

## APPENDIX A: APPLICABLE WATER QUALITY STANDARDS

The Montana Surface Water Quality Standards and Procedures (Water Quality Standards: Title 17, Chapter 30, Sub-Chapter 6) are a part of the Administrative Rules of Montana. These standards provide the basis for 303(d) listing decisions as well as the basis for setting water quality targets. Per Section 17.30.608 of the Water Quality Standards, all waterbodies in the Swan Lake Watershed are classified as B-1 except for Swan Lake, which is classified as A-1. The following information provides language applicable to waterbodies classified as either A-1 or B-1 and also applicable to water quality restoration and TMDL development in the Swan Lake Watershed. In addition, the primary pollutant(s) of concern addressed by the standard, as they relate to this document, are also listed. Where A-1 and B-1 standards are the same, it is noted.

17.30.623(1):

*"Waters classified B-1 are to be maintained 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."*

Pollutants: All (includes sediment, organic carbon) (a waterbody is impaired when the beneficial use is not fully supported)

17.30.622:

(1) *"Waters classified A-1 are to be maintained suitable for drinking, culinary and food processing purposes after conventional treatment for removal of naturally present impurities."*

(2) *"Water quality must be 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."*

Pollutants: All (includes sediment, organic carbon)(a waterbody is impaired when the beneficial use is not fully supported)

17.30.623(2) and 17.30.622(3): [Applies to B-1 and A-1 classifications]

*"No person may violate the following specific water quality standards for waters classified B-1 (A-1 for 17.30.622(3)):"* Relevant specific standards are discussed below:

17.30.623(2)(d): [Applies to B-1 classification only]

*"The maximum allowable increase above naturally occurring turbidity is five nephelometric turbidity units except as permitted in 75-5-318, MCA."*

Pollutant: Sediment (suspended solids);  
Nutrients (nutrient enrichment: algae blooms)

75-5-318, MCA allows for short-term turbidity increases if authorized by the DEQ (can also be authorized by the department of fish, wildlife and parks in conjunction with DEQ) and if specific conditions, as defined by 75-5-318, MCA, are satisfied.

17.30.622(3)(d): [Applies to A-1 classification only]

*"No increase above naturally occurring turbidity or suspended sediment is allowed except as permitted in 75-5-318, MCA."*

Pollutant: Sediment (suspended solids)

Nutrients (nutrient enrichment: algae blooms)

17.30.623(2)(f) and 17.30.622(3)(f): [Applies to B-1 and A-1 classifications]

*"No increases are allowed above naturally occurring concentrations of sediment or suspended sediment (except as permitted in 75-5-318, MCA, settleable solids, oils, or floating solids, which will or are likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish, or other wildlife."*

Pollutant: Sediment; Organic Carbon, Nutrients

17.30.623(2)(h) and 17.30.622(3)(h): [Applies to B-1 and A-1 classifications]

*"Concentrations of carcinogenic, bioconcentrating, toxic, or harmful parameters which would remain in the water after conventional water treatment may not exceed the applicable standards set forth in department Circular WQB-7."*

WQB-7 identifies dissolved oxygen values ranging from 3 to 9.5 depending on species life stages and whether the value is a 30 day mean, a 7 day mean, a 7 day mean minimum, or 1 day minimum.

17.30.637(1): [This is from a section of the water quality standards applicable to all waterbodies including those classified as either B-1 or A-1]

*"State surface waters must be free from substances attributable to municipal, industrial, agricultural practices or other discharges that will:"*

17.30.637(1)(a): [Applies to B-1 and A-1 classifications]

*"settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines;"*

Pollutants: Sediment

17.30.637(1)(d): [Applies to B-1 and A-1 classifications]

*"create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life;"*

Pollutants: All (includes sediment, organic carbon)

17.30.637(1)(e): [Applies to B-1 and A-1 classifications]

*"create conditions which produce undesirable aquatic life;"*

Pollutants: Nutrients (linked to undesirable algae growth),  
Organic Carbon (linked to decreased dissolved oxygen &  
subsequent nutrient enrichment)

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17.30.602 Definitions [All apply to B-1 and A-1 classifications]:

17.30.602 (19):

*"Naturally occurring"* means conditions or material present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil and water conservation practices have been applied. Conditions resulting from the reasonable operation of dams in existence as of July 1, 1971 are natural.

Pollutants: All

17.30.602(24):

*"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.

Pollutants: All

17.30.602(28):

“Sediment” means solid material settled from suspension in a liquid; mineral or organic solid material that is being transported or has been moved from its site of origin by air, water or ice and has come to rest on the earth’s surface, either above or below sea level; or inorganic or organic particles originating from weathering, chemical precipitation or biological activity.

17.30.602(30):

“Settleable solids” means inorganic or organic particles that are being transported or have been transported by water from the site or sites of origin and are settled or are capable of being settled from suspension.

Below are some notes associated with the above water quality standards:

- The standards of interest are nearly identical for B-1 and A-1 classified waterbodies. An A-1 classification has stricter protection requirements associated with allowable levels of impurities for drinking, culinary and food processing purposes (ARM 17.30.622) and stricter protection requirements associated with allowable levels of turbidity (ARM 17.30.622(3)(d)).
- The term “naturally occurring” is not the same as “natural background.” “Naturally occurring” can incorporate some limited level of human influence under conditions where reasonable land, soil, and water conservation practices are applied whereas “natural background” as used in this document is not intended to incorporate any human influences.

- There are no numeric standards for inorganic or organic sediment or settleable solids. Even turbidity is more narrative than numeric since values are based on naturally occurring conditions, which can vary and require interpretation.
- The definitions of sediment and settleable solids both include particulate organic carbon, thus providing the linkage between the siltation listing and particulate organic carbon.
- The WQB-7 dissolved oxygen values, which are based on minimum allowable concentrations, are currently not being met in areas of Swan Lake. However, it is known that certain lake types have naturally low dissolved oxygen levels in their bottom waters during summer stratification. Unfortunately, the current classification system for state waters does not discern between different types of waterbodies (i.e. rivers, streams, lakes, etc.), and occasions do arise when the numeric standards are not consistent with natural background conditions. The applicability of the Swan Lake oxygen standards under WQB-7 are preceded by “No person may violate the following specific water quality standards .....” per ARM 17.30.622(3), implying that natural background conditions cannot be considered a violation of the numeric standards.

To address the above dissolved oxygen condition, the Standards section of DEQ has been actively developing a lake- and reservoir-specific classification system, to which more accurate standards could be applied. The classification system will assign a Carlson trophic state index (TSI) to each class of lake or reservoir. This index has a 0-100 scale and is essentially a measure of the abundance of phytoplankton in the lake. Swan Lake’s Carlson TSI is currently between 30 and 40, and preliminary analyses indicate that Swan Lake would fall into a class with other somewhat shallow Western Montana lakes having a typical Carlson TSI index of about 35. Other similar lakes in the area are Lake of the Woods, Peterson Lake, and Glen Lake. Lakes having this index value are usually oligotrophic (they have low algae population densities), however some of the shallower lakes in this index range (like Swan Lake) may have anoxic bottom waters during the summer. In fact, low dissolved oxygen has been observed in the bottom waters of other oligotrophic lakes in Montana. Dissolved oxygen profiles of Lake Agnes in the Pioneer Mountains near Dillon were measured in July and August 2003. The results showed that DO concentrations within 1 meter of the bottom were as low as 0.4 mg/L. Yet, Lake Agnes has a Carlson TSI of between 22 and 33 (based on either chlorophyll *a* or secchi depth, respectively), and is located in a remote watershed with no on-lake development other than a primitive hike-in campsite. Like Swan Lake, the watershed has been logged in the past, the lake has a similar relative depth, and the lake supports a thriving native fish population. Therefore, the low DO in parts of Swan Lake’s bottom waters may not be so unusual for the type of lake that it is, and the existing levels are considered within the range of natural background conditions for the purpose of making an impairment determination.