Antidegradation 101:
The Basics of Antidegradation Policy and Implementation

What is Antidegradation?

The Clean Water Act (CWA) Section 303 (Title 33 of United States Code [U.S.C.] 1313) requires states to adopt water quality standards for waters of the United States within their applicable jurisdiction. Such water quality standards must include, at a minimum, (1) designated uses for all waterbodies within their jurisdiction, (2) water quality criteria necessary to protect the most sensitive of the uses, and (3) antidegradation provisions. Antidegradation policies and implementing procedures must be consistent with the regulations inTitle 40 of the *Code of Federal Regulations (*CFR) 131.12.

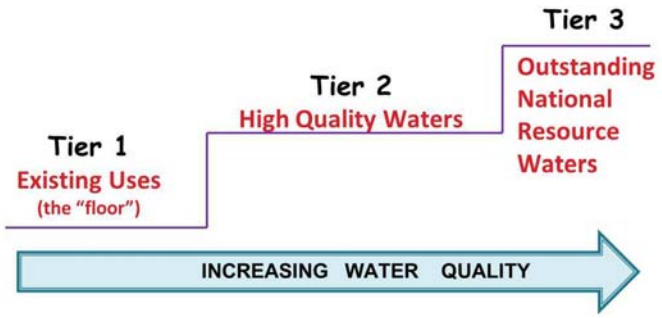

Figure 1. Three tiers or levels of water quality protection identified in federal antidegradation regulations.

Antidegradation is an important tool that states use in meeting the CWA requirement that water quality standards protect the public health and welfare, enhance the quality of water, and meet the objective of the Act to "restore and maintain the chemical, physical and biological integrity" of the nation's waters. EPA's regulation requires that states adopt antidegradation policies and identify implementation methods to provide three levels (tiers) of water quality protection to maintain and protect

1) existing water uses and the level of water quality (WQ) to protect those uses (Tier 1),
2) high quality waters (Tier 2), and
3) outstanding national resource waters (ONRW; Tier 3) (Figure 1).

The entire text of the federal antidegradation regulation appears below—it is remarkable for its brevity, which masks the considerable difficulties faced by public agency staff in implementing the seemingly elegant and simple principles described. Alaska's antidegradation policy in 18 AAC 70.015 follows this regulation very closely.

> (a) The State shall develop and adopt a statewide antidegradation policy and identify the methods for implementing such policy pursuant to this subpart. The antidegradation policy and implementation methods shall, at a minimum, be consistent with the following:
>
> > (1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.
> >
> > (2) Where the quality of the waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that

quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully. Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control.

(3) Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

(4) In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with section 316 of the Act.

The basic "floor" of antidegradation regulations (Tier 1) does not allow loss of an existing use nor does it allow water quality to drop below levels needed to maintain an existing use (Figure 2). Existing uses are "those uses actually attained in the waterbody on or after November 28, 1975." This is an important distinction—waters must be protected at a level reflecting the highest use achieved since November 1975 regardless of whether water quality has declined since then or whether that use is recoverable. The basic protection provided by Tier 1 applies to all waters, regardless of use designation.

The second level of protection is for high-quality waters. High-quality waters are defined in 40 CFR 131.12(a)(2) as waters where the quality of the water is better than the levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water. Thus, Tier 2 waters are those recognized as being naturally better than water quality criteria for aquatic life and recreation, and they should be maintained in that condition (e.g., concentrations of certain pollutants

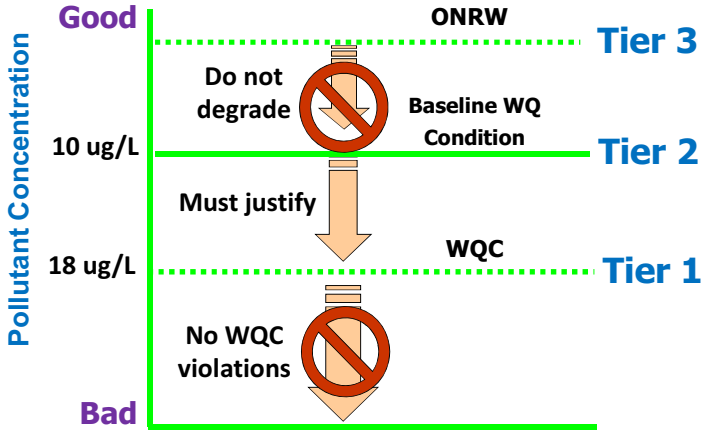

Figure 2. Example illustrating the three tiers in antidegradation policy.

are very low, biological communities are known to be representative of fauna having minimal human impacts) (Figure 2). The higher water quality of Tier 2 waters can only be degraded by a wastewater discharge or other activity if the state finds, after public participation and intergovernmental review, that allowing lower water quality

- is necessary to accommodate important economic or social development in the area in which the waters are located;
- protects existing uses;
- meets all applicable statutory and regulatory requirements for all new and existing point sources;
- uses all cost-effective and reasonable BMPs for nonpoint source control;
- uses the most reasonable and effective methods of pollution prevention, control and treatment; and
- meets applicable water quality criteria and the whole effluent toxicity limit.

EPA stresses the importance of identifying and protecting Tier 2 waters as these are the ones most likely to be affected by potentially degrading activities or proposed activities.

Finally, the third and highest level of antidegradation protection is for outstanding national resource waters (ONRW). ONRW typically include waters within National and State parks or wildlife refuges, or waters of exceptional aesthetic, recreational, or ecological significance. If a state determines that the characteristics of a waterbody constitute an ONRW, and designates a waterbody as such, those characteristics and water quality must be maintained and protected (Figure 2). Only minor and temporary decreases in water quality are allowed in Tier 3 waters. The CWA does not require states to adopt ONRW necessarily, but they must have a mechanism in place whereby ONRW could be adopted.

Table 1 introduces and summarizes some key terms and issues associated with antidegradation, policy, and implementation.

Table 1. Summary of federal antidegradation concepts, key issues, and terms.

Concept	Key issues	Key Terms	Comments
Tier 1 All waters should be protected at some basic level.	In actuality, implementing an antidegradation review procedure focuses on regulated activities impacting regulated waters, i.e., waters of the state or waters of the United States.	Regulated activities Actionable activities Regulatory authority Control document Permits, certification Surface waters Waters of the state Waters of the United States.	Can include intrastate isolated wetlands and groundwater if state regulations stipulate. Regulated activities include NPDES and section 404 permits, and section 401 Water Quality Certifications; can include septic and withdrawal permits.

Concept	Key issues	Key Terms	Comments
	The basic level of protection is defined by existing uses of the waterbody and the water quality criteria (WQC) associated with those uses.	Existing use Water quality criteria Water quality standard	Existing uses are water quality targets implicitly or explicitly attained at any time since November 28, 1975. Existing uses cannot be removed and must be protected. Designated uses are desired uses and usually cited in state water quality standards.
	If water quality is already worse than the minimum WQC threshold for some pollutants, additional loadings of those pollutants should be banned if water quality will be further lowered.	Use impairment Use impaired waters Applicable WQS (water quality standards) TMDLs; 303(d) list Trading	Trading may allow new loadings if the new loads are completely offset by reductions in existing loads. Loadings of other, nonproblematic pollutants are not affected if they are nondegrading or if they are subject to antidegradation reviews that provide authorization.
Tier 2 Waters that are cleaner than the *basic* level (i.e., WQC) should be protected at that existing higher quality unless there is a significant local benefit.	*Cleaner* can be expressed parameter-by-parameter, numerically or narratively, or through some other scheme. Tier 1 protection still applies, to keep water quality at or above threshold water quality criteria numeric or narrative values.	High-quality waters WQ better than WQS Assimilative capacity Available capacity	EPA prefers the *parameter-by-parameter* approach, which infers that many (even most) waters are always protected at both Tiers 1 and 2 (i.e., most waters will exceed minimum levels needed to support existing uses for at least one or more parameters at some time). Determining available assimilative capacity for each parameter provides a basis for quantitatively assessing degradation and its relative significance involves some knowledge of existing (baseline) water quality and the nature of the proposed discharge.
	Measuring water quality to determine when (and by how much) it is *cleaner* than the basic (WQC) level can be resource intensive; regular updates (i.e., yearly) are often needed	Baseline water quality Existing water quality Ambient conditions Current conditions	Baseline (existing) water quality (BWQ) provides the yardstick against which degradation is measured; it can be difficult to characterize and update. Depending on the loading inputs under consideration, seasonal and/or event-based assessments might be needed.

Concept	Key issues	Key Terms	Comments
	Most states allow some non-significant impacts or degradation in these higher quality waters without requiring social or economic justification.	De minimis discharge Non-significant discharge Significant degradation Allowable degradation	EPA memo indicates discharges using up to 10% cumulative assimilative capacity may be considered non-significant or de minimis. Allowable degradation might include use of some portion of the available assimilative capacity (e.g., 5%–25%) for specific pollutant(s), or characterizing BWQ at a certain percentile (e.g., 85%) of total ambient measurements and requiring new loads to meet those *antideg* concentrations at end-of-pipe. Cumulative, consecutive, multiple allowances for non-significant impacts can result in water quality criteria exceedances and use of remaining assimilative capacity incrementally, without an antidegradation review.
	Important social, economic, and local/regional benefits can be difficult to demonstrate.	Economic development Social development In the area	Guidance from federal, state, and other sources are available to conduct a wide range of analyses—from simple to complex.
	Demonstrating that degradation is *necessary* requires analyses of alternatives to the proposed activity and assurances that all legal, cost-effective, and reasonable point source and NPS controls are in place.	Highest statutory and regulatory requirements for new and existing point sources. Cost-effective and reasonable BMPs for nonpoint sources Necessary	While not requiring BMPs for NPSs, there is an expectation that the most obvious, egregious, and manageable NPS loadings are minimized under antidegradation provisions. Nondegradation applies to all regulated nonpoint sources, and to stormwater from regulated MS4s, industrial, and construction activity. Specific procedures for conducting analyses of alternatives to the proposed activity can require significant resources, and fail to provide relevant information if they are not robust. Defining *cost effective* and *reasonable* can be difficult.
	Federal and state regulations require public participation and intergovernmental coordination under the state's Continuing Planning Process (CPP), a requirement of the CWA.	Public hearing Intergovernmental coordination Continuing Planning Process (CPP) under CWA	Public hearings on multiple issues (NPDES permit, antidegradation, and the like.) can be combined; states can use existing procedures; Continuing Planning Process procedures are sometimes old and outdated.

Concept	Key issues	Key Terms	Comments
Tier 3 Some pristine or unique waters should not be degraded even if socio-economic benefits can be shown.	Designation of Tier 3 waters can be problematic if nearby landowners fear a ban on development.	Outstanding National Resource Waters (ONRW) and Outstanding State Resource Waters (OSRW) Unique waters Tier 3 list Nominating Tier 3s Approval for Tier 3s	ONRW and OSRW are considered the most pristine in the nation. These waters are usually listed in state WQS. Some water resource organizations seek provisions allowing for the public to nominate ONRW and OSRW.
	Protection of Tier 3 waters requires upstream pollution controls and antidegradation controls.	Upstream sources Upstream loadings	This consideration can lead to treating the entire upstream area as Tier 3. However, since most Tier 3 situations involve headwaters streams, this might not be an issue.
	Most states allow some short-term, limited degradation of Tier 3 waters if long-term impacts are avoided.	Short-term impacts Limited impacts Non-significant impacts	Short-term impacts to Tier 3 waters is typically defined as “weeks and months, not years” and almost always less than a year. Limited impacts usually involve short term use of 5 to 10 percent of the available assimilative capacity for pollutant(s) of concern. Enhanced general permit requirements for minor activities (e.g., culvert replacements, utility crossings) can provide a basis for allowing “short-term, temporary, and non-significant” impacts in Tier 3 situations if the requirements are sufficiently stringent, activities are monitored, and requirements for proper BMP selection, siting, installation, operation, and maintenance are in place.

Antidegradation applies to many important regulatory activities within the state such as NPDES permitted activities (particularly “new and/or expanded” point sources including WWTPs, industrial discharges, and stormwater), Section 404 permits implemented through 401 certification, and sometimes other regulated activities through local ordinances (septic systems, erosion/sediment control, etc.), state permitted or managed activities on public lands, and nonpoint source controls, including cost effective and reasonable BMPs required (Figure 3).

Implementation guidance and other information has been available for some time regarding designating uses, identifying existing and beneficial uses, and implementing water quality criteria in both NPDES and ambient programs (i.e., 303[b], 303[d], TMDLs). However, Alaska, like many states, has not yet developed procedures for implementing the antidegradation policy of the water quality standards program. Federal guidance on antidegradation is also very limited. In an effort to begin learning about antidegradation policies, ADEC contracted Tetra Tech, Inc. to evaluate antidegradation implementation policies of several states across the U.S. spanning a range of alternative procedures (See "*Evaluation of Options for Antidegradation Implementation Guidance", October 6, 2008*) and hosted a conference in Anchorage, Alaska in 2009, which was intended to inform policy makers, wastewater discharge permittees, permit writers, and interested public regarding options for implementation procedures or methods. Specific objectives of that workshop were to: (1) share information about EPA antidegradation policy, (2) identify the pros and cons of various state antidegradation implementation approaches, lessons learned, legal challenges and precedents, and (3) provide a forum for stakeholders to discuss the implementation programs adopted by other states and approaches that might work best in Alaska. That conference was designed for informational purposes only and no regulations were proposed at the workshop.

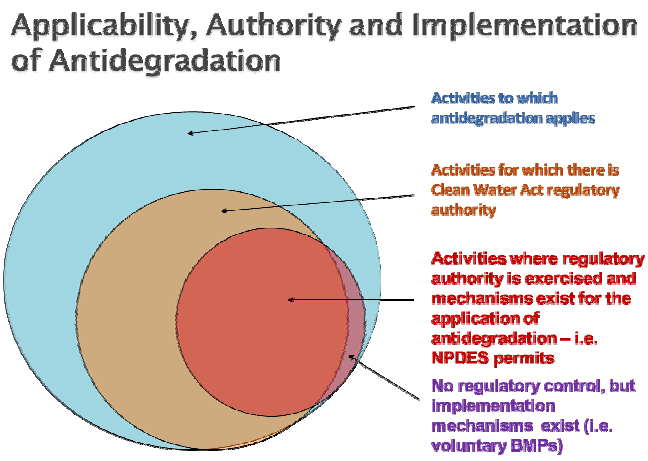

Figure 3. Antidegradation potentially applies to a broad range of activities, including NPDES permits, Section 404 permits, local ordinances, and non-point source controls.

ADEC also developed Interim Antidegradation Policy Implementation Methods in July 2010 and an *Implementation Procedures Work Plan* in December 2011, which relies on a stakeholder process to develop implementation procedures that are feasible, protective, and transparent.

Issues Regarding Antidegradation Implementation

While the general concepts behind the antidegradation policy in the CWA and ADEC's regulations are readily understandable, implementation of those regulations is challenging. Many concepts within the regulation need to be carefully defined, which is difficult when considering the myriad of waterbodies and the many types of activities of potential concern. Most of the challenges faced by water resource agency personnel implementing federal and state antidegradation policies revolve around Tier 2 waters because the protection of high-quality waters under Tier 2 of the antidegradation rule is not as straightforward as the approach for Tiers

1 and 3. Antidegradation policies are often interpreted incorrectly as an absolute prohibition on lowering of water quality in *high-quality* waters, i.e., those that exceed minimum levels needed to support existing uses. Such a prohibition could be interpreted as a *no-growth* policy, which EPA has noted is not consistent with its position. The Agency has noted repeatedly that existing regulations and EPA guidance do not prohibit activities that would lower water quality in high-quality waters but rather provide a structure for the systematic evaluation of activities that are expected to lower water quality in certain cases.

Implementing the Tier 2 antidegradation provisions allows states to make decisions after considering all the available information regarding the necessity of the proposed activity and the social, economic, and environmental impacts of lowering water quality. In explaining the intent of its *Great Lakes Water Quality Guidance* on antidegradation, EPA noted that review of potentially degrading activities under a state's antidegradation policy is, "intended to ensure that any lowering of water quality is necessary, that the lowering of water quality is minimized and that desirable economic and social benefits accrue to the area affected by the lowered water quality as a result of the lowering of water quality."

Perhaps not surprisingly, antidegradation implementation issues often arise within a permitting context, such as a request by a municipal authority or industry to expand (i.e., increase the flow) an existing wastewater discharge, or construct a new discharge on a waterbody. The following hypothetical example illustrates many of the implementation issues that a state needs to address:

> A city wants to double the size and discharge flow of their existing wastewater treatment plant (WWTP) to address concerns regarding predicted population growth over the next 20 years. The WWTP discharges to a stream known to support salmon spawning and rearing. What should the state consider in terms of evaluating this permit request?

To answer this question, the state would need to answer several other questions such as:

- What is the current water quality condition of the waterbody? How is current water quality condition defined?
- Should this waterbody be classified "high quality" or Tier 2? On what basis?
- If the waterbody is a Tier 2 water, what type of data and analysis are needed to demonstrate that the expanded discharge will not cause significant degradation to the high water quality present there?
- How is "significant degradation" defined? When does a predicted decrease in water quality become significant degradation?
- If the water quality is predicted to be degraded somewhat because of the expanded WWTP, how can the city demonstrate that the degradation is necessary due to "important

economic or social development"? How is "important economic or social development" defined?

- To what extent should the city consider alternatives to doubling their treated effluent flow? Are there feasible non-degrading alternatives available that would accomplish the same objective?

The questions listed above demonstrate some of the nuances of antidegradation policy that need to be defined and evaluated when implementing the policy. In general, antidegradation implementation issues can be grouped according to the following four basic categories:

1. What triggers an antidegradation review?
    a. de minimis vs. significant degradation – should the level of review and documentation be tiered to the level of potential degradation?
    b. Presumptive compliance – should certain projects be exempt from analysis?
    c. Should reissued permits require antidegradation analysis if the analysis was not performed for previous permit versions, if there is no change to the discharge?

2. How are waters designated as low (Tier 1) and high quality (Tier 2) waters?
    a. Parameter-by-parameter or waterbody as a whole?
    b. What information is needed to determine baseline water quality?
        i. How much information is needed to make the determination and what level of statistical analysis will be performed?
        ii. What percentage of water quality exceedances determines the tier?
        iii. How is seasonal variation in water quality addressed?
        iv. How can data collection costs be minimized?

3. How are OSRW or ONRW (Tier 3) waters designated? What process should be used to nominate, evaluate and designate an ONRW and who is responsible for each of these steps and the final decision?

4. As part of wastewater discharge permitting, what should be included in an antidegradation analysis to evaluate the potential degradation and determine whether or not degradation can be authorized? Should the level of review be different depending on the nature of the proposed discharge?
    a. How should DEC evaluate the economic/social benefits of a project? What information is readily available and what factors should be considered? What level of information should be required of applicants?
    b. When should DEC consider other point and non-point source discharges to the waterbody? What level of review and documentation is needed?

c. When is an alternatives analysis 18 AAC 70. 015 (a)(2)(D) necessary? What level of analysis is necessary? Can other documents (Environmental Impact Statements, etc.) meet the need?

In summary, antidegradation is one of the three legs of the water quality standards program (designated uses and water quality criteria being the other legs) and is a critical component for implementing the Clean Water Act goals. While an antidegradation policy and interim implementation methods are available in Alaska, more detailed implementation methods are under development. As with most states, implementation of antidegradation policy in Alaska is challenging and complex. While some of the challenges are technical in nature (e.g., how to measure baseline water quality or changes to assimilative capacity), other decisions are clearly socio-political (e.g., what factors should determine whether a waterbody merits ONRW or Tier 3 status?).