Solids (Suspended/ Bedload) Iron Alteration in stream-side or littoral vegetative
Pumpkin Creek – headwaters to the mouth (Tongue River)	Not Assessed	Salinity Temperature, water Low Flow Alterations

[1]Nonpollutants for which TMDLs are not required are italicized.

1. Data Sufficiency for Agricultural Beneficial Use Determinations
DEQ's "Standard Operating Procedure Water Quality Assessment Process and Methods" (MDEQ 2006) states:

> *"DEQ has not developed SCD [sufficient and credible data] decision tables for making beneficial use-support determinations for agricultural and industry. Generally if there are sufficient credible data for making beneficial use-support determinations for aquatic life, drinking water, and recreation, then data are also sufficient to make determinations for agriculture. However, the reviewer may require additional information concerning salinity and toxicity to make beneficial use-support decisions for agriculture if sources of impairment to agriculture are probable and information regarding probable causes of impairment are not provided in the available data set."*

In the 2008 assessments, DEQ determined that the Tongue River and its tributaries had SCD for agricultural use support; however, the Tongue River Reservoir did not have SCD to make an assessment. It appears from the Tongue River Reservoir Assessment Record that salinity and sodium adsorption ratio (SAR) data were collected in 2001 and 2003 and that sufficient data were available to assess the aquatic life and cold water fishery uses in the Reservoir. Therefore, we do not understand DEQ's conclusion that insufficient data exist to make an agricultural use support determination.

<u>Question 1.1</u> - What constitutes sufficient credible data for making agriculture beneficial use determinations?

> **DEQ Response:**
> DEQ employ's a narrative, "case-by-case" approach for establishing sufficient credible data for agriculture use assessment. In DEQ's assessment method SOP, referenced by EPA above, the second sentence ("*Generally if there…*") is intended to provide latitude for assessors to judge if the electrical conductivity (EC) data, which is scored with other chemistry data for aquatic life use SCD, contains the necessary information to establish the (salinity) cause/source linkage required by EPA's Assessment Database (ADB). According to the expression of Montana's EC/SAR standards, it is necessary to establish two things: 1) that anthropogenic sources are present, and 2) that the numeric criteria are exceeded as a result.

<u>Comment 1.1</u> - Please explain DEQ's decision for determining there is sufficient data for the Tongue River and its tributaries, but insufficient credible data to make an agricultural beneficial use support decision for the Tongue River Reservoir.

> **DEQ Response:**
> Due to limited availability of data following modifications to the Tongue River Reservoir dam in 2002, DEQ determined there was a lack of sufficient credible data to allow the assessment of the agriculture use based on DEQ's current assessment method.

2. Age of Data
It appears from the Tongue River Watershed Assessment Records that DEQ inconsistently included or excluded data based on age. DEQ applied at least 3 different timeframes when comparing available data to the water quality standards. Examples of the different timeframes are highlighted below:

(1) data from 2001-2006 were used to calculate monthly average concentrations for Electrical Conductivity (EC) and Sodium Absorption Ratio (SAR)
(2) all available data were compared to the instantaneous maximum EC and SAR criteria
(3) a range of metals, nutrients, and biology data were evaluated against water quality standards and some older data, mostly pre 1980's data, were considered "out of date".

In DEQ's guidance on Aquatic Life Use Support Determinations, the Chemistry Data Table assigns the highest score of 4 to "*data generally less than 5 years old*" and a score of 3 to "*data that are older than ideal, but there are no indications that conditions have changed significantly*". Beyond this statement, there is no explanation of DEQ's decision-making process for excluding data based on age in DEQ's Assessment Methodology.

EPA's 2004 Guidance for Assessment, Listing and Reporting Requirements (USEPA 2004) recommends that:

> *"Data should not be excluded from consideration solely on the basis of age. The State's methodology should specifically discuss how the state considered age in determining relevance. A State should consider all data and information. However, in this consideration, a State may determine that certain data are no longer representative of current conditions (e.g., land use has changed significantly, point source discharges have changed significantly, the hydrology of the water has been modified, and/or field and laboratory methods have changed), and therefore may decide not to use the data for making the assessment determination."*

Question 2.1 - What is DEQ's process for determining whether data are representative of current conditions?

DEQ Response:
Generally, the process relies on assessor's professional judgment when considering the relevant data currency questions posed in the SCD tables. This judgment may include consideration of changes in conditions such as recent hydrological modifications to the water body, new point or non-point sources, or recent natural disturbances such as floods or landslides affecting the water body. All data evaluation (SCD) scores are reviewed by the program's Monitoring Section Supervisor and (or) Quality Assurance Officer.

Question 2.2 - What is DEQ's basis for using only data from 2001-2006 for the monthly average and using all of the available data for the instantaneous maximum?

DEQ Response:
The 2001-2006 data was the most recent and most continuous record, which allowed the calculation of an average based on a relatively consistent recording interval. Data outside of this range was not consistently available, and when data was available it was usually with a smaller number of data points per month.

Individual results used for evaluating instantaneous maximum value are not bound by the minimum numbers used for calculation of the average and therefore, all were used.

Question 2.3 - For other data types (e.g., nutrients, metals), what is DEQ's rationale for excluding some historic data and including other data?

DEQ Response:
The issue DEQ focuses on for assessment decision-making is whether waterbodies are currently impaired. Data is used if the field and analytical methods employed are still valid and if recent environmental conditions have not changed significantly since the time of collection.

3. Assessment Methodology for EC and SAR

The Agriculture Supply Beneficial Use Support Decision Table (see Appendix A) from DEQ's Assessment standard operating procedures (SOPs) (MDEQ 2006) define the unimpaired condition for salinity. The Assessment SOPs present different EC and SAR thresholds for determining impairment, conflicting with the standards for EC and SAR adopted and approved for the Tongue, Powder, and Little Powder River Watersheds in 2003.

Comment 3.1 – DEQ's Assessment Methodology should be updated to describe how DEQ will assess for EC and SAR.

DEQ Response:
DEQ Agrees. DEQ plans to address this in its next revision of the assessment method.

Question 3.2 – For other waterbodies in the State that do not have numeric criteria for EC and SAR, how does DEQ make agricultural use support determinations and what thresholds are applied? Would Table 13 of the Assessment SOP serve as the basis for attainment decisions?

DEQ Response:
Table 13 combines a comparison to reference conditions and the use of static thresholds for use support decision-making. DEQ has used Table 13 from the current assessment method up to this point.

4. Calculation of EC and SAR Monthly Average

Neither DEQ's Assessment SOPs nor the EC and SAR criteria provide implementation guidance on the data requirements for the calculation of monthly averages for comparison to numeric water quality criteria. In the Tongue River watershed assessments, DEQ used "a minimum of 4 samples per month" as the basis for calculating the monthly average and determining exceedence frequencies.

Question 4.1 - What is DEQ's rationale for using a minimum of 4 samples per month?

DEQ Response:
DEQ used the approach followed in the 2007 status report for the Tongue River Basin (Environmental Protection Agency and Tetra Tech, Inc., 2007). This was done for consistency in data analysis.

Question 4.2 - What is DEQ's procedure for calculation of monthly averages (i.e., for EC, SAR, and other parameters)?

DEQ Response:
DEQ used the approach followed in the 2007 status report for the Tongue River Basin (Environmental Protection Agency and Tetra Tech, Inc., 2007).

5. Exceedence Frequency
Montana's WQS for EC and SAR state that "no sample may exceed" the instantaneous maximum criteria. Without a clear assessment methodology, EPA interprets this to mean that a waterbody would be listed based on a single exceedence of the criteria. However, for the Tongue River Segment from the Wyoming Border to the Tongue River Reservoir, DEQ did not list the segment as impaired for EC even though the instantaneous criterion was exceeded once in 2002 (Specific Conductance (SC) value of 3,000 µS/cm) as indicated in DEQ's Assessment Record (MDEQ 2008c).

Question 5.1 - Since the water quality standard is stated as "no sample shall exceed", why was the Tongue River from the Wyoming Border to the Tongue River Reservoir not listed as impaired for EC?

DEQ Response:
DEQ believes the value cited is in error. The hardcopy recording of this value in the assessment record was hand written in field notes and the units recorded for the value were uS rather than uS/cm. Also, no calibration logs were available for the instrument used. However, DEQ believes that the root cause of the error was transcription, where the decimal behind the third significant figure was omitted (e.g., should have been 300.0 uS/cm rather than 3,000 uS/cm). This belief is based on the following points.

Point 1. Data bracketing this value from the continuous record provided by the USGS indicates that EC values were 694 uS/cm (on 10/01/2002, flow 134 cfs) and 725 uS/cm (on 11/21/2002, flow 140 cfs).

Point 2. The relationship between SC and Flow for the USGS station at the Wyoming/Montana border (USGS-06306300) is illustrated in Figure 1.0

Figure 1.0 – Relationship between SC and Flow for the Tongue River @ Decker, MT

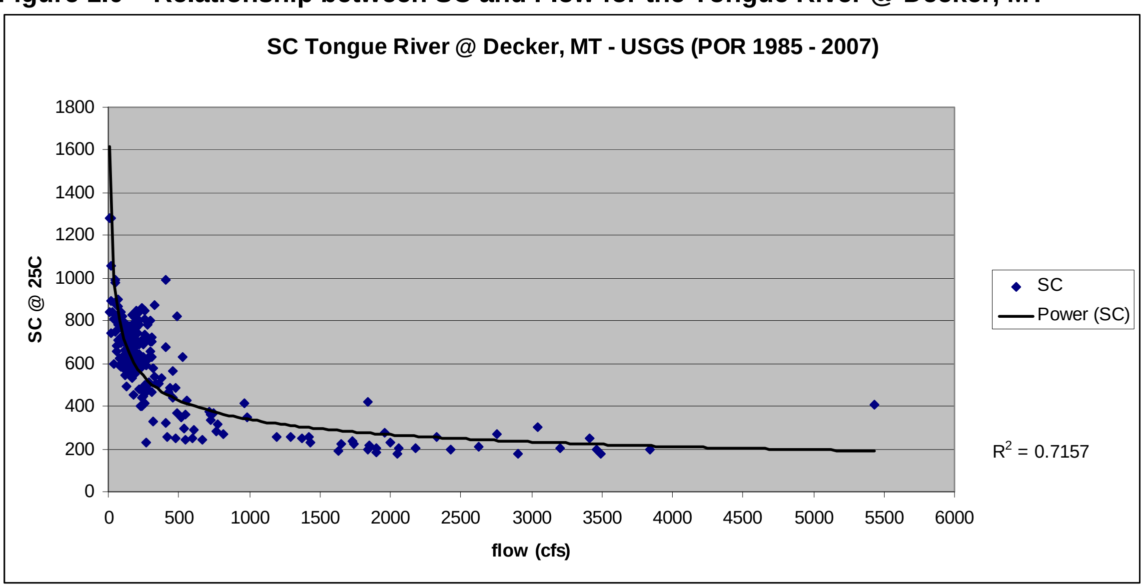
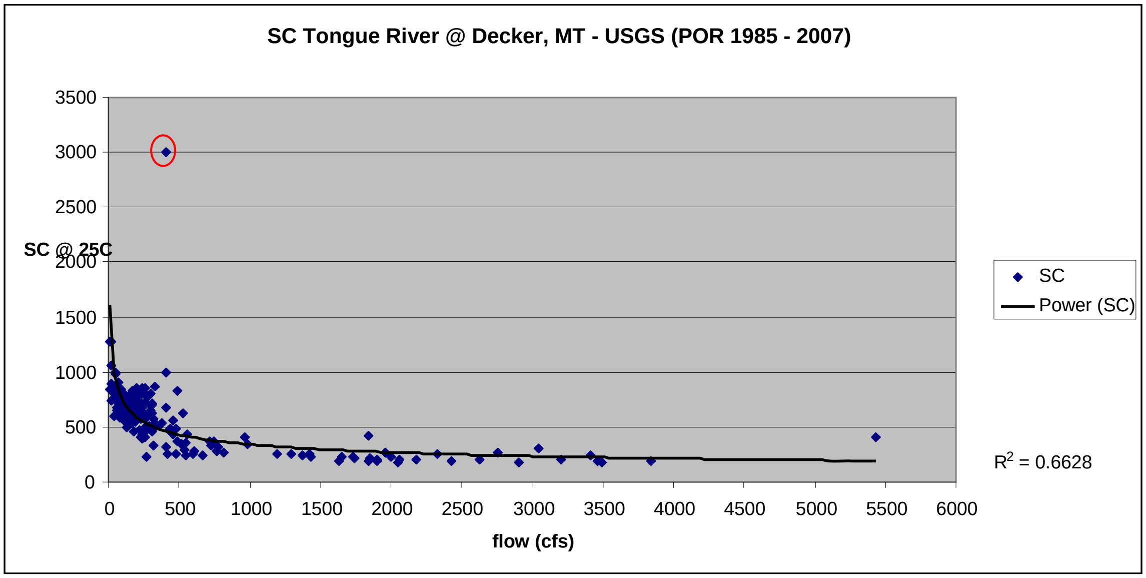


Figure 1.0 indicates a significant relationship (r^2 = 0.72) between SC and flow using a power curve.

When DEQ's value is added, the significance of the power curve's relationship drops to $r^2 = 0.66$ and the scale of the graph has to be doubled to accommodate it (Figure 1.1)

Figure 1.1 Relationship between SC and Flow for the Tongue @ Decker, MT (DEQ result included)

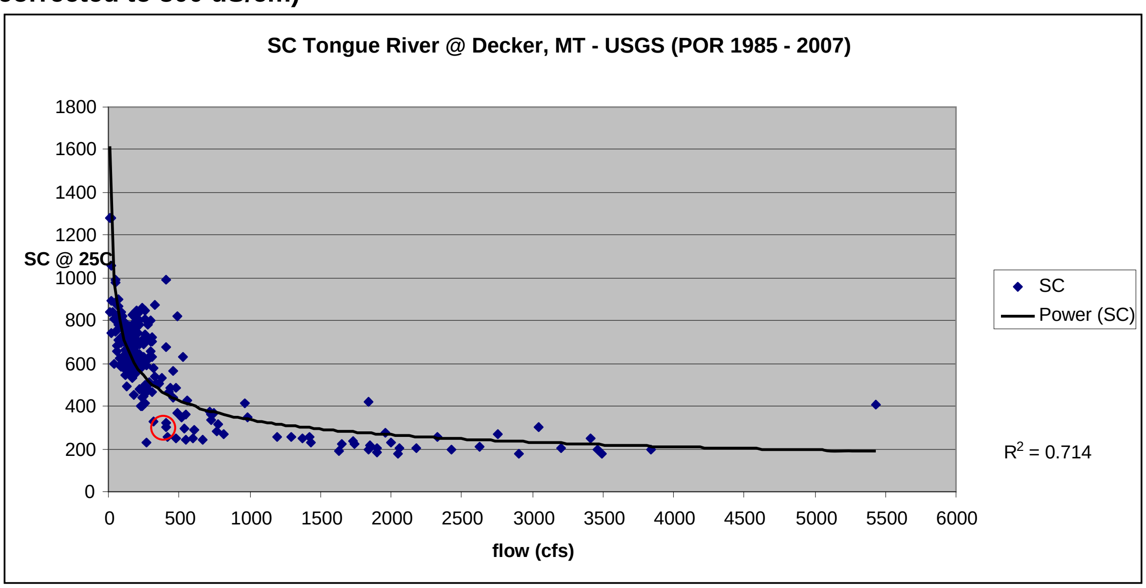


This indicates that DEQ's 2002 EC value of 3,000 uS/cm, corresponding to a flow of 406 cfs, is an extreme outlier to the long-term established relationship between SC and Flow at this station.

Point 3. The highest recorded SC values from the USGS data (n = 255, POR 1985 - 2007) were 1,280 uS/cm; twice, at 10 and 18 cfs.

Point 4: If DEQ's result was transcribed incorrectly and was in fact, 300 uS/cm, the value and corresponding flow fall in line with the historical relationship established by the USGS (Figure 1.2).

Figure 1.2 Relationship between SC and Flow for the Tongue River @ Decker, MT (DEQ result corrected to 300 uS/cm)



Conclusion: The value DEQ recorded in 2002 was very likely to have been transcribed incorrectly when recorded in the assessor's field notes. This likelihood should prevent its use as the basis for a single point measurement listing.

Question 5.2 - What is the allowable exceedence frequency for the instantaneous maximum criteria?

DEQ Response:
Without a detailed assessment process that defines an allowable exceedence frequency which takes into account random excursions, DEQ *generally* applies the instantaneous maximum as written in the standard. Under the standard, allowable exceedence frequency of the instantaneous maximum is zero - when caused by man (no person shall...).

Note: EPA believes the value of 3,000 µS/cm EC may be in error based on an EPA conversation with USGS, the agency responsible for collecting the data. DEQ should verify this value with USGS before finalizing the assessment.

DEQ Response to Note: DEQ agrees that the value is in error see response to question 5.1.

DEQ's WQS do not` specify an allowable exceedence frequency for the monthly average EC and SAR criteria in the Tongue River watershed. For example, the monthly average EC criterion was exceeded once in the five-year timeframe on the Tongue River segment from Hanging Woman Creek to the T-Y Diversion Dam but the segment was not listed as impaired for EC.

Question 5.3 - How many exceedences of the monthly average EC and SAR criteria are allowed before DEQ considers the waterbody impaired?

DEQ Response:
Without a detailed assessment process that defines an allowable exceedence frequency which takes into account random excursions, DEQ *generally* applies the monthly average as intended by the standard.

6. Link between Natural Sources and EC and SAR Criteria

DEQ's Assessment Records for Otter Creek, Pumpkin Creek, and 2 segments of Hanging Woman Creek show EC and SAR values exceeded the instantaneous maximum criteria and the monthly average criteria 90 -100% of the time but determines these violations are attributable to "natural" sources and should be placed in Category 2b. DEQ developed Category 2B as a user-defined category designated for waterbodies where: "*Available data and/or information indicate that a water quality standard is exceeded due to an apparent natural source in the absence of any identified manmade sources*." However, Appendix B of the IR shows these waters in Category 5 for salinity.

Comment 6.1 - Please clarify whether DEQ considers Hanging Woman Creek, Otter Creek and Pumpkin Creek as or Category 2b waters for salinity or in Category 5 for salinity.

DEQ Response:
DEQ considers these waters to be in Category 2b. However, they appear in Category 5 (CWA Section 303(d) list) due to the category listing business rules in the Assessment Database (ADB).

After these waters have undergone a detailed review by the program's Water Quality Standards Section a final listing decision will be made and the waters will be reported in the appropriate category (i.e., Category 1, 4C, or 5) as determined by that review.

Question 6.2 – To which uses and criteria does the natural condition provision (MCA 75-5-306) apply?

DEQ Response:
The natural condition provision applies to all criteria. MCA 75-5-306(1) establishes that waters do not have to be treated to a condition purer than natural. [75-5-306(1): "It is not necessary that wastes be treated to a purer condition that the natural condition of the receiving stream as long the minimum treatment requirements … are met."] For uses, the natural condition provision is applied via use support assessment decisions relative to established criteria. If conditions are greater than criteria, *in the absence of identified man-caused sources*, that cause will be placed in Category 2B and queued up for a more focused water quality investigation.

Question 6.3 – How does DEQ determine natural background?

DEQ Response:
DEQ most often uses a "reference condition," which is a range of values derived from data collections at reference sites (e.g., sites with no or limited anthropogenic affects) within the Omernik Level III Ecoregions.

However, in the case of the subject waterbodies, DEQ relied upon EPA's determination of natural background condition in its 2007 assessment of the Tongue River watershed (Environmental Protection Agency and Tetra Tech, Inc., 2007b). In EPA's modeling report used to support the water quality assessment (Environmental Protection Agency and Tetra Tech, Inc., 2007a), the following discussion is provided relative to determination of "natural conditions" (reference Section 7.1, page 114):

> **Natural Condition SC and SAR**
> As described in Appendix J of the Assessment Report, a number of anthropogenic factors such as irrigation, agriculture, CBM discharge, wastewater treatment discharge, mining, etc. were removed from the model to estimate the potential magnitude of human affect. In the absence of field data describing the hydrologic and pollutant fate/transport characteristics associated with many of these factors, it was not possible to specifically calibrate SC and SAR loading from these sources. These sources were addressed in the model using a literature-based understanding of their characteristics. However, the potential magnitude of change between the existing and natural conditions was based on a relative comparison of two model scenarios, thereby minimizing the error/uncertainty associated with model fit to the observed data. As a result, the uncertainty associated with comparisons of SC and SAR between the two scenarios is largely a function of the model's ability to simulate each of the various anthropogenic factors. While it is not possible to evaluate the model's ability to simulate each of these sources, no other assessment methodology is currently available to estimate what water quality conditions might have been like in the absence of man's influence. As a result, the model provides one of the only means for evaluating the impact of human's actions at the watershed scale.

7. Sediment Impairment Determinations

DEQ's methodology for evaluating excess fine sediment impacts in the Tongue River watershed is inconsistent. DEQ listed the Tongue River downstream of the confluence with Hanging Woman Creek impaired for "suspended solids / bedload" due to "*indications of channel modifications, moderate bank erosion, and abundant irrigated cropland*" (MDEQ 2008a), suggesting that excess fine sediment is impairing aquatic life. However, citations from Montana Fish Wildlife and Parks (FWP) reports demonstrate that FWP considers the fisheries limited due to "reduced turbidity / sediment levels" (MDEQ 2008a). In addition, EPA's Water Quality Assessment for the Tongue River Watershed (USEPA 2007) showed that "*on average, concentrations downstream of the reservoir are 26 percent of the concentrations just upstream of the reservoir*" and concluded that fisheries and aquatic life uses in the lower Tongue River were impacted by insufficient sediment supply.

Question 7.1 - What was DEQ's basis for concluding that this segment is impaired due to excess fine sediment and not a lack of sediment?

DEQ Response:
In the current assessment, impairment is observed in the biology and chemistry categories. Sources are documented for man-caused sediment contributions. The assessor documents violation of Montana's sediment standards of "harm to use" and "above naturally occurring" levels of sediment to prove siltation as an impairment. Therefore, this segment of the Tongue River remains in category 5 for this cycle.

EPA used computer models to make assumptions of conditions in the Tongue River to support development of the referenced Assessment Report (Environmental Protection Agency and Tetra Tech, Inc., 2007). The assessor evaluated the model results in the current assessment with caution: acknowledging model uncertainty. Therefore, the assessor weighted discrete data/results that were collected in-channel, or on-the-ground, much heavier to characterize impacts relative to the model-derived results.

Hanging Woman Creek provides another example of DEQ's inconsistent sediment impairment decisions. The upper segment of Hanging Woman Creek (headwaters to Stroud Creek) is considered unimpaired for sediment while the lower segment is listed for sediment. Ironically, a 2002 NRCS Stream Corridor Assessment (NRCS 2002) ranked the upper section of Hanging Woman Creek as "not sustainable" compared to the majority of Hanging Woman Creek which was considered "sustainable".

Comment 7.1 - Please explain DEQ's rationale for listing only the lower portion of Hanging Woman Creek as sediment impaired.

DEQ Response:
As articulated in the response to Comment 6, once a cause is listed and approved by EPA, "good cause" must be demonstrated to allow a delisting. The assessment of the lower segment of Hanging Woman recognized the geomorphic conditions that result in naturally high erosion rates, naturally erosive soils, sparse ground cover, a semiarid conditions, and high-energy rain events. However, there are also man-caused sources of sediment, which include moderate to heavy irrigation, grazing activities, bank cuts, and bank sloughing; this segment needs to remain listed for sediment/siltation. More data and or analysis is required to determine the effect of natural versus man-caused sources and support good cause delisting, if warranted.

The upper segment of Hanging Woman Creek (the Wyoming border to Stroud Creek) has not been listed for sediment/siltation in previous cycles. Based on the available data, there was not enough information to determine if sediment/siltation was, in fact, causing harm to use and thus supported a new cause of impairment from sediment.

SPECIFIC 2008 ASSESSMENT RECORD COMMENTS

8. Powder River Watershed Assessments

The 2008 IR does not contain updated assessments for the Powder River and its tributaries (i.e., Mizpah Creek, Stump Creek, and Little Powder River). Based on a preliminary review of the data, it appears that sufficient credible data exist to update the assessments for EC and SAR, at a minimum.

Question 8.1 - What is DEQ's plan and schedule for assessing these waters?

DEQ Response:
DEQ has reviewed and updated the water quality assessments for Agriculture beneficial use on the Powder River (MT42J001_010 and MT42J003_010), Little Powder River (MT42I001_010), Mizpah Creek (MT42J005_010), and Stump Creek (MT42J004_010). The results of these assessments are incorporated in the Final 2008 Integrated Report. DEQ also intends to revisit these waterbodies and conduct full water quality assessments for the remaining beneficial uses with the results incorporated in the 2012 Integrated Report.

Note: While reviewing Montana's Clean Water Act website, EPA noticed that the assessment record for Segment MT42J001_010 (mainstem from the border to the Little Powder River) appears to be missing.

DEQ Response to Note:
There is now an Assessment Record Report for this waterbody which will be publicly available upon EPA approval of the 2008 Integrated Report.

9. Hanging Woman Creek Assessment

DEQ lists the upper segment of Hanging Woman Creek from the Wyoming Border to Stroud Creek as impaired for iron based on a single iron exceedence of 1,410 µg/l. We believe this is an error and that the iron exceedence occurred at a sampling location (Y15HNGWC01) near Birney which is in the downstream segment of Hanging Woman Creek (MT42B002_031) (EPA 2007). DEQ should verify the exceedence location and modify the Assessment Record.

Also, comments in the "Data Matrix" Worksheet of the Assessment Record for upper Hanging Woman Creek (MDEQ 2008b) state: "*Since the single high iron data point is only moderately above the Chronic Standard and there are no likely metals sources in the watershed, a judgment of impairment of Aquatic Life uses will not be made.*" This statement contradicts DEQ's "no sample shall exceed" WQS and DEQ's conclusion in the "Summary" Worksheet of the Assessment Record that the segment is impaired for iron. We recommend reconciling this language in the final Assessment Record.

Comment 9.1 – The upper segment of Hanging Woman Creek should be not listed as impaired for iron and the segment from Stroud Creek to the mouth (MT42B002_031) should be listed for iron.

DEQ Response:
EPA's comment is correct. The assessment record was updated and is reflected in the Final 2008 Water Quality Integrated Report.

10. Category 2b Waters: Identification of Natural Sources

DEQ developed Category 2B as a user-defined category designated for waterbodies where: "*Available data and/or information indicate that a water quality standard is exceeded due to an apparent natural source in the absence of any identified manmade sources*."

Based on a review of the 2008 Category 2b waters, DEQ's methodology for placing waters in Category 2b is unclear and appears inconsistent.

Comment 10.1 – EPA recommends including an explanation of what methods DEQ uses (e.g., modeled analysis, best professional judgment) to determine if sources are natural.

DEQ Response:
Refer to DEQ response to question 6.3.

Comment 10.2 - EPA requests additional supporting information documenting DEQ's basis for listing the following waters in Category 2b and describing the process DEQ used to determine anthropogenic versus natural sources in the watershed.

- Lodgepole Creek (iron)
- Larb Creek (copper, lead)
- Cherry Creek (iron)
- Thompson Creek (the pollutant associated with the 2b listing for this segment is not clear)
- Beaver Creek (nitrite-nitrate)
- Arrow Creek (iron)
- Cedar Creek (copper, iron, lead and selenium)
- Yellowstone River (arsenic)
- Missouri River (2 segments for arsenic)
- Beaver Creek (cadmium, lead)
- Sawlog Creek (arsenic)

DEQ Response:
Of the waters mentioned in this comment, only the Yellowstone River had a new assessment conducted during the 2008 reporting cycle. All other assessments were approved by EPA in 2006, along with the definition and use of Category 2B. DEQ's use of Category 2B is to allow for the identification of situations were a pollutant may exceed state water quality standards (i.e., criteria) but without associated man-caused sources – a requirement to develop a TMDL. The intent is to be transparent with listing decisions and provide a "place-holder" for potential cause impairments that need a more detailed, site-specific investigation to fully understand the source, or sources, of pollutant levels relative to established criteria.

Thompson Creek - cadmium, copper, iron, and zinc are causes associated with the 2B listing as there are no sources listed other than Natural.

Yellowstone River – in the Assessment Record's data matrix, there is an entry in cell C149 referencing the USGS NAWQA report (Peterson et al., 2004) which states:

> "Arsenic appears to be the only trace element that exceeded state surface water-quality standards. Of 10 arsenic samples collected in 1999 and 2001, five were > 10 µg/L (criterion). Older data show similar exceedence rates. USGS report states that elevated arsenic is

common in many geothermal waters (i.e., like the Yellowstone River headwaters) and samples from the river in the park confirm this. Therefore, the arsenic concentrations are very probably natural. Copper, lead, zinc, & selenium were below standards."

Regarding man-caused vs. natural sources: refer to DEQ's response for Comment 10.1.

Question 10.3 - What is the level of certainty required prior to placing a waterbody in Category 2b?

DEQ Response:
The listing of waters in Category 2B is a decision made by staff conducting the use support assessment and is based on the *apparent* lack of man-caused sources, known natural sources, or both. Moreover, it allows DEQ to prioritize more detailed investigations and the collection of additional water quality data in order to make more informed, and more defensible, use support decisions.

11. Draft List of Use Attainability Analyses (UAA) Waters

DEQ identified thirteen waters currently classified as cold water fisheries that might need to be reclassified based on limited grab temperature data reflective of warm water fishery conditions. These waters were placed in Category 2b because, as stated in the Assessment Records, "*There is insufficient information to evaluate the cold water fishery beneficial use; it does not support the use likely due to natural conditions (category 2b).*" EPA recognizes that Category 2b serves as a placeholder to allow DEQ time to collect the necessary fisheries and temperature data and evaluate if a Use Attainability Analysis is required. However, we want to ensure that these waterbodies are reviewed in a timely manner.

Question 11.1 - What is DEQ's plan to collect the necessary data to determine the appropriate fisheries classification for these waterbodies?

DEQ Response:
Following an approved 2B listing, DEQ will evaluate, prioritize, and develop site-specific plans for each 2B waterbody-pollutant.

12. Keyser Creek

The Keyser Creek Assessment Record (MDEQ 2008c) was reviewed as part of EPA's review of Category 2b waters. DEQ determined that Keyser Creek (MT43F002_030) fully supports all uses except for cold water fishery which placed the water in Category 2b because the segment may be misclassified (see Comment #12). Currently, Keyser Creek is classified as a B-2 water; however, only ½ mile of the entire stream length of 22 miles contains water. The Keyser Creek Assessment Record (MDEQ 2008c) states:

> *"The macroinvertebrate sample was moderately impaired, and showed indicators of being spring-fed, and possibly periodically dewatered. The chlorophyll a value of 82 mg/m2 is moderately higher than the contact recreation criteria of 50 mg/m2; however, the nutrient concentrations were below criteria. Riparian vegetation consisted of decadent and dying cottonwoods, and juniper. All age classes of woody species were represented, although showing signs of stress from the drought conditions. The stream reach assessment indicated moderate impairment, while the riparian assessment indicated no impairment. The stream is stable vertically and horizontally, and has access to a floodplain. Some bank sloughing and erosion on outside bends is occurring. The DO*

> *concentration is below the 30 day mean aquatic life standard of 6.5 mg/L, and approaches the 7 day mean minimum of 5.0 mg/L."*

This information suggests that Keyser Creek is not fully supporting its uses. We encourage DEQ to review and verify the conclusion that Keyser Creek is fully supporting its uses.

Comment 12.1 - Please explain the basis for considering this segment as fully supporting its aquatic life and drinking water uses.

> **DEQ Response:**
> EPA approved this listing in 2006 as part of the reassessment effort (2004-2006). Currently there is no new data available. DEQ will consider EPA's comment in the next assessment of this waterbody.

ADDITIONAL COMMENTS

13. General Comment on the Report

Montana's IR provides detailed documentation on a variety of program areas; however, the information on the status of individual waterbodies and conditions statewide and the process used to interpret whether waterbodies are attaining water quality standards is difficult to locate in the document.

Comment 13.1 - We encourage MT DEQ to streamline future Integrated Reports to focus on the presentation of information relevant to monitoring and assessment of water resources in Montana.

> **DEQ Response:**
> DEQ will be working on providing the most streamlined and efficient presentation of Clean Water Act sections 303(d) and 305(b) reporting elements as required by federal statue or rule.

Comment 13.2 - EPA recommends including a brief narrative and summary in which the number of water body segments (Assessment Units) in each of the Integrated Reporting Assessment Categories in 2006 and 2008 are compared. This table can be generated from the Assessment Database. An example is included in Appendix B.

> **DEQ Response:**
> DEQ will consider this table for inclusion in subsequent reports.

14. DEQ's Classification System "Exceptions"

Table 3-3 from Section 3.1.3.2.1 (page 13 of the IR) lists seven waterbodies whose designated uses were originally classified as "exceptions" by DEQ because of poor water quality that existed when the waters were classified in 1955. Pursuant to 40 CFR 131.20(a), DEQ is required to re-examine the classifications that do not include the uses specified in 101(a)(2) (i.e., aquatic life and recreation) during their triennial review process.

Comment 14.1 - Please describe DEQ's plan and associated timeframe to reassess the classifications assigned to the waters listed in Table 3-3.

Table 3-3. Montana Surface Water with Use Class Exceptions

Waterbody	Present Classification	Desired Classification
Rainy Creek (main stem from the W.R. Grace water supply intake to the Kootenai River)	C-1	B-1
Clark Fork River (from Warm Springs Creek to Cottonwood Creek)	C-2	B-1
Clark Fork River (from Cottonwood Creek to the Little Blackfoot River)	C-1	B-1
Ashley Creek (main stem from bridge crossing on Airport Road to the Flathead River)	C-2	B-1
Prickly Pear Creek (below East Helena –Upper Missouri Basin)	I	B-1
Silver Bow Creek (Upper Clark Fork Basin)	I	B-1
Muddy Creek (Sun River Basin)	I	B-1

DEQ Response:
DEQ will provide planning elements and timeframe for evaluating these use classifications within the Montana Environmental Performance Partnership Agreement (PPA) with EPA where the DEQ can appropriately prioritize this activity with other activities that require the same staff resources.

15. Public Water Supply (PWS) General Comments
This section of the IR references terminology which has no common meaning and is somewhat misleading. For example, the IR states on page 56 that most ground water sources are “naturally protected” and uses the term “natural purification” on page 58 which is not an accepted hydrogeologic process.

Comment 15.1 – In lieu of using these terms, we suggest including a more detailed discussion of hydrogeologic conditions which can reduce the vulnerability to contamination. We also suggest adding Concentrated Animal Feeding Operations (CAFOS) to the list of sources of microbiological contaminants mentioned in this section.

DEQ Response:
Reference to natural purification has been removed from the text. Regarding CAFO’s, that source is implicit within the list of “animal wastes” already listed under microbiological category.

Comment 15.2 – Please identify the number of Source Water Protection Plans DEQ has certified.

DEQ Response:
15

16. Public Water Supply Violations
Section 4.5.3.4.1 states that most nitrate violations were associated with “naturally occurring” contaminants. There are very few sources of naturally occurring nitrate. Please explain the basis for the conclusion that the sources are natural.

Also, Table 4-14 highlights the large number (276) of nitrate violations associated with late samples, missed samples, improper sampling procedures, or an incomplete understanding of requirements. Sampling procedures for nitrate have been in place for many years and the 1986 and 1996 Amendments to the Safe Drinking Water Act did not modify the sampling and analysis requirements for nitrate.

Comment 16.1 – Please explain the rationale for the conclusion that nitrate violations are due to natural sources.

DEQ Response:
The original text of Section 4.5.3.4.1 was improperly worded and has been revised.

Most of these were associated with naturally occurring contaminants, but some of the nitrate violations may be the result of contamination from improper sewage disposal or agricultural practices.

Comment 16.2 – Please explain why there were so many Quality Control violations for nitrate.

DEQ Response:
Training of systems and water operators is continuous on how important it is for them to provide good information to analytical labs for their sample reports to meet (DEQ) compliance. DEQ's Public Water Supply program has committed to providing public outreach to the systems, educating them on compliance timeline requirements and proper sample labeling. Through this effort DEQ has seen a reduction in the number of violations and systems over the recent two years.

17. Ground Water

The IR highlights the significant need to develop a statewide ground water management strategy for Montana. Currently there is poor coordination of ground water management between State agencies. This need has also been identified through the State's efforts to develop of a comprehensive monitoring strategy. EPA would like to highlight the fact that ground water is the source of water for 1848 of 2078 PWS systems in Montana and provides drinking water for 61% of Montana's residents, which points to the importance of allocating resources to comprehensive manage this critical resource.

Comment 17.1 - EPA encourages DEQ to identify resources to ensure a ground water strategy is developed, improve interagency coordination, and ensure dedicated DEQ staff to focus on ground water issues.

DEQ Response:
DEQ is in the process of developing a statewide monitoring strategy that will address all CWA programs. This strategy is expected to be completed in September 2009

18. Observed Effects

Section 6.6 presents DEQ's approach to considering "observed effects", or conditions that produce an undesirable effect on a waterbody, in future assessments. The IR notes that "the designations of "impairment" and "observed effect" are not mutually exclusive; thus, a condition can be listed in the database both as an impairment to a beneficial use as well as an "observed effect."

Examples of observed effects include aquatic macroinvertebrate bioassessments, sediment screening value (threshold), and a single toxic exceedence. Since DEQ's water quality criteria are written as "no sample shall exceed", please explain how a single toxic exceedence would be considered an observed effect versus an exceedence of the WQS.

EPA's 2004 Guidance for Assessment, Listing and Reporting Requirements (USEPA 2004) states,

> *"States should place waters in Category 5 when a water is shown to be impaired or threatened in relation to biological assessments used to evaluate aquatic life uses or narrative or numeric criteria adopted to protect those uses even if the specific pollutant is not known. These waters should be listed unless the State can demonstrate that non-pollutant stressors cause the impairment, or that no pollutant(s) causes or contribute to the impairment. Prior to establishing a TMDL for such waters, the pollutant causing the impairment would need to be identified."*

It is our expectation that DEQ will adhere to this guidance when differentiating between observed effects and impairments.

Question 18.1 - What is DEQ's approach to distinguishing between an observed effect and an impairment?

DEQ Response:
Pollutant impairment listings drive the requirement for TMDL development. TMDLs, by definition, require a mass per unit load to be described and allocated. A TMDL cannot be defined for an observed effect, e.g., taste and order. When the effect of an underlying pollutant is observed, but no explicit measure of the pollutant is available thus defining the root cause of the effect being observed, the resultant listing is reported as an "observed effect." DEQ seeks to identify the root cause pollutant(s) driving an observable effect and list that pollutant, or pollutants, to provide explicit guidance to TMDL development. Observed effect listing provides DEQ with the ability to provide assessment transparency and recognition of a potential water quality problem for further investigation.

Comment 18.1 - Please describe a situation where DEQ would view a "single toxic exceedence" as an observed effect versus an impairment.

DEQ Response:
From the EPA Assessment Database (Cause Look-up Table):

Cause Name: Single Sample Toxic Exceedence
Cause Description: "Single Sample Toxic Exceedence. This code is typically used as an Observed Effect. Only one sample returned an exceedence of the criteria, and warrants further study, but does not warrant a TMDL."

A situation: the department receives Whole Effluent Toxicity (WET) test results from a stream where the mortality of the aquatic organisms in the test group is not statistically significant (e.g., four or fewer individuals out of a test population of 12), and, thus the test result would be reported as an "observed effect" of the constituent used in the test (e.g., copper).

[EPA Comment] References

MDEQ. 2006. 2005. Standard Operating Procedure Water Quality Assessment Process and Methods (APPENDIX A to 303(d) 2000 – 2004). Montana Department of Environmental Quality, Water Quality Planning Bureau. Helena, Montana. Available online at: http://www.deq.state.mt.us/wqinfo/QAProgram/SOP%20WQPBWQM-001.pdf.

MDEQ. 2008a. Assessment Record for the Tongue River, diversion dam just above Pumpkin Creek to the mouth (Yellowstone River)(MT42C001_011). Montana Department of Environmental Quality, Water Quality Planning Bureau. Helena, Montana. Available online at: http://cwaic.mt.gov.

MDEQ. 2008b. Assessment Record for Hanging Woman Creek from the Wyoming border to Stroud Creek(MT42B002_032). Montana Department of Environmental Quality, Water Quality Planning Bureau. Helena, Montana. Available online at: http://cwaic.mt.gov.

MDEQ. 2008b. Assessment Record for the Tongue River from the Wyoming Border to the Tongue River Reservoir (MT42B001_010). Montana Department of Environmental Quality, Water Quality Planning Bureau. Helena, Montana. Available online at: http://cwaic.mt.gov.

NRCS. 2002. *Tongue River Stream Corridor Assessment. Montana Reaches. Phase II - Physical Habitat Assessment*. Natural Resources Conservation Service. U.S. Department of Agriculture. Bozeman, Montana.

USEPA. 1997. Establishing Site Specific Aquatic Life Criteria Equal to Natural Background. Memo dated November 5, 1997, from Tudor Davies, U.S. Environmental Protection Agency, to Water Management Division Directors, Regions 1-10. Washington, DC.

USEPA. 2004. Guidance for 2004 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act. U.S. Environmental Protection Agency Office of Water, Office of Wetlands, Oceans, and Watershed, Assessment and Watershed Protection Division. Washington, DC.

USEPA. 2005. Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act. U.S. Environmental Protection Agency Office of Water, Office of Wetlands, Oceans, and Watershed, Assessment and Watershed Protection Division. Washington, DC.

USEPA. 2006. Information Concerning 2008 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions. U.S. Environmental Protection Agency Office of Water, Office of Wetlands, Oceans, and Watershed, Assessment and Watershed Protection Division, Washington, DC.

USEPA. 2007. Water Quality Assessment for the Tongue River Watershed, Montana. Environmental Protection Agency, Montana Operations Office. Helena, Montana.

APPENDIX A. Table 13 from DEQ's Standard Operating Procedures Water Quality Assessment Process and Methods (APPENDIX A to 303(d) 2000 – 2004)

Table 13. Agriculture Supply Beneficial Use Support Decision Tables

Agriculture Supply (Streams and Lakes)			
DATA TYPE	**UNIMPAIRED OR LEAST IMPAIRED**	**MODERATELY IMPAIRED**	**SEVERELY IMPAIRED**
Salinity (general)	The water quality is similar to reference condition or does not restrict agricultural use.	Water salinity exceeds reference condition and discourages agricultural use.	Water salinity exceeds reference condition and cannot be used for agriculture.
Livestock (Salinity)	The water salinity is satisfactory for livestock and poultry; the specific conductance is less than 5000 uS/cm.	The water salinity limits use by livestock and poultry; Specific conductance is between 5000 and 15,000 uS/cm.	Livestock and poultry are unable to use the water due to high salinity; specific conductance is more than 15,000 uS/cm.
Irrigation (Salinity)	The water is satisfactory for irrigation. The sodium adsorption Ratios are less than 4; or water may only impact sensitive crops. Specific conductance is less than 1500 uS/cm.	Irrigation water may have an adverse effect on soils. Sodium adsorption ratios are between 4 and 18; or water may have an adverse effect on crops and may require careful management. Specific conductivity is 1500-7500 uS/cm.	Irrigation water is likely to have an adverse effect on soils. Sodium adsorption ratio is greater than 18, or water has an adverse effect on crops. Specific conductance is more than 7500 uS/cm.
Toxicants	Trace metal concentrations are similar to reference condition.	Trace metal concentrations and other toxicant concentrations exceed reference condition; however, the water can still be used for agriculture.	The water cannot be used for agriculture due to elevated trace metals or other toxicants.

APPENDIX B. Summary Statistics Table Generated from Montana's Draft 2008 Assessment Database

Montana 2008 Summary Statistics (2006 to 2008)

Number of Assessment Units		
Category	**Current Cycle (2008)**	**Previous Cycle (2006)**
1	138	137
2	43	43
3	87	93
4A	68	51
4B	0	0
4C	107	101
5	661	677
TOTAL	1104	1102

Number of Assessment Unit - Cause Combinations		
Category	**Current Cycle (2008)**	**Previous Cycle (2006)**
4A	239	190
4B	0	0
4C	153	143
5	2831	2816
TOTAL	3223	3149

Comment #: 9

Type: I am providing information, which could affect assessments and/or priority rankings.
Commenter: American Fisheries Society
Received: June 10th, 2009

Comment Text:
Please see attached letter from Montana Chapter of the American Fisheries Society regarding data and review shortcomings in the Draft Report.

Comment Attachment:
DEQ Note: the comment letter provided information and comments regarding past assessment decisions on streams that did not receive an assessment review/update during this reporting cycle and remained unchanged from the 2006 assessments. The letter also provided comments on 1)

TMDLs that have had official public comment periods conducted and have been finalized and submitted to EPA, and 2) DEQ's solicitation process for requesting data.

DEQ Response:
DEQ thanks the MCAFS for taking time to review the state's 303(d) list of waters that are of concern to the MCAFS and in preparing a formal comment letter. DEQ will factor the information regarding specific waterbody assessments provided in the comment letter during subsequent assessments of the waterbodies identified

DEQ is also redesigning its solicitation and noticing process for the Integrated Report from the use of notices via US mail to the implementation of an email list serve, which interested parties may opt in or out of as they choose. DEQ list serves may be accessed from the agencies home page (http://deq.mt.gov/) and selecting the list of interest from the Online Services drop-down menu.

Comment #: 10

Type: I am identifying a minor typographical or publication error.
Commenter: Lolo National Forest
Received: June 10th, 2009

Comment Text:
Middle Missouri watershed is incorrectly assigned, should be Lower Clark Fork.

DEQ Response:
The commenter is referring to Assessment Unit MT76M002_190, which is listed under the Middle Missouri watershed. The commenter is correct and this AU's watershed location was incorrect. DEQ has updated this record correcting the watershed to the Lower Clark Fork.

Comment #: 11

Type: Other
Commenter: Private Citizen
Received: June 9th, 2009

Comment Text:
DEQ Note: the comment submitted by this citizen consisted of several hand written notes and copies of personal correspondences and opinion letters to newspapers that are dated during 2007 and 2008. The issue of concern for this individual is the use of rotenone by Montana Fish, Wildlife, and Parks (FWP) to control [manage] fisheries in lakes and streams of the South Fork Flathead River basin.

DEQ Response:
The management of fisheries in Montana is the responsibility of the MFWP and specific comments regarding these management actions need to be directed to that agency. Protocol governing this type of activity is governed by state laws, including the Montana Environmental Policy Act (MEPA). Under MEPA the agency taking the action is required to implement all appropriate analysis and public scoping of the activity. MFWP appears to be implementing the activities directed by MEPA where this assumption is based on documents posted on FWP's website, e.g., "South Fork Cutthroat

Conservation Project To Be Discussed At May 12 Meeting." (http://fwp.mt.gov/news/article_7958.aspx. Accessed Aug. 13, 2009). Public comments that are specific to this action and activity need to be submitted to the acting agency, which in this case is FWP

Comment #: 12

Type: I am providing information, which could affect assessments and/or priority rankings.
Commenter: Montana Fish and Wildlife Parks
Received: June 9th, 2009

Comment Text:
Comment submitted via FAX

Comment Attachment:
DEQ Note: the comment letter provided information and comments regarding past assessment decisions on streams that did not receive an assessment review/update during this reporting cycle and remained unchanged from the 2006 assessments. The letter also provided comments on 1) TMDLs that have had official public comment periods conducted and have been finalized and submitted to EPA, and 2) DEQ's solicitation process for requesting data.

DEQ Response:
DEQ thanks the MFWP for taking time to review the state's 303(d) list of waters that are of concern to the MFWP and in preparing a formal comment letter. DEQ will factor the information regarding specific waterbody assessments provided in the comment letter during subsequent assessments of the waterbodies identified

DEQ is also redesigning its solicitation and noticing process for the Integrated Report from the use of notices via US mail to the implementation of an email list serve, which interested parties may opt in or out of as they choose. DEQ list serves may be accessed from the agencies home page (http://deq.mt.gov/) and selecting the list of interest from the Online Services drop-down menu.

GLOSSARY

303(d) List	A compilation of impaired and threatened waterbodies in need of water quality restoration, which is prepared by DEQ and submitted to EPA for approval. This list is commonly referred to as the "303(d) List" because it is prepared in accordance with the requirements of section 303(d) of the federal Clean Water Act of 1972. In the integrated reporting format Category 5 is considered the "303(d) list" by EPA. DEQ develops Water Quality Restoration Plans for all category 4C waters in addition to the TMDLs required for category 5 waters.
305(b) Report	A general overview report of state water quality conditions, which DEQ prepares and submits to EPA in accordance with the requirements of section 305(b) of the federal Clean Water Act of 1972. The integrated reporting format of this document encourages the combination of 305(b) requirements with 303(d) requirements in a single document.
Anthropogenic impacts	Human caused changes leading to reductions in water quality.
Assessment	A complete review of waterbody conditions using chemical, physical, or biological monitoring data alone or in combination with narrative information, that supports a finding as to whether a waterbody is achieving compliance with applicable WQS.
Basins	For water quality planning purposes, Montana is divided into four hydrologic basins or regions: the Columbia Basin (west slope waters draining to the Columbia River), the Upper Missouri Basin (all Missouri River drainages above the Marias River confluence), the Lower Missouri Basin (Missouri River drainages including and downstream of the Marias River, and a segment of the Saskatchewan drainage in Glacier National Park), and the Yellowstone Basin (waters draining into the Yellowstone and the Little Missouri rivers).
Beneficial uses	The uses that a waterbody is capable of supporting when all applicable WQS are met. What standards apply to a particular waterbody depend on its classification under the Montana Water-Use Classification System.
Beneficial Use Support Determination	A finding, based on sufficient credible data, that a state's water is – or is not – achieving compliance with the WQS for its applicable beneficial uses.
Best Management Practices (BMPs)	Those activities, prohibitions, maintenance procedures, or other management practices used to protect and improve water quality. BMPs may or may not be sufficient to achieve WQS and protect beneficial uses.
Biological data	Chlorophyll a data, aquatic biology community information (including fish, macroinvertebrates, and algae), and wildlife community characteristics.

Chemistry and toxicity data	Includes bioassay, temperature and total suspended sediment data and information relating to such factors as toxicants, nutrients, and dissolved oxygen.
Communities	Organisms of a biologically related group (i.e. fish, wildlife, macroinvertebrates or algae).
Data categories	Chemistry/physical, habitat, and biological data used for assessing the availability of sufficient credible data for making aquatic life and fisheries beneficial use support determinations.
Data Quality Objectives	Data quality objectives are systematic planning tools based on the scientific method. They are used to develop data collection designs and to establish specific criteria for the quality of data to be collected. This process documents the criteria for defensible decision-making before an environmental data collection activity begins with consideration given to the implication of the decision, schedule for completion, and available resources.
Degradation	A change in water quality that lowers the quality of high quality waters for a parameter. The term does not include those changes in water quality determined to be non-significant pursuant to 75-5-301(5)(c). [75-5-103(5) MCA]
Full support	A beneficial use determination based on sufficient credible data, that a waterbody is achieving all the WQS for the use in question.
Habitat data	See physical and habitat data.
Hydrogeomorphology	The science relating to the geographical, geological, and hydrological aspects of waterbodies, and to changes to these aspects in response to flow variations and to natural and human-caused events, such a heavy rainfall or channel straightening.
Hydrologic Unit Code (HUC)	A standardized mapping system devised by the US Geologic Survey for the hydrology of the United States. The system employs four basic levels of designation or mapping: regions, sub-regions, accounting units, and cataloging units. Each level is assigned a two-digit code so that a cataloging unit has an eight-digit unique identifier, or code. In Montana, there are 100 "8-digit" or "4th code" HUCs.
Impaired waterbody	A waterbody or stream segment for which sufficient credible data shows that the waterbody or stream segment is failing to achieve compliance with applicable WQS (nonsupport or partial support of beneficial uses). [75-5-103(11) MCA]
Independent evidence	An approach used to make aquatic life use support determinations when a limited array of chemistry/physical, habitat or biological data provide clear evidence that is sufficient to make a beneficial use support determination.
Integrated Water Quality Report (or Integrated Report)	A report providing an overview of the status of state water quality monitoring and planning programs. It combines in one document the information previously submitted to the EPA in separate 303(d) List and 305(b) Report documents.

Macroinvertebrates	Animals without backbones that are visible to the human eye (insects, worms, clams, and snails).
Montana Water-Use Classification System	Montana State regulations [ARM 17.30.606 - 658] assigning state surface waters to one of nine use classes. The class to which a waterbody is assigned defines the beneficial uses that it should support.
Naturally occurring	Water conditions or material present from runoff or percolation over which humans have no control or from developed land where all reasonable land, soil, and water conservation practices have been applied. [75-5-306(2) MCA]
Nonpoint source	Source of pollution, which originates from diffuse runoff, seepage, drainage, or infiltration. [ARM 17.30.602(18)] NPS pollution is generally managed through BMPs or a water quality restoration plan.
Nonsupport	A beneficial use determination, based on sufficient credible data, that a waterbody is not achieving all the WQS for the use in question, and the degree of water quality impairment is relatively severe.
Overwhelming evidence	Information or data from only one data category that, by itself, constitutes sufficient credible data for making an aquatic life use support determination.
Parameter	A physical, biological, or chemical property of state water when a value of that property affects the quality of the state water. [75-5-103(22) MCA]
Partial support	A beneficial use determination, based on sufficient credible data, that a waterbody is not achieving all the WQS for the use in question, but the degree of impairment is not severe.
Pathogens	Bacteria or other disease causing agents that may be contained in water.
Physical and habitat data	Narrative and photo documentation of habitat conditions, habitat surveys and function rankings, direct measurements of riparian or aquatic vegetation communities, and other measures of hydrogeomorphic characteristics and function.
Point source	A discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, or vessel or other floating craft, from which pollutants are or may be discharged. [75-5-103(24) MCA]
Pollutant	As defined in the federal Clean Water Act, pollutant means dredged spoil; solid waste; incinerator residue; sewage; garbage; sewage sludge; munitions; chemical wastes; biological materials; radioactive materials; heat; wrecked or discarded equipment; rock; sand; cellar dirt; and industrial, municipal, and agricultural waste discharged into water (CWA Section 502(6))..

Pollution	Defined by Montana law [75-5-103(25) MCA] as: 1. Contamination or other alteration of the physical, chemical, or biological properties of state waters that exceed that permitted by Montana WQS, including but not limited to standards relating to changes in temperature, taste, color, turbidity or odor; or, 2. The discharge, seepage, drainage, infiltration, or flow of liquid, gaseous, solid, radioactive, or other substance into state water that will or is likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, or welfare, to livestock, or to wild animals, bird, fish or other wildlife, or 3. Discharge, seepage, drainage, infiltration, or flow that is authorized under the pollution discharge permit rules of the board is not pollution under this chapter. Activities conducted under the conditions imposed by the department in short term authorizations pursuant to 75 5 308 MCA are not considered pollution under this chapter.
Prioritization	A ranking of impaired waterbodies conducted by DEQ in consultation with the statewide advisory group using established criteria to rank waterbodies as high, moderate, or low priority for preparing Water Quality Restoration Plans (specifically TMDL plans).
Reasonable land, soils, and water conservation practices	Methods, measures, or practices that protect present and reasonably anticipated beneficial uses. These practices include but are not limited to structural and nonstructural controls and operation and maintenance procedures. Appropriate practices may be applied before, during, or after pollution producing activities. [ARM 17.30.602(21)]
Reference Condition	The condition of a waterbody capable of supporting its present and future beneficial uses when all reasonable land, soil, and water conservation practices have been applied. Reference conditions include natural variations in biological communities, water chemistry, soils, hydrology, and other natural physiochemical variations.
Region	See Basin.
Riparian area	Plant communities contiguous to and affected by surface and subsurface hydrologic features of natural waterbodies. Riparian areas are usually transitional between streams and upland.
Segment	A defined portion of a waterbody.
State water	A body of water, irrigation system, or drainage system, either surface or underground (excludes water treatment lagoons or irrigation waters, which do not return to state waters).
Sub-major basin	The aggregation of several watersheds or HUCs into a larger drainage system. The US Geological Survey has defined 16 sub-major basins (sub-region) in Montana with at least two in each of the Montana basins (regions).

Sufficient credible data	Chemical, physical, or biological monitoring data, alone or in combination with narrative information that supports a finding as to whether a waterbody is achieving compliance with applicable WQS. [75-5-103(30) MCA]
Suspended solids	Materials such as silt that may be contained in water and do not dissolve.
Threatened waterbody	A waterbody for which sufficient credible data and calculated increases in loads show that the water body or stream segment is fully supporting its designated uses but threatened for a particular designated use because of: (a) proposed sources that are not subject to pollution prevention or control actions required by a discharge permit, the nondegradation provisions, or reasonable land, soil, and water conservation practices; or (b) documented adverse pollution trends. [75-5-103(31) MCA]
Total Maximum Daily Load (TMDL)	The sum of the individual waste load allocations for point sources and load allocations for both nonpoint sources and natural background sources established at a level necessary to achieve compliance with applicable WQS. [75-5-103(32) MCA] In practice, TMDLs are water quality restoration targets for both point and nonpoint sources that are contained in a water quality restoration plan or in a permit.
Toxicant	A toxic agent
Waterbody	A lake, reservoir, river, stream, creek, pond, marsh, wetland, or other body of water above the ground surface.

Water Quality Assessment Categories	A system defined by EPA guidance for classifying the water quality status based on the waters' assessment status. The five categories included in this system are: Category 1, Category 2 (2, 2A and 2B), Category 3, Category 4 (4A, 4B, and 4C), and Category 5. Category 1: Waters for which all applicable beneficial uses have been assessed and all uses have been determined to be fully supported. Category 2: Waters for which available data and/or information indicate that some, but not all of the beneficial uses are supported. Subcategory 2A: Available data and/or information indicate that some, but not all of the beneficial uses are supported. Subcategory 2B: Available data and/or information indicate that a water quality standard is exceeded due to an apparent natural source in the absence of any identified anthropogenic sources. Category 3: Waters for which there is insufficient data to assess the use support of any applicable beneficial use, so no use support determinations have been made. Category 4: Waters where one or more beneficial uses have been assessed as being impaired or threatened, however, either all necessary TMDLs have been completed or are not required: Subcategory 4A: All TMDLs needed to rectify all identified threats or impairments have been completed and approved. Subcategory 4B: Waterbodies are on lands where "other pollution control requirements required by local, State, or Federal authority" [see 40 CFR 130.7(b)(1)(iii)] are in place, are expected to address all waterbody-pollutant combinations, and attain all WQS in a reasonable period of time. These control requirements act "in lieu of" a TMDL, thus no actual TMDLs are required. Subcategory 4C: Identified threats or impairments result from pollution categories such as dewatering or habitat modification and, thus, the calculation of a Total Maximum Daily Load (TMDL) is not required. Category 5: Waters where one or more applicable beneficial uses have been assessed as being impaired or threatened, and a TMDL is required to address the factors causing the impairment or threat.
Water quality limited segment (WQLS)	A body of water that is not fully supporting its beneficial uses (an impaired waterbody). If there is no water quality restoration plan with an approved TMDL for a waterbody, it is listed on the 303 (d) List of impaired waters.
Water quality restoration plan	A plan to improve water quality to achieve state WQS. Such a plan may also be referred to as a "TMDL plan" if it addresses the eight criteria used by the EPA to approve TMDL plans.

Water quality standards	the standards adopted in ARM 17.30.601 et seq. and WQB-7 to conserve water by protecting, maintaining, and improving suitability and usability of water for public water supplies, wildlife, fish and aquatic life, agriculture, industry, contact recreation, and other beneficial uses.
Weight of evidence	An approach used to make aquatic life use support determinations when there are high levels of information from all three data categories (chemistry/physical, habitat and biological), including two biological communities.

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