Wyoming's
Methods for Determining Surface Water Quality Condition and TMDL Prioritization

Draft

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Table of Contents

1. Introduction 4
1.1 Section 305(b) Requirements 4
1.2 Section 303(d) Requirements 4
2. Data Requirements 4
Credible Data 5
Wyoming's Weight-of-Evidence Approach 6
Historic Data 6
Streamflow Conditions 6
3. Designated Uses and Classifications 7
4. Designated Use Support Determinations 9
4.1 Drinking water 9
4.2 Fisheries 9
4.3 Aquatic life other than fish 11
Wyoming Stream Integrity Index 11
River Invertebrate Prediction and Classification System 12
4.5 Recreation 13
4.6 Wildlife 14
4.7 Agriculture 15
4.8 Industry 16
4.9 Scenic value 16
5. Categorization of Surface Waters 17
5.1 Determining Causes and Sources for 303(d) Listed Waters 18
5.2 Georeferencing Categorized Waters 18
5.3 Wyoming's Assessment Database 19
6. Guidelines for De-listing Section 303(d) Listed Waters 19
7. TMDL Prioritization 20
8. References 21

List of Acronyms

Chapter 1	Chapter 1 of the Wyoming Water Quality Rules and Regulations
CFR	Code of Federal Regulations
CWA	Federal Clean Water Act
QA/QC	Quality Assurance/Quality Control
SAP	Sampling and Analysis Plan
SEO	Wyoming State Engineer's Office
TMDL	Total Maximum Daily Load
UAA	Use Attainability Analysis
USEPA	U.S. Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
WDEQ	Wyoming Department of Environmental Quality
WGFD	Wyoming Game and Fish Department
W.S.	Wyoming Statute

1. Introduction

In 1972, Congress enacted the Federal Water Pollution Control Act, otherwise known as the Clean Water Act (CWA). The purpose of the CWA is to promote the restoration and/or maintenance of the chemical, physical and biological integrity of our nation's surface waters and to support the *protection and propagation of fish, shellfish, and wildlife and recreation in and on the water*. The U.S. Environmental Protection Agency (USEPA) is charged with administering the CWA. However, Section 101(b) of the CWA states that *it is the policy of Congress to recognize, preserve, and protect the primary responsibilities and rights of States to prevent, reduce, and eliminate pollution, to plan the development and use (including restoration, preservation, and enhancement) of land and water resources, and to consult with the Administrator in the exercise of his authority under this Act.* As such, the Wyoming Department of Environmental Quality, Water Quality Division (WDEQ/WQD) administers the Clean Water Act in Wyoming.

1.1 Section 305(b) Requirements

Section 305(b) of the CWA requires that each state prepare and submit a biennial report to USEPA by April 1st of even numbered years. The report must contain a description of the navigable waters of the state for the preceding year, including the extent to which current conditions allow for the *protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities in and on the water.* Section 305(b) also requires each state to report the water quality and the elimination of pollutants necessary for designated use support. Specifically, each state is to identify waters not meeting the above conditions, recommend strategies to achieve these objectives and to estimate the environmental impacts, economic and social costs and benefits and the predicted timeline for project completion. Lastly, Section 305(b) requires that the sources and extent of non-point source pollution in each state be estimated, including a description of the current program used to mitigate these pollutants and associated financial costs.

1.2 Section 303(d) Requirements

Section 303(d) of the CWA requires that states identify and list waters for which the effluent limits outlined in Section 301 are not effective in attaining designated uses. Each state must submit a 303(d) List of impaired and threatened waters to USEPA by April 1st of each even numbered year. USEPA must review and approve or disapprove the 303(d) List within 30 days of submittal. Section 303(d) also requires that states develop a separate TMDL for each pollutant/segment combination on the 303(d) List. Waters on the 303(d) List must be prioritized for TMDL development based on the severity of each pollutant/segment combination or listing. Wyoming's biennial Integrated 305(b) and 303(d) Report (hereafter referred to as the Integrated Report) combines the requirements of both CWA sections into a single document.

2. Data Requirements

Much of the data and information used in making designated use support determinations are generated by WDEQ's Surface Water Quality Monitoring Program. Surface Water Monitoring Program studies typically result in final reports, which are available on WDEQ's webpage. In addition, WDEQ routinely reviews water quality data from a variety of other sources, including Wyoming's 34 conservation districts, federal, state and local government agencies, non-profit organizations and the private sector. WDEQ solicits data every two years using the department's automated electronic mailing list or listserv. As part of administering the CWA in Wyoming, 40 CFR 130.7(b)(5) requires that WDEQ *shall assemble and evaluate all existing and readily available water quality-related data and information to develop the list required by §§130.7(b)(1) and 130.7(b)(2). At a minimum "all existing and readily available water*

quality-related data and information" includes but is not limited to all of the existing and readily available data and information about the following categories of waters:

- *(i) Waters identified by the State in its most recent section 305(b) report as "partially meeting" or "not meeting" designated uses or as "threatened";*
- *(ii) Waters for which dilution calculations or predictive models indicate nonattainment of applicable water quality standards;*
- *(iii) Waters for which water quality problems have been reported by local, state, or federal agencies; members of the public; or academic institutions. These organizations and groups should be actively solicited for research they may be conducting or reporting. For example, university researchers, the United States Department of Agriculture, the National Oceanic and Atmospheric Administration, the United States Geological Survey, and the United States Fish and Wildlife Service are good sources of field data; and*
- *(iv) Waters identified by the State as impaired or threatened in a nonpoint assessment submitted to EPA under section 319 of the CWA or in any updates of the assessment.*

All water quality data are thoroughly evaluated against the surface water quality standards contained in Chapter 1 of Wyoming's Water Quality Rules and Regulations (WDEQ, 2013a). Water quality data must be submitted to WDEQ no later than July 15 during odd-numbered (e.g. 2013) years to be considered for inclusion in the subsequent Integrated Report (e.g. 2014). Any supplemental data or other information deemed necessary by WDEQ must be provided promptly as requested. Incomplete data, or those submitted beyond the July 15 deadline are typically considered toward the subsequent Integrated Report (e.g. 2016).

Credible Data

The Wyoming Environmental Quality Act (WDEQ, 2012), Wyoming Statute (W.S.) § 35-11-103(c)(xix), and Section 2(a)(i) of Chapter 1 define credible data as *scientifically valid chemical, physical and biological monitoring data collected under an accepted sampling and analysis plan including quality control, quality assurance procedures and available historical data*. Section 35(b) of Chapter 1 requires that *credible data be collected on each water body, and shall be considered for purposes of characterizing the integrity of the water body including consideration of soil, geology, hydrology, geomorphology, climate, stream succession and the influences of man upon the system. These data in combination with other available and applicable information shall be used through a weight-of-evidence approach to designate uses and determine whether those uses are being attained.* Chapter 1, Section 35(d) requires that *credible data shall be utilized in determining a water body's attainment of designated uses,* although a less than complete set of data may be used to make a decision on designated use support (i.e. attainment) *in instances where numerical standards contained in these rules are exceeded or on ephemeral or intermittent water bodies where chemical or biological sampling is not practical or feasible* (Chapter 1, Section 35(b)). Hereafter, within this document, the use of the term credible data will refer to the definition above.

As described in Section 35(a)(i) of Chapter 1, data must be collected *using accepted referenced laboratory and field methods employed by a person who has received specialized training and has field experience in developing a monitoring plan, a quality assurance plan, and employing the methods outlined in such plans; or works under the supervision of a person who has these qualifications. Specialized training includes a thorough knowledge of written sampling protocols and field methods such that the data collection and interpretation are reproducible, scientifically defensible, and free from preconceived bias.* Section 35(a)(ii) of Chapter 1 states that *data must include documented quality assurance, consisting of a plan that details how environmental data operations were planned, implemented, and assessed with respect to quality during the duration of the project.*

A variety of scientifically defensible laboratory and field methods may be used to collect and analyze data for water quality assessments. WDEQ's Manual of Standard Operating Procedures for Sample Collection and Analysis contains information regarding the standard sampling and analysis methods and references, data handling and field equipment commonly used by WDEQ's Surface Water Quality Monitoring Program. Quality assurance/quality control documentation, including completed data sheets, instrument calibration logs and a detailed description of study design (e.g. map of study site locations, coordinates, photographs and other relevant descriptive information) must accompany all data submissions. WDEQ may also choose to conduct field audits and/or collect additional samples for verification during the QA/QC process. For data collected specifically for use support determinations (i.e., assessments), WDEQ requires a pre-approved sampling and analysis plan (SAP) and a quality assurance project plan (QAPP).

All SAPs must include:

(i) study goals and objectives
(ii) site location information (latitude, longitude and map)
(iii) overall study design
(iv) water quality parameters
(v) sampling duration and frequency
(vi) sample collection and analytical methods
(vii) quality assurance project plan (QAPP)
(viii) documentation indicating that the entity has obtained permission to sample study sites on State, National Park Service and private lands
(ix) documentation indicating the training and qualifications of samplers

Wyoming's Weight-of-Evidence Approach

Wyoming's weight-of-evidence approach evaluates all relevant data and other information and uses scientific deduction to assess the designated use support of surface waters. In using this approach, WDEQ may utilize statistical tests, analytical procedures and evaluate additional data to ensure the validity, representativeness and objectiveness of data. Section 35(b) of Chapter 1 requires that a weight-of-evidence approach be used to analyze credible data when making designated use support determinations. As a general policy, however, WDEQ uses a weight-of evidence approach when evaluating all data to make designated use support determinations. WDEQ's weight-of-evidence approach has been adapted from Section 3, Volume 2 of USEPA's Guidelines for Preparation of the Comprehensive State Water Quality Assessments, 305(b) Reports and Annual Electronic Updates: Supplement EPA-841-B-97-002B (USEPA, 1997) and Section IV of USEPA's Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act (USEPA, 2005).

Historic Data

Section 2(b)(xxii) of Chapter 1 defines historic data as *scientifically valid data that is more than five years old, or qualitative information that adds some factual information on the historic conditions of a water body. This historic qualitative information may include photographs, journals and factual testimony of persons who have lived near or relied upon the water body, and old records on water use and water conditions*. Following recommendations in USEPA's Consolidated Assessment and Listing Methodology (CALM) (USEPA, 2002), WDEQ will only evaluate historical data toward designated use support determinations if they are considered representative of current water quality conditions and they are evaluated with data collected within the last five years.

Streamflow Conditions

Section 11 of Chapter 1 states that *numeric water quality standards shall be enforced at all times except during periods below low flow.* For the purpose of designated use support determinations, the periods

below low flow described in Section 11 refer to natural low flow conditions caused by drought. Low flow can be demonstrated using methods described in Section 11(i), (ii) and (iii) of Chapter 1. WDEQ often reviews streamflow data before making designated use support determinations using numeric criteria. As stated in Section 11(c), *the narrative water quality standards in Sections 14, 15, 16, 17, 28 and 29(b) of these regulations shall be enforced at all stream-flow conditions.*

Turbidity

Section 23 (a) of Chapter 1 states that in all cold water fisheries and/or drinking water supplies (Classes 1, 2AB, 2A and 2B), the discharge of substances attributable to or influenced by the activities of man shall not be present in quantities which would result in a turbidity increase of more than ten (10) nephelometric turbidity units (NTUs). Section 23 (b) states that in all warm water or nongame fisheries (Classes 1, 2AB, 2B and 2C), the discharge of substances attributable to or influenced by the activities of man shall not be present in quantities which would result in a turbidity increase of more than 15 NTUs. Due to the variable nature of turbidity data, WDEQ requires that credible data and a weight of evidence approach be used to make designated use support determinations with turbidity data.

3. Designated Uses and Classifications

Wyoming's Antidegradation Policy, described in Section 8(a) of Chapter 1 states that *water uses in existence on or after November 28, 1975 and the level of water quality necessary to protect those uses shall be maintained and protected*. Section 2(b)(ix) of Chapter 1 defines designated uses as *those uses specified in water quality standards for each water body or segment whether or not they are being attained*. Designated uses are equivalent to management goals or expectations for each of Wyoming's surface waters, and are assigned to each water using a tiered classification system described in Section 4 of Chapter 1. This approach places waters into Classes 1-4 (see Table 1) based on their designated uses, with Class 1 waters being managed for the highest and Class 4 the lowest water quality, respectively. Wyoming's current surface water classifications are contained within the Wyoming Surface Water Classification List (WDEQ, 2013b). Section 3 of Chapter 1 states that *the objectives of the Wyoming pollution control program are to provide, wherever attainable, the highest possible water quality commensurate with the following nine uses:*

Drinking water - *The drinking water use involves maintaining a level of water quality that is suitable for potable water or intended to be suitable after receiving conventional drinking water treatment.*

Fisheries - *The fisheries use includes water quality, habitat conditions, spawning and nursery areas, and food sources necessary to sustain populations of cold water game fish, warm water game fish and nongame fish. This use does not include the protection of aquatic invasive species or other fish which may be considered ""undesirable" by the Wyoming Game and Fish Department or the U.S. Fish and Wildlife Service within their appropriate jurisdictions.*

Aquatic life other than fish - *This use includes water quality and habitat necessary to sustain populations of organisms other than fish in proportions which make up diverse aquatic communities common to the waters of the state. This use does not include the protection of human pathogens, insect pests, aquatic invasive species or other organisms which may be considered "undesirable" by the Wyoming Game and Fish Department or the U.S. Fish and Wildlife Service within their appropriate jurisdictions.*

Fish consumption - *The fish consumption use involves maintaining a level of water quality that will prevent any unpalatable flavor and/or accumulation of harmful substances in fish tissue.*

Recreation - *Recreational use protection involves maintaining a level of water quality which is safe for human contact. It does not guarantee the availability of water for any recreational purpose. The recreational designated use includes primary contact recreation and secondary contact recreation subcategories*.

Wildlife - *The wildlife use includes protection of water quality to a level which is safe for contact and consumption by avian and terrestrial wildlife species.*

Agriculture - *For purposes of water pollution control, agricultural uses include irrigation and/or livestock watering.*

Industry - *The industrial use involves maintaining a level of water quality useful for industrial purposes.*

Scenic value - *Scenic value use involves the aesthetics of a waterbody (odor, color, taste, settleable solids, floating solids, suspended solids and solid waste) and is not necessarily related to general landscape appearance.*

Table 1. Wyoming's surface water classifications (far left column) and designated uses (top row). For each surface water class, a Yes indicates that a designated use is protected, while a No indicates that the use is not protected.

	Drinking water	Cold water game fish	Warm water game fish	Nongame fish	Fish consumption	Aquatic life other than fish	Recreation[2]	Wildlife	Agriculture	Industry	Scenic value
1	*Yes*[1]	*Yes*[1]	*Yes*[1]	*Yes*[1]	*Yes*[1]	*Yes*	Yes	Yes	Yes	Yes	Yes
2AB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2A	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
2B	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2C	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2D	No	If present	If present	If present	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3A	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
3B	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
3C	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
3D	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
4A	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
4B	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
4C	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes

[1] Class 1 waters are not necessarily protected for all uses (indicated by an italicized "*Yes*") in all circumstances. For example, all surface waters in National Parks and Wilderness Areas are Class 1; however, all such waters are not necessarily managed for fisheries or aquatic life other than fish uses (e.g. hot springs, ephemeral waters and wet meadows).

[2] Wyoming's recreational designated use is subdivided into primary and secondary recreational uses, but WDEQ uses only a single recreational designated use in assigning surface water classifications.

4. Designated Use Support Determinations

Designated use support determinations for Wyoming's surface waters are made on a biennial basis during preparation of the Integrated Report. Chapter 1 contains all of Wyoming's numeric and narrative criteria, which define limits for the protection of the state's ten designated uses. A numeric criterion is comprised of a quantifiable unit of measurement for each parameter and a duration and frequency of exposure; narrative criteria are descriptive parameters not easily expressed as quantitative values. Section 2 of this document provides a detailed description of WDEQ's data requirements for making designated use support determinations. All data and other information used in making designated use support determinations, including those generated by WDEQ or from outside sources are available for public review. WDEQ's methods for determining designated use support for each of the state's designated uses are described separately below.

4.1 Drinking water

Section 3(d) of Chapter 1 states that *the drinking water use involves maintaining a level of water quality that is suitable for potable water or intended to be suitable after receiving conventional drinking water treatment.*

USEPA administers the Public Drinking Water Program in Wyoming. Therefore, WDEQ does not extensively monitor surface waters for this use. For numeric criteria, Section 18 of Chapter 1 states that *in all Class 1, 2AB and 2A waters, the "Human Health Consumption of Fish and Drinking Water" values listed in Appendix B of these regulations shall not be exceeded. In all Class 2B, 2C and 2D waters, the "Human Health Consumption of Fish" (consumption of aquatic organisms) values shall not be exceeded. In certain waters, the criteria listed in Appendix B of these regulations may not be appropriate due to unique physical or chemical conditions. In such cases, human health values may be established using the site-specific procedures outlined in the references listed in Appendix E or other scientifically defensible methods.* The drinking water use is also evaluated using numeric criteria in Sections 22 and 23 and narrative criteria in Sections 13, 14, 15, 16, 17 and 29 of Chapter 1. Evaluations of numeric criteria may or may not require the use of credible data, as defined in Section 2 (a)(i) of Chapter 1; however, when narrative criteria are evaluated to determine designated use support, credible data are required.

Fully supporting - Representative data show no exceedance of any drinking water criteria within at least 2 separate years of any 3-year period.

Fully supporting, but threatened - Representative data show no exceedance of any drinking water criteria. However, data indicate a declining water quality trend, that if continued, will likely result in a designated use support determination of not fully supporting.

Not fully supporting - Representative data show that at least one drinking water criterion is exceeded.

Indeterminate - Representative data, collected during a designated use support assessment, are either insufficient or inconclusive and designated use support cannot be determined.

Not assessed - Representative data are not available to determine designated use support.

4.2 Fisheries

Section 3(b) of Chapter 1 states that *the fisheries use includes water quality, habitat conditions, spawning and nursery areas, and food sources necessary to sustain populations of cold water game fish, warm water game fish and nongame fish. This use does not include the protection of aquatic invasive species or other fish which may be considered "undesirable" by the Wyoming Game and Fish Department or the U.S. Fish and Wildlife Service within their appropriate jurisdictions.*

Wyoming has three separate sub-categories for the fisheries use: cold water game fisheries, warm water game fisheries and nongame fisheries. Fisheries designated use support is evaluated using the numeric criteria listed in Sections 21, 23, 24, 25, 26 and Appendices B (listed under aquatic life acute and chronic values), C and D and narrative criteria in Sections 12, 13, 15, 16, 22, 26, 28, 29 and 32 of Chapter 1. The acute aquatic life criteria listed in Appendix B constitute the highest concentration of a physical or chemical parameter to which an aquatic community can be exposed for one hour without deleterious effects. Chronic aquatic life criteria represent the highest average concentration of a physical or chemical parameter to which an aquatic community can be exposed to for four days without deleterious effects. The average concentration of four evenly spaced samples is preferred by WDEQ for evaluating acute (i.e. one sample every 15 minutes) and chronic (i.e. one sample per day) criteria for designated use support determinations. However, it is generally assumed that a single sampling event represents the water quality condition for these longer time periods. WDEQ uses the aquatic life other than fish use (see Section 4.3) as an additional surrogate measure of fisheries designated use support. Evaluations of numeric criteria may or may not require the use of credible data, as defined in Section 2 (a)(i) of Chapter 1; however, when narrative criteria are evaluated to determine designated use support, credible data are required.

Dissolved oxygen, water temperature and pH and can be influenced by a variety of other water quality pollutants, such as sedimentation and nutrient enrichment. Sections 24, 25 and 26 specify that for class 1, 2 and 3 waters, anthropogenic pollution shall not be present in quantities that would change dissolved oxygen, temperature and pH to levels that would adversely affect aquatic life or impair designated uses. WDEQ uses a weight of evidence approach to determine whether any of these three pollutants are causing an impairment to fisheries or aquatic life other than fish uses and whether the source(s) are anthropogenic or natural. This process includes an evaluation of representative credible data and information.

WDEQ recognizes that fish populations and communities can be influenced by factors such as stocking rates, fishing pressure, stream connectivity and competitive displacement via invasive species. However, because WDEQ does not directly study fish communities while monitoring water quality, the influence of these factors is often unknown. WDEQ regularly uses WGFD sampling records to determine current and historic fish distributions.

Fully supporting - Representative data show no exceedance of any fisheries or aquatic life other than fish use criteria within at least 2 separate years of any 3-year period.

Fully supporting, but threatened - Representative data show no exceedance of any fisheries or aquatic life other than fish criteria. However, data indicate a declining water quality trend, that if continued, will likely result in a designated use support determination of not fully supporting.

Not fully supporting - Representative data show that at least one fisheries or aquatic life other than fish criterion is exceeded for at least 2 separate years within a 3-year period.

Indeterminate - Representative data, collected during a designated use support assessment, are either insufficient or inconclusive and designated use support cannot be determined.

Not assessed - Representative data are not available to determine designated use support.

4.3 Aquatic life other than fish

Section 3(g) of Chapter 1 states that the aquatic life other than fish use *includes water quality and habitat necessary to sustain populations of organisms other than fish in proportions which make up diverse aquatic communities common to the waters of the state. This use does not include the protection of human pathogens, insect pests, aquatic invasive species or other organisms which may be considered "undesirable" by the Wyoming Game and Fish Department or the U.S. Fish and Wildlife Service within their appropriate jurisdictions.*

Aquatic life other than fish designated use support can be evaluated using numeric and/or narrative criteria. Numeric criteria are listed in Section 26 and Appendices B (listed under aquatic life acute and chronic values) and C of Chapter 1. The acute aquatic life criteria listed in Appendix B constitute the highest concentration of a physical or chemical parameter to which an aquatic community can be exposed for one hour without deleterious effects. Chronic aquatic life criteria represent the highest average concentration of a physical or chemical parameter to which an aquatic community can be exposed to for four days without deleterious effects. The average concentration of four evenly spaced samples is preferred by WDEQ for evaluating acute (i.e. one sample every 15 minutes) and chronic (i.e. one sample per day) criteria for designated use support determinations. However, it is generally assumed that a single sampling event represents the water quality condition for these longer time periods.

Narrative criteria for the aquatic life other than fish use can be found in Sections 12, 13, 15, 16, 21, 22, 24, 25, 26, 28, 29 and 32 of Chapter 1. The aquatic life other than fish designated use is primarily evaluated for perennial streams using the Wyoming Stream Integrity Index (WSII) (Hargett, 2011) and the River Invertebrate Prediction and Classification System (RIVPACS) (Hargett, 2012) described below. The results of these two models are combined into a single narrative rating derived from the decision matrix in Table 2 and incorporated into a weight of evidence evaluation of aquatic life other than fish designated use support.

WDEQ may also use other methods to assess streams, such as multi-habitat sampling (WDEQ, 2012) when riffles are not present, or paired watershed studies when unique ecological conditions sometimes found in large rivers, small headwater streams (<5 mi^2) and effluent dependent waters are encountered. RIVPACS and WSII cannot be used to evaluate multi-habitat samples or to assess intermittent or ephemeral waters. Aquatic life other than fish designated use support determinations are used by WDEQ as surrogate measures of fisheries, agricultural, wildlife and industrial designated use support. Evaluations of numeric criteria may or may not require the use of credible data as defined in Section 2 (a)(i) of Chapter 1; however, when narrative criteria are evaluated to determine designated use support, credible data are required.

Dissolved oxygen, water temperature and pH and can be influenced by a variety of other water quality pollutants, such as sedimentation and nutrient enrichment. Sections 24, 25 and 26 specify that for class 1, 2 and 3 waters, anthropogenic pollution shall not be present in quantities that would change dissolved oxygen, temperature and pH to levels that would adversely affect aquatic life or impair designated uses. WDEQ uses a weight of evidence approach to determine whether any of these three pollutants are causing an impairment to fisheries or aquatic life other than fish uses and whether the source(s) are anthropogenic or natural. This process includes an evaluation of representative credible data and information.

Wyoming Stream Integrity Index

The WSII (Wyoming Stream Integrity Index) uses thirteen independent multimetric models to assess the aquatic life other than fish use of perennial wadeable streams and wadeable reservoir regulated (i.e. tailwater) sections of the Bighorn and North Platte Rivers in Wyoming (Hargett, 2011). Study sites with unknown biological condition are compared to reference condition for each of eleven bioregions occurring

within Wyoming. Model scores are calculated by averaging the standardized values of several benthic macroinvertebrate community metrics representing richness, composition, life history, functional feeding, habitat preference and tolerance/diversity categories. Scores that exceed the 25th percentile of reference calibration scores are identified as being full support (i.e. within expected reference condition). Index scores below the 25th percentile of reference calibration scores are split into two unequal portions. Scores in the upper 1/3 of this range are identified as indeterminate, whereas scores that fall in the lower 2/3 are assigned a partial/non-support rating (i.e. degraded). The partial/non-support designation indicates that the macroinvertebrate community is in degraded due to either anthropogenic or natural stressors.

River Invertebrate Prediction and Classification System

Wyoming RIVPACS (River Invertebrate Prediction and Classification System) is a predictive model developed to assess narrative criteria associated with the aquatic life other than fish use of the state's perennial wadeable streams (Hargett, 2012). The model compares the taxonomic composition of a macroinvertebrate community of unknown condition (observed) to that of a reference community (expected). The eight variables used in the prediction of the expected condition are longitude, latitude, watershed area, alkalinity and categorical variables for the individual or combined bioregions of the Southern Rockies and Bighorn Mountains, Black Hills, High Valleys & Upper North Platte and Southern Foothills & Laramie Range. The deviation, or ratio of the observed (O) community from that which is expected (E), or O/E value, is used as a measure of biological condition for each of the eleven bioregions occurring within Wyoming. O/E values of 1 represent the best possible biological condition, whereas values <1 are suggestive of some degree of biological degradation. As with the WSII index, O/E values are codified into one of three narrative aquatic life designated use-support categories: full support (i.e. within expected reference condition), indeterminate and partial/non-support (i.e. degraded). The partial/non-support designation indicates that the macroinvertebrate community is in degraded due to either anthropogenic or natural stressors.

Table 2. Aquatic life other than fish designated use support decision matrix

		WY RIVPACS Narrative Category[1]		
		Full Support	Indeterminate	Partial/Non-Support
WSII Narrative Category[1]	Full Support	Meets Narrative Criterion	Meets Narrative Criterion	Indeterminate
	Indeterminate	Meets Narrative Criterion	Indeterminate	Narrative Criterion Exceeded
	Partial/Non-Support	Indeterminate	Narrative Criterion Exceeded	Narrative Criterion Exceeded

[1]The full support, indeterminate and partial/non-support narrative designated use support categories used with the WSII and RIVPACS and reported here are intended to describe those communities within expected reference condition, indeterminate and degraded condition, respectively; these narrative categories do not represent designated use support determinations.

Fully supporting - Representative data show no exceedance of any numeric or narrative aquatic life criterion within at least 2 separate years of a 3-year period.

Fully supporting, but threatened - Representative data show no exceedances of any aquatic life criteria. However, data indicate a declining water quality trend, that if continued, will likely result in a designated use support determination of not fully supporting.

Not fully supporting - Representative data indicate that at least one numeric or narrative aquatic life criterion is exceeded within at least 2 separate years of a 3-year period.

Indeterminate - Representative data, collected during a designated use support assessment, are either insufficient or inconclusive and designated use support cannot be determined.

Not assessed - Representative data are not available to determine designated use support.

4.4 Fish Consumption

Section 3(i) of Chapter 1 states that *the fish consumption use involves maintaining a level of water quality that will prevent any unpalatable flavor and/or accumulation of harmful substances in fish tissue.* As stated in Section 18 of Chapter 1, *in all Class 1, 2AB and 2A waters, the "Human Health Consumption of Fish and Drinking Water" values listed in Appendix B of these regulations shall not be exceeded. In all Class 2B, 2C and 2D waters, the "Human Health Consumption of Fish" (consumption of aquatic organisms) shall not be exceeded*. Narrative criteria for the fish consumption use can be found in Sections 13, 17, 18 and 22(c) of Chapter 1. Evaluations of numeric criteria may or may not require the use of credible data as defined in Section 2 (a)(i) of Chapter 1; however, when narrative criteria are evaluated to determine designated use support, credible data are required.

Fully supporting - Representative data show no exceedance of any fish consumption criteria within at least 2 separate years of any 3-year period.

Fully supporting, but threatened - Representative data show no exceedance of any fish consumption criteria. However, data indicate a declining water quality trend, that if continued, will likely result in a designated use support determination of not fully supporting.

Not fully supporting - Representative data show that at least one fish consumption criterion is exceeded.

Indeterminate - Representative data, collected during a designated use support assessment, are either insufficient or inconclusive and designated use support cannot be determined.

Not assessed - Representative data are not available to determine designated use support.

4.5 Recreation

Section 3(e) of Chapter 1 states that the *recreational use protection involves maintaining a level of water quality which is safe for human contact. It does not guarantee the availability of water for any recreational purpose*. The coliform group of bacteria is the principal indicator used to determine the suitability of a water body for domestic, recreational, industrial and other uses. Coliform bacteria are comprised of non-fecal and fecal subgroups present in soils, vegetation, some industrial wastes and in the gut and feces of warm-blooded animals. *Escherichia coli* (*E. coli*) bacteria are one subset of the fecal coliform group used to detect the presence of fecal material originating from warm-blooded animals. Epidemiological studies have demonstrated that *E. coli* concentration is more strongly correlated with incidents of gastrointestinal illnesses than fecal coliform concentration. Consequently, *E. coli* is considered a better indicator of public health risk than fecal coliforms (WDEQ, 2011).

All of Wyoming's surface waters are designated for either primary or secondary contact recreational uses. Waters designated for secondary contact recreation through the use attainability analysis process outlined in Sections 33 and 34 of Chapter 1 are identified in the Wyoming Surface Water Classification List. All other surface waters are designated for primary contact recreational use. Assessments of recreational designated use support in Wyoming are based on the numeric *E. coli* criteria found in Section 27 of Chapter 1. These criteria (Table 3) are intended to maintain a level of water quality that is safe for human contact by protecting humans from fecal associated pathogens, including bacteria, viruses and protozoa. Because *E. coli* concentrations can be highly variable, these criteria are based on a 60 day

geometric mean of *E. coli* samples. In order to represent the entire 60-day period, WDEQ requires that a minimum of five samples be collected and that they be separated by a minimum of 10 days. However, WDEQ recommends collecting more than five samples when resources allow. When more than five samples are collected, samples within ten day periods must be averaged before being used to calculate the 60 day geometric mean.

Fully Supported – Representative data show no exceedance of the appropriate primary or secondary recreational use criterion.

Fully supporting but threatened - Representative data show no exceedance of the appropriate primary or secondary recreational use criterion. However, data indicate a declining water quality trend, that if continued, will likely result in a designated use support determination of not fully supporting.

Not fully supported - Representative data show that the appropriate primary or secondary recreational use criterion is exceeded.

Indeterminate - Representative data, collected during a designated use support assessment, are either insufficient or inconclusive and designated use support cannot be determined.

Not assessed – Representative data are not available to determine designated use support.

Table 3. Table listing Wyoming's *E. coli* criteria for primary and secondary recreational uses.

Recreational Use Designation	Season	*E. coli* Criteria
Primary Contact	May 1 - September 30	Concentrations of *E. coli* bacteria shall not exceed a geometric mean of 126 organisms per 100 milliliters during any consecutive 60 day period.
Primary Contact	October 1 - April 30	Concentrations of *E. coli* bacteria shall not exceed a geometric mean of 630 organisms per 100 milliliters during any consecutive 60 day period.
Secondary Contact	All Year	Concentrations of *E. coli* bacteria shall not exceed a geometric mean of 630 organisms per 100 milliliters during any consecutive 60 day period.

Section 27(c) of Chapter 1 lists the single sample maximum *E. coli* concentrations that can be used to post recreational use advisories or to derive single-sample maxima on point source discharges. The single-sample maxima cannot be used to assess recreational designated use support; however, an exceedance of the single-sample maximum (235 organisms per 100 milliliters) for high use swimming areas during the summer recreational season (May 1 - September 30) may be used to post recreational use advisories. High use swimming areas include swimming beaches, public reservoirs and other popular recreational areas. WDEQ does not typically post recreational use advisories on surface waters with moderate, light or infrequent full body contact recreation.

4.6 Wildlife

Section 3(h) of Chapter 1 states that *the wildlife use includes protection of water quality to a level which is safe for contact and consumption by avian and terrestrial wildlife species.* Narrative criteria for the wildlife use can be found in Sections 15, 16 and 22 of Chapter 1. WDEQ will evaluate credible data, including those related to wildlife illness, death, or deformity from wildlife agencies and utilize wildlife health information obtained from scientific literature when necessary and available. Unless data and/or information suggest otherwise, WDEQ will generally use aquatic life other than fish designated use support as a surrogate measure of wildlife designated use support. Evaluations of aquatic life numeric

criteria may or may not require the use of credible data as defined in Section 2 (a)(i) of Chapter 1; however, when narrative criteria are evaluated to determine designated use support, credible data are required.

Fully supporting - Representative data show no exceedance of any numeric or narrative aquatic life criterion and/or narrative wildlife criteria within at least 2 separate years of a 3-year period.

Fully supporting, but threatened - Representative data show no exceedance of any wildlife use criterion. However, data indicate a declining water quality trend, that if continued, will likely result in a designated use support determination of not fully supporting.

Not fully supporting - Representative data show that at least one wildlife use criterion is exceeded within at least 2 separate years of a 3-year period.

Indeterminate - Representative data, collected during a designated use support assessment, show that an aquatic life other than fish use criterion is not supported, or are either insufficient or inconclusive and designated use support cannot be determined.

Not assessed - Representative data are not available to determine designated use support.

4.7 Agriculture

Section 3(a) of Chapter 1 states that *for purposes of water pollution control, agricultural uses include irrigation and/or livestock watering*. Section 20 states that *all Wyoming surface waters which have the natural water quality potential for use as an agricultural water supply shall be maintained at a quality which allows continued use of such waters for agricultural purposes. Degradation of such waters shall not be of such an extent to cause a measurable decrease in crop or livestock production.* Narrative criteria for the agricultural use can be found in Sections 15, 16, 20 and 22 of Chapter 1. Credible data relating to agricultural use or specific livestock and/or crop production are required when determining designated use support using these criteria. Unless data and/or information suggest otherwise, WDEQ will generally use aquatic life other than fish designated use support as a surrogate measure of agricultural designated use support. Evaluations of numeric criteria may or may not require the use of credible data as defined in Section 2 (a)(i) of Chapter 1; however, when narrative criteria are evaluated to determine designated use support, credible data are required.

Fully supporting - Representative data show no exceedance of any numeric or narrative aquatic life other than fish criterion and/or narrative agricultural criterion within at least 2 separate years of a 3-year period.

Fully supporting, but threatened - Representative data show no exceedance of any agricultural use criterion. However, data indicate a declining water quality trend, that if continued, will likely result in a designated use support determination of not fully supporting.

Not fully supporting - Representative data show that at least one agricultural use criterion is exceeded within at least 2 separate years of a 3-year period.

Indeterminate - Representative data, collected during a designated use support assessment, show that an aquatic life other than fish use criterion not supported, or are either insufficient or inconclusive and designated use support cannot be determined.

Not Assessed - Representative data are not available to determine designated use support.

4.8 Industry

Section 3(c) of Chapter 1 states that *industrial use protection involves maintaining a level of water quality useful for industrial purposes*. Section 19 states that *all Wyoming surface waters which have the natural water quality potential for use as an industrial water supply shall be maintained at a quality which allows continued use of such water for industrial purposes. Degradation of such waters shall not be of such an extent to cause a measurable increase in raw water treatment costs to the industrial user(s).* Narrative criteria for the industrial use can be found in Sections 15, 16 and 19 of Chapter 1. Unless data and/or information suggest otherwise, WDEQ will generally use aquatic life other than fish designated use support as a surrogate measure of industrial designated use support. Evaluations of numeric criteria may or may not require the use of credible data as defined in Section 2 (a)(i) of Chapter 1; however, when narrative criteria are evaluated to determine designated use support, credible data are required.

Fully supporting - Representative data show no exceedance of any numeric or narrative aquatic life other than fish criterion and/or narrative industrial criterion within at least 2 separate years of a 3-year period.

Fully supporting, but threatened - Representative data show no exceedance of any industrial use criterion. However, data indicate a declining water quality trend, that if continued, will likely result in a designated use support determination of not fully supporting.

Not fully supporting - Representative data show that at least one industrial use criterion is exceeded within at least 2 separate years of a 3-year period.

Indeterminate - Representative data, collected during a designated use support assessment, show that an aquatic life other than fish use criterion is not supported, or are either insufficient or inconclusive and designated use support cannot be determined.

Not Assessed - Representative data are not available to determine designated use support.

4.9 Scenic value

Section 3(f) of Chapter 1 states that *scenic value use involves the aesthetics of the aquatic systems themselves (odor, color, taste, settleable solids, floating solids, suspended solids, and solid waste) and is not necessarily related to general landscape appearance*. Narrative criteria for the scenic value use can be found in Sections 15, 16 and 17 of Chapter 1. Credible data must be evaluated when determining scenic value designated use support.

Fully supporting - Representative data show no exceedance of any scenic value criterion within at least 2 separate years of a 3-year period.

Fully supporting, but threatened - Representative data show no exceedance of any scenic value criterion. However, data indicate a declining water quality trend, that if continued, will likely result in a designated use support determination of not fully supporting.

Not fully supporting - Representative data show that at least one scenic value criterion is exceeded within at least 2 separate years of a 3-year period.

Indeterminate - Representative data, collected during a designated use support assessment are either insufficient or inconclusive and designated use support cannot be determined.

Not assessed - Representative data are not available to determine designated use support.

5. Categorization of Surface Waters

Once designated use support determinations are made by WDEQ, USEPA requires that all surface waters of the state be placed into one of five categories (USEPA 2005, 2006). Because designated uses, water quality standards and designated use support methodologies are not consistent across all states, tribes and territories, surface water categorizations are used to standardize these various approaches for USEPA's national reporting purposes. In Wyoming, designated use support determinations translate directly into the five categories below.

Category 1 - Available data and/or information indicate that all designated uses are supported and no use is threatened.

Category 2 - Available data and/or information indicate that at least one designated use is supported, while one or more other uses are either indeterminate or not assessed.

Category 3 - Available data and/or information are either insufficient or inconclusive and designated use support cannot be determined for any uses.

Category 4 - Available data and/or information indicate that at least one designated use is impaired, but a TMDL is not needed. There are three sub-categories of category 4:

4A. Impaired waters with TMDLs approved by EPA.

4B. A use impairment that is being addressed by the state through other pollution control measures. For example, a stream that has been historically impaired by excess sedimentation from urban stormwater runoff may be moved to category 4B after stormceptors are installed that are expected to effectively trap the excess sediment before it reaches the stream.

4C. A use impairment not caused by a pollutant, but instead by anthropogenic non-pollutant stressor(s). A pollutant can be thought of as a stressor for which an allowable load can be calculated and is defined in Section 502(6) of the CWA as *dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water*. Examples of anthropogenic non-pollutant stressors for which a pollutant load cannot be calculated include stream flow alterations, stream channelization and concrete lined channels (USEPA, 2005).

The Wyoming State Engineer's Office (SEO) regulates water quantity in Wyoming's surface waters; neither USEPA nor WDEQ have any regulatory authority over water quantity related issues Section 101(g) of the CWA states that *it is the policy of Congress that the authority of each State to allocate quantities of water within its jurisdiction shall not be superseded, abrogated or otherwise impaired by this chapter. It is the further policy of Congress that nothing in this chapter shall be construed to supersede or abrogate rights to quantities of water which have been established by any State.* The Code of Federal Regulations, 40 CFR 131.4(a) states that *consistent with section 101(g) and 518(a) of the Clean Water Act, water quality standards shall not be construed to supersede or abrogate rights to quantities of water.* The Wyoming Environmental Quality Act, W.S. 35-11-1104(a)(iii) states that *nothing in this act limits or interferes with the jurisdiction, duties or authority of the state engineer, the state board of control, the director of the Wyoming game and fish department, the state mine inspector, the oil and gas supervisor or the oil and gas conservation commission, or the occupational health and safety commission.* Regarding WDEQ's regulatory authority, Section 1 of Chapter 1 states that *nothing in this definition is intended to expand the scope of the Environmental Quality Act, as*

limited in W.S. 35-11-1104 nor do these regulations supersede or abrogate the authority of the state to appropriate quantities of water for beneficial uses.

Augmenting and/or decreasing natural streamflows is collectively termed "flow alterations" by WDEQ for the purpose of assessing designated use support. Flow alterations occur in all of Wyoming's river basins to some degree and their effects on water quality can range from beneficial to deleterious. WDEQ routinely evaluates the effects of flow alterations and other anthropogenic non-pollutant stressors when reviewing water quality data and other information toward designated use support determinations. Waters are not placed on Wyoming's 303(d) List of impaired waters requiring a TMDL (USEPA category 5) when flow alterations are considered to be the primary cause of a water quality impairment. Instead, these waters are placed into USEPA category 4C, which recognizes that a use impairment is not caused by a pollutant, but instead by an anthropogenic non-pollutant stressor(s). Placing a water in category 4C for flow alterations indicates that at least one designated use is impaired, but that neither WDEQ nor EPA has any regulatory authority over the cause of the impairment.

Category 5 - Available data and/or information indicate that at least one designated use is not being supported or is threatened. Category 5 waters are added to Wyoming's 303(d) List of impaired waters requiring TMDLs. Each pollutant/segment combination is considered a separate 303(d) Listing. For example, if the aquatic life other than fish use on a stream segment is impaired due to copper, sediment and selenium, these three pollutants would be considered three separate 303(d) Listings.

5.1 Determining Causes and Sources for 303(d) Listed Waters

The pollutant causing impairment for each of Wyoming's 303(d) Listed waters is identified during water quality assessments using available data and/or information and a weight of evidence approach. When the available data and/or information identify a pollutant's source(s), it is also added to the 303(d) List. Identifying point sources can usually be accomplished by comparing water quality data above and below an effluent outfall. Non-point sources, however, are typically diffuse and multiple sources can have an additive effect on water quality. In some cases, the source of a pollutant is unknown and therefore no source(s) are identified in the 303(d) List. WDEQ acknowledges that sources may exist which are beyond the scope of available data and/or information. Sources may be added or removed from existing 303(d) Listings as necessary as additional data and/or information become available.

5.2 Georeferencing Categorized Waters

All categorized waters are georeferenced by WDEQ using GIS (Geographic Information Systems) and the U.S. Geological Survey (USGS) 1:24K NHD (National Hydrography Dataset) data layer. Linear (streams) and polygon (lakes, reservoirs, ponds) shapefiles are updated every two years and submitted to USEPA along with the Integrated 305(b) and 303(d) Report. These shapefiles are available to the public for download on WDEQ's Watershed Protection Program website. Study site locations from available data and/or information are used to delineate the extent of each categorized water. Lakes and reservoirs are typically placed into just one of the five categories, but can also be subdivided into several categories. In contrast, streams commonly have segments in more than one category. WDEQ typically delineates stream segments in one of two ways, depending on the number of study sites used in the assessment. If two or more study sites exist, the segment will usually be delineated to include the distance between the sites. If only one study site exists, however, the segment is usually extended from this site to the nearest upstream and downstream tributary. WDEQ recommends that data submissions include the necessary number of study sites to allow for an accurate delineation of each assessment.

A unique 305(b) identifier is assigned to each categorized water by WDEQ and serves as a permanent reference. Each identifier contains information about the state, river basin and 12-digit HUC (hydrologic unit code) containing the water and a sequence number indicating the order in which waters have been

categorized within the 12-digit HUC. For example, a 36.5 mile segment of the Bear River, from the confluence with Woodruff Narrows Reservoir upstream to the confluence with Sulphur Creek was placed in category 5 and added to the 303(d) List in 2002. The 305(b) identifier for this segment is WYBR160101010303_01, indicating that it is located in Wyoming (WY), in the Bear River Basin (BR), in 12 digit HUC 160101010303 and that this was the first (01) categorization decision by WDEQ within this 12 digit HUC.

5.3 Wyoming's Assessment Database

Data and information for all of Wyoming's categorized surface waters are stored in a relational Microsoft Access database called the Assessment Database (ADB). The ADB was created by USEPA to assist states in creating CWA data reports and to improve the quality and consistency of water quality reporting and water quality data analysis. The ADB is updated every two years and is submitted to USEPA along with the Integrated Report.

6. Guidelines for De-listing Section 303(d) Listed Waters

All non-supporting or threatened waters (Category 5) that are placed on Wyoming's 303(d) List of Impaired and Threatened Waters Requiring TMDLs will ultimately be removed from the 303(d) List (i.e. de-listed), by one of several means. The first is through the development of a TMDL (see Section 7 below TMDL prioritization), after which the water is moved from Category 5 to Category 4A. Secondly, de-listing can occur when a water is moved to Category 4B because the addition of pollution control measures are considered effective in remediating the cause of the impairment or threat. A water can be de-listed if it can be demonstrated that the original data analysis or listing rationale were incorrect. A de-listing can also occur when a water is restored and the previously impaired or threatened uses are determined to be supported. A de-listing can occur when a Use Attainability Analysis (UAA) removes an impaired use from a water. Lastly, a water can be de-listed as the state's rules and standards are periodically revised and updated.

The data requirements for demonstrating that a water has been restored and should be de-listed are intended to be more stringent than those necessary to add a water to the 303(d) List. Below, for each designated use, WDEQ provides *general guidelines* for the data necessary to remove waters from the 303(d) List. These guidelines are intended to provide general goals or endpoints to those interested in watershed restoration. However, it is important to note that because each watershed and 303(d) Listing is unique, WDEQ *strongly* recommends consulting Water Quality Assessment personnel to the discuss *specific* data requirements for each potential de-listing.

Drinking water - Representative data, collected for at least 2 consecutive years, show no exceedance of the numeric criteria in Appendix B (listed under "Human Health Value Fish & Drinking Water"), Sections 22 and 23 and/or narrative criteria in Sections 13, 14, 15, 16, 17 and 29 of Chapter 1 for the pollutant associated with the listing.

Fisheries - Representative data, collected for at least 2 consecutive years, show no exceedance of the numeric criteria listed in Sections 21, 23, 24, 25, 26 and Appendices B, C and D and narrative criteria in Sections 12, 13, 15, 16, 22, 28, 29 and 32 of Chapter 1 for the pollutant associated with the listing. If the water was originally listed by default because the aquatic life other than fish use was not fully supported, data spanning at least two consecutive years must demonstrate that the aquatic life other than fish use is now fully supported.

Aquatic life other than fish - Representative data, collected for at least 2 consecutive years, show no exceedance of the numeric criteria in Sections 21, 25, 26 and Appendices B (listed under "aquatic life acute values and aquatic life chronic values") and C and the narrative criteria in Sections 12, 13, 15, 16, 22, 25, 28, 29 and 32 of Chapter 1 for the pollutant associated with the listing.

Fish consumption - Representative data, collected for at least 2 consecutive years, show no exceedance of the numeric criteria listed in Appendix B (listed under "Human Health Value Fish & Drinking Water" or "Human Health Value Fish Only") or the narrative criteria found in Sections 13, 17 and 22(c) of Chapter 1 for the pollutant associated with the listing.

Recreation - Representative data, collected between May 1 and September 30 for at least 2 consecutive years, show no exceedance of the appropriate primary or secondary recreational use criterion described in Section 27 (a) and (b) of Chapter 1 associated with the listing.

Wildlife - Representative data, collected for at least two consecutive years, show no exceedance of any wildlife narrative criteria in Sections 15, 16 and 22 of Chapter 1 for the pollutant associated with the listing.

Agriculture - Representative data, collected for at least two consecutive years, show no exceedance of any agricultural narrative criteria in Sections 15, 16, 20 and 22 of Chapter 1 for the pollutant associated with the listing.

Industry - Representative data, collected for at least two consecutive years, show no exceedance of any industrial narrative criteria in sections 15, 16 and 19 of Chapter 1 for the pollutant associated with the listing.

Scenic value - Representative data collected for at least two consecutive years show no exceedance of the narrative criteria in Sections 15, 16 and 17 of Chapter 1 for the pollutant associated with the listing

7. TMDL Prioritization

Section 303(d)(1) of the federal CWA requires states and tribes to "establish a priority ranking" for the segments identified as needing a TMDL. This ranking must evaluate the severity of the pollutant and the specific designated uses adversely impacted by the pollutant. However, the most severe water quality problems or the most toxic pollutants need not always be given the highest priority for TMDL development if circumstances warrant a lower priority. Consistent with 40 CFR § 130.7(b)(4), each state must also submit a priority ranking every two years within the 303(d) List of the Integrated Report, including waters targeted for TMDL development in the next two years. USEPA guidance encourages states to maintain a TMDL schedule within which TMDLs are completed in a time frame of no longer than 8 to 13 years from the time of initial listing. WDEQ anticipates that some TMDLs will take less than a year while others may take upwards of 3 years to finalize.

USEPA's 2006 Integrated Report Guidance recommends that priority rankings be clear and either in the form of a scheduled TMDL completion date or a tiered system such as high, medium and low. Prior to Wyoming's 2008 TMDL Workplan Update, WDEQ utilized a high, medium and low ranking system. Beginning with the 2010 Integrated Report, the prioritization for TMDL development was changed within the 303(d) List to include the approximate dates that each TMDL is expected to be initiated. By including initiation in the 303(d) List, the public will be better informed of the anticipated timeline of each TMDL.

The severity of the impairment, the EPA time frame, data availability and the effective use of resources will be primary factors in developing the ranking schedule. Typically no single factor will have precedence over another factor. In general, factors for priority ranking will be utilized in the following manner:

> **1. Timeliness.** Waterbodies that have been on the 303(d) List the longest will typically be scheduled for TMDL development before newly listed waterbodies.

2. Hazards to Human and Environmental Health. Waterbodies on the Section 303(d) List for pollutants posing a significant human or environmental health risk (i.e. priority pollutants) will typically be scheduled for TMDL development sooner than other waterbodies.

3. Data Quality and Availability. Waterbodies on the 303(d) list having existing data that are sufficient to develop a TMDL will typically be developed before waterbodies needing additional data or analysis. Waterbodies with insufficient data will be given a lower priority to allow time for additional data collection.

4. Endangered Species. Waterbodies supporting aquatic species that are considered threatened, endangered or are species of concern will typically be scheduled for TMDL development before waterbodies without such species.

5. Timely Restoration. Waterbodies with ongoing implementation practices which are believed to have a high possibility of achieving full restoration within 8 years of initial listing will typically be scheduled for TMDL development later than waterbodies without such ongoing efforts.

6. Quality of the Impaired Water. Higher quality waterbodies (Class 1 or 2) on the Section 303(d) List will typically be scheduled for TMDL development sooner than lesser quality (Class 3 or 4) waterbodies.

Once the above factors have been adequately evaluated, the available resources of the TMDL Program are also considered toward determining a TMDL development schedule. TMDLs will be developed on a watershed basis whenever feasible in order to maximize staff efficiency and cost effectiveness.

8. References

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