2002 MONTANA 305(b) REPORT

This *2002 Montana 305(b) Report* provides an overview of Montana's surface water quality assessment program. It is a "companion piece" to the recently-issued *2002 Montana 303(d) List; A Compilation of Impaired and Threatened Waterbodies in Need of Water Quality Restoration*. As required by the federal Clean Water Act, the *303(d) List* focuses on those waters in the state which have been assessed as having one or more of their beneficial uses impaired by human-caused pollution. The 305(b) Report expands the perspective to include information relating to state waters which have been assessed as fully supporting all applicable beneficial uses as well as waters where information collected to date is not sufficient to complete beneficial use support determinations.

This report is being published in two forms. A compact disk is being utilized to provide the report to Region VIII of EPA in an electronic format which complies with EPA requirements. The contents of the disk include this text file, an Access database, ArcView GIS shape files, and the assessment data records for all waters included in Montana's water quality assessment database. Copies of this disk are available on request to individuals and organizations which have the computer software necessary to utilize them.

For general public use, this report is being published online at the EnviroNet web site. This version contains exactly the same information as the compact disk version, but internet access is all that is required to view the information. This text portion of the report is readable using Adobe Acrobat Reader, which can be downloaded at no cost from many web sites. The database, map and assessment record sheet materials may be accessed by means of an interactive system which allows the user to search for information employing a variety of criteria.

No paper copy version of this report is being published for the reason that a paper copy of all the material included herein would run several thousand pages. Even a version which did not include the assessment record sheets would be hundreds of pages.

Montana Surface Waters Overview

Montana is the fourth largest state in the Union with 145,552 square miles of land area. Its population of 902,195 (2000 census) produces a sparse population of 6.2 persons per square mile. Population, and population growth, are concentrated in the valleys of the western and southwestern portion of the state. Population increased by 12.9% during the 1990s.

The eastern portion of the state is characterized by glaciated plains and northwestern great plains ecoregions. These give way to a mountain valley and foothill prairie region along the Rocky Mountain Front and the lower elevations of the Missouri and Yellowstone River headwaters. The western third of the state lies within the middle and northern Rocky Mountain ecoregions.

Montana contains headwater streams of the Clark Fork-Pend Oreille-Columbia, Missouri-Yellowstone-Mississippi and St. Mary-Saskatchewan-Nelson watersheds. For administrative purposes the Montana Department of Environmental Quality (DEQ) has identified four administrative basins in the state:

- Columbia – all Montana's west-draining waters, including the Clark Fork, Flat Head, and Kootenai Rivers.
- Upper Missouri – the Missouri River drainage downstream to the confluence with the Marias River.

- Lower Missouri – the remaining Missouri River drainage in the state, including the Marias, Musselshell and Milk rivers. The Montana headwaters of the St. Mary drainage are also included in this basin.
- Yellowstone – all waters of the Yellowstone River in Montana. Waters of the Little Missouri drainage in Montana are also included.

Efforts to improve the accuracy of the inventory of waters of the United States have been continuing for a number of years. The USGS and EPA, with assistance from other federal and state entities, have produced first the River Reach File (RF3) and then, in the last couple of years, the National Hydrography Dataset (NHD). The NHD is the source of the stream and lake size estimates used in this report. Because the USGS topographical maps which were the primary data source used to develop the RF3 and NHD were made over a period of decades, the coverage detail and accuracy varies across the state. The consistency and accuracy of the coverage for perennial streams and the larger lakes is excellent, but there is substantial variability with respect to ephemeral and intermittent streams and the small ponds and wetlands. Fortunately, it is the perennial streams and the larger lakes and reservoirs which are the focus of water quality issues and management, and Montana's water quality assessment effort concentrates on these larger waterbodies unless specific factors, such as the presence of likely causes of pollution, draws attention to particular intermittent or ephemeral streams or to individual ponds or wetlands.

The table which follows this paragraph displays size estimates for waters is the four administrative basins. The figures shown for streams, ditches and canals include all linear waters included in the NHD dataset. The size estimates for perennial streams, ditches and canals are relatively solid estimates, while those for intermittent and ephemeral streams are more tenuous. Review of the various dataset editions intended to list all lakes, reservoirs, ponds, and wetlands in the state revealed substantial variation in their waterbody number and total size estimates. For this reason, the size estimates for these waters displayed by the table are based on named waters having an area of at least 5 acres.

MONTANA SURFACE WATERS

RIVER BASINS	Perennial Streams (Miles)	Intermittent & Ephemeral Streams (Miles)	Ditches & Canals (Miles)	Lakes Ponds & Reservoirs*** (Acres)
Columbia	16,997	12,522	1,002	223,986
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 at least 5 acres in area.

Size estimates derived from National Hydrography Dataset

Surface Water Quality Assessment Process

Introduction

The water quality assessment of streams, lakes and wetlands is an important step in a process intended to ensure that all waterbodies in the state will have water quality adequate to support all of their intended beneficial uses. The process has been developed and shaped by legal mandates, water quality standards, the tools and techniques of water quality monitoring, the availability of information, and the funds and administrative resources that can be devoted to assessment efforts.

In overview, the main steps of this process in Montana are:

1. State waters are classified under a system that identifies the beneficial uses that each waterbody will be expected to support. State waters in Montana initially were classified in 1955 and the system has been substantially modified over the years.

2. State water quality standards identify the specific water quality conditions that must be met for a waterbody to support each beneficial use.

3. Many entities and organizations collect data (for many different reasons) which indicate the quality of waters and their compliance with the applicable water quality standards.

4. The Department of Environmental Quality searches out the available data and identifies waterbodies for which there are "sufficient credible data" to make valid and reliable determinations of beneficial use support.

5. When sufficient data are available for a waterbody, DEQ compares the data with water quality criteria and guidelines to make "beneficial use-support determinations." Waterbodies that do not fully support all uses designated under the standards are placed on the State's 303(d) List of impaired waters.

Montana Beneficial-Use Classification

Montana waterbodies are classified according to the present and future beneficial uses that they normally would be capable of supporting. The state Water-Use Classification System (ARM 17.30.604-629) identifies the following beneficial uses:

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

The current use classification of each waterbody in Montana was assigned on the basis of its actual or anticipated uses in the early 1970s**.** Waterbodies are classified primarily by: 1) the level of protection that they require; 2) the type of fisheries that they support (warm water or cold water) or; 3) their natural ability to support use for drinking water, agriculture etc. The use classification system was designed for streams, so some of the uses designated by the classification system are not always applicable to lakes and wetlands. The designated beneficial uses for each class in the system are as follows:

A-CLOSED – Waters are suitable for drinking, culinary and food processing purposes after simple. Also suitable for swimming, recreation, and growth and propagation of fishes and associated aquatic life (although access restrictions to protect public health may limit actual use).

A-1 – Waters are suitable for drinking, culinary, and food processing purposes after conventional treatment for removal of naturally present impurities. Also suitable for bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply.

B-1 – Waters are 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; and agricultural and industrial water supply.

B-2 – Waters are 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; and agricultural and industrial water supply.

B-3 – Waters are 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; and agricultural and industrial water supply.

C-1 – Waters are suitable for bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

C-2 – Waters are suitable for bathing, swimming and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

C-3 – Waters are suitable for bathing, swimming, and recreation; growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl and furbearers. Naturally marginal for drinking, culinary, and food processing purposes, agriculture and industrial water supply.

I – (Impaired) The State of Montana has a goal to improve these waters to 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; and agricultural and industrial water supply**.**

Water Quality Standards

Montana water quality standards include both use-specific components and general provisions. Standards may be either numerical or narrative. The use-specific standards vary depending on the water-use classification, whereas the general provisions apply to all state waters. Narrative standards provide a minimum level of protection to state water and may be used to limit the discharge of pollutants, or the concentration of pollutants in state waters not covered under numerical standards.

Montana has established numerical water quality standards relating to:

- Chronic and acute factors affecting aquatic life,
- Human health,
- Fecal coliform levels,
- Changes in pH, turbidity, color, and temperature.

Some water quality standards can be specified in absolute, numerical terms, such as "acute aquatic life standards," or "chronic aquatic life standards" which limit the average concentration of a toxic over a period of time. Many others, however, are defined in terms of change from what would naturally exist, such as "no increase above naturally occurring condition" or "Induced variation of hydrogen ion concentration (pH) within the range of 6.5 to 8.5 must be less than 0.5 pH units."

Montana "narrative water quality standards" encompass two basic concepts:

- Activities which would result in nuisance aquatic life are prohibited,
- No increases are allowed above naturally occurring conditions of sediment, settleable solids, oils or floating solids, which are harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish or other wildlife.

DEQ interprets nuisance aquatic life as excessive biomass (e.g., alga growth) or the dominance of an undesirable species. "Naturally occurring" refers to conditions or materials present from over which man has no control, or from developed land where "reasonable" land, soil, and water conservation practices have been applied. The Montana Surface Water Quality Standards and Procedures define "reasonable" land, soil, and water conservation practices as follows:

> *Reasonable land, soil, and water conservation practices" means 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.*

Conditions resulting from reasonable operation of dams in existence July 1, 1971, are considered natural.

DEQ uses reference condition to determine if narrative water quality standards are being achieved. The term "Reference condition" is defined as 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. In other words, reference condition reflects a waterbody's greatest potential for water quality given historic land use activities.

DEQ applies the reference condition approach for making beneficial use-support determinations for certain pollutants (such as sediment) that have specific narrative standards. All classes of waters are subject to the provision that there can be no increase above naturally occurring concentrations of sediment and settable solids, oils, or floating solids sufficient to create a nuisance or render the water harmful, detrimental or injurious. These levels depend on site-specific factors, so the reference condition approach is used.

Identification of Available Water Quality Data

In recent years DEQ's water quality monitoring data along with information from other selected sources have been incorporated into computerized water quality databases. These records and databases provide a basic foundation, which is updated as new monitoring data is collected by DEQ or obtained from others sources. Then, early in each two-year assessment cycle, DEQ sends out requests for information to several hundred individuals, organizations, and agencies involved in water quality monitoring and management. Responses to these requests provide much useful information as well as references to additional materials available from other sources. Searches for these references and general searches for additional water quality information are conducted on the library catalogs and databases of Montana university system and resource agency libraries. The data and information obtained from these outside

sources are combined with the results obtained from DEQ's ongoing monitoring efforts to provide the basis for water quality assessments.

Sufficient Credible Data (SCD) Assessment

Montana law 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." This definition is consistent with a model developed by EPA for assessing the beneficial uses of streams on the basis of a combination of physical (habitat), biological, and chemical monitoring. For example, EPA recommends that monitoring for aquatic life use support include the collection of habitat and community-level biological data as well as the measurement of chemical parameters in water and sediment.

Montana DEQ drew on the EPA model to develop sufficient credible data criteria and decision tables to evaluate data adequacy for lakes and wetlands as well as for streams. Methods and criteria are specified to evaluate SCD for the Montana Water-Use Classification System beneficial uses. These uses are: 1) drinking, culinary use, and food processing; 2) aquatic life support for fishes, associated aquatic life, waterfowl, and furbearers; 3) bathing, swimming, and recreation; 4) agriculture supply; and, 5) industrial supply.

The sufficient credible data review focuses on four components that contribute to data validity and reliability for water quality assessment:

- Technical soundness of methodology
- Spatial/temporal coverage
- Data quality
- Data currency.

In most cases a finding that there is sufficient credible data will result when several types of data have been collected over a period of time using sound technical methods and there are no indications of recent changes to the water body that would invalidate previously obtained results.

Aquatic Life and Fisheries Support SCD – The Montana Water-Use Classification System requires that all waters support the "growth and propagation of fishes and associated aquatic life, waterfowl, and furbearers" (ARM 17.30.604-624). Based on this requirement, the "aquatic life" assessment considers fish, invertebrates, aquatic plants, and associated wildlife. Therefore, the aquatic life sufficient credible data assessment entails an evaluation and scoring of the following data categories:

> **Habitat/physical** – includes qualitative and /or quantitative riparian and aquatic vegetation information, and hydrogeomorphic characteristics and functions.
>
> **Biology** – includes chlorophyll *a* data; and aquatic biological community data such as fish, macroinvertebrates and algae; and wildlife community characteristics.
>
> **Chemistry/toxicity** – includes bioassay, temperature and total suspended sediment data and chemistry data such as toxicants, nutrients, and dissolved oxygen.

Ideally, SCD for aquatic life would include data pertaining to all three categories; but very strong evidence relating to two data categories can constitute SCD for an aquatic life beneficial use-support determination.

Drinking Water and Contact Recreation SCD – For drinking water and contact recreation uses, evaluation of multiple data categories is not necessary; the data are simply rated as sufficient or insufficient for each of these uses based on tables which apply the four general components of data adequacy to the specific standards indicating drinking water and contact recreation use support.

Agricultural and Industrial Water Supply SCD – Generally, if there are sufficient credible data for drinking water, contact recreation, and aquatic life beneficial use-support determinations, there are also sufficient data to make agriculture and industry beneficial use-support determinations. However, additional salinity and toxicity information may be required for agriculture supply use-support determinations.

Beneficial Use-support Determination (BUD)

Once it is ascertained that sufficient credible data are available for a waterbody, the assessment process moves to determine the level of beneficial use support. The degree of support for each beneficial use is rated using four categories:

- Full support
- Partial support
- Non-support
- Threatened

A use is fully supported when all water quality standards applicable to that use are met. When one or more standards are not met due to human activities, the water body is either "not supporting" or "partially supporting" the beneficial use tied to that standard. A use that is currently fully supported but for which observed trends or proposed new sources of pollution indicate a high probability of future impairment may be rated as "threatened." Because the standards for determining use support are different for each use, the use-support determinations for the various uses of a waterbody are often not the same. Only those beneficial uses that apply to the particular water-use classification of a waterbody are evaluated for that waterbody.

Beneficial Use Determination, Aquatic Life and Fisheries – Making aquatic life and fisheries use-support determinations can be a complex process because of the amount and variety of information that may bear on the decision. In some cases the reviewer will evaluate, compare, and weigh many bits of physical, biological, chemical, and habitat data in reaching the aquatic life and fisheries use-support determinations for a waterbody. In other cases clear evidence of use impairment or support is provided from only one or two of the aquatic life data categories (habitat/physical, biology, and chemistry). Where there is a wide variety of data with no single element that by itself supports a conclusion, the evaluator follows a process employing criteria that lead to a determination based on the overall weight of evidence. A slightly different process is followed when data are not available for all the categories, yet there is clear evidence to support a particular determination. Whatever the process used, data showing that aquatic life and fisheries uses are “moderately impaired” result in a “partially supporting” determination. Data indicating that aquatic life and fisheries uses are “severely impaired” result in the waterbody being listed as “not supporting” these uses.

Beneficial Use Determination, Other Uses – Beneficial use determinations for the drinking water, contact recreation, agriculture supply, and industrial supply uses are relatively straightforward. For each of these uses criteria based on water quality standards are listed in a table, the available data for a waterbody are evaluated using the listed criteria, and an overall use-support determination is made based on consideration of all the criteria for which data are available. In some situations the overall rating will result from clear evidence of support or impairment associated with one or two criteria; other

determinations may be derived from indications of water quality derived from the entire set of criteria which apply to a particular use.

Note: A detailed presentation of the Montana water quality assessment methodology is provided in Appendix A of the *2002 Montana 303(d) List* http://nris.state.mt.us/wis/environet/2002_303dhome.html.

Surface Water Assessment Result Summary

Adoption of the new assessment process as the basis for the water quality assessments reported in Montana's 2000 *303(d) List* and *2001 305(b) Report* caused the DEQ to focus its efforts in developing those reports on applying the new methodology to data which had already been collected either by DEQ staff or by other entities. Very little new field monitoring was accomplished during that reporting cycle. During the 2002 reporting cycle the emphasis has returned to obtaining new field data. DEQ has continued to seek out information from other entities, but it also has been able to give renewed emphasis to data collection by its own staff or contract consultants.

During the 2002 cycle, assessments have been done for 86 waters for which there were insufficient data to assess in 2000. Several of these waters have been found to be fully supporting all applicable beneficial uses, while others have been assessed as impaired for one or more uses and have been added to the 303(d) List. Another 54 waters, listed as impaired in 2000, have undergone additional assessment which has often resulted in the identification of more impaired uses or new causes of impairment. Seven waters not previously included in the Montana database were also evaluated during the 2002 cycle, with three determined to be fully supporting all uses and four rated as being impaired for at least one use. Data collected during the 2002 field season for another 20 to 30 waters are still being reviewed. This data should be sufficient to allow assessment of most of these waters.

The interactive database portion of this report provides detailed information about the assessment status of more than 1000 waters included in the Montana assessment database. For each water the assessment determinations, maps, and the documentation supporting the assessment determinations may be accessed. Readers interested in reviewing the status of specific waters should use that section of this report. The tables on the next few pages of this text section of the report provide a statewide summary of the current water quality status of Montana surface waters.

MONTANA 2002 WATER QUALITY ASSESSMENT SUMMARY

Columbia

	Waterbody Segments		Stream Miles		Lake/Wetland Area	
	Number	Percent	Miles	Percent	Acres	Percent
Fully Supporting	17	4.6%	147	3.5%	13,503	6.7%
Impaired	204	55.4%	2,550	60.9%	162,427	80.4%
Reassess	147	39.9%	1,488	35.6%	26,209	13.0%
Total	368	100.0%	4,185	100.0%	202,139	100.0%

Upper Missouri

	Waterbody Segments		Stream Miles		Lake/Wetland Area	
	Number	Percent	Miles	Percent	Acres	Percent
Fully Supporting	14	4.2%	209	4.7%	0	0.0%
Impaired	192	57.8%	3,083	68.9%	62,293	73.8%
Reassess	126	38.0%	1,183	26.4%	22,112	26.2%
Total	332	100.0%	4,475	100.0%	84,405	100.0%

Lower Missouri

	Waterbody Segments		Stream Miles		Lake/Wetland Area	
	Number	Percent	Miles	Percent	Acres	Percent
Fully Supporting	13	7.3%	281	4.5%	3,040	1.0%
Impaired	74	41.3%	3,079	49.4%	256,711	85.3%
Reassess	92	51.4%	2,869	46.1%	41,138	13.7%
Total	179	100.0%	6,229	100.0%	300,889	100.0%

Yellowstone

	Waterbody Segments		Stream Miles		Lake/Wetland Area	
	Number	Percent	Miles	Percent	Acres	Percent
Fully Supporting	9	4.8%	247	4.7%	0	0.0%
Impaired	59	31.2%	949	18.2%	8,152	47.0%
Reassess	121	64.0%	4,014	77.0%	9,176	53.0%
Total	189	100.0%	5,210	100.0%	17,328	100.0%

STATE

	Waterbody Segments		Stream Miles		Lake/Wetland Area	
	Number	Percent	Miles	Percent	Acres	Percent
Fully Supporting	53	5.0%	884	4.4%	16,543	2.7%
Impaired	529	49.5%	9,661	48.1%	489,583	81.0%
Reassess	486	45.5%	9,554	47.5%	98,635	16.3%
Total	1068	100.0%	20,099	100.0%	604,761	100.0%

Source: Montana 2002 Assessment Database

MONTANA 2002 BENEFICIAL USE ASSESSMENT SUMMARY

BENEFICIAL USE - AQUATIC LIFE SUPPORT

River and Stream miles in the assessment database to which this use applies = 20,099 Mi.
Lake, Reservoir, & Wetland acres in the assessment database to which this use applies = 604,760 Ac.

Use-Support Assessment	Streams and Rivers		Lakes, Reservoirs, Wetlands	
	Waters	Miles	Waters	Acres
Fully Supporting	102	2,007	12	80,861
Not Supporting	132	1,998	5	6,733
Partial Support	307	6,243	15	188,019
Threatened	0	0	3	7,550
Insufficient Data to Assess	466	9,851	36	321,597

BENEFICIAL USE - COLD WATER FISHERY

River and Stream miles in the assessment database to which this use applies = 11,948 Mi.
Lake, Reservoir, & Wetland acres in the assessment database to which this use applies = 547,296 Ac.

Use-Support Assessment	Streams and Rivers		Lakes, Reservoirs, Wetlands	
	Waters	Miles	Waters	Acres
Fully Supporting	77	951	10	202,547
Not Supporting	125	1,943	5	6,971
Partial Support	274	4,334	5	40,611
Threatened	1	8	3	7,550
Insufficient Data to Assess	355	1,748	23	289,617

BENEFICIAL USE - WARM WATER FISHERY

River and Stream miles in the assessment database to which this use applies = 8,343 Mi.
Lake, Reservoir, & Wetland acres in the assessment database to which this use applies = 61,366 Ac.

Use-Support Assessment	Streams and Rivers		Lakes, Reservoirs, Wetlands	
	Waters	Miles	Waters	Acres
Fully Supporting	20	972	2	3,040
Not Supporting	5	113	1	300
Partial Support	46	2,363	4	13,180
Threatened	0	0	0	0
Insufficient Data to Assess	108	4,895	9	44,846

BENEFICIAL USE - DRINKING WATER SUPPLY

River and Stream miles in the assessment database to which this use applies = 14,533 Mi.
Lake, Reservoir, & Wetland acres in the assessment database to which this use applies = 591,761 Ac.

Use-Support Assessment	Streams and Rivers		Lakes, Reservoirs, Wetlands	
	Waters	Miles	Waters	Acres
Fully Supporting	232	4,004	10	172,012
Not Supporting	133	2,796	11	301,809
Partial Support	11	215	2	953
Threatened	0	0	0	0
Insufficient Data to Assess	499	7,518	33	116,988

Source: Montana 2002 Assessment Database

MONTANA 2002 BENEFICIAL USE ASSESSMENT SUMMARY (Cont.)

BENEFICIAL USE - PRIMARY CONTACT (RECREATION)

River and Stream miles in the assessment database to which this use applies = 20,099 Mi.

Lake, Reservoir, & Wetland acres in the assessment database to which this use applies = 604,760 Ac.

Use-Support Assessment	Streams and Rivers		Lakes, Reservoirs, Wetlands	
	Waters	Miles	Waters	Acres
Fully Supporting	263	4,725	15	205,107
Not Supporting	36	556	3	38,512
Partial Support	171	2,931	8	270,803
Threatened	1	136	0	0
Insufficient Data to Assess	536	11,752	35	90,338

BENEFICIAL USE - AGRICULTURAL USE SUPPORT

River and Stream miles in the assessment database to which this use applies = 14,533 Mi.

Lake, Reservoir, & Wetland acres in the assessment database to which this use applies = 591,761 Ac.

Use-Support Assessment	Streams and Rivers		Lakes, Reservoirs, Wetlands	
	Waters	Miles	Waters	Acres
Fully Supporting	462	8,330	17	233,157
Not Supporting	14	98	3	3,628
Partial Support	32	714	7	48,753
Threatened	0	0	0	0
Insufficient Data to Assess	367	5,391	29	306,224

BENEFICIAL USE - INDUSTRIAL SUPPLY

River and Stream miles in the assessment database to which this use applies = 14,533 Mi.

Lake, Reservoir, & Wetland acres in the assessment database to which this use applies = 591,761 Ac.

Use-Support Assessment	Streams and Rivers		Lakes, Reservoirs, Wetlands	
	Waters	Miles	Waters	Acres
Fully Supporting	470	7,965	23	286,757
Not Supporting	10	168	3	3,628
Partial Support	37	1,004	2	3,778
Threatened	0	0	0	0
Insufficient Data to Assess	358	5,396	28	297,599

Source: Montana 2002 Assessment Database

MONTANA 2002 CAUSES OF IMPAIRMENT SUMMARY

Cause/Sub-Cause Category	Streams and Rivers				Lakes, Reservoirs, & Wetlands			
	Segments Impaired	% of Tot. Impaired Segments	Miles Impaired	% of Tot. Impaired Miles	Segments Impaired	% of Tot. Impaired Segments	Acres Impaired	% of Tot. Impaired Acres
Pesticides					1	3.7%	3,800	0.8%
Priority organics	2	0.4%	45	0.5%				
Nonpriority organics	1	0.2%	9	0.1%				
PCB's	4	0.8%	70	0.7%	2	7.4%	129,357	26.4%
Metals	182	36.3%	3,633	37.6%	15	55.6%	437,822	89.4%
Arsenic	36	7.2%	391	4.0%	3	11.1%	36,789	7.5%
Cadmium	38	7.6%	534	5.5%				
Copper	57	11.4%	1,095	11.3%				
Chromium	1	0.2%	1	0.0%	1	3.7%	3,781	0.8%
Lead	36	7.2%	1,085	11.2%	2	7.4%	246,600	50.4%
Mercury	44	8.8%	1,292	13.4%	6	22.2%	418,837	85.5%
Selenium	7	1.4%	78	0.8%	5	18.5%	13,575	2.8%
Zinc	42	8.4%	614	6.4%				
Unionized Ammonia	2	0.4%	105	1.1%	1	3.7%	35,180	7.2%
Sulfates	2	0.4%	19	0.2%	2	7.4%	9,100	1.9%
Nutrients	112	22.3%	2,792	28.9%	7	25.9%	178,049	36.4%
Phosphorus	15	3.0%	399	4.1%				
Nitrogen	13	2.6%	175	1.8%	1	3.7%	5,600	1.1%
Nitrate	15	3.0%	280	2.9%				
Other nutrients	2	0.4%	139	1.4%	2	7.4%	3,861	0.8%
pH	14	2.8%	106	1.1%	1	3.7%	20	0.0%
Siltation	212	42.2%	3,723	38.5%	5	18.5%	135,369	27.6%
Organic enrichment/Low DO	6	1.2%	199	2.1%	2	7.4%	129,807	26.5%
Salinity/TDS/chlorides	5	1.0%	129	1.3%	1	3.7%	3,500	0.7%
Salinity/TDS/sulfates	12	2.4%	597	6.2%	4	14.8%	4,572	0.9%
Thermal modifications	54	10.8%	1,463	15.1%				
Flow alteration	199	39.6%	4,145	42.9%	7	25.9%	43,874	9.0%
Dewatering	103	20.5%	1,949	20.2%	1	3.7%	3,781	0.8%
Water level fluctuations		0.0%		0.0%	4	14.8%	36,084	7.4%
Other habitat alterations	334	66.5%	6,409	66.3%	4	14.8%	8,465	1.7%
Bank erosion	87	17.3%	1,829	18.9%				
Channel incisement	21	4.2%	339	3.5%				
Riparian degradation	124	24.7%	3,199	33.1%				
Fish habitat degradation	95	18.9%	1,516	15.7%	1	3.7%	3,781	0.8%
Pathogens	14	2.8%	434	4.5%				
Radiation	1	0.2%	81	0.8%				
Oil and grease	1	0.2%	24	0.2%				
Suspended solids	20	4.0%	367	3.8%				
Noxious aquatic plants	2	0.4%	13	0.1%	4	14.8%	289,280	59.1%
Algal Grwth/Chlorophyll a	15	3.0%	340	3.5%	3	11.1%	131,027	26.8%
Total toxics	2	0.4%	30	0.3%				
Turbidity	10	2.0%	108	1.1%				
State Total Impaired	**502**		**9,660**		**27**		**489,582**	

Source: 2002 Montana Assessment Database

MONTANA 2002 SOURCES OF IMPAIRMENT SUMMARY

Source/Sub-Source Category	Streams and Rivers				Lakes, Reservoirs, & Wetlands			
	Segments Impaired	% of Tot. Impaired Segments	Miles Impaired	% of Tot. Impaired Miles	Segments Impaired	% of Tot. Impaired Segments	Acres Impaired	% of Tot. Impaired Acres
Industrial Point Sources	9	1.8%	143	1.5%				
Municipal Point Sources	14	2.8%	442	4.6%	2	7.4%	161,187	32.9%
Domestic Wastewater Lagoon					1	3.7%	3,500	0.7%
Agriculture	301	60.0%	6,898	71.4%	18	66.7%	315,386	64.4%
Crop-related Sources	111	22.1%	3,323	34.4%	8	29.6%	22,877	4.7%
Grazing related Sources	218	43.4%	5,214	54.0%	3	11.1%	4,852	1.0%
Intensive Animal Feeding Operations	11	2.2%	230	2.4%				
Silviculture	94	18.7%	1,144	11.8%	5	18.5%	137,357	28.1%
Harvesting, Restoration, Residue Mngt	3	0.6%	61	0.6%				
Forest Management					1	3.7%	3,800	0.8%
Logging Road Construction/Maintenance	42	8.4%	439	4.5%	2	7.4%	6,030	1.2%
Construction	59	11.8%	1,263	13.1%	4	14.8%	35,864	7.3%
Highway/Road/Bridge Construction	41	8.2%	800	8.3%	3	11.1%	3,364	0.7%
Land Development	17	3.4%	448	4.6%	1	3.7%	35,180	7.2%
Urban Runoff/Storm Sewers	8	1.6%	161	1.7%	1	3.7%	126,007	25.7%
Resource Extraction	173	34.5%	2,593	26.8%	7	25.9%	291,090	59.5%
Surface Mining	1	0.2%	3	0.0%				
Subsurface Mining	10	2.0%	98	1.0%				
Placer Mining	15	3.0%	162	1.7%	1	3.7%	5,500	1.1%
Dredge Mining	11	2.2%	97	1.0%				
Petroleum Activities					1	3.7%	9	0.0%
Mill Tailings	20	4.0%	342	3.5%				
Mine Tailings	32	6.4%	364	3.8%				
Acid Mine Drainage	55	11.0%	698	7.2%	3	11.1%	40,561	8.3%
Abandoned mining	131	26.1%	1,896	19.6%	6	22.2%	291,081	59.5%
Inactive mining	1	0.2%	38	0.4%				
Land Disposal	10	2.0%	105	1.1%	1	3.7%	35,180	7.2%
Onsite Wastewater Systems (Septic Tanks)	1	0.2%	29	0.3%				
Hydromodification	167	33.3%	4,216	43.6%	8	29.6%	175,439	35.8%
Channelization	59	11.8%	1,393	14.4%				
Dredging	2	0.4%	22	0.2%				
Dam Construction	15	3.0%	544	5.6%				
Upstream Impoundment	8	1.6%	328	3.4%	1	3.7%	126,007	25.7%
Flow Regulation/Modification	87	17.3%	2,254	23.3%	6	22.2%	143,089	29.2%
Bridge Construction	9	1.8%	181	1.9%				
Habitat Modification (other than Hydromod.)	112	22.3%	2,507	26.0%	1	3.7%	3,781	0.8%
Removal of Riparian Vegetation	48	9.6%	1,263	13.1%				
Bank or Shore Modification/Destabilization	58	11.6%	1,296	13.4%				
Atmospheric Deposition	4	0.8%	58	0.6%	3	11.1%	376,507	76.9%
Leaking Underground Storage Tanks	1	0.2%	9	0.1%				
Highway Maintenance and Runoff	38	7.6%	486	5.0%				
Spills	1	0.2%	26	0.3%				
Contaminated Sediments	21	4.2%	234	2.4%				
Debris and bottom deposits	1	0.2%	1	0.0%	2	7.4%	250,500	51.2%
Internal nutrient cycling (lakes)					1	3.7%	35,180	7.2%
Sediment resuspension	1	0.2%	24	0.3%				
Recreation/Tourism Activities	1	0.2%	12	0.1%				
Groundwater Loadings	1	0.2%	37	0.4%				
Other	4	0.8%	57	0.6%				
Source Unknown	14	2.8%	287	3.0%	4	14.8%	138,657	28.3%
State Total Impaired	**502**		**9,660**		**27**		**489,582**	

Source: 2002 Montana Assessment Database

Glossary of Terms

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 water quality standards.

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 water quality standards are met. What standards apply to a particular waterbody depend on its classification under the Montana Water-Use Classification System.

Beneficial use determination - A finding, based on sufficient credible data, that a state water is – or is not – achieving compliance with the water quality standards for its applicable 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).

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 nonsignificant 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 water quality standards for the use in question.

Habitat data – See physical and habitat data.

Hydrologic units (HUCs) – Watersheds delineated by the US Geologic Survey as fourth order drainages and assigned Hydrologic Unit Codes based on a standardized system. In Montana, there are several HUCs in each sub-major basin and two or more sub-major basins in each water basin.

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 water quality standards (nonsupport or partial support of beneficial uses). [75-5-103(11) MCA]

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 - 614] 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)] Nonpoint source pollution is generally managed through best management practices or a water quality restoration plan.

Nonsupport – A beneficial use determination, based on sufficient credible data, that a waterbody is not achieving all the water quality standards 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 which, 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 water quality standards for the use in question, but the degree of impairment is not severe.

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]

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 water quality standards, 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.

Reasonable land, soil, 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.

Segment – A defined portion of a waterbody.

State waters – 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).

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 water quality standards. [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 water quality standards. [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.

Waterbody – A lake, reservoir, river, stream, creek, pond, marsh, wetland or other body of water above the ground surface.

Water quality restoration plan - A plan to improve water quality to achieve state water quality standards. 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.

Acronyms, & Abbreviations

ARM	Administrative Rules of Montana
BUD	Beneficial Use Determination
DEQ	Montana Department of Environmental Quality
DFWP	Montana Department of Fish, Wildlife and Parks

EPA	U.S. Environmental Protection Agency.
HUC	Hydrologic Unit
MCA	Montana Code Annotated
NHD	National Hydrography Dataset
NPS	Nonpoint source pollution
PS	Point source pollution
SCD	Sufficient Credible Data
TMDL	Total Maximum Daily Load
USGS	United States Geographical Survey
WQB-7	Circular WQB-7, Montana Water Quality Standards