Idaho Antidegradation Implementation Procedures

Public Comment Draft, Version 2

State of Idaho
Department of Environmental Quality
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Acknowledgments

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Abbreviations, Acronyms, and Symbols

µg	microgram
7Q10	7-day, 10-year minimum statistical flow value
30Q10	30-day, 10-year minimum statistical flow value
ACOE	US Army Corps of Engineers
AU	assessment unit
BMP	best management practice
BURP	Beneficial Use Reconnaissance Program
CFR	Code of Federal Regulations
cfs	cubic feet per second
CWA	Clean Water Act
DEQ	Idaho Department of Environmental Quality
E. coli	*Escherichia coli*
EPA	US Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
HUC	hydrologic unit code
IDAPA	refers to Idaho Administrative Code
IPDES	Idaho Pollutant Discharge Elimination System
IR	Integrated Report
ITD	Idaho Transportation Department
L	liter
lb	pound
MGD	million gallons per day
NOI	notice of intent
NPDES	National Pollutant Discharge Elimination System
ORW	outstanding resource water
POTW	publicly owned treatment works
RPTE	reasonable potential to exceed (water quality criteria)
TMDL	total maximum daily load
WBAG	Water Body Assessment Guidance
WBID	water body identification number

Executive Summary

Antidegradation is a policy and set of procedures aimed at maintaining the existing quality of Idaho waters. Maintaining water quality that is better than the minimums set by water quality criteria is a primary objective of the Clean Water Act (CWA) and is considered one of the three key elements of water quality standards: beneficial uses, water quality criteria, and antidegradation. This objective is achieved by reviewing water quality-related permits and licenses for their effect on water quality. If the water receiving the discharge is of high quality, significant proposed degradation in water quality is evaluated closely to determine if it can be minimized or avoided. If significant degradation cannot be avoided, the activity is evaluated to determine if it is necessary and important to the social or economic health of the affected public.

Federal rules on antidegradation date back to 1983. While Idaho's antidegradation policy has existed for nearly as long, the state lacked an identified set of implementation procedures for the policy. This lack became the subject of a legal complaint against the US Environmental Protection Agency (EPA) in its oversight of Idaho's water quality standards. As a result, Idaho adopted new rules describing its antidegradation implementation procedures. These rules were finalized in spring 2011, with updates made in 2012, and 2015. This guidance document defines the requirements of the new rules and describes how Idaho will implement its antidegradation policy. It provides guidance for conducting reviews of permits or licenses to determine compliance with the antidegradation provisions in Idaho's water quality standards.

Three Tiers of Protection

Antidegradation policy assigns water bodies one of three levels of protection. Each level, or tier, has its own requirements for protecting existing water quality, as defined below.

- Tier I is the minimum level of protection for any water body, and generally ensures all applicable water quality criteria are met. It requires water quality be maintained so the existing and designated uses of the water are supported.
- Tier II is the middle level of protection and ensures degradation is "necessary to accommodate important economic or social development" (IDAPA 58.01.02.051.02). Degradation is not forbidden, but it must be necessary and justified.
- Tier III is the highest level of protection, reserved for waters of outstanding character. No degradation of water quality is permitted in these waters.

Antidegradation is more about levels of protection than it is about levels of quality. For Tier III, antidegradation is about protection, as the outstanding character of the water may have little to do with actual water quality in the traditional sense of pollutant concentrations (e.g., waters may have particularly high ecological value).

Most of the interest in antidegradation policy is regarding Tier II waters. This tier is where antidegradation procedures can work to maintain high-quality water and where dischargers may have to expend extra effort to reduce or justify their proposed degradation of water quality.

Key Points of Idaho's Antidegradation Program

Federal rules for antidegradation set minimum program requirements. Idaho's rules adhere closely to these federal requirements, but the federal rules have allowed states a fair degree of flexibility in how they implement their programs. Key points of Idaho's rules and program regarding this flexibility are described below.

Activities Subject to Review

Under the CWA, only discharges to waters of the United States are regulated, and only these discharges are subject to antidegradation review in Idaho. By Idaho rule, antidegradation review is triggered by an application for a new or reissued permit or license, including Idaho Pollutant Discharge Elimination System (IPDES) discharge permits and any federal permit or license that requires certification under CWA §401 including EPA National Pollutant Discharge Elimination System discharge permits (CWA §402), Army Corps of Engineers dredge and fill permits (CWA §404), Federal Energy Regulatory Commission licenses. Discharges not needing a permit or license, such as from nonpoint source activities, are not directly subject to antidegradation review. Idaho rule also exempts restoration activities designed to improve water quality from antidegradation review.

Tier Determination

Antidegradation policy assigns water bodies one of three levels of protection. Under Idaho rule, the level of protection (i.e., tier) is determined on a water body-by-water body basis using the most recent federally approved Integrated Report (IR), which summarizes water quality throughout the state. The IR identifies water bodies that do not support beneficial uses or meet all water quality criteria, also known as impaired water bodies. The water quality criteria for aquatic life and recreation uses are distinct and different, so water body tiering is split by these broad use categories.

Nondegrading, Degrading, and Insignificant Degrading Activities

An early step in the review process is evaluating the change in water quality proposed. Not all activities subject to review will be found to degrade water quality. When evaluating proposed changes in discharge that may cause degradation of water quality, the permit or license's change in allowable discharge is reviewed. For an existing discharge, if a reissued permit or license maintains allowable discharge, and the activity does not otherwise change in character, the activity will most likely be nondegrading.

Under Idaho rule, the Idaho Department of Environmental Quality (DEQ's) concern for degradation is forward-looking. DEQ looks at what may be permitted for the future, not what has already been permitted in the past. An activity must be new or cause an increase in pollutant discharge from an existing activity, through greater volume or concentration of pollutants, to degrade water quality

Idaho's antidegradation rule provides requirements for determining the significance of the change in water quality due to an activity or discharge. For discharge to waters receiving Tier II protection, a degrading activity causing no more than a cumulative 10% loss of assimilative capacity from conditions as of July 1, 2011, may be considered an insignificant degradation of water quality after considering the size and character of the activity or discharge and the magnitude of its effect on the receiving stream. Insignificant degradation of water quality is permitted without investigating other source controls, analyzing other alternatives, or justifying social or economic concerns.

Although the level of protection is determined on a water body-by-water body basis, evaluation of degradation occurs by pollutant, for those pollutants of concern, from an activity or discharge.

Significant Degradation of High-Quality (Tier II) Water

Significant degradation is allowed in a watershed of high-quality water (i.e., Tier II water) when attainment of the highest statutory and regulatory requirements for all new and existing point sources has been met, and when cost-effective and reasonable best management practices for all nonpoint sources has been achieved (e.g., surface water quality is better than the assigned criteria). When evaluating proposals to significantly degrade high-quality waters, DEQ will look at whether nonpoint sources in the watershed will be controlled through cost-effective and reasonable best management practices.

The other major condition necessary to allow significant degradation of high-quality water is the activity must be shown to be "necessary to accommodate important economic or social development" (IDAPA 58.01.02.051.02). This condition is broken down into two parts: (1) assessing the necessity of degradation by finding ways to reduce or prevent increases in discharge of pollutants or lessen their impact on water quality and (2) demonstrating an important social or economic justification for degradation that cannot be reasonably avoided.

A new or proposed increase in pollutant discharge could be rejected because the degree of degradation is unnecessary or because the activity is not justified as socially or economically important.

Review Process

Antidegradation review in Idaho is integrated into the state's IPDES permitting or §401 certification process. Reviews will be done by DEQ staff when issuing or certifying permit/license applications and supporting documents. Tier I review will be performed for all new or reissued permits or licenses to demonstrate existing and designated uses will be maintained and protected. DEQ will determine if Tier II protection applies according to IDAPA 58.01.02.051 and 58.01.02.052, the degree of water quality degradation that will occur, and if that degradation is significant. When significant degradation of a Tier II water body is proposed, DEQ will work with the applicant to evaluate alternatives to reduce degradation and determine if degradation that cannot be reasonably avoided is socially or economically justified. DEQ will present its determination in an antidegradation review document, which will be included in DEQ's IPDES permit or §401 certification.

Public review is essential to the process, particularly if degradation will be allowed in a Tier II water body. The antidegradation review will be open to public comment as part of DEQ's permitting or §401 certification process.

1 Purpose and Overview

These procedures provide guidance for implementing Idaho's policy to protect surface water quality from degradation**.** The statutory policy on antidegradation is found in Idaho's "Water Quality Standards" (IDAPA 58.01.02) and consists of three tiers of antidegradation protection (IDAPA 58.01.02.051), as required by federal rule. The implementation of the policy is addressed in IDAPA 58.01.02.052. Detailed implementation steps are depicted in the flowchart in Appendix A and include the following:

- Identify the antidegradation protection levels (i.e., tiers) that apply to a surface **water body.**
- Ensure **existing uses** of the water body are maintained and protected in all cases.
- Determine whether a new, or change in an existing, activity or **discharge** will result in significant water quality degradation.
- Coordinate with other government agencies.
- Review and approve **less-degrading** or **nondegrading alternatives** for **high-quality waters.**
- Assess the importance of social or economic development to justify significant degradation of high-quality waters.
- Engage the public in the process.

Federal rules for antidegradation set minimum program requirements, and Idaho's rules adhere closely to these federal requirements. The federal rules have allowed states a fair degree of flexibility in how they implement their programs, and this guidance documents the requirements of Idaho's antidegradation rules and describes how antidegradation will be implemented in Idaho.

1.1 Applicable Laws and Regulations

Requirements for protecting and managing surface water quality are established in Idaho Code, Title 39, Chapter 36. Idaho Code §39-3603 establishes Idaho's antidegradation policy, and Idaho Code §39-3617–3620 establishes procedures for designating and restricting nonpoint source activities on **outstanding resource waters** (ORWs).

The Board of Environmental Quality, with assistance from the Idaho Department of Environmental Quality (DEQ) and approval by the Idaho Legislature, promulgates administrative rules on water quality (IDAPA 58.01.02).

1.2 Antidegradation and Beneficial Uses

Antidegradation is one of three required regulatory elements of the water quality standards. The other two elements are assignment of **beneficial uses** and adoption of **water quality criteria** (narrative and numeric). All three elements must be administered to effectively protect water quality and the uses dependent on that quality. **Designated uses** and water quality criteria applicable for each of the uses are found in Idaho's water quality standards.

1.2.1 Beneficial Uses

IDAPA 58.01.02.100 describes designated beneficial uses and the use categories that may be applied in Idaho. By category and subcategory uses are as follows:

- *Aquatic Life*—salmonid spawning, cold water, seasonal cold water, warm water, or modified
- *Recreation*—primary contact or secondary contact
- *Water Supply*—domestic, agricultural, or industrial

Aesthetic and wildlife uses apply to all waters.

IDAPA 58.01.02.101 describes waters for which uses specified in IDAPA 58.01.02.100 have not been designated (undesignated surface waters defined in IDAPA 58.01.02.101.01). Undesignated waters that are not man-made waterways are presumed to support cold water aquatic life and primary or secondary contact recreation; therefore, DEQ applies the cold water aquatic life and contact recreation criteria when protecting and managing such undesignated waters. About 70% of Idaho's water bodies do not have specific use designations as of 2019 (IDAPA 58.01.02.110–160) and are protected by applying IDAPA 58.01.02.101.

For waters where uses have been designated, the specific use designations are identified in IDAPA 58.01.02.110–160 by subbasin (US Geological Survey 4th-level hydrologic units, represented by hydrologic unit codes [HUCs]) and **water body units** (represented by water body identification numbers [WBIDs]). Designated uses normally reflect uses of a water body at the time of designation but may also reflect a desired or potential use not yet attained.

Uses may exist in a water body even if they have not been designated in the water quality standards (IDAPA 58.01.02.110–160) and are not presumed by default (IDAPA 58.01.02.101). Salmonid spawning, a recognized use in IDAPA 58.01.02.100 is a prime example; many waters in Idaho that currently support salmonid spawning are not designated in rule. Such existing uses must be protected although they are not designated.

Water quality criteria specific to Idaho's beneficial use designations (i.e., numeric criteria) are found in the water quality standards, IDAPA 58.01.02.210 and 250–253. All waters of the state are subject to general criteria contained in IDAPA 58.01.02.200 (i.e., narrative criteria), regardless of use.

The antidegradation review must identify the beneficial uses of the water body analyzed. Beneficial uses may vary within a water body and may change with location, water body size, or type. Most waters have more than one designated beneficial or existing use. Where multiple uses exist or have been designated for a water body, the use with the most stringent water quality requirements must be maintained and protected.

All **jurisdictional waters** of the state are protected under at least one of the three tiers of the antidegradation rule. Section 1.2.2 describes these tiers. Section 1.3 explains jurisdictional waters and the activities and discharges antidegradation applies to.

1.2.2 Tiers of Protection from Degradation

The federal rule and Idaho's statutory policy establish three tiers of antidegradation protection, which are tied to assessment outcomes reported in the most recently US Environmental Protection Agency (EPA)-approved **Integrated Report** (IR). Tiers of antidegradation protection are applied to assessment units (section 2.2).

Tier I (Maintenance of Existing Uses)

Tier I protection is the minimum level of protection and requires that the level of water quality necessary to protect existing uses be maintained and water quality criteria be met. Tier I protection applies to all surface waters, regardless of the **current water quality** or designated use. A review is conducted to prevent authorizing an activity or discharge that would cause or contribute to a beneficial use not being fully supported or violation of water quality criteria. Tier I protection accounts for all existing beneficial uses (e.g., water supply uses).

Tier I review (section 3) must be performed for all new or reissued permits or licenses (IDAPA 58.01.02.052.07). Existing uses and the water quality necessary to protect the existing uses must always be maintained and protected.

Tier II (High-Quality Waters)

Tier II protection applies only to the subset of surface waters that are of high quality for aquatic life or recreation (40 CFR §131.12(a) (2)) as determined on a water body-by-water body basis. For these high-quality waters, Tier II provides an added layer of protection in addition to the Tier I minimum protection. Unlike Tier I protection, Tier II protection only applies to aquatic life and recreation uses.

A Tier II determination protects high-quality waters from degradation by requiring an analysis of the necessity for significant degradation and the social or economic importance of the activity before it is allowed. A Tier II analysis should only be conducted for activities or discharges subject to a permit or a license that cause degradation (IDAPA 58.01.02.052.08). Under Tier II protection, insignificant degradation will be allowed without further analysis of alternatives. Significant degradation may occur only after an acceptable analysis of alternatives for avoiding or minimizing pollution of the water and an acceptable **social or economic justification of importance** of the action causing degradation. Section 4 presents procedures for evaluating the potential for an activity or discharge to degrade or lower water quality. Section 5 presents procedures for determining whether degradation is insignificant or, if significant, whether it is justified and may proceed. Temporary or short-term changes in water quality do not constitute degradation and may occur without a Tier II analysis (section 2).

Tier III (Outstanding Resource Waters)

Tier III protection, the highest level of protection, prohibits degradation, and applies only to waters of the highest quality or with other outstanding resource values that the legislature has designated by law as worthy of such protection (ORWs). As described in section 6, an activity or discharge that will not cause degradation or that causes temporary and limited degradation of Tier III waters may be allowed by DEQ on a case-by-case basis, provided such changes in water quality do not impact existing uses or alter the essential character or special use that makes the water an ORW.

1.2.3 Tier Listing

DEQ does not maintain a list of Idaho waters identifying levels of antidegradation tier protection. Tier I protection applies to all jurisdictional water bodies. No ORWs have been designated in Idaho as of 2019, and currently, there is no list of waters with Tier III protection. If waters become legislatively designated as ORWs in the future, they will appear in IDAPA 58.01.02. DEQ does not intend to create and maintain a complete list of waters given Tier II protection; such a list would be dynamic and depend upon regular monitoring and assessment of all waters in the state. In Idaho's IR, Appendix F lists assessed waters of the state that fully support beneficial uses (DEQ 2018).

DEQ intends to determine whether Tier II protection is needed at the time an activity or discharge is proposed on a permit or license application. DEQ uses assessment data from the most recent EPA-approved IR to determine a water body's level of antidegradation protection.

Numerous Idaho waters currently receive National Pollutant Discharge Elimination System (NPDES) and/or Idaho Pollutant Discharge Elimination System (IPDES) permitted discharges[1]; these waters would receive either Tier I or Tier I and Tier II protection. Section 2 describes how DEQ determines when a water body warrants Tier II antidegradation protection.

1.3 Applicable Waters and Exempt Activities

Idaho's antidegradation policy applies to all activities that may result in a discharge subject to IPDES permit or certification under the Clean Water Act (CWA) §401. Such activities include all those that require a permit pursuant to CWA §402 (IPDES discharge permits) and §404 (dredge and fill permits) or Federal Energy Regulatory Commission (FERC) licenses.

Jurisdictional waters are a subset of the waters of the state. EPA and US Army Corps of Engineers (ACOE) have developed regulations that specify how CWA jurisdiction determinations are made. ACOE and EPA are responsible for making jurisdictional determinations. Certain activities, such as the examples described below, are not subject to antidegradation review.

1.3.1 Restoration Projects

If an activity qualifies as a restoration project, antidegradation review does not apply (IDAPA 58.01.02.052.02). Water quality restoration projects return water body conditions closer to its natural or original state. It is not necessary that a restoration project completely achieves this goal or does so immediately. Restoration projects are designed to improve water quality, if projects do not work toward improving water quality conditions in a water body, they are

[1]Current NPDES permits in Idaho can be viewed by permittee, location, and permit number at *https://www.deq.idaho.gov/permitting/issued-permits/*.

unlikely to qualify as restoration projects. Restoration projects shall implement best management practices.

DEQ recognizes that some projects with a goal to improve water quality in the long run may still result in short-term worsening of water quality. For example, forest road obliteration projects or culvert replacements may cause a short-term pulse in sediment. This disturbance is expected and acceptable as long as best management practices (BMPs) are used to minimize short-term deterioration of water quality. Such measures should be incorporated into the design of a restoration project and considered in the project approval decision.

1.3.2 Emergency Actions

The rules regarding antidegradation do not address emergency actions. Most emergency activities do not require a permit or license that would trigger antidegradation review or allow adequate time to consider antidegradation. DEQ will handle emergency actions on a case-by-case basis using its discretion to apply antidegradation provisions in a manner appropriate to the circumstances. Examples of emergency actions include cleanup activities associated with a diesel spill into a water body or unexpected levee repair due to imminent flooding danger.

1.3.3 Short-Term or Temporary Changes in Water Quality

As a general principle, DEQ believes degradation of water quality should be viewed in terms of permanent or long-term changes in water quality. Short-term or temporary reductions in water quality, if reasonable BMPs are used, are not considered degradation that triggers a Tier II analysis. This allowance is not a blanket exemption (it will be applied on a case-by-case basis) and does not mean DEQ will overlook a collection of activities or one large activity occurring over a short time period that collectively or individually results in longer-term changes in downstream water quality. **Short-term or temporary changes in water quality**, in the context of this guidance, refer to reductions in water quality lasting for a short time period with no long-term, residual effects.

Short-term or temporary changes in water quality are often associated with fill activity permitted under CWA §404. While the footprint of fill material discharged into jurisdictional waters is generally permanent, the activity often results in a short-term increase in suspended sediment downstream from the fill. If there are no long-term, residual effects associated with the short-term increase in suspended sediment downstream from the fill, short-term increases will not be considered degradation that would trigger a Tier II analysis.

2 Determining Where Tier II Protection Applies

While Tier I antidegradation protection applies to all jurisdictional waters and Tier III waters are designated by state statute, additional data must be considered to determine if Tier II protection is applicable to a specific assessment unit.

By statute, Idaho has established a water body-by-water body approach for identifying waters that will receive Tier II antidegradation protection (Idaho Code §39-3603(b)). This approach uses an IR for water quality status and supporting data. Since the IR is updated every 2 years, each Tier II determination will be made as applications for new or reissued permits or licenses come to DEQ.

Tier II antidegradation determination is based on three factors:

1. The water body's category of use support (i.e., Categories 1–5) according to the most recent EPA-approved IR
2. The beneficial uses of the receiving water body
3. Whether data indicate the water body as a whole is of high quality

2.1 Integrated Report and Use-Support Status Categories

Every 2 years, DEQ is required by the CWA to conduct a comprehensive analysis of Idaho's water bodies to determine whether they meet state water quality standards and support beneficial uses, or if additional pollution controls are needed. This analysis is summarized in the IR and submitted to EPA for approval. The IR guides the development and implementation of water quality improvement plans (i.e., total maximum daily loads [TMDLs]) to protect water quality and achieve federal and state water quality standards. Once EPA approves the IR, it can be used by a state to guide its management decisions. The most current IR is found at *www.deq.idaho.gov/water-quality/surface-water/monitoring-assessment/integrated-report.*

The IR compiles available environmental data and information from all components of DEQ's surface water quality program, as well as from other agencies, organizations, companies, and individuals. This information indicates to water quality managers the relative quality of Idaho's water bodies and is used to set priorities and allocate resources accordingly. All of the state's waters are classified into at least one of five categories. In the 2016 IR, the following five categories are described and summarized in Table 1 (DEQ 2018).

Table 1. Integrated Report categories.

Integrated Report Category	Description
1	Waters with all applicable uses presumed to be fully supported. Presumption based on lack of pollution sources.[a]
2	Waters for which all applicable uses that have been assessed were found to be fully supported.
3	Waters with no assessed applicable uses due to lack of data.
4a	Waters that have an EPA-approved TMDL.
4b	Waters with controls other than a TMDL that are expected to restore all applicable uses to full support within a reasonable period of time.
4c	Waters for which a lack of applicable use support is caused by flow or habitat alteration (i.e., pollution), not a pollutant.
5	Waters for which one or more applicable uses are not fully supported due to a pollutant.[b]

a. This presumption is based on these waters being located entirely within wilderness/roadless areas.
b. Category 5 is equivalent to the §303(d) list of impaired waters (i.e., a TMDL "to do" list).
Note: The term waters means assessment units, which are subdivisions of water body units represented with WBIDs in Idaho's water quality standards.

For a more detailed explanation of how IR report categories are implemented, see *Idaho's 2016 Integrated Report* (2018).

2.2 Water Body Units and Assessment Units

Water body units are the geographic basis for identifying waters of Idaho and designating beneficial uses in the water quality standards. These units and their WBIDs are based on 1:100,000-scale hydrography and divide the state of Idaho into unique, nonoverlapping drainage areas.

In headwaters areas, WBIDs correspond to true watersheds—all surface water in a water body unit flows to a single point where it exits the unit. In Figure 1 (upper right-hand inset), this situation is exemplified by the stream labeled 003 (shown in red). Because water body units are nonoverlapping by design, any unit downstream from a headwater unit has both an entry and an exit point and is not a true watershed. This situation would correspond to the heavy blue, green, and pink lines. The nonheadwater water body units may consist of a large main stem segment and a collection of many smaller tributaries. The small tributaries likely provide only a fraction of the flow in the main stem. Water quality and uses within a WBID can be quite varied.

The potential variation in water quality and uses within a WBID becomes problematic when evaluating the effect that a discharge or activity might have on water quality. It is also problematic for assessing use support and designating uses. The further removed from the headwaters a water body unit is, the more probable it is that the main stem flow of water in and out of the unit is unlike that of the tributaries within the unit (e.g., WBID 001 in Figure 1, upper right-hand inset). DEQ addressed this problem for assessment purposes by using stream order to break water body units into smaller subunits for assessment called **assessment units** (AUs). Small tributaries to larger streams, which can be very different in character but occur in the same water body unit, are split into separate AUs (Figure 1, lower left-hand inset). All water body units in Idaho are broken into AUs; all waters belong to a water body unit and an AU. This finer division allows DEQ to better refine its assessment of water quality and use support.

While AUs are better for assessment purposes than whole WBIDs, they still are not perfect because many distinct 1st- and 2nd-order tributaries that drain different areas are still lumped together into one AU. DEQ could subdivide AUs further but doing so would require additional data collection, which is not feasible. Instead, data used are collected from specific sampling sites to infer water quality throughout an AU. It is possible that differences in activities and discharges exist within an AU, and all water within the AU may not be of the same quality as found at the sampled sites. Typically, DEQ samples at the most downstream extent of an AU, where it is expected that water quality will reflect the effects of all upstream activities. Even in larger streams, the location of a sampling site could reflect better or worse water quality than the bulk of the AU (section 2.6).

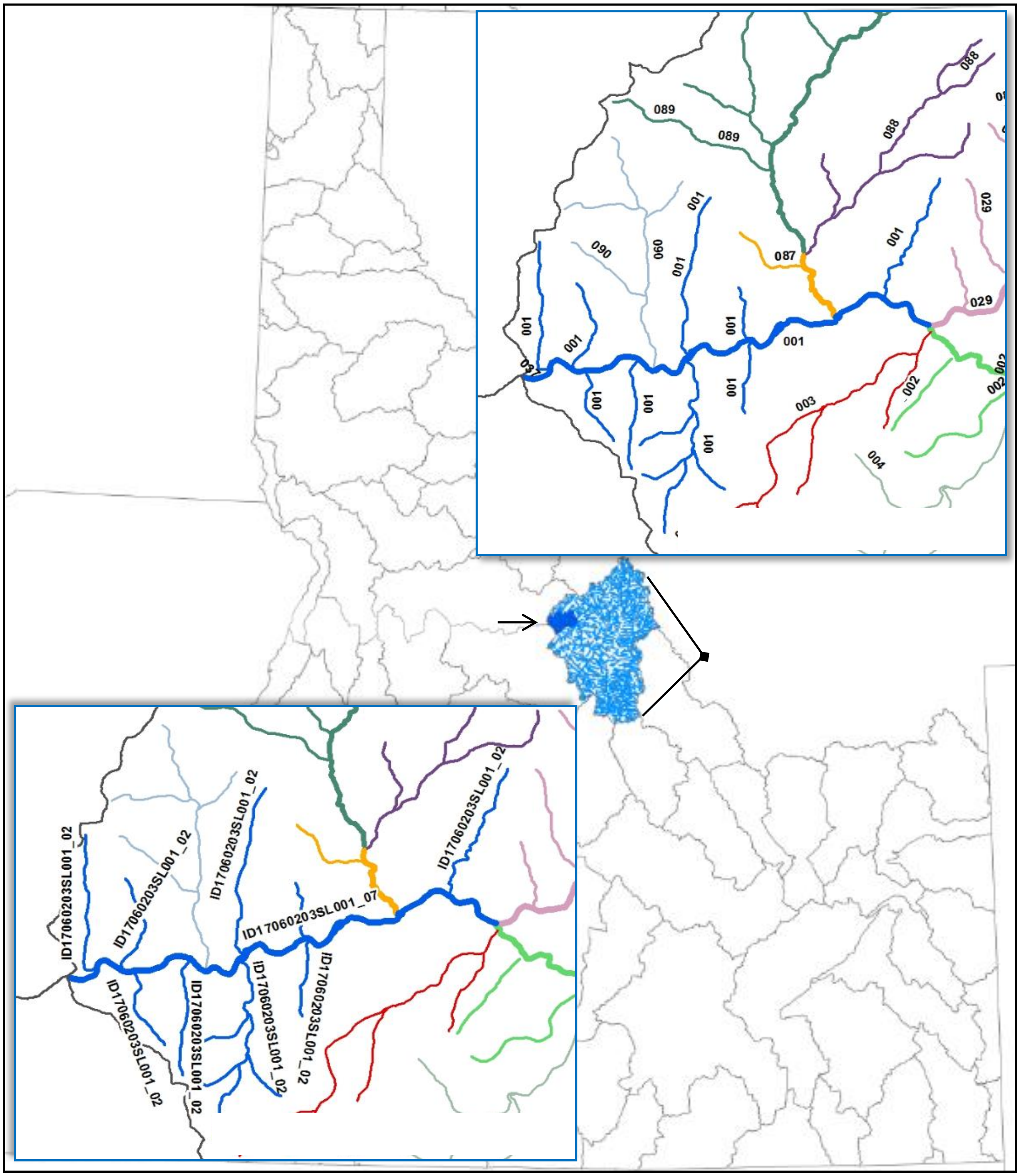

Figure 1. Map detailing WBIDs and AUs for HUC 17060203—Middle Salmon-Panther subbasin.

2.3 Assigning Tier II Protection

Tier II antidegradation classification of an AU is based on the most recent EPA-approved IR, its supporting data, and the beneficial uses of the receiving water body. To ensure the level of protection reflects the quality of the water that would be affected by a proposed activity or discharge, DEQ may also consider how well the available data represent that water. If necessary, DEQ will examine the IR supporting data and, if the water body is unassessed, review any more recent relevant data available. The AU receiving Tier II protection and its beneficial uses will be identified and analyzed in the antidegradation review.

The relationship between IR categories and antidegradation protection is summarized in Table 2. Examples of water body-specific classifications related to IR categories are provided in Appendix B. A flowchart to determine whether to apply Tier I or Tier II antidegradation protection is presented in Figure 2; this chart will be used with data presented in the most recent EPA-approved IR. Tier I review must occur in all cases, even when Tier II is warranted.

Cause for impairment is listed in the IR. Some causes are general (e.g., combined habitat/biota) and do not necessarily correspond with specific water quality criteria, while others are specific (e.g., copper) and are associated with particular criteria.

Table 2. IR categories translated to tiers of antidegradation protection.

Integrated Report Category	Antidegradation Protection Tier
1	Tier II for all applicable uses
2	Tier II for all applicable uses
3	Tier I or II, as data show at time of antidegradation review (case-by-case)
4a[a]	Tier I for the use that is impaired—except aquatic life use, may be Tier II if the only cause of impairment is dissolved oxygen, pH, or temperature and bioassessment (DEQ 2018) shows support of aquatic life use.
4b[a]	Same as 4a
4c	Tier I for aquatic life uses. AUs in Category 4c are listed for causes other than dissolved oxygen, pH, or temperature; the rule does not allow for biological data to provide additional Tier II protection.
5[a]	Same as 4a

a. For AUs in Category 4a, 4b, and 5, level of antidegradation protection may vary by beneficial use if the AU is impaired for only one beneficial use. Where aquatic life is supported for an AU (and contact recreation is impaired), Tier II applies for the aquatic life beneficial use; where aquatic life is unassessed, level of protection is determined on a case-by-case basis. Where contact recreation is supported for an AU (and aquatic life is impaired), Tier II applies for the contact recreation beneficial use; where contact recreation is unassessed, level of protection is determined on a case-by-case basis.

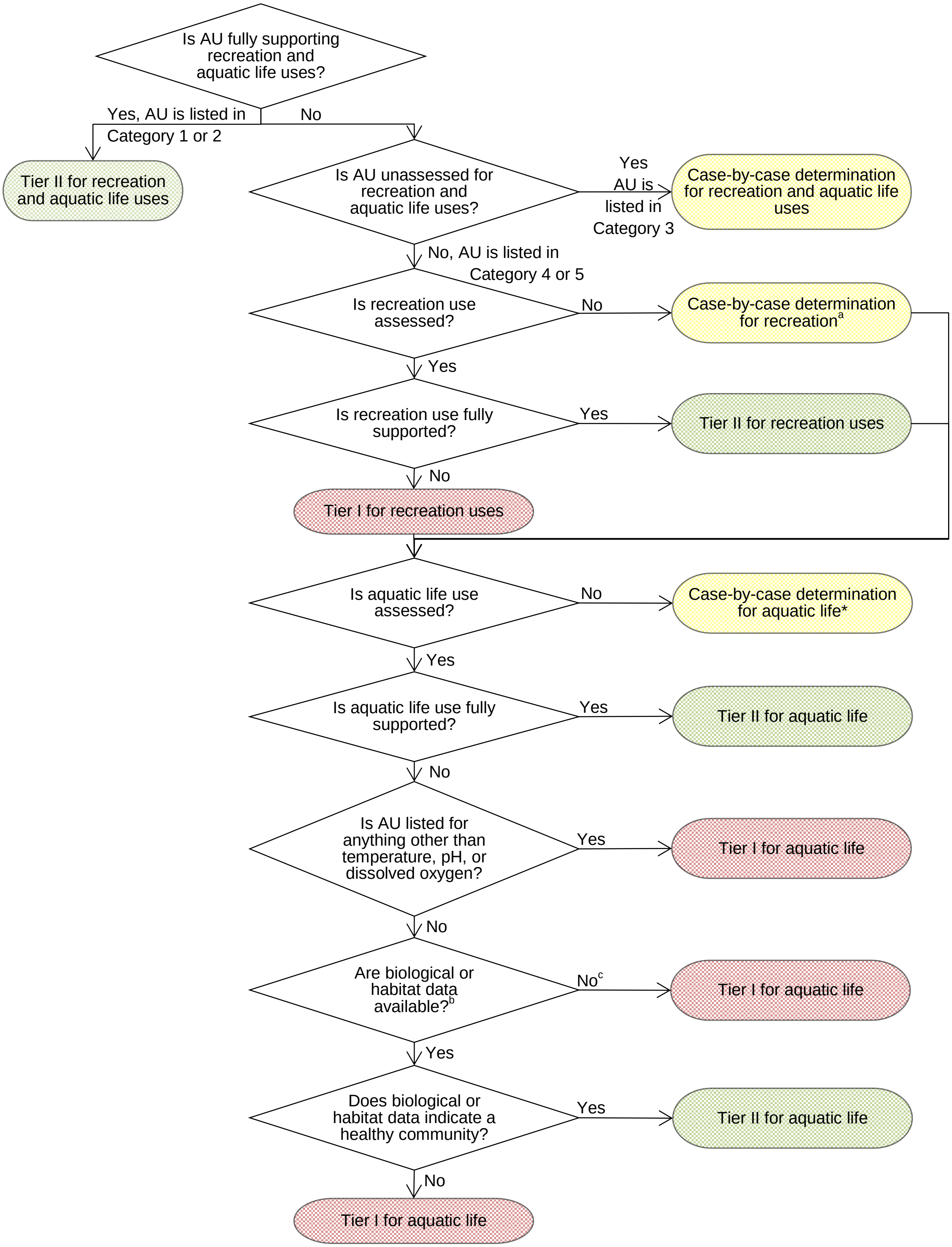

Figure 2. Flowchart for determining whether Tier I or Tier II protection is warranted.

a. DEQ will try to obtain data needed to make an informed decision on support of the use that is unassessed.

b. Biological or habitat data can be DEQ Beneficial Use Reconnaissance Program (BURP) data, BURP-compatible data, or external data (DEQ 2016). Antidegradation tiering determinations can be made with data not sufficient for water body assessments.
c. DEQ will try to obtain biological or habitat data to make an informed decision on the aquatic life use support.

2.3.1 Water Bodies Supporting Assessed Beneficial Uses

All AUs considered fully supporting of all their applicable uses or all their assessed applicable uses (i.e., Category 1 and 2 of the IR) will be given Tier I and Tier II protection for all uses.

2.3.2 Water Bodies with Unassessed Uses

Waters in Idaho may be unassessed due to a lack of suitable data at the time assessments were performed for the latest IR. AUs without an assessment (i.e., Category 3 of the IR) will be evaluated on a case-by-case basis to determine whether they are high quality and need to be given Tier II protection. This evaluation need not occur, and generally will not occur, until DEQ receives notification of an application for a new or reissued permit for a proposed new discharge or activity that could degrade water quality.

When an activity or discharge is proposed on an unassessed water, all relevant information available will be used to determine the appropriate level of antidegradation protection, including new information generated during the application process to specifically address the question of whether the water is of high quality. New information may come from DEQ, other agencies, organizations, companies, or individuals. In accordance with Idaho 58.01.02.052.08(a)(ii), DEQ may ask the **applicant** to gather information to help with this determination.

DEQ may not have the level of information necessary per the *Water Body Assessment Guidance* (WBAG) (DEQ 2016) to determine support status for purposes of the IR. Idaho Code §39-3603(2)(b)(ii) requires DEQ determine the level of antidegradation protection based on available information.

DEQ completes the following to make an antidegradation tiering decision for unassessed aquatic life uses:

1. Look for available DEQ or outside agency water quality data.
    a. Data on compliance with water quality criteria
    b. Biological and habitat data collected under DEQ protocols
    c. Biological and habitat data collected by other entities
2. If none of the above data are available, conduct a site visit.
    a. If water is flowing and data collection is possible, collect water samples following standard operating procedures and field sampling plans and protocols. Temperature and bacteria data are sufficient for aquatic life use and recreation use tiering purposes.
    b. If water is not present during a site visit, consider the following in the tiering decision:
        i. Presence/absence and condition of riparian community
        ii. Substrate type and cobble embeddedness
        iii. Bank stability
        iv. Evidence of fish and seasonal recreation
3. If data are not available and data collection is not possible, ask the applicant for permission to proceed with a Tier II assumption.

Depending on how the data are collected, it may not be possible to calculate DEQ's assessment indices, as described in section 2.4; these data would have to be interpreted using a weight-of-evidence approach and best professional judgment. If relevant data cannot be found or collected in a timely manner, DEQ will ask the applicant for agreement in treating the AU as Tier II, and if the applicant agrees, proceed with antidegradation review on this basis.

For an unassessed recreation use, *Escherichia coli (E. coli)* data are needed to make a tier determination. The determination is made using a 5-sample, 30-day geometric mean compared to the water quality criteria (IDAPA 58.01.02.251.01.a). A single sample analyzed for *E. coli* is enough to make a tiering determination. If the sample shows bacteria levels are less than the single sample maximum for the appropriate subcategory of contact recreation use that triggers additional sampling (IDAPA 58.01.02.251.01.b), DEQ will consider the AU Tier II for recreation. If bacteria levels are greater than the single sample maximum, DEQ will either request collection of additional samples or will not treat the AU as Tier II for recreation.

DEQ will consider relevant pollutants when evaluating data necessary for making a tier determination (section 4.1).

2.3.3 Water Bodies Not Fully Supporting Beneficial Uses or Not Meeting All Criteria

DEQ assesses aquatic life and recreation uses differently because of the differences in water quality requirements in the criteria (values) and the pollutants (parameters) that apply to each. Although uses are assessed separately, if one use is not supported, the water body is considered to not fully support applicable beneficial uses and is placed in Category 4 or 5 in the IR.

While a water body must be identified as not *fully* supporting its uses if it fails to meet even one criterion, it is not considered consistent with antidegradation policy to dismiss protection of the water body from degradation that would affect another use that *is* fully supported. For AUs identified as not fully supporting at least one use, the rule calls for DEQ to evaluate aquatic life and recreation uses separately to determine the appropriate level of antidegradation protection.

2.3.4 Mixed Tiers for a Single Assessment Unit

Because there are different data requirements for evaluating aquatic life and recreation uses (e.g., bioassessment data are not used in evaluating recreation uses, and *E. coli* data are not used in evaluating aquatic life uses), it is possible an AU may warrant Tier II protection for recreation and Tier I for aquatic life, or vice versa. Figure 2 depicts individual tiering for recreation and aquatic life uses. This mixed, by-use assignment of antidegradation tiers is deliberate and will be resolved during the review of a proposed activity or discharge and its expected effect on water quality and applicable uses (section 4). Descriptions of how DEQ evaluates potential degradation of aquatic life and recreation beneficial uses, respectively, are included in sections 2.4 and 2.5.

2.3.5 Water Bodies with a Use Designation of None

AUs with a use designation of *none* will be given Tier I protection only for the use with the *none* designation. This situation will rarely be encountered in Idaho. For example, Blackbird Creek, from the reservoir dam to the mouth, was assessed and designated as *none* for aquatic life and secondary contact recreation (IDAPA 58.01.02.130.05). This creek would be provided Tier I protection for aquatic life; the tier of antidegradation protection for recreation would depend on the IR category.

2.3.6 Man-Made Waterways

DEQ's interpretation of Idaho's water quality standards is canals or drains not specifically designated are not protected for CWA §101(a) uses and will be treated as Tier I waters for antidegradation purposes unless DEQ is presented with data to the contrary. This policy adheres to "Man-Made Waterways," (IDAPA 58.01.02.101.02), which states man-made waters are protected for the use for which they were developed, usually agricultural water supply. DEQ does not consider natural water bodies modified after November 28, 1975, as man-made waterways.

2.3.7 Ephemeral Waters

Ephemeral streams, reaches, or water bodies receive Tier I protection under the antidegradation policy. Tier II protection is not appropriate because the nature of the flows of ephemeral streams do not allow for sustained support of beneficial uses relevant to antidegradation tiering (aquatic life and contact recreation) and do not have the level of water quality necessary to qualify for Tier II protection. These streams lack water most of the time, which prevents assessing assimilative capacity and changes in water quality.

2.3.8 Intermittent Waters

Intermittent streams, reaches, or water bodies receive Tier I protection under the antidegradation policy but may also be given Tier II protection if data support such a decision. To proceed with a tiering decision, DEQ will follow the procedures for unassessed waters (section 2.3.2).

2.3.9 Effluent-Dominated Waters

Intermittent or ephemeral streams, reaches, or water bodies that receive point-source discharges often become effluent-dominated waters (i.e., the majority of the flow is provided by the effluent). In most instances, these waters would be Tier I for recreation. Tier protection for aquatic life would be a case-by-base determination. It would be unlikely that effluent-dominated waters would fully support aquatic life use or receive Tier II protection.

2.4 Aquatic Life Beneficial Uses

An AU may be identified as either supporting or not supporting its applicable aquatic life beneficial use based on one or more of the following data types:

- Chemical (i.e., dissolved oxygen, pH, or other applicable pollutant concentrations)
- Physical (i.e., turbidity and temperature or other applicable measures)
- Biological (biological assessment data—Box 1)

Biological data are the major source of information for DEQ's assessments of aquatic life use support, but chemical or physical data may also be available or the only data attainable. Chemical and physical data are relevant and easily compared to water quality criteria in the water quality standards. These data may, and often do (temperature), exceed criteria when the biological data do not indicate a problem exists.

Box 1. Biological Assessment

A biological assessment is an integration of biological data that reflects exposure of the sampled populations to pollution over time. A biological assessment is a holistic measure of a water body's condition.

DEQ collects most of the biological assessment data on macroinvertebrate and fish communities and habitat quality via its Beneficial Use Reconnaissance Program (BURP) as well as from other entities. These data are reduced to various multimetric index scores. Individual index scores are then combined for each site, and, if available, scores for multiple sites may be combined to arrive at a single score for each assessment unit, as described in Idaho's *Water Body Assessment Guidance* (WBAG).

Data not BURP compatible may also be used in bioassessment, as described in the WBAG (DEQ 2016).

This conflict among the various data types must be resolved. For the IR, DEQ is required to implement the federal independent applicability policy, which means a water must be listed if either the biology indicates lack of use support, or any one of the associated water quality criteria are not met.[2] Independent applicability means a water body can be assessed for its support of aquatic life without biological data.

It is counterintuitive that a single chemical or physical measure of water quality, such as a point-in-time measurement of temperature or copper concentration, can overrule a more integrative measure such as a multi-index biological assessment. EPA justifies this conservative approach because chemical and physical measures are considered leading indicators of problems yet to appear in the biology. While it may be appropriate to develop a TMDL to address failure to meet one criterion, this means many water bodies in Idaho are biologically healthy and considered high quality by most Idahoans, yet fail to meet one or two criteria. For example, the Lochsa River in north-central Idaho is a high-quality stream where temperature criteria set to protect cold water aquatic life are occasionally exceeded (Box 2).

To be conservative in antidegradation review and not discount the high quality of streams such as the Lochsa River, Idaho's antidegradation rule calls for assigning Tier II protection based on biological data when the listing cause is only dissolved oxygen, pH, or temperature, favoring biological data over the three chemical and physical measures of water quality (Figure 2).

The IR and its supporting data will be the primary determinant of whether a segment of water is high quality. Valid relevant and scientifically defensible data collected by third parties will also be used. Examples of the type of data considered relevant and defensible is provided in section 4.2.1 of the WBAG (DEQ 2016).

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[2] While independent applicability originated with NPDES permitting, it has long been applied by EPA to reporting for CWA §303(d) purposes.

Box 2. Examples of Water Body Classification for Antidegradation Protection

The Lochsa River from Deadman Creek to the mouth (AU ID17060303CL001_05) was listed in Category 5 of the 2012 IR. The only identified cause for listing was temperature, and no DEQ-collected biological assessment data (BURP data) were available.

Local knowledge suggested this river is considered one of the best trout fisheries in the state. After evaluating other sources of biological data for the AU, the river was assigned an antidegradation tier of protection.

When an AU is not fully supporting its applicable aquatic life uses due to dissolved oxygen, pH, and/or temperature, DEQ will examine the underlying biological data. If the biological and aquatic habitat data indicate a healthy and balanced aquatic community, the AU will be provided Tier II antidegradation protection (Figure 2). In this evaluation, DEQ will consider the representativeness of the data for the area affected by a proposed discharge or activity (section 2.6). Biological and habitat data DEQ may have available, as presented by multimetric indices, are listed in Table 3. If biological data collected by DEQ are lacking or insufficient, other relevant data will be considered when assigning an antidegradation tier for each case that arises from a proposed activity or discharge with degradation potential.

Table 3. Multimetric indices currently used by DEQ in assessing aquatic life use support in streams and rivers.

Wadeable Streams	Rivers
Stream Macroinvertebrate Index (SMI2)	River Macroinvertebrate Index (RMI2)
Stream Fish Index (SFI2)	River Fish Index (RFI2)
Stream Habitat Index (SHI2)	

To use these multimetric indices for determining whether Tier II antidegradation protection is appropriate, scores for at least two indices must be available. DEQ will evaluate the indices by following the protocols outlined in the latest WBAG (DEQ 2016). If the average of the indices is greater than or equal to 2, DEQ will consider the AU’s high quality and will apply the Tier II level of protection. If the average of the indices is less than 2, the AU will not be considered high quality, and Tier I protection will apply. DEQ will incorporate biological monitoring data for the specific location of an activity or discharge that may become available during the permitting process.

Instances may occur where biological data are available but not compatible with DEQ’s biological assessment protocols (i.e., not BURP-compatible). This possibility exists particularly in the case of large rivers and reservoirs. In these instances, biological data collected by external sources (such as federal and state land management agencies, university researchers, and private companies and contractors) may be available, but the data may not have been collected in a manner that allows it to be used in DEQ’s multimetric indices. These data can still be informative but will be evaluated on a case-by-case basis.

When no biological data are available, DEQ will try to obtain new information relevant to determining the appropriate level of antidegradation protection. New information may come from DEQ, other agencies, organizations, companies, or individuals. DEQ may ask the applicant to gather information to aid in this determination. If no such data can be obtained, Tier II protection will not apply.

2.5 Recreation Beneficial Uses

The assessment of recreation use support is typically based on traditional measures of water quality that can be compared to numeric criteria for bacteria and toxics. The most common measure of water quality used to assess contact recreation use support is bacteria concentration. Bacteria such as *E. coli* indicate the likely presence of pathogens that could affect the health of swimmers and others who may ingest the water while recreating on or in it.

Data on concentrations of toxic pollutants are also used to gauge support of recreation uses such as fishing. While fishing is supported by a healthy, reproducing population of fish and their food organisms, supporting consumption of those fish requires they have levels of contaminants that make them safe to eat.[3] Because fish that are caught may be eaten, toxics criteria (Box 3) for protecting human health apply to waters protected for recreation uses. Recreation toxics criteria are different from those that protect aquatic life. The relevant pollutants are different, and the criteria values for the same pollutant can differ greatly.

Box 3. Recreation Toxics Criteria

Toxics criteria applicable to protecting recreation use are typically concentrations in water. They are derived from toxins' tendency to bioaccumulate in fish tissue and then be consumed by people. An exception is mercury, whose criterion is a concentration in fish flesh—this provides a more direct measure of human exposure and bypasses the need to consider bioaccumulation from water in limiting the risk to health.

Assigning antidegradation protection for recreation beneficial uses is straight forward. If an AU is listed in the IR as impaired for recreation, Tier I antidegradation protection will apply; if recreation use is fully supported, Tier II will apply.

If a water body is listed in the IR as not fully supporting its applicable primary or secondary contact recreation beneficial uses, accompanying water quality data likely exist indicating an exceedance of the water quality criteria (usually *E. coli* concentrations). Some water bodies may be listed as impaired for primary or secondary recreation based on exceedance of a human health toxic criterion. Unlike aquatic life uses, DEQ does not have an assessment methodology independent from criteria for evaluating the support of recreation beneficial uses. If an AU is listed as impaired for recreation, Tier I antidegradation protection for recreation will always apply, and the antidegradation analysis will evaluate whether the existing or designated beneficial use of recreation will be maintained based on the pollutants of concern identified for the activity or discharge.

In antidegradation analysis, the subcategory of recreation—primary or secondary—does not matter; the criteria applied are the same. If a water body unit is undesignated in the Idaho water quality standards, presumed uses apply (recreation and aquatic life) (IDAPA 58.0102.101.01). The presumption is for primary or secondary contact recreation, and so in this case, the choice must be about which use is most appropriate for the water body unit. Whether designated or presumed, a water body unit is primary or secondary, never both. As noted in section 2.3.2,

[3]The criteria ensure acceptable risk at specific levels of consumption used to calculate the criteria.

whether the water body is designated for primary or secondary recreation can make a difference in determining the level of protection if the water body is unassessed and only a single water sample is collected. In these circumstances, DEQ will compare the sample to the single sample maximums applicable to the designated use (the maximums are different for primary and secondary recreation) to determine whether a water body is high enough quality for recreation uses.

2.6 Spatial Extent of Water Quality Characterization

Because water quality within a water body unit or even an AU can vary considerably, DEQ will evaluate and assign the appropriate level of antidegradation protection to the smallest subdivision of a water body unit that makes sense in terms of representativeness of data. The subdivision will be at least as small as an AU.

While DEQ does its best to avoid sampling sites that are not representative of an AU, occasionally an AU may have such sites due to the sheer number of smaller waters lumped in the AU, access constraints, or monitoring strategies based on probability design for a statewide assessment.

Many AUs have multiple sampling sites representing a single AU. In such cases, the sampling results are unlikely to be exactly the same among sites, possibly due to sampling in different years. In some cases, multiple results may even conflict with support status determination.

In situations where there are multiple sampling sites per AU, DEQ will evaluate whether these sites are representative of the water that will be affected by a proposed discharge or activity. If all the data are determined to be representative, DEQ will follow the procedures established in the WBAG for evaluating the information. The WBAG directs the assessor to use the lowest index score when there are only two sampling sites. If data from more than two sampling sites applicable to a single AU are available, the assessor will average the multi-index scores into one score for the AU (DEQ 2016).

If some or all of the sampling sites are not representative of the water that would be affected by the discharge or activity, DEQ may opt to use none of the data or only use data from those sampling sites that represent the affected water. For antidegradation purposes, DEQ may address a smaller portion of an AU where doing so makes sense.

This additional division may be especially applicable when an AU consists of a collection of 1st- and 2nd-order tributaries and when the activities, and thus water quality, differ among the streams in the AU. In this case, DEQ will use only the data from the stream affected by an increased discharge or activity or only sample streams within the AU with comparable influences on water quality. In another example, for a larger (higher-order) stream with sampling sites both upstream and downstream of an activity or discharge, it makes sense to use only the nearest downstream sampling site. This strategy avoids the confounding effects intervening tributaries may have on water quality.

When characterizing water quality, evaluate the tier of protection appropriate for the AU that could or would be affected by a proposed activity or discharge. If this is only a portion of the AU, use only the data relevant to the affected water's condition.

3 Tier I Review—Protecting Existing Uses

This section describes the antidegradation review that must be performed for all waters requiring certification under CWA §401 to ensure existing uses are protected. Implementation steps for Tier I review are depicted in the flowchart in Appendix A.

Existing uses and the water quality necessary to protect those uses must be maintained. All activities or discharges must not cause or contribute to a violation of numeric or narrative water quality criteria. For IPDES and NPDES individual permits, ensuring the water quality necessary to protect existing uses will generally be accomplished by evaluating reasonable potential to exceed (RPTE) water quality criteria, and if there is RPTE, the effluent limits set to ensure compliance with criteria. This evaluation is based on the lowest applicable criterion and must protect the most sensitive use, whether or not existing uses are designated. DEQ will also evaluate compliance with any applicable TMDLs because TMDLs set allocations necessary to restore water bodies to compliance with criteria and full support of uses. If an existing use is not designated, DEQ must determine whether the existing use is more sensitive than the AU's designated uses or undesignated **presumed use protections**.

3.1 What Is an Existing Use?

The regulatory definition of an existing use is as follows:

> Those beneficial uses actually attained in waters on or after November 28, 1975, whether or not they are designated for those waters in Idaho Department of Environmental Quality Rules, IDAPA 58.01.02, "Water Quality Standards." (IDAPA 58.01.02.010.38)

When historical data indicate a use was attained on or after November 28, 1975, use will now become an existing use. Two questions arise when discussing existing uses:

- What does it mean for a use to be *actually attained*?
- Are the use choices limited to those described in the Idaho's water quality standards?

While this guidance does not fully explore these questions, the following answers are provided for antidegradation purposes:

- A use may be determined as existing as described in the WBAG, Chapter 3 (DEQ 2016). DEQ will use all available information, including any completed subbasin assessment, to make this determination.
- Existing uses will generally fall within the beneficial use choices defined in Idaho's water quality standards. These uses will generally be protected and maintained by applying the numeric and narrative criteria in the water quality standards.[4]

Once the applicable uses are determined (section 1.2) a Tier I review ensures an activity or discharge will not cause or contribute to a failure to meet applicable criteria for the most sensitive use in the receiving water, meaning the edge of any authorized mixing zone.

[4] The term "generally" is applied to allow for other beneficial uses and associated criteria not currently found in Idaho's water quality standards.

3.2 Determining Applicable Criteria and Most Sensitive Use

Uses are protected by two types of criteria:

- A numeric limit on quality for a particular pollutant
- A general narrative statement that prohibits harmful quantities of a particular pollutant (e.g., sediment) or class of pollutants (e.g., nutrients and toxics)

Narrative criteria play an important role in protecting uses from harm due to pollutants for which limited knowledge exists of the adverse effects or difficulty in specifying broadly applicable numeric criteria. In determining use support, these criteria are often evaluated through the ecological, biological, or other physical factors for a water segment. However, a narrative criterion requires water body-specific interpretation, just as in a TMDL or water quality-based effluent limit, to arrive at a numeric value useful in antidegradation. Together, numeric and narrative criteria cover all possible pollutants that may harm uses.

Achieving the water quality necessary to protect existing uses in a Tier I review will require ensuring the applicable criteria for the most sensitive existing use, designated or not, will not be exceeded by the proposed activity or discharge.

The most sensitive use depends on the pollutant. For example, humans are more sensitive to arsenic, while fish and many other aquatic organisms are more sensitive to zinc. Since the CWA requires all waters of the United States to support some form of both recreation and aquatic life uses (unless it is shown such uses are unattainable), and many water bodies have other designated uses as well, multiple criteria apply. The result of these multiple uses and overlapping criteria is the use with the most restrictive criteria determining the required water quality.

Multiple uses (existing or designated) will always occur for a water body, resulting in two kinds of criteria. First, each use has a set of relevant parameters (e.g., dissolved oxygen, temperature, arsenic for aquatic life and bacteria, arsenic, and other bioaccumulative toxins for recreation). Second, where parameters are the same, the criterion set for each use may be different (e.g., the level of arsenic that will support aquatic life differs from that necessary to support fish consumption [recreation use]). For each pollutant evaluated, DEQ must determine whether multiple criteria values exist for that pollutant and if they differ by use. If different values apply to a given pollutant, the Tier I review will focus on the criterion for the use that requires better water quality, or the most sensitive use.[5] This use will vary from pollutant to pollutant. Example cases are discussed below.

Consider a water body with cold water aquatic life and primary contact recreation as existing or designated uses.

[5] "Most sensitive" is in the context of current knowledge. More sensitive use information may be available that DEQ is not aware of when making this determination.

Case 1—Criterion for One Use but Not the Other

When bacteria are the pollutant of concern, a criterion exists for recreation use but not for aquatic life, so recreation is the most sensitive use for bacteria.[6] For temperature and dissolved oxygen, aquatic life is the most sensitive use because criteria exist for aquatic life but not recreation use.

Case 2—Criterion for Both Uses

When arsenic is the pollutant of concern, different criteria values protect aquatic life uses and recreation uses, so none, one use, or both uses could be impaired. For arsenic, the criterion for recreation, set to protect human health, is lower than for aquatic life; recreation is the most sensitive use.[7] If selenium, zinc, or cyanide is the pollutant under evaluation, the most sensitive use is aquatic life. For any pollutant, the use with the lower criterion is more sensitive and drives water quality protection.

These examples involve numeric criteria. Narrative criteria are fundamentally no different and can create either of the situations described in Cases 1 and 2. A common example is sediment—aquatic life is generally the most sensitive use.

3.3 Documenting Tier I Compliance

For discharge permits, the Tier I antidegradation review in the IPDES permit or §401 certification must demonstrate effluent limits and associated requirements of the permit are set at levels to ensure compliance with narrative and numeric water quality standards—and where applicable, wasteload allocations established in the TMDL—so the permit will protect and maintain existing and designated beneficial uses of the receiving water body. This compliance is achieved by describing the effluent limits, permit requirements, and applicable information on the wastewater treatment technology that will be used.

The Tier I antidegradation review for a §404 dredge and fill permit must demonstrate the project will comply with Idaho numeric and narrative water quality standards by describing BMPs that will be applied to reduce erosion, minimize turbidity, and prevent impacts from other pollutants of concern to receiving water bodies.

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[6]While bacteria criteria could be developed for fish, the only criteria currently in place are for *E. coli*, which can indicate the presence of human pathogens.

[7]Human health criteria for toxins (e.g., arsenic) that apply to water protected for recreation are based on exposure due to consumption of fish.

4 Evaluating Potential for Activity or Discharge to Degrade Water Quality

This section outlines the procedure for evaluating an activity or discharge to determine whether it will degrade or lower water quality (i.e., change the concentration of a pollutant closer to a water quality criterion). While the discussion is primarily relevant to evaluating individual IPDES permits, the concepts apply to general permits, §404 dredge and fill permits, and FERC licenses (section 7).

Only an activity or discharge that might cause degradation is subject to a Tier II antidegradation analysis. This evaluation is performed for each parameter or pollutant of concern associated with the activity or discharge that is relevant to the use for which the AU is afforded Tier II protection. If water quality is degraded for any one parameter or pollutant, the activity as a whole degrades the water.

Because it is possible for an AU to have Tier II protection for one use category and not the other, DEQ accounts for the relevance of the pollutant to a particular use when conducting an antidegradation review. In situations where an AU warrants different tiers of antidegradation protection for recreation or aquatic life, when evaluating degradation potential from the same pollutant (such as zinc), the most protective value of the two uses should be applied (i.e., Tier I protection should be applied for both recreation and aquatic life so that degradation does not occur).

Narrative criteria apply to all uses, so relevance is more subjective. For example, DEQ considers total phosphorus as relevant to both recreation and aquatic life use, while sediment is relevant only to aquatic life.

When conducting a Tier II review, analysis should be limited to only relevant pollutants. If a water body is determined to be Tier I for recreation and Tier II for aquatic life, a Tier II analysis of *E. coli* is not necessary provided the existing recreation use (Tier I) is protected.

4.1 Tier II Pollutants of Concern

Pollutants of concern are those quantifiable qualities of a discharge that may adversely affect the water quality of a receiving water body. Not every chemical found in discharge or every parameter for which water quality criteria exist will be of concern. Pollutants that rise to a level of concern will vary by discharge, quality and size, and location of the discharge (i.e., quality of the receiving water).

From the permit or license, DEQ will determine the pollutants of concern, meaning any pollutant for which the following are present:

- Effluent limits
- Monitoring requirements
- Reasonable potential analysis was conducted

The impact to a receiving water will be determined using a reasonable potential analysis. Because the results of the reasonable potential analysis are not indicative of RPTE analysis, DEQ will consult the permit fact sheet to ascertain all the pollutants for which a reasonable potential analysis was performed. DEQ will also look for pollutants of concern in TMDLs and impaired listings in the IR. The fact that a water body is listed for a particular pollutant and a TMDL has been prepared for that pollutant does not automatically mean it is a pollutant of concern for every discharge. DEQ must still determine whether the permitted activity involves or may have an effect on the listed pollutant to consider it a pollutant of concern.

Pollutants of concern may include more than just the pollutants that are discharged. For example, §404 permits involve the discharge of fill or dredged material. The fill or dredged material is obviously a pollutant of concern. But, §404 activities can sometimes have an effect on other water quality parameters. For instance, when a §404 permit allows removing streamside vegetation, the temperature of the water body may be affected, and temperature may become a pollutant of concern.

4.2 Data Needed to Calculate Change in Water Quality

A proposed activity can result in existing receiving water quality being degraded, improved, or unchanged. To evaluate which will occur, expected water quality for the following two effluent scenarios must be determined and compared:

- Without the new or increased activity or discharge (i.e., the existing or currently permitted condition)
- With the new or increased activity or discharge (i.e., the proposed or future revised condition)

In this context, current water quality is the pollutant load permitted to occur before any changes in the permitted activity or discharge. Proposed water quality results from those pollutant levels that may be allowed to occur in the future after new or increased activities or discharges are licensed or permitted. Outside of new discharges or activities, existing water quality must be estimated rather than measured, due to variations in discharge and receiving stream conditions.

Current potential water quality for existing discharges is estimated by calculating water quality after the mixing of the maximum permitted discharge (for each pollutant) with the receiving water under critical conditions. Performing this calculation again with the proposed change in discharge determines the potential future water quality. The following must be known to perform the calculations:

- Upstream water quality
- Effluent quality for each pollutant that is currently allowed (zero if the proposal is for a new discharge)
- Effluent quality for each pollutant allowed under the proposal
- Activity’s design or maximum production-based flow
- Appropriate critical flow of the receiving water, or multiple flows for a flow-tiered permit situation[8]

[8]Some discharge permits specify limits on effluent quality that vary with categories of receiving streamflow. For these flow-tiered permits, there is a critical flow within each tier.

All newly **regulated activities** or discharges may degrade water quality because they add pollutant loads to the receiving water body. Similarly, an expansion or increase of an existing discharge may also cause degradation of water quality. Degradation may be avoided if, for example, the quality of the new discharge is as good as or better than the receiving water quality, or if the increased loads are offset by companion load-reducing activities (section 4.4).[9]

Existing activities that propose no expansion or existing discharges that propose no change in their discharge upon permit or license renewal will not cause degradation of water quality.[10] Nondegrading activities and discharges are not subject to Tier II antidegradation analysis. Once DEQ determines an activity would not expand or a discharge would not increase, the antidegradation question that remains is whether Tier I requirements are met.

The majority of discharges DEQ considers are to perennial receiving waters. If discharge is to intermittent streams, antidegradation analysis must be done for the period when water is present, even if some of the discharge occurs when the stream is dry. This analysis allows the assimilative capacity of the receiving water to be calculated (section 5.1).

4.2.1 Quality of Receiving Water

Antidegradation policy addresses the change in receiving water quality caused by an activity or discharge. Antidegradation review is forward-looking, and to fairly judge both new and existing discharges, DEQ looks at the change in downstream water quality before and after a change in permitted operation. Viewing degradation of water quality as simply the change in quality upstream to downstream may work for a new activity or discharge, but it does not work for an existing discharge. For existing discharges, an existing change occurs in water quality from upstream to downstream. This difference alone does not indicate future worsening conditions due to a proposed change in discharge.

Although DEQ's focus in flowing waters is on downstream water quality that results from mixing discharge with the receiving stream, to calculate water quality resulting from a new activity or discharge or for an increase in an existing discharge, we need to know the quality of the receiving water body unaffected by the activity or discharge in question (i.e., the upstream portion of the water body for flowing waters):

- Before/upstream—A location where the water body is not influenced by the source under consideration. This location is either immediately upstream (in a river or stream) or outside the influence of the plume (for lakes or reservoirs) for existing sources. For a proposed new discharge, the location is at the proposed discharge point.

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[9] In the context of antidegradation, an offset is a reduction of load upstream that provides the added assimilative capacity so the load added by a new or increased discharge does not lower water quality.

[10] It is possible water quality could decline even if an activity or discharge does not increase, such as with a decrease in flow and the assimilative capacity of the receiving water body. If this change in flow is not due to the activity or discharge under review, it will not be considered out of compliance with antidegradation requirements. Compliance with water quality-based effluent limits may require a reduction in activity or discharge independent of antidegradation requirements.

- After/downstream—the location where water quality will reflect the addition of pollutants from the proposed activity or discharge. We are interested in the full effect or fully mixed result. Because this location may be far downstream and not observable until the proposed discharge occurs, this is a prospective calculation.

Knowing the upstream water quality is essential to calculating potential degradation caused by new and increased sources as well as remaining **assimilative capacity**. While adequately characterizing upstream water quality is important, how much data this takes will depend on water quality variability and the amount of uncertainty tolerated in the analysis. Depending on the quantity of available background data, DEQ will use a conservative estimate of pollutant concentrations when calculating degradation.

Upstream water quality can be determined by a number of methods. The methods depend on site-specific situations, such as the extent of monitoring data available, existing upstream point source discharges, and specific characteristics of the pollutants of concern. The use of monitoring data may be sufficient, especially where extensive data exist (e.g., 30 or more measurements to calculate a 95th-percentile concentration). For other situations, calculations or modeling using the appropriate model for the pollutants of concern may be needed.

DEQ typically uses the 95th percentile (i.e., the value that is expected to be exceeded 5% of the time) of measurements as a conservative characterization of ambient concentrations when evaluating permit limits. In particular, DEQ uses this value for assessing limits based on receiving water criteria applicable to relativity short-term effects (e.g., aquatic life criteria). Getting a reliable estimate of the 95th percentile requires sufficient data. Thirty measurements across the full range of streamflow variation are recommended, although as few as 12 (monthly samples for a year) will be acceptable. If fewer than 12 measurements are available, DEQ will use the maximum value measured during critical conditions, rather than an estimated 95th percentile. If no data are available, DEQ may request the applicant obtain such data.

For other types of receiving water criteria (e.g., criteria based on longer-term effects such as those applicable to human health or nutrients), a more appropriate assumption for upstream water quality would represent the central tendency (e.g., mean, geometric mean, or median).[11] DEQ recognizes differing time periods will apply to derivation of central tendency values for different types of designated uses and associated criteria. For example, annual averaging would be appropriate for bioaccumulation of mercury in fish, annual or seasonal for nutrients, and summer critical periods for pollutants such as dissolved oxygen and temperature. Such temporal considerations apply not only to upstream concentrations but to other elements that limit calculations.

DEQ expects sufficient data will usually be available in the permit or license application and discharge monitoring reports for existing permitted discharges. DEQ will also rely heavily on the

[11]For example, DEQ's guidance for implementing its criteria for mercury recommends using the mean value for water column or fish tissue concentration as related to the human health criterion and recommends the geometric mean for potential future aquatic life criteria (DEQ 2005). Another example is the Idaho Falls NPDES permit in which EPA evaluated phosphorus limits using a median value for the upstream concentration.

calculation of upstream water quality prepared in the effluent limits for the discharge permit. Depending on the permitting situations, these calculations may need to address seasonal water flows and a flow-tiered discharge framework.

DEQ recognizes measurements of upstream water quality are important but may not be sufficient to reflect potential upstream quality that would occur with other upstream sources discharging at their permitted limits. While it is optimal for DEQ to account for the effect of upstream dischargers releasing at permitted limits, it may not be practical for DEQ to conduct an extensive evaluation given the time period for issuing a permit or certification and the level of information available. DEQ will rely on the permit's evaluation of upstream water quality and encourage permitting authorities to account for upstream discharge impacts on assimilative capacity.

The question of how far upstream to look for other sources affecting water quality at a point downstream is not easy to answer. Everything flows downstream, so it is desirable to consider the entire upstream watershed. Taken to an extreme, however, this could mean looking at distant sources in Wyoming, Montana, and Canada. As a practical matter, a more limited geographic scope is needed. If there are large increases in flow, or upstream sources are relatively small, the effect of distant sources on further degradation of water quality will be small. DEQ suggests the upstream limit for considering other permitted sources that may be affecting water quality be the upstream boundary of the water body unit where the discharge is located. If the source under evaluation is closer to the upstream rather than downstream extent of the water body unit, the limit should be the upstream boundary of the water body unit upstream of the discharge. If upstream sources are already discharging at their permitted maximum, they contribute to further degradation only if permitted to increase their discharge.

Most pollutants are not strictly conservative, meaning they do not simply accumulate or steadily increase downstream; instead, they are physically, chemically, or biologically active and experience transformation or fractionation with time and travel (section 4.3, Box 4). They may adsorb to sediments, combine with other constituents and precipitate, convert into a gaseous form and be lost to the atmosphere, be taken up by living organisms, or be otherwise lost from the water column. Assimilative capacity is more than dilution, and downstream concentrations cannot be accurately estimated without accounting for such transformations.

Dissolved oxygen, nutrients, and temperature are examples of nonconservative parameters. Any estimate of their concentration that is not representative of a physical point near the source of load increase will be more accurate if modeled to account for known transformations.

In situations where upstream sources are not currently discharging at their allowed limits, modeling can be quite useful and perhaps necessary. The decision whether to estimate water quality with modeling or with simpler mixing calculations is up to the person analyzing effects on water quality. This decision to model should be driven by the pollutant, acceptable error in the estimates, and whether time and data are available to conduct modeling. Although monitoring data may not reflect potential upstream water quality, it is valuable in calibrating model predictions.

Simple mixing estimates that ignore pollutant fate and transport are always a starting point and may be sufficient in many instances. Modeling is only useful if it will improve on simpler estimates.

DEQ makes the following recommendations for modeling:

- Always model dissolved oxygen and temperature.
- Seriously consider modeling forms of phosphorus and nitrogen, as suggested by tolerance of uncertainty.
- Only model other pollutants if needed to reduce bias in conservative mixing estimates.

Chapra (1997) and the Council for Regulatory Environmental Modeling (2009) are recommended references on water quality modeling.

4.2.2 Effluent Characteristics

Much of the needed information on effluent quality and quantity will be found in the current or proposed permit or license or accompanying fact sheet. Additional information may be found in the permit application and, for an existing discharge, in discharge monitoring reports.

For pollutants with quantitative limits in a permit or license, those limits will be used to calculate the discharge's effect on water quality. Two common situations occur in which data in the permit alone will be inadequate to assess the effect of a new or increased existing discharge on water quality.

- **No permit limits.** In either a new or an increased existing discharge, a pollutant may be known to be present but has no effluent limits (no technology-based effluent limit requirements). It may also have been determined there will be no RPTE water quality criteria. In this case, there will be no permit limits in either the new or reissued permit from which to calculate degradation.
- **First-time permit limits.** In the renewal of an existing permit, a pollutant may be added for the first time because of new data collected in the permit cycle, new regulations, or due to an increase in discharge leading to RPTE. In this situation, there will be a limit in the reissued permit but not a limit in the old permit.

Even pollutants without permit limits can cause degradation of water quality. It will be necessary to determine both the current and proposed quality of the effluent for pollutants of concern regardless of whether they rise to the level of needing permit limits. For NPDES and IPDES discharges, this determination is typically limited to information on characteristics of the discharge as described in the permit application.

A first-time permit limit suggests there will be degradation of water quality, but this is not necessarily the case. A new limit could be due solely to a change in regulations (e.g., a new or more stringent criterion or a new effluent limits guideline) and not result in worsening water quality. In these situations, it will be necessary to determine the quality of the effluent prior to the limit and compare it to the quality with the proposed new limit. Current effluent quality for a pollutant without a prior limit must be based on discharge monitoring data or, lacking monitoring data, estimated based on other similar discharges.

Where new limits are a result of RPTE analysis in the absence of any actual increased discharge of pollutants, it is essential to apply the same statistical procedures to characterize the quality of the effluent before a new limitation (e.g., procedures in *Technical Support Document For Water Quality-based Toxics Controls* [EPA 1991]).[12] If the same statistical procedures are not used, water quality could appear to change when the change is an artifact of different methodologies. Information on proposed effluent quality with regard to a limited pollutant may be found in the permit application or may be estimated based on other similar discharges.

4.3 Calculating the Change in Water Quality—Will Degradation Result?

Antidegradation policy concerns **adverse** changes in water quality that may occur due to a new or changed activity or discharge.[13] In flowing waters, a discharge cannot affect upstream water quality. DEQ's focus is at a point downstream of the activity or discharge for rivers and streams, but lakes and reservoirs must be treated differently because effects are not unidirectional (section 4.3.2). The change regulated is the difference between potential existing water quality (with discharge at the maximum permitted under the current permit or license) and potential future water quality (with discharge at the maximum permitted under the proposed permit or license).

In determining if changes in water quality are adverse and significant, it is most practical to focus on change near the point of discharge, after appropriate mixing. Consider the following simplifying assumptions:

- Near a source, all pollutants can be treated as conservative (i.e., the pollutant mass stays constant; it does not dissipate, transform, precipitate, or otherwise leave the water column [Box 4]).
- Fully mixed concentrations provide a fixed reference on which to gauge changes in water quality.

For conservative pollutants, this near-field analysis will not necessarily ensure water quality criteria are not exceeded further downstream and may overestimate exceedance for nonconservative pollutants. For accurate assessment of distant effects, a far-field analysis that accounts for fate, transport and additional load occurring downstream is needed.

[12]This technical support document is an example of the statistical procedures often used in deriving NPDES permit limits. The *Technical Support Document For Water Quality-based Toxics Control* may not be appropriate for all pollutants or discharge situations, and other statistical procedures may be used. When judging if discharge has increased, the same statistical procedures should be applied to both the current and future discharge scenarios.

[13]An adverse change in water quality is one that moves the concentration of a pollutant closer to the most limiting applicable criterion, reducing assimilative capacity.

Below the point where an activity or discharge adds pollutant load to the receiving water body, downstream water quality is in transition, whether rapidly or gradually. Mixing zone characteristics, particularly location and outfall design, are important in minimizing the physical size of this transition zone and possible adverse effects, and these characteristics often limit the volume used to dilute a discharge. Irrespective of how quickly mixing occurs or the size of a regulatory mixing zone, downstream water quality that results from a discharge can be calculated only if the volume of water it mixes with is specified. From that volume, a completely mixed concentration is calculated.

Box 4. Conservative Versus Nonconservative Pollutant Behavior

If a pollutant is conservative, conservation of mass implies that average cross-section pollutant concentrations where mixing is incomplete will be the same as fully mixed conditions. If mass is lost (i.e., a nonconservative pollutant), calculations based on dilution alone will overestimate fully mixed concentrations.

While near and far are not precise terms, they are useful when estimating the effect of a discharge on water quality. Near the point of discharge (i.e., near field), the time elapsed is too short for any significant transformations of pollutants to have occurred. Average cross-section pollutant concentrations may be reasonably calculated considering dilution only, even for nonconservative pollutants such as dissolved oxygen, ammonia, and temperature.

Farther away from the point of discharge (i.e., far field), fate and transport for nonconservative pollutants become increasingly important. At some distance (time of travel) from the point of discharge, accurate estimates of nonconservative pollutant concentrations require accounting for their transformations during transport, in addition to mixing.

Generally, downstream receiving water quality will eventually reach a steady, fully mixed state. Even if full mixing is not reached or is interrupted by another discharge or tributary, it provides a useful reference point for calculating changes in water quality. DEQ recommends assessing changes in water quality for antidegradation purposes based on the full critical stream flow (e.g., 100% mixing) although the volume allowed for regulatory mixing is likely less. This assessment is recommended because assimilative capacity is based on the full critical flow. It is also recommended because regulatory mixing zones represent partial mixing and may change in size with permit renewal, such as due to a change in outfall design.[14]

For all activities or discharges, calculate their effect on downstream water quality using Equation 1.[15]

$$C_p - C_c = \Delta C$$

Equation 1. Effect on water quality.

[14]Calculated pollutant concentrations resulting from discharge will be less with full mix than partial mix, as will the magnitude of change in those concentrations due to an increase in load. A partial mix point could be used for assessing change, but to be comparable, the dilution ratio would need to be the same for existing and future conditions.

[15] The equations presented are general (i.e., without units of measure). Consistent measurement units and/or appropriate conversion factors must be used. For example, to get pollutant load expressed in pounds/day from Equation 3 with a flow measured in millions of gallons/day and a pollutant concentration measured in milligrams/liter, the result must be multiplied by a unit conversion factor of 8.34 lb/gallon.

where

C_p = proposed downstream water quality, after mixing

C_c = current downstream water quality, after mixing

ΔC = change in downstream water quality, after mixing

DEQ will evaluate the effect on water quality for each pollutant of concern. If ΔC indicates an adverse change for any pollutant (i.e., it moves the concentration closer to a criterion for a particular use), there is degradation of water quality.

To calculate current and proposed water quality for use in Equation 1, consider two situations: (1) a completely new activity or discharge and (2) an expansion or increase in an existing activity or discharge. For either situation, Equation 2 can be used to determine the resulting concentration after full mixing.

$$C = \frac{LR_{up} + LR_{dis}}{Q_{up} + Q_{dis}}$$

Equation 2. Mixing equation for effect of discharges.

where

C = concentration in the receiving water body resulting from discharge after full mixing, generally downstream

LR_{up} = load rate of receiving water body pollutant, upstream of the discharge

LR_{dis} = load rate of discharge pollutant

Q_{up} = flow of receiving water body, upstream of the discharge

Q_{dis} = flow of discharge

Load rates are calculated as the product of flow and concentration, as shown in Equation 3.

$$LR_{up} = Q_{up} \times C_{up} \text{ and } LR_{dis} = Q_{dis} \times C_{dis}$$

Equation 3. Load rates.

where

C_{up} = pollutant concentration in receiving water body, upstream of the discharge

C_{dis} = pollutant concentration in the discharge

Equation 2 is generic, dynamic, and has infinite solutions. Of interest is a particular pair of solutions for each pollutant of concern: (1) the receiving water concentration allowed by the current permit (C_c) and (2) the receiving water concentration allowed by the proposed permit (C_p).[16] If seasonality or flow-tiered permit limits are involved, there will be multiple such pairs.

[16] Equation 2 works as well if Q_{dis} is zero, and the discharge load is a direct input. Upstream load is always calculated from Equation 3 because receiving streamflow and concentration must be known.

These concentrations are determined using critical flow conditions in the receiving water body and permit conditions associated with those conditions.

4.3.1 Critical Conditions

Critical conditions are a combination of the maximum permitted effluent flow, maximum projected effluent concentrations or maximum allowable effluent limits, critical low flow of the receiving stream, and upstream receiving water quality concentrations (as determined by monitoring, calculation, or modeling). If seasonal or flow-tiered effluent limits are considered, there will be multiple sets of these critical conditions.

When flow or volume in the receiving water body is low, adding a pollutant will have a greater effect on its concentration than when flow or volume is high because there is less water to dilute the pollutant load. To evaluate what could be a realistic near worst-case scenario, consider the critical conditions for dilution that could occur. The maximum discharge flow is based on the facility design capacity or production-based maximum discharge. This value will be stated in the permit or license for the current discharge and in the permit application for the proposed discharge. The receiving water body critical flow is determined according to IDAPA 58.01.02.210.03 for each pollutant evaluated. For chronic aquatic life criteria, this is the 7-day, 10-year minimum statistical (7Q10) flow. For nutrients, using the 30-day, 10-year minimum statistical (30Q10) flow is recommended during the growing season (i.e., April–September). For mercury, use the annual average flow. For temperature and dissolved oxygen, the 7Q10 flow is also useful, but flow may be calculated on a monthly basis to account for seasonality.[17]

For the effluent, the critical load is the maximum permitted load stated in the permit or license or, if a load is not stated, the product of the maximum discharge flow and the maximum permitted effluent concentration.

At least two sets of critical conditions should be evaluated: (1) the current permit or license and (2) the proposed permit or license.[18] These conditions will yield C_c and C_p in Equation 2 for each pollutant evaluated, which are then used in Equation 1. It is possible, but unlikely, the receiving stream critical conditions used in the analysis will differ between now and the future. An anticipated change in upstream flow regulation or diversion would be one possible cause of a change in critical streamflow.

The receiving water body critical load is the product of the critical flow described above and the potential upstream concentration as described in section 4.2.1.

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[17]Calculation of low flows for regulated systems should only include flow data from the period of flow regulation. Breaking a year up into parts (seasons or months) will alter the annual probabilities of the target flow, and water quality criteria, being exceeded. Adjustments may be necessary to not exceed criteria more frequently than intended.

[18]More pairs of conditions will be evaluated if seasonality or flow-tiered effluent limits are involved—one pair of critical conditions for each season or flow tier.

4.3.2 Modification for Lakes and Reservoirs

Applying the criteria and these procedures to lakes and reservoirs depends on how slowly water moves through the water body, or the detention time. A lake or reservoir with 15 days or less detention time is treated as flowing (i.e., a stream or river). Those with greater than a 15-day detention time are treated differently, and the calculations described above should be modified. This modification is necessary because the concept of upstream and downstream loses meaning, and there is not sufficient velocity in the receiving water to facilitate rapid mixing. IDAPA 58.01.02.060.01.h recognizes this with different mixing zone requirements for lakes and reservoirs.

Look at total load added over some period of time, rather than the load rates defined above, and look at the volume available for mixing, which is limited by rule, rather than the flow rate in the receiving water body. Similar to the situation with flowing waters, critical conditions determine the appropriate values for these input variables.

$$C = \frac{L_{10} + L_{dis}}{V_{10} + V_{dis}}$$

Equation 4. Mixing equation for lakes and reservoirs.

where

C_{up}

C = mixed concentration resulting from discharge

L_{10} = receiving water body pollutant load in V_{10}

L_{dis} = effluent pollutant load delivered over the time it takes to exchange mixed volume of receiving water body at critical inflow

V_{10} = receiving water body volume available for mixing—the volume of the lake or reservoir beneath a circle centered on the point of discharge that encompasses one-tenth the minimum surface area of the water body

V_{dis} = volume of effluent discharged over the time it takes to exchange mixed volume of receiving water body at critical inflow

The modification is based on the limitation in Idaho's water quality standards for existing discharges authorized before July 1, 2015—the horizontal extent of a mixing zone in a lake or reservoir is not to take up more than 10% of the surface area (IDAPA 58.01.02.060.01.h). For dischargers authorized after July 1, 2015, the size of the mixing zone is not to exceed 5% of the total open surface area of the water body. In place of Q_{up}, use V_{10}, the volume of the lake or reservoir beneath a circle centered on the point of discharge that encompasses one-tenth the minimum surface area of the water body. If the water body is stratified, this volume should be limited to the layer (e.g., epilimnion or hypolimnion) in which the discharge occurs. A circle is used as a simplified depiction of the plume, which could instead be modeled or determined through a tracer study if a more accurate assessment is needed. The ambient load is a product of this volume and the ambient concentration outside the influence of the discharge plume.

Whether the water body is stratified at the time of critical low inflow will be based on when that critical flow occurs, which in turn depends on the pollutant. For example, if the pollutant is a metal that is toxic to aquatic life, the critical low inflow would be the 7Q10 for all inflows combined. If critical inflow occurs the last week of September, this is the time when the presence or absence of stratification would be determined. This critical inflow period is also the time when the volume available for mixing would be determined.

To determine the appropriate volume of discharge and corresponding load to use in **Equation 4**, determine the time period over which the discharge should be evaluated. This renewal time is described as the time it would take critical inflow to replace the volume of water allowed for mixing (V_{10}). The volume of effluent discharged during this time is mathematically mixed with the volume of water in the lake or reservoir allowed for mixing from above.

A measurement of the renewal time for the allowed mixing area surrounding the point of discharge would be used. In absence of this, estimate a suitable time based on the volume of the mixed layer (e.g., epilimnion) for the entire water body divided by the critical inflow for the entire water body (i.e., residence time). For example, if the volume of the entire epilimnion of a lake or reservoir is 1,000 acre-feet and the 7Q10 for all inflow is 25 cubic feet per second (cfs), the residence time would be about 20 days (1,000 acre-feet ÷ (25 cfs × 1.984 acre-feet/day/cfs) ≈ 20 days). In the absence of more specific information about renewal time in the actual area allowed for mixing, expect the volume allowed for mixing to exchange at the same rate as the entire water body.[19] In this example, the volume (V_{dis}) and load of effluent (L_{dis}) used in **Equation 4** would be that discharged in 20 days.

As with streams and rivers, **Equation 4** would be calculated for two conditions—existing and proposed. Those paired results would be used in Equation 1 to quantify the proposed change in water quality.

A three-dimensional hydrodynamic model could be used to identify the worst-case water quality conditions at the edge of any authorized mixing zone, with the mixing zone not to exceed 10% of the lake or reservoir's surface area.

4.3.3 Change in Discharge

A change in an existing discharge must occur before a change in water quality, subject to regulation, can take place. For antidegradation review, existing discharge is nondegrading if there are no changes in the discharge. Appendix C contains examples of new or increased discharges and how they would be addressed.

[19]This approximation is unlikely to hold true in portions of lakes and reservoirs with irregular shorelines and deep bays. In such areas, the exchange rate could be considerably slower than for the water body as a whole and the residence time much longer. Use this simplifying assumption with caution and where it is not appropriate, evaluate and use area-specific exchange rates.

An existing discharge must increase its pollutant load to degrade the receiving water body's quality.[20] An increase in load may occur through either an increase in concentration at static discharge volume or an increase in the discharge volume with no change, or possibly even a decrease, in concentration. Concentration changes may be pollutant specific, while changes in discharge volume affect the loads of all pollutants.

While increased loads can result in worse water quality, it is possible for an increased discharge load to decrease concentrations of a pollutant in the receiving water body. This oddity occurs when effluent quality is better than receiving water quality. It may also occur when flow tiers in a flow-tiered permit are adjusted with no increase in discharged load.

4.4 Other Considerations

When evaluating changes in water quality, consider these questions: (1) will upstream pollution reductions offset downstream increases, (2) are adverse changes temporary, and (3) is more information needed to draw conclusions?

4.4.1 Use of Offsets

The Idaho antidegradation rule allows the use of offsets to mitigate specific proposed increases in pollutant load to Tier II and III waters (IDAPA 58.01.02.052.06.c). The antidegradation rule requires that offsets occur before an activity or discharge commences and be upstream of any potential degradation. Figure 3 shows degradation resulting from a discharge with no offset. Figure 4 shows no degradation resulting because water quality upstream is improved before the discharge is added—the upstream improvement of water quality offsets the downstream lowering of water quality resulting from the discharge.

[20]While unusual, it is possible where effluent discharge dominates water quality, the receiving water quality becomes worse although discharge load decreases (e.g., a decrease in discharge volume coupled with an increase in effluent pollutant concentration).

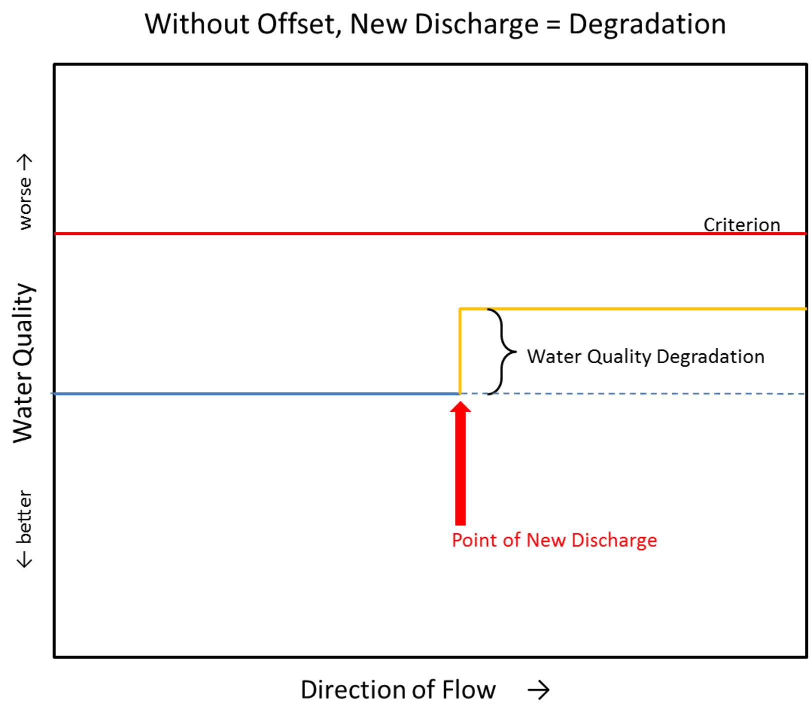

Figure 3. Discharge without offset.

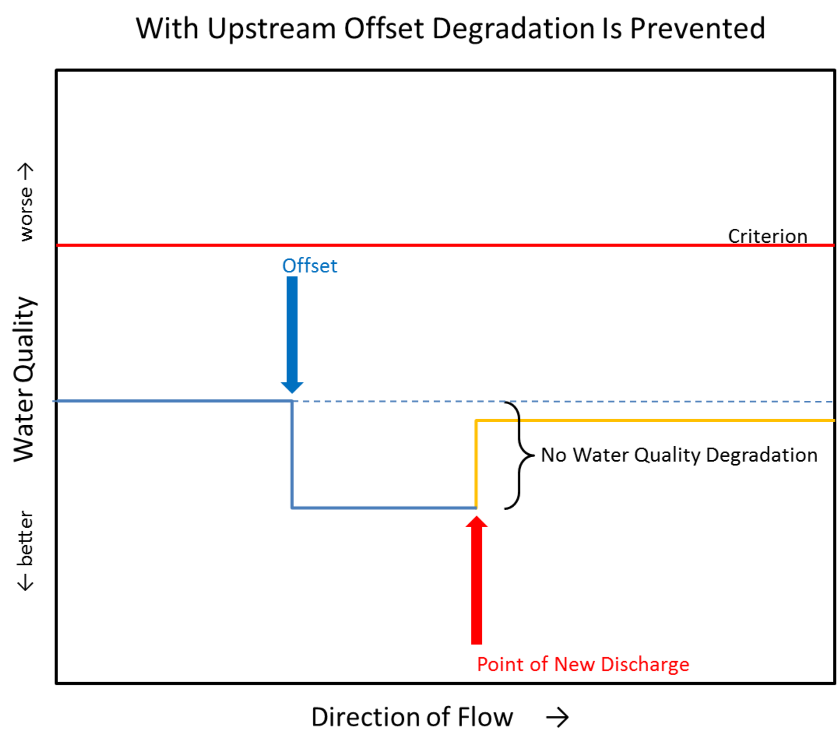

Figure 4. Discharge with appropriate offset; no water quality degradation occurs.

For some pollutants (e.g., nutrients), a lag in their effect on water quality may occur and appears as a gap between the point of discharge and the water quality degradation. In this case, the location of an offset could be below the point of discharge yet upstream of degradation.

Through properly conducted offsets, no net degradation of water quality occurs, not even in a portion of the receiving water, relative to current conditions. As the diagrams show, there would be upstream to downstream changes in water quality. Due to placement of the offsets, water quality at all points in the stream would still be at least as good after as before the discharge plus its associated offsets. Degradation is prevented, and the need for antidegradation analysis in Tier II waters is avoided, making it possible to allow new or increased discharge in Tier III waters.

Because of placement considerations and lack of flow, the use of offsets in lakes and reservoirs is problematic but may be considered by DEQ.

4.4.2 Short-Term or Temporary Impacts

A short-term or temporary change in water quality from an individual activity does not constitute degradation and does not trigger a Tier II analysis. Do not presume that short-term or temporary activities will result in short-term or temporary impacts; in some cases, a short-term activity could result in a longer-lasting effect. When evaluating such projects, DEQ may consider the following:

- Duration and extent of water quality impact
- Potential for delayed, cumulative, or long-term effects on existing beneficial uses beyond the duration of the permitted activity

For a §404 fill project, DEQ may conclude that no long-term, permanent degradation will occur if all appropriate and reasonable BMPs related to erosion and sediment control, project stabilization, and prevention of both short- and long-term water quality degradation will be applied and maintained (e.g., preserving vegetation, streambank stability, and basic drainage).

Projects that may result in only short-term or temporary lowering of water quality include culvert replacements, small bridge installations, and streambank restoration. Such projects may cause a temporary increase in sediment. For example, culvert replacements completed according to the Idaho Forest Practices Act may comply with Idaho’s antidegradation implementation rule. The temporary increase in turbidity would not constitute degradation and would not need a Tier II antidegradation analysis. If an activity or discharge occurs over a short time frame but has persistent, long-term water quality effects, Tier II analysis would apply.

4.4.3 Requests for Additional Information

To evaluate proposed changes to water quality, DEQ may request the applicant provide additional information on the proposed activity or discharge. Such information may include details about the proposed project’s location or operation, outfall design, effluent characteristics, and monitoring data for the receiving water body. This request is likely if modeling is required to estimate upstream water quality or plume configuration.

5 Tier II Analysis—Is Degradation Significant, Necessary, and Important?

This section describes how DEQ will determine if degradation is significant, the analysis necessary to determine whether significant degradation of high-quality (Tier II) water is **necessary** and **justified** due to social or economic importance, and how DEQ will be assured that controls on other sources of pollution to a high-quality water body are being implemented before allowing justifiable degradation.

Implementation steps for Tier II review are depicted in the flowchart in Appendix A. Examples of a Tier II antidegradation review are provided on the DEQ's surface water web page—one for an NPDES permit and one for a dredge and fill permit. Examples of antidegradation analyses submitted to DEQ by the applicants are available at *www.deq.idaho.gov/water-quality/surface-water/antidegradation*.

For waters determined to be of high quality (section 2.3), the rules require degradation must be shown to be "necessary to accommodate important economic or social development in the area in which the waters are located" (IDAPA 58.01.02.051.02) before DEQ allows significant degradation. This requirement can be broken down into two components: (1) the necessity of the degradation and (2) the importance of social or economic development associated with an activity or discharge. Under importance, the geographic scope—the area in which the waters are located—must be defined during the analysis. Ensuring degradation of high-quality waters is necessary and important, and has been part of federal regulation since 1983 and DEQ rule since 1993.

While necessity and importance are the core of Tier II analysis, IDAPA 58.01.02.051.02, per 40 CFR §131.12(a)(2), requires the following:

> In allowing such degradation or lower water quality, the Department shall assure water quality adequate to protect existing uses fully. Further, the Department shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and cost-effective and reasonable best management practices for nonpoint source control. In providing such assurance, the Department may enter together into an agreement with other state of Idaho or federal agencies in accordance with Sections 67-2326 through 67-2333, Idaho Code. (IDAPA 58.01.02.051.02)

The antidegradation policy and implementation procedures (IDAPA 58.01.02.051–052) address the above longstanding policy requirements and provide details on determining necessary and important degradation. The rules also provide for insignificant degradation to AUs with Tier II protection without analysis of necessity (alternatives analysis) and importance (social and economic justification) (IDAPA 58.01.02.052.08).

When allowing degradation in waters with Tier II protection, it is still necessary to ensure water quality will adequately protect existing uses as well, which is the purpose of Tier I protection provided to all waters (section 3). Tier II protection is an extra level of protection that goes above and beyond Tier I protection for high-quality waters.

Four questions apply only in Tier II antidegradation analysis:

1. Is the discharge insignificant?
2. Are other required controls in place and operating?

3. Is the degradation necessary?
4. Does the activity bring important social or economic development to the affected community?

5.1 Degradation Significance

Although the federal regulations make no mention of insignificant degradation, court cases have allowed for activities or discharges that are de minimis, or too trivial to warrant governmental regulatory concern.[21] The purpose of determining whether some degradation is insignificant is to ensure state resources are focused where they can provide the most good. A determination of insignificance means Idaho is willing to overlook degradation that has little effect to focus on discharges or activities that create more degradation.

Determining a discharge or activity is significant does not mean the activity or discharge cannot take place, only that the discharge or activity will need to be justified as necessary and important before it can be permitted. Offsets may be used to prevent what would otherwise be significant degradation (section 4.4.1).

Idaho's antidegradation rule provides guidance for determining if a discharge is insignificant (IDAPA 58.01.02.052.08):

> Insignificant Degradation. If the Department determines an activity or discharge will cause degradation, then the Department shall determine whether the degradation is insignificant.
>
> i. A cumulative decrease in assimilative capacity of more than ten percent (10%), from conditions as of July 1, 2011, shall constitute significant degradation. If the cumulative decrease in assimilative capacity from conditions as of July 1, 2011, is equal to or less than ten percent (10%), then, taking into consideration the size and character of the activity or discharge and the magnitude of its effect on the receiving stream, the Department may determine that the degradation is insignificant.
>
> ii. The Department may request additional information from the applicant as needed to determine the significance of the degradation.
>
> iii. If degradation is determined to be insignificant, then no further Tier II analysis for other source controls (Subsection 052.08.b), alternatives analysis (Subsection 052.08.c.), or socioeconomic justification (Subsection 052.08.d.) is required.

Assimilative capacity is the difference between ambient concentration and the concentration allowed by the controlling criterion.

Idaho set a cumulative cap at 10% of assimilative capacity and established water quality conditions as of July 1, 2011, as the baseline. Without a cumulative cap, a series of insignificant discharges over time could cumulatively consume a significant share, or all, of the assimilative capacity and degrade water quality down to the level of the criterion without necessity and

[21]In the specific case of antidegradation, the courts have accepted a loss of up to 10% of a water body's assimilative capacity as de minimis, as long as there is a cumulative cap on excused degradation (Kentucky Waterways Alliance v. EPA [2008]). A 10% threshold for significance is also stated in an August 10, 2005, EPA memo (King 2005).

importance ever being questioned. A cumulative cap prevents the lack of analysis that could occur through a series of incremental steps, none of which are significant in themselves. Idaho bases its cap on assimilative capacity and uses a watershed approach to determine cumulative degradation from point sources (by reviewing existing and past permits); nonpoint sources need to be reviewed where data are available.

If the loss of assimilative capacity for a single pollutant is less than 10%, it does not automatically exempt a discharge or activity from Tier II analysis. This determination is made at DEQ's discretion. As described in IDAPA 58.01.02.052.08, the reviewer must consider the size and character of the activity or discharge and the magnitude of its effect on the receiving stream, and possibly review additional data, before making a determination of significance. This review includes looking at the cumulative effect on water quality of discharging multiple pollutants. Even individually, if the loss of assimilative capacity for a pollutant is less than 10%, DEQ has the discretion to determine the collective impact as significant. If additional data are available indicating a water quality concern, such as fish tissue concentrations at a level of concern to human health, DEQ may use their discretion when determining significance. This discretion will consider pollutants with a strong tendency to bioaccumulate and may significantly affect biota and human health even if the loss of assimilative capacity is less than 10%.

Figure 5 illustrates insignificant water quality degradation. In this example, a single new/increased discharge in a high-quality water is examined without considering a cumulative cap. Steps for determining level of significance include determining the applicable baseline water quality followed by comparing the baseline to the criterion to determine the remaining assimilative capacity; 10% of the remaining assimilative capacity is the basis for an insignificance determination. The blue-shaded area in Figure 5 is the change in water quality considered insignificant. The greatest amount of change in a pollutant concentration that can be dismissed as insignificant occurs when the ambient concentration of that pollutant as of July 1, 2011, is lowest.

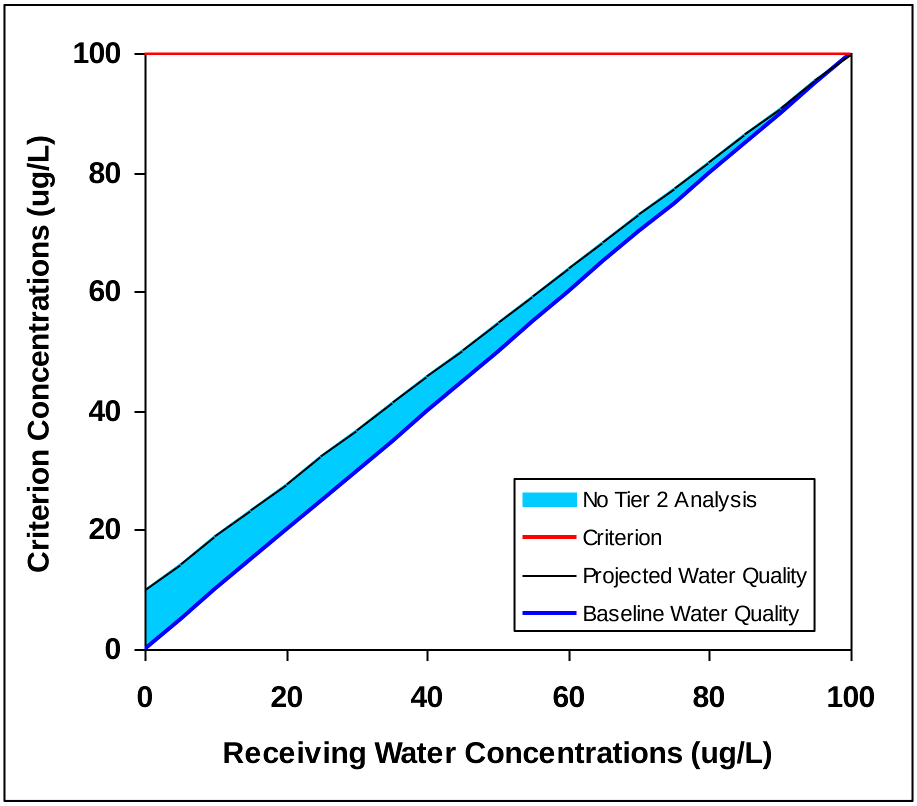

Figure 5. Insignificant discharge (blue-shaded area represents insignificant change in water quality).

An example of assimilative capacity is tabulated in Table 4. Applying this concept for parameter concentrations regulated by narrative criteria, such as sediment and nutrients, requires determining a numeric value applicable to the receiving water body in question.

For example, consider pollutant “Y” with a criterion of 100 micrograms/liter (µg/L) and an ambient concentration of 20 µg/L as of July 1, 2011. The assimilative capacity for Y in the water is 80 µg/L, and the threshold based on assimilative capacity is 8.0 µg/L with a cumulative allowable value for future water quality conditions of 28.0 µg/L (10% of 80 µg/L = 8 µg/L added to the ambient concentration of 20 µg/L = 28 µg/L).

Table 4. Example of assimilative capacity and associated significance thresholds.

Ambient Concentration (July 1, 2011)	Assimilative Capacity (July 1, 2011)	10% of Assimilative Capacity (Threshold Water Quality Change for Significance)
	Micrograms per liter	
10	90	9.0
20	80	8.0
30	70	7.0
40	60	6.0
50	50	5.0
60	40	4.0
70	30	3.0
80	20	2.0
90	10	1.0
100	0	0.0

Consider a series of discharges, or increases in a single discharge, over time to the same water body. Table 5, Example 1 illustrates how this would work for a series of four proposed changes in discharge for a pollutant with an ambient concentration of 20 µg/L as of July 1, 2011, and a criterion of 100 µg/L. On July 1, 2011, the remaining assimilative capacity is 80 µg/L, of which 10% or 8 µg/L, can be lost before the change in water quality becomes significant.

Only the final increase on January 1, 2023, would be considered a significant change in water quality because the cumulative change would exceed the allowable 10% loss in assimilative capacity. The first three cases of increased discharge are all insignificant because the cumulative loss of assimilative capacity does not exceed 10% (8 µg/L) of the initial value (80 µg/L) on July 1, 2011.

Table 5. Example 1—significance determinations for a series of changes in discharge.

Date of Change in Discharge	Receiving Water Concentration After Mixing	Remaining Assimilative Capacity	Cumulative Cap	Used Assimilative Capacity	Water Quality Change Significant?
	Micrograms per liter				
(Baseline, as of July 1, 2011)	20.0	80.0	8.0	N/A	N/A
September 30, 2011	21.0	79.0	8.0	1.0	No, ≤10% of starting assimilative capacity used
November 30, 2015	26.5	73.5	8.0	6.5	
December 16, 2020	28.0	72.0	8.0	8.0	
January 1, 2023	29.5	70.5	8.0	9.5	Yes, cumulative change in receiving water concentration exceeds 10% of starting assimilative capacity

Note: N/A = not applicable

Consider a second example for the same pollutant (criterion of 100 µg/L) in another water body where the initial ambient concentration is 80 µg/L as of July 1, 2011. The assimilative capacity for the pollutant in the water would be 20 µg/L; the threshold for cumulative loss based on this initial assimilative capacity would be 2.0 µg/L (10% of 20 µg/L = 2 µg/L).

Table 6, Example 2 illustrates how this would work for the same series of proposed discharge changes in Example 1. Only the first discharge could claim insignificance. All subsequent discharges are over the cumulative cap and are significant, although the incremental change for the third and fourth discharges is less than 2.0 µg/L.

Table 6. Example 2—significance determinations for a series of changes in discharge.

Date of Change in Discharge	Receiving Water Concentration After Mixing	Remaining Assimilative Capacity	Cumulative Cap	Used Assimilative Capacity	Water Quality Change Significant?
	Micrograms per liter				
(Baseline, as of July 1, 2011)	80.0	20.0	2.0	N/A	N/A
September 30, 2011	81.0	19.0	2.0	1.0	No, ≤10% of starting assimilative capacity used
November 30, 2015	86.5	13.5	2.0	6.5	Yes, cumulative change in receiving water concentration exceeds 10% of starting assimilative capacity
December 16, 2020	88.0	12.0	2.0	8.0	
January 1, 2023	89.5	10.5	2.0	9.5	

Note: N/A = not applicable

Analysis of insignificance is done by pollutant, so it is possible some proposed changes in pollutant discharge will be found insignificant and others significant. When this is the case, even one pollutant causing significant change in water quality will trigger Tier II analysis for that pollutant. If the proposed change in all pollutants evaluated is insignificant, the discharge as a whole is insignificant and further Tier II analysis is not needed.

If a proposed activity or discharge is determined significant, it means further Tier II analysis is required; it does not automatically mean the discharge is not allowed or must be modified. It is possible that no changes in the discharge as proposed will be needed before allowing the discharge, but that determination is the subject of an **alternatives analysis**.

5.1.1 Baseline Water Quality

Baseline water quality as of July 1, 2011, per Idaho's water quality standards, does not mean the conditions exactly on that date, but rather the water quality under critical conditions that would exist given authorized discharges and nonpoint source activities as of that date. It is the water quality that would be present if other sources of pollutants that affect water quality for the parameter under question were to be discharging at their full permitted load. These conditions represent the baseline water quality for judging loss of assimilative capacity and whether new or increased activity or discharge after July 1, 2011, will cause significant degradation of water quality. Baseline water quality is a calculation, not an observation.

Where ambient monitoring data are available, such as from discharge monitoring reports, DEQ recommends using the 95th percentile from at least 1 year of monthly data to characterize baseline water quality (section 4.2). If upstream sources contribute to baseline water quality, add in their potential contribution to baseline quality (i.e., full permitted loads if that is not what they were discharging as of July 1, 2011). In situations where new or increased upstream sources have contributed to degradation of water quality since July 1, 2011, account for their contribution as part of the 10% loss in assimilative capacity to characterize baseline water quality.

For many water bodies, there may be insufficient monitoring data to document the baseline water quality as of July 1, 2011, especially for new sources, a new process, or a new pollutant of concern. In these situations, DEQ will try to anticipate the need for data and work with dischargers to acquire the data needed. With new data, DEQ will need to estimate water quality under critical conditions, starting with measurements of present water quality and subtracting increases in pollutant loads authorized since July 1, 2011, to determine baseline water quality. A decision tree for various scenarios in determining baseline water quality as of July 1, 2011, is provided in Appendix D.

DEQ created a spreadsheet tool based on the requirements in rule to assist in calculating the loss of assimilative capacity. The inputs are as described in section 4, and the calculated change in water quality is compared to the 10% loss of assimilative capacity as described above. In using the tool, consider the conservative/nonconservative nature of the pollutant, cumulative significance of multiple pollutants, and the history of other changes in water quality since July 1, 2011. The calculator is available at *www.deq.idaho.gov/PLACEHOLDER*. Section 4.2.1 discusses determining baseline water quality.

5.2 Ensuring Other Controls Are Achieved

Federal regulations (40 CFR §131.12(a)(2)) and Idaho's water quality rule (IDAPA 58.01.02.051.02) require degradation of high-quality water cannot be allowed unless measures to control other sources of water quality degradation will be achieved.

This analysis is specific to the pollutants/parameters determined to be significant in the proposed or increased activity or discharge. It is also limited to other sources in the same watershed that could affect water quality affected by the discharge under review.

The water quality standards define "**cost-effective** and reasonable best management practices for nonpoint sources" as all approved BMPs specified in IDAPA 58.01.02.350.03 and 055.07. BMPs for activities not specified in the water quality standards are determined on a case-by-case basis. "Highest statutory and regulatory requirements for point sources" are defined as follows:

> All applicable effluent limits required by the Clean Water Act and other permit conditions. It also includes any compliance schedules or consent orders requiring measures to achieve applicable effluent limits and other permit conditions required by the Clean Water Act. (IDAPA 58.01.02.010.48)

As part of the antidegradation analysis, DEQ will review point and nonpoint source controls on a water body unit basis (WBIDs; including those areas upstream and downstream of the discharge) unless it is determined a different spatial extent is appropriate for a particular pollutant. The spatial extent of the review will be determined by the following factors:

- The upstream and downstream extent of the high-quality waters—the other source control review is intended to ensure protection for the high-quality water of concern. DEQ's review should include sources impacting the high-quality water upstream and downstream of the discharge. DEQ's review should not extend to Tier I upstream and downstream waters. If the upstream or downstream water is unassessed, data (e.g., temperature and *E. coli*) should, if possible, be collected during the season of proposed permitted discharge to determine whether it is high quality and should be considered in the source control review.

- The extent, moving upstream or downstream from the discharge point, where the relevant pollutants discharged are no longer of concern—Other sources should be reviewed where it is reasonable to conclude the water quality degradation resulting from the newly proposed activity or discharge may overlap with or contribute to pollutants from the other sources. Consider the type of pollutants in the discharge (conservative or nonconservative), source of pollutants, size of discharge and receiving water body, proximity to other permitted discharges or regulated activities, season of discharge, and stream order.
- If the point of discharge is in the lower downstream portion of the WBID, review other controls downstream into the next water body unit to the extent appropriate based on the factors listed above.

By rule, DEQ is required to investigate other point sources of pollution (in the context of proposed degradation of water quality) and verify they are meeting their respective control requirements, or have an enforceable mechanism in place to achieve those requirements. For other point sources with discharge permits, DEQ verifies the permit compliance reports and identifies any noncompliance that indicate the pollutants or parameters of concern are discharged at a level greater than permitted. If information is lacking, such as any failure to monitor effluent as required, DEQ cannot determine compliance.

For nonpoint sources with approved BMPs, cost-effective and reasonable BMPs are identified in the following rules and plan (IDAPA 58.01.02.350.03 and 58.01.02.055.07):

- “Rules of the Idaho Forest Practices Act” (IDAPA 20.02.01)
- “Solid Waste Management Rules” (IDAPA 58.01.06)
- “Individual/Subsurface Sewage Disposal Rules” (IDAPA 58.01.03)
- “Sewage Disposal on the Rathdrum Prairie in Kootenai County, Idaho” (Spokane Valley Rathdrum Prairie Aquifer) (IDAPA 41.01.01.110)
- “Stream Channel Alteration Rules” (IDAPA 37.03.07)
- “Rules Governing Exploration, Surface Mining, and Closure of Cyanidation Facilities” (IDAPA 20.03.02)
- “Dredge and Placer Mining Operations in Idaho” (IDAPA 20.03.01)
- “Rules Governing Dairy Byproduct” (IDAPA 02.04.14)
- *Idaho Agricultural Pollution Abatement Plan* (ISWCC 2015)

To determine whether the cost-effective and reasonable BMPs are in place or will be achieved, DEQ must undertake the following:

- Determine the nonpoint sources within the watershed. Consider two factors: (1) whether the nonpoint source discharges the pollutant causing the allowed degradation and (2) whether the nonpoint source is likely to contribute the pollutant of concern to the high-quality water.
- Determine the applicable BMPs for the nonpoint sources in the watershed. DEQ should contact the designated management agency for the particular nonpoint source activity for

a listing of applicable BMPs. The designated agencies are defined in IDAPA 58.01.02.010, as "department of lands for timber harvest activities, oil and gas exploration and development, and mining activities; the soil conservation commission for grazing and agricultural activities; the transportation department for public road construction; the department of agriculture for aquaculture; and the Department [DEQ] for all other activities." When DEQ is the designated agency for other unspecified activities, they should contact the state or federal agency, if any, that is the land manager for, or may have regulatory control over, the nonpoint source activity at issue. Applicable BMPs include those identified in the water quality standards and other BMPs applicable through regulatory, nonregulatory, or incentive-based programs. Some activities may have no applicable BMPs.

- Determine from the list of applicable BMPs, which ones are cost-effective and reasonable as defined in the water quality standards. Accomplish this task by working with designated management agencies. IDAPA 58.01.02.055.07 and 350.03 define cost-effective and reasonable BMPs as all approved BMPs. For activities not specified in the water quality standards, determine BMPs on a case-by-case basis according to IDAPA 58.01.02.350. If approved BMPs apply to the relevant nonpoint source activities in the watershed, they are, by definition, cost-effective and reasonable BMPs. For activities without approved BMPs, DEQ and the appropriate agency must determine whether those applicable BMPs are cost-effective and reasonable. For example, the Idaho Transportation Department (ITD) is a designated agency and published a BMP manual with a list of post construction BMPs. DEQ, working with ITD, would determine whether ITD's BMPs apply to a transportation project in the watershed, and would determine whether any applicable BMPs were cost-effective and reasonable given site-specific circumstances.
- Determine whether the cost-effective and reasonable BMPs shall be achieved in the watershed. DEQ will work with the designated agency or other land management or regulatory agency to determine whether the cost-effective and reasonable BMPs for point and nonpoint sources are in place or shall be achieved.

If noncompliance with required pollutant discharge controls or BMPs is identified for pollutants or parameters of concern, DEQ will determine if an enforceable agreement is in place with the appropriate regulatory authority to achieve compliance. When noncompliance occurs and no enforceable agreement is in place, DEQ will notify the applicant that the requirements for potentially allowing degradation are not met. DEQ may provide options to resolve the situation for the applicant's consideration, including contacting designated management agencies. Appendix E provides another source control review.

5.3 Ensuring Necessity of Degradation through Alternatives Analysis

Federal and state regulations require that for DEQ to allow degradation of high-quality water, the activity must be necessary and important. Alternatives analysis is the process for determining whether an activity is necessary.

When determining whether the proposed degradation is necessary, the discharger must evaluate various alternatives and identify the least-degrading alternative that is **reasonable** to reduce or eliminate the pollutants or parameters of concern associated with the discharge. The alternatives analysis identifies feasible alternatives, evaluates the reasonableness of implementing them, considers costs, and selects an alternative contributing the least amount of significant pollutants under reasonable circumstances.

Idaho antidegradation implementation rule (IDAPA 58.01.02.052.08.c) establishes principles to identify alternatives and select a reasonable and least-degrading alternative:

> Alternatives Analysis. Degradation will be deemed necessary only if there are no reasonable alternatives to discharging at the levels proposed. The applicant seeking authorization to degrade high water quality must provide an analysis of alternatives aimed at selecting the best combination of site, structural, managerial and treatment approaches that can be reasonably implemented to avoid or minimize the degradation of water quality. To identify the least degrading alternative that is reasonable, the following principles shall be followed:
>
> i. Controls to avoid or minimize degradation should be considered at the earliest possible stage of project design.
>
> ii. Alternatives that must be evaluated as appropriate are:
>
> (1) Relocation or configuration of outfall or diffuser;
>
> (2) Process changes/improved efficiency that reduces pollutant discharge;
>
> (3) Seasonal discharge to avoid critical time periods for water quality;
>
> (4) Non-discharge alternatives such as land application; and
>
> (5) Offsets to the activity or discharge's effect on water quality.
>
> iii. The Department retains the discretion to require the applicant to examine specific alternatives or provide additional information to conduct the analysis.
>
> iv. In selecting the preferred alternative the applicant shall:
>
> (1) Evaluate economic impacts (total cost effectiveness, incremental cost effectiveness) of all technologically feasible alternatives;
>
> (2) Rank all technologically feasible treatment alternatives by their cost effectiveness at pollutant reduction;
>
> (3) Consider the environmental costs and benefits across media and between pollutants; and
>
> (4) Select the least degrading option or show that a more degrading alternative is justified based on Subsections 052.08.c.iv.(1), 052.08.c.iv.(2), or 052.08.c.iv.(3) above.

The Tier II necessity demonstration requires considering alternatives that would still allow the desired development with less or no pollution. Based on these rules and the outcome of the **alternatives analysis** steps described below, alternatives may be eliminated because they are not cost-effective with respect to pollutant removal, the overall best for the environment, or affordable.

For example, some wastewater treatment methods that are technologically feasible may not be cost-effective and could be eliminated from further consideration. These methods may include pumping and hauling sewage to another treatment facility, wastewater distillation, and incineration (thermal destruction). Applicants must demonstrate in their analyses why specific alternatives are eliminated.

5.3.1 Timing and Integration of Alternatives Analysis

To meet the intent of antidegradation to maintain **high water quality**, DEQ believes it is vital to consider alternatives at the earliest opportunity to minimize project delays or redesign during water quality permitting.

DEQ does not intend to create a separate alternatives analysis in project design. When a proposed discharge of pollutants could degrade water quality, DEQ will consider the implication of water quality degradation and the Idaho antidegradation requirements at the outset and integrate them into project design. DEQ encourages early communication between project designers, EPA or ACOE permit writers, other federal agencies involved in complying with the National Environmental Policy Act, and DEQ staff responsible for application review.

5.3.2 Identifying Nondegrading and Less-Degrading Alternatives

The goal of alternatives analysis is to find ways to minimize or eliminate the detrimental effect on water quality by whatever means can be reasonably implemented for the pollutants or parameters of concern. This analysis may result in identifying multiple reasonable alternatives. While some cost savings may result from some of the alternatives, steps to discharge less pollution are usually going to cost more and raise the question of whether it is reasonable to implement more costly pollution control alternatives.

Alternatives that identify ways to eliminate or reduce degradation of stream water quality should be evaluated during an antidegradation analysis of a discharge to a Tier II AU. The alternatives analysis should, at a minimum, identify and evaluate alternatives within five categories (IDAPA 58.01.02.052.08):

1. Relocation or configuration of outfall or diffuser
2. Process changes/improved efficiency that reduces pollutant discharge
3. Seasonal discharge to avoid critical time periods for water quality
4. Nondischarge alternatives such as land application
5. Offsets to the activity or discharge's effect on water quality

Address each of these alternative categories fully to demonstrate viable alternatives to degradation of the stream water quality have been given equal consideration. To assist with the alternatives analysis, the applicant must determine the overall capital costs, annual operation and maintenance costs, and total cost to implement each alternative over the life of the activity or discharge.

For facilities with an outfall, relocating or reconfiguring an outfall or diffuser must be considered, where appropriate. While this action alone will not reduce pollutant loads, it can be effective in reducing receiving water pollutant concentrations and its effect on high-quality water. For example, a larger stream nearby offers greater assimilative capacity and can be useful when siting a new facility. For existing discharges, it could be beneficial to extend pipe to a larger stream. Diffusers, which do not alter fully mixed concentrations, are effective in altering the extent and distribution of elevated pollutant concentrations and minimizing degradation of high-quality water.

Generated waste that needs to be treated and discharged might be reduced through changes in industrial processes or greater efficiency in raw material use to save costs and reduce waste. A material substitution is worthwhile if more costly raw components create even greater savings in waste treatment costs. For a municipality, waste reduction includes hazardous waste education and collection to reduce loads at the source, recovery of heat from an effluent, and water conservation or reuse.

A critical or limiting time for waste discharge usually exists, typically during seasonal low flows when assimilative capacity of flowing waters is at a minimum. If wastewater can be stored and discharged seasonally (e.g., through land application or irrigation use during the summer), the critical time for aquatic life and recreation use may be avoided, reducing overall degradation of water quality and the need for load reduction.

To avoid discharge to surface water, land-apply reuse water, inject it into ground water, or use a closed-loop reuse system. These methods all have limitations, such as potential impacts to ground water and indirectly to surface water, and their own permitting requirements. However, for some processes in some settings, no-discharge alternatives can be viable. With the increasing shortage of water in many areas and overall increase in the value of water as a resource, some form of reuse, even if not in the original process, will become more attractive and commonplace and could become more cost-effective to implement.

There are often multiple sources of pollution, especially for any sizeable receiving water body. Some sources may have been operating for a long time, and although they are discharging legally, redesigning their facilities or processes may provide greater pollution reduction than better design of a new source. This possibility creates an opportunity for the operator of a proposed new or increased discharge to collaborate with other dischargers and forge a binding agreement to reduce their combined pollutant loads and improve the water quality of the water body as a whole.

With advances in pollution control and new efficiencies and treatment technologies on the rise, pollution-reduction strategies once considered unreasonable may now be possible; however, these innovations cannot be predicted. To account for this unpredictability, DEQ reserves the right to require an applicant to examine specific alternatives.

5.3.3 Evaluating Alternatives and Making a Choice

While only **technologically feasible** alternatives should be considered, they will likely vary in their level of pollutant load and may not all be reasonable. They may vary widely and nonlinearly in the **cost-effectiveness** of pollution reduction and involve competing environmental costs and benefits. Discharge alternatives will be ranked according to cost to the discharger and at some point will not be reasonable to implement. Choosing the preferred alternative becomes a matter of balancing cost of pollution reduction versus overall environmental gain, while remaining affordable. The type of pollution controls that are reasonable to implement will be pollutant- and process-specific.

In some cases, treatment costs can be and are passed on to the consumer (e.g., ratepayers in the case of a publicly owned sewage treatment plant) who will bear the cost is important to consider when fairly assessing whether an alternative can be reasonably implemented.

To make the selection process more systematic, a four-step narrowing of alternatives is recommended:

1. Amount of degradation caused
2. Cost-effectiveness of pollutant removal
3. Environmental cost-benefit trade-offs
4. Affordability of alternatives

After discussions with the discharger, if DEQ determines the necessity of the preferred alternative has not been demonstrated, DEQ shall either request more information or deny approval of the activity as proposed.

Step 1—Ranking Alternatives from Least to Most Degrading

To determine the amount of degradation caused by each alternative identified, all feasible alternatives should be ranked by the permit applicant from least to most degrading to water quality. For less degrading alternatives, identify the amount of pollution reduction accomplished. The applicant may bypass further alternatives analysis (steps 2–4) by selecting the least-degrading alternative feasible for the pollutants or parameters of concern.

If the applicant opts for the least-degrading alternative, the test of degradation necessity is met and analysis to determine social and economic importance should be conducted. If the least-degrading option is not preferred, the next least-degrading alternative may be justified as reasonable on the basis of cost-effectiveness of improved pollutant reduction, environmental trade-offs, or affordability (steps 2–4).

To rank alternatives, the applicant must identify the initial baseline condition of the receiving water body. In some cases (e.g., total suspended sediments), it may be reasonable to presume the initial baseline for the receiving water body is zero. Once the baseline is determined, estimate the amount of pollutant reduction accomplished by each alternative. After the alternative is implemented, identify the resulting concentration in the effluent after mixing and calculate the effects of the effluent on the receiving water body. Consider creating ranking tables where the resulting instream concentration of a specific pollutant of concern after full mix is listed in ascending order. This display will allow for a simplistic view of which alternatives are the least degrading for a specific pollutant. It may be possible that an alternative with the least degradation for one pollutant is not the least degrading option for another pollutant. Some judgement is needed to determine which alternative will create the least amount of degradation in the receiving water body (step 3).

Step 2—Ranking Alternatives by Cost-Effectiveness

If necessary, step 2 ranks each alternative by its pollutant-reduction cost-effectiveness. Cost-effectiveness looks at the cost per unit mass of pollutant removed, such as dollars per pound ($/lb). Most processes generate an effluent stream measured in volume per day; cost-effectiveness can be evaluated in $/lb/million gallons per day (MGD), or other comparable units.

Greater pollution reduction will typically cost more, but economies of scale and alternate technologies can result in nonlinear per-unit costs.[22] While outside this guidance's scope, treatment costs and amortization of initial capital costs versus ongoing operation and maintenance costs should be considered. If alternatives are ranked by per-unit pollutant-reduction costs, the cost of improved pollutant reduction can be compared. This comparison may justify a more-degrading alternative if the incremental cost of improved treatment far outweighs the incremental gain in pollutant reduction.

For example, if Alternative 1 removes 100 lb of a pollutant for $10,000 per MGD, the unit cost is $100/lb/MGD. If Alternative 2 removes 90 lb of the pollutant for only $900 per MGD, its unit cost is only $10/lb/MGD (Table 7). The latter is more cost-effective, as there is a sharp jump in per-pound cost for removing the additional 10 lb/MGD: $910/lb/MGD ([$10,000−$900]/10 lb). In this case, it would be easy for the discharger to argue the cost of removing 10 more pounds of pollutant was unreasonable, so the next best alternative should be accepted as the preferred alternative. In this way, alternatives imposing a cost that is disproportionate to the possible environmental gain may be eliminated from further consideration.

Consider the previous example further. If Alternative 3 could achieve pollutant reduction of 50 lb at a cost of $450 per MGD, the cost per pound of treatment would be only slightly better at $9/lb/MGD (Table 7), and the marginal cost of nearly doubling pollutant removal compared to using Alternative 2 would be $11.25/lb/MGD ([$900−$450]/40 lb). Alternative 2 remains the preferred alternative.

Table 7. Example of ranking cost-effectiveness.

Alternative	Pounds Removed	Cost ($)/MGD	Unit Cost ($) (lb/MGD)
1 – Least degrading	100	10,000	100
2 – More degrading	90	900	10
3 – Most degrading	50	450	9

Step 3—Considering Environmental Trade-Offs

The cost-effectiveness example in Table 7 compares one pollutant in isolation. Because multiple pollutants usually exist in a discharge, environmental trade-offs must be considered. The most effective alternative for one discharge may not be the best for another.

In this example, a discharge may involve adding heat and phosphorus to a receiving water. Some of the treatment processes and alternatives may be different (e.g., chilling for temperature and ultrafiltration for phosphorus); maximizing one will do nothing for the other, and treatment costs will be additive. Finding the optimum environmental solution in this situation may involve some intermediate level of treatment of both phosphorus and temperature. A compromise in treatment

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[22] Some costs of treatment will be scalable. For example, power costs and cost of reagents such as alum go up in proportion to the volume treated. Differing treatment alternatives have differing costs that are not always proportional to volume. Instead, a doubling of pollutant reduction may cost more or less than twice as much. Options are best compared on a per unit basis, taking into account all various costs and their timing.

may be warranted if one of the pollutants is more limiting to the support of beneficial uses. In the latter case, it would make more environmental sense to treat the limiting pollutant—reducing temperature over phosphorus if temperature is the greater impediment to support of beneficial uses.

This decision could be further complicated if the cost of treating temperature is greater than the cost of treating phosphorus. Phosphorus treatment may offer more environmental benefit per unit cost of pollutant reduction, although temperature is the more limiting pollutant. Another alternative for treating both may avoid such a trade-off (e.g., land application could deal with both temperature and phosphorus at once, without additive costs for each pollutant), but a trade-off may result in less water in the receiving water body.

Alternatives to degradation of a receiving water body may have environmental impacts on other types of water (e.g., ground water) or even other media (e.g., air pollution or hazardous materials generation). If an alternative to degrading surface waters creates a larger environmental impact on another type of water or media, the alternative may not be a preferred because it would create a larger environmental problem.

Environmental impacts on other media could include increased air pollution or solid waste disposal from reduced discharge to water. Adding to the direct effects of increased pollutant loads to other media, increased air pollution or solid waste may eventually affect water quality.

While it is difficult to quantify trade-offs in currency ($/lb/MGD), the effort is useful when determining and quantifying the environmental trade-offs. Consider the following questions when evaluating environmental trade-offs:

- What effects does land application have on ground water (e.g., will it delay phosphorus load rather than avoid the load to surface water)?
- Are the alternatives to reduce environmental effects on ground water more or less costly than degradation to surface water?
- Will reducing degradation of surface water affect another use (e.g., drinking water, where no alternative source exists)?
- Are there air pollution concerns to address?
- Do any of the alternatives create hazardous waste that will need to be managed?

Environmental quality is better when less pollution is discharged. Finding the best solution, determining the most economically efficient way to treat and handle waste, and considering public and environmental health versus economic health is an ongoing challenge.

Step 4—Judging Affordability

After analyzing pollutant reduction cost-effectiveness and environmental trade-offs, assess the affordability of the best remaining alternatives. This assessment determines if an alternative is too expensive to reasonably implement for the type of discharge or activity proposed for a specific industry. This approach might result in selecting the next-least-degrading alternative, while maintaining affordability to the public or private entity. Alternatives identified as technologically feasible are considered **affordable** if the applicant does not supply an affordability analysis.

Along with cost-effectiveness consider affordability and standard practice in the industry. For example, Table 7, Alternative 2 ($10/lb/MGD) is only slightly less cost-effective than Alternative 3 ($9/lb/MGD) but offers a large improvement in pollutant load reduction. While overall treatment costs double ($900 per MGD for Alternative 2 compared to $450 per MGD for Alternative 3), both alternatives are reasonable, affordable, and worthwhile given their cost-effectiveness. If the $900 per MGD Alternative 2 is commonly implemented by similar facilities, the argument for the cheaper option is less compelling.

If the applicant determines the remaining least-degrading alternative is affordable, it is the preferred alternative. If it is not affordable, the affordability of the next alternative should be evaluated until an alternative is chosen that is practicable, economically efficient, and reasonable overall. Clearly document when an alternative is not affordable and show how its substantial adverse economic impact would preclude use for the activity or discharge under review.

To judge the affordability of pollution control requirements of public sector entities, estimate the total annual pollution control costs per household related to median household income using the annualized capital costs and annual operating costs of the project. These costs are compared across alternatives, and measures of impact are made incorporating the community's current financial and socioeconomic wellbeing. For example, a municipality or sewage authority operating a publicly owned treatment works (POTW) that must be upgraded or expanded is a public entity that must comply with pollution control requirements to meet water quality standards. Municipalities, however, may also be required to control other point or nonpoint sources of pollution within their jurisdiction. Appendix F provides an example worksheet to evaluate affordability by alternative for POTWs. Additional guidance for judging affordability for public sector entities is presented in the *Interim Economic Guidance for Water Quality Standards Workbook*, section 2 (EPA 1995).

The approach for private sector development will differ from public sector entities as costs will be realized by the entity paying for the pollution controls. Once the costs of the pollutant controls are estimated, the ability of the private entity to pay for it must be calculated. The primary measure of economic impact to private entities is profitability. Secondary measures include indicators of liquidity (how easily can an entity pay its short-term bills), solvency (how easily can an entity pay its fixed and long-term bills), and leverage (how much money the entity can borrow). Additional guidance for judging affordability for private sector entities is presented in the *Interim Economic Guidance for Water Quality Standards Workbook,* section 3 (EPA 1995).

5.4 Justifying Social or Economic Importance

At this point, it is assumed the preferred alternative will result in degradation to the receiving waters and is necessary; the applicant must demonstrate this activity or discharge will result in important economic or social development in the area in where the waters are located. A social or economic justification shows the social or economic benefits occurring from an activity are important to the affected community. An activity must be either socially or economically important, not both; depending on the project, it may be prudent to focus on one or the other.

The Idaho antidegradation implementation rule (IDAPA 58.01.02.052.08.d) established the following principles to show socioeconomic justification of an activity that will cause significant degradation:

> Socioeconomic Justification. Degradation of water quality deemed necessary must also be determined by the Department to accommodate important economic or social development. Therefore, the applicant seeking authorization to degrade water quality must at a minimum identify the important economic or social development for which lowering water quality is necessary and should use the following steps to demonstrate this:
>
> i. Identify the affected community;
>
> ii. Describe the important social or economic development associated with the activity, which can include cleanup/restoration of a closed facility;
>
> iii. Identify the relevant social, economic and environmental health benefits and costs associated with the proposed degradation in water quality for the preferred alternative. Benefits and costs that must be analyzed include, but are not limited to:
>
> (1) Economic benefits to the community such as changes in employment, household incomes and tax base;
>
> (2) Provision of necessary services to the community;
>
> (3) Potential health impacts related to the proposed activity;
>
> (4) Impacts to direct and indirect uses associated with high quality water, e.g., fishing, recreation, and tourism; and
>
> (5) Retention of assimilative capacity for future activities or discharges.
>
> iv. Factors identified in the socioeconomic justification should be quantified whenever possible but for those factors that cannot be quantified, a qualitative description of the impacts may be accepted; and
>
> v. If the Department determines that more information is required, then the Department may require the applicant to provide further information or seek additional sources of information.

A socially justified project is important to the social development of the local community in at least one aspect (e.g., population growth or job growth) or helps meet important community service needs (e.g., sewage treatment or transportation infrastructure). These projects provide added environmental benefits, such as POTWs that provide additional capacity for wastewater treatment, mine site reclamation, and historical site cleanup. Socially justified projects must demonstrate some local need for the project (i.e., identify the social conditions and relate how the project will fulfill those needs).

An economically justified project is important to the economic development of the local community. Economic development projects increase the economic base of the local community. Determining the economic importance of a project may require more in-depth analysis than social justification and may cover how the costs of the proposed degradation (including downstream effects) are equaled or exceeded by benefits to the community. In a simplified cost-benefit analysis, the applicant will use the following steps to show the social or economic justification:

1. Identify the affected community.

2. Describe important social or economic development associated with the activity.
3. Identify environmental and social or economic impacts to the affected community.

Step 1—Identify the Affected Community

The affected community is the population in the geographical area where the waters are located. This area should be large enough to include both the people living near the site of the proposed activity and those in the community who are expected to directly or indirectly benefit from the activity.

Once the affected community is identified, a description of the current economic and environmental conditions of that community should be completed to identify those areas that will be evaluated in steps 2 and 3. For example, residents of a small town with a wastewater treatment plant that is proposing a change in its effluent discharge would be affected by the degradation of water. Downstream users affected by this change may be towns that rely on the water body to supply drinking water. Well water users should also be considered if their water supply could be impacted from degradation of ground water from land application.

When evaluating current economic conditions, describe the overall economic health of the community, and include any pertinent information on household incomes, general employment rates, and growth. Descriptions of current water quality and biological health also help to accurately reflect current environmental conditions.

Step 2—Describe Important Social or Economic Benefits Associated with the Activity

The applicant must describe the benefits the activity will have on the economic or social development of the affected community. In this step, describe why the proposed discharge activity (or degradation of quality of water) is important to the overall social or economic health of the community. Establish the current condition of the affected community from step 1, and estimate of the benefits to the community based on the effects of the proposed activity. The applicant should make every effort to quantify these changes, but DEQ recognizes not all social indicators can be easily quantified and will accept a qualitative assessment of changes to these indicators.

The proposed activities may accrue the following benefits:

- Encourage job growth
- Serve a larger area or greater population
- Increase property values or the tax base in the affected community
- Provide a necessary public service
- Decrease in household expenses for services
- Correct a public health or environmental problem
- Retain assimilative capacity for future growth

Step 3—Identify Environmental and Social or Economic Impacts Associated with the Discharge

Step 3 determines the overall environmental, social, and economic impacts associated with the proposed project and accompanying degradation of water quality. This step compares the benefits associated with the activity identified in step 2 to the impacts associated with the discharge identified in step 3. The applicant should discuss the following environmental, social, and economic impacts to the affected community:

- Changes in employment rate
- Changes in personal or household income
- Changes in property values or community tax base
- Necessary public services provided
- Potential public health or safety problems (e.g., levels of lead in people's blood)
- Negative impacts to uses based on water quality (e.g., fishing, recreation, or tourism)
- Reduction or loss of assimilative capacity for future industry and development
- Impact on community development potential
- Environmental benefits associated with reclamation and other restored property

Include environmental, social, and economic impacts:

- What impacts will degradation of the water body have on the immediate community (e.g., loss of recreation or decrease in attractiveness for tourism)?
- What impacts will degradation have on the fishery and do these translate to a loss of revenue for the city or residents?
- Could downstream drinking water intakes see an increase in treatment costs due to degradation of water quality?

The environmental, social, and economic measures identified above do not constitute a comprehensive list and will not be relevant to all activities or discharges. Each situation and community is different and will require an analysis of unique factors. The applicant is encouraged to analyze additional factors that characterize the specific community under consideration. As with step 2, the applicant should make every effort to quantify these changes. The social or economic justification should state whether degradation of water quality is important to the social or economic health of the community, and a rationale should be provided.

5.4.1 Social or Economic Justification Considerations: Public versus Private Entities

Because public and private sector entities often have different practices and goals, affecting different sectors of the community, the two types of activities may have different social or economic justification evaluations.

Public sector developments encompass POTWs, public utilities, and other entities owned or operated by a governmental (local, state, or federal) agency or an entity controlled by the government. Public sector entities do not operate on a for-profit basis and gain most of their capital for expenses from user fees and obligation or revenue bonds. Evaluating impacts to public entities may include looking at financial impacts to the public entity and socioeconomic conditions of the surrounding community. The impact of those pollution control costs can affect a wider community, and the general financial and economic health of the community will determine if the impacts are important.

Private developments are owned and operated on a for-profit basis. These private entities use profits or investments from shareholders to raise the capital needed for pollution control costs and may pass along those costs to the end user through higher prices for the goods or services. For these private entities, measuring substantial impacts may require estimating the financial impacts on their balance sheet and analyzing the overall impact on the surrounding community (e.g., the impact of lost employment on the community or the increased cost of goods or services).

The line between public and private entities may be blurred when the public entity provides a service to significant numbers of private entities (e.g., a wastewater treatment plant servicing a mainly industrial area or a private, for-profit hospital providing a substantial benefit to the public). In this case, the methods to evaluate public entities and those for private entities may both need to be employed to determine an overall economic impact.

5.4.2 Social or Economic Justification Evaluation

If the applicant demonstrates the project will lead to overall beneficial changes in the factors presented, the project will be considered to provide important social or economic development. This determination will be made on a case-by-case basis using information provided with the application and obtained during public comment. Public services, such as a wastewater treatment plant, hospital, or school (or their expansion) may be determined a socially important priority.

When information available to DEQ is not sufficient to determine the social or economic benefits or environmental impacts associated with the proposed activity, DEQ may request the applicant submit additional information.

After appropriate discussions with the discharger, if DEQ determines the social and economic justification of the proposed activity has not been demonstrated, DEQ shall deny certification or permitting of the proposed activity and provide the applicant with a written explanation of the deficiencies in the analysis.

5.5 Summary of the Justification for Degrading Water Quality

Sections 5.3 and 5.4 describe the approach the applicant shall follow for determining whether less-degrading or nondegrading alternatives to the proposed activity will be required to prevent degradation of Idaho surface waters. DEQ will summarize the results of the alternatives analysis and social and economic justification evaluation in the antidegradation review. The steps below and flow chart (Figure 6) summarize the alternatives analysis and social and economic justification process conducted during Tier II antidegradation analyses:

1. If it is determined that significant degradation would occur due to the proposed activity, an analysis of less-degrading and nondegrading alternatives to the proposed activity is required for the significant pollutants or parameters.
2. The applicant is required to identify feasible pollution control alternatives, including those resulting in no degradation and/or less degradation, as appropriate, in addition to applying the minimum level of pollution control required.

3. If the applicant prefers the least-degrading feasible alternative, the alternatives analysis is complete.
4. To justify a more-degrading alternative as reasonable, the applicant must evaluate the pollutant-reduction cost-efficiency, environmental trade-offs, and affordability associated with each alternative or mix of alternatives.
5. The applicant will identify the least-degrading alternative (item 3 above) or a more-degrading alternative that is reasonable (item 4 above). This is the preferred alternative.
6. The applicant will conduct a social and economic justification (steps 1–3) of the preferred alternative to justify degradation of water quality.
7. DEQ will evaluate the applicant’s social and economic justification. If information is not sufficient to make a determination regarding the justification, DEQ may require the applicant to provide further information.
8. If the activity is socially or economically important, DEQ will provide certification or permitting for the preferred alternative. If the applicant does not adequately justify social or economic importance, DEQ will deny certification or permitting.

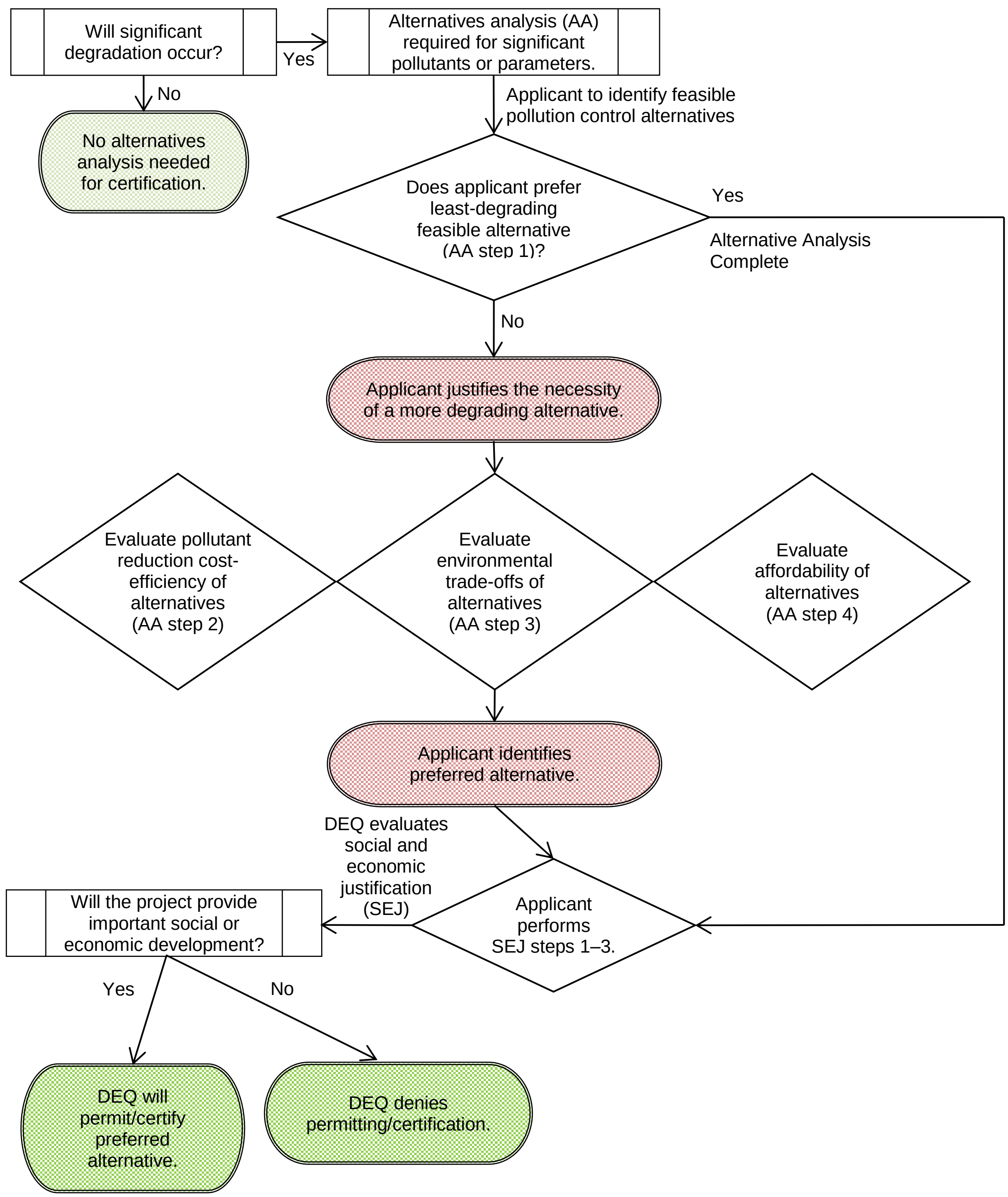

Figure 6. Alternatives analysis and social and economic justification summary.

5.6 Documenting Tier II Compliance

For high-quality waters assigned Tier II protection, the antidegradation review in the permit development or §401 certification must evaluate how permit issuance will affect water quality for each relevant pollutant for the beneficial use of the receiving water, and determine whether degradation will occur (sections 4.1–4.4). If degradation of high-quality water will occur, the review must determine whether the degradation will be significant (section 5.1).

Where significant degradation is proposed, the antidegradation review must determine whether the point source and nonpoint source controls shall be achieved and are adequate to protect existing uses fully (section 5.2). The review will also summarize the alternatives analysis conducted by the applicant (section 5.3) and determine whether the degradation of high-quality water is necessary and important. If the applicant chooses a more degrading alternative, the antidegradation review will summarize the social and economic justification that demonstrates the importance of the degradation to the social or economic health of the community (section 5.4).

6 Tier III Designation—Protecting Outstanding Resource Waters

High-quality water bodies considered to be of exceptional recreation or ecological significance (e.g., waters in national or state parks, wild and scenic rivers, or wildlife refuges) may be nominated for designation as ORWs. These waters may not necessarily have high water quality. Only water bodies designated by the state legislature as ORWs are given the Tier III level of protection and are protected from the impacts of point and nonpoint source activities under antidegradation regulations. This protection means water quality in these waters will be maintained, and no person shall conduct a new or substantially modify an existing activity if the activity is expected to lower or degrade water quality. The only allowed exception is for short-term or temporary activities that do not alter the essential character or special uses of a segment, allocation of water rights, or the operation of water diversions or impoundments (IDAPA 58.01.02.052.09.f.i).

6.1 Point Source Activities

Tier III protections applying to ORWs require the water quality be maintained and protected from impacts of both point and nonpoint source activities. This protection means point source discharges to the ORW will not be allowed to expand, and new point sources will not be allowed to discharge into the ORW.

Point source discharges that cause degradation to an ORW may be allowed if the proposed degradation is offset by reductions in pollution from other sources tied to the proposed point source activity or discharge (IDAPA 58.01.02.052.09.g). These offsets must occur before the activity or discharge begins and upstream of the degradation the activity or discharge may cause. Allowed offsets are described in greater detail in section 4.4.1.

To show the degradation caused by a point source discharge to an ORW is offset by reductions from other sources, the point source discharger must submit documentation on both the proposed degradation due to the discharge and the decreases proposed to offset this reduction. Calculations showing the change in ambient water quality downstream of the offsets and also downstream of the proposed discharge would demonstrate the overall net impact of the offsets and the proposed discharge to the ORW. A net improvement in water quality is the most desirable outcome of these proposed offsets to the discharge, especially in water bodies of exceptional significance, but a full offset is the minimum requirement. If the calculations demonstrate the degradation of the ORW is not fully and completely offset by reductions upstream of the degradation, the point source discharge will not be allowed (IDAPA 58.01.02.052.06.c).

The point source discharger is encouraged to submit documentation of scheduled timelines for the proposed reductions and for the proposed activity to demonstrate offsets are occurring before the proposed degradation. The documentation should show how the discharger will ensure the reductions proposed to offset the degradation will be accomplished.

Point source activities discharging to tributaries of ORWs are not subject to the same limitations as those discharging directly to ORWs. These activities are subject to the antidegradation protections for the water body they discharge to, provided water quality of the ORW (below the appropriate or designated mixing zone) is not lowered, and antidegradation requirements for the tributary (i.e., Tier I or II) are addressed.

6.2 Nonpoint Source Activities

Nonpoint source activities on ORWs are restricted (IDAPA 58.01.02.052.09.f). Once a stream segment has been designated as an ORW, no person shall conduct a new or substantially modify an existing nonpoint source activity that can reasonably be expected to lower the water quality of the ORW, except for conducting short-term or temporary nonpoint source activities that do not alter the essential character or special uses of a segment, allocation of water rights, or operation of water diversions or impoundments.

Tributaries to ORWs are not subject to restrictions of nonpoint source activities in the same manner as ORWs. A new or substantially modified existing nonpoint source activity may be conducted that lowers or degrades water quality in the tributary to an ORW if the water quality of the ORW is not lowered and antidegradation requirements for the tributary are addressed.

Nonpoint source activities that took place before the designation of the water as an ORW may continue and shall be conducted in a manner that protects and maintains the current water quality of the ORW. Existing nonpoint source activities may not be substantially modified in a way that may be reasonably expected to lower or degrade the quality of water once the water has been designated as an ORW.

7 Individual Permits

Dredge and fill and IPDES/NPDES permit types are individual and general. These permit types have similar components but are used under different circumstances and involve different permit issuance processes.

Individual permits are specifically tailored to individual facilities. After receiving the appropriate application form, DEQ will develop a permit for the facility based on the information provided in the permit application and from other sources (e.g., previous permit requirements, discharge monitoring reports, technology and water quality standards, TMDLs, ambient water quality data, and special studies). DEQ will issue a permit to the facility for up to a 5-year cycle with a requirement to reapply no less than 180 days before the expiration date.

8 General IPDES or NPDES Permits, Dredge and Fill Permits, and FERC Licenses

Similar discharges to surface waters may be authorized under a single general IPDES or NPDES permit. These discharges are from aquaculture facilities, stormwater runoff, recreation dredge mining activities, or concentrated animal feeding operations. Discharge covered by a general permit, but which cannot comply with general permit conditions or antidegradation requirements must be covered under an individual permit. General NPDES permits are currently issued by EPA Region 10 and subject to §401 certification by Idaho. After July 1, 2020, IPDES will issue state general permits, and antidegradation review is part of the state permitting process. Antidegradation review of general IPDES or NPDES permits requires different considerations than for individual permits. No information specific to a discharge or receiving water body is available for general permits, so Tier I and Tier II (where applicable) protections are addressed broadly.

Section 401 certification is required for individual and general §404 dredge and fill permits and FERC operation licenses. These permits and licenses differ substantially from individual permits and must meet antidegradation requirements (IDAPA 58.01.02.052.03).

8.1 Tier II General Permits

All general permits require that permit conditions are met, including the general requirement that permitted discharges must ensure that water quality standards are not violated, and BMPs contained in the permit are implemented. Compliance with the terms of the general permits is required to maintain authorization to discharge under the permit. Discharges covered by a general permit, but which cannot comply with general permit conditions or antidegradation requirements, must be covered under an individual permit.[23]

8.1.1 General NPDES Permits Issued before July 1, 2011

Regulated activities authorized by general NPDES permits issued before July 1, 2011, (currently in effect and not expired), are not required to undergo a Tier II antidegradation analysis as part of the **Notice of Intent** (NOI) process. Such a discharge must comply with the existing general

[23] Primacy was approved for Idaho on July 1, 2018, placing IPDES on a phased permit takeover schedule to gain primacy for general permits on July 1, 2020. DEQ will prepare IPDES permits instead of EPA preparing NPDES permits; DEQ will consider antidegradation in their permitting process.

permit conditions and any associated antidegradation requirements put in place when the general permit was issued. This requirement includes new or expanded activities or discharges regulated by existing general permits, except as indicated in a particular permit.

For example, an NOI submitted for a new discharge covered by the existing aquaculture general permit would not undergo a Tier II antidegradation analysis. Where DEQ has denied water quality certification, a Tier II antidegradation analysis may be necessary to obtain individual certification.

8.1.2 New or Reissued General Permits

General permits issued or reissued after July 1, 2011, must be evaluated to consider the potential for degradation. Antidegradation reviews will be conducted for the entire class of general permittees to decide whether or not the general permit complies with state water quality standards. Antidegradation reviews will focus on pollutants that may contribute to water quality degradation and will examine whether water quality criteria are met, degradation is likely to occur, and the permit conditions and permit record satisfy the requirements of the Tier II analysis. This review will also determine whether or not the potential activity or discharge will have an insignificant effect on water quality. If DEQ finds the general permit adequately addresses antidegradation at the time the permit is issued, DEQ will not need to include conditions specific to antidegradation in the general permit or the §401 certification of the permit.

If DEQ cannot determine the general permit adequately addresses antidegradation at the time the permit is issued, DEQ must include conditions in the §401 certification that provide reasonable assurance the activities covered under the general permit will comply with the antidegradation policy. Depending on the type of activities covered under the general permit and the conditions and requirements of the general permit, DEQ may incorporate the following conditions into the §401 certification or permit:

- Require additional or more-stringent effluent limits and any other limitations and monitoring requirements necessary to ensure compliance with the antidegradation provisions.
- Retain DEQ's authority to, after reviewing submitted NOIs, require all or a subset of new or expanding discharges to undergo a Tier II analysis if it is determined degradation may occur as a result of cumulative impacts from multiple discharges to a water body, impacts from a single discharger over time, or other individual circumstances.

Existing activities or discharges currently covered under an effective general permit will be deemed to comply with Tier II of the antidegradation policy when seeking coverage under a reissued general permit as long as the activity or discharge is not expanding. Such activities or discharges will not be required to undergo a Tier II antidegradation analysis as part of the NOI process. If the activity or discharge is expanding, it must comply with any new antidegradation requirements of the reissued general permit. Tier I antidegradation compliance must be documented in the IPDES permit or §401 certifications for all new or reissued general permits.

Existing activities or discharges required to be permitted for the first time under a new general permit, and not proposing to expand, will be deemed not to cause degradation. This determination results in regulation that will limit the discharge for the first time and is a step toward reducing water quality degradation.

New or increased activities or discharges seeking coverage under a new or reissued general permit for the first time must comply with the antidegradation requirements of that general permit and any associated §401 certification.

8.2 §404 Dredge and Fill Permits

CWA §404 regulates the placement of dredged or fill material into waters of the United States. ACOE administers the §404 permit program dealing with these activities (e.g., wetland fills and instream sand/gravel work) in cooperation with EPA and in consultation with other public agencies.

To ensure that antidegradation and other water quality protection requirements are considered, reviewed, and met in a comprehensive and efficient manner, these requirements are addressed and implemented through DEQ's §401 water quality certification processes. Applicants who fulfill the terms and conditions of applicable §404 permits and the corresponding §401 water quality certification will have fulfilled the antidegradation requirements. Additional antidegradation considerations may be incorporated into §404 permits and the corresponding §401 certifications at the time of permit issuance.

A Tier I antidegradation review must be performed for all new or reissued §404 dredge and fill permits and must demonstrate the existing uses and level of water quality necessary to protect existing uses will be maintained and protected. This demonstration is achieved by describing BMPs that will be applied to reduce erosion, minimize turbidity, and prevent impacts from other pollutants of concern to receiving water bodies.

For activities covered under §404 general permits (e.g., nationwide or regional permits), the antidegradation review will be conducted while DEQ reviews the general permit for §401 certification. Similar to the process for general NPDES/IPDES permits, the antidegradation review will focus on pollutants that may contribute to water quality degradation (most commonly sediment) and will examine whether water quality criteria are met, degradation is likely to occur, and the permit conditions satisfies the requirements of the Tier I and any required Tier II review (IDAPA 58.01.02.052.03).

For discharges of dredged or fill material covered under an individual §404 permit, the ACOE must ensure the §404(b)(1) guidelines have been met (40 CFR 230), requiring all appropriate alternatives to avoid and minimize degradation be evaluated. DEQ will coordinate with ACOE and the applicant to ensure the analysis conducted to fulfill the §404(b)(1) guidelines will also fulfill the antidegradation review requirements.

Antidegradation review of §404 nationwide and individual permits should consider all pollutants of concern, not just sediment. Screen the projects to determine if there is the potential for adverse changes to pollutants (e.g., review the §404 permit application, IR for water body impairments, and land use activities in the project vicinity). If potential for adverse changes does exist, document the potential impacts in the antidegradation review.

Temperature is an example of a pollutant of concern other than sediment. If temperature is listed in the AU, DEQ may consider how removing riparian vegetation could contribute to the impairment. If it is an agricultural area and the project results in wetland fills and the adjacent surface water is impaired for nutrients, the project could further contribute to the existing impairment. Parameters bound up in sediments (e.g., phosphorus) or historical mining areas with heavy metals bound to sediment might be other pollutants of concern.

8.3 FERC Licenses

FERC licenses the operation of hydroelectric dams. Applicants for these licenses are required to obtain §401 water quality certification. DEQ's certification will look at conditions necessary to comply with Idaho's water quality standards, including antidegradation provisions.

Although dams impound water rather than add anything to it, they may affect water quality in the impoundment and downstream. Water quality certification and antidegradation review do not focus on the effect of a traditional discharge but on the changes in water quality that may result from the dam and its impoundment and how operations may alter that quality. A Tier I antidegradation review must be performed for all new or reissued FERC licenses as part of the §401 water quality certification process to demonstrate compliance with Idaho's numeric and narrative water quality standards.

DEQ may place conditions on operations or require other actions to ensure compliance with the antidegradation provisions. Applicants who fulfill the terms and conditions of an applicable FERC license and the corresponding §401 water quality certification will have fulfilled antidegradation requirements. A Tier II antidegradation analysis will be performed where significant degradation will occur, to determine whether the project is necessary to accommodate important social or economic development.

When a project is relicensed with FERC, the process will compare the calculated water quality under the current FERC license with calculated water quality in the future under the proposed FERC license, at a point downstream of the project. If this comparison shows no degradation in water quality, no Tier II antidegradation analysis is necessary.

8.4 Intergovernmental Coordination

Intergovernmental coordination is required of DEQ before approving a regulated activity that would degrade an AU with Tier II protection. This requirement ensures all relevant public entities at the local, state, and federal levels are aware of any proposal to degrade high water quality and can review, seek additional information, and comment on the proposal. Intergovernmental coordination is needed to collect information on whether other source controls shall be achieved. An applicant may contact other government agencies to solicit input, but if they do not, DEQ will consult the following agencies, as appropriate:

- EPA Region 10
- US Forest Service, Bureau of Land Management, Idaho Department of Lands, and other land management agencies in the affected watershed

- Idaho Department of Fish and Game, US Fish and Wildlife Service, and National Marine Fisheries Service
- District health department serving the county where the facility or activity discharges
- Municipal governments of communities affected by the discharge
- Environmental agencies of other states whose waters may be affected by permit issuance
- Other interested governmental organizations, upon request

The intergovernmental coordination and review process should occur before the alternatives analysis and social and economic justification reviews are finalized, but it may occur in tandem with the public notice procedures outlined in the next section.

8.5 Public Notification and Review

DEQ must provide public notice and opportunity for public comment on the alternatives analysis and social and economic justification review. DEQ intends to provide public review of all antidegradation analyses in conjunction with the public review of DEQ's draft permit or §401 water quality certifications. If DEQ does not provide a draft water quality certification at the time of §404 permit review, a draft certification will be made available for review on DEQ's website, and the public will be given 21 days to submit comments for §404 permit certifications. Because FERC does not provide public notice, DEQ will issue its own public notice on certification decisions for FERC licenses. Notices are posted on DEQ's website at *www.deq.idaho.gov/news-public-comments-events*. A copy of the public notice shall also be sent to the relevant government agencies listed in section 8.4.

The notice identifies the action considered, lists all beneficial uses identified for the surface water, and calls for comments from the public on the proposed activity. The notice shall clearly state the time frame for submitting comments, the methods by which comments may be submitted, and to whom comments must be directed.

An applicant may also engage the public before the alternatives analysis and social and economic justification review is finalized. This approach is recommended because it leads to fewer questions during formal public comment, but it is not required. If the applicant chooses to engage the public on its own, provide DEQ with a summary of public comments received and the applicant's responses.

9 Antidegradation Review Decisions

Regulated activities that may result in degradation of Tier II waters can only be approved after DEQ makes all of the following findings:

- The level of water quality necessary to protect applicable beneficial uses is fully maintained. Water quality shall not be degraded to a level that does not comply with the applicable water quality standards.
- The highest statutory and regulatory requirements for new and existing point sources shall be achieved.
- All cost-effective and reasonable BMPs for nonpoint source pollution control shall be achieved.

- Allowing degradation of water quality is necessary and accommodates important social or economic development in the area where the surface water is located.

DEQ will make a final determination on the proposed activity, and if degradation is justified, implementing the preferred alternative will become a condition of the IPDES permit or §401 certification and incorporated in the permit or license. When information submitted to DEQ is not sufficient to justify the proposed degradation, DEQ may request additional documentation. After reviewing additional information, DEQ will determine if the degradation is justified and if so, issue an IPDES permit or approve or deny certification.

All antidegradation review decisions, including denial of certification, shall be documented by DEQ, and become part of the permit or license issuer’s administrative record of decision. Review documents, including existing water quality assessments, determinations of degradation, analyses of public comments, alternatives analyses, demonstrations of social and economic justification, and any other decisions or findings are public records.

To the extent allowed under Idaho Code §74-107 and 74-114, any information submitted to DEQ, pursuant to the rules of the Board of Environmental Quality, that contains trade secrets shall be kept confidential by DEQ if notice of the existence of a trade secret appears on the information and DEQ determines the information constitutes a trade secret pursuant to the process provided in Idaho Code §74-114 and the “Rules Governing the Protection and Disclosure of Records in the Possession of the Department of Environmental Quality” (IDAPA 58.01.21).

10 Conclusion

DEQ developed these procedures to implement its antidegradation policy as required by the federal water quality standards (40 CFR §131.12). Idaho’s antidegradation policy is found in the Idaho’s water quality standards (IDAPA 58.01.02). This guidance provides the requirements of these rules, describes how antidegradation will be implemented in Idaho, and presents recommended procedures that can be modified as needed.

DEQ solicited the input and participation from public and private entities while developing this guidance. Nine antidegradation guidance development meetings were held between December 2010 and August 2011. A 30-day public comment period opened on January 27, 2012, with the release of the public comment draft guidance. The draft document was updated to address public comments from January and March 2012, April 2015, and July 2019 on the antidegradation provisions. In November, 2019, the public will have the opportunity to comment on this antidegradation procedure guidance during a public workshop.

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Glossary

The terms defined in this glossary are specific to antidegradation analysis. Definitions for statute or rules are also provided.

§303(d): This section of the Clean Water Act requires reporting of waters that need total maximum daily loads.

§305(b): This section of the Clean Water Act requires reporting on water quality status of all waters.

§401: This section of the Clean Water Act requires certification that water quality standards will be met.

§404: This section of the Clean Water Act requires permits for discharge of dredge or fill material.

Adverse: A change in water quality to conditions that are worse for support of a beneficial use (e.g., an increase in temperature is adverse to cold water aquatic life, as is a decrease in dissolved oxygen).

Affordable: Pollution control alternatives within the financial means of most dischargers or activities of the same industrial classification (e.g., Standard Industrial Classification [SIC] code) or size for a publicly owned treatment works (major or minor). The concept of affordability is discharger-specific. If a wastewater treatment alternative is not affordable for a discharger for a specific activity type (e.g., presents a substantial adverse economic impact), it is not a reasonable alternative for purposes of Tier II antidegradation analysis.

Alternatives Analysis: An evaluation of alternatives for regulated activities or discharges that might degrade water quality, including less-degrading alternatives, nondegrading alternatives, and no-discharge alternatives. Examples of alternatives include treatment process changes, relocated discharge facilities, land application, reuse, and subsurface discharges.

Ambient: The prevailing water quality conditions in a water body, as opposed to effluent quality.

Antidegradation: A regulatory policy and implementation procedure to protect existing and designated uses of surface waters and to specify how DEQ will determine whether and to what extent existing surface water quality may be degraded.

Applicant: Applicant means an entity applying for a permit or license subject to certification under the Clean Water Act §401.

Assessment Unit (AU): The geographic unit for reporting water quality in Idaho’s Integrated Report. AUs are a subdivision of water body identification units (identified by water body identification numbers, or WBIDs), are based on stream size, and bound an area of water more likely to be of similar quality than the larger WBID they are a part of.

Assimilative Capacity: The amount (load) of a pollutant that can be added to a specific water body under critical conditions without causing the concentration to exceed water quality criteria associated with a beneficial use. It is calculated as the difference between the criterion level and the ambient level of a pollutant.

Beneficial Uses: All existing and designated uses on or in surface waters of the state (often shortened to just use) as defined in IDAPA 58.01.02:

> Any of the various uses which may be made of the water of Idaho, including, but not limited to, domestic water supplies, industrial water supplies, agricultural water supplies, navigation, recreation in and on the water, wildlife habitat, and aesthetics. The beneficial use is dependent upon actual use, the ability of the water to support a nonexisting use either now or in the future, and its likelihood of being used in a given manner. The use of water for the purpose of wastewater dilution or as a receiving water for a waste treatment facility effluent is not a beneficial use.

Cost-Effectiveness: The cost per unit mass of pollutant removal achieved in wastewater treatment (e.g., dollars per pound); a greater cost per pound means lower cost-effectiveness. In comparing alternative treatment methods, if there is a large jump in cost per unit mass for a relatively small gain in pollutant removal, the alternative offering greater pollutant removal but at significantly lower cost-effectiveness may not be reasonable. Treatment methods with differences of less than 10% in cost per unit mass of pollutant removed may be considered equally.

Current Water Quality: A measurement or estimate of surface water quality for pollutants under currently permitted pollutant loads at a specific time and in a specific location.

Degradation or Lower Water Quality: Idaho Code §39-3602(7) defines this as:

> For purposes of antidegradation review, a change in a pollutant that is adverse to designated or existing uses, as calculated for a new point source, and based upon monitoring or calculated information for an existing point source increasing its discharge. Such degradation shall be calculated or measured after appropriate mixing of the discharge and receiving water body.

Designated Use: A beneficial use assigned to a specific water body unit as tabulated in the water quality standards (IDAPA 58.01.02.110–160), as well as the beneficial uses that apply to all waters of the state (IDAPA 58.01.02.100).

> Those beneficial uses assigned to identified waters in Idaho Department of Environmental Quality Rules, IDAPA 58.01.02, "Water Quality Standards and Wastewater Treatment Requirements," Sections 110 through 160, whether or not the uses are being attained.

Discharge: IDAPA 58.01.02 defines this as:

> When used without qualification, any spilling, leaking, emitting, escaping, leaching, or disposing of a pollutant into the waters of the state. For purposes of antidegradation review, means "discharge" as used in Section 401 of the Clean Water Act.

Ephemeral Waters: IDAPA 58.01.02 defines this as:

> A stream, reach, or water body that flows naturally only in direct response to precipitation in the immediate watershed and whose channel is at all times above the water table.

Existing Use: Beneficial uses actually attained in or on a surface water body on or after November 28, 1975, whether or not the uses are designated in the water quality standards (IDAPA 58.01.02).

> Those beneficial uses actually attained in waters on or after November 28, 1975, whether or not they are designated for those waters in Idaho Department of Environmental Quality Rules, IDAPA 58.01.02, "Water Quality Standards."

High-Quality Water: The overall quality of a water body unconstrained by water quality of individual parameters. Outstanding resource waters can be recognized for their high ecological value.

High Water Quality: The concentrations of parameters that are better than water quality criteria.

Integrated Report (IR): A report on the status of use support and compliance with water quality standards for state surface waters. The IR meets the regulatory reporting requirements of Clean Water Act §305(b) and §303(d) (Idaho Code §39-3602(15).

> "Integrated report" means the consolidated listing and reporting of the state's water quality status pursuant to the federal clean water act.

Intermittent Waters: IDAPA 58.01.02 defines this as:

> A stream, reach, or water body which naturally has a period of zero (0) flow for at least one (1) week during most years. Where flow records are available, a stream with a 7Q2 hydrologically-based unregulated flow of less than one-tenth (0.1) cubic feet per second (cfs) is considered intermittent. Streams with natural perennial pools containing significant aquatic life uses are not intermittent.

Jurisdictional Waters: Waters of the United States to which the Clean Water Act applies.

Justified: A socially or economically justified project is important to the social or economic development of the local community.

Less-Degrading Alternative: An alternative to a proposed activity or discharge that would result in less degradation to water quality than the minimum level of pollution control.

Listed: A water body identified in the Integrated Report in Category 5 for failure to meet one or more water quality criteria or for not fully supporting a use (e.g., bioassessment may directly determine aquatic life use is not fully supported).

Man-Made Waterways: IDAPA 58.01.02 defines this as:

> Canals, flumes, ditches, wasteways, drains, laterals, and/or associated features, constructed for the purpose of water conveyance. This may include channels modified for such purposes prior to November 28, 1975. These waterways may have uniform and rectangular cross-sections, straight channels, follow rather than cross topographic contours, be lined to reduce water loss, and be operated or maintained to promote water conveyance

Necessary: No reasonable alternatives exist to prevent or minimize degradation.

Nondegrading Alternative: An alternative to a proposed or existing discharge that would not result in degradation of existing water quality.

Notice of Intent (NOI): A form or application applicants must submit to EPA when seeking coverage under a general permit.

Outstanding Resource Water (ORW): A surface water body the Idaho legislature designated as an outstanding national or state resource water. An ORW receives Tier III antidegradation protection (IDAPA 58.01.02).

> A high quality water, such as water of national and state parks and wildlife refuges and water of exceptional recreational or ecological significance, which has been designated by the legislature and subsequently listed in this chapter. ORW constitutes an outstanding national or state resource that requires protection from point and nonpoint source activities that may lower water quality.

Parameter: A characteristic of water quality relevant to a beneficial use. Parameters may be a pollutant that directly changes water quality (e.g., discharge of copper increases copper concentrations) or a characteristic affected by a pollutant. For example, dissolved oxygen is a parameter of concern that is often adversely affected by discharge of oxygen-demanding organic waste (i.e., biological oxygen demand is the pollutant) or indirectly by nutrient enrichment (e.g., phosphorus, a pollutant). The terms parameter and pollutant are often used interchangeably.

Pollutant: IDAPA 58.01.02 defines this as (also see Parameter):

> Dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical waste, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, silt, cellar dirt; and industrial, municipal and agricultural waste, gases entrained in water; or other materials which, when discharged to water in excessive quantities, cause or contribute to water pollution. Provided however, biological materials shall not include live or occasional dead fish that may accidentally escape into the waters of the state from aquaculture facilities.

Presumed Use Protection: Protection of water quality of undesignated water bodies based on the presumption they can support cold water aquatic life and primary or secondary contact recreation.

Reasonable: Alternatives are identified as reasonable based on case-specific information. Nondegrading or less-degrading pollution control alternatives shall be considered reasonable where the costs of such alternatives are affordable.

Regulated Activity: A regulated activity or discharge requires a permit or license and is subject to CWA §401 certification (e.g., CWA §402 [IPDES permits], CWA §404 [dredge and fill permits], or a FERC license).

Short-Term or Temporary Changes in Water Quality. Reductions in water quality lasting for a short time period with no long-term, residual effects.

Social or Economic Justification: An evaluation of whether the project causing degradation provides social or economic benefits important to the community in the area in which it occurs.

Technologically Feasible: Capable of accomplishment as evidenced by a prior success under similar circumstances (e.g., industry standards are in place for a facility or treatment technologies exist at similar facilities).

Tier I Protection: Policies and procedures requiring an antidegradation review to prevent degradation that would result in a beneficial use not being fully supported or violation of water quality criteria. Tier I protection applies to all surface waters as the minimum protection level, regardless of existing water quality.

Tier II Protection: Policies and procedures requiring an analysis of alternatives and social or economic considerations to justify significant degradation or a determination the degradation is insignificant. Tier II protection applies to all surface waters where existing water quality is sufficient to classify them as high quality on a water body-by-water body basis.

Tier III Protection: Policies and procedures that prohibit any degradation in waters designated in the water quality standards as ORWs. A new or expanded source of pollutants may be allowed if it is offset to avoid degradation.

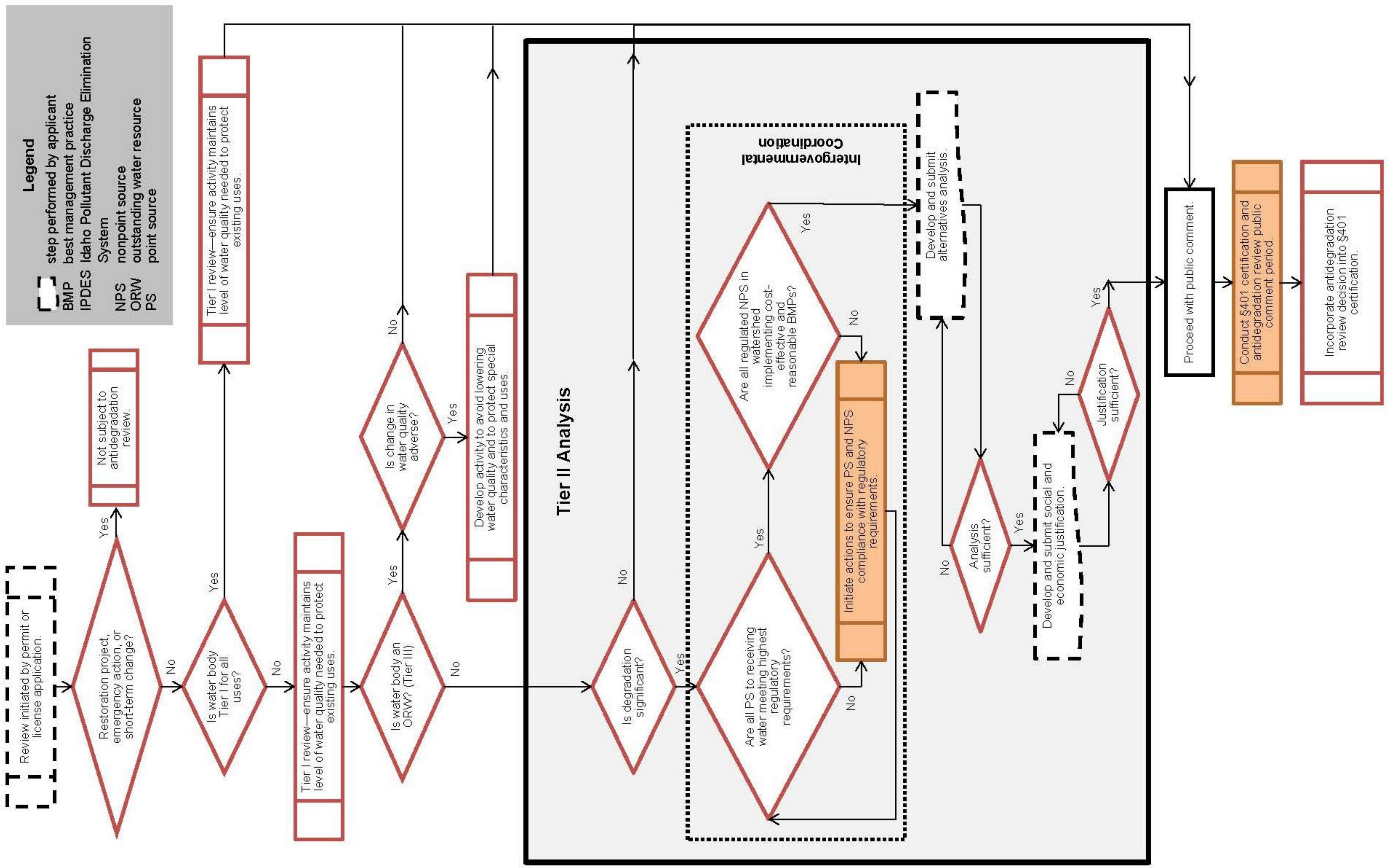
Water Body: A generic term for a stream, river, lake, reservoir, or other type of water, or a portion of water, usually identified by name and/or boundaries.

Water Body Unit and Water Body Identification Numbers (WBID): Water body units are the geographic unit used in Idaho's water quality standards for identifying and designating beneficial uses. A water body unit includes all the named and unnamed tributaries within a drainage and is considered a single unit unless designated otherwise. All water body units are assigned a unique identification number (WBID) in IDAPA 58.01.02.

> Includes all named and unnamed tributaries within a drainage and is considered a single unit unless designated otherwise.

Water Quality Criteria: Elements of water quality standards expressed as pollutant concentrations or narrative statements representing the level of chemical, physical, or biological water quality that supports a beneficial use. Numeric criteria are use-specific, applying only to particular beneficial uses. Narrative criteria are general, applying to any and all uses applicable to a water body.

Appendix A. Antidegradation Review Flow Chart


Legend
step performed by applicant
BMP best management practice
IPDES Idaho Pollutant Discharge Elimination System
NPS nonpoint source
ORW outstanding water resource
PS point source
Review initiated by permit or license application.
Restoration project, emergency action, or short-term change?
Not subject to antidegradation review.
Is water body Tier I for all uses?
Tier I review—ensure activity maintains level of water quality needed to protect existing uses.
Is water body an ORW? (Tier III)
Is change in water quality adverse?
Develop activity to avoid lowering water quality and to protect special characteristics and uses.
Tier II Analysis
Is degradation significant?
Intergovernmental Coordination
Are all PS to receiving water meeting highest regulatory requirements?
Initiate actions to ensure PS and NPS compliance with regulatory requirements.
Are all regulated NPS in watershed implementing cost-effective and reasonable BMPs?
Develop and submit alternatives analysis.
Analysis sufficient?
Develop and submit social and economic justification.
Justification sufficient?
Proceed with public comment.
Conduct §401 certification and antidegradation review public comment period.
Incorporate antidegradation review decision into §401 certification.
Yes
No

Appendix B. Examples of Water Body-Specific Antidegradation Classification

These examples are from Section 2, "Determining Where Tier II Protection Applies," which explain the categories of the Integrated Report (IR) and from Table 2 (section 2.1), which translates IR categories to tiers of antidegradation protection.

Water Body Classification[24]

1. If water is listed in Category 1 or 2 of the IR, it receives Tier II protection for all uses.
2. If water is listed in Category 3 of the IR, case-by-case evaluation is necessary.
3. If water is listed in Category 4 or 5 of the IR, the following questions must be addressed:
    a. Are recreation uses supported?
        i. If yes, AU is Tier II for recreation.
        An example is ID16010202BR005_02b Worm Creek (lower)—This AU fully supports its contact recreation use and is listed in Category 4a of the IR for not supporting cold water aquatic life uses.

        ii. If no, AU is Tier I for recreation.
        An example is ID17040204SK050_02 Woods Creek—This AU is listed as not supporting contact recreation uses due to *E. coli* violations. The aquatic life uses are unassessed.

        iii. If unassessed, AU is evaluated on a case-by-case basis.
        An example is ID17010302PN001_04 South Fork Coeur d'Alene River—This AU is unassessed for recreation and is determined case-by-case.

    b. Are aquatic life uses supported?
        i. If yes, AU receives Tier II protection for aquatic life.
        ii. If no, is the AU listed for anything other than temperature, pH, or dissolved oxygen?
            1. If yes, AU is Tier I for aquatic life.
            An example is ID17010302PN001_04 South Fork Coeur d'Alene River—It is in Categories 4a and 5 of the IR for not supporting the cold water aquatic life beneficial use. The causes for listing include cadmium, lead, zinc, and sediment. Because this AU is listed for pollutants other than the three outlined in the rule, it is provided Tier I protection.

            2. If no (i.e., the water body is listed for only temperature, pH, or dissolved oxygen), does biological assessment indicate a healthy and balanced community?
                a. If yes, AU is Tier II for aquatic life.

[24] Specific AUs listed from the 2016 IR (DEQ 2018) are examples only. The categories can change in the future.

b. If no, AU is Tier I for aquatic life.
c. If no bioassessment data from any source are available, AU is Tier I for aquatic life.
   An example is a stream listed in Category 5 as not supporting its aquatic life use due to temperature. If no current biological data are available from any source to evaluate the health of the biological community, the AU would be evaluated as Tier I.

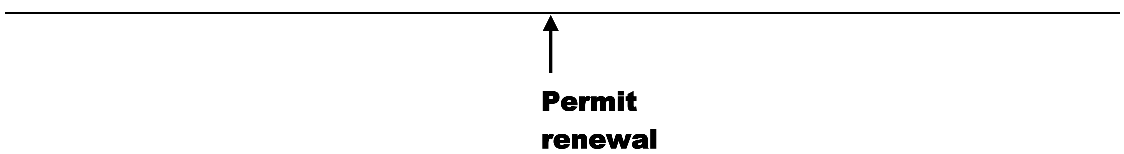
   iii. If unassessed, the level of antidegradation protection applicable to an AU is evaluated on a case-by-case basis.
   An effort should be made to obtain biological or habitat data for unassessed waters to make an informed decision on the aquatic life use support.

Appendix C. Examples of New and Increased Discharge

In each example, the line represents the level of discharge with time; the beginning of the line indicates when discharge begins.

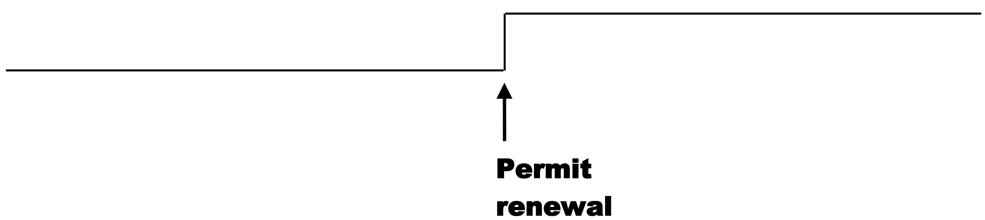
Examples of New and Increased Discharge

Discharge A—Existing permitted discharge, no increase



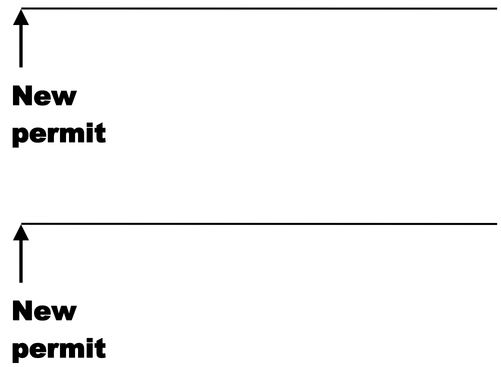
In this situation, permitted discharge does not increase with permit renewal, so there is no degradation of water quality. Discharge receives Tier I review only.

Discharge A2—Existing permitted discharge, permitted discharge increases



In this situation, permitted discharge increases with permit renewal, so there is degradation of water quality. *If* this degradation is significant and of a Tier II AU, there will be Tier II analysis in addition to Tier I review.

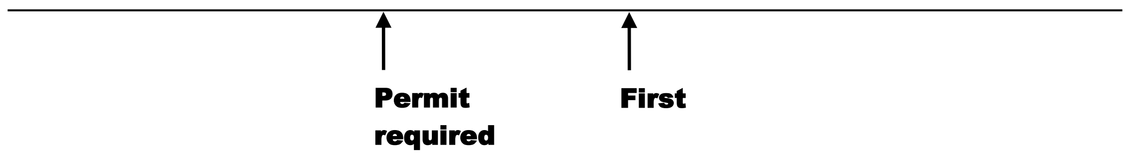
Discharge B—New permitted discharge



In this situation, there will likely be degradation of water quality. *If* this degradation is significant and of a Tier II AU, there will be Tier II analysis in addition to Tier I review.

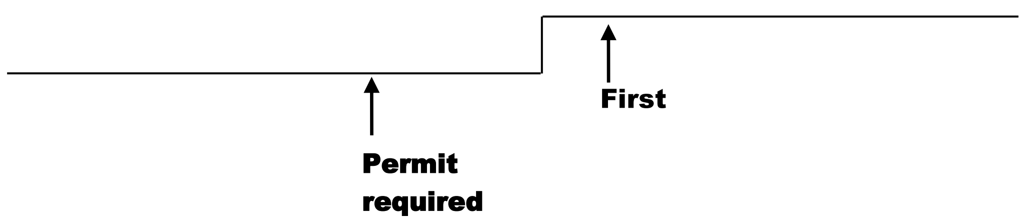
Examples of Existing Discharge without a Previous Permit

Discharge C—Change in regulation, existing discharge with no permit required when discharge commenced, no increase in discharge since permit required



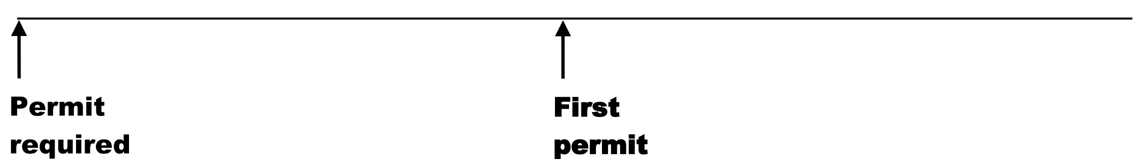
In this situation, discharge does not increase with the first permit, so there is no degradation of water quality. Discharge receives Tier I review only.

Discharge C2—Change in regulation, existing discharge with no permit required when discharge commenced, discharge increases since permit required



In this situation, discharge increases with first permit, so there is degradation of water quality. *If* this degradation is significant and of a Tier II AU, there will be Tier II analysis in addition to Tier I review.

Discharge D—Illegal discharge, existing discharge without required permit



In this situation, a permit was required when the discharge began. When permitted for the first time, this discharge will be treated as a new discharge (Discharge B above). Baseline will be water quality without discharge (i.e., upstream water quality), so there will be degradation of water quality. *If* this degradation is significant and of a Tier II AU, there will be Tier II analysis in addition to Tier I review.

Appendix D. Decision Tree for Baseline Water Quality as of July 1, 2011

Baseline water quality is that which is permitted to occur as of July 1, 2011, but may not actually be observable on July 1, 2011, because permitted sources are not discharging at permit limits.

1. There are water quality data for pollutants of concern (i.e., an existing source with appropriate discharge monitoring report data) upstream of discharge.
   a. There are no sources of pollutants of concern upstream.

      Instream data above source being evaluated will be characteristic of water quality on July 1, 2011, whether collected before or after that date.

      Use ambient upstream water quality measurements to characterize baseline (e.g., the 95th percentile or other statistic appropriate to the pollutant of concern based on at least a year of monthly data) closest to or including July 1, 2011, if possible.
   b. There are other sources of pollutants of concern upstream.
      i. If there have been no changes in discharge between the time of water quality measurements and July 1, 2011, data will be characteristic of July 1, 2011.

         Use ambient upstream water quality measurements, as in 1a above (e.g., 95th percentile) and account for changes in load (e.g., due to existing upstream sources) **as if they were discharging at their permitted maximum**. To determine changes in load, consult the permitting records.
      ii. There have been new or increased discharges between the time of water quality measurements and July 1, 2011, so data are not characteristic of water quality on July 1, 2011.

         It will be necessary to estimate baseline water quality accounting for changes in load due to new or increased upstream sources **as if they were not discharging** *and* any existing sources **as if they were discharging at their permitted maximum**. To determine changes in load, consult the permitting and discharge monitoring report records.
2. There are no water quality data for pollutants of concern as of July 1, 2011, (i.e., working with a new source or inadequate data from an existing source).
   a. Ask discharge applicant to acquire 1 year of monthly data for pollutants of concern, and proceed as above.

For conservative pollutants, accounting for changes in load that have been permitted but have not yet occurred, may entail subtracting out the changes in pollutant load that have occurred since July 1, 2011 (i.e., assume no loss of mass in transport). Nonconservative pollutants (e.g., ammonia, dissolved oxygen, nutrients, and temperature) will require modeling of pollutant fate and transport.

Appendix E. Example of Tier II Antidegradation Review

AVIMOR OTHER SOURCE CONTROL REVIEW

Introduction

Avimor's Final NPDES permit (ID-0028371) was signed by EPA on March 9, 2016. As part of the NPDES permitting process DEQ conducted a Tier II antidegradation analysis because Avimor proposed to discharge into a high quality water body (Spring Valley Creek). DEQ concluded that, because Avimor was a new discharge, the discharge would result in degradation. In order to allow degradation, DEQ must assure that there shall be achieved in the watershed the highest statutory and regulatory requirements for all new and existing point sources and cost-effective and reasonable best management practices (BMPs) for all nonpoint source controls. DEQ reviewed other source controls as part of its tier II analysis and determined that Avimor is the only point source and cost-effective and reasonable BMPs were in place for nonpoint sources.

Upon the finalization of Avimor's NPDES permit, Idaho Conservation League commented that the other source control review should have looked at additional areas in the watershed, in particular at the downstream sources and controls. In response, DEQ developed a workplan for an additional other source control review and then conducted the review. (The workplan is attached to this report.) This report sets forth the results of DEQ's additional other source control review.

Figure 1 is a map of the Spring Valley Creek watershed area DEQ addressed in this follow up Tier II antidegradation analysis of the downstream source controls in the creek. Specifically DEQ looked at the sources between the yellow markers shown in Figure 1.

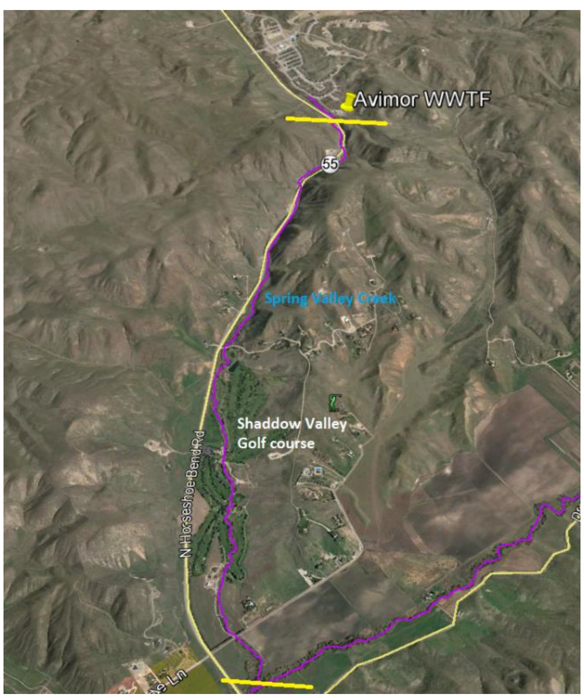


Figure 1. Follow-up antidegradation analysis area.

This Tier II antidegradation analysis included a review of sources in Spring Valley Creek that have the potential to impact the water quality downstream of Avimor's discharge. Since there are no other known point sources in Spring Valley Creek, this antidegradation analysis identified the nonpoint source(s) in the watershed downstream of Avimor's discharge, and then considered whether those nonpoint source(s) had the potential to discharge the pollutants that cause the allowed degradation in Avimor's NPDES permit; in this case DEQ looked specifically at BOD, TP, Temperature, and TN.

Secondly, DEQ in cooperation with each designated management agency (DMA) considered whether the sources identified are reasonably likely to contribute the pollutants of concern to Spring Valley Creek. For those sources that could reasonably be expected to contribute pollutants of concern to Spring Valley Creek, DEQ and the DMAs identified applicable BMPs that are cost-effective and reasonable and determined whether such BMPs are currently in place or expected to be in place in the future.

Four specific land use activities were identified and evaluated for possible pollutant contributions to Spring Valley Creek for the downstream antidegradation analysis. These include the Highway 55 roadway, individual septic systems, the Shadow Valley Golf Course, and agricultural activities.

Highway 55

Spring Valley Creek flows south paralleling Highway 55 for approximately 1.6 miles from Avimor's discharge to the north end of Shadow Valley's Golf Course as outlined in Figure 2. Due to the steep topography and tight narrow canyon in this area, Spring Valley Creek is confined and flows in close proximity to Highway 55, leaving little buffer area between the creek and the road. Towards the north end of the golf course the canyon opens up and Spring Creek begins to flow in a southeasterly direction away from Highway 55.

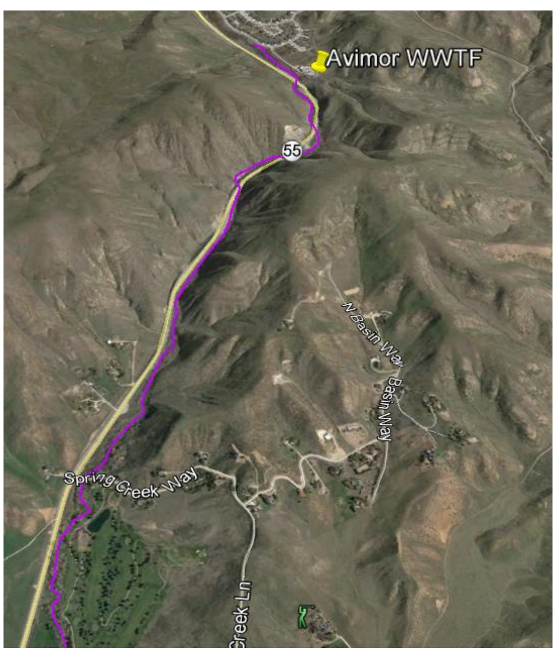


Figure 2. Spring Valley Creek next to Highway 55, between Avimor and Shadow Valley Golf Course.

The impacts associated with Highway 55 are expected to occur mainly in the canyon area between Avimor's discharge and the golf course due to the close proximity of the paved road to the creek, particularly during heavy rain events. The primary pollutant of concern associated with impacts from the highway is TP, BOD, and TN that are associated with sediment runoff and increased erosion during storm events. DEQ consulted with the Idaho Transportation Department (ITD), who is responsible for administering source control activities along Highway 55 and is the designated agency for public roads. Although sediment is not one of the pollutants of concern for Avimor, DEQ continued to review the highway 55 BMPs with ITD.

Together, ITD and DEQ evaluated the area for potential sources and BMPs. One potential source of sediment comes from stormwater runoff, which has caused some erosion on the banks next to the creek (see Figure 3). In these areas the potential for sediment to enter Spring Valley Creek is likely. ITD confirmed that the following stormwater controls are currently in place, where possible, to help control this type of erosion from occurring:

- Curbs that are used for directing the sheet flows away from slopes and into curb cuts or catchments with outlet protection.
- Swales, vegetated areas, and/or rocky areas that absorb sheet flow.

These BMPs are included and further described in ITD's *Best Management Practices Catalog*. In addition to these permanent BMPs, when construction activities occur on the highway, ITD installs additional stormwater BMPs to protect the creek from sediment runoff.

DEQ and ITD determined that the BMPs described above are cost effective and reasonable for this stretch of the highway. The BMPs are currently in place, and so these BMPs are achieved in the watershed.

Figure 3. Erosion occurring along Highway 55 next to Spring Valley Creek.

Individual Septic Systems

Septic systems, if not properly maintained and installed, have the potential to contribute to the degradation of nearby waterbodies. The primary pollutants of concern related to septic systems in the Spring Valley Creek watershed include total phosphorus (TP), total nitrogen (TN), and other organics that have the potential to influence the biological oxygen demand (BOD) in the creek. DEQ consulted with the Central District Health Department to determine the potential impacts to Spring Valley Creek from nearby septic systems. According to the Central District Health Department's database search, there are currently 33 permitted septic systems in the vicinity of Spring Valley Creek (Figure 4). However, the database does not track when a property owner connects to a centralized treatment system, therefore there may be a smaller number of septic systems in the area that are undocumented, due to more recent connections to centralized systems.

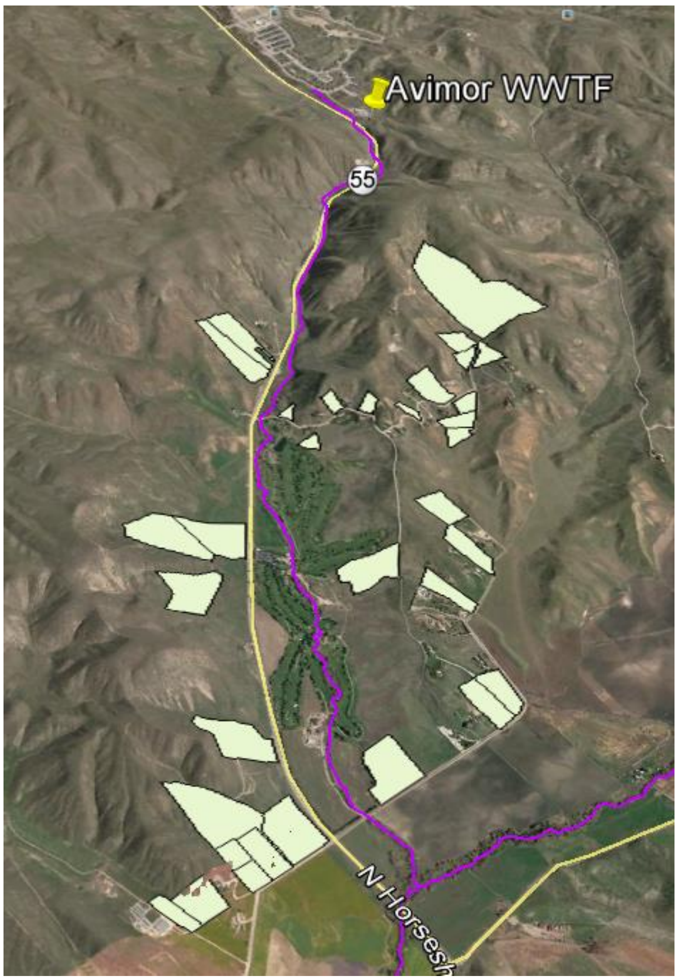


Figure 4. Septic systems in the vicinity of Spring Valley Creek.

According to the Central District Health Department, all of the septic systems permitted in the Spring Valley Creek watershed are in compliance with the surface water septic system setbacks outlined in the Individual/Subsurface Disposal Rules and the *Technical Guidance Manual for Individual and Subsurface Sewage Disposal Systems*. The Rules are by definition cost-effective and reasonable BMPs under the WQS (See section 350 of the WQS.) Therefore, cost-effective and reasonable BMPs are in place with respect to septic tanks.

Shadow Valley Golf Course

Spring Valley Creek flows south through the center of the Shadow Valley Golf Course for approximately 1 mile (Figure 5). There is no other DMA for golf courses, and therefore, DEQ is the DMA. The primary pollutants of concern to Spring Valley Creek from the golf course include TP and TN from fertilizer used to maintain the greens. Additionally, in areas where the riparian area has been altered or removed, temperatures in the creek have the potential to increase throughout the golf course.

DEQ could find no BMPs applicable to golf courses. Therefore, DEQ did no further source control review relevant to the Avimor antidegradation requirements. Although sources and BMPs were not addressed, the riparian buffer was noted to be vegetated with lawn grasses in most areas, whereas in small perimeter areas the riparian area was vegetated with grasses, shrubs and trees (Figures 6 and 7).

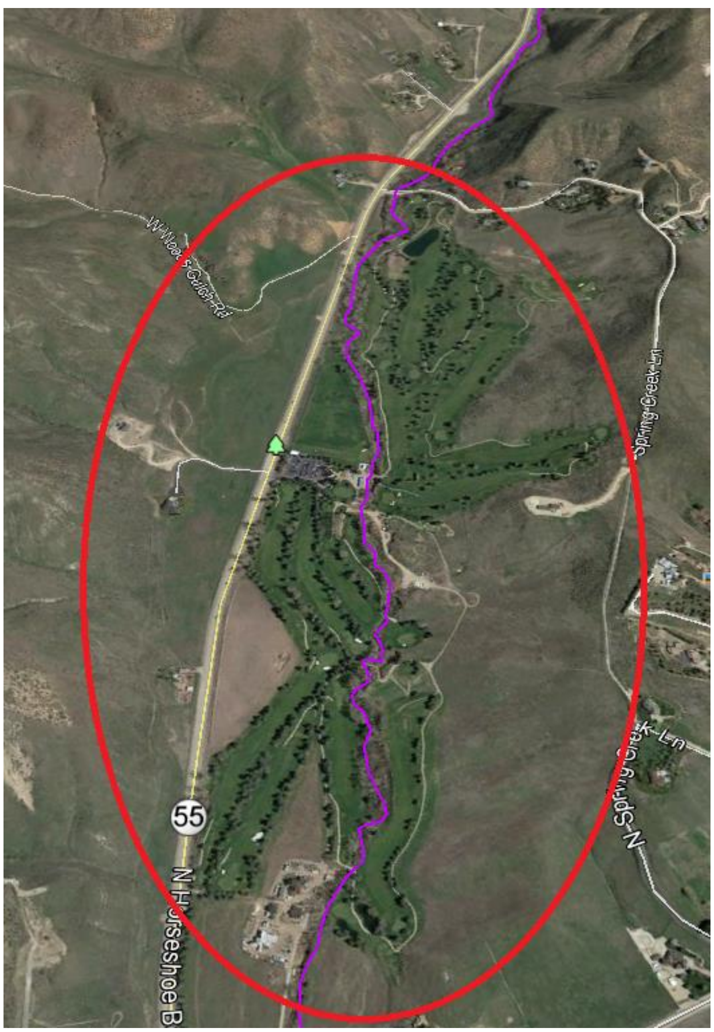


Figure 5. Spring Valley Creek through Shadow Valley Golf Course.

Figure 6. Riparian area vegetated with lawn grasses.

Figure 7. Riparian area vegetated with grasses, shrubs, and trees.

Agricultural Sources

Agricultural land use activities that have the potential to impact Spring Valley Creek occur from south of the Shadow Valley Golf Course to the confluence of Dry Valley Creek. This agricultural area has been used to grow crops and sustain livestock for more than 70 years. The majority of the hillsides in this area have been used for high intensity livestock grazing including open range, while the valley floor next to the creek has been farmed intensively for row crops, alfalfa and other feed crops with intermixed livestock operations.

The primary pollutants of concern to Spring Valley Creek from this agricultural area include TP, and TN that are associated with sediment runoff. Additionally, cow manure and sediments that enter the creek could lead to increased BOD and areas that have been heavily grazed could lead to temperature increases in the creek, particularly in areas where the riparian area has been altered or removed.

DEQ consulted with the Ada County Soil and Conservation District, the DMA identified in the Water Quality Standards and the *Idaho Agricultural Pollution Abatement Plan* for agricultural activities, to evaluate the land use impacts and associated BMPs in the Spring Valley Creek watershed. The applicable BMPs for agricultural activities including grazing and irrigated cropland are listed in the *Idaho Agricultural Pollution Abatement Plan*. The BMPs in the *Agricultural Pollution Abatement Plan* are cost effective and reasonable BMPs for antidegradation purposes. IDAPA 58.01.02.010.17.

The following BMPs specific to grazing and applicable to these parcels are identified in the *Idaho Agricultural Pollution Abatement Plan*:

- Access control
- Fencing
- Forage and biomass planting
- Forage harvest management
- Livestock pipeline
- Pond
- Prescribed grazing
- Riparian buffer
- Spring development
- Watering facility

The following BMPs, specific to irrigated cropland and applicable to these parcels are identified in the *Idaho Agricultural Pollution Abatement Plan*:

- Conservation crop rotation
- Constructed wetland
- Cover crop
- Critical area planting
- Deep tillage
- Filter strip
- Integrated pest management
- Irrigation field ditch
- Tailwater recovery
- Nutrient management
- Mulching
- No till
- Reduced till
- Sprinkler system

The riparian vegetation along Spring Valley Creek between the golf course and W Brookside Ln (approximately .25 miles), has been mostly removed, leaving little buffer area between the creek and adjacent uplands (Figure 8). There were no visible agricultural BMPs observed along this stretch of Spring Valley Creek.

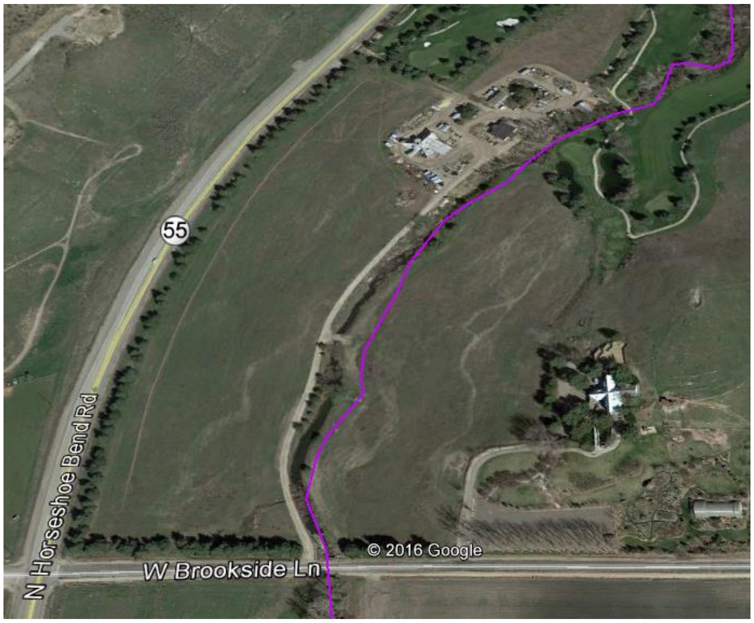


Figure 8. Riparian area between golf course and W Brookside Ln.

Spring Valley Creek from the south of W Brookside Ln to the confluence with Dry Valley Creek (approximately .25 miles) appears to increase slightly in riparian vegetation (Figure 9). Along with a small riparian buffer, fencing was also observed, which are both identified as BMPs for grazing in the *Idaho Agricultural Pollution Abatement Plan*.

Figure 9. Riparian area south of W Brookside Ln.

Although this stretch of Spring Valley Creek was impacted by agricultural uses, and the potential for pollutants to enter the creek is likely, this land is being converted in the near future to an urban use. (See discussion of Dry Creek Ranch below.) While cost effective and reasonable agricultural BMPs are not in place in all areas in this stretch, the agricultural use will cease and therefore will no longer be relevant to the delivery of pollutants of concern to Spring Valley Creek.

Dry Creek Ranch

A planned community (Dry Creek Ranch) has been approved for development to the east of Highway 55 between Brookside Lane and the Ada County landfill property (see Figure 10). Although the parcels to the north of Brookside Lane and south of the golf course are not included in the development plan, it is likely that this.25 miles of area along Spring Valley Creek will no longer be used for agricultural activities, and will likely be developed with residential uses. The cattle that have previously grazed this area will not be brought back this year.

The proposed project, known as the Dry Creek Ranch was part of a development agreement between Ada County and the previous developer dating back to February 10, 2010. The planned development will be served by private sewer and water; pressurized irrigation will be provided where water rights are available; and agreements with service providers will be required.

The 2010 1,414 acre development was originally planned to be a high density development with an expected population of 9,643 people. However, a recent proposed amendment to the Dry Creek Ranch planned community was submitted to Ada County and a public hearing is scheduled for October 6th, 2016. The proposed amendment will reduce the housing density on the acreage by approximately 50%. The new development proposes to include a greenbelt pathway along Spring Valley Creek, but other development activities are unknown at this time.

Impacts to Spring Valley Creek from the new community will likely result from increased stormwater runoff and a possible new NPDES WWTF discharge, depending on the water management construction and design. The development will be required to be designed in accordance with the governing authorities' guidelines for stormwater and is subject to ACHD, DEQ, and EPA requirements, including the Construction General Permit stormwater requirements. Therefore, it is reasonable to believe that the new development will occur in compliance with cost effective and reasonable BMPs.

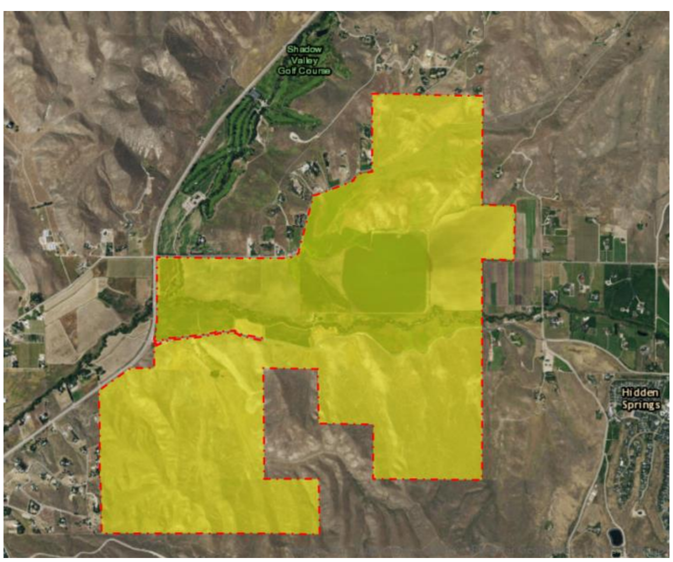


Figure 10. Dry Creek Ranch planned community.

Appendix F. Example Worksheets for Alternatives Analysis for Publicly Owned Treatment Works

Use the following worksheet to determine affordability of a pollution control project. For the antidegradation analysis, the applicant should complete one worksheet per alternative.

Average Annualized Cost per Household for Alternative #: ____	
Calculate Total Annual Cost of Treatment Option (use new form for each alternative)	
Interest Rate for Financing *(i)*	_______ (expressed as a fraction)
Time Period for Financing *(n)*	______________ (years)
Annualization Factor: $\frac{i(1+i)^n}{(i+1)^n-1} =$	_________________ (1)
Total Capital Cost to be Financed	_________________ (2)
Annual Operating Costs of Project	_________________ (3)
Annualized Capital Cost [(1) × (2)]	_________________ (4)
Total Annual Cost of Project [(3) + (4)]	_________________ (5)
Calculate Total Annual Cost to Households	
Total Annual Cost of Project (5) × Percentage of Total Wastewater Flow Attributable to Residential and Municipal Wastewater Flows	_________________ (6)
Total Annual Cost of existing Plant ($) × Percentage of Total Wastewater Flow Attributable to Residential and Municipal Wastewater Flows	_________________ (7)
Total Annual Cost to Households [(6) + (7)]	_________________ (8)
Calculate Average Annualized Cost per Household	
$\frac{Total\ Ann.Cost\ to\ Households\ (8)}{Number\ of\ Households} =$	_________________ (9)
$\frac{Avg.Ann.Cost\ per\ Household\ (9)}{Median\ Household\ Income} x\ 100 =$	____________% (10)
Current Annual Cost per Household	________________ (11)
Change in Cost per Household [(9) – (11)]	________________ (12)

If the total annual cost per household is less than 1.0% of median household income, it is assumed that the project is not expected to impose a substantial economic hardship on households. If the total annual cost per household is between 1.0% and 2.0% of median household income, communities are expected to incur midrange impacts. If the average annual cost per household exceeds 2.0% of median household income, the project may place an unreasonable financial burden on many of the households within the community (EPA 1995, section 2). These guidelines are general thresholds for assessing economic hardship that may need to be adjusted based on overall economic health of a community in comparison to others.

Use the following worksheet to determine some of the socioeconomic indicators needed to compute the annualized cost per household and justify the social or economic importance. All indicators may not be needed for the analysis.

Indicator	Year and Source	Data
a) Population served	2010 (US Census Bureau)	
b) Number of households	2010 (US Census Bureau)	
c) Median household income, national	2010 (US Census Bureau)	
d) Median household income, state	2010 (US Census Bureau)	
e) Median household income, county	2010 (US Census Bureau)	
f) Median household income, city		
g) Major type of employment	Idaho Department of Labor	
h) % of total wastewater flow from residential and municipal sources		
i) Unemployment rate, state	Idaho Department of Labor, August 2012	
j) Unemployment rate, county	Idaho Department of Labor, August 2012	
k) Unemployment rate, city		
l) Property tax revenues		
m) Sales tax and miscellaneous revenues		
n) Total government revenues [(l) +(m)]		
o) Current market value of taxable property		
p) Average home valuation	County Assessor	
q) Property tax delinquency rate		
r) Bond rating – insured sewer		
s) Overall net debt		

Additional guidance is provided in the *Interim Economic Guidance for Water Quality Standards Workbook* (EPA 1995).