EVALUATION OF OPTIONS FOR ANTIDEGRADATION IMPLEMENTATION GUIDANCE

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1.0 Introduction

Federal regulations require states to adopt antidegradation policies and implementation methods to protect water quality, allowing it to be degraded only under certain circumstances. Alaska Department of Environmental conservation (ADEC) adopted its current antidegradation policy in 1996, and it was approved by EPA in 1997. However, the State has not adopted implementation methods as required under 40 CFR 131.12. Some waterbodies in Alaska have natural water quality that exceeds the minimum criteria set by the Water Quality Standards (WQS) found in 18 AAC 70 for protection of designated uses. While these waters can be addressed through ADEC's natural condition-based water quality standards approach, in such cases, discharges that may degrade water quality must meet certain conditions and must not cause violations of WQS.

Because of Alaska's size, sparse population, and its remote character, the vast majority of Alaska's water resources are in pristine condition. More than 99.9% of Alaska's waters are considered unimpaired. With more than 3 million lakes, 714,004 miles of streams and rivers, 36,000 miles of coastline, and approximately 176,863,000 acres of freshwater and tidal wetlands, less than 0.1% of Alaska's vast water resources have been identified as impaired. Historically, Alaska's water quality assessments focused on areas with known or suspected water quality impairments.

Federal law states that antidegradation implementation methods must (1) protect existing instream uses and the water quality necessary to protect those uses; (2) protect water quality that exceeds minimum criteria limits unless there are important economic or social benefits associated with any lowering of water quality, which implies both an alternatives analysis and a socioeconomic benefits analysis; and (3) protect the quality of Outstanding National Resource Waters (ONRWs).

Tetra Tech was tasked to provide information that could be used by ADEC to develop an antidegradation implementation plan to guide Alaska's water quality standards antidegradation policy. This required a review of several other States implementation documents, found in Appendix A, which will act as a guide for developing several options for Alaska's implementation methods. This report presents Alaska's antidegradation policy, how other States implement their policies and how it relates to Alaska's policy, and several options for an implementation guidance.

2.0 Alaska's Antidegradation Policy

Alaska's antidegradation policy can be found in Department of Environmental Conservation document 18 AAC 70, *Water Quality Standards,* under section 18 AAC 70.015, amended as of December 26, 2006. The policy states that

(a) It is the state's antidegradation policy that

(1) existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected;

(2) if the quality of a water exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality must be maintained and protected unless the department, in its discretion, upon application, and after compliance with (b) of this section, allows the reduction of water quality for a short-term variance under 18 AAC 70.200, a zone of deposit under 18 AAC 70.210, a mixing zone under 18 AAC 70.240, or another purpose as authorized in a department permit, certification, or approval; the department will authorize a reduction in water quality only after the applicant submits evidence in support of the application and the department finds that

(A) allowing lower water quality is necessary to accommodate important economic or social development in the area where the water is located;

(B) except as allowed under this subsection, reducing water quality will not violate the applicable criteria of 18 AAC 70.020 or 18 AAC 70.235 or the whole effluent toxicity limit in 18 AAC 70.030;

(C) the resulting water quality will be adequate to fully protect existing uses of the water;

(D) the methods of pollution prevention, control, and treatment found by the department to be the most effective and reasonable will be applied to all wastes and other substances to be discharged; and

(E) all wastes and other substances discharged will be treated and controlled to achieve

(i) for new and existing point sources, the highest statutory and regulatory requirements; and

(ii) for nonpoint sources, all cost-effective and reasonable best management practices;

(3) if a high quality water constitutes an outstanding national resource, such as a water of a national or state park or wildlife refuge or a water of exceptional recreational or ecological significance, the quality of that water must be maintained and protected; and

(4) if potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy described in this section is subject to 33 U.S.C. 1326 (commonly known as sec. 316 of the Clean Water Act).

(b) An applicant for a permit, certification, or approval who seeks to reduce water quality as described in (a) of this section shall provide to the department all information reasonably necessary for a decision on the application, including the information and demonstrations required in (a) of this section and other information that the department finds necessary to meet the requirements of this section.

(c) An application received under (a) of this section is subject to the public participation and intergovernmental review procedures applicable to the permit, certification, or approval sought,

including procedures for applications subject to the Alaska Coastal Management Program in AS 46.40 and 6 AAC 50, and applications subject to 18 AAC 15. If the department certifies a federal permit, the public participation and intergovernmental review procedures followed by the federal agency issuing that permit will meet the requirements of this subsection.

3.0 Review of Select State Antidegradation Implementation Guidance and Identification of Options

The following section briefly summarizes antidegradation policy and implementation guidance reviewed by Tetra Tech for several States and EPA Region 8. The States reviewed were: Arizona, Pennsylvania, Delaware, West Virginia, Wyoming, and Oregon. These States, as well as Region 8 represent a range of policies and level of guidance with respect to antidegradation in water quality standards. The following section presents various options identified by Tetra Tech, broken out by major aspects of antidegradation implementation guidance.

3.1 Definition of Antidegradation and Review

Each State has a slightly different definition of antidegradation, although some (West Virginia, Wyoming, and Region 8) never define the term in their document. In Arizona's implementation guidelines, R18-11-107, antidegradation is defined as, "The determination of whether there is any degradation of water quality in a navigable water" (on a pollutant by pollutant basis). Arizona's more thorough implementation procedures, drafted April 2008, changes the definition to, "A regulatory policy and implementation procedure adopted by EPA and ADEQ to protect existing uses of surface waters and to specify how ADEQ will determine, on a case-by-case basis, whether and to what extent, existing water quality may be lowered in a surface water." Delaware's document states, "Antidegradation refers to policies and procedures designed to prevent or minimize the reduction of water quality below existing levels," while Pennsylvania states, "The basic concept of antidegradation is to promote the maintenance and protection of existing water quality for High Quality (HQ) and Exceptional Value (EV) waters, and protection of existing uses for all surface waters because it recognizes that existing water quality and uses have inherent value worthy of protection and preservation." Oregon's definition is more detailed; "An antidegradation policy provides a means for maintaining and protecting water quality of surface waters by requiring that all activities with the potential to affect existing water quality undergo review and comment prior to any decision to approve or deny a permit or certificate for the activity."

While the definitions for antidegradation and antidegradation policy vary, each State has the same definition for antidegradation review as, "the process by which the State determines that antidegradation requirements are satisfied for a given regulated activity that may have an effect on surface water quality."

The above differences in definition of antidegradation suggest a continuum in terms of how detailed the implementation guidance may be, what may trigger an antidegradation review, and possibly, level of detail of the review itself. Delaware's definition is the simplest option and perhaps most open to flexible interpretations. It also is based solely on existing water quality which is easiest to measure and define but may or may not be that which is necessary to maintain achievable beneficial uses of a waterbody. Arizona's current definition is also relatively simple and specifies "navigable water", which could be construed as a more limited definition than their proposed draft definition or those provided by other States reviewed.

Oregon's definition implies more screening of activities in terms of when an antidegradation review is required but is otherwise similar to Delaware's interpretation. Pennsylvania's definition is more detailed than the ones above in that it specifies high quality and exceptional value waters, indicating importance assigned to these waters. This is in contrast to Arizona's proposed definition, which focuses on whether and how much existing water quality can be lowered.

3.2 Definition of Existing Water Uses

Section a.1 and a.2.(C)of Alaska's antidegradation policy states that "existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected". The implementation guidance should define the term "existing uses". All the States, except Oregon, and Region 8 defined existing uses as those uses actually attained in a waterbody on or after November 28, 1975, whether or not it is included in the water quality standards. This is a standard definition derived from EPA guidance and would be appropriate for Alaska to use as well.

3.3 Baseline or Existing Water Quality

To complete an antidegradation review, the water segment receiving a new or expanded regulated discharge needs to have baseline or existing water quality characterized prior to the discharge. In Arizona's implementation guidelines, R18-11-107, Delaware, and Region 8, the applicable procedures

used to characterize existing background quality that are used for purposes of developing TMDLs are followed. The characterization of existing background water quality should appropriately consider spatial and temporal variability. However, where background data are limited, it may be concluded that a segment is high quality and subject to Tier 2 protection based on ancillary data such as land use information, population and demographics, geology, presence of point or nonpoint sources, climatological data, or the health of the aquatic community.

Arizona's 2008 draft implementation procedures gives a very detailed approach for determining baseline water quality. In general, baseline water quality for perennial waters is based on existing assessments conducted under ADEQ monitoring and assessment programs. Other data collected by a federal or state agency, the regulated entity, the public, or any other source may be used as long as the data: 1) were collected in accordance with an approved quality assurance project plan; and 2) were collected using specified assessment or sample collection and analysis protocols. The data should be no older than 5 years and should include at least 4 samples (one sample per quarter) over a minimum one-year period. Where no, or few data exist, the data are collected from immediately upstream of the proposed discharge location. In general, the agency will perform an arithmetic average of all credible data to determine baseline water quality for a particular pollutant. Due to the lack of flow on intermittent, effluent dependent, and ephemeral waters, and the highly managed nature of canal systems, which are subject to Tier 1 protection levels, ADEQ does not require a determination of baseline water quality on these waters.

West Virginia defines baseline water quality as the ambient concentration established at the time of initial antidegradation review. Where baseline water quality has not been established for the water segment or the parameter of concern, data from a federal or state agency, the regulated entity, the public, or any other source can be used as long as the data are recent and reliable. If adequate data are not available, the regulated entity may be required to provide baseline water quality for those parameters of concern.

Currently, DEC collects water quality information through a public solicitation and through a year round waterbody nomination process. Information is assessed by a multi-state agency process called the Alaska Clean Water Actions (ACWA). Based on this assessment, a waterbody is placed in a one of the CWA categories in the state's Integrated Report. DEC actively solicits all existing and readily available

water quality data and information in accordance federal EPA guidance. This includes, but is not limited to waters for which water quality problems have been reported by local, state, or federal agencies; members of the public; or academic institutions. These organizations and groups are solicited for research they may be conducting or reporting. University researchers, the United States Department of Agriculture, the National Oceanic and Atmospheric Administration, the United States Geological Survey, and the United States Fish and Wildlife Service are examples of such sources of field data. DEC actively accepts and solicits water quality data and information on a continuous basis. Additionally, formal public notice is made every two years soliciting such information as part of the development of the Integrated Report. DEC considers and evaluates data and information from a wide range of sources, such as those listed below:

- previous reports prepared to satisfy CWA Sections 305(b), 303(d) and 314 and any updates reports of ambient water quality data including state ambient water quality monitoring programs, complaint investigations, etc., from the public and other readily available data sources (e.g., STORET (an EPA environmental database), USGS, research reports, etc.), and data and information provided in public comments
- reports of dilution calculations or predictive models
- water quality management plans
- Superfund (contaminated sites) Records of Decision
- Safe Drinking Water Act source water assessments

In addition to these conventional sources of data DEC also considers water quality data and information from citizen volunteer monitoring networks. General Considerations for All Waterbody Categories DEC will consider the following when evaluating a water for the Section 303(d) list of impaired waters (Category 5), when removing a water from the impaired waters list, or in making an attainment determination. DEC will review data considering whether typical elements of a quality assurance project plan (QAPP) is submitted for water quality data and information. A QAPP checklist for sampling, QA project plan review checklist, and elements of a good QAPP can be found on DEC's web site at http://www.dec.state.ak.us/water/wqapp/wqapp_index.htm.

Water quality data and information collected and submitted without a QAPP, or using a QAPP with weak confidence, will not be relied on to make an impairment determination. DEC makes impairment determinations based on credible data. Credible data means scientifically valid chemical, physical, or

biological monitoring data collected under a scientifically accepted sampling and analysis plan, including quality control and quality assurance procedures that are consistent with Alaska's water quality standards in 18 AAC 70. Water quality data and information that is less than five years is preferred. In certain instances, data and information over five years old may be considered in an impairment determination only if it is carefully scrutinized, reviewed, and validated as credible.
(Information from Alaska's Final 2008 Integrated Water Quality Monitoring and Assessment Report; April 1, 2008 Alaska Department of Environmental Conservation.)

Based on this review, options for determining existing water quality include:

Option A – Use the same procedures used to make "impaired waters" decisions, considering spatial and temporal variability.

Option B – Use recent data from existing assessments conducted under State monitoring and assessment programs.

Option C – Use recent data from other reliable sources as long as it was collected in accordance with an approved quality assurance plan and was collected using specified assessment or sample collection and analysis protocols.

Option D – Have the applicant provide the data for parameters of concern over a specified time period.

3.4 Nonpoint Sources

In Arizona, non-point source discharges are not exempt from antidegradation requirements, as ADEQ has statutory authority to adopt rules to regulate non-point source discharges of pollutants to surface waters. However, ADEQ has not yet used this authority to establish a regulatory program and thus they are not regulating nonpoint discharges that are subject to ADEQ antidegradation review.

West Virginia states that, "Nonpoint source activities will be deemed to be in compliance with antidegradation requirements with the installation and maintenance of cost-effective and reasonable best management practices…" The State does note that if the "BMPs are demonstrated to be inadequate to reduce or minimize water quality impacts, the Secretary may require that more appropriate BMPs be developed and applied". Such an approach for applying antidegradation reviews to nonpoint pollutant sources in Alaska would be recommended, if the state chooses to include nonpoint pollution in its antidegradation program.

3.5 Significant Degradation

In Arizona, Delaware, Oregon and Region 8, significant degradation may be demonstrated with respect to any one (or a combination) of the following factors:

a) percent change in ambient concentrations predicted at the appropriate critical condition(s),
b) the difference, if any, between existing ambient quality and ambient quality that would exist if all point sources were discharging at permitted loading rates,
c) percent change in loadings (i.e., the new or expanded loadings compared to total existing loadings to the segment or, for existing facilities only, the proposed permitted loadings compared to the existing permitted loadings),
d) percent reduction in available assimilative capacity,
e) nature, persistence, and potential effects of the parameter,
f) potential for cumulative effects,
g) predicted impacts to aquatic biota,
h) degree of confidence in any modeling techniques utilized, and
i) the difference, if any, between permitted and existing effluent quality

Also, in Delaware and Region 8, proposed activities that would lower the ambient water quality of any parameter (e.g., numeric criterion measurement) by more than 5%, reduce the available assimilative capacity by more than 5%, or increase pollutant loadings by more than 5% will, by rule-of-thumb, be presumed to pose significant degradation.

In Arizona's 2008 draft implementation procedures, significant degradation is defined as, "the consumption of 20% or more of the assimilative capacity for any pollutant or any consumption of assimilative capacity that exceeds a cumulative cap of 50% of assimilative capacity.

In West Virginia, for Tier 2 waters, degradation is significant if a regulated activity results in a reduction in the water segment's available assimilative capacity (the difference between the baseline water quality and the water quality criteria) of 10% or more at the appropriate critical flow condition(s) for parameters of concern. Degradation will also be deemed significant if the proposed activity, together with all other activities allowed after the baseline water quality is established, results in a reduction in the water segment's available assimilative capacity of 20% or more at the appropriate critical flow

conditions for the parameters of concern. Significant degradation is determined on a parameter-by-parameter basis for each parameter of concern that might be affected by the regulated activity.

Wyoming has similar language as West Virginia's regarding significant degradation, but notes that if the activity results in only temporary or short term changes in water quality, then it will not be considered significant degradation if water quality returns to pre-discharge conditions. Several other States have a similar policy.

While several States recognize many indicators that would demonstrate the potential for significant degradation, nearly all written implementation policies to date rely on assimilative capacity or pollutant loading changes caused by the activity or discharge. This is understandable because predictions of potential impact are most readily addressed using water quality modeling, which relies on loads as inputs. However, there is no universal percentage of assimilative capacity use or consumption that is likely to be appropriate for all waterbodies. Potential impacts to aquatic biota are more difficult to predict although there are several tools available (ecological risk assessment models, species sensitivity distribution analyses, etc.). All models are subject to uncertainties and these should be carefully reviewed as part of any antidegradation analysis. Some modeling techniques may not fully account for cumulative effects for example, or may under- or overestimate effects on biota.

Given the State implementation procedures reviewed, options to consider for determining that degradation is significant include:

Option A – Lowering ambient water quality of any parameter by more than 5%, reduce the available assimilative capacity by more than 5%, or increase pollutant loadings by more than 5%. This is the most restrictive of the options identified.

Option B – Reduction in assimilative capacity of 10% or more for parameters of concern and reduction in assimilative capacity of 20% or more for cumulative impacts (i.e., as a sort of "cap" on total degradation). This is an intermediate option.

Option C – The consumption of 20% or more of the assimilative capacity for any pollutant or any consumption of assimilative capacity that exceeds a cumulative cap of 50% of assimilative capacity. This is the least conservative of the options identified.

3.6 Identification of Tiers

Federal regulation lays out a 3-tiered approach to antidegradation implementation. Most States have Tiers 1, 2, and 3 as defined by the Clean Water Act, while some States include a Tier 2.5. In general Tier 1 is the basic water quality protection afforded to all waters, as defined by use-based water quality criteria, while Tier3 protects Outstanding National Resource Waters and allows only temporary and minimal degradation. A discussion of Tier3 or Outstanding Natural Resource Waters is presented in the next section. This discussion focuses primarily on what is protected under Tier2, which varies among States.

In Arizona's implementation guidelines, R18-11-107, Delaware, and Region 8, decisions regarding whether a waterbody is subject to Tier 2 protection requirements is based on best professional judgment of the overall quality and value of the segment. In general, waterbodies with existing water quality that is better than necessary to support fishable/swimmable uses (i.e., exceeds minimum water quality critiera) is subject to Tier 2 requirements. Note that attainment of both aquatic life (fishable) and recreational (swimmable) uses is not required for these programs. In general, Tier 1-only waters are those segments where fishable/swimmable goal uses are not attained, or where assimilative capacity does not exist for <u>any</u> of the parameters that would be affected by the proposed activity.

In Arizona's 2008 draft implementation procedures, Tier 1 and Tier 2 protection are applied on a pollutant-by-pollutant basis. Tier 1 protection is afforded for the pollutants not meeting water quality criteria and Tier 2 protection for pollutants that are equal to or better than water quality criteria. Tier 1 protection also categorically applies to all non-perennial surface waters (e.g., all intermittent streams and ephemeral waters), effluent dependent waters, all canals, and all waters on the state's 303(d) list for the pollutants that resulted in the surface water being listed.

In Oregon, high quality waters are those which have water quality that meets or is better than all water quality standards. While this is not referred to as a "Tier 2" waterbody by ODEQ, it is afforded the same protection as Tier 2 waterbodies in other states. This is in contrast to Arizona and some other States in which the waterbody is classified on a water quality parameter-by-parameter basis (thus, in these States, a waterbody can be simultaneously water quality limited or impaired for one parameter but high quality for other parameters). Oregon also has water quality-limited waters, which are those waters that a) do not meet water quality standards during the entire year or defined season even after

implementation of standard technology, b) only meet water quality standards through the use of higher than standard technology, or c) insufficient information exists to determine if water quality standards are being met. This is different from the other states' Tier 1 waters in which there are circumstances when the water can be further degraded. The review process is apparently the same as that for high quality waters.

Pennsylvania has high quality waters, which are similar to Tier 2 waters. These waters should have "suitable" chemical or biological conditions. For the chemical condition, a surface water is high quality if long-term water quality (at least 1 year of data) for 12 chemical parameters is better than levels necessary to support propagation of fish, shellfish, and wildlife and recreation. The 12 parameters include dissolved oxygen, iron, dissolved copper, temperature, dissolved arsenic, dissolved lead, aluminum, dissolved nickel, dissolved cadmium, pH, ammonia nitrogen, and dissolved zinc. In addition, at least 24 samples should be collected at intervals that have been clearly timed over the flow year. For the biological condition, one of the following must be met: a) in comparison to a reference stream, the water shows a macroinvertebrate community score of 83% or greater using a protocol based on EPA's Rapid Bioassessment Protocol (RBP); or b) the water is a designated Class A wild trout stream. If either the stream chemistry data or the stream biology data meets the respective qualification criteria, the stream qualifies as high quality.

West Virginia affords Tier 2 protection to high quality waters. High quality waters are those waters whose quality exceeds levels necessary to support recreation and wildlife and the propagation and maintenance of fish and other aquatic life. These waters may <u>not</u> exceed the level of quality needed to meet or exceed numeric criteria for <u>every</u> parameter. West Virginia affords protection based on the minimum uses being attained, not the numeric water quality. Therefore, a water segment listed on the state's 303(d) list may be afforded Tier 2 protection if the parameter(s) for which the water segment is listed does not result in that water's failure to attain minimum uses and where all other parameters exceed the quality necessary to support recreation and wildlife and the propagation and maintenance of fish and other aquatic life. For example, if a waterbody is impaired for recreational uses due to high bacteria concentrations, it would still be protected at Tier 2 levels for dissolved oxygen, metal concentrations, and so on if actual values for those parameters exceeded minimum water quality criteria.

In Wyoming, Tier 2 protection applies to waters which have an existing quality that is better than the established use-support criteria and where an assimilative capacity exists for parameters that might be affected by a proposed activity sometime in the future. These waters are known to support populations of fish and/or drinking water uses.

The review presented above indicates some differences in the way States have addressed Tier 2, and to some extent Tier 1 antidegradation policies. The pollutant-by-pollutant basis used by Arizona, Delaware, Region 8, and Wyoming is relatively easy to determine (assuming the data are available) but could present a complex "bookkeeping" exercise requiring at least some basic modeling. The more holistic approach used by Oregon and West Virginia is attractive in being simpler to track and maintain and is related more directly to the beneficial uses that exist. However, these approaches also require more information in order to determine whether or not a given activity will potentially impact a Tier 2 water. Finally, the Pennsylvania approach for determining Tier 2 waters is an interesting hybrid that uses chemical and biological information but relies on a carefully defined range of data (12 physicochemical parameters and macroinvertebrate assessment). However, it is unclear how these data provide information regarding Tier 2 based on recreational uses. Also this approach does require a fair amount of data, though most of the parameters are commonly measured. In summary, options for this aspect of the implementation guidance include:

Option A – All waters protected at Tier 1 and Tier 2 level via pollutant by pollutant antidegradation approach, the simplest and most straightforward approach

Option B – Consideration of biological and other data of a waterbody similar to a reference waterbody.

3.7 Outstanding National Resource Waters

Section (a).3. of Alaska's antidegradation policy requires that outstanding national resource waters (ONRWs) be maintained and protected. Each State reviewed, with the exception of Pennsylvania, has a criterion to identify ONRWs in their guidance document. Arizona's implementation guidelines, R18-11-107, uses the term Unique Waters and the factors to be considered are:

1. the navigable water is of exceptional recreational or ecological significance because of its unique attributes, including but not limited to, attributes related to the geology, flora, fauna, water quality, aesthetic values or the wilderness characteristics of the navigable water

2. threatened or endangered species are known to be associated with the navigable water and the existing water quality is essential to the maintenance and propagation or provides critical habitat to the species.

Any proposed activity that would result in a permanent new or expanded direct source of pollutants to any segment which has been designated as a Unique Water is prohibited. Also, any proposed activity that would result in a permanent new or expanded indirect source of pollutants (e.g., an upstream source) to a Unique Waters segment is prohibited except where such source would have no effect on the existing quality of the downstream Unique Waters segment. Arizona's 2008 draft implementation procedures uses the term Outstanding Arizona Waters (OAWs) but is otherwise very similar.

In Delaware and Region 8, the factors to be considered in determining whether to assign an ONRW designation may include the following:

a) location (e.g., on federal lands such as national parks, national wilderness areas, or national wildlife refuges),
b) previous special designations (e.g., wild and scenic river),
c) existing water quality (e.g., pristine or naturally-occurring),
d) ecological value (e.g., presence of threatened or endangered species during one or more life stage),
e) recreational or aesthetic value (e.g., presence of an outstanding recreational fishery), and
f) other factors that indicate outstanding ecological or recreational resource value (e.g., rare or valuable wildlife habitat).

In Arizona, Delaware, and Region 8 outstanding water quality is not a prerequisite for ONRW designation. These States also allow public nomination of any state water for ONRW protection at any time by sending a written request. In Arizona, the written request should contain a map and a description of the navigable water; a written statement in support of the nomination, including specific reference to the applicable criteria for unique waters classification; supporting evidence demonstrating that one or more of the applicable unique waters criteria has been met; and relevant water quality data. Delaware and Region 8's only requirement is that the segment have outstanding value as an aquatic resource, which may derive from the presence of exceptional scenic or recreational attributes, or from the presence of unique or sensitive ecosystems. Any proposed activity that would result in a permanent

new or expanded direct source of pollutants to any segment is prohibited, regardless of effluent quality. Upstream sources are also prohibited except where such source would have no effect on the existing quality of the ONRW.

Delaware and Region 8 also have a Tier 2.5, which is for Outstanding State Resource Waters (OSRW). The requirements for these waters are exactly the same as those for ONRWs. The only difference is that proposed activities, both direct and indirect, that would result in a permanent lowering in OSRW water is prohibited, except on a case-by-case basis where proposed expansions would also upgrade treatment levels, and if it serves to maintain or enhance the value, quality, or use of the OSRW.

Outstanding resource waters in Oregon must be high quality waters and must constitute an outstanding state or national resource based on its extraordinary water quality, ecological values, or requirement for special water quality protection in order to maintain critical habitat areas. This is interpreted to prohibit new or expanded sources from discharging directly to an ORW or upstream of an ORW if it results in a change in water quality within the ORW.

Pennsylvania provides "outstanding national resource" protection to its Exceptional Value waters. To be an Exceptional Value water it must first qualify as a high quality water and then possess one or more of the following:

- Location in a national wildlife refuge or state game propagation and protection area
- Location in a designated state park natural area or state forest natural area, national natural landmark, federal or state wild river, federal wilderness area or national recreation area
- Qualification as an outstanding nation, state, regional, or local resource water
- Exceptional regional significance
- A score of at least 92% (or its equivalent) using the biological assessment qualifier
- Qualification as a Wilderness Trout Stream

In West Virginia, ONWRs include, but are not limited to, all streams and rivers within the boundaries of Wilderness Areas designated by the Wilderness Act within the State; all federally designated rivers under the "Wild and Scenic Rivers Act"; all streams and other bodies of water in State parks which are high quality waters or naturally reproducing trout streams; waters in national parks and forests which

are high quality waters or naturally reproducing trout streams; waters designated under the "National Parks and Recreation Act of 1978"; and those water whose unique character, ecological or recreational value, or pristine nature constitutes a valuable national or state resource. Any proposed activity that would result in a permanent new or expanded discharge upstream of an ONRW segment is prohibited except where such source would improve or not degrade the existing water quality of the downstream ONRW segment.

Wyoming considers water quality, aesthetic, scenic, recreational, ecological, agricultural, botanical, zoological, municipal, industrial, historical, geological, cultural, archaeological, fish and wildlife, the presence of significant quantities of developable water, and other values of present and future benefit to the people when designating outstanding waters. In addition, all surface waters located within the boundaries of national parks and congressionally designated wilderness areas as of January 1, 1999 are classified as outstanding aquatic resources. They prohibit new or increased "end-of-the-pipe", effluent dischargers of pollution, but allow limited discharges associated with stormwater runoff and construction activities.

The above summary indicates a number of possible criteria for defining ONRWs. Some definitions (e.g., Wyoming and West Virginia) may be relatively easy to implement because national parks and similar areas may automatically be criteria for designating ONRWs. Where such parkland is scarce within a State, such a criterion may be appropriate. Several States may define ONRWs on the basis of presence of endangered species or critical habitat. This criterion could lead to a large number of ONRWs where an endangered species is widespread (though not necessarily abundant), such as certain salmon species, or in a State where multiple endangered species occur in various habitats. Those criteria related to unique or exceptional significance may capture the spirit of Tier 3 designation but may be difficult to determine. Such a value process would require some transparent, credible guidelines to enable a meaningful and productive public process.

The following are broad options identified. Clearly, some of these may have several suboptions as well.

Option A – Must meet or exceed all water quality criteria.
Option B – Outstanding water quality is not a prerequisite.
Option C – Threatened or endangered species are known to be associated with the waterbody.

Option D – Exceptional recreational or ecological significance because of its unique attributes.

Option E – Location, previous special designations, existing water quality, ecological value, recreational or aesthetic value, etc.

Option F – All waterbodies within wilderness areas, state and federal parks, etc.

3.8 Antidegradation Review Trigger

In Arizona's 2008 draft implementation procedures, a finding of predicted significant water quality degradation triggers comprehensive Tier 2 antidegradation review. However, it should be noted that pollutants of concern for Tier 2 antidegradation reviews include those pollutants reasonably expected to be present in the discharge for which a numeric water quality standard exists.

In Delaware and Region 8, antidegradation requirements are triggered whenever a regulated activity is proposed that may have some effect on surface water quality. "Regulated activities" typically include NPDES-permitted discharges – such as those issued for wastewater plants, industrial facilities, concentrated animal feeding operations, and municipal separate storm sewer systems, Clean Water Act Section 404 permits issued by the US Army Corps of Engineers, and other activities regulated by state permits, reviews, or approvals.

In Oregon, the antidegradation review must be considered for every DEQ water quality action. 401 water quality certifications, new NPDES permits, or a permit renewal that will result in a new or increased load or lower water quality are subject to an antidegradation review.

In West Virginia, any regulated activity in a Tier 2 water segment is required to go through the Tier 2 antidegradation review process where:

a) The regulated activity is a new or expanded activity that would significantly degrade the water quality; or
b) The Secretary determines, upon renewal of a permit or certification, that other individual circumstances warrant a full review such as cumulative degradation resulting from multiple discharges within a watershed, degradation resulting from a single discharge over time, or degradation caused by a regulated facility's historic noncompliance with its permit.

Many State implementation guides do not present specific policies regarding review triggers, noting that such triggers are made on a case-by-case basis. Some options identified in our review include:

Option A – Predicted significant degradation based on load allocation or assimilative capacity modeling. This option is fairly straight forward but assumes high certainty in the pollutants of concern and modeling inputs.

Option B – Whenever any activity regulated under state or federal rules is proposed that may have some effect on water quality. This option is very general and may be too vague to sufficiently guide antidegradation analytical reviews or defend against legal scrutiny.

Option C – Upon application for a new or expanded NPDES or CWA Sec 404 permit application. This is the easiest option to implement and may be clearest.

3.9 Thermal Discharge Impairment

Section a.4 of Alaska's antidegradation policy is relevant when water quality impairment is associated with a thermal discharge. The only State to mention impairment due to thermal discharge is Delaware and their document refers to Section 316 of the Clean Water Act. Indication that the antidegradation policy described in this section is subject to 33 U.S.C. 1326 (commonly known as section316 of the Clean Water Act) is sufficient.

3.10 Requirements for Alternatives Analysis

Requirements that a proposed new or expanded discharge be "necessary" to accommodate important economic or social development implies that at least some examination of alternatives to the proposed activity has occurred. In Arizona, Delaware, Region 8, and West Virginia, the applicant is required to prepare an evaluation of alternatives. The evaluation must provide, at a minimum, substantive information pertaining to the costs and environmental impacts associated with the following alternatives:

- pollution prevention measures
- reduction in scale of project
- water recycle or reuse
- process changes
- innovative treatment technology
- advanced treatment technology

- seasonal or controlled discharge options to avoid critical water quality periods
- improved operation and maintenance of existing treatment systems
- alternative discharge locations (e.g., to the soil, or to another surface water location)

In Delaware and Region 8, non-degrading or less-degrading pollution control alternatives with costs that are less than 110% of the costs of the pollution control measures associated with the proposed activity are considered reasonable.

Oregon considers a few of the above mentioned alternatives, but also considers:

- recycling or reuse with no discharge
- discharge to on-site system
- discharge to sanitary sewer
- land application

The evaluation of these alternatives provides information pertaining to the effectiveness, costs, and environmental impacts of the alternatives, as well as discussions of their technical and economic feasibility.

Pennsylvania must complete an affordability analysis and a direct cost comparison of alternatives. If a nondischarge alternative is not cost-effective and environmentally sound, the applicant must utilize the best available combination of technologies. This process is known as the antidegradation best available combination of technologies or ABACT.

Wyoming has general guidance, stating that the assessment shall at a minimum address practical water quality control technologies, the feasibility and availability of which has been demonstrated under field conditions similar to those of the activity under review.

Based on the above findings, a few alternatives that could be considered are:

Option A – Analysis should contain information on possible alternatives and their effectiveness, costs, environmental impacts, and technical and economic feasibility

Option B – Complete an affordability analysis and direct cost comparison for selected alternatives

Option C – Address practical water quality control technologies and proven alternatives, the feasibility and availability of which has been demonstrated under similar conditions

3.11 Important Economic or Social Development

Section a.2.(A) requires that "allowing lower water quality is necessary to accommodate important economic or social development in the area where the water is located". The implementation guidance needs to address what constitutes an important economic or social development.

In Arizona, Delaware, Region 8, and West Virginia, the factors to be addressed include, but are not limited to:

a) employment (i.e., increasing, maintaining, or avoiding a reduction),
b) increased production,
c) improved community tax base,
d) housing, and
e) correction of an environmental or public health problem.

Where information is not sufficient to make a preliminary determination regarding the socio-economic costs or benefits associated with the proposed activity, the applicant may be required to submit information about the following:

- information pertaining to current aquatic life, recreational, or other water uses;
- information necessary to obtain the environmental impacts that may result from the proposed activity;
- facts pertaining to the current state of economic development in the area;
- government fiscal base; and
- land use in the areas surrounding the proposed activity.

Pennsylvania and Oregon require similar factors be addressed but Oregon also sites local economy, household income, indirect effects to other businesses, and increases in sewer fees as indicators. In Oregon, for both high quality and water quality limited waters, the applicant must provide DEQ with enough information to allow for a financial impact analysis that assesses whether allowing an activity that lowers water quality has socioeconomic benefits that outweigh the environmental costs. It should be noted that the process evaluation differs between public and private sector developments.

Wyoming's implementation states that, "If the applicant submits evidence that the activity is important for development, it shall be presumed important unless information to the contrary is submitted in the

public review process. The determination shall take into account information received during the public comment period and shall give substantial weight to any applicable determinations by local governments or land use planning authorities."

Options for addressing socio-economic impacts or development as part of an antidegradation review are generally similar to those used by federal agencies for NEPA and EIS projects in evaluating alternatives. Specific tools used to determine social or economic benefits vary among programs and one might expect differences in antidegradation decisions depending on which tools are used and the input data available. For this aspect of implementation guidance, options may be more related to the actual factors considered (e.g., Arizona versus Oregon requirements). Wyoming's approach is relatively general and may not withstand legal challenges as effectively as other approaches mentioned above.

3.12 Public Participation and Intergovernmental Review

Section C of Alaska's antidegradation policy states that the application is subject to public participation and intergovernmental review, but this process should be outlined in the implementation guidance. In Arizona and Delaware, the minimum intergovernmental coordination process requires that copies of the completed antidegradation review worksheet and/or public notice be provided to state and federal government agencies along with a written request to provide comments by the public comment deadline. Both Arizona and Region 8 state that because the socio-economic importance of a proposed activity is a question best addressed by the local interests, particular weight will be given to the comments submitted by local governments, land use planning authorities, and other local interests in determining whether the balancing of benefits and costs that was the basis for the preliminary decision was appropriate. Based upon comments and information received during the public comment period, the preliminary determination regarding the social or economic importance may be reversed. Also, in Delaware and Region 8 public participation occurs regardless of the outcome of the preliminary decision. In Pennsylvania, the Department will hold a public hearing on a proposed new, additional, or increased discharge to Exceptional Value Waters when requested by an interested person on or before the termination of the public comment period on the discharge. Oregon only goes through the public participation and intergovernmental coordination if the review process yields a recommendation to approve the proposed activity. West Virginia and Wyoming require intergovernmental coordination and public participation, but not much detail is given as to their procedures.

Option A – Occurs regardless of preliminary decision.

Option B – Occurs only if preliminary decision yields a recommendation to approve the proposed activity.

Summary of Options Identified for Antidegradation Implementation Guidance

Antidegradation Policy Issue	Option 1	Option 2	Option 3	Option 4
Baseline Water Quality*	Employ same procedures used to make "impaired waters" decisions **Pros:** procedures are already in place; high level of data credibility; high confidence regarding waterbody status; consistent with TMDL program and 303(d) assessments; assessment of assimilative capacity inherent in procedures **Cons:** may require considerable effort or time by DEC; resource intensive; data are often limited spatially or temporally for parameter(s) of concern; lack of data could cause delays	Base upon existing assessments conducted under monitoring and assessment programs **Pros:** data already available; follows DEC program quality assurance procedures so data quality should be adequate; integrates well with current ACWA assessment process; allows for new data to be collected by third parties **Cons:** slightly less data credibility as Option 1, but allows for more data collection; often unavailable or sparse for parameters of concern; assumes a fairly extensive monitoring program, which may not be feasible for Alaska; might need to use "pristine waters composite" with "rebuttable presumptions" for BWQ parameters for water in unimpacted areas	Use data from a federal or another state agency, or any other source, as long as the data are recent and reliable **Pros:** DEC doesn't need to collect data; similar to current ACWA procedures **Cons:** data often unavailable or sparse; difficult to ensure adequate data quality or comparability of methods used; credibility level lower than Option 2; more resource-intensive to manage	Have the applicant provide the data for parameters of concern over a specified time period **Pros:** requires less work for the State, straightforward; can require necessary data quality; could use in combination with Option 2 to produce "pristine waters composite" with "rebuttable presumptions" for BWQ parameters for water in unimpacted areas **Cons:** heavy monitoring and assessment burden for permittees; requires oversight; schedule may not be ensured; may require some negotiation with applicant; may not be accurate baseline if other recent changes have taken place
Significant Degradation**	20% assimilative capacity consumption allowance and cumulative cap of 50% of available assimilative capacity from baseline water quality **Pros:** cumulative cap provides permanent protection for waters; objective, quantitative criteria; transparent	Lowering ambient water quality of any parameter by more than 5%, reduce the available assimilative capacity by more than 5%, or increase pollutant loadings by more than 5% **Pros:** provides the most water quality protection; objective, quantitative criteria; transparent	Reduction in assimilative capacity of 10% or more for parameters of concern and if all activities result in a reduction in assimilative capacity of 20% or more **Pros:** provides high level of water quality protection; provides for cumulative cap of 20%; objective, quantitative criteria;	

	Cons: allows for most water quality degradation of all options; single number may not be appropriate for all waterbodies	**Cons:** lack of a cumulative cap might allow incremental degradation down to water quality criteria for any/all parameters; most restrictive; single number may not be appropriate for all waterbodies	transparent ; intermediate option **Cons:** less water quality protection than Option 2; single number may not be appropriate for all waterbodies	
Tier Assignment	All waters protected at Tier 1 and Tier 2 level via pollutant by pollutant antidegradation approach **Pros:** simple and straightforward; consistent with most State antidegradation approaches **Cons:** creates a "bookkeeping" approach that might be data-intensive for waters in developed or impacted areas; can be counterintuitive at times, a stream is Tier 2 for some parameters but not others	Consideration of biological and other data of a waterbody similar to a reference waterbody **Pros:** more holistic; simpler to track and maintain; considers full range of chemical, biological, physical, geomorphic, sediment transport, and other structural and functional attributes **Cons:** requires more assessment data than current approaches; requires more resources to analyze and assess structure and function; requires known reference conditions		
Outstanding National Resource Waters	All waterbodies within wilderness areas, state and federal parks, etc. **Pros:** easy to implement; easy to justify **Cons:** could lead to a large number of ONRWs; some waters might be impacted already; might need to exempt or allow for some to remain at current water quality	Exceptional recreational or ecological significance because of its unique attributes **Pros:** allows for flexibility; includes pristine waters lying outside of public lands; provides high level of water quality protection; provides "rebuttable assumption" that unimpacted waters are pristine **Cons:** might be resource intensive to manage; decisions may be difficult to determine; subject to debate	Threatened or endangered species are known to be associated with the water **Pros:** provides protection for T&E species; links high level antidegradation approach to high profile environmental issues **Cons:** T&E species distribution is often unknown; T&E areas are not always outstanding resources otherwise; could lead to a large number of ONRWs in AK; might be resource intensive to manage	Must meet or exceed all water quality criteria **Pros:** can be fairly restrictive; objective; would include the most waters for Tier 3 antidegradation protection **Cons:** natural conditions may exceed WQC but still be exceptional waters; could result in numerous ONRWs in AK; might be seen as detrimental to mining and other development

Antidegradation Review Trigger	Predicted significant degradation based on load allocation or assimilative capacity modeling. **Pros:** quantitative triggers are repeatable and understood; captures major impacts **Cons:** assumes high certainty in the pollutants of concern and modeling inputs; might miss some activities with the capacity to degrade water quality significantly	Whenever any activity regulated under state or federal rules is proposed that may have some effect on water quality. **Pros:** captures most activities that might result in degradation; can require applicant to conduct analyses; unlikely to be subject to challenge **Cons:** places burden on applicants, regardless of size and capacity to conduct analysis	Upon application for a new or expanded NPDES or CWA Sec 404 permit application. **Pros:** easier to implement ; straightforward; consistent with most current state approaches **Cons:** might omit some state-permitted activities with capacity for significant water quality degradation	
Requirements for Alternatives Analysis	Analysis should contain information on possible alternatives and their effectiveness, costs, environmental impacts, and technical and economic feasibility **Pros:** comprehensive; most rigorous of proposed approaches; provides for the highest degree of certainty; less prone to challenge **Cons:** time-consuming review; places heavy analytical burden on applicants	Complete an affordability analysis and direct cost comparison for selected alternatives **Pros:** addresses socioeconomic factors; limits the level of analysis for applicants to only those the appear to be viable **Cons:** may not be adequately identify best alternative for environment; could lead to a "cookie cutter" approach that routinely ignores alternatives that might provide more water quality protection	Address practical water quality control technologies and proven alternatives, the feasibility and availability of which has been demonstrated under similar conditions **Pros:** based on known information and current track records; further limits the level of analysis for applicants; easiest to justify and implement **Cons:** limited to proven alternatives, further restricting the number and types of options, which may result in more degradation then de minimus	
Public Participation and Intergovernmental Review	Occurs regardless of preliminary decision **Pros:** always allows for public involvement; provides an ongoing sense of interest and concern for water quality; keeps other agencies and the public	Occurs only if preliminary decision yields a recommendation to approve the proposed activity **Pros:** saves time and money; easier to manage		

	engaged in water quality protection **Cons:** may result in lengthy, unnecessary process sometimes; resource intensive; requires more management	**Cons:** preliminary decision might be challenged or used to charge DEC with bias in further antidegradation review deliberations		

* Alaska should use the current & existing ACWA process to provide the baseline water quality assessments for impacted waters - ie, those in areas of mining, development, & current discharges. Additional information will need to be solicited for some of these waters, but it looks like it is already being done to accommodate EPA integrated reporting procedure.

For the 99.9% of waters that are not impacted at all - those lying in more remote areas, beyond the current dischargers/mining/development areas, an "assumed" set of baseline water quality parameters should be developed based on a composite of current water quality for those “unimpacted” pristine (i.e., reference) waters. This composite would serve as the assumed baseline water quality parameters for all of those waters. The composite would constitute a set of “rebuttable presumptions” that an applicant could refute by providing their own data, at their own expense, under a monitoring/assessment program conducted in accordance with ADEC QAPP requirements. If they could prove actual water quality was different from the "assumed" composite set of parameter values, ADEC would use the actual data.

** We would recommend that any discharger using more than 5% of the assimilative capacity must conduct an alternatives analysis & social/economic justification analysis. We would also recommend an overall cap of less than 50% for cumulative impacts. The cap is a bit of a misnomer because all an applicant has to do is show significant economic or social benefits to receive authorization to use all available assimilative capacity - i.e., take water quality down to minimum water quality criteria.

APPENDIX A

STATES SUMMARY TABLE

Antidegradation Information	Antidegradation Summary Information by State and EPA Region			
	Arizona	Delaware	Oregon	Pennsylvania
Written Antideg Policy Adopted / Year of Adoption		2004 (updated version)		1999
Written Implementation Methods Adopted / Year of Adoption		1999	2001	Pennsylvania Clean Streams Law (35 P.S. §691.1 et seq.) and regulations at Title 25 Pa. Code Title 25, including Chapters 91, 92, 93, 95, 96, 102, and 105; Nov. 2003
Contact / web site	http://www.epa.gov/waterscience/standards/wqslibrary/az/az_9_anti.pdf	http://www.dnrec.state.de.us/water/antidegp.pdf	http://www.deq.state.or.us/wq/pubs/imds/antideg.pdf	Kellie DuBay
How are existing uses defined and the level of WQ needed to protect those uses?	Existing use means a use that is actually attained in the waterbody on or after November 28, 1975, whether or not it is included in the water quality standards.	Existing use means a use that is actually attained in the waterbody on or after November 28, 1975, whether or not it is included in the water quality standards.	Not defined	those uses actually attained in the waterbody on or after November 28, 1975, whether or not those uses have been included in the water quality standards
How is significance of degradation determined?	The likelihood that a proposed activity will pose significant degradation will be judged by the Department for all water quality parameters that would be affected by the proposed activity. Proposed activities will be considered significant and subject to tier 2 requirements where significant degradation is projected for one or more water quality parameter. Significant	Same as Arizona		

	degradation may be demonstrated with respect to any one (or a combination) of the following factors: (a) percent change in ambient concentrations predicted at the appropriate critical condition(s), (b) the difference, if any, between existing ambient quality and ambient quality that would exist if all point sources were discharging at permitted loading rates, (c) percent change in loadings (i.e., the new or expanded loadings compared to total existing loadings to the segment or, for existing facilities only, the proposed permitted loadings compared to the existing permitted loadings), (d) percent reduction in available assimilative capacity, (e) nature, persistence, and potential effects of the parameter, (f) potential for cumulative effects, (g) predicted impacts to aquatic biota, (h) degree of confidence in any modeling techniques utilized, and (i) the difference, if any, between permitted and existing effluent quality.			
Does antideg review apply to nonpoint sources and 401 WQCs?			Conduct a full review. New certifications that will not result in lower water quality do not require a complete review, but the permit record must fully document that no lowering of water quality is expected to occur for any water quality parameter.	Pennsylvania requires the implementation of erosion and sediment control, nutrient management and stormwater management BMPs under the federal Clean Water Act, the Pennsylvania Clean Streams Law, the Nutrient Management Act, and

				the Stormwater Management Act
Which waters are subject to Tier 2 protection and how is this determined?	Decisions regarding whether a waterbody is "high quality" and subject to tier 2 protection requirements will be based on a best professional judgment of the overall quality and value of the segment. In general, water with existing quality that is better than necessary to support fishable/ swimmable uses will be considered "high quality" and subject to tier 2 requirements. Note that attainment of both aquatic life (fishable) and recreational (swimmable) uses is not required in order to quality as a "high quality" segment.	Same as Region 8 and Arizona	Based on the rules OAR 340-041-0006(41) and 340-041-0026(1)(a)(A)(iii), High Quality Waters are those which have water quality that meets or is better than all water quality standards. A High Quality Water is one that is not a Water Quality Limited Water. This interpretation is in contrast to some other States in which the waterbody is classified on a water quality parameter-by-parameter basis (thus, in these States, a waterbody can be simultaneously Water Quality Limited for one parameter but High Quality for other parameters). Therefore, in Oregon, waterbodies must have water quality that meets or is better than all water quality criteria in order to be classified as High Quality Waters (HQW).	
Intergovernmental coordination and public participation provisions required?	Intergovernmental coordination minimum process states that upon request, the Department will provide copies of the completed antidegradation review worksheet and/pr public notice to state and federal government agencies along with a written request to provide comments by the	That Division shall conduct all antidegradation reviews consistent with the intergovernmental coordination procedures included in the State's Continuing Planning Process.	Public participation and intergovernmental coordination will occur if the applicant review process yields a recommendation to approve the proposed activity. DEQ will then consider the various agencies' comments and public comments in reaching a final decision or recommendation to the Environmental Quality Commission	The Department will hold a public hearing on a proposed new, additional, or increased discharge to Exceptional Value Waters when requested by an interested person on or before the termination of the public comment period on the

	public comment deadline. Because the socio-economic importance of a proposed activity is a question best addressed by local interests, the Department will give particular weight to the comments submitted by local governments, land use planning authorities, and other local interests in determining whether the balancing of benefits and costs that was the basis for the Division's preliminary decision was appropriate. Based upon comments and information received during the public comment period, the Division may reverse its preliminary determination regarding the social or economic importance of a proposed activity.	Intergovernmental coordination minimum process states that upon request, the Division will provide copies of the completed antidegradation review worksheet and/pr public notice to state and federal government agencies along with a written request to provide comments by the public comment deadline. The antidegradation review findings will be subjected to Delaware's public participation requirements. A separate public notice for purposes of antidegradation need not be issued.	regarding whether to authorize the proposed activity pursuant to the State's antidegradation requirements. *If the applicant review process results in a denial of the permit, then the applicant has the right to appeal the decision to the Environmental Quality Commission (EQC)*. In this situation, the antidegradation review should be made available to the EQC. If the appeal is successful and the EQC directs DEQ to proceed with a permit, then the antidegradation review will be included in the staff report and made available for public comment and intergovernmental coordination during the usual period for comment on the application.	discharge.
Burden of proof needed to demonstrate that lower WQ is necessary to accommodate important economic or social development	The applicant is required to demonstrate the social and economic importance of the proposed activity.	Same as Arizona	Need a through analysis to demonstrate the costs (see appendix C) and must demonstrate that it is necessary and important	A person proposing a new, additional or increased discharge to High Quality or Exceptional Value Waters, who has demonstrated that no environmentally sound and cost effective nondischarge alternative exists under clause (A), shall demonstrate that the discharge will maintain and protect the existing quality of receiving surface waters, except as provided in subparagraph (iii)."

				The Department may allow a reduction of water quality in a High Quality Water if it finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the Commonwealth'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
Specific requirements for determining "important economic and social development"	The applicant is required to demonstrate the social and economic importance of the proposed activity. The factors to be addressed in such a demonstration may include, but are not limited to, the following: (a) employment (i.e., increasing, maintaining, or avoiding a reduction in employment), (b) increased production, (c) improved community tax base, (d) housing, and (e) correction of an environmental or public health problem.	Same as Arizona	A number of indicators must be considered, all of which would be projected to occur if a lowering of water quality was not allowed. These include indicators such as increases in unemployment, losses to the local economy, changes in household income, decreases in tax revenues, indirect effects on other businesses, and increases in sewer fees	Public need/social services, public health/safety, quality of life, employment, tax revenues, tourism, etc.
How State assures that existing uses are fully protected while allowing lower WQ	Prior to authorizing any proposed activity that would significantly degrade a tier 2 water, the Department shall ensure that existing uses will be fully protected consistent with the tier 1 implementation	Same as Arizona		

	procedures provided.			
How State evaluates BMPs for NPS control in antideg review				
Criteria used to identify ONRWs	Unique Waters The factors to be considered in determining whether to assign a Unique Waters designation may include the following: 1.) The navigable water is of exceptional recreational or ecological significance because of its unique attributes, including but not limited to, attributes related to the geology, flora, fauna, water quality, aesthetic values or the wilderness characteristics of the navigable water. 2.) Threatened or endangered species are known to be associated with the navigable water and the existing water quality is essential to the maintenance and propagation or the navigable water provides critical habitat. Outstanding water quality is not a prerequisite for Unique Waters designation. The public may nominate any state water for Unique Waters protection by written request. The written request should contain 1. A map and a description of the navigable water; 2. A written statement in support of the nomination, including specific reference to the applicable criteria for unique waters	The factors to be considered in determining whether to assign an ONRW designation may include the following: (a) location (e.g., on federal lands such as national parks, national wilderness areas, or national wildlife refuges), (b) previous special designations (e.g., wild and scenic river), (c) existing water quality (e.g., pristine or naturally-occurring), (d) ecological value1 (e.g., presence of threatened or endangered species during one or more life stages), (e) recreational or aesthetic value (e.g., presence of an outstanding recreational fishery), and (f) other factors that indicate outstanding ecological or recreational resource value (e.g., rare or valuable wildlife habitat). Outstanding water quality is preferred but not a prerequisite for ONRW designation. The public may nominate any state water for ONRW protection at any time by sending a written request. The	By definition at 340-041-0006(42), Outstanding Resource Waters must be High Quality Waters, i.e. a waterbody must meet all water quality criteria. OAR 340-041-0026(1)(a)(D) further clarifies the definition of ORW to mean that the waterbody must also constitute an outstanding state or national resource based on its extraordinary water quality, ecological values, or requirement for special water quality protection in order to maintain critical habitat areas. The Environmental Quality Commission designates a waterbody as an Outstanding Resource Water after a process of nomination, review, and public comment.	Does not give criteria to identify ONRWs

	classification, 3. Supporting evidence demonstrating that one or more of the applicable unique waters criteria has been met; and 4.) Relevant water quality data.	written request should explain why an ONRW designation is warranted based on one or more of the factors identified above.		
Application of antidegradation policies to other activities such as channel and flow alterations				
Determination of cumulative WQ impacts				
Requirements for alternatives analyses	The applicant is required to prepare an evaluation of alternatives. The evaluation must provide, at a minimum, substantive information pertaining to the costs and environmental impacts associated with the following alternatives: pollution prevention measures, reduction in scale of project, water recycle or reuse, process changes, innovative treatment technology, advanced treatment technology, seasonal or	Same as Arizona	In evaluating the alternatives, the discharger/applicant/ source must consider all known, available, and reasonable methods of prevention, control, and treatment to prevent the lowering of water quality. At a minimum, the following alternatives must be considered: • Improved operation and maintenance of existing treatment system	A person proposing a new, additional or increased discharge to High Quality or Exceptional Value Waters shall evaluate nondischarge alternatives to the proposed discharge and use an alternative that is environmentally sound and cost-effective when compared to the cost of the proposed discharge. If a

	controlled discharge options to avoid critical water quality periods, improved operation and maintenance of existing treatment systems, and alternative discharge locations.		• Recycling or reuse with no discharge • Discharge to on-site system • Seasonal or controlled discharges to avoid critical water quality periods • Discharge to sanitary sewer • Land application	nondischarge alternative is not environmentally sound and cost-effective, a new, additional or increased discharge shall use the best available combination of cost-effective treatment, land disposal, pollution prevention and wastewater reuse technologies.

Antidegradation Information	Antidegradation Summary Information by State and EPA Region (continued)		
	Region 8	**West Virginia**	**Wyoming**
Written Antideg Policy Adopted / Year of Adoption		Title 47-02, Requirements Governing Water Quality Standards/2008	Chapter 1 – Wyoming Surface Water Quality Standards, Section 8 Antidegradation/2007
Written Implementation Methods Adopted / Year of Adoption		Title 60-05, Antidegradation Implementation Procedures/2008	Wyoming Surface Water Quality Standards Implementation Policies for Antidegradation, Mixing Zones, Turbidity, Use Attainability Analysis/2001
Contact / web site	http://www.epa.gov/region8/water/wqs/wqsdocs.html	http://www.wvsos.com/csr/verify.asp?TitleSeries=47-02 http://www.wvsos.com/csr/verify.asp?TitleSeries=60-05	http://www.epa.gov/waterscience/standards/mixingzone/files/WY_Implementation_Policies.pdf
How are existing uses defined and the level of WQ needed to protect those uses?	Existing use means a use that is actually attained in the waterbody on or after November 28, 1975, whether or not it is included in the water quality standards.	"Existing uses" are those uses actually attained in a water on or after November 28, 1975, whether or not they are included as designated uses in the water quality standards. Tier 1 protection	Water uses in existence on or after November 28, 1975 and the level of water quality necessary to protect those uses shall be maintained and protected.
How is Baseline or Existing WQ Determined or Characterized?	The Division will follow the state procedures used to characterize existing background quality that are used for purposes of developing Total Maximum Daily Loads (TMDLs). The characterization of existing background water quality should appropriately consider spatial and temporal variability. However, where background water column data are limited, the Division may conclude that a segment is high quality and subject to tier 2 protection based on ancillary data such as land use	"Baseline water quality" means that ambient concentration established at the time of an initial antidegradation review for a stream or stream segment or any other water(s) of the state. Where baseline water quality has not been established for the water segment the regulated entity proposes to impact or has not been established for a parameter of concern that is reasonably expected to be discharged into the water segment as a result of the proposed regulated activity, the Secretary must determine the baseline water quality for the receiving water body. The Secretary may consider data	The Antidegradation Implementation Policy identifies "baseline load" under the discussion of determination of significance for Class 2 waters (Tier 2 review). The Implementation Policy states that the baseline total load shall be determined at the time of the first proposed new or increased water quality impacts to the reviewable waters.

	information, population and demographics, geology, presence of point or nonpoint sources, climatological data, or the health of the aquatic community.	for establishing the baseline water quality from a federal or state agency, the regulated entity, the public, or any other source, as long as the data are recent and reliable. If adequate data are not available, the agency may, in conjunction with the regulated entity or on its own initiative, establish a plan for obtaining the necessary data. The regulated entity may be required to provide baseline water quality for those parameters of concern that are reasonably expected to be discharged as a result of the regulated activity into the affected water segment to help the permitting agency determine the baseline water quality, the existing uses, and the applicable tier. The regulated entity may contact the Secretary prior to initiating the baseline water quality evaluation to seek concurrence with its determination of the parameters of concern for is proposed activity and its proposed sampling protocol.	
Definition of new or expanded discharge; when/how is antideg review required?		New or expanded discharge not explicitly defined in the Antidegradation policy or implementation policy. Section 3.7 of the Implementation Policy states, "On or after July 2,200 1, the effective date of these implementation procedures, new and reissued WV/NPDES general permits will be evaluated to consider the potential for significant degradation as a result of the permitted activity."	The Antidegradation Implementation Policy does not explicitly define new or expanded discharge. The language in the Antidegradation Implementation Policy implies that "expanded" discharge means an increase of pollution from an existing discharge.
How is significance of degradation determined?	The likelihood that a proposed activity will pose significant degradation will be judged by the Division for all water quality parameters that would be affected by the proposed activity. Such significance judgments will be made on a parameter-by-parameter basis. The Division will identify and eliminate from further review only those proposed activities that present insignificant threats to water quality. Proposed activities will be considered significant and subject to tier 2 requirements where significant degradation is	Section 5.6.c of the Antidegradation Implementation Policy provides process for determining significant degradation. For Tier 2 degradation is significant if the activity results in a reduction in the water segment's available assimilative capacity (the difference between the baseline water quality and the water quality criteria) of ten percent or more at the appropriate critical flow condition(s) for parameters of concern. Degradation will also be deemed significant if the proposed activity, together with all other activities allowed after the baseline water quality is established, results in a reduction in the water segment's available assimilative capacity of 20% or more at the appropriate critical flow conditions for the parameters of concern. This section excepts	The significance determination shall be made with respect to the net effect of the new or increased water quality impacts of the proposed activity, taking into account any environmental benefits resulting from the activity and any water quality-enhancing mitigation measures impacting the segment or segments under review, if such measures are incorporated with the proposed activity. The activity shall be considered not to result in significant degradation, if: the activity may be permitted

	projected for one *or more* water quality parameters.	discharges affecting dissolved oxygen, pH or fecal coliform will be deemed insignificant provided that specific numeric benchmarks are met. The policy also states that significant degradation will be determined on a parameter-by-parameter basis for each parameter of concern that might be affected by the regulated activity.	under a general permit established by the state for discharges regulated under section 402 of section 404; or the new or increased loading from the source under review is less than 10% of the existing total load to that segment for critical constituents, provided that the cumulative impact of increased loadings from all sources does not exceed 10% of the baseline total load established for the segment; or the new or increased loading from the source under review will consume, after mixing, less than 20% of the available increment between low flow pollutant concentrations and the relevant standards for critical constituents; or the activity will result in only temporary or short tem changes in water quality.
Does antideg review apply to nonpoint sources and 401 WQCs?		401 WQCs are not required to undergo a Tier 2 antidegradation review, provided, however, that where an individual 401 certification is required, the Secretary may require an appropriated antidegradation review. Where section 401 allows for filling of a water, this exemption only applies to the site of the fill, and does not apply to activities downstream of the fill.	- The Department adopted a policy on October 11, 1996 regarding the issuance of 401 certifications for activities on Class 1 waters (Tier 3 protection). This policy was specifically designed to ensure the protection of existing quality and uses of Class 1 waters and serves as the antidegradation implementation procedure for activities subject to 401 certification on Class 1 waters. - Nonpoint sources of pollution are not regulated by permits issued by the Department, but are controlled by the voluntary application of cost effective and reasonable best management practices. For Class 1 waters, best management practices will maintain

			existing quality and water uses.
Which waters are subject to Tier 2 protection and how is this determined?	Segments may be afforded tier 2 protection by the state in one of two ways. The first way is for the Board to assign tier 2 protection through a rulemaking action. Where this occurs, a high quality use designation will be added to the state standards for the segment. The sole implication of a high quality designation in the state water quality control program is that it *mandates* application of the tier 2 review requirements described below. The second way to afford tier 2 protection is for the Division to make a determination that this level of protection is warranted during the antidegradation review of a proposed activity. Such decisions will be based on all relevant information including any ambient water quality (i.e., physical, chemical, biological) data submitted by the applicant. Decisions regarding whether a waterbody is high quality and subject to tier 2 protection requirements will be based on a best professional judgment of the overall quality and value of the segment. In general, waters with existing quality that is better than necessary to support fishable/swimmable uses will be considered high quality and subject to tier 2 requirements.	The existing high quality waters. - 4.1b.I. High quality waters are those waters whose quality is equal to or better than the minimum levels necessary to achieve the national water quality goal uses. - 4.1.b.2. High quality waters may include but are not limited to the following: - 4.1.b.2.A. Streams designated by the West Virginia Legislature under the West Virginia Natural Stream Preservation Act, pursuant to W. Va. Code 922-13-5; and - 4.1.b.2.B. Streams listed in West Virginia High Quality Streams, Fifth Edition, prepared by the Wildlife Resources Division, Department of Natural Resources (1986). - 4.I.b.2.C. Streams or stream segments which receive annual stockings of trout but which do not support year-round trout populations.	Applies to high quality waters under Class 2 of the state's classification system. These are waters which have an existing quality that is better than the established use-support criteria and where an assimilative capacity exists for parameters that would be affected by a proposed activity. Waters classified as 2AB, 2A, 2B, or 2C are known to support populations of fish and/or drinking water supplies.
Intergovernmental coordination and public participation provisions required?	The Division shall conduct all antidegradation reviews consistent with the intergovernmental coordination procedures included in the state's continuing planning process. Because the socio-economic importance of a	Need satisfaction of the intergovernmental coordination of the state's continuing planning process and opportunity for public comment and hearing	Yes. The Antidegradation Policy under Section 8 of Water Quality Standards regulations states that Wyoming Department of Environmental Protection must conduct intergovernmental coordination and public participation before

	proposed activity is a question best addressed by local interests, the Division will give particular weight to the comments submitted by local governments, land use planning authorities, and other local interests in determining whether the balancing of benefits and costs that was the basis for the Division's preliminary decision was appropriate. Based upon comments and information received during the public comment period, the Division may reverse its preliminary determination regarding the social or economic importance of a proposed activity.		issuing a permit to a new or increased source of pollution that meets the five antidegradation policy conditions. The antidegradation implementation policy specifies public notice and comment period for issuance of NPDES point sources (non-stormwater) and stormwater industrial permits and acknowledges lack of public comment periods for stormwater construction general permits (beyond that held for permit issuance) and 401/404 permits.
Burden of proof needed to demonstrate that lower WQ is necessary to accommodate important economic or social development		Must demonstrate that lowering water quality is necessary in the area in which the waters are located. In evaluating the regulated activity's demonstration of socio-economic importance, the agency may use EPA's Interim Economic Guidance for Water Quality Standards Workbook (EPA 823-B-95-002, March, 1995).	In determining the economic reasonableness of water quality control alternatives, the Administrator may use some of the following factors to weigh the reasonableness of the various alternatives. (1) Whether the costs of the alternative significantly exceed the costs of the proposal; (2) For publicly owned treatment works (POTWs), whether user charges resulting from the alternative would significantly exceed user charges for similarly situated POTWs or public water supply projects; (3) For any discharger into waters of the state, whether the treatment alternative represents

			costs that significantly exceed costs for other similar dischargers to similar stream classes, or standard industry practices. (4) Any other environmental benefits, unrelated to water quality which may result from each of the alternatives examined.
Specific requirements for determining "important economic and social development"	The applicant is required to demonstrate the social and economic importance of the proposed activity. The factors to be addressed in such a demonstration may include, but are not limited to, the following: (a) employment (i.e., increasing, maintaining, or avoiding a reduction in employment), (b) increased production, (c) improved community tax base, (d) housing, and (e) correction of an environmental or public health problem.	The regulated activity must document such factors as employment, increased production, improved community tax base, housing, ancillary community economic benefit, correction of an environmental or public health problem, etc. In addition, a regulated entity may be required to submit the following: information pertaining to current aquatic life, recreational, or other water uses; information necessary to determine the environmental impacts that may result from the proposed activity; facts pertaining to the current state of economic development in the area; government fiscal base; and land use in the areas surrounding the proposed activity.	If the applicant submits evidence that the activity is important development, it shall be presumed important unless information to the contrary is submitted in the public review process. The determination shall take into account information received during the public comment period and shall give substantial weight to any applicable determinations by local governments or land use planning authorities.

How State assures that existing uses are fully protected while allowing lower WQ	Prior to authorizing any proposed activity that would significantly degrade a tier 2 water, the Division shall ensure that existing uses will be fully protected consistent with the tier 1 implementation procedures provided.	The Antidegradation Implementation Policy refers to the use of trading as one mechanism for assuring existing uses are protected. For example, under Tier 2 protection, the policy states: "A proposed activity that will result in a new or expanded discharge in a water subject to Tier 2 protection may be allowed where the applicant agrees to implement or finance upstream controls of point or nonpoint sources sufficient to offset the water quality effects of the proposed activity from the same parameters and insure an improvement in water quality as a result of the trade."	For Class 1 waters, existing uses will be protected by implementing the requirements described in Section III of this implementation policy. For High Quality and Use Protected Waters, this implementation policy assumes that attainment of the criteria assigned to protect the current waterbody classification will serve to maintain and protect all existing uses. In some cases, however, water quality may have improved in the segment since the classifications were assigned, resulting in an existing use that is higher than the current classification. In other cases, the classifications may have been assigned based on inadequate information, resulting in classifications that do not fully encompass the existing uses of the segment. Where the antidegradation review results in the identification of an existing use that has protection requirements that are clearly defined, but are not addressed in the current classification and criteria, the Division will ensure that such existing uses are fully protected, based on implementation of appropriate numeric or narrative water quality

			criteria or criteria guidance. For example, where a proposed activity will result in the discharge of a substance for which sufficient data to derive appropriate criteria are available (e.g. §304(a) criteria), but numeric criteria have not been adopted in the Chapter 1 regulations, the Division will develop effluent limitations that will protect the existing use. In cases where there is a proposed discharge where federally-listed threatened or endangered species are present (i.e. aquatic species), the Division will work with the U.S. Fish and Wildlife Service and EPA to gather available information and evaluate whether special existing use protection requirements are necessary to protect the listed species. Where there is a question regarding the appropriate classification of a segment, the applicant may be required to provide information regarding existing uses.
How State evaluates BMPs for NPS control in antideg review		If BMPs are demonstrated to be inadequate to reduce or minimize water quality impacts, the Secretary may require that more appropriate BMPs be developed and applied	No mention of BMP evaluation. The Antidegradation Implementation Policy states that NPS BMPs will maintain existing quality and water uses.

Criteria used to identify ONRWs	The factors to be considered in determining whether to assign an ONRW designation may include the following: (a) location (e.g., on federal lands such as national parks, national wilderness areas, or national wildlife refuges), (b) previous special designations (e.g., wild and scenic river), (c) existing water quality (e.g., pristine or naturally-occurring), (d) ecological value1 (e.g., presence of threatened or endangered species during one or more life stages), (e) recreational or aesthetic value (e.g., presence of an outstanding recreational fishery), and (f) other factors that indicate outstanding ecological or recreational resource value (e.g., rare or valuable wildlife habitat). Outstanding water quality is not a prerequisite for ONRW designation. The public may nominate any state water for ONRW protection at any time by sending a written request. The written request should explain why an ONRW designation is warranted based on one or more of the factors identified above.	ONWRs include, but are not limited to, all streams and rivers within the boundaries of Wilderness Areas designated by The Wilderness Act within the State; all Federally designated rivers under the "Wild and Scenic Rivers Act; all streams and other bodies of water in state parks which are high quality waters or naturally reproducing trout streams; waters in national parks and forests which are high quality waters or naturally reproducing tout streams; waters designated under the "National Parks and Recreation Act of 1978"; and those waters whose unique character, ecological or recreational value, or pristine nature constitutes a valuable national or state resource.	Class 1, Outstanding Waters are based on value determinations rather than use support. Class 1 waters are those surface waters in which no further water quality degradation by point source discharges other than from dams will be allowed. In designating Class 1 waters, water quality, aesthetic, scenic, recreational, ecological, agricultural, botanical, zoological, municipal, industrial, historical, geological, cultural, archaeological, fish and wildlife, the presence of significant quantities of developable water, and other values of present and future benefit to the people are considered. (taken from http://www.blm.gov/nstc/WaterLaws/wyoming2.html)
Application of antidegradation policies to other activities such as channel and flow alterations		Not discussed.	The Antidegradation Implementation Policy doesn't specifically address other activities, although it does single out stormwater industrial and construction discharges.
Determination of cumulative WQ		Not explicitly addressed, although language at Section 5.6.c in the Antidegradation Implementation Policy touches on this by stating,	Not mentioned specifically.

impacts		"Degradation will also be deemed significant if the proposed activity, **together with all other activities allowed after the baseline water quality is established**, results in a reduction in the water segment's available assimilative capacity of 20% or more at the appropriate critical flow conditions for the parameters of concern.	
Requirements for alternatives analyses	The evaluation prepared by the regulated entity must provide substantive information pertaining to the cost and environmental impacts associated with the following alternatives: pollution prevention measures, reduction in scale of project, water recycle or reuse, process changes, innovative treatment technology, advanced treatment technology, seasonal or controlled discharge options to avoid critical water quality periods, improved operation and maintenance of existing treatment systems, and alternative discharge locations.	The evaluation prepared by the regulated entity must provide substantive information pertaining to the cost and environmental impacts associated with the following alternatives: pollution prevention measures, reduction in scale of project, water recycle or reuse, process changes, innovative treatment technology, advanced treatment technology, seasonal or controlled discharge options to avoid critical water quality periods, improved operation and maintenance of existing treatment systems, and alternative discharge locations.	The assessment shall at a minimum, address practical water quality control technologies, the feasibility and availability of which has been demonstrated under field conditions similar to those of the activity under review.