APPENDIX A
Water Quality Assessment Process and Methods

Introduction

The assessment of streams, lakes and wetlands to identify "impaired" waters for inclusion on the 303(d) List 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 (DEQ) 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 303(d) List of impaired waters.

6. Waters on the 303(d) List are prioritized and scheduled for the development of plans to correct their impaired condition. (Additional data may be collected before planning starts to verify existing conditions or to further identify the causes and sources of impairment).

7. Plans are developed for waterbodies on the 303(d) List identifying actions that will be taken to improve water quality so that the waterbody can fully support the applicable beneficial uses.

8. Planned actions are implemented and monitoring is done to ensure that water quality improves at least as much as necessary for the waterbody to fully support its beneficial uses.

This appendix will focus on steps 4 and 5 from the above list discussing in detail the process and methods employed by Montana DEQ to accomplish these two steps. To provide background information for this detailed discussion of Steps 4 and 5, an overview will first be provided of Steps 1-3. Steps 6-8 are addressed either in other appendices of this document or in the state's 305(b) Report of statewide water quality.

Montana Water-Use Classification

Montana waterbodies are classified according to the present and future beneficial uses that they normally would 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 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 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**.**

A waterbody is considered to support its beneficial uses when it meets the water quality standards established to protect those uses. A waterbody is considered to be impaired when there is a violation of the water quality standards established to protect any of the applicable beneficial uses. In some cases the violation of a standard will result in the impairment of only a single use; in other situations the violation of one or more standards may result in the impairment of all uses for the applicable classification.

Water Quality Standards

Montana water quality standards include both use-specific components (ARM 17.30.621 - 629) and general provisions (ARM 17.30.635 - 646). 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 (F.R. 36765).

Montana has established **"**numerical**"** water quality standards relating to:

- Chronic and acute factors affecting aquatic life (Circular WQB-7)
- Human health (Circular WQB-7)
- Fecal coliform levels (ARM 17.30.620-629).
- Changes in pH, turbidity, color, and temperature (ARM 17.30.620-637).

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 (ARM 17.30.637)
- 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 (ARM 17.30.620-629).

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. Conditions resulting from reasonable operation of dams in existence July 1, 1971, are considered natural (75-5-306 MCA).

Section 17.30.602 (21) of the Montana Surface Water Quality Standards and Procedures defines “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.*

DEQ interprets "reasonably anticipated beneficial uses" to be all the uses designated for the stream’s classification.

Reasonable land, soil, and water conservation practices are not always accomplished by using best management practices (BMP's). BMP’s are land management practices that provide a degree of protection for water quality, but they may not be sufficient to achieve compliance with water quality standards and protect beneficial uses. Therefore, reasonable land, soil, and water conservation practices generally include MBPS, but additional conservation practices may be required to achieve compliance with water quality standards and restore beneficial uses.

Reference Condition

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.

Also, Montana water quality standards do not currently contain specific provisions addressing nutrients (nitrogen and phosphorus), or detrimental modification of habitat or flow. However, these constituents and actions are all known to adversely affect beneficial uses under certain conditions or combination of conditions. The reference condition approach is used to determine if beneficial uses are supported when nutrients and flow or habitat modifications are present.

Waterbodies that are used to determine reference conditions are not necessarily pristine, perfectly suited to giving the best possible support to all possible beneficial uses. Reference condition also does not reflect an effort to turn the clock back to conditions that may have existed before human settlement, but is intended to accommodate natural variations in biological communities, water chemistry, etc. due to climate, bedrock, soils, hydrology and other natural physiochemical differences. The intention is to differentiate between natural conditions and any widespread or significant alterations of biology, chemistry or hydrogeomorphology due to human activity. Therefore, reference condition should reflect minimum impacts from human activities. It attempts to identify the potential condition that could be attained (given historical land use) by the application of reasonable land, soil and water conservation practices. DEQ realizes that presettlement water quality conditions usually are not attainable.

Comparisons of conditions in a waterbody to conditions in a reference waterbody must be made during similar season and/or hydrologic conditions for both waterbodies. For example, the TSS of a stream at base flow during the summer should not be compared to the TSS of reference condition that would occur during a runoff event in the spring. In addition, a comparison should not be made to the lowest or highest TSS values of a reference site, which represent the outer boundaries of reference condition.

The following methods may be used to determine reference conditions:

Primary Approach

- Comparing conditions in a waterbody to baseline data from minimally impaired waterbodies that are in a nearby watershed or in the same region having similar geology, hydrology, morphology, and/or riparian habitat.
- Evaluating historical data relating to condition of the waterbody in the past.
- Comparing conditions in a waterbody to conditions in another portion of the same waterbody, such as an unimpaired segment of the same stream.

Secondary Approach

- Reviewing literature (e.g., a review of studies of fish populations, etc. that were conducted on similar waterbodies that are least impaired).
- Seeking expert opinion (e.g., expert opinion from a regional fisheries biologist who has a good understanding of the waterbody's fisheries health or potential
- Applying quantitative modeling (e.g., applying sediment transport models to determine how much sediment is entering a stream based on land use information, etc.).

DEQ uses the primary approach for determining reference condition if adequate regional reference data are available and uses the secondary approach to estimate reference condition when there are no regional data. DEQ often uses more than one approach to determine reference condition, especially when regional reference condition data are sparse or nonexistent.

303(d) Listing Process Overview

Impaired state waters that do not fully support their beneficial uses are identified primarily during the biennial development of the state's 303(d) List. The 1997 Montana Legislature amended state water quality law to require that the placement of waterbodies on the state's 303(d) List must be supported by sufficient credible data to ensure that such listings are justified (75-5-702 MCA). Based on this legislation and the applicable sections of the federal Water Quality Act, DEQ has adopted the following principles for the development of the 303(d) List:

- DEQ shall consider all currently available data, including information or data obtained from federal, state, and local agencies, private entities, or individuals with an interest in water quality protection.
- DEQ shall develop guidelines that can be used to assess the validity and reliability of the data used in the listing and for making beneficial use-support determinations. A data management system will be developed to track and document the data sufficiency and beneficial use support determinations.
- DEQ shall use the guidelines in making all additions to or deletions from the 303(d) List. The data and information used in making any changes in the 303(d) List will be available for public review.
- DEQ will monitor and reassess all waterbodies that are removed from the 303(d) List due to the lack of sufficient credible data during the following field season or as soon as possible thereafter.

A major step in implementing these principles was to develop and document guidelines for the sufficient credible data and beneficial use determinations. First, DEQ reviewed general EPA guidelines for making beneficial use determinations and refined them into a beneficial use-support assessment process applicable to Montana. Next, DEQ identified the data required for this assessment process and drafted guidelines for evaluating data validity and reliability. These initial guidelines for sufficient credible data and beneficial use determination were then subjected to an intensive, iterative process of review and refinement to produce the version that has been used in the development of the Draft 2000 303(d) List. This version is described in the following pages.

For each waterbody, the entire review is documented on an Excel spreadsheet so anyone can examine the basis and rationale for the DEQ decisions. Data reports and other data sources considered in the reviews are identified within the spreadsheet. The spreadsheet also documents how the available data were assessed to determine if the available data are sufficient and credible for making beneficial use-support determinations. The rationale for use-support determinations is documented by means of rating tables and assessor's comments. Finally, the assessment methods employed for making the use-support determinations are recorded and the probable causes and sources of impairment are identified.

Identification of Available Water Quality Data

DEQ and its predecessor agencies have been gathering water quality data for many years. The bulk of these data have been retained in agency files and records. 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 data bases provided a basic foundation to which materials from other sources were added through a systematic effort so that DEQ would have all readily available data for making waterbody assessment determinations for the 2000 303(d) List.

DEQ began its effort to identify external sources of data by sending out more than 2,700 letters requesting information from individuals, organizations, and agencies identified as possibly having water sampling data or other relevant information. Some of the major organizations and agencies receiving these requests included the following:

Natural Resource Conservation Service
Montana Department of Fish Wildlife and Parks
U.S. Forest Service
U.S. Geological Survey
Montana Natural Resources Information System of the Montana State Library
All Montana Conservation Districts
U.S. Fish and Wildlife Service
University of Montana
Montana State University
Montana Tech of the University of Montana
The Riparian and Wetland Research Program
of the Montana Forest and Conservation Experiment Station
Montana Department of Natural Resources and Conservation
U.S. Bureau of Reclamation
U.S. Bureau of Land Management
Montana Department of Transportation
Plum Creek Timber Co.
Montana Nature Conservancy
Champion International

U.S. Army Corps of Engineers
Montana Power Company
Montana Dakota Utilities
The seven Montana Tribal governments
Montana Bureau of Mines and Geology
U.S. Environmental Protection Agency
AVISTA (Washington Water Power)
All known local volunteer water quality groups.

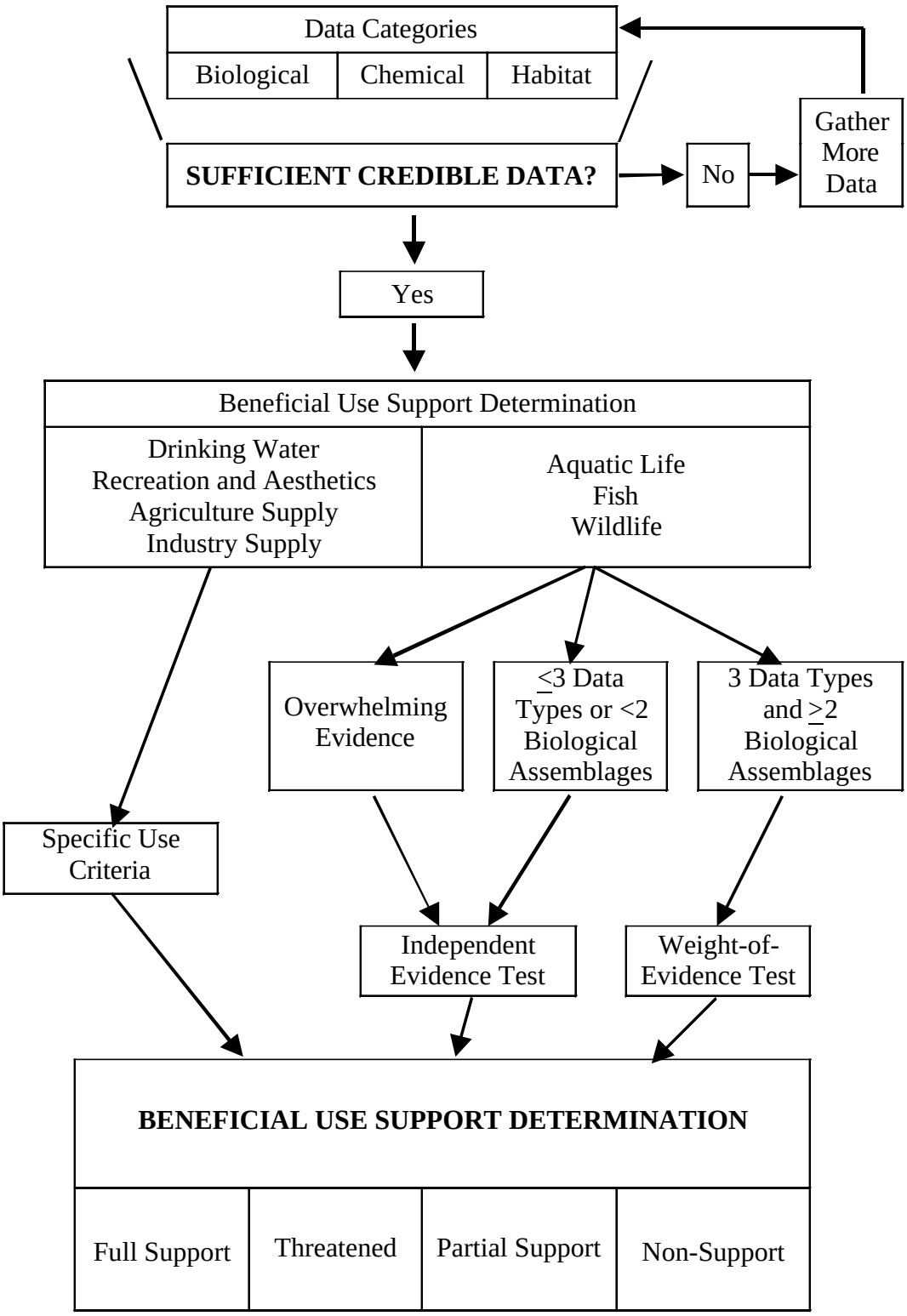
Information and data supplied in response to this mailing provide much useful information, particularly for water quality measurements (water station data), riparian habitat (Riparian Wetland Research Program RWRP), fisheries (Montana River Information System and the Department of Fish Wildlife and Parks MRIS and DFWP) and detailed local-area water quality studies (conservation districts, university, and agency studies). Often the sources or materials provided in response to the letter provided references to additional materials available from other sources.

Specific searches for these references and general searches for water quality information were conducted on all the major Montana reference and information search tools available including:

Montana DFWP (library holdings and data in the Montana Rivers Information System)
Montana State Library (bibliography and reference holdings)
Montana Natural Resource Information System
United States Geological Service (water quality monitoring data)
Montana Bureau of Mines and Geology (Ground Water Information Center)
Montana State University (bibliography and reference holdings)
Montana Tech (bibliography and reference holdings)
University of Montana (bibliography and reference holdings)
U.S. Forest Service (GIS data)
Plum Creek (technical reports and white papers).

While most of the data uncovered by this intensive search effort were valuable, some were unusable or of limited value. Some information uncovered could not be reliably interpreted because there was inadequate documentation of such basic elements as the specific location, time, and methods employed in collecting the data. In some cases large amounts of raw data were discovered which had been collected but never processed or analyzed by the collecting agency. The main reason data were collected but not analyzed was the cost, and since it would have been prohibitive for DEQ to assume the processing cost, such raw data usually were considered not readily available for the beneficial use assessment. In some cases old data were not used when newer data were available to provide a better indicator of current water quality conditions. However, some older data were valuable indicators of reference condition at an earlier time or as indicators of changes in water quality that had resulted from land use change.

Figure 1. Sufficient Credible Data Assessment & Beneficial Use-Support Determination Process



Sufficient Credible Data Assessment

Montana law requires DEQ to use sufficient credible data (SCD) to make beneficial use-support determinations. The law defines SCD as "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 MCA).

DEQ has developed data quality objectives (DQOs) to ensure that data are sufficient and credible for evaluating whether a waterbody should be added to or removed from the 303(d) List. These DQOs apply only to 303(d) and 305(b) listing decisions. They are not intended or designed for use in determining compliance with permits for enforcement purposes or for the development of TMDL plans. Those activities often require additional information.

The DQOs were developed to ensure that beneficial use-support determinations would be made with a reasonable level of confidence. It must be recognized however that the art and science of water quality assessment is complex, that methods of assessment change over time, and that the factors affecting the quality of particular waterbodies change. In recognition of these realities state law requires DEQ to review and revise 303(d) listing decisions at intervals not to exceed 5 years. The law also requires that if DEQ removes a waterbody from the 303(d) List due to the lack of sufficient credible data, it shall monitor and assess that waterbody during the next field season or as soon as possible thereafter (75-5-702 MCA).

In any water quality assessment process there is always a risk of concluding that a waterbody is impaired when it truly is not or concluding that a waterbody is not impaired when it is. Either of these errors involves a cost. Concluding that a waterbody is impaired when it is not results in a cost in resources and dollars for collecting additional information, preparing a TMDL plan, and perhaps implementing unnecessary corrective measures. Concluding that a waterbody is not impaired when it actually is means that existing human health threats and environmental degradation will not be addressed.

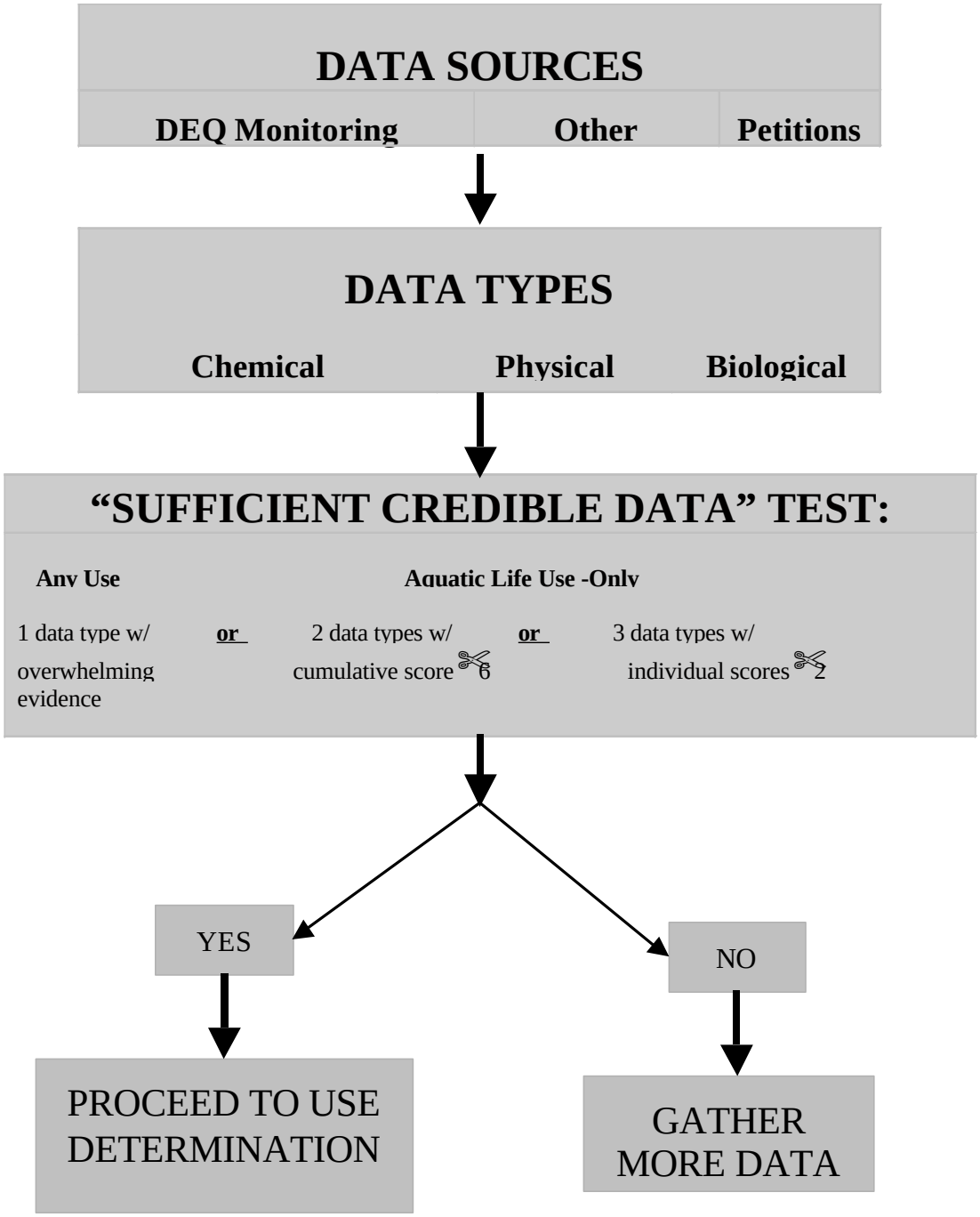
Recognizing these risks, DEQ has used the following goals in designing its guidance for determining the availability of sufficient credible data:

- Assess few waterbodies as impaired when in fact they are not.
- If the decision is uncertain, adopt the choice that will not reduce protection of the resource.

It should be noted that any decision to remove a waterbody from the 303(d) List due to a lack of SCD will result in the collection of additional data during the next field season or as soon as possible thereafter. Also, a decision placing a waterbody on the List generally means that it will receive additional monitoring and assessment to collect additional information needed to further identify the sources and causes of impairment for the development of a TMDL plan. Therefore, DEQ should be able to determine if a waterbody was incorrectly listed as impaired before resources are expended to develop and implement a TMDL plan.

The process DEQ uses to determine if data are sufficient and credible for making beneficial use-support decisions is summarized in Figure 2. The concepts underlying this process came from an EPA model for assessing the beneficial uses of streams using a combination of physical (habitat), biological, and chemical monitoring (U. S. EPA 1997). The model defines the relationship between parameters such as fish and benthic macroinvertebrate indices that directly measure the condition of the biotic community and its response over time to stressors, and parameters that directly measure stressors such as levels of pH, nutrients, and toxicants. EPA recommends that states incorporate a suite of parameters in their monitoring

Figure 2. Sufficient Credible Data Assessment: Flow Diagram



programs to evaluate attainment of beneficial uses. For example, EPA recommends that monitoring for aquatic life use support include the collection of habitat and community level biological data and the measurement of chemical parameters in water and sediment.

Sufficient Credible Data Decision Tables

The SCD decision process employs decision tables. The tables DEQ employed for determining if data are sufficient and credible for making aquatic life use-support determinations for streams are modified versions of tables that were recommended by EPA (1997). DEQ has developed additional SCD decision tables to determine if data are sufficient and credible for making aquatic life use-support determinations for lakes and wetlands and for other beneficial use-support determinations such as drinking water and contact recreation. **[All tables will be found at the end of this appendix.]**

The tables focus the SCD process 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

The process of deciding if there are sufficient credible data to evaluate use support of each beneficial use takes into account all of these four individual components. In most cases a finding of 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 waterbody that would invalidate the results obtained. The SCD decision tables are specifically designed to help the evaluator determine when the total package of available information is adequate.

Overwhelming Evidence

There are situations where a single set of data is all that is needed to tell the evaluator that a particular beneficial use is or is not supported. For example a single set of water chemistry data may be sufficient to establish that a waterbody is not fit for use as a source of drinking water. When such "overwhelming evidence" is available use of the SCD decision tables becomes unnecessary. **Reliable data that reflect current human-caused impairments** normally constitute overwhelming evidence when they document,

For aquatic life uses:

- Any exceedence of an acute aquatic life standard.
- A 250% exceedence of a chronic aquatic life standard, even if there is only one credible data point.
- Any exceedence of an aquatic life standard based on sufficient data to calculate a geometric mean.
- Any 50% exceedence of a narrative standard (e.g. sediment levels in an impaired stream reach are determined to be 50% greater than sediment levels of an appropriate reference site).
- Any activities that negatively impact habitat by more than 50% (e.g. less than 50% of a stream corridor has adequate riparian habitat when compared to potential or reference condition).
- Any activities that negatively impact biological communities by more than 50% (e.g. a fish population reduced to less than 50% of its potential due to sedimentation; or macroinvertebrate communities less than 50% of those in reference waters).

For fishery uses:

- Any significant non-natural barriers to fish movement or migration. Note: conditions resulting from the

reasonable operation of dams in existence since July 1, 1971, are considered natural (75-5-306 MCA).

- Chronic de-watering of a considerable section of a waterbody.

Overwhelming evidence also can establish that a waterbody is fully supported (e.g. direct rigorous measurement of the biological communities indicates that aquatic life use is fully supported).

Aquatic Life/Fisheries SCD

The aquatic life beneficial use is a broad descriptor intended to protect fish, invertebrates, aquatic plants, and associated wildlife. All of the water classes defined under the Montana Water-Use Classification system require that the rated waters support the beneficial use of "growth and propagation of fishes and associated aquatic life waterfowl and furbearers" (ARM 17.30.604-624). The aquatic life/fisheries SCD tables (Tables 1-3 for streams and Tables 4-6 for lakes) provide a systematic but flexible approach for making decisions concerning the level of information required for aquatic life beneficial use-support determinations. It is a holistic approach entailing consideration of data from the following three data categories:

Physical/habitat – includes qualitative and/or quantitative riparian and aquatic vegetation information, and hydrogeomorphic characteristics and functions. For example, data may include stream reach habitat surveys with photos to document impairments, and physical measurements of the stream channel, such as pebble counts and channel cross sections.

Biology – includes chlorophyll *a* data; and aquatic biological assemblage data relating to fish, macroinvertebrates, and algae; and wildlife community characteristics. Measurements often include population estimates, biomass, number and relative abundance of sensitive or pollution-tolerant species, diversity, and distribution.

Chemistry/toxicity – includes bioassays; temperature and total suspended sediment data; and chemistry data such as concentrations of toxicants, nutrients, and dissolved oxygen.

Aquatic Life/Fisheries SCD tables have been developed for each data category to assist the reviewer in evaluating and documenting whether data are sufficient and credible by using the following data components to score the data: 1) technical soundness 2) spatial/temporal coverage, 3) quality, and 4) currency. The overall score for each data category ranges from 1 to 4. Data given a higher score provide a higher level of information for making an aquatic life use-support determination. For example, the component scores for the biological data category might be: 2 for technical soundness, 3 for spatial/temporal coverage, 3 for quality and, 2 for currency. In this situation, the reviewer would usually assign the biology data category an overall score of 2 or 3 depending on his/her interpretation of how useful the data are for making an aquatic life/fisheries beneficial use-support determination.

The overall data category score usually is <u>not</u> just the numerical average of the component scores. For example, if the data currency component scores a 1 and the other components each score a 4, the reviewer may assign an overall score of 1, because the data do not indicate current conditions. The reviewer documents the rationale used to make the overall scoring decision for each data category at the bottom of each table.

The overall scores from the three data categories are added together (ignoring any score of "1") to obtain a SCD score for the aquatic life/fisheries data. If the total SCD score is at least 6 (all three data categories have overall scores of 2 or more, or if two data categories score 3 or more), the reviewer concludes there are sufficient credible data to make use-support determinations for the aquatic life and fisheries beneficial uses.

DEQ infers that a waterbody's associated wildlife communities are protected if no data indicate impairment to wildlife and the aquatic life and fishery beneficial uses are determined to be fully supported. However, DEQ would determine that a waterbody's aquatic life beneficial use is not fully supported if data show that the associated wildlife populations are impaired. Also, DEQ may require additional information before making an aquatic life use-support determination if sources of impairment to wildlife such as elevated metals in the food chain resulting from land use practices are probable and if information regarding probable causes of impairment are not provided in the available data set.

Drinking Water, and Recreation and Aesthetics SCD

DEQ also has developed decision tables to determine if data are sufficient and credible for making drinking water, and recreation and aesthetics beneficial use-support determinations (Tables 7 and 8). For these uses the evaluation of multiple data categories is not necessary and the four components of data adequacy are not numerically scored but are simply rated as sufficient or insufficient. The DEQ reviewer then decides on the overall sufficiency of the data after consideration of the component ratings, and documents the rationale used to make the decision at the bottom of each table.

Agricultural and Industrial Water Supply SCD

DEQ has not developed SCD decision tables for making beneficial use-support determinations for agriculture 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 and industry. 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.

Ephemeral Streams and Wetlands

DEQ regulations define ephemeral streams as waterbodies that receive water only in direct response to precipitation or snowmelt, and which are always located above the water table (ARM 17.30.602). DEQ defines ephemeral wetlands as state waterbodies that have surface water for less than 90 days per year. Only narrative water quality standards apply to ephemeral waterbodies. DEQ usually assesses only aquatic life use support for ephemeral waterbodies and requires only physical/habitat data (minimum SCD score = 3). However, DEQ recommends that chemistry/toxicity or biological data should be collected when it is practical and appropriate for evaluating aquatic life use support or the use support of other beneficial uses.

Beneficial Use Support Determination

Once it has been determined that there are sufficient credible data to evaluate a waterbody, the assessment process moves to determining the level of beneficial use support required for each use of that waterbody by the Montana Water-Use Classification. Figure 3 displays a flow diagram for the beneficial use support evaluation process.

DEQ conducts beneficial use-support determinations (BUDs) in order to document which state waterbodies are impaired due to anthropogenic impacts on water quality. Beneficial use-support determinations include the following categories (EPA 1997):

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

A waterbody is considered to be "fully supporting" its beneficial uses when the water quality standards established to protect those uses are met. When one or more beneficial uses are not fully supported due to human activities the waterbody may be rated as either "not supporting" or "partially supporting" the affected use or uses. A "threatened" rating indicates that there is evidence that one or more fully supported uses may soon be impaired. The support determinations for the various uses of a waterbody usually will not all be the same because the standards used to determine use support are different for each use.

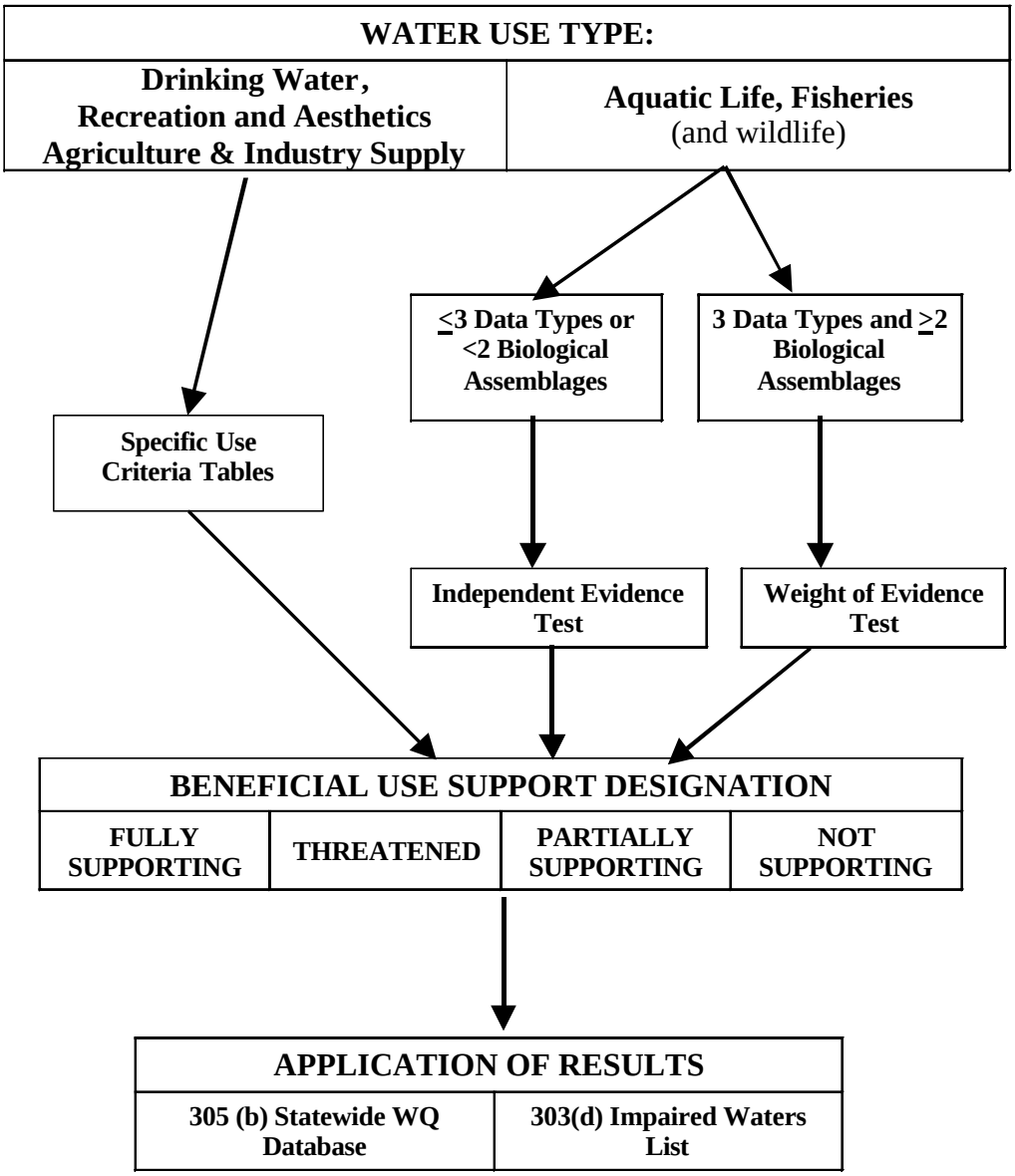
DEQ has found from nearly 45 years of working with the Montana Water-Use Classification System that the actual support for the mix of beneficial uses defined for the different classes can best be addressed by examining the following categories:

- Aquatic Life (considers all life forms which make up and depend on the aquatic ecosystem)
- Cold Water Fishery **or** Warm Water Fishery
- Drinking Water Supply (protects culinary and food-processing use)
- Recreation and Aesthetics (bathing, swimming, boating, fishing, etc.)
- Agriculture Supply
- Industry Supply

Only those categories that apply to the beneficial uses specified for each water-use classification are evaluated for the waterbodies in that classification. For example, a waterbody classified C-1 would not be assessed for use support of drinking water supply or warm water fishery since neither category applies to the waterbody's designated beneficial uses.

EPA considers fish consumption to be a beneficial use but Montana law does not recognize this use. Therefore, DEQ considers fish consumption when making aquatic life and fisheries, and recreation and aesthetics beneficial use-support determinations for 303(d) List purposes. State waters where fish consumption advisories are in effect are identified and discussed in the Montana 305(b) Report.

Figure 3. Beneficial Use-support Determination Flow Diagram



Threatened Uses

Montana water quality law (75-5-103 MCA) defines the term "threatened waterbody" to mean:

> *A waterbody or stream segment for which sufficient credible data and calculated increases in loads show that the waterbody 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.*

DEQ has not developed decision tables to determine if specific uses are threatened. Instead, DEQ considers that a beneficial use may be threatened if:

- Data show a decline in the conditions supporting the beneficial use, listed in the beneficial use support decision table or
- Activities proposed for the watershed would be sources of pollution that are not subject to pollution prevention or control actions required by a discharge permit or
- Activities for which a permit is required are occurring within the watershed without a permit or;
- Reasonable land soil and water conversation practices are not being implemented.

A DEQ reviewer assigning a determination of "threatened" to a waterbody beneficial use is required to identify the information used and rationale for making this determination.

Aquatic Life and Fisheries Beneficial Use Determination

The broad range of factors that must be considered in assessing support for the aquatic life/fisheries uses make the assessment of support for these uses more complex than the assessment of support for other uses. Depending on the type and amount of information available, DEQ has developed two distinct tests which may be employed to make aquatic life/fisheries support decisions.

The "**weight-of-evidence test**" is a process for making aquatic life use support decisions when there is a high level of information. DEQ uses this if there are sufficient and credible data in all three of the data categories and if two or more biological assemblages were assessed (minimum score = 3). The assemblages employed must be adequate to reflect any probable impairment. Conclusions drawn from each data category are combined using the weight-of-evidence test to produce the final aquatic life use-support determination employing the following guidelines in combination with Beneficial Use-Support Decision Tables 9 and 10.

- **Fully Supporting** requires all data categories to indicate the waterbody is unimpaired or least impaired, or no more than one data category (i.e. physical/habitat biology or chemistry/toxicity) indicate moderate impairment; **OR** no more than one biological assemblage indicates moderate impairment (the biological community that indicates impairment must be at least 50% of reference condition).

- **Partially Supporting** requires two or more data categories indicating moderate impairment or one data category indicating severe impairment (i.e. physical/habitat biology or chemistry/toxicity) with the remaining data categories indicating that the waterbody is unimpaired or least impaired; **OR** two biological assemblages indicating moderate impairment; or one biological assemblage indicating less than 50% of reference condition.

- **Not Supporting** requires one or more data categories indicating moderate impairment in combination with a separate category indicating severe impairment; **OR** two biological assemblages indicating less than 50% of reference condition.

The **"independent-evidence test"** is a decision process in which any sufficient and credible data that indicate that a waterbody is impaired would result in DEQ placing the waterbody on the 303(d) List. DEQ uses the independent evidence test to make aquatic life use-support determinations if only one or two of the data categories are used (physical/habitat biology or chemical/toxicity); or if all three categories are used but only one biological assemblage (e.g. fish) was assessed or the biological data category's score was < 3.
The independent-evidence test is used when a full suite of data is not available but the information that is available is adequate to provide a basis for making an aquatic life use-support determination. For example data indicating that a stream segment experiences frequent dewatering could be an adequate basis for determining that the aquatic life/fisheries beneficial use is impaired. The factors listed in Tables 9 and 10 are directly applied to interpret the use support of each beneficial use. If all available data indicate that a waterbody is "unimpaired/least impaired" then the beneficial use-support determination would be fully supporting. Any data indicating that a beneficial use is "moderately impaired" would result in the waterbody being listed as partially supporting. Any data indicating that a beneficial use is "severely impaired" would result in the waterbody being listed as not supporting the beneficial use being evaluated.

Beneficial Use Determination - Other Uses

Reaching beneficial use determinations for the drinking water, recreation and aesthetics, agriculture supply and industrial supply uses is a relatively straightforward process. For these uses, criteria based on the relevant water quality standards are listed in Tables 11, 12, 13, and 14. The available data for a waterbody are evaluated using the listed criteria, and an overall use support assignment is made based on consideration of all the criteria for which relevant 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 that apply to a particular use.

Petitions

Under Montana law any person can petition DEQ to change any beneficial use support decision by providing the data necessary to support the requested change (75-5-702 MCA). For example a petition to reconsider a DEQ partial support determination for aquatic life could be based on data from multiple biological assemblages (i.e. fish, macroinvertebrates, algae) which clearly demonstrate that aquatic life is not impacted by any of the listed probable causes and sources of impairment. DEQ beneficial use-support determinations also could be appealed by providing data that clearly demonstrates that the causes of impairment are due to naturally occurring conditions.

When DEQ receives a petition it conducts a sufficient credible data assessment. All available data including both the data used to make the original determination and those provided with the petition are reviewed to ensure that there are sufficient credible data to provide a basis for a valid beneficial use determination. Then the normal tests and table criteria are used to make a beneficial use-support determination. This process must be completed within 60 days of the petition submittal. If DEQ determines that original determination should be revised, it must provide public notice of the proposed change and allow 60 days for public comment prior to taking final action.

Literature Cited

U.S. EPA. 1997. Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) EPA-841-B-97-002A.

Table 1. Biology Sufficient Credible Data Decision Table for Aquatic Life Use (Streams)

Score	Technical Components	Spatial/Temporal Coverage	Data Quality	Data Currency
1	-Visual observations of biota were made with no true assessment - Simple documentation. - Unable to make a comparison to reference condition. - Relative abundance data of fish that are not supplemented with quantitative data or can not be interpreted by a biologist. - Fish creel surveys with limited supplemental information.	- very limited monitoring - data are extrapolated from other sites	-Data precision and sensitivity is very low or unknown. - Qualified professional does not provide any oversight. - Poor taxonomic resolution	- Data are not relevant; biological communities may have changed significantly since the assessment was made.
2	- Only one assemblage was assessed (e.g., RBP Protocols). - Probable sources and causes of impairment are documented. - Reference condition can be approximated by a professional scientist. - Relative fish abundance data that can be interpreted by a qualified professional or also includes quantitative fish density.	-Limited to a single sampling - Limited sampling for site-specific studies	- Data precision and sensitivity are low to moderate. - Data were collected following appropriate protocols; however individuals had limited training. - Qualified professional provided oversight. - Good taxonomic resolution.	- It is unlikely that the biological communities have changed significantly since the survey was conducted.
3	- Two assemblages assessed or one assemblage with quantitative (e.g., biomass) measurements also made following standard operating procedures (SOPs). - Often includes biotic index interpretations. - Fisheries data often includes information about growth rates, age class and condition; The entire fish assemblage is targeted. - Reference condition can be determined with a reasonable degree of confidence and used as a basis for assessment.	-Monitoring normally occurs during a single season. - Monitoring may include site specific studies; However, also has limited spatial coverage of the stream reach.	- Data have moderate precision and sensitivity. - Qualified professional performs survey or provides training; the individual making the survey is well trained. - Qualified professional performs the survey. - Detailed taxonomic resolution	- Data were collected recently or it is very unlikely that the biological community has changed significantly since the survey was conducted.
4	-Two or more assemblages assessed and often includes quantitative measurements following SOPs. -Reference condition is well understood and is used as the basis of the assessment. -Often includes biotic index interpretations	-Surveys conducted for multiple years and/or seasons - Broad coverage of sites - Often uses targeted or probabilistic design	-High precision and sensitivity. -Assessment performed by a highly experienced qualified professional.	-Data are current; there is no doubt that the biological survey reflects current conditions.

Table 2. Chemistry/Toxicity Sufficient Credible Data Decision Table for Aquatic Life Use (Streams)

Score	Technical Components	Spatial/Temporal Coverage	Data Quality	Data Currency
1	-Best professional judgment based on land use data or source locations - Chemical parameters analyzed are limited and do not provide sufficient information concerning probable causes of impairment.	- Low spatial and temporal coverage -limited data at critical periods - Limited period of record (e.g. one day)	-Data precision and sensitivity is very low or unknown and data appear to be an outlier (suspect). - High detection limits make the data difficult or impossible to interpret. QC protocols indicate contamination, etc. QA/QC protocols were not followed.	-Data do not reflect current conditions.
2	- Usually grab or composite water quality samples - Synthesis of historical information on fish contamination levels -Screening models based on loading data (not calibrated or verified) - Sediment contamination data (e.g., metal scans) -Limited chemical parameters ; however probable impairment causes are targeted and probable sources of impairment documented. - Reference condition can be approximated by a professional. -Acute or Chronic WET; or Acute ambient; or acute sediment tests	-Moderate spatial and/or temporal coverage.. -Data collected at critical periods (e.g., spring, summer, spawning season) -Short period of record but good spatial coverage -Quarterly sampling	- Data quality and sensitivity are low to moderate. - Data were collected following appropriate protocols but individuals had limited training. - Low detection limits -QC indicates there was no contamination, etc. -low replication used for toxicity tests	- Data are substantially older than ideal, but appear to be a reasonable indicator of current conditions.
3	- Series of grab or composite samples (diurnal coverage as appropriate) - Calibrated models - Width/depth integrated sampling - Combination of two or more analyses of the following: water column, sediment, chlorophyll; toxicity testing; bioaccumulation data (e.g., fish consumption advisory data). -Reference condition can be determined with a reasonable degree of confidence and used as a basis for assessment. -2-3 Acute or Chronic Ambient; or Acute sediment; or Acute and Chronic WET tests for effluent dominated system	-Broad spatial and temporal coverage of site with sufficient frequency and coverage to capture acute events. -Typically monthly sampling during key periods. -Lengthy period of record (sampled over a period of months for >2 years)	- Data have moderate precision and sensitivity. - Professional scientist provides training; the individual collecting the samples is well trained. - Qualified professional collects samples; Data is analyzed in a competent laboratory that uses methods with low detection limits -QC documents where there are no sampling or analytical errors. - Moderate replication used for toxicity tests	Data are older than ideal, but there are no indications that conditions have changed significantly.
4	-Combination of three or more of the following: water column chemistry, sediment chemistry, chlorophyll or bioaccumulation data; or toxicity testing. >3 acute and chronic ambient tests; or acute or chronic sediment tests.	Broad spatial (several) and temporal coverage (monthly sampling during key periods for > 3 yrs) of site with sufficient frequency and parameter coverage to capture acute events, chronic conditions and all other potential impacts.	-High precision and sensitivity. -Data collected and analyzed by qualified professionals following detailed QA/QC protocols. -High replication used for toxicity tests	-Data are current,. generally less than 5 years old, and/or there is high certainty that conditions have not changed since data were collected.

Table 3. Habitat/Physical Sufficient Credible Data Decision Table for Aquatic Life Use (Streams)

Score	Technical Components	Spatial/Temporal Coverage	Data Quality	Data Currency
1	-Habitat characteristics were observed visually with no true assessment -Only has documentation of land use practices that might alter habitat. - No attempt to compare to reference condition; observed impacts are likely to be natural.	Sporadic visits; assessments are only made at limited access points such as road crossings.	-Data precision and sensitivity are very low or unknown. - Data were not collected by trained individuals following appropriate protocols.	-Data are not relevant; habitat has likely changed significantly since the assessment was made.
2	- Visual observations of habitat characteristics were made with simple assessment. - Land use maps used to characterize watershed condition; Probable sources of impairment are documented. - Reference Condition can be approximated by a qualified professional.	-Limited to annual visit and non-specific to season; -Limited spatial coverage -Site specific studies	- Data precision and sensitivity are low - Data were collected following appropriate protocols ; however individuals had limited training. - Qualified professional involved only through correspondence.	- It is unlikely that the habitat has changed significantly since the assessment was made.
3	- Use of visual-based habitat assessment following SOPs (e.g., Stream Reach Assessment and PFC). - Documentation includes photographs. - Assessment includes quantitative measurements of selected parameters. - Data on land use are used to supplement assessment. - Reference condition can be determined with a reasonable degree of confidence and used as a basis for assessment.	-Assessment normally occurs during a single season. - Assessment is broad; often covering the entire stream reach or region. - An attempt was made to access the stream reach wherever possible.	- Data have moderate precision and sensitivity. - Professional biologist performs survey or provides training; the individual making the assessment is well trained. - Professional biologist or hydrologist performs the assessment.	- Data were collected recently or it is very unlikely that the habitat has changed significantly since the assessment was made.
4	-Assessment of habitat based on quantitative measurements of instream parameters, channel morphology and floodplain characteristics. -Reference condition is well understood and is used as the basis of the assessment.	-Good access of the entire stream reach including private property. - Helicopter surveys, etc. -Data from multiple years.	-High precision and sensitivity. -Assessment was performed by highly experienced professional.	-Data are current; There is no doubt that the assessment reflects current conditions.

Table 4. Biology Sufficient Credible Data Tables for Aquatic Life Use (Lakes and Wetlands)

Score	Technical Components	Spatial/Temporal Coverage	Data Quality	Data Currency
1	- Simple documentation, visual observations only(no true assessment) - Unable to make a comparison to reference condition. - Relative abundance data of fish is not supplemented with quantitative data or can not be interpreted by a qualified professional. - Fish creel surveys with limited supplemental information.	- Very limited monitoring	-Data precision and sensitivity are very low or unknown. - Professional biologist does not provide any oversight. - Poor taxonomic resolution	-Data do not reflect current conditions.
2	- Only one biological assemblage was surveyed or observed (usually fish or algae for lakes; and waterfowl, vegetation or macroinvertebrates for wetlands); includes documentation sufficient for interpretation by qualified professional. - Probable sources and causes of impairment are documented. - Reference condition can be approximated by a qualified professional.	-Limited to a single sampling - Limited sampling for site-specific studies	- Data precision and sensitivity are low to moderate. - Data were collected or observations were made following appropriate protocols, but individuals had limited training. - Professional biologist provided oversight. - Good taxonomic resolution.	- Data are substantially older than ideal, but there is reason to believe that current conditions are reasonably represented.
3	- Relative abundance data or well-documented observations for two biological assemblages such as fish, algae, macroinvertebrates, amphibians, etc., with quantitative (e.g. population, growth rates, primary production, age class, size, condition) data for at least one assemblage. - May include biotic index interpretations. -The entire fish assemblage may not be targeted but all fish species sampled were identified. - Reference condition can be determined with a reasonable degree of confidence and used as a basis for assessment.	-Monitoring normally occurs during a single season. - Monitoring may include site specific studies, but has limited spatial coverage	- Data have moderate precision and sensitivity. - Qualified professional performs survey or provides training; the individual making the survey is well trained. - Qualified professional performs the survey or makes observations. - Detailed taxonomic resolution	Data are older than ideal, but there are no indications that conditions have changed significantly.
4	-Two or more assemblages were surveyed and assessed; includes quantitative measurements for at least two assemblages following detailed SOPs. -Reference condition is well understood and is used as the basis of the assessment. -The fish survey was designed to sample the entire fish assemblage. -Often includes biotic index interpretations	-Surveys conducted for multiple years and/or seasons - Broad coverage of sites - Often uses targeted or probabilistic design	-High precision and sensitivity. -Assessment performed by a highly experienced professional biologist. -Detailed taxonomic resolution	-Data are current, generally less than five years old, and/or there is certainty that the conditions have not changed..

Table 5. Chemistry/Toxicity Sufficient Credible Data Tables for Aquatic Life Use (Lakes and Wetlands)

Score	Technical Components	Spatial/Temporal Coverage	Data Quality	Data Currency
1	-Best professional judgment based on land use data or source locations -Limited chemical analyses which do not provide sufficient information concerning probable causes of impairment. -Data extrapolated when homogeneous conditions are expected	- Low spatial and temporal coverage - limited data at critical periods - Limited period of record (e.g. one day)	-Data precision and sensitivity are very low or unknown and data appear to be an outlier (suspect). - High detection limits make the data difficult to interpret. -QA/QC protocols not followed.	-Data do not reflect current conditions.
2	- Usually grab or composite water quality samples -Screening models based on loading data (not calibrated or verified) - Sediment contamination data (e.g. metal scans) - fish consumption advisories -Chemical parameters limited; however, probable causes of impairment were targeted and documented. - Reference condition can be approximated by a professional. -Acute or Chronic WET; or Acute ambient; or acute sediment tests - Synthesis of historical information on fish contamination levels for lakes - N/P ratios calculated for lakes -Trophic status determined for lakes using at least two of the following; TOC, transparency, primary production, phytoplankton density and/or biomass, total nitrogen, total phosphorus or chlorophyll a.	-Moderate spatial and/or temporal coverage. -Data collected at critical periods (Lakes sampled near turnover, late winter and/or mid-summer; Wetlands sampled in the spring or summer) -Short period of record; but good spatial coverage -Quarterly sampling or targeted seasonal-sampling. - Several parameters often collected over several years (e.g., Secchi Depth).	- Data quality and sensitivity are low to moderate. - Data was collected following appropriate protocols; however individuals had limited training. - Low detection limits -QC indicate there was no contamination or other problems. -low replication used for toxicity tests	- Data are substantially older than ideal, but there is reason to believe that they reasonably indicate current conditions.
3	- Series of grab or composite samples (depth-integrated, diurnal coverage, hypolimnion and epilimnion sampling as appropriate) - Calibrated models - Combination of two or more analyses of the following: water column, sediment, chlorophyll; toxicity testing; primary production; bioaccumulation. -Reference condition can be determined with a reasonable degree of confidence and used as a basis for assessment. -2-3 Acute or Chronic Ambient; or Acute sediment; or Acute and Chronic WET tests for effluent dominated system -trophic status determined using Secchi depth, total phosphorus and chlorophyll a; and includes a dissolved oxygen/temperature profile(s) for lakes. -N/P ratios calculated for lakes	-Broad spatial and temporal coverage of site with sufficient frequency and coverage to capture acute events (lakes sampled near turnover; late winter or mid summer; wetlands sampled late winter/early spring and mid-summer). -Typically monthly sampling during key periods. -Lengthy period of record (sampled over a period of months for >2 years)	- Data have moderate precision and sensitivity. - Qualified professional provides training; the individual collecting the samples is well trained. - Qualified professional collects samples; Data are analyzed in a competent laboratory that uses methods with low detection limits -QC documents that there are no sampling or analytical errors. - Moderate replication used for toxicity tests	Data are older than ideal, but there are no indications that conditions have changed significantly.
4	-Combination of three or more of the following: water column chemistry, sediment chemistry, chlorophyll a, primary production, bioaccumulation data or toxicity testing. - Includes trophic status, dissolved oxygen profiles and N/P ratios (lakes) >3 acute and chronic ambient tests; or acute or chronic sediment tests. - Includes sediment core sampling	Broad spatial (several) and temporal coverage (monthly sampling during key periods for > 3 yrs) of site with sufficient frequency and parameter coverage to capture acute events, chronic conditions and other potential impacts.	-High precision and sensitivity. -Data collected and analyzed by professionals following detailed QA/QC protocols. -high replication used for toxicity tests	-Data are current, generally less than 5 years old, and/or it is essentially certain that conditions have not changed since they were collected.

Table 6. Physical/Habitat Sufficient Credible Data Tables for Aquatic Life Use (Lakes and Wetlands)

Score	Technical Components	Spatial/Temporal Coverage	Data Quality	Data Currency
1	-Habitat characteristics were observed visually with no true assessment - Simple documentation of practices that might alter habitat. - No attempt to compare to reference condition; observations are likely to be natural.	Sporadic visits; assessments only at limited areas.	-Assessment precision and sensitivity are very low or unknown. - Assessment was not conducted by trained individuals.	-Data do not reflect current conditions.
2	- Visual observations of habitat characteristics or impairments (e.g. shoreline erosion, fluctuating water levels, siltation, riparian and aquatic vegetation, grazing, buffer zones, spawning areas, wildlife habitat/use) were made with simple assessment. - Use of land use maps to characterize watershed condition; probable impairment causes & sources documented. - Reference condition can be approximated by a qualified professional.	-Limited to annual visit and non-specific to season; -Limited spatial coverage -Site specific studies	- Assessment precision and sensitivity are low - Assessment was undertaken following appropriate protocols, but individuals had limited training. - Qualified professional involved only through correspondence.	- Data are substantially older than ideal, but there is reason to believe they reasonably indicate current conditions.
3	- Use of visual-based habitat assessment following SOPs; and/or includes a detailed interpretation. - Documentation includes photographs - Sources and causes of impairment are well documented and understood. - Information concerning surrounding land use and/or reservoir management activities is used to supplement assessment. - Reference condition can be determined with a reasonable degree of confidence and used as a basis for assessment.	-Assessment normally occurs during a single season. - Assessment is broad; often covering the entire water body.	- Data have moderate precision and sensitivity. - Qualified professional provides training; the individual making the assessment is well trained. - Qualified professional performs the assessment and makes interpretations.	- Data are older than ideal, but there are no indications that conditions have changed significantly.
4	-- Assessment includes quantitative measurements of selected parameters. -Aerial photographs, satellite images or infrared photographs are used as part of the assessment. Detailed studies conducted to determine impacts to habitat caused by dam operations, etc. -Reference condition is well understood and is used as the basis of the assessment.	-Assessment is broad; often covering the entire water body; data collected from multiple years. -Aerial surveys that are ground truthed.	-High precision and sensitivity. -Assessment was performed by a qualified professional following detailed protocols.	- Data are current, generally less than five years old, and/or it is essentially certain that the conditions have not changed since data were collected.

Table 7. Drinking Water Sufficient Credible Data Decision Table

Level of Information	Technical Component	Spatial/Temporal Coverage	Data Quality	Data Currency
Insufficient Data	- Probable impairments to drinking water were not measured. -Impairments are inferred. -Probable sources of impairment were not documented.	-Limited temporal coverage (less than quarterly sampling for <3 years). -Data not collected at critical times -Limited spatial coverage that does not adequately target probable impairments (e.g., one location) - Limited water quality data with no exceedences of standards, but sediment data indicate contamination, and/ or probable sources of impairment are located in the watershed.	-Data precision and sensitivity are low or unknown. - QC protocols not followed or indicate contamination. -Detection limits are too high. -Samples not properly preserved	- Data do not reflect current conditions.
Sufficient Credible Data	-Total recoverable metals were measured. - Total and dissolved metals were measured. -Organic compounds were measured -Sampling and analysis includes sediment. -Probable sources of impairment were documented.	-Human health water quality standards are exceeded. -A sufficient number of parameters were analyzed through sampling at least quarterly; or sampling adequately targeted critical time periods for >3 years. -Good spatial coverage or well-targeted sampling locations. -Limited water quality data with no exceedences of standards, sediment data do not have elevated metals and/or organic compounds and no probable sources of impairment are located in the watershed.	-Data precision and sensitivity moderate. -QA/QC protocols are followed. - Low detection limits	-Data likely reflects current conditions. - There have not been any significant changes in activities occurring in the watershed since the data were collected.

Note: For this guidance document, exceedence is defined as a pollutant level that violates Montana's water quality standards

Table 8. Recreation and Aesthetics Sufficient Credible Data Decision Table

Level of Information	**Technical Component**	**Spatial/Temporal Coverage**	**Data Quality**	**Data Currency**
Insufficient Data	-Observations of algae blooms, odors, turbidity, aesthetics, etc. without documentation. -Observations made about flows or water levels without documentation. -Observations made concerning surface scums, pollution, toxins, etc. without documentation.	- Very limited water chemistry or fecal coliform data. -Data not collected at critical times such as during the summer for swimming. Limited spatial coverage that does not adequately target probable causes of impairments (e.g., one location). -Limited temporal cover	-Data precision and sensitivity are low or unknown. - QA/QC protocols were not followed. -Samples not properly collected or preserved; or exceed holding times. -Poor documentation	- Data do not reflect current conditions.
Sufficient Credible Data	-Observations of algae blooms, odors, turbidity, aesthetics, etc., well documented. - Documentation includes photos. -Probable sources of impairment identified; probable causes of impairment measured or well documented (toxins, dewatering, etc). -Chlorophyll *a* data collected -Fecal coliform data collected -Fish consumption advisories resulting from anthropogenic impairment -Information concerning beach closures. -Sechii disk data (lakes). -Long-time local residents provide consistent historical perspectives regarding their observation of changes in water quality over time.	-Good temporal coverage of observations, photo documentation, fecal coliform data, etc. -Data and observations are targeted during the summer months. -Good spatial coverage or well targeted sampling location(s). -Limited water quality data or documentation; however, data indicate severe impairment.	-Data precision and sensitivity moderate. -QA/QC protocols are followed. - Low detection limits	-Data likely reflect current conditions. -There have been no significant activity changes in the watershed since the data were collected.

Table 9. Aquatic Life/Fisheries Use Support Decision Table for Streams

DATA CATEGORY (Streams) 1. CHEMISTRY	UNIMPAIRED OR LEAST IMPAIRED	MODERATELY IMPAIRED	SEVERELY IMPAIRED
1(a) TOXICITY (e.g., WET Tests)	Bioassay test indicates no acute or chronic toxicity	Bioassay test indicates chronic toxicity	Bioassay test indicates acute toxicity
1(b) CHEMICAL TOXICANTS - (trace metals, ammonia, chlorine, organics, pesticides, etc.) 1, 2 *Acute and Chronic Water Quality Standards*	For any pollutant: No exceedence of acute or chronic standards, and/or the chronic standards are exceeded by less than 10% no more than once for one parameter in a three-year period when measurements were taken at least four times/year (quarterly).	For any pollutant: Acute standards are exceeded by less than 25%; and/or chronic standards are exceeded by 10-50%; and/or water quality standards are exceeded in no more than 10% of the measurements from a large data set.	For any pollutant: Acute standards are exceeded by at least 25%; and/or chronic standards are exceeded by more than 50%; and/or water quality standards are exceeded in more than 10% of the measurements from a large data set.
Sediment Chemistry (Toxicants, e.g., metals and organic compounds)	Sediment trace metal concentrations are similar to reference condition.	Sediment trace metal concentrations are moderately higher than reference condition.	Sediment trace metal concentrations are substantially higher than reference condition.
Models	Predictive models do not indicate impairment.	Predictive models indicate moderate impairment.	Predictive models indicate severe impairment.
Bioaccumulation (e.g., fish tissue)	Pollutants are not bioaccumulated or are only slightly above background levels.	Bioaccumulation of pollutant is moderately above background levels.	Bioaccumulation of pollutant is substantially higher than background levels.

1 **Note: When possible, use the average concentration of samples collected over a 96 hour period and compare directly to chronic standard values; one data point (n=1) is sufficient if no other data were collected within 96 hours.**

2 **Note: Reference Conditions may be determined through a combination of the following: Comparison of the water body to a least impaired stream, historical data showing previous condition of the water body, conditions in a less-impaired upstream or downstream segment of the same water body, conditions in a paired watershed, a review of pertinent literature, expert opinion or modeling.**

Table 9. Aquatic Life/Fisheries Use Support Decision Table for Streams *(Cont.)*

DATA CATEGORY (Streams)	UNIMPAIRED OR LEAST IMPAIRED	MODERATELY IMPAIRED	SEVERELY IMPAIRED
1(c) CHEMISTRY (Nutrients, dissolved oxygen, pH, TSS, turbidity, and temperature) [3] [4] [5] *Water quality Standards*	**Water quality standards are not exceeded for any pollutant; or the measurements are similar to reference condition; and/or for one parameter only, the water quality standard was randomly exceeded by less than 10% in no more than 10% of the measurements from a large data set.**	**Water quality standards are exceeded by less than or equal to 50%; Parameters that do not have numeric values will be compared to reference condition; and/or the water quality standards are exceeded for 11 to 25% of the measurements from a large data set.**	**Water quality standards are exceeded by more than 50%; Parameters that do not have numeric values will be compared to reference condition; and/or the water quality standards are exceeded by more than 25% of the measurements from a large data set.**
Nutrients	**Nutrient concentrations are similar to reference condition.**	**Nutrient concentrations are moderately higher than reference condition.**	**Nutrient concentrations are substantially higher than reference condition.**
Sediment	**Total Suspended Sediment or turbidity measurements are similar to reference condition.**	**Total Suspended Sediment or turbidity measurements are moderately higher than reference condition.**	**Total Suspended Sediment or turbidity measurements are higher than reference condition.**
Models	**Predictive models indicate no impairment.**	**Predictive models indicate moderate impairment.**	**Predictive models indicate severe impairment.**

3 **Note: Dissolved Oxygen requires consideration of diel changes and the time of year (e.g., presence or absence of critical life stage); pH and temperature standards reflect deviations from natural. For pH and temperature a 110% exceedence of standards means a 10% exceedence of the maximum allowable change from natural.**

4 **Note: A large data set is 4 times/year for 3 years.**

5 **Note: Reference Conditions may be determined through a combination of the following: Comparison of the water body to a least impaired stream, historical data showing previous condition of the water body, conditions in a less-impaired upstream or downstream segment of the same water body, conditions in a paired watershed, a review of pertinent literature, or expert opinion or modeling.**

Table 9. Aquatic Life/Fisheries Use Support Decision Table for Streams *(Cont.)*

DATA CATEGORY (Streams) **2. HABITAT**	**UNIMPAIRED OR LEAST IMPAIRED**	**MODERATELY IMPAIRED**	**SEVERELY IMPAIRED**
6 7 ***Habitat (e.g., evidence of excessive sediment or dredging)***	**Data indicate that the habitat is similar to reference condition. (channel morphology; substrate composition; bank/riparian structure)**	**Modification of habitat slight to moderate with some evidence of watershed erosion caused by land use activities. Channel modification slight to moderate.**	**Severe habitat alteration by channelization and dredging activities, bank failure or heavy watershed erosion.**
Flow	**Flow regime of the region. Dams built prior to July 1, 1971 are operated in a reasonable manner where impacts to aquatic life habitat are minimized.**	**Comparison to reference condition indicates that flow alterations have an impact on aquatic life habitat.**	**Comparison to reference condition indicates that flow alterations have severely impacted aquatic life habitat.**
Riparian Area	**The stream has riparian vegetation of natural types with minimal short-term impacts.**	**Limited riparian zones because of encroaching land use patterns.**	**Removal of riparian habitat is widespread.**
Stream Reach Survey	**The DEQ Stream Reach Survey score is greater than or equal to 75 percent of reference condition or the total possible score.**	**DEQ Stream Reach Survey score is between 25-75 percent of reference condition or of the total possible score.**	**The DEQ Stream Reach Survey score is less than or equal to 25 percent of reference condition or of the total possible score.**
Proper Functioning Condition	**Proper functioning condition**	**Functional- at risk**	**Nonfunctional**
Geomorphology (e.g. pattern, channel cross section, longitudinal profile, pebble count)	**Measurements indicate that the geomorphology is similar to reference condition.**	**Measurements indicate that the stream is moderately unstable.**	**Measurements indicate that the stream is extremely unstable (often Rosgen stream types F, G and D).**

6 **Note: DEQ is using habitat and reference condition to interpret narrative water quality standards that protect aquatic life use.**

7 **Note: Reference Conditions may be determined through a combination of the following: Comparison of the water body to a least impaired stream, historical data showing previous condition of the water body, conditions in a less-impaired upstream or downstream segment of the same water body, conditions in a paired watershed, a review of pertinent literature, expert opinion or modeling.**

Table 9. Aquatic Life/Fisheries Use Support Decision Table for Streams *(Cont.)*

DATA CATEGORY (Streams) **3. BIOLOGY**	**UNIMPAIRED OR LEAST IMPAIRED**	**MODERATELY IMPAIRED**	**SEVERELY IMPAIRED**
Biological Assemblages ***A) Macroinvertebrate*** ***B) Periphyton*** ***C) Fishery*** 8,9,10	**Data indicate functioning, sustainable biological assemblages, none of which have been modified significantly beyond the natural range of the reference condition (greater than 75 percent of reference condition).**	**At least one biological assemblage indicates moderate impairment when compared to reference condition (25-75 percent of reference condition).**	**At least one assemblage indicates severe impairment Data clearly indicate severe modification of the biological community when compared to reference condition (less than 25 percent of reference condition).**
Chlorophyll	**The benthic chlorophyll level is similar to reference condition; or the chlorophyll is no more than 100 mg/m^2.**	**The benthic chlorophyll level is moderately higher than reference condition; or the chlorophyll is greater than 100 and not more than 150 mg/m^2.**	**The benthic chlorophyll level is substantially greater than reference condition; or the chlorophyll is greater than 150 mg/m^2.**
Fish Survey (Population estimates)	**Sustainable (wild) fishery is greater than 75 percent of reference condition; or meets the goals of a DFWP management plan**	**Sustainable (wild) fishery population is 25-75 percent of reference condition; or the goals of a DFWP management plan are not met due to anthropogenic impacts to water quality.**	**The stream does not support a sustainable (wild) fishery due to anthropogenic impacts to water quality.**
Wildlife	**Associated wildlife populations are minimally impacted.**	**Associated wildlife populations have been moderately impacted.**	**Associated wildlife populations have been severely impacted.**

8 **Note: DEQ will work with DFWP to further develop fishery guidelines.**

9 **Note: Associated wildlife includes amphibians, waterfowl, and furbearers.**

10 **Note: Reference Conditions may be determined through a combination of the following: Comparison of the water body to a least impaired stream, historical data showing previous condition of the water body, conditions in a less-impaired upstream or downstream segment of the same water body, conditions in a paired watershed, a review of pertinent literature, or expert opinion or modeling.**

Table 10. Aquatic Life Use Support Tables for Lakes and Wetlands (Fish, Aquatic Life, and Wildlife)

DATA CATEGORY (Lakes and Wetlands) **1. CHEMISTRY**	UNIMPAIRED OR LEAST IMPAIRED	MODERATELY IMPAIRED	SEVERELY IMPAIRED
1(a) TOXICITY	**Bioassay test indicates that there is no acute or chronic toxicity**	**Bioassay test indicates chronic toxicity**	**Bioassay test indicates acute toxicity**
1(b) CHEMICAL (TOXICANTS - trace metals, ammonia, chlorine, organics, pesticides, etc.) [11] [12] ***Acute and Chronic Water Quality Standards***	**For any pollutant: No exceedence of acute or chronic standard values; and/or the chronic standards are exceeded by less than 10% no more than once for one parameter in a three year period when measurements were taken at least four times/year.**	**For any pollutant: Acute standards are exceeded by less than or equal to 25%; or chronic standards are exceeded by less than or equal to 50%; and/or water quality standards are exceeded in no more than 10% of the measurements from a large data set.**	**For any pollutant: Acute standards are exceeded by more than 25%; or chronic standards are exceeded by more than 50%; and/or water quality standards are exceeded in more than 10% of the measurements from a large data set.**
Sediment Chemistry (Toxicants, e.g., metals, Organic compounds)	**Sediment trace metal concentrations are similar to reference condition.**	**Sediment trace metal concentrations are moderately higher than reference condition.**	**Sediment trace metal concentrations are substantially higher than reference condition.**
Trophic Status	**Trophic status is similar to reference condition**	**Trophic status exceeds reference condition.**	**Trophic status is hyper-eutrophic.**
Models	**Predictive models do not indicate impairment**	**Predictive models indicate moderate impairment.**	**Predictive models indicate severe impairment**
Bioaccumulation (e.g., fish tissue, etc.)	**Pollutants are not bioaccumulated above background levels.**	**Bioaccumulation of pollutant is slightly above background levels.**	**Bioaccumulation of pollutant is substantially higher than background levels.**

11 **Note: When possible, use the average concentration of samples collected over a 96 hour period and compare directly to chronic standard values; one data point (n=1) is sufficient if no other data were collected within 96 hours.**

12 **Note: Reference Conditions may be determined through a combination of the following:**

Comparison of the water body to a least impaired stream, historical data showing previous condition of the water body, conditions in a less-impaired upstream or downstream segment of the same water body, conditions in a paired watershed, a review of pertinent literature, expert opinion or modeling.

Table 10. Aquatic Life Use Support Tables for Lakes and Wetlands (Fish, Aquatic Life, and Wildlife) (*cont*.)

DATA CATEGORY (Lakes and Wetlands)	UNIMPAIRED OR LEAST IMPAIRED	MODERATELY IMPAIRED	SEVERELY IMPAIRED
1(c) <u>CHEMISTRY</u> (nutrients, dissolved oxygen, pH, TSS, turbidity and temperature) 13, 14, 15 ***Water Quality Standards***	**Water quality standard values are not exceeded for any pollutant; or the measurements are similar to reference condition; and/or for one parameter only the water quality standard was exceeded randomly by less than 10% in less than or equal to 10% of the measurements from a large data set.**	**Water quality standard values are exceeded by less than 50%; Parameters that do not have numeric values will be compared to reference condition; and/or the water quality standards are exceeded for 11 to 25% of the measurements from a large data set.**	**Water quality standard values are exceeded by greater than 50%; Parameters that do not have numeric values will be compared to reference condition; and/or the water quality standards are exceeded for greater than 25% of the measurements from a large data set.**
Nutrients	**Nutrient concentrations are similar to reference condition.**	**Nutrient concentrations are moderately higher than reference condition.**	**Nutrient concentrations are substantially higher than reference condition.**
Models	**Predictive models do not indicate impairment**	**Predictive models indicate moderate impairment.**	**Predictive models indicate severe impairment.**

13 **Note: Dissolved Oxygen requires consideration of diel changes and the time of year (e.g., presence or absence of critical life stage). pH and Temperature standards reflect deviations from natural. For pH and temperature a 10% exceedence of standards means a 10% exceedence of the maximum allowable change from natural.**

14 **Note: A large data set is 4 times/year for 3 years.**

15 **Note: : Reference Conditions may be determined through a combination of the following: Comparison of the water body to a least impaired stream, historical data showing previous condition of the water body, conditions in a less-impaired upstream or downstream segment of the same water body, conditions in a paired watershed, a review of pertinent literature, expert opinion or modeling.**

Table 10. Aquatic Life Use Support Tables for Lakes and Wetlands (Fish, Aquatic Life, and Wildlife) (*cont*.)

DATA CATEGORY (Lakes and Wetlands) 2. HABITAT	UNIMPAIRED OR LEAST IMPAIRED	MODERATELY IMPAIRED	SEVERELY IMPAIRED
Habitat 16 17	**Data indicate that the habitat is similar to reference condition.**	**Modification of habitat includes moderate evidence of impacts to the shoreline or littoral zone such as erosion or removal of native riparian or littoral vegetation.**	**Severe habitat alteration by shoreline erosion (bank failure) or removal of riparian or littoral vegetation .**
Sediment	**No significant deposition of sediments beyond reference condition.**	**Moderate levels of sediment are being transported to the lake from the watershed.**	**Excessive levels of sediment are being transported to the lake from the watershed.**
Water Level	**Water level fluctuation is similar to reference condition; or dams are operated in a reasonable manner where negative impacts to aquatic life are minimized.**	**Water level fluctuations have moderate impact on aquatic life habitat; or dam operations could be improved to benefit all designated beneficial uses, including aquatic life.**	**Water level fluctuations have severely impacted aquatic life habitat; or dams are not operated to support all designated beneficial uses, including aquatic life.**
Proper Functioning Condition or HGM Functional Assessment	**Proper Functioning Condition**	**Functional- at risk**	**Nonfunctional**
Habitat Assessment	**Habitat assessment indicate none/slight impairment**	**Habitat Assessment indicates moderate impairment**	**Habitat assessment indicates severe impairment.**

16 **Note: DEQ is using habitat and reference condition to interpret narrative water quality standards that protect aquatic life use.**

17 **Note: Reference Conditions may be determined through a combination of the following: Comparison of the water body to a least impaired stream, historical data showing previous condition of the water body, conditions in a less-impaired upstream or downstream segment of the same water body, conditions in a paired watershed, a review of pertinent literature, expert opinion or modeling.**

Table 10. Aquatic Life Use Support Tables for Lakes and Wetlands (Fish, Aquatic Life, and Wildlife) (*cont*.)

DATA CATEGORY (Lakes and Wetlands) 3. **BIOLOGY**	UNIMPAIRED OR LEAST IMPAIRED	MODERATELY IMPAIRED	SEVERELY IMPAIRED
Biological Assemblages ***- Fish*** ***- periphyton*** ***-phytoplankton*** ***- macroinvertebrates*** ***- zooplankton*** 18,19,20	**Data indicate functioning, sustainable biological assemblages, none of which have been modified significantly beyond the natural range of the reference condition (greater than 75 percent of reference condition remaining).**	**At least one biological assemblage indicates moderate impairment (25-75 percent of reference condition remaining).**	**At least one assemblage indicates severe impairment (less than 25 percent of reference condition remaining).**
Chlorophyll	**The chlorophyll levels are similar to reference condition.**	**The chlorophyll level is moderately higher than reference condition.**	**The chlorophyll level is substantially greater than reference condition.**
Paleolimnology	**Sediment core samples do not indicate impairments.**	**Sediment core samples show moderate changes in salinity, trophic status, sedimentation rates or alkalinity as a result of anthropogenic impacts.**	**Sediment core samples show excessive changes in salinity, trophic status, sedimentation rates or alkalinity as a result of anthropogenic impacts.**
Fishery Survey	**Fishery is similar to reference condition; or meets DFWP management goals.**	**Fish population is moderately impaired; or although there is a fishery, the DFWP management goals are not met due to anthropogenic impacts to water quality.**	**The lake does not support a fishery population due to anthropogenic impacts to water quality.**
Wildlife	**Impacts to associated wildlife populations are minimal.**	**Impacts to wildlife populations have been moderate.**	**Impacts to associated wildlife populations have been severe.**

18 **Note: DEQ will work with DFWP to further develop fishery guidelines.**

19 **Note: Associated wildlife includes amphibians, waterfowl, and furbearers.**

20 **Note: Reference Conditions may be determined through a combination of the following: Comparison of the water body to a least impaired stream, historical data showing previous condition of the water body, conditions in a less-impaired upstream or downstream segment of the same water body, conditions in a paired watershed, a review of pertinent literature, expert opinion or modeling.**

Table 11. Drinking Water Beneficial Use Support Decision Table

BENEFICIAL USE	**UNIMPAIRED OR** *LEAST IMPAIRED*	**MODERATELY IMPAIRED**	**SEVERELY IMPAIRED**
Drinking Water	**No human health standard exceedences.**	**Not Applicable**	**Exceedence of human health standards.**

Note: Assume drinking water will be treated prior to consumption (e.g., chlorination or filtration)

Note: For this guidance document, exceedence is defined as a violation of Montana's water quality standards.

Table 12. Contact Recreation Beneficial Use Support Decision Table

DATA OR INFORMATION	NOT/LEAST IMPAIRED	MODERATELY IMPAIRED	SEVERELY IMPAIRED
Algae, Toxins etc.	**There are no excessive blue-green algae blooms, turbidity, odor, toxins, etc.; similar to reference condition.**	**Excessive blue-green algae blooms turbidity, odor, toxins, etc. moderately restrict swimming or boating.**	**Swimming or boating severely inhibited by excessive blue-green algae blooms, pathogens, turbidity, odor, toxins, etc.**
Chlorophyll	**The benthic chlorophyll level is similar to reference condition; or the chlorophyll is no more than 50 mg/m^2.**	**The benthic chlorophyll level moderately exceeds reference condition; or the chlorophyll is more than 50 mg/m^2 but not more than 100 mg/m^2.**	**The benthic chlorophyll level greatly exceeds reference condition; or the chlorophyll is more than 100 mg/m^2.**
Bathing Closure	**No bathing area closures.**	**Beach closures.**	**Lakewide bathing closures.**
Fecal Coliforms	**Fewer than 200 colonies fecal coliform per 100 ml for 90 percent of the samples collected in a 30-day period; or similar to reference condition.**	**No more than 10 percent of samples exceed 400 colonies fecal coliform per 100 ml during any 30-day period and probable sources are identified.**	**More than 10 percent of samples exceed 400 colonies fecal coliform per 100 ml in a 30 day period and probable sources are identified.**
De-watering	**Water quantity is similar to reference condition; dams are operated in a reasonable manner so recreation impairment is minimized.**	**Water body is partially dewatered and discourages recreation.**	**Water body is dewatered and can not be used for recreation.**

Table 13. Agriculture Supply Beneficial Use Support Decision Tables

DATA AND INFORMATION	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 can not 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 ratios 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.**

Table 14. Industry Supply Beneficial Use Support Decision Tables

DATA AND INFORMATION	UNIMPAIRED OR LEAST IMPAIRED	MODERATELY IMPAIRED	SEVERELY IMPAIRED
Salinity	**Salinity is similar to reference condition and/or the salinity does not restrict use by industry.**	**Salinity is above reference condition and discourages water use by industry.**	**Salinity is above reference condition and water cannot be used by industry.**
Turbidity	**Turbidity is similar to reference condition and/or the turbidity does not restrict use by industry.**	**Turbidity is above reference condition and discourages use by industry.**	**Turbidity is above reference condition and water cannot be used by industry.**
De-watering	**Water quantity is similar to reference condition.**	**Water body is partially de-watered and discourages use by industry.**	**Water body is de-watered and can not be used by industry.**