

Arizona Department of Environmental Quality

Antidegradation Implementation Procedures



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Glossary

Alternatives Analysis: An evaluation of possible cost-effective, reasonable alternatives to regulated discharges that might degrade water quality, including less-degrading alternatives, non-degrading alternatives, and no-discharge alternatives, such as treatment process changes, relocated discharge facilities, land application, reuse, and subsurface discharges. The evaluation must provide substantive information pertaining to the cost and environmental impacts associated with the proposed discharge and the alternatives being evaluated, so that the most cost-effective, most reasonable, and least degrading approach for addressing impacts from the proposed discharge can be identified.

Antidegradation: 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.

Available Assimilative Capacity: The difference between pollutant quantities or loads in a surface water as characterized by baseline water quality and the projected or modeled water quality criteria threshold for the pollutant under review; the concentration increment between the baseline water quality and the water quality criterion for any pollutant.

Baseline Water Quality: A characterization of selected pollutants in a surface water as measured and expressed during a specified time period. Once established, baseline water quality is a fixed quantity/quality unless it is updated by ADEQ to reflect changes in water quality.

Degradation: A decline in the chemical, physical, or biological conditions of a surface water or other decline in water quality as measured on a pollutant-by-pollutant basis

Designated Use: A use of a surface water specified in the surface water quality standards rules by ADEQ, including those uses specified in R18-11-104. Designated uses include domestic water source, full-body contact recreation, partial body contact recreation, fish consumption, aquatic and wildlife (cold water), aquatic and wildlife (warm water), aquatic and wildlife (ephemeral), aquatic and wildlife (effluent dependent waters), agricultural irrigation, and agricultural livestock watering.

Effluent-Dependent Water: A surface water that consists of discharges of treated wastewater that is classified as effluent-dependent water by the Director under R18-11-113. An effluent-dependent water is a surface water that, without the discharge of treated wastewater, would be an ephemeral water.

Ephemeral Water: A surface water that has a channel that is at all times above the water table and that flows only in direct response to precipitation.

Existing Use: A use of a surface water that has actually occurred in a surface water on or after November 28, 1975, or a use supported by water quality at any time since that date, whether or not the uses are included as designated uses in the surface water quality standards rules.

Existing Water Quality: Baseline water quality.

High Quality Water: A surface water with water quality that is better than the applicable water quality standard for a pollutant.

Intermittent Surface Water: A stream or reach of a stream that flows continuously only at certain times of the year, as when it receives water from a spring or from another surface source, such as melting snow.

Less-Degrading Alternative: A cost-effective, reasonable alternative to a proposed discharge that would result in fewer detrimental changes to water quality as characterized by the baseline water quality assessment.

Minimal Degradation: A deterioration or decline in water quality that results in the consumption of less than 20% of the available assimilative capacity for a pollutant.

National Pollutant Discharge Elimination System: The point source discharge permit program established by §402 of the Clean Water Act [33 U.S.C. § 1342].

Non-Degrading Alternative: A cost-effective, reasonable alternative to a proposed discharge that would result in no significant degradation of water quality as characterized by the baseline water quality assessment.

Outstanding Arizona Water: A surface water that ADEQ has classified as an outstanding state resource water under R18-11-112.

Perennial Surface Water: A surface water that flows continuously throughout the year.

Pollutant: Fluids, contaminants, toxic wastes, toxic pollutants, dredged spoil, solid waste, substances and chemicals, pesticides, herbicides, fertilizers and other agricultural chemicals, incinerator residue, sewage, garbage, sewage sludge, munitions, petroleum products, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and mining, industrial, municipal, and agricultural wastes or any other liquid, solid, gaseous, or hazardous substance.

Regulated discharge: Any discharge that requires a permit or a water quality certification pursuant to a state or federal law (e.g., CWA §402 NPDES permits, CWA §404 Dredge and Fill Permits, and any federal permit or license subject to CWA §401 certification).

Short-Term Degradation: Degradation that is six months or less in duration, i.e., water quality returns to baseline water quality within six months after the discharge commences.

Significant Degradation: The consumption of 20 percent or more of the available assimilative capacity for any pollutant or any consumption of assimilative capacity that exceeds a cumulative cap of 50% of assimilative capacity.

Surface Water: A water of the United States, including the following:

- a. A water that is currently used, was used in the past, or may be susceptible to use in interstate or foreign commerce;
- b. An interstate water, including an interstate wetland;
- c. All other waters, such as an intrastate lake, reservoir, natural pond, river, stream (including an intermittent or ephemeral stream), creek, wash, draw, mudflat, sandflat, wetland, slough, backwater, prairie pothole, wet meadow, or playa lake, the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce, including any such water:
 - i. That is or could be used by interstate or foreign travelers for recreational or other purposes;
 - ii. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
 - iii. That is used or could be used for industrial purposes by industries in interstate or foreign commerce;
- d. An impoundment of a surface water as defined by this definition;

- e. A tributary of a surface water identified in subsections (a) through (d) of this definition; and
- f. A wetland adjacent to surface water identified in subsections (a) through (e) of this definition.

Temporary Degradation: Degradation that is six months or less in duration, i.e., water quality returns to baseline water quality within six months after the discharge commences; short-term degradation.

Tier 1 Protection: Policies and procedures that prohibit degradation which results in the loss of an existing use, or violation of water quality criteria; and prohibit degradation of existing water quality where pollutants of concern do not meet applicable water quality standards. Tier 1 protection applies to all surface waters regardless of existing water quality as the minimum protection level. Tier 1 protection categorically applies to all non-perennial surface waters (i.e., all intermittent streams and ephemeral waters), effluent dependent waters, all canals, and all waters on the state's §303(d) impaired waters list for the pollutants that resulted in the surface water being listed.

Tier 2 Protection: Policies and procedures that prohibit significant degradation of a surface water unless a review of reasonable alternatives and social and economic considerations justifies a lowering of water quality. Tier 2 protection level applies to perennial waters with high quality water (i.e., where existing water quality is better than applicable water quality standards as determined on a pollutant-by-pollutant basis).

Tier 3 Protection: Policies and procedures that prohibit any lowering of water quality in unique waters as identified under R18-11-112 unless it is short-term and temporary, as determined by the Director of ADEQ on a case-by-case basis.

Toxic: A pollutant or combination of pollutants which, after discharge and upon exposure, ingestion, inhalation, or assimilation into an organism, either directly from the environment or indirectly by ingestion through food chains, may cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction), or physical deformations in the organism or its offspring.

Water Quality Criteria: Elements of water quality standards that are expressed as pollutant concentrations, levels, or narrative statements representing a water quality that supports a designated use.

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1 Overview of Arizona's Antidegradation Approach

*Summary of Clean Water Act and State Water Quality Requirements
Uses and Water Quality Criteria
Review of Tier-Based Anti-Degradation Approach
Coverage and General Applicability
Coordination with 305(b) Assessment and 303(d) Listing
Intergovernmental Coordination and Review Process
Public Notification and Participation*

This document has been issued to provide guidance to persons conducting regulated discharges that may degrade water quality in Arizona. Regulated discharges include those that require a permit or a §401 water quality certification pursuant to state or federal law. The information contained in this document is intended to provide guidance only, and is not a substitute for the provisions of any other laws, rules, or regulations.

The guidance that follows addresses implementation procedures for Arizona's antidegradation rule found at A.A.C. 18-11-107 and federal antidegradation policy at 40 CFR §131.12. ADEQ is required by 40 CFR §131.12(a) to develop and adopt a statewide antidegradation policy and to identify methods for implementing that policy. The guidance generally includes:

- ◆ Processes for identifying the antidegradation protection level (i.e., the “*tier*”) that applies to a surface water;
- ◆ Procedures for determining baseline water quality (BWQ);
- ◆ Approaches for assessing water quality degradation;
- ◆ Procedures for identifying and assessing less degrading or non-degrading alternatives;
- ◆ Procedures for determining the importance of economic or social development to justify significant degradation of high quality surface waters;
- ◆ Information on intergovernmental coordination and public participation processes.

1.1 DESIGNATED USES AND WATER QUALITY CRITERIA

Water quality standards, including designated uses and associated water quality criteria can be found in Title 18 Chapter 11, Article 1 of the Arizona Administrative Code. Under the Clean Water Act and Arizona's surface water quality standards rules, existing uses are recognized and designated uses are assigned to surface waters. Designated uses include full body contact recreation, partial body contact recreation, domestic water source, fish consumption, aquatic and wildlife, agricultural irrigation, and livestock watering (*See* A.A.C. R18-11-104). Designated uses may vary in a surface water and may change at various locations. Most surface waters have more than one designated use. Where more than one use exists, or has been designated for a surface water, the use with the most stringent water quality requirements must be maintained and protected.

Existing and Designated Uses

Existing uses are those uses that have actually occurred in a water body since November 28, 1975, or those uses supported by water quality at any time since that date, whether or not the uses are included as designated uses. The antidegradation rule requires ADEQ to maintain and protect existing uses and the level of water quality necessary for existing uses

Designated uses are established by ADEQ and include the uses listed in R18-11-104. These uses include domestic water source, full-body contact recreation, partial-body contact recreation, fish consumption, aquatic and wildlife (cold water), aquatic and wildlife (warm water), aquatic and wildlife (ephemeral), aquatic and wildlife (effluent dependent waters), agricultural irrigation, and agricultural livestock watering. Designated uses are accompanied by an established set of *water quality criteria* that describe numeric or narrative benchmarks designed to ensure that the designated uses are achievable. In accordance with state regulations, designated uses can be established or changed only through administrative rulemaking.

1.2 REVIEW OF THE TIER-BASED ANTIDEGRADATION APPROACH

Federal and state law requires that surface waters be protected from discharges that might degrade water quality. To implement this requirement, it is necessary to identify antidegradation protection levels, or tiers, appropriate to each surface water. The state antidegradation rule, R18-11-107, delineates three tiers of protection for Arizona surface waters. These tiers are applied on a pollutant-by-pollutant basis. Under this approach, surface water quality might degrade for one or more pollutants of concern but be unaffected for other pollutants. Degradation may be further described as minimal (consumption of less than 20% of the assimilative capacity for a pollutant of concern) or significant (consumption of 20% or more of the assimilative capacity for a pollutant). Minimal degradation is permitted under the antidegradation rule and does not trigger comprehensive Tier 2 antidegradation review requirements. Significant degradation triggers the comprehensive Tier 2 antidegradation implementation procedures described below. The tiered protection levels are applied as follows:

Tier 1 –Applies to all surface waters as a minimum level of protection and requires that the level of water quality necessary for existing uses be maintained and protected. ADEQ interprets Tier 1 as requiring that water quality standards be achieved. Tier 1 prohibits further degradation of existing water quality where a pollutant of concern does not meet applicable water quality standards. Tier 1 applies as the default protection level for all surface waters, including intermittent waters, ephemeral waters, effluent dependent waters, canals, and impaired waters on the §303(d) list for the pollutants that resulted in the surface water being listed on the §303(d) list.

Tier 2 – Applies to high quality, perennial surface waters, i.e., where existing water quality is better than applicable water quality standards. Tier 2 requires that existing high water quality be maintained, but allows limited degradation. Tier 2 prohibits significant degradation unless a review of reasonable alternatives and social and economic considerations justifies a lowering of water quality. Tier 2 is the default protection level for all perennial waters.

Tier 3 – Applies only to Outstanding Arizona Waters identified in R18-11-112. Tier 3 prohibits any lowering of water quality in an Outstanding Arizona Water unless it is short-term, as determined by ADEQ on a case-by-case basis.

Where a perennial surface water is listed on the state's §303(d) impaired waters list for one or more pollutants, and where existing water quality for other parameters is better than water quality standards, the surface water will be afforded Tier 1 and Tier 2 protection on a pollutant-by-pollutant basis. That is, Tier 1 protection for the pollutants not meeting water quality standards and Tier 2 protection for pollutants that are equal to or better than water quality standards. Tier 3 protection will be afforded for all pollutants of concern in an Outstanding Arizona Water. **Where a perennial water has not been listed as an impaired water or as an Outstanding Arizona Water, the presumed antidegradation protection level is Tier 2 for all pollutants of concern.**

For Tier 2 protection, determinations regarding the significance of degradation are based on baseline water quality (BWQ) and the relative change in water quality projected to result from the discharge under review. In general, BWQ, as discussed in Chapter 4, defines existing water quality for purposes of antidegradation reviews. BWQ can be established for perennial surface waters through monitoring and water quality assessments conducted by ADEQ, regulated entities, or by others. It is important to note that BWQ for any surface water may be re-evaluated if monitoring indicates a general trend towards water quality improvement.

It is important to understand that baseline water quality is fixed. When a perennial surface water is characterized for the purposes of establishing baseline water quality (BWQ), that characterization serves as the point of reference for future antidegradation reviews for that surface water unless BWQ is updated by ADEQ to reflect changes in water quality. The allowance for up to a 20 percent reduction in assimilative capacity for any pollutant of concern (i.e., "significant degradation") is calculated from BWQ at the time an application to discharge is submitted to ADEQ. Also, ADEQ has established a 50% cumulative cap on the consumption of assimilative capacity calculated from the time BWQ is determined originally. Any consumption of assimilative capacity greater than a 50% cumulative cap on the use of available assimilative capacity is considered to be significant degradation. If a regulated discharge consumes more than 20% of available assimilative capacity for a pollutant or exceeds the 50% cumulative cap, the regulated discharge would be required to conduct an alternatives analysis and demonstrate "important economic or social development" if allowances are sought to further reduce assimilative capacity. If such demonstrations are made, ADEQ may allow consumption of additional assimilative capacity as long as intergovernmental and public participation processes are followed and water quality standards are not violated.

Degradation is generally assumed to be significant if a discharge results in the reduction of a surface water's *assimilative capacity* for any pollutant of concern by 20 percent or more during critical flow conditions or the discharge consumes any percentage of assimilative capacity beyond 50% of the total available assimilative capacity. If the level of degradation is estimated to be less than 20 percent and the 50% cumulative cap is not exceeded— i.e., not significant — and existing uses are maintained, the antidegradation review process is complete and the applicant may proceed with permitting. Details on the antidegradation review process for waters protected under each tier — including degradation assessment, alternatives analysis, and social and economic impacts evaluation — are outlined in the following chapters. Appendix A, Antidegradation Review Flow Chart, provides an overview of the Tier 1, 2, and 3 review processes.

1.3 COVERAGE AND GENERAL APPLICABILITY

General Coverage

In general, the antidegradation implementation procedures described in this guidance apply to a regulated discharge that may affect surface water quality. These include point source discharges regulated under the Arizona Pollutant Discharge Elimination System (NPDES) and the National Pollutant Discharge Elimination System (NPDES) permit programs; discharges which result in the placement of dredged or fill material into surface waters regulated under §404 of the Clean Water Act; federal permits and licenses that are subject to state water quality certification under §401 of the Clean Water Act; and other regulated discharges that may degrade surface water quality.

Non-point Source Coverage

Non-point source discharges (NPS) are not exempt from antidegradation requirements. ADEQ has statutory authority to adopt rules to regulate non-point source discharges of pollutants to surface waters [A.R.S. §49-203(A)(3)]. However, ADEQ has not yet used this authority to establish a regulatory program to control non-point source discharges of pollutants. Thus, non-point source discharges of pollutants currently are not regulated discharges that are subject to ADEQ antidegradation review. ADEQ may establish a regulatory program to control non-point source pollution in the future. Until ADEQ creates regulatory programs to control non-point source discharges of pollutants, antidegradation review requirements do not apply.

In March 1994, US EPA transmitted guidance regarding non-point sources and the antidegradation provisions of the water quality standards, with clarifying remarks for antidegradation implementation. US EPA's regulatory interpretation of 40 CFR §131.12(a)(2) is that federal antidegradation policy does not require ADEQ to establish best management practices (BMPs) for non-point source pollution control *where regulatory programs requiring BMPs do not exist*. The Clean Water Act leaves it to the states to determine what, if any, controls on non-point sources are needed to provide for attainment of state water quality standards. States may adopt regulatory or voluntary programs to address non-point sources of pollution. 40 CFR §131.12(a)(2) does not require that states adopt or implement best management practices for non-point sources prior to allowing point source degradation of high quality water. However, where a state has a regulatory program for non-point source pollution control, the state must assure that such controls are properly implemented before authorization is granted to allow degradation of water quality. US EPA also interprets 40 CFR §131.12(a) as prohibiting degradation as unnecessary to accommodate important economic and social development if it could be partially or completely prevented through implementation of existing state-required BMPs.

The table on the following page summarizes the antidegradation review approach used in Arizona, which is based on the type of regulated discharge under consideration (e.g., by permit type), the receiving water, and the baseline water quality for relevant pollutants of concern in the receiving surface water.

Table 1-1. Summary of Arizona Antidegradation Permit Review Procedure – Applicable to All Discharges

Type of Permit:	Individual Arizona Pollutant Discharge Elimination System Permits (Non Storm Water)			General AZ PDES Permits		404 Permits & 401 Certifications	
Receiving Water:	Ephemeral Waters Intermittent Streams Effluent Dependent Waters	Perennial Streams, Rivers, and Lakes	Outstanding Arizona Waters	All Waters	Outstanding Arizona Waters	All Waters	Outstanding Arizona Waters
Antidegradation Requirements:	Meet discharge standards composited from: <ul style="list-style-type: none"> ▪ WQ Criteria ▪ Technology-Based Standards (e.g., BAT) Must not cause violation of WQ Standards No BWQ determination	Establish Baseline Water Quality using: <ul style="list-style-type: none"> ▪ Existing Ambient WQ and/or Effluent Data ▪ New Credible Data Must not cause violation of WQ Standards If BWQ parameters are equal to or better than WQ Standards, cannot consume 20% or more of the available pollutant assimilative capacity or exceed a cumulative cap of 50% except under certain conditions (see below)	Meet requirements based on individual ADEQ antidegradation review Must not cause violation of WQ Standards Must protect existing uses	Requirements established at the time of general permit issuance or renewal. Compliance with BMPs stipulated by general permit conditions and/or §401 certification Must not cause violation of WQ Standards Must protect existing uses	No degradation allowed unless it is short-term Must not cause violation of WQ Standards Requirements of nationwide permit established at time of permit issuance or renewal Compliance with BMPs stipulated by permit and 401 certification §401 certification of individual §404 permits based on §401(b)(1) guidelines	Antidegradation review conducted during §401 certification of nationwide and individual permits Requirements of nationwide permit established at time of permit issuance or renewal Compliance with BMPs stipulated by permit and 401 certification §401 certification of individual §404 permits based on §401(b)(1) guidelines	No degradation allowed unless it is short-term Must not cause violation of WQ Standards Must protect existing uses
Additional Requirements:		If consuming ≥ 20% of assimilative capacity or ≥ 50% cumulative cap, must conduct alternatives analysis and demonstrate that proposed discharge is necessary to accommodate important economic or social development.	Analysis of alternatives may be required; no degradation of Outstanding Arizona Waters allowed unless it is short-term	Analysis of alternatives may be required	No degradation of Outstanding Arizona Waters allowed unless it is short-term	Must not cause violation of WQ Criteria	No degradation of Outstanding Arizona Waters allowed unless it is short-term

1.5 COORDINATION WITH 305(B) ASSESSMENT AND 303(D) LISTING

§305(b) of the Clean Water Act requires each state to prepare and submit to U.S. Environmental Protection Agency (US EPA) a biennial report describing water quality of all surface waters in the state. Each state must monitor water quality and review available data to determine if water quality standards are being met. From the §305(b) report, the §303(d) list is created which identifies surface waters that do not meet water quality standards. These waters are known as *water quality limited waters* or *impaired waters*. Identification of a surface water as impaired may be based on a violation of a numeric or narrative water quality standard.

To coordinate antidegradation reviews with the §305(b) and §303(d) listing process, ADEQ will implement the following procedures:

- ◆ *Tier 1 Protection (applicable to all waters):* No further degradation of existing water quality is permitted in a surface water where the existing water quality does not meet applicable water quality standards. Impaired waters are identified on Arizona's §303(d) List and targeted for future Total Maximum Daily Load (TMDL) development.
- ◆ *Tier 2 Protection:* There will be no §303(d) listings based on the results of a Tier 2 antidegradation review. If a §305(b) water quality assessment shows that significant degradation of a surface water is occurring, but water quality standards have not been violated, ADEQ may conduct a special study of the extent and source(s) of degradation to determine likely trends and explore possible antidegradation actions. Where possible, ADEQ may develop an action plan for halting and reversing such degradation by providing technical and other assistance to address probable sources of degradation and implement appropriate management practices, awarding priority points for grant or other funding programs targeted at water quality protection, amending permits or water quality certification conditions, and working with stakeholders to support actions needed to protect and restore water quality.
- ◆ *Tier 3 Protection:* No long-term degradation is allowed in the Outstanding Arizona Waters (OAW) afforded Tier 3 protection. If a §305(b) assessment shows that long-term degradation of an OAW is occurring, ADEQ may conduct a special study of the extent and source(s) of degradation to determine likely trends and explore possible antidegradation actions. Where possible, ADEQ may develop an action plan for halting and reversing such degradation by providing technical and other assistance to probable sources of degradation to implement appropriate management practices, awarding priority points for grant or other funding programs targeted at water quality protection, amending permits or water quality certification conditions, and working with stakeholders to support actions needed to protect and restore water quality.

1.6 Intergovernmental Coordination and Review Process

Federal and state regulations require intergovernmental coordination and public participation for Tier 2 reviews and public participation in decisions that may result in water quality degradation. Coordinating antidegradation reviews among various agencies and other interested parties will involve significant cooperation in gathering data, conducting assessments, analyzing alternatives and evaluating potential social and economic impacts. A list of agencies that may be involved in the intergovernmental coordination and review process is included as Appendix E of this document.

Where applicable and practical, the antidegradation review procedure will be integrated into and proceed concurrently with existing environmental reviews pursuant to the issuance of NPDES permits, Clean Water Act §404 permits, water quality certifications issued under §401 of the Clean Water Act, and other regulatory programs. Information contained within existing environmental reviews, such as environmental assessments, environmental impact statements, facility plans, and findings of no significant impact may be used to provide part or all of the requirements of the antidegradation procedure and review.

Persons proposing discharges that might degrade water quality are encouraged to notify ADEQ before determining baseline water quality or applying for a permit. Implementation of Arizona's antidegradation policy will require considerable consultation, coordination, and cooperation to ensure that relevant issues are addressed early in the review process. For comprehensive Tier 2 assessments on perennial waters, determining BWQ, assessing projected impacts, analyzing possible alternatives, and evaluating economic or social benefits, if applicable, must occur prior to issuing an individual NPDES permit. Therefore, it is recommended that an applicant discharging into a perennial water meet with ADEQ in a pre-application conference at least two years prior to permit issuance. Timely notification and early consultation with ADEQ will help ensure that the issuance of permits can proceed without disruption to facility design, construction, or other activities planned by the applicant.

1.7 PUBLIC NOTIFICATION AND PARTICIPATION

Information on baseline water quality, existing or designated uses, water quality standards, applicability of protection tiers, antidegradation assessments, impact analyses, discharge permits, monitoring reports, agency decisions, and other matters related to antidegradation reviews will be documented by ADEQ and made part of the public record. Public notification of proposed actions and requests for public comment and hearings will be made in accordance with Chapter 8.

2 Tiered Protection Levels

Description of Tiers and Procedure for Tier-Based Listings Process for Identifying or Revising Tiers

2.1 DESCRIPTION OF TIERS AND PROCEDURE FOR TIER-BASED LISTINGS

Federal and state regulations require that surface waters be protected from discharges that might degrade water quality. To implement this requirement, it is necessary to identify protection levels appropriate for each surface water, and in many cases, the specific pollutants of concern. The protection tiers assigned to waters in Arizona are based on existing water quality, water quality standards, and, in some cases, the surface water classification (e.g., Outstanding Arizona Water). Table 2-1 summarizes decision criteria for assigning protection tiers and the antidegradation requirements for each. More information on conducting the antidegradation reviews required for waters requiring Tier 2 and Tier 3 protection can be found in Chapter 3 of this document.

Table 2-1. Tier Descriptions and Summary of Antidegradation Protection Requirements

Tier	Parameters/Waters Included	Protection Requirements
1	All surface waters. All segments on the state's 303(d) impaired waters list for the parameters that resulted in the water segment being listed. All ephemeral streams All intermittent streams All effluent dependent waters All canals.	Existing uses and the level of water quality necessary to protect the existing uses must be maintained and protected, (e.g, numeric water quality criteria for the use must be achieved and/or maintained). Where a surface water is impaired, there shall be no lowering of the water quality with respect to the pollutant causing the impairment.
2	For perennial waters, reflecting high-quality waters, i.e., where the level of water quality is better than applicable water quality criteria. Tier 2 is the default protection level for perennial waters that are not Outstanding Arizona Waters or listed on the §303(d) list.	Existing high quality water in perennial streams and lakes must be protected. No significant degradation of the Tier 2 parameters in the surface water is allowed unless an antidegradation review of reasonable alternatives and social and economic considerations justifies a lowering of water quality. Must also show that the highest requirements for new and existing point sources are achieved and that all cost-effective reasonable nonpoint source controls are implemented. Tier 1 protection applies regardless of any economic or social benefits associated with a proposed activity.
3	Outstanding Arizona Waters.	No lowering of water quality allowed unless it is short-term, as determined by the Director of ADEQ on a case-by-case basis.

2.2 PROCESS FOR IDENTIFYING OR REVISING TIERS

Identifying the Appropriate Tier

At a minimum, all surface waters in Arizona are protected in accordance with Tier 1 antidegradation requirements. Tier 1 applies categorically to all intermittent and ephemeral streams, effluent dependent waters, canals, and to surface waters on the ADEQ §303(d) impaired waters list for the pollutants that resulted in the water segment being listed. Perennial waters that are found to have existing water quality better than applicable water quality standards are protected at the Tier 2 level. Tier 3 protection applies to Outstanding Arizona Waters listed in R18-11-112.

Where a surface water is listed on the state's §303(d) impaired waters list for one or more pollutants, and where water quality for other pollutants is better than water quality standards, the surface water will be assigned Tier 1 and Tier 2 protection on a pollutant-by-pollutant basis.

If a protection tier has not already been determined for a perennial surface water, ADEQ will establish the tier by identifying the existing use(s) of the segment, determining baseline water quality (BWQ), and comparing the attributes of the surface water under study to the criteria for the tiers as cited above. Tier 2 is the default protection level for all perennial waters.

Upon establishing the appropriate tier for a surface water, ADEQ will document its findings and make this information available as part of the public record. Tier levels established by ADEQ may be revised, or alternate tier assignments may be made, through the process described in the following section.

Listing or Revising Tier Assignments

Protection levels for surface waters are determined by ADEQ. ADEQ will track BWQ characterization and the designation of appropriate tier levels for all Arizona surface waters.

Where assessment of data indicate that a surface water does not meet applicable water quality standards, such impaired waters will be included on Arizona's §303(d) List of Impaired Waters as set forth in the Impaired Waters Rule, R18-11-602. Tier 1 protection will apply to those impaired waters for the pollutants that resulted in the surface water being listed. Tier 1 protection also applies categorically to all intermittent and ephemeral streams, effluent dependent waters, and canals.

The criteria and process for classifying Outstanding Arizona Waters with a Tier 3 protection level are prescribed in R18-11-112. This process includes a formal request to the Director of ADEQ, submission of information on water quality and other factors, at least one public meeting in the local area, and rulemaking by ADEQ to classify the surface water as an Outstanding Arizona Water.

Any person may nominate a surface water for Tier 3 protection by following the steps and providing the information required by R18-11-112.

Table 2-2. Process for Classifying Outstanding Arizona Waters for Tier 3 Protection Level

A.A.C. R18-11-112 prescribes the process for classifying Outstanding Arizona Waters (OAW). Any person may nominate a surface water to be afforded Tier 3 level of protection by filing a nomination with ADEQ. ADEQ considers nominations during the triennial review of surface water quality standards. The nominating party has the burden of establishing the basis for classifying a surface water as an OAW. The nomination shall include a map and description of the surface water; a statement in support of the nomination, including specific reference to the applicable criteria for unique water classification; supporting evidence that the applicable criteria are met; and available, relevant water quality data for establishing baseline water quality. ADEQ may classify a surface water as an OAW based on the following criteria:

- The surface water is a perennial water and is in a free-flowing condition;
- The surface water has good water quality. For the purposes of this regulation, "good water quality" means that the surface water has water quality that meets or is better than applicable water quality standards; and
- The surface water meets one or both of the following conditions: (a) is of exceptional recreational or ecological significance because of its unique attributes; (b) threatened or endangered species are known to be associated with the surface water and maintenance of existing water quality is essential to maintenance or propagation of a T&E species or the surface water provides critical habitat for a threatened or endangered species.

ADEQ may adopt, by rule, site-specific water quality standards to maintain and protect existing water quality for an OAW. ADEQ may consider the following factors when making a decision whether to classify nominated surface water as OAW:

- Whether there is the ability to manage the OAW and its watershed to maintain and protect existing water quality;
- The social and economic impact of Tier 3 antidegradation protection;
- Public comments in support or opposition to the OAW classification;
- The timing of the OAW nomination relative to the triennial review of surface water quality standards;
- The consistency of an OAW classification with applicable water quality management plans; and
- Whether the nominated surface water is located within a national or state park, national monument, national recreation area, wilderness area, riparian conservation area, area of critical environmental concern, or has another special use designation (for example, Wild and Scenic River designation).

The Department shall hold at least one public meeting in the local area of a nominated OAW to solicit public comment. The nomination and all other information or input collected during the nomination and consideration process will be made part of the public record.

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3 Antidegradation Review Requirements

Waters Subject to Antidegradation Provisions
Antidegradation Review Requirements by Tier
Antidegradation Review Requirements by Type of Activity
Individual NPDES Permits
Phase 1 Individual Stormwater Permits
Activities Covered by General NPDES Permits
Activities Covered Under Section 404 Permits and 401 Certification

This chapter outlines the review procedure that will be followed when regulated discharges that have the potential to degrade water quality are proposed. The antidegradation review procedure is based on the protection tier assigned to the receiving water, the type of receiving water, existing (i.e., baseline) water quality in the receiving water, the projected impacts, and nature of the proposed discharge.

Regulated discharges that have the potential to degrade water quality are subject to antidegradation review requirements. These include point source discharges regulated under the NPDES permit program; the placement of dredged or fill material regulated under §404 of the Clean Water Act; and discharges regulated under federal permits or licenses that are subject to state water quality certification under §401 of the Clean Water Act. This chapter provides guidance for conducting antidegradation reviews for these regulated discharges.

3.1 WATERS SUBJECT TO ANTIDEGRADATION PROTECTION

Antidegradation protection requirements apply to “surface waters” as defined by R18-11-101(43). “Surface water” has the same meaning as “water of the United States” and includes:

- a. Waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce;
- b. An interstate water, including an interstate wetland;
- c. All other waters, such as an intrastate lake, reservoir, natural pond, river, stream (including an intermittent or ephemeral stream), creek, wash, draw, mudflat, sandflat, wetland, slough, backwater, prairie pothole, wet meadow, or playa lake, the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce, including any such water:
 - ◆ That is or could be used by interstate or foreign travelers for recreational or other purposes;
 - ◆ From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
 - ◆ That is used or could be used for industrial purposes by industries in interstate or foreign commerce.
- d. An impoundment of a surface water as defined by this definition;
- e. A tributary of a surface water identified in subsections (a) through (d) of this definition; and
- f. A wetland adjacent to surface water identified in subsections (a) through (e) of this definition.

3.2 ANTIDEGRADATION REVIEW REQUIREMENTS BY TIER

Tier 1: Reviews for Protecting Existing Uses

Tier 1 reviews must ensure that the level of water quality necessary to protect existing uses is maintained and protected. In general, the “level of water quality necessary to protect existing uses” is defined by state-adopted surface water quality standards.

General Applicability

Tier 1 protection applies to all surface waters. In determining whether a surface water is afforded only Tier 1 protection, ADEQ will focus on whether the surface water meets or fails to meet applicable water quality standards.

Non-Perennial Waters

Lack of flow in ephemeral and intermittent streams makes it difficult to characterize baseline water quality and conduct Tier 2 antidegradation reviews. Similarly, lack of flow and/or the nature of flow in effluent dependent waters also makes these waters difficult to characterize, other than simply characterizing the effluent being discharged. These non-perennial waters will receive Tier 1 protection for all pollutants of concern. Applicable water quality standards must be maintained and protected for these surface waters.

The majority of permitted discharges in Arizona are to non-perennial waters and thus will receive Tier 1 review. For example, most individual National Pollution Discharge Elimination System (NPDES) permit applicants will likely be discharging to an ephemeral stream segment where there is no other existing discharge to the segment, no flow in the channel beyond the immediate area of the discharge, and no available ambient water quality data. No baseline water quality assessment will be required for these discharges. Antidegradation reviews for most discharges will focus on requirements that applicable water quality standards be met end-of-pipe, and technology-based requirements, e.g., best available technology (BAT) is applied as required by permit conditions. Antidegradation review for NPDES-permitted storm water discharges to non-perennial waters will focus on meeting water quality standards to the maximum extent practicable (MEP) through the implementation of best management practices and storm water pollution prevention plans.

Canals

Canals regulated under the surface water quality standards rules may have a variety of surface water and ground water sources. Baseline water quality in canals may change significantly depending on canal inputs and withdrawals. For purposes of antidegradation review, canals will be regulated as Tier 1 waters. Again, applicable water quality standards must be maintained and protected for canals listed in Appendix B of the surface water quality standards rules.

Waters on the Arizona §303(d) List

For surface waters listed on the §303(d) list, Tier 1 protection will be provided for the listed pollutants; non-listed pollutants in §303(d) listed waters may be afforded Tier 2 protection. Under this approach, no discharges will be permitted to cause further degradation for pollutants that do not meet applicable water quality standards unless actions are taken to improve water quality through Total Maximum Daily Load (TMDL) implementation for the pollutant(s) that fail(s) to meet applicable water quality criteria, or through other pre-TMDL actions that result in attainment of the relevant criteria. Where existing uses of a surface water are impaired, there will be no lowering of the water quality with respect to the pollutants of concern causing the impairment.

Tier 2: Reviews for Protecting High Quality Perennial Waters

Tier 2 protection applies to high quality perennial waters with water quality better than applicable water quality standards, as determined on a pollutant-by-pollutant basis. Existing water quality in high quality surface waters must be maintained and protected unless it is determined – after opportunity for intergovernmental review and public comment and hearing – that there are no less-degrading or non-degrading alternatives and allowing significant degradation is necessary to accommodate important economic or social development in the area where the waters are located. In addition, all statutory and regulatory requirements for point and non-point sources must be met. If degradation is allowed, it must not result in violation of applicable water quality standards.

General Applicability

Any regulated discharge to a perennial water is subject to Tier 2 antidegradation review to determine if the discharge will significantly degrade water quality. A discharge that may significantly degrade a Tier 2 protected water is required to go through a comprehensive Tier 2 antidegradation review. If ADEQ determines after an initial assessment that comprehensive Tier 2 review requirements do not apply to a proposed discharge, the discharge must still achieve the highest applicable and established statutory and regulatory requirements, or the conditions of the permit or water quality certification, whichever is most protective. Determinations issued under these provisions will be made in accordance with the public notification process described in Chapter 8.

Expedited vs. Comprehensive Tier 2 Review

No individual Tier 2 degradation assessment is required for discharges regulated under a general permit or §401 water quality certifications of federal licenses and permits. These discharges will be required to meet the conditions of the general permit or §401 certification.

A comprehensive Tier 2 review must be conducted for all discharges regulated under an individual NPDES permit to a perennial water. The Tier 2 antidegradation assessment is to determine whether or not significant degradation will occur, i.e., whether or not 20% or more of the available assimilative capacity for any pollutant of concern will be consumed as a result of the proposed discharge during critical flow conditions.

Comprehensive Tier 2 Antidegradation Review Procedure for Discharges to Perennial Waters

Degradation under Tier 2 shall be deemed significant if the discharge results in a reduction of available assimilative capacity (the difference between the baseline water quality and the applicable water quality standard) of 20 percent or more at the defined critical flow condition(s) for the pollutant(s) of concern. Significant degradation will be determined on a pollutant-by-pollutant basis.

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. If multiple water quality standards apply, the calculations regarding remaining assimilative capacity will be conducted using the most stringent applicable standard.

If a determination is made that significant degradation will occur, ADEQ will determine whether significant degradation is necessary. ADEQ shall determine the necessity of significant degradation by evaluating whether reasonable and cost-effective, less degrading or non-degrading alternatives to the proposed discharge exist. The applicant will be responsible for conducting an alternatives analysis as described in this guidance. ADEQ will evaluate any alternatives analysis submitted by the applicant for consistency with the requirements outlined in Chapter 6. The

alternatives analysis must provide substantive information pertaining to the costs and environmental impacts associated with the following alternatives:

- ◆ Pollution prevention measures
- ◆ Reduction in scale of project
- ◆ Water reuse
- ◆ Treatment process changes
- ◆ Innovative treatment technology or technologies
- ◆ Advanced treatment technology or technologies
- ◆ Seasonal or controlled discharge options to avoid critical flow periods
- ◆ Improved operation and maintenance of existing treatment systems
- ◆ Alternative discharge locations, including subsurface discharges
- ◆ Zero discharge alternatives

After alternatives to allowing significant degradation have been adequately evaluated, a determination shall be made regarding whether cost-effective and reasonable non-degrading or less degrading alternatives to the proposed discharge exist. This determination will be based primarily on the alternatives analysis developed by the regulated entity, but may be supplemented with other information and data. As a rule of thumb, ADEQ will consider non-degrading or less degrading pollution control alternatives with costs that are less than 110 percent of the base costs of the pollution control measures associated with the proposed discharge to be cost-effective and reasonable [*See* Section 6.4].

If it is determined that reasonable, cost-effective, less degrading or non-degrading alternatives to the proposed discharge exist, the project design must be revised accordingly. In general, if such alternative(s) exist, the alternative or combination of alternatives that result in the least amount of degradation must be implemented. If the regulated entity does not agree to adopt such reasonable and cost-effective alternatives, the alternatives analysis findings will be documented and the discharge will not be allowed. If significant degradation would occur even after application of reasonable less degrading or non-degrading alternatives, a determination must be made as to whether the proposed discharge is necessary to accommodate important economic or social development in the area in which the waters are located. ADEQ will evaluate the social and economic justification for consistency with the requirements outlined in Chapter 7. The social and economic importance of the proposed discharge must be documented, including, but not limited to, the following:

- ◆ Employment (e.g., increasing, maintaining or avoiding a reduction in employment)
- ◆ Increased production
- ◆ Improved community tax base
- ◆ Housing (e.g., availability, affordability)
- ◆ Ancillary community economic benefit
- ◆ Correction of an environmental or public health problem

A regulated discharge proposing significant degradation of water protected at the Tier 2 level may also be required to submit information pertaining to current aquatic life, recreational, or other water uses; information necessary to determine the environmental impacts that may result from the proposed discharge; facts pertaining to the current state of economic development in the area (e.g., population, area employment, area income, major employers, types of businesses); data on the government fiscal base; and the nature of land use in the areas surrounding the proposed discharge.

Once the available information pertaining to the socio-economic importance of the proposed discharge has been reviewed by ADEQ, a preliminary determination regarding whether the

degradation is necessary to accommodate important social and economic development must be made. In evaluating the demonstration of social and economic importance, ADEQ will use the procedures outlined in Chapter 7. If the proposed discharge is determined to have social or economic importance in the area where the surface water is located, the basis for that preliminary determination shall be documented and the Tier 2 review shall continue. If significant degradation is proposed, the applicant also must show that the highest requirements for new and existing point source discharges are achieved, that all cost-effective reasonable non-point source controls are implemented and that Tier 1 protection is provided. If pollutants associated with non-point sources will be discharged by the applicant – and the discharge will result in significant degradation for those parameters – ADEQ will work with the applicant and the non-point sources to assure that all cost-effective and reasonable best management practices for non-point source pollution control are implemented.

Tier 2 reviews include the public participation provisions outlined in Chapter 8. Once the intergovernmental coordination and public participation requirements are satisfied, the Director of ADEQ will make a final determination concerning the social or economic importance of the proposed discharge. All key determinations, including determinations to prohibit the discharge, must be documented and made a part of the public record.

It is recommended that an applicant discharging into a perennial water meet with ADEQ in a pre-application conference at least two years prior to permit issuance because of the substantial information requirements associated with the comprehensive Tier 2 antidegradation review.

Tier 3: Reviews to Protect Outstanding Arizona Waters

Existing water quality in Outstanding Arizona Waters must be maintained and protected.

Any proposed discharge that would degrade existing water quality in an Outstanding Arizona Water is prohibited, unless the applicant demonstrates that the water quality impacts are temporary.

General Applicability

Tier 3 protection applies only to surface waters that are classified as Outstanding Arizona Waters and listed in R18-11-112 (E). Currently, there are 18 Outstanding Arizona Waters in Arizona. They are:

1. The West Fork of the Little Colorado River, from its headwaters to Government Springs;
2. Oak Creek, including the West Fork of Oak Creek; from its headwaters to the Verde River;
3. Peoples Canyon Creek; from its headwaters to the Santa Maria River;
4. Burro Creek, from its headwaters to Boulder Creek;
5. Francis Creek, from its headwaters to Burro Creek;
6. Bonita Creek, from the San Carlos Indian Reservation boundary to the Gila River;
7. Cienega Creek, from the confluence with Gardner Canyon and Spring Water Canyon at R18E, T17S to the USGS gauging station at 32°02'09" / 110°40'34" in Pima County;
8. Aravaipa Creek, from its confluence with Stowe Gulch to the downstream boundary of the Aravaipa Canyon Wilderness Area;
9. Cave Creek and the South Fork of Cave Creek from their headwaters to the Coronado National Forest boundary (in the Chiricahua Mountains);
10. Buehman Canyon Creek from its headwaters to approximately 9.8 miles downstream, a tributary to the San Pedro River;
11. Lee Valley Creek from its headwaters to Lee Valley Reservoir;
12. Bear Wallow Creek, from its headwaters to the boundary of the San Carlos Indian Reservation;
13. North Fork of Bear Wallow Creek from its headwaters to Bear Wallow Creek;
14. South Fork of Bear Wallow Creek from its headwaters to Bear Wallow Creek;
15. Snake Creek from its headwaters to the Black River;
16. Hay Creek from its headwaters to the West Fork of the Black River;
17. Stinky Creek, from the Fort Apache Indian Reservation boundary to the West Fork of the Black River;
18. KP Creek, from its headwaters to the Blue River.

Tier 3 Antidegradation Review Process

Discharges that impact Outstanding Arizona Waters (OAWs) are subject to Tier 3 review. **New or expanded discharges directly to an OAW are prohibited.** For example, a new or expanded discharge from a wastewater treatment plant directly to one of the 18 OAWs listed in R18-11-112 is prohibited by the Tier 3 antidegradation rule. In addition, ADEQ will impose whatever controls are necessary on indirect discharges that occur upstream of or to tributaries of an OAW to maintain and protect existing water quality in a downstream OAW.

In determining impacts from a proposed discharge on a OAW, ADEQ will determine whether the proposed discharge is short-term in nature and the resulting changes in water quality are temporary. In general, temporary impacts are defined as those occurring for a period of six months or less. The applicant shall use all practical means to minimize temporary water quality impacts to a OAW.

Determinations regarding antidegradation reviews for regulated discharges that affect OAWs will be made on a case-by-case basis after consideration of the following factors:

- ◆ The length of time during which the water quality will be lowered;
- ◆ The percent change in ambient concentrations and the parameters affected;
- ◆ The likelihood for long-term water quality benefits to the segment (e.g., as may result from dredging of contaminated sediments);
- ◆ The degree to which achieving applicable water quality standards during the proposed activity may be at risk; and
- ◆ The potential for any residual long-term impacts or influences on existing uses.

If after review of the factors above, ADEQ determines that a proposed discharge will be temporary in nature, the proposed discharge may be authorized. In such case, the antidegradation review findings must be documented and public participation activities initiated. If the review finds that the proposed discharge will not be temporary, the proposed discharge will be denied. In all cases, Tier 1 protection must be maintained.

A new or expanded discharge upstream of an OAW is prohibited where the proposed discharge would degrade existing water quality of the downstream OAW. To determine whether the proposed discharge will result in the lowering of water quality in the downstream OAW, the following factors may be considered:

- ◆ Change in ambient concentrations predicted at the appropriate critical flow condition(s)
- ◆ Change in loadings (i.e., the new or expanded loadings compared to total existing loadings to the segment)
- ◆ Reduction in available assimilative capacity
- ◆ Nature, persistence and potential effects of the parameter
- ◆ Potential for cumulative effects
- ◆ Degree of confidence in the various components of any modeling technique utilized (e.g., degree of confidence associated with the predicted effluent variability)

If a preliminary determination is made that the requirements above will be met, the antidegradation review findings must be documented and the applicable public participation activities must be initiated. If the review finds that the proposed discharge will result in the lowering of water quality in a downstream OAW, the proposed discharge will be denied.

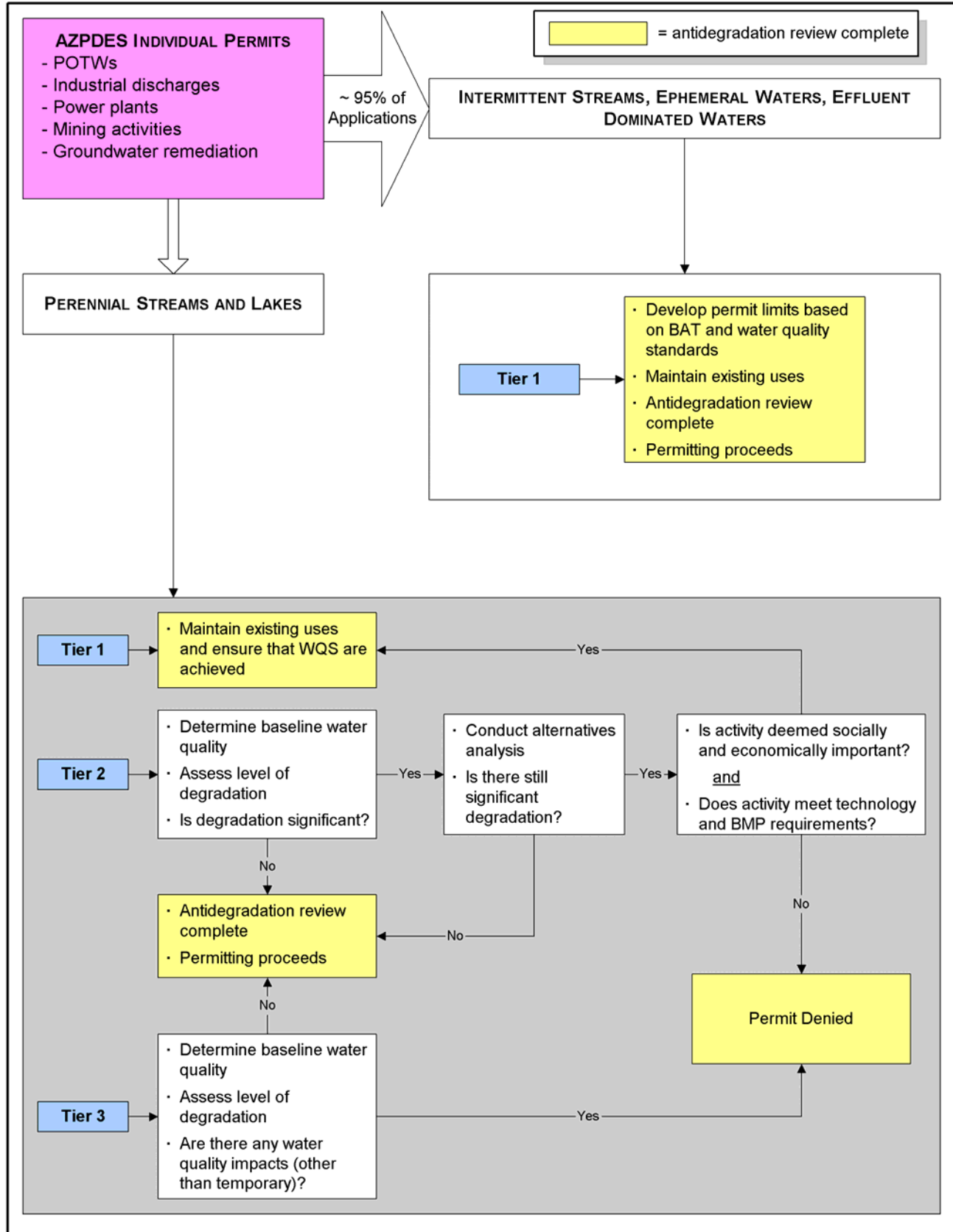
3.3 Antidegradation Review Requirement by Type of Activity

Antidegradation review requirements for regulated discharges that may degrade water quality vary according to 1) classification, existing uses, and condition of the receiving water; 2) the type of discharge and permit under which the discharge is conducted; and 3) the range and severity of projected impacts on the surface water. For example, antidegradation review requirements for discharges authorized under general permits differ from antidegradation review requirements for discharges regulated by individual NPDES permits. This section outlines the antidegradation review requirements for regulated discharges that may degrade water quality, including those with individual and general NPDES permits and those covered by §401 water quality certification of federally-permitted or licensed discharges (e.g., §404 permits).

It should be noted that all regulated discharges are subject to an antidegradation review at the time of issuance, modification, or renewal of a permit (e.g., individual, general, regional, or nationwide). Discharges authorized by general permits are not required to undergo an individual Tier 2 antidegradation review as part of the NOI submittal process. However, the collective and cumulative impact of those discharges may be subject to an antidegradation review at the time the general permit is issued. Compliance with the requirements of general permits and prompt attention to conditions that might result in water quality degradation will help ensure that discharges authorized by general permits do not cause violations of water quality standards.

A discharge authorized by a general permit is subject to an individual antidegradation review if the discharge may degrade water quality in an Outstanding Arizona Water protected at the Tier 3 level. In addition, some new or expanded discharges formerly authorized by a general permit may not be eligible for such coverage in the future if ADEQ believes they could significantly degrade a surface water. In those cases, applicants will be required to seek coverage under an individual permit.

In order to implement Arizona's antidegradation policy in an efficient manner, it is recommended that persons proposing individually-permitted discharges which might degrade water quality notify ADEQ before determining baseline water quality (see Chapter 4) or applying for a permit. Such an approach will help ensure that the antidegradation review proceeds smoothly, without delay, and that planned facilities will comply with applicable statutes and rules. Figure 3-1 summarizes the review requirements for individual NPDES; NPDES Stormwater Permits; general NPDES permits; individual and nationwide §404 permits, and federal permits and licenses subject to §401 water quality certification.



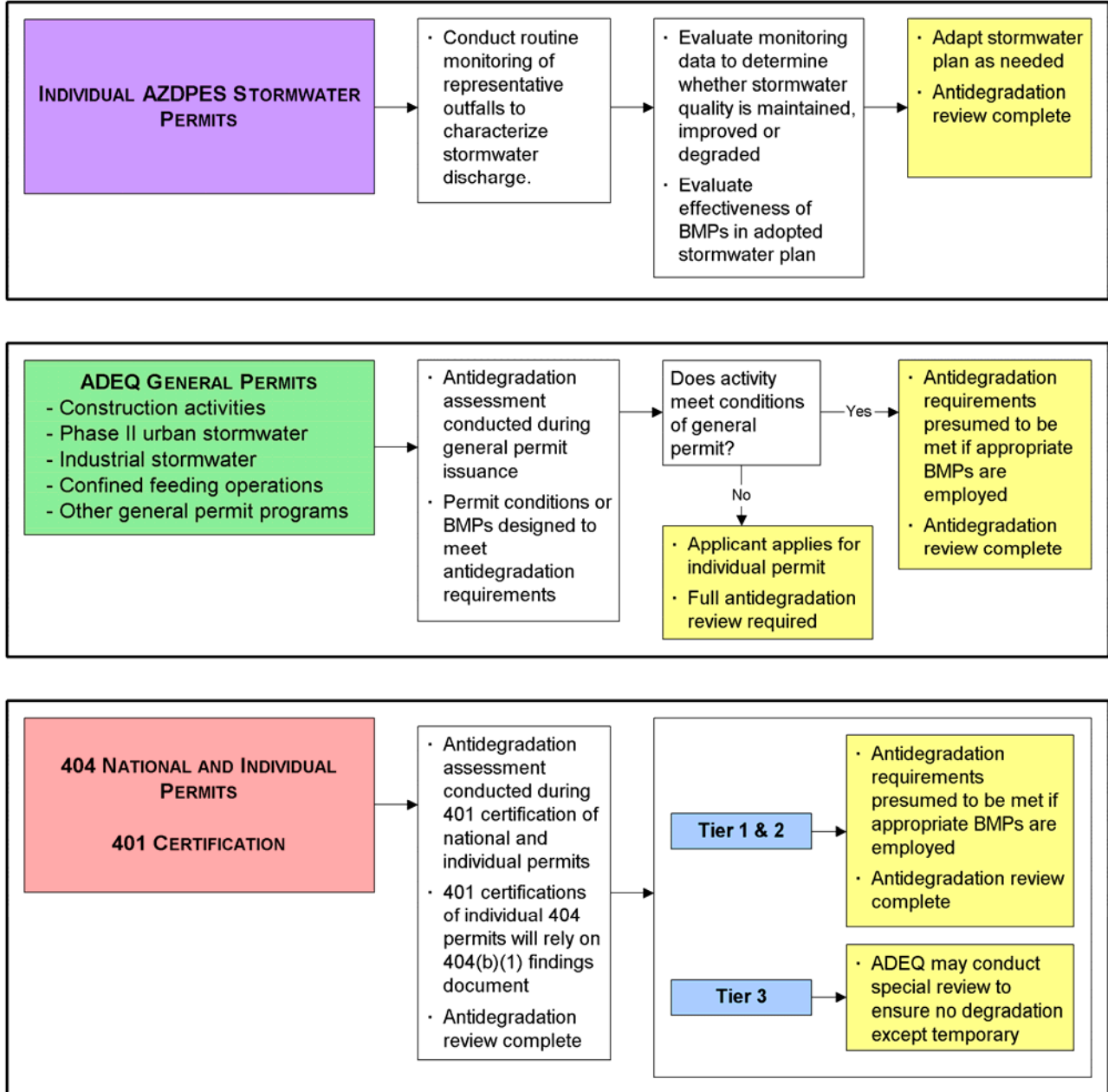


Figure 3-1. Antidegradation Review Requirements by Permitted Activities

3.3 INDIVIDUAL NPDES PERMITS

General Applicability

All point source discharges regulated by individual NPDES permits are subject to an antidegradation review when new or expanded discharges are proposed and at the time of permit renewal. Discharges authorized by general NPDES permits are subject to a categorical antidegradation review when the general permit is issued or renewed. Discharges that do not meet NPDES general permit conditions must seek coverage under an individual NPDES permit and complete an individual antidegradation review. Permits for new or expanded discharges must consider the protection level of the receiving surface water when developing limits for pollutants of concern, characterizing effluent quality, or assessing other discharges that may degrade water quality. At a minimum, all NPDES permits must ensure that water quality is protected at the Tier 1 level (i.e., the level of water quality necessary to maintain existing uses must be maintained and protected).

Overview of the Antidegradation Review Procedure

The antidegradation review for individually NPDES-permitted facilities will be based upon the assigned protection level and baseline water quality (BWQ; see Chapter 4) of the receiving water, the existing uses of the segment, applicable water quality standards, flow regime of the receiving water, pollutants of concern associated with the discharge, projected impacts on the receiving water, cumulative impacts from other pollutant sources, and the significance of any degradation that might occur as a result of the discharge.

Antidegradation reviews for discharges from industrial facilities will be handled in a manner similar to those related to wastewater treatment plants, i.e., the review will focus on the status of the receiving water segment, the characteristics of the discharge, and the impact(s) of the discharge and other sources upon the receiving water. All applicants will be required to identify pollutants reasonably expected to be in the discharge, estimate flow rates, and characterize pollutant concentrations and/or mass pollutant loads, as specified by ADEQ. In addition, applicants will be expected to collect and submit existing or new information on BWQ needed to analyze the impact(s) of the discharge to a perennial water if ambient water quality data are not available.

Permit Limits and Antidegradation Requirements for Individual Permits

ADEQ must ensure that water quality associated with the existing use(s) for each receiving water segment is maintained and protected, and that antidegradation requirements are considered in the development of permit limits.

Permit Limits for Discharges to Perennial Waters: In the case of a point source discharge to a perennial water, the primary antidegradation implementation activities will occur when water quality-based effluent permit limits are developed for the individual NPDES permit. During the permit development process, ADEQ will assess baseline water quality using both internal and applicant-supplied data, identify existing and designated uses of the receiving water and analyze the impacts of the discharge as well as cumulative discharges that might affect the assimilative capacity of the receiving surface water for relevant pollutants of concern.

Because the permit limits have a significant impact on the treatment processes, technologies, and procedures used by the applicant, it is important that ADEQ be notified early as to the nature of the discharge, discharge location, and effluent characteristics. Developing permit limits requires

collection of a considerable amount of information on the receiving water, the applicant's discharge, and other activities in the drainage area. Early notification will ensure that the information collection process begins well before the applicant needs a permit to conduct planning activities, seek funding, design facilities, or proceed with project construction. It is recommended that an applicant discharging into a perennial water meet with ADEQ in a pre-application conference at least two years prior to NPDES permit issuance.

The following section provides an overview of how permit limits will be developed and issued under the state's antidegradation implementation procedures for discharges to perennial waters. It should be noted that much of the antidegradation review for a point source discharge regulated by an individual NPDES permit will occur during the permitting process. Proposed discharges that may significantly degrade waters protected at the Tier 2 level must undergo a comprehensive antidegradation review to determine whether less degrading or non-degrading alternatives exist and whether significant degradation is justified on the ground that it is necessary to accommodate important social economic and social development in the area of the point source discharge.

Basis for Developing Permit Limits for Point Source Discharges to Perennial Waters

Individual permit limits will be based upon applicable effluent guidelines, the characteristics of the discharge, and analyses designed to ensure that no significant degradation of the receiving water occurs. In addition, the permit limits must ensure that existing uses are maintained and protected.

Under Arizona's antidegradation program, significant degradation is defined as the consumption of 20 percent or more of assimilative capacity of the receiving water for any pollutant of concern associated with the discharge during critical flow (e.g., 7Q10) conditions or any consumption of assimilative capacity that exceeds a cumulative cap of 50% of available assimilative capacity.

Early notification and consultation between the applicant and ADEQ will help ensure that the NPDES permitting process proceeds efficiently. The following steps outline the general procedure for processing an NPDES permit:

- ◆ Applicant notifies ADEQ of intent to apply for permit coverage
- ◆ ADEQ determines eligibility for general permit or individual permit coverage
- ◆ Applicant or ADEQ collects BWQ information for applicable pollutants of concern
- ◆ ADEQ develops draft permit limits based on effluent guidelines, applicable water quality standards, BWQ, and antidegradation requirements
- ◆ Applicant applies for permit after consultation with ADEQ
- ◆ ADEQ develops final permit limits for pollutants of concern
- ◆ ADEQ issues permit to applicant after antidegradation review

Applicants seeking individual permit coverage may be required to provide or collect baseline water quality information on pollutants of concern (e.g., pH, metals) reasonably expected to be in the discharge, if that information is not available (see Chapter 4). Table 3-1 shows the minimum BWQ information required, by size of discharge, before permit development. Data collection for other pollutants may be required depending on the nature of the proposed discharge and the pollutants reasonably expected in the discharge. The BWQ requirements will be based on the effluent characterization of the facility. Antidegradation requirements are not applied within ADEQ-approved mixing zones, but must be met at the edge of the mixing zone. It should be noted that mixing zones are prohibited for persistent, bioaccumulative pollutants listed in the mixing zone rule at R18-11-114(K). The list of persistent bioaccumulative pollutants includes

chlordane, DDT and its metabolites (DDD and DDE), dieldrin, dioxin, endrin, endrin aldehyde, heptachlor, heptachlor epoxide, lindane, mercury, PCBs, and toxaphene.

Table 3-1. Minimum BWQ Information for Dischargers

Parameter	All Dischargers	Discharges < 0.1 MGD	Discharges > 1.0 MGD
Flow	Y	Y	Y
Temperature	Y	Y	Y
BOD5/CBOD5/DO	Y	Y	Y
E. coli	Y	Y	Y
Total Suspended Solids	Y	Y	Y
pH	Y	Y	Y
Total Ammonia		Y	Y
Total Residual Chlorine		Y	Y
Total Nitrogen		Y	Y
Total Phosphorus		Y	Y
Total Dissolved Solids		Y	Y
Antimony			Y
Arsenic			Y
Beryllium			Y
Cadmium			Y
Copper			Y
Lead			Y
Mercury			Y
Nickel			Y
Selenium			Y
Silver			Y
Thallium			Y
Zinc			Y
Hardness			Y

ADEQ will develop and issue permit limits based on the information received from the applicant and other sources. Water quality standards must be met and existing uses maintained for waters protected at the Tier 1 level (i.e., all surface waters). For the Tier 2 level, if the applicant is not able to meet limitations that do not cause significant degradation, further antidegradation review (i.e., alternatives analysis, economic/social justification) will be required. As noted above, degradation of unique waters protected at the Tier 3 level will not be permitted except where

water quality degradation is short-term. After the required antidegradation review is completed, ADEQ will proceed with permit issuance or renewal.

Permit Limits for Ephemeral, Intermittent and Effluent Dependent Waters

Permit limits for discharges to ephemeral, intermittent, and effluent dependent waters will be based upon:

- ◆ Numeric water quality standards for the surface water under review, as described in the Arizona Administrative Code, Title 18, Chapter 11, Article 1.
- ◆ US Environmental Protection Agency effluent guidelines and other technology-based requirements (e.g., secondary treatment requirements, BAT, MEP).

3.4 ACTIVITIES COVERED BY NPDES STORM WATER PERMITS

Urban areas with populations greater than 100,000 based on the 1990 census (Phase I MS4 communities) were required to apply for an individual NPDES storm water permit. Urban areas with populations determined from 2000 census data are considered Phase II MS4 communities. Storm water discharges from Phase II MS4s are authorized by individual or general NPDES storm water permits. However, neither Phase I or Phase II MS4s authorized under individual storm water permits are required to meet the same antidegradation requirements that apply to other individual NPDES permits outlined above.

Antidegradation reviews for individual NPDES storm water permits will be based on an adaptive management approach. This approach may include routine monitoring of storm water quality at representative outfalls to adequately characterize storm water discharges. The MS4 will then evaluate, through effectiveness monitoring, whether storm water quality is being maintained, improving, or degrading and whether BMPs identified in the MS4's storm water pollution prevention plan are effective at controlling the discharge of pollutants. Future antidegradation review of individual NPDES storm water permits will consist of an analysis of the effectiveness of the BMPs and compliance with the requirements of the storm water permit.

3.5 ACTIVITIES COVERED BY GENERAL NPDES PERMITS

A number of discharges to surface waters are authorized under general NPDES permits issued by ADEQ. These include storm water runoff from municipalities required to comply with the Phase II storm water rules, industrial activities covered by the storm water program, and construction sites one acre or larger. Well discharges (for potable water wells, well testing, and well development) also are covered by general permits.

Regulated discharges authorized by general permits are not required to undergo a Tier 2 antidegradation review as part of the permitting process. However, new and reissued general permits must be evaluated to consider the potential for significant degradation as a result of the permitted discharges.

All NPDES general permits require that permit conditions be met, including the general requirement that permitted discharges must ensure that water quality standards are not violated and best management practices contained in the permit are implemented. Compliance with the terms of the general permits issued by ADEQ is required to maintain authorization to discharge under the general permit. Discharges covered by a general permit that do not comply with general permit conditions or antidegradation requirements will be required to seek coverage under an

individual permit. The following sections describe the general antidegradation implementation provisions for various types of activities covered by general permits.

Overview of the Antidegradation Review Procedure for General Permits

Antidegradation reviews for discharges authorized by general permits will occur for the entire class of general permittees when the general permit is issued or may be required by ADEQ in cases where impacts may be significant or prevent the attainment of an existing use.

Antidegradation reviews will focus on pollutants of concern that may contribute to water quality impairment.

General NPDES permits may be subject to a full antidegradation review if the Director determines that cumulative degradation resulting from multiple discharges within a watershed, degradation from a single discharge over time, degradation caused by permit noncompliance or permit inadequacies, or other individual circumstances warrant a full antidegradation review.

Certain general permit programs are now being implemented, such as storm water from construction activities and from urbanized areas. Information regarding the existence, effectiveness, or costs of control practices for controlling flows, reducing pollution, and meeting the water quality and antidegradation requirements of these programs is emerging. For permittees covered under general permits, the antidegradation requirements of this section can be considered met for permits and programs that have a formal process to select, develop, adopt, and refine control practices (i.e., design, installation, and maintenance) for protecting water quality. This adaptive management process must ensure that information is developed and used to revise permit or program requirements.

3.6 ACTIVITIES COVERED UNDER SECTION 404 PERMITS AND SECTION 401 CERTIFICATION OF THE CLEAN WATER ACT

Section 404 of the Clean Water Act regulates the placement of dredged or fill material into the “waters of the United States,” including small streams and wetlands adjacent or connected to “waters of the United States.” The U.S. Army Corps of Engineers (COE) administers the §404 permit program dealing with these activities (e.g., wetland fills, in-stream sand/gravel work, etc.), in cooperation with the U.S. Environmental Protection Agency (US EPA) and in consultation with other public agencies. Individual permits are issued for activities with significant impacts. Activities covered under §404 permits include any activity that results in the placement of dredged or fill material into the waters of the U.S., including but not limited to the following:

Aids to Navigation	Reshaping Existing Drainage Ditches
Structures in Artificial Canals	Recreational Facilities
Maintenance Activities	Storm Water Management Facilities
Survey Activities	Mining Activities
Outfall Structures and Maintenance	
Oil and Gas Structures	
Mooring Buoys	
Temporary Recreational Structures	
Utility Line Activities	
Bank Stabilization	
Linear Transportation Projects	
U.S. Coast Guard Approved	
Bridges	
Hydropower Projects	
Minor Discharges	
Minor Dredging	
Oil Spill Cleanup	
Surface Coal Mining Activities	
Removal of Vessels	
Structural Discharges	
Stream and Wetland Restoration	
Activities	
Modifications of Existing Marinas	
Single-family Housing	
Maintenance of Existing Flood	
Control Facilities	
Temporary Construction, Access	
and Dewatering	
Maintenance Dredging of Existing	
Basins	
Boat Ramps	
Emergency Watershed	
Protection/Rehabilitation	
Cleanup of Hazardous and Toxic	
Waste	
Residential, Commercial,	
Institutional Developments	
Agricultural Activities	

For minor activities covered under nationwide §404 permits (e.g., road culvert installation, utility line activities, bank stabilization, etc.), antidegradation requirements will be deemed to be met if all appropriate and reasonable BMPs related to erosion and sediment control, project stabilization, and prevention of water quality degradation (e.g., preserving vegetation, stream bank stability, and basic drainage hydrology) are applied and maintained. Applicants desiring to fulfill antidegradation review requirements under this approach will be responsible for ensuring that nationwide permit requirements and relevant water quality certification conditions are met.

Nationwide general permits are issued for activities with impacts not deemed to be significant. Individual permits are issued for activities that are considered to have more than minor adverse impacts. In all cases, i.e., for both individual and nationwide §404 permits, states have an obligation to certify, certify with conditions, or not certify §404 permits under §401 of the Clean Water Act. Antidegradation reviews involving the placement of dredged or fill material will be performed via the §401 water quality certification process and evaluations that consider broad ecosystem-level impacts.

Arizona manages its §401 water quality certification program to ensure that activities resulting in the placement of dredged or fill material into surface waters do not cause water quality impairments or significant degradation of surface waters. Under the BMP-based approach adopted by Arizona, regulated activities that qualify for coverage under U.S. Army Corps of Engineers regional or nationwide §404 permits that have been certified by the state pursuant to §401 of the Clean Water Act will not be required to undergo a Tier 2 antidegradation review at the time of submitting a NOI and receiving authorization to discharge under the nationwide permit.

The decision making process for individual §404 permits is contained in the §404(b)(1) guidelines (40 CFR Part 230) and contains all of the required elements for a Tier 1 and Tier 2 antidegradation review. Prior to issuing a permit under the §404(b)(1) guidelines, the Corps of Engineers must: 1) make a determination that the proposed discharges are unavoidable (i.e., necessary); 2) examine alternatives to the proposed activity and authorize only the least damaging practicable alternative; and 3) require mitigation for all impacts associated with the activity. A §404(b)(1) findings document is produced as a result of this procedure and is the basis for the permit decision. Public participation is also provided for in this process. Because the §404(b)(1) guidelines meet the requirements of a Tier 1 and Tier 2 antidegradation review, ADEQ will not conduct a separate review for the proposed activity. Tier 1 and Tier 2 antidegradation review will be met through §401 certification of individual §404 permits and will rely upon the information contained in the §404(b)(1) findings document.

Regulated discharges that may degrade waters protected at the Tier 3 level must comply with the antidegradation requirements applicable to that protection level (i.e., only temporary impacts permitted) before a §401 certification will be granted. Any discharge authorized under an individual or nationwide §404 permit will require an individual §401 certification if it will discharge to an Outstanding Arizona Water to ensure that impacts will be temporary.

Antidegradation Review Considerations

In order to ensure that antidegradation and other water quality protection requirements are considered, reviewed, and met in a comprehensive and efficient manner, these requirements will be addressed and implemented through the permitting and §401 water quality certification processes. Under this approach, applicants who fulfill the terms and conditions of applicable §404 permits and the terms and conditions of the §401 water quality certification related to the §404 permit will be considered to meet antidegradation requirements. Antidegradation considerations

will be incorporated into §404 permits and the corresponding §401 certifications at the time of permit issuance.

ADEQ reserves the right to make case-specific determinations regarding the implementation of this approach during the §404 permitting or §401 water quality certification processes, which must be completed prior to the commencement of any activities that result in the placement of dredged or fill material into Arizona surface waters. In general, the affected waters from all activities that result in the placement of dredged or fill material into state waters must meet Tier 1 protection requirements at a minimum, and meet the antidegradation requirements for higher-tiered waters if they will be degraded as a result of the activity.

Impacts to Downstream or Adjacent Waters

It is important to note that where an activity covered by a §404 regional or nationwide general permit allows for placement of dredged or fill material, the permit only applies to the site of the fill and does not apply to activities or conditions downstream of or adjacent to the site of the fill.

Certain nationwide and regional permits require individual §401 certification by the State of Arizona. During that individual certification process, ADEQ will evaluate any potential impacts to downstream waters and incorporate certification requirements to ensure compliance with all aspects of the antidegradation rule.

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4 Determining Baseline Water Quality

*Summary of Approach
Baseline Water Quality Assessment Procedures
BWQ Sampling Location
Sampling and Analytical Protocol
Parameters of Concern
Interpretation of Data and Determination of BWQ*

4.1 SUMMARY OF APPROACH

Arizona's antidegradation rule states that "existing water quality shall be maintained and protected" for Tier 2 and Tier 3 surface waters. *Existing* water quality – or baseline water quality (BWQ) – provides the yardstick against which predicted degradation associated with a regulated discharge is measured. For Tier 1 protection, which is applicable to all surface waters, "no degradation of existing water quality is permitted" for any pollutant causing water quality to not meet the applicable water quality standard.

This section describes how baseline water quality is characterized through:

- ◆ Establishment of BWQ information for surface waters using existing water quality assessment data where they exist.
- ◆ Approaches which consider the size and potential impacts of the proposed discharge when determining data needs for BWQ characterization and antidegradation review.
- ◆ Cooperative action by both ADEQ and the applicant to generate BWQ information where few or no data exist.

In general, BWQ for perennial waters will be based upon existing assessments conducted under ADEQ monitoring and assessment programs. BWQ assessments will seek to gather information on pollutants of concern reasonably expected to be in discharges regulated by state, federal, or local agencies including, but not limited to, suspended and settleable solids, sediment, nutrients, bacteria, BOD, and metals.

Where no, or few, data exist, ADEQ will advise the applicant on what data are needed and provide guidance to the applicant on how to collect and report the needed information to ADEQ. For perennial waters, the priority approach for assessing baseline water quality is to use existing water quality data where available. Where adequate data are not available, the second priority approach is to collect baseline water quality data. The third approach for assessing baseline water quality is to use an appropriate water quality model. At times, more than one approach may be needed to characterize BWQ. Note that due to the lack of flow on intermittent, effluent dependent, and ephemeral waters, and the highly managed nature of canal systems where relative contributions of source water varies significantly, these types of surface waters will be subject to Tier 1 protection levels and appropriate water quality-based effluent limits designed to achieve applicable water quality standards. Therefore, applicants proposing discharges to these surface waters will not be required to determine BWQ.

In general, individual BWQ characterizations will not be required for discharges authorized by general permits unless there are pollutants of concern reasonably expected in the discharge that might cause loss of an existing use or degradation of an Outstanding Arizona Water. Table 4-1 summarizes the BWQ requirements by the type of permit.

Table 4-1. Applicability of BWQ Requirements to Permit Types

Type of Permit	BWQ Requirement
NPDES Individual Permits <ul style="list-style-type: none"> ▪ Ephemeral streams, intermittent streams, effluent dependent waters ▪ Perennial waters 	CWA technology-based requirements (e.g., BAT) and Water Quality Standards to be met end-of-pipe; no BWQ assessment is required BWQ assessment required
NPDES General Permits	Comply with prescribed BMPs No BWQ assessment required except on OAWs
NPDES Storm Water Permits	Comply with BMPs in storm water pollution prevention plans. No BWQ assessment required
§404 Permits and §401 Water Quality Certification	Comply with prescribed BMPs or certification requirements No BWQ assessment required except on OAWs.

The regulated entity generally will be required to provide baseline water quality data for pollutants of concern that are reasonably expected to be discharged to help ADEQ determine BWQ, existing uses, and the applicable tier. The regulated entity is advised to contact ADEQ prior to initiating a BWQ evaluation to seek guidance and concurrence regarding the pollutants to be assessed and the proposed sampling protocols.

4.2 BASELINE WATER QUALITY ASSESSMENT PROCEDURES

Baseline water quality must be established in order to conduct an antidegradation review for regulated discharges that may degrade perennial waters. Specifically, BWQ must be established if no BWQ characterization is available or if no information is available for a pollutant of concern reasonably expected to be discharged into the surface water. The Director may consider data 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: 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. If adequate data are not available, ADEQ may require the applicant to generate the necessary BWQ data prior to issuing a permit.

For any discharge to a perennial surface water, BWQ must be established for pollutants of concern before an NPDES permit decision can be made. If adequate water quality data are not available to establish BWQ, regulated entities will be required to generate and provide such data. It is recommended that regulated entities submit their BWQ monitoring and QA/QC plans well in advance (e.g., at least six months in advance) of any planned activities or permit application submittals, to facilitate and streamline the permitting processes. Environmental groups, trade

organizations, the general public, ADEQ and other governmental agencies may also elect to generate BWQ data with the prior approval of ADEQ and under appropriate, documented quality assurance / control procedures. Multiple dischargers to a surface water may combine resources to generate BWQ data and may join with other watershed stakeholders in the effort. The technical complexity associated with this process precludes establishment of universally applicable procedures. However, the objective of this effort – generating a reasonable, credible, and scientifically defensible characterization of existing water quality – provides a framework for conducting monitoring activities needed to conduct antidegradation reviews.

Given the complexity of the issue, potential generators of BWQ data are expected to notify ADEQ of their intent to generate data and to obtain agency concurrence on proposed sampling protocols, sampling locations, pollutants of concern, reporting format, etc., prior to initiating data collection efforts. The initial consultation with the agency may also be used by regulated entities to evaluate the availability of existing data that may be used as a supplement to, or in lieu of, new BWQ data.

During data generation projects by regulated entities or third parties, ADEQ may conduct field or laboratory audits to verify that data generators are adhering to established sampling protocols, and may split samples for independent analysis. Data generators that proceed without agency notification and concurrence risk rejection of the data and significant delays in the permitting process. Potential generators of BWQ data are also encouraged to notify other regulated entities and stakeholders in the segment of their intent to generate BWQ data. Stakeholder cooperation in the BWQ assessment process may allow sharing of the cost of data generation and avoidance of conflict in subsequent permitting actions.

Once BWQ is established for a surface water, it is the yardstick against which degradation is measured during all future antidegradation reviews on the segment. If future monitoring data indicate that BWQ is improving due to upstream water pollution controls or water quality is changing due to natural conditions, ADEQ may revise BWQ to reflect those water quality changes. Antidegradation policy generally does not allow a lowering of BWQ. That is, BWQ is not a moving target, unless it moves in the direction that reflects improving water quality. However, if it is shown that there was an error in determining BWQ, then BWQ can be re-evaluated.

4.3 BWQ SAMPLING LOCATION

For discharges into a perennial water where there are no existing water quality data on the surface water (i.e., where new data must be collected for assessment of baseline water quality), the location of the BWQ assessment location generally will be immediately upstream of the proposed discharge location. For lakes, BWQ will be assessed near tributary inlet mixing areas, in the main body of the lake, or in other areas of the lake as appropriate. Determinations regarding BWQ characterization and accommodation of variations caused by seasonal impacts, water level fluctuations, or other factors will be made by ADEQ.

Where there is adequate, existing water quality data from multiple sampling sites on a surface water, these stations can become the BWQ stations from which a composite BWQ characterization can be developed. Alternatively, ADEQ may choose one existing monitoring site as the BWQ station from which to characterize baseline water quality. ADEQ may request additional monitoring at the site if the existing data are insufficient, e.g., where no information has been collected on pollutants of concern reasonably expected in the proposed discharge.

Generally BWQ will be characterized upstream of the proposed discharge point in the receiving surface water above the area of influence of the discharge. Where discharges enter permitted mixing zones, the BWQ will be determined on a case-by-case basis.

Sampling and Analytical Protocol

In general, BWQ will be established through existing monitoring and assessment programs sponsored or approved by ADEQ. If no data exist for a surface water, ADEQ may require the applicant to collect and report such data as might be needed, as specified below. For approved sampling and analytical procedures, refer to the *Credible Data Requirements* in the Impaired Waters Rule, R18-11-602, and the *Fixed Station Network Procedures Manual for Surface Water Quality Monitoring*, ADEQ, (February 16, 2000).

It is important to note that the BWQ pollutant concentrations derived from the data generated will be assumed to be the concentration present during the normal annual low-flow period. Use of existing, available and appropriate data or collection of new data are the preferred approaches to determining BWQ. As noted below, the applicant may also use an appropriate model to represent BWQ conditions. Applicants may be required to collect BWQ data after the permit is issued to develop a BWQ profile during build-out of the activity's discharge capacity.

In most cases, ambient water quality data for perennial waters should be no older than five years. ADEQ will consider the use of older data on a case-by-case basis, as deemed appropriate, if such data is representative of baseline water quality conditions. In cases where significant changes have occurred in the watershed in the last five years, it may be appropriate to use a shorter period of record. The minimum elements of an acceptable BWQ monitoring plan include the collection of at least four samples (one sample per quarter) over a minimum one-year period. Data generators may sample more frequently than specified, but are expected to provide the results of all monitoring. Only ADEQ-approved monitoring results will be used in the establishment of BWQ. Sampling of lakes may differ, depending on the related hydrology, depth, length, location, and other factors. In all cases, applicants are advised to seek input from ADEQ prior to developing a BWQ sampling plan and/or collecting samples.

All stream samples should be taken when there is a measurable surface flow in the segment at the BWQ sampling location. If environmental conditions prevent achieving the minimum collection requirements, the sampling period should be extended until at least 4 samples are obtained.

Before initiating BWQ sampling for a surface water, a sampling plan should be developed and submitted consistent with the Impaired Waters Rule R18-11-602(A)(2). The sampling plan should address the following elements: experimental design of the sampling project; project goals and objectives; evaluation criteria for data results; background of the sampling project; identification of target conditions (including a discussion of whether any weather, seasonal variations, stream flow, lake level, or site access may affect the project); data quality objectives; types of samples scheduled for collection; sampling frequency; sampling period; sampling locations and rationale for site selection; and a list of field equipment (including tolerance range and any other specifications related to accuracy and precision). Analytical methods for samples collected must comply with R18-11-111, which specifies that:

A person conducting an analysis of a sample taken to determine compliance with a water quality standard shall use an approved analytical method prescribed in 9 A.A.C. 14, Article 6, or an alternative analytical method that is approved by the Director of the Arizona Department of Health Services under R9-16-610(B); and

A test result from a sample taken to determine compliance with a water quality standard is valid only if the sample is analyzed by a laboratory that is licensed by the Arizona Department of Health Services for the analysis performed.

Samples, containers, preservation techniques, holding times, and analysis shall be conducted in accordance with *Guidelines Establishing Test Procedures and Analysis of Pollutants* in 40 CFR Part 136 and performed by a laboratory certified by the Arizona Department of Health Services, as stipulated above. The use of other validated analytical methodologies may be authorized where

such use can be technically justified. Stream flow shall be measured each time BWQ sampling is performed.

Acceptable methods for flow measurement include those described in *Fixed Station Network Procedures Manual for Surface Water Monitoring*, ADEQ, February 16, 2000, or in the U.S. Geologic Survey manual *Techniques of Water Resources Investigations of the United States Geologic Survey* (Chapter A8, Book 3, "Discharge Measurements at Gauging Stations"). Lake level shall be measured each time BWQ sampling is performed using procedures approved by ADEQ Assessment Program.

As noted, ADEQ may consider data 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: 1) were collected in accordance with an approved quality assurance project plan; 2) were collected using specified assessment or sample collection and analysis protocols; and 3) meet Arizona credible data and data interpretation requirements under R18-11-602 and R18-11-603 if the data are to be used to identify an impaired water or for a TMDL decision.

4.4 POLLUTANTS OF CONCERN

Dischargers may be required to generate BWQ data for any pollutants of concern associated with the proposed discharge. Pollutants of concern are those pollutants reasonably expected to be present in the discharge that have numeric or narrative water quality standards.

In addition to the pollutants of concern, regulated entities may also be requested to provide water quality data for parameters necessary to determine the appropriate value range of water quality criteria (e.g., pH, temperature, hardness). If a dissolved metal is a pollutant of concern, a regulated entity may also be requested to provide the information necessary to translate the total metal present in the discharge to an in-stream dissolved concentration. Again, the importance of consultation between BWQ data generators and ADEQ staff prior to BWQ data generation cannot be overstated.

4.5 INTERPRETATION OF DATA AND ESTABLISHMENT OF BWQ

Generators of BWQ data are expected to provide documentation of their adherence to approved or established protocols and certification that the submitted information is accurate and complete. ADEQ will review available data and determine BWQ for individual water segments and lakes on a pollutant-by-pollutant basis.

In general, the agency will perform an arithmetic average of all credible data to determine BWQ for a particular pollutant. For data sets that contain "not detected" or "less than" analytical results, BWQ may be considered to be zero where the reported detection limit is less than or equal to the applicable water quality standard for the pollutant. ADEQ will assume that the concentration of a pollutant reported as "non-detect" or "less than" is $\frac{1}{2}$ the detection limit where the detection limit is greater than the applicable standard for a pollutant when calculating the arithmetic average for the BWQ determination.

Data generators should make every effort to use the most sensitive, practical analytical methods available. The use of less sensitive analytical methods may cause rejection of the data set. ADEQ will use the initial BWQ value established for a particular pollutant in a surface water to judge the impact of all subsequent proposals for discharges involving that pollutant. BWQ reassessments may be appropriate if the data used in the original determination is shown to be inaccurate or invalid or if the water quality of the segment is believed to be significantly improved over that which existed at the time of the original BWQ determination. Affected stakeholders may petition the ADEQ Director to authorize a BWQ reassessment under those circumstances.

5 Assessing the Level of Degradation of Proposed Discharges

*Applicability of Degradation to the Various Protection Tiers
Procedure for Degradation Assessment
Calculations to Determine the Significance of Degradation*

Antidegradation impact assessments are required for all regulated discharges requiring individual NPDES permits that have the potential to degrade water quality in Arizona. The assessment procedures described in this chapter do not apply to non-point sources of pollution or activities covered under general permits. The procedures vary by the tier level of protection and by the type of surface water. In general, antidegradation reviews for Tier 1 protection and protection of non-perennial waters and canals will focus on meeting applicable surface water quality standards and technology-based limits (e.g., BAT) end-of-pipe. For pollutants with Tier 2 protection levels on perennial waters, the degradation assessment further determines whether or not significant degradation will occur – i.e., whether or not 20 percent or more of the available assimilative capacity for any pollutant of concern will be consumed as a result of the proposed discharge during critical flow (e.g., 7Q10) conditions or the cumulative cap of 50% of available assimilative capacity is exceeded. The level of degradation will be assessed from BWQ conditions.

For Tier 3 protection levels, the degradation assessment must determine that no degradation will occur as a result of the proposed discharge unless the impacts are temporary. As a general rule of thumb, temporary impacts are defined as impacts of less than six months duration. Temporary impacts on a unique water should be minimized to the maximum extent practicable.

5.1 APPLICABILITY OF DEGRADATION TO THE VARIOUS PROTECTION TIERS

The concept of degradation is relatively simple: any discharge that results in a lowering of water quality from BWQ is considered to degrade water quality. Degradation is not allowed to cause or contribute to impairments that result in the loss of existing uses (i.e., the Tier 1 threshold), and is not allowed at all in Outstanding Arizona Waters unless it is temporary, as determined by ADEQ (i.e., the Tier 3 threshold).

Degradation may be permitted at the Tier 2 protection level as described below. Significant degradation may be allowed in waters protected at the Tier 2 level if the applicant – after conducting a review of reasonable less degrading or non-degrading alternatives – demonstrates that:

- ◆ Lowering water quality is necessary to accommodate important economic or social development in the area where the water is located;
- ◆ The highest statutory and regulatory requirements for all new and existing point sources are achieved;
- ◆ All cost-effective and reasonable best management practices for non-point source control are implemented; and
- ◆ Tier 1 protection is ensured.

Decisions regarding significant degradation of Tier 2 protection levels will only be made after the required alternatives analysis and economic / social benefits justification have been completed, after technology-based and nonpoint source control requirements are met, and after the intergovernmental coordination and public participation provisions in Chapter 8 have been satisfied. For Tier 2 assessments of discharges to perennial waters, determining BWQ, assessing projected impacts, analyzing possible alternatives, and evaluating economic or social benefits, if applicable, must occur prior to issuing an individual NPDES permit. Therefore, it is recommended that an applicant discharging to a perennial water meet with ADEQ in a pre-application conference at least two years prior to the anticipated date of NPDES permit issuance.

5.2 PROCEDURE FOR TIER 2 DEGRADATION ASSESSMENT

Tier 2 assessment procedures vary by the type of surface water, as outlined below:

Discharges to Ephemeral Waters, Intermittent Streams, Effluent Dependent Waters, and Canals

The majority of individual NPDES permit applicants will likely discharge to an ephemeral water, intermittent water, effluent dependent water, or canal. Tier 2 degradation assessment procedures do not apply to these discharges. Discharges in these cases will be required to meet applicable surface water quality standards and technology-based standards, e.g., best available technologies (BAT) at the “end-of-the-pipe.” (Tier 1 degradation assessment procedures).

Discharges to Perennial Waters

All other individually-permitted discharges to perennial waters must conduct an antidegradation assessment to determine whether or not significant degradation will occur, i.e., whether or not 20 percent or more of the available assimilative capacity for any pollutant of concern will be consumed as a result of the proposed discharge during critical flow (e.g., 7Q10) conditions or the cumulative cap of 50% of available assimilative capacity is exceeded. Both the 20 percent assimilative capacity consumption allowance and the cumulative cap of 50% of available assimilative capacity are measured from baseline water quality. The Tier 2 degradation assessment is based on three characterizations:

- ◆ BWQ, as determined by data collected pursuant to Chapter 4
- ◆ The flow and pollutant loads resulting from the proposed discharge
- ◆ Projected changes in water quality that occur as a result of the proposed discharge

The results of the degradation assessment will be used to determine whether the proposed discharge will be subject to additional requirements as part of the permitting process. As noted in the first sections of this chapter, there are a number of factors that must be considered in deliberations concerning whether or not a proposed discharge that will degrade water quality is allowable. These factors relate to the water quality protection criteria associated with the various tiers, and include:

- ◆ Calculations to characterize the significance of water quality degradation
- ◆ Analyses of reasonable, cost-effective, less degrading or non-degrading alternatives
- ◆ Examination and justification of important economic or social costs and benefits

The following section addresses the first item noted above. Chapter 6 provides information on analyzing alternatives to a proposed discharge; Chapter 7 outlines a procedure for examining and reporting important economic or social benefits that will occur as a result of the proposed discharge to justify significant degradation.

Mixing Zones

For new dischargers requesting a mixing zone in a Tier 2 situation, Tier 2 reviews would be needed for pollutants whose effluent concentrations would lower water quality beyond the Tier 2 antidegradation limits. The permitting approach would be the same as the current approach used for mixing zones: the only change would be that a new section of the mixing zone would be added to reflect the downstream mixing area where the Tier 2 limits could be exceeded (i.e., where mixing zone impacts would meet applicable water quality standards, but not the Tier 2 antidegradation limit given the baseline water quality in that portion of the receiving water). The Tier 2 review would provide justification for lowering water quality to the Tier 1 level within the affected downstream area of the mixing zone (see Figure 2-1 below), i.e., justification would be needed to lower water quality from Tier 2 BWQ to the Tier 1 level (water quality criteria) downstream of the mixing zone. At some point downstream at the boundary of the antidegradation mixing zone, dilution would presumably return the receiving water quality to BWQ (Tier 2 status).

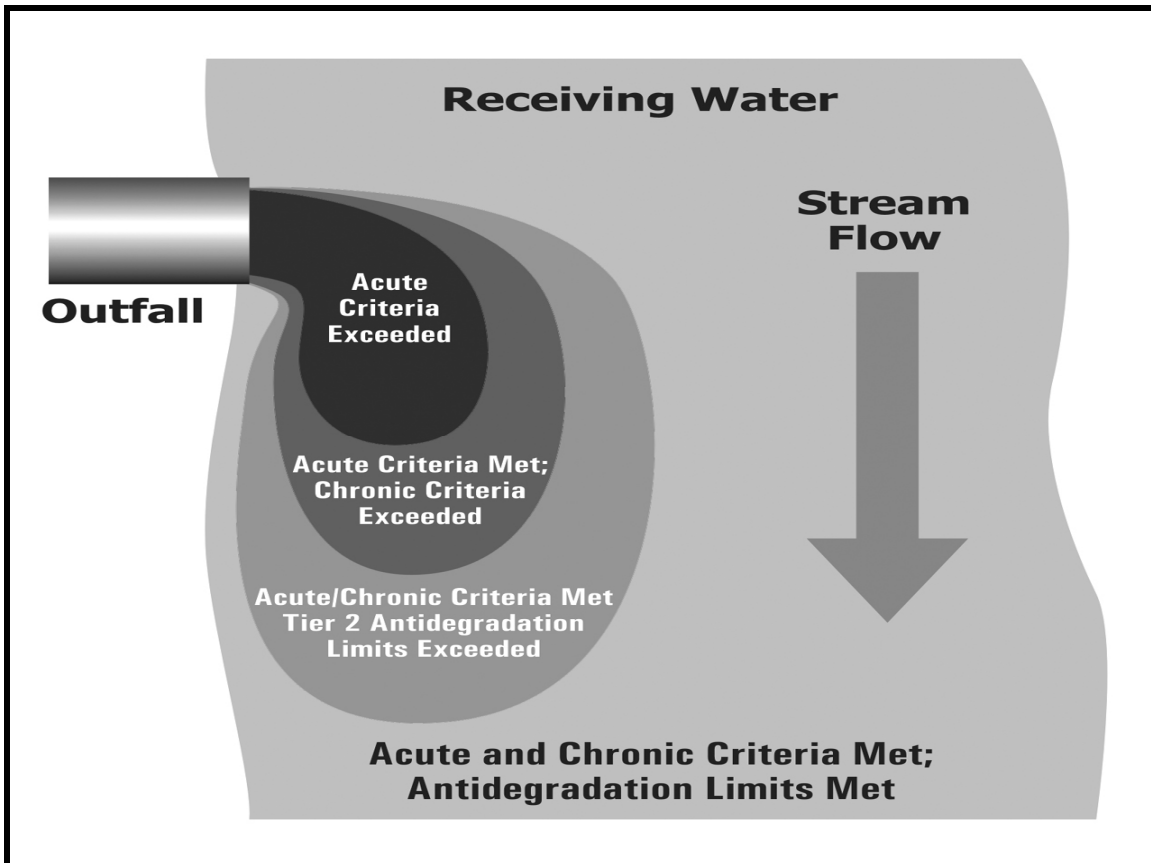


Figure 5-1. Antidegradation Mixing Zone for Receiving Water Protected at the Tier 2 Level

Existing facilities with mixing zones which are applying for permit renewals with no new or expanded discharge would not be required to undergo a comprehensive Tier 2 review, because their existing effluent is already deemed to compose part of the receiving water's BWQ.

5.3 CALCULATIONS TO DETERMINE SIGNIFICANCE OF DEGRADATION

By definition, at the Tier 2 protection levels BWQ is better than the minimum water quality standards for one or more pollutants. The difference between *observed* BWQ and the water quality standard constitutes the available assimilative capacity for any pollutant of concern under study. Figure 5-2 below provides a simplified visual representation of available assimilative capacity for pollutant *x*.

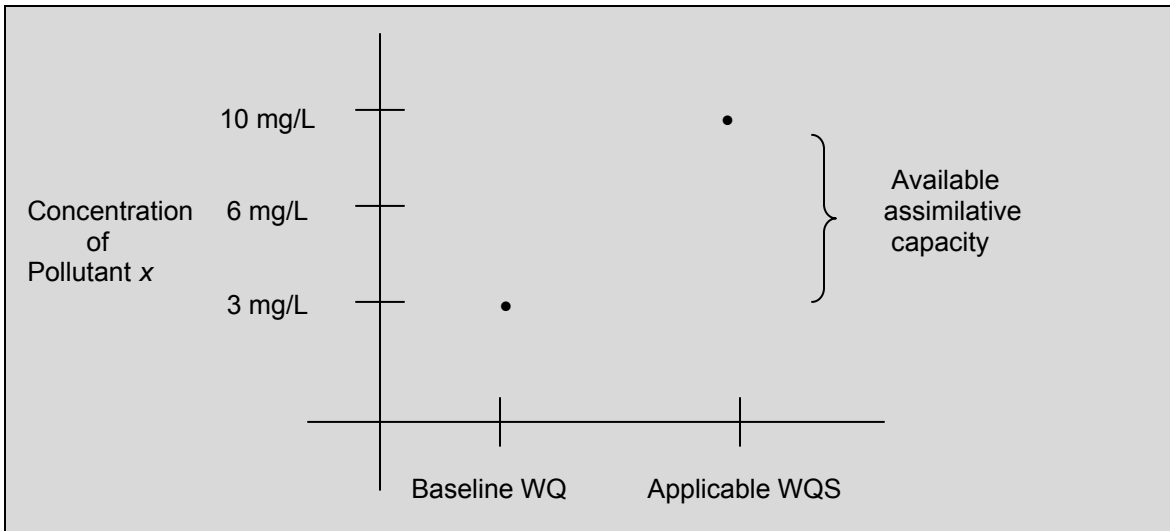


Figure 5-2. Simplified Representation of Assimilative Capacity for Pollutant *x*

In this example, the applicable water quality standard for pollutant *x* is 10 mg/L and the *observed* BWQ measurement is 3 mg/L. The total available assimilative capacity for pollutant *x* is the load associated with the difference between the two concentrations at the critical stream flow condition, e.g., a regulated discharge that would cause existing (i.e., baseline) water quality concentrations of pollutant *x* to increase from 3 mg/L to 10 mg/L would consume all of the available assimilative capacity of the surface water.

Antidegradation protection requirements for Tier 1 protection levels allow all of the available assimilative capacity to be used. Use of the total available assimilative capacity can also be allowed in Tier 2 protection levels if the alternatives analysis and economic/social justification requirements outlined in Chapters 6 and 7 and the intergovernmental coordination and public participation conditions outlined in Chapter 8 are satisfied.

In Figure 5-2, the total available assimilative capacity is the difference between the water quality standard for the receiving water and observed (i.e., baseline) water quality, or 10 mg/L minus 3 mg/L = 7 mg/L. Twenty percent of 7 mg/L is 1.4 mg/L; thus a regulated discharge undergoing a Tier 2 review would be allowable (i.e., not significant) if it did not cause the water quality in the receiving segment to equal or exceed BWQ (i.e., 3 mg/L) plus the significant degradation limit (i.e., 1.4 mg/L), or 4.4 mg/L for pollutant *x*.

To address degradation associated with repeated regulated discharges over time, ADEQ is establishing a separate significance threshold of 50% cumulative cap on the consumption of total assimilative capacity. This approach creates a “backstop” so that multiple or repeated regulated discharges to a water body over time which individually do not consume 20% of the available

assimilative do not result in the consumption of the majority of the total assimilative capacity without ADEQ ever conducting a comprehensive Tier 2 antidegradation review. ADEQ has established this significance threshold at 50% of the total available assimilative capacity when BWQ is characterized. This means that once 50% of the available assimilative capacity is used in a surface water for a pollutant of concern, any further lowering of water quality is considered significant degradation. ADEQ will conduct a comprehensive Tier 2 antidegradation review for each lowering of water quality once the 50% cumulative cap is exceeded, regardless of the amount of assimilative capacity that would be used by the regulated discharge.

The calculations noted above are to be executed for critical flow or lake/reservoir water level conditions for the pollutants of concern. Critical flow conditions are the lowest flow over 7 consecutive days that has a probability of occurring once every 10 years (7Q10) in the receiving water. Critical lake/reservoir water levels will be determined on a case-by-case basis.

The specific formulas to be used for calculating discharge loads that will or will not result in significant degradation are detailed below.

Calculations for Tier 2 Pollutants on Perennial Streams

The calculation to determine a discharge that will result in significant degradation is a variation of the mass balance equation that is used to determine water quality-based discharge limits:

$$(Q_d)(C_d) + (Q_s)(C_s) = (Q_r)(C_r)$$

Where:

Q_d=discharge flow cfs

Q_s=stream flow (7Q10)

Q_r=resulting flow or Q_s+Q_d

C_d=discharge concentration,

C_{bwq}=concentration in stream or background water quality

C_r= resultant concentration set equal to (WQS-C_{bwq})0.1 +C_{bwq}

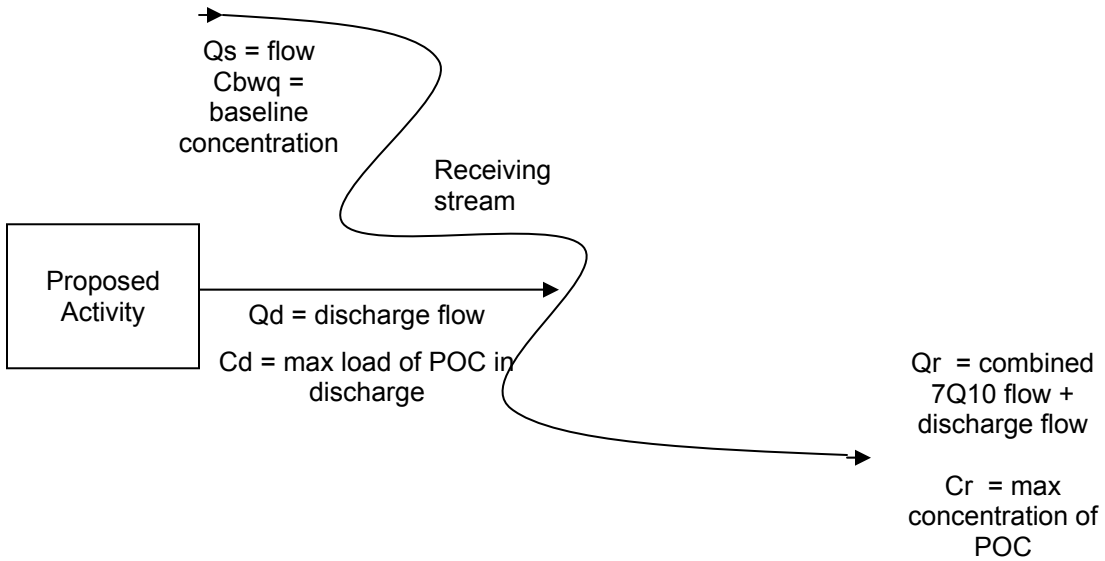
Solve for C_d:

$$C_d = \frac{[C_r(Q_d + Q_s)] - [(C_s)(Q_s)]}{Q_d}$$

For purposes of Tier 2 antidegradation reviews, ADEQ would solve for the discharge concentration that would use up 20% of the assimilative capacity:

$$C_d = \frac{[(WQS - C_{bwq})0.2 + C_{bwq}](Q_d + Q_s) - [(C_s)(Q_s)]}{Q_d}$$

Then compare calculated Cd with the proposed Cd . If the calculated Cd is greater than the proposed Cd then no significant degradation.



It is important to note that the use of the entire Cd load value by one or more discharges would prevent any further loadings of that POC in the stream segment, since all of the allowable assimilative capacity (i.e., 20 percent) would be consumed. An exception could be made in Tier 2 waters if future proposed discharges are deemed socially and economically important (see Chapter 7).

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6 Identifying and Evaluating Pollution Control Alternatives for Tier 2 Protection

*Less Degrading and Non-Degrading Pollution Control Measures
Identifying Cost Components and Assessing Costs
Evaluating Environmental Impacts Associated with Alternatives
Cost and Reasonableness Criteria for Alternatives Evaluation
Procedure for Comparing Costs of Various Alternatives
Summary of the Alternatives Analysis Process*

A regulated entity proposing any discharge that would significantly degrade water quality in a Tier 2 surface water (i.e., consume 20 percent of the remaining assimilative capacity or exceed the cumulative cap of 50% for any pollutant of concern) is required to prepare an evaluation of alternatives to the proposed discharge. The evaluation must provide substantive information pertaining to the cost and environmental impacts associated with the proposed discharge and the alternatives evaluated. This chapter provides guidance on how to evaluate alternatives to proposed discharge affecting water quality protected at the Tier 2 level when an impacts analysis of a proposed discharge determines that significant degradation may occur.

The intent of the alternatives analysis is to identify cost-effective and reasonable *less degrading* or *non-degrading* approaches for reducing discharge-related impacts so they do not result in significant degradation of the receiving water. An alternatives analysis is also helpful – but not required – to applicants proposing discharges in Tier 1 or Tier 3 waters, since a comprehensive review of possible less or non-degrading alternatives might identify cost-effective and reasonable approaches for reducing or eliminating degradation in those waters.

6.1 LESS DEGRADING AND NON-DEGRADING POLLUTION CONTROL MEASURES

For any proposed discharge, there may be a number of less degrading and/or non-degrading pollution control measures that might provide cost-effective and reasonable alternatives for preventing the degradation of a surface water. Under Arizona's antidegradation implementation procedures, applicants are required to analyze these alternatives if their proposed discharge will cause significant degradation of higher quality (i.e., Tier 2) waters. Less degrading or non-degrading pollution control alternatives identified and assessed during this process should be reliable, demonstrated processes or practices that can be reasonably expected to result in a defined range of treatment or pollutant removal.

If experimental or unproven methods are proposed, ADEQ may request information on previous applications of the method, effectiveness, transferability (if applicable), costs, and other information as appropriate. Applications containing proposals for new or experimental methods will be required to append information regarding likely performance results and may be approved at the discretion of the Director with the understanding that if the proposed technology does not meet projected pollutant control targets the applicant must adopt conventional or other pollution control measures that meet state antidegradation requirements.

Pollution control alternatives to be evaluated when a proposed discharge will result in significant degradation of the receiving water segments include, but are not limited to, the following:

- ◆ Examples of Non-Discharge Alternatives
 - Pollution prevention and treatment process changes
 - Recycling/reusing wastewater (i.e., closed loop systems)
 - Holding/transport facilities for treatment/discharge elsewhere
 - Groundwater recharge (i.e., soil-aquifer treatment, injection)
 - 100% reuse

- ◆ Examples of Non-Degrading or Less-Degrading Alternatives
 - Advanced or innovative biological/physical/chemical treatment
 - Pollution prevention and process changes
 - Improvements in the collection system
 - Improved operation and maintenance of existing treatment system
 - Seasonal or controlled discharges to avoid critical periods
 - Alternative discharge locations
 - Reduction in the scope of the proposed project

Applicants will be expected to address reasonable and cost-effective alternatives, or mix of alternatives in their evaluations, including approaches that are completely different from conventional practice, e.g., land application (subsurface/surface), deep well injection, alternative discharge locations, and other alternatives. ADEQ staff and the applicant will meet to discuss these and other issues early in the process. It is the responsibility of the applicant to screen for and propose a list of available, cost-effective alternatives that will be evaluated in detail. ADEQ may require that additional alternatives be analyzed.

It is recommended that the applicant document any alternatives that were determined to be unreasonable or not cost-effective. The intent of the alternatives review process is to ensure that significant degradation does not occur unless no cost-effective, reasonable alternative(s) exist. If the project results in significant degradation even after applying reasonable, cost-effective alternatives, the proposal must demonstrate 1) important social or economic development as outlined in Chapter 8; 2) the level of water quality necessary to protect existing uses is maintained (i.e., Tier 1 protection); 3) all cost-effective and reasonable best management practices for nonpoint source control are implemented; and 4) the highest statutory and regulatory requirements for all new and existing point sources are achieved (R18-11-107 C).

6.2 IDENTIFYING COST COMPONENTS AND ASSESSING COSTS

An assessment of costs related to the alternatives summarized above is necessary to determine whether or not a prospective alternative pollution control measure is reasonable. General cost categories include:

- ◆ Capital costs
- ◆ Operating costs
- ◆ Other costs (one-time costs, savings, opportunity cost, salvage value)

In general, opportunity costs associated with use of a pollution control measure may be included in the cost assessment as appropriate. For example, lost opportunity costs for lots in a proposed subdivision that would be used for spray irrigation rather than housing, or losses related to a process change that results in a missed production run are legitimate and should be documented. Speculative value, i.e., that which is associated with potential future development rather than that associated with an actual proposed project, however, should not be included in cost projections.

In order to develop a standardized framework for projecting, evaluating, and comparing costs associated with various pollution control measures, applicants should use a present worth framework for generating and reporting cost information. Components of the present worth framework include:

$$P = C + O + [A * (P/A, d, n)] - S - L$$

Where:

- P = Present worth,
- C = Capital cost,
- O = Other costs (expressed as dollars invested at the beginning of the project),
- A = Annual operating cost,
- d = Discount rate,
- n = Useful life in years,
- S = Present worth of salvage value of facilities,
- L = Present worth of salvage value of land, and
- (P/A, d, n) = Equal series present worth factor, = $[(1 + d)^n - 1] / [d (1+d)^n]$.

The present worth calculated for the alternative technologies depends on the right choice for the discount rate (d), and the useful life (n) of the equipment or facility. Recommended discount rates for Arizona are provided by the Arizona Water Infrastructure Finance Authority (WIFA). The useful life of the facility or equipment is based upon similar facilities or equipment handling similar wastes and flows and must be approved by ADEQ. Speculative costs for land, facilities, etc., will not be allowed. For more information on the present worth calculation and other methods that may be used to assess costs, see Appendix B, Direct Cost Comparison of Alternatives.

6.3 EVALUATING ENVIRONMENTAL IMPACTS ASSOCIATED WITH ALTERNATIVES

Pollution control measures evaluated as alternatives to a proposed discharge may have environmental impacts that help define their overall value and/or desirability. Applicants are required to provide substantive information pertaining to both the cost and environmental impacts associated with pollution control alternatives evaluated for activities that would significantly degrade Tier 2 level of protection. The information related to environmental impacts should include impacts on the natural environment (i.e., land, air, and water) resulting from implementation of the alternative. The types of impacts evaluated during this process include, but are not limited to:

For all activities:

- ◆ Sensitivity of stream uses
- ◆ Need for low-flow augmentation
- ◆ Sensitivity of groundwater uses in the area
- ◆ Potential to generate secondary water quality impacts (storm water, hydrology)
- ◆ System or technology reliability, potential for upsets/accidents
- ◆ Effect on endangered species
- ◆ Non-water quality environmental impacts

For all discharges:

- ◆ Nature of pollutants discharged
- ◆ Dilution ratio for pollutants discharged

- ◆ Discharge timing and duration
- ◆ Siting of plant and collection facilities

Review of these impacts might be on a qualitative or quantitative basis, as appropriate. Non-water quality environmental impact analyses to be submitted by the applicant include estimations of the potential impact of the alternative(s) on odor, noise, energy consumption, air emissions, and solid waste generation. Odor and noise may be addressed qualitatively while other non-water quality impacts might need to be addressed quantitatively. The energy use, air emission, and solid waste generation impacts can be expressed as a percent increase/decrease as compared to the proposed activity. Other factors that should be considered during the review include the technical, legal, and local considerations of the various alternatives examined. The schedule and the estimated time of completion of the project should also be provided for each alternative discussed.

6.4 COST AND REASONABLENESS CRITERIA FOR ALTERNATIVES EVALUATION

In general, an alternative or suite of alternatives is considered to be cost-effective and reasonable if it is feasible and the cost is less than 110 percent of the *base costs* of pollution control measures for the proposed discharge in present worth costs. It should be noted that the 110 percent cost-effectiveness criterion is a general rule-of-thumb – if pollution control costs for alternatives that would result in substantial water quality benefits slightly exceed the 110 percent cost threshold, those alternatives may be required.

When calculating the cost of a proposed discharge and any less- or non-degrading alternatives, it is important to identify the base cost for required pollution control measures for any proposed discharge. The base cost for NPDES-permitted facilities is the cost of treatment to meet applicable water quality standards or the cost of meeting federal technology-based requirements, whichever is more stringent and legally applicable. The base cost for §404 dredge-and-fill permits (e.g., wetland fills, mining streambed fills) is the cost of pollution controls to meet minimum §404 permit and §401 water quality certification requirements. Base cost includes technology based limits or technology required to meet water quality standards. The base cost – the cost for legally required base pollution control measures – is the starting point for alternatives analysis cost comparisons.

6.5 PROCEDURE FOR COMPARING COSTS OF VARIOUS ALTERNATIVES

Base pollution control measures are those required to treat regulated discharges to technology-based requirements or water quality-based limits for Tier 1 protection. Base pollution control measures are the “floor” from which alternatives or other pollution control/reduction costs are compared. The cost of base pollution control measures is important in the antidegradation review process since cost “reasonableness” is one of the tests for requiring adoption of alternatives in cases where degradation will be significant. In reviewing costs for a variety of discharge scenarios, three reference costs can be identified (see Figure 6-1):

- ◆ The cost of treatment that results in no discharges of any parameters of concern (the “no-discharge” cost)
- ◆ The cost of treatment that produces an effluent that results in no significant degradation of the receiving water, i.e., that does not consume more than 20 percent of the available assimilative capacity for any pollutant of concern (POC)

- ◆ The cost of treating an effluent to a quality that meets specific effluent/best available technology (BAT) limits or water quality criteria for any/all pollutants of concern (i.e., the conceptual minimum Tier 1 requirement)

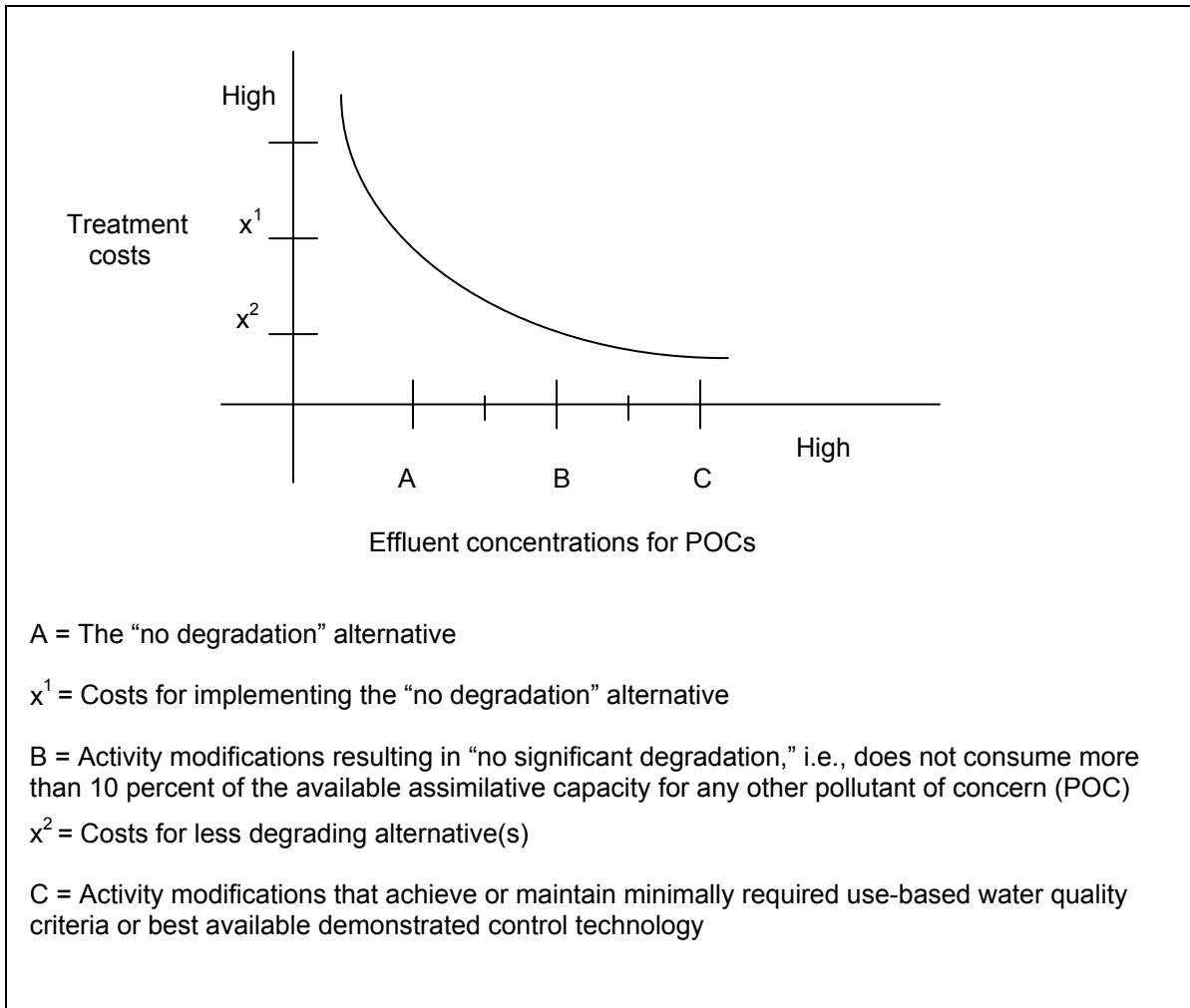


Figure 6-1. Comparison of Treatment Costs to Produce Effluents of Varying Quality

As noted above, the base cost for comparing the reasonableness and cost-effectiveness of less degrading or non-degrading alternatives is the cost of producing an effluent that meets water quality standards or the cost of meeting federally-required effluent concentration limits or best available technology, whichever is more stringent. (level C in Figure 6-1). For other regulated activities, the base cost is the cost of meeting technology-based limits required to meet water quality criteria, or the management practices required as part of permitting or certification.

Applicants will be required to submit cost information to ADEQ for base pollution control measures as defined above and alternative pollution control measures that would result in no significant degradation (level B), and any available alternatives to the original proposal. ADEQ may request cost or other information regarding preventing degradation (level A). ADEQ will assess the limitations of the alternatives analysis and may request additional analyses or information, as needed, to make a determination.

6.6 SUMMARY OF THE ALTERNATIVES ANALYSIS PROCESS

The preceding discussion describes the approach that will be followed by ADEQ for determining whether or not less- or non-degrading alternatives to the proposed discharge will be required to prevent significant degradation of Arizona surface waters. The following steps summarize the alternatives analysis process and other relevant actions during antidegradation reviews for Tier 2 protection levels:

- ◆ Based on characterizations of the proposed discharge, baseline water quality (BWQ), and projected impacts on the receiving water segment, ADEQ will determine whether or not the proposed discharge will significantly degrade water quality, i.e., consume more than 20 percent of the available assimilative capacity for any other parameter of concern (POC).
- ◆ If it is determined that significant degradation would likely occur due to the proposed discharge, an analysis of less degrading or non-degrading alternatives to the proposed discharge will be required.
- ◆ The applicant will be required to submit cost information for base pollution control measures associated with the proposed discharge, alternative pollution control measures that would result in no significant degradation, and for other less or non-degrading alternatives as appropriate.
- ◆ ADEQ will evaluate the proposed discharge, the less and non-degrading alternatives, and the costs and feasibility associated with each mix of options.
- ◆ ADEQ will identify the least degrading alternative – or mix of alternatives – that does not exceed the 110 percent base cost threshold (i.e., is cost-effective and reasonable). This will be ADEQ's preferred option.
- ◆ If the preferred option (i.e., pollution control alternative or mix of alternatives) will not result in significant degradation of the receiving water segment, permitting of the discharge may proceed. If the preferred option (i.e., pollution control alternative or mix of alternatives) will result in significant degradation of the receiving water, the applicant will be required to conduct an analysis of economic and social benefits so ADEQ can determine whether or not the discharge can be permitted. In addition to the social and economic importance, in order to permit degradation of a high quality water, the applicant must demonstrate that the proposed discharge fully protects existing uses, achieves the highest statutory and regulatory requirements for existing and new point source discharges, and implements cost-effective, reasonable best management practices for non-point source control.
- ◆ All water quality impacts in the alternatives analysis will be assessed at the BWQ station and back-calculated to develop the upstream effluent limit (i.e., the assessment of degradation of proposed discharges and of alternatives will be assessed at the BWQ point, while permit limits and permit compliance will be developed and assessed at the discharge point).

7 Determining Social and Economic Importance for Tier 2 Reviews

*Regulatory Requirements for Social and Economic Analysis
Role of the Applicant in Reporting Social and Economic Benefits
Role of DEP in Making a Preliminary Determination of Social and Economic Importance
Role of the Public in Determining Social and Economic Importance
Final Determination*

7.1 REGULATORY REQUIREMENTS FOR SOCIAL AND ECONOMIC ANALYSIS

As discussed in previous chapters, if an alternatives analysis has been conducted for a proposed discharge to a Tier 2 protected water, and the least degrading, cost-effective alternative still results in significant degradation, an analysis of the social and economic importance (SEI) of the discharge must be conducted. Under Arizona's antidegradation rule, R18-11-107, prior to authorizing any proposed discharge that would significantly lower the water quality of a Tier 2 water, ADEQ must ensure that allowing lower water quality is necessary to accommodate important social or economic development in the area in which the surface water is located.

There are several steps in determining SEI. First, the applicant conducts an analysis of the social and economic benefits associated with the discharge. The applicant must document any social and economic benefits/costs associated with the proposed discharge and report them to ADEQ. ADEQ then reviews the information and makes a preliminary determination of the social and economic importance of the proposed project. Finally, after public hearing as provided in R18-11-07(C), ADEQ assesses all information and makes a final determination. The following sections detail the roles and procedures for determining SEI.

7.2 ROLE OF THE APPLICANT IN REPORTING SOCIAL AND ECONOMIC BENEFITS

The role of the applicant is to demonstrate the social and economic benefits of the proposed discharge associated with allowing significant degradation of high quality water. Due to the need to collect information, analyze impacts, and discuss details of the report both internally and with the applicant, ADEQ recommends that this process begin early. Initiating the social and economic benefits reporting process along with the facility planning and permitting process will ensure that all procedures associated with the antidegradation review are completed promptly and do not unduly delay processing of the permit application.

The report on social and economic benefits (positive and negative) associated with the project is relatively simple and straightforward. ADEQ requires that up-to-date and accurate data are included in the report, and that estimates of job gains/losses, housing impacts, etc., be summarized completely and based on defensible estimates. Using the Social and Economic Importance Worksheet, Appendix C, the applicant must document how the proposed discharge affects the social, economic, and environmental factors listed below.

Social, Economic, and Environmental Considerations

Below are the economic and social benefits most commonly associated with this socio-economic analysis:

1. Creating, expanding or maintaining employment
2. Reducing the unemployment rate
3. Increasing median household income
4. Reducing the number of households below the poverty line
5. Increasing needed housing supply
6. Increasing the community tax base
7. Providing necessary public services (e.g., fire department, school, infrastructure)
8. Correcting a public health, safety, or environmental problem
9. Improving quality of life for residents in the area

Below are the environmental benefits or costs most commonly associated with this analysis:

1. Promoting/impacting fishing, recreation, and tourism industries
2. Enhancing/impacting threatened and endangered species
3. Providing increased flood control and sediment trapping through maintaining or creating wetlands and riparian zones or impacting wetlands and riparian zones
4. Reserving assimilative capacity for future industry and development or reserving no capacity for future discharges.

The applicant may choose to describe additional factors as needed to strengthen its Social and Economic Importance Analysis. Appendix D, *Other Economic and Environmental Considerations*, provides examples of other issues that might be helpful to address in developing an assessment. All information provided shall be based upon the most current, available data (e.g., unemployment statistics, census data, etc.). The applicant must also demonstrate that the proposed discharge fully protects existing uses, achieves the highest statutory and regulatory requirements for existing and new point source discharges, and implements cost-effective, reasonable best management practices for non-point source control.

7.3 ROLE OF ADEQ IN MAKING A PRELIMINARY DETERMINATION OF SOCIAL AND ECONOMIC IMPORTANCE

Prior to authorizing any proposed discharge that would significantly lower the water quality of a Tier 2 protected water, ADEQ shall ensure that the proposed discharge is necessary to accommodate important economic or social development in the area in which the waters are located. In making a preliminary decision, ADEQ will rely primarily on the demonstration made by the applicant. However, ADEQ may weigh the applicant's demonstration against counterbalancing socioeconomic costs associated with the proposed discharge, such as any anticipated negative socioeconomic effects on the community and the projected environmental effects (i.e., those determined in the alternatives analysis and/or the social and economic importance process). ADEQ will assess all information and make a preliminary determination on the facts on a case-by-case basis.

If information available to ADEQ is not sufficient to make a preliminary determination regarding the socioeconomic importance of the proposed discharge, ADEQ may require the project applicant to submit specific items of information needed to support a determination of social and economic importance. The types of information required of the applicant will be determined on a case-by-case basis, but may include: a) information pertaining to current aquatic life, recreational, or other uses of the surface water; b) information necessary to determine the environmental impacts that may result from the proposed discharge; c) facts pertaining to the current state of economic development in the area (e.g., population, area employment, major employers, area income, types of businesses); d) governmental fiscal base; and e) land use in the areas surrounding the proposed activity. ADEQ may require use of quantitative models for large proposed activities (e.g., major industrial wastewater treatment facility, large concentrated animal feeding operation, etc.).

Once the available information pertaining to the socioeconomic importance of the proposed discharge has been reviewed by ADEQ, a preliminary determination regarding social and economic importance shall be made. If the proposed discharge is determined to be necessary to accommodate important economic or social development in the area in which the affected waters are located, the substance and basis for that preliminary determination shall be documented and the Tier 2 review shall continue. ADEQ shall forward its preliminary determination to selected governmental agencies and make the preliminary determination available to the public. ADEQ shall include a review of social and economic importance issues in the public hearings associated with the project as provided for in state antidegradation regulations (see Chapter 8).

7.4 ROLE OF THE PUBLIC AND INTERGOVERNMENTAL COORDINATION IN DETERMINING SOCIAL AND ECONOMIC IMPORTANCE

The role of the public and selected governmental agencies is to express views and concerns regarding the preliminary ADEQ determination. ADEQ will consider these comments in making its final determination. See Chapter 8, Intergovernmental Coordination and Public Participation, describing how interested parties can participate.

7.5 FINAL DETERMINATION

Once the public hearing requirements are satisfied, ADEQ Director shall make a final determination concerning the social or economic importance of the proposed activity. In addition to the determination of social and economic importance, the Director must find that the proposed discharge fully protects existing uses, achieves the highest statutory and regulatory requirements for existing and new point source discharges, and implements cost-effective, reasonable best management practices for nonpoint source control (if applicable). All social and economic importance findings and other required findings, including determinations to deny issuance of a permit for an activity, shall be documented and made part of the public record.

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8 Requirements for Intergovernmental Coordination and Public Participation

*Public Notification Requirements
Opportunities for Public Participation
Intergovernmental Coordination and Review
Appeals of Antidegradation Review Decisions*

The antidegradation review process provides opportunity for public participation. Public notice of antidegradation review findings, solicitations of public comment, and maintenance of antidegradation review documents as part of the public record help ensure that interested parties can be engaged and involved throughout the review process. In addition, intergovernmental coordination and review and a public hearing are required prior to any action that allows a significant lowering of water quality in a surface water afforded Tier 2 protection. This requirement provides an additional level of involvement and input during antidegradation review discussions.

This chapter outlines public participation and intergovernmental coordination and review requirements. It should be noted that the processes for both follow existing state rules regarding public notice, comment, and records. Antidegradation reviews for NPDES-permitted facilities will employ the public participation procedures that are available through the permitting process (e.g., draft permits, fact sheets, opportunities to comment, etc.). The fact sheet will include a discussion for the public of ADEQ's antidegradation review. Appeals of antidegradation review decisions rendered by the Director also adhere to current rules and practice.

8.1 PUBLIC NOTIFICATION REQUIREMENTS

Public notice and opportunity for public comment will be provided for all antidegradation reviews. Public notice and opportunity for comment may be combined with other public participation procedures, such as those related to NPDES permitting processes or intergovernmental coordination / review procedures.

Discharges that may result in a significant degradation of water quality for Tier 2 parameters can only be approved after ADEQ holds a public hearing on whether degradation should be allowed under the general public hearing procedures prescribed at R18-1-401 and R18-1-402 and the Director makes all of the following findings:

- ◆ The level of water quality necessary to protect existing uses is fully protected. Water quality shall not be lowered to a level that does not comply with applicable water quality standards.
- ◆ The highest statutory and regulatory requirements for new and existing point sources are achieved.
- ◆ All cost-effective and reasonable best management practices for non-point source pollution control are implemented.
- ◆ Allowing lower water quality is necessary to accommodate important economic or social development in the area where the surface water is located.

After an antidegradation review has been conducted for a discharge that may result in significant degradation of waters protected at the Tier 2 level or an discharge that may degrade a Tier 3 water, the public notice will include a notice of availability of: 1) the decision as to whether or not the proposed discharge meets antidegradation requirements; 2) determination of projected impacts on baseline water quality; 3) findings and determinations from the alternatives analysis, when required; 4) the conclusions of any social and economic evaluation of the proposed activity, where necessary; and 5) a description of the surface water that is subject to the antidegradation review.

Required public notice will be provided through the appropriate legal advertisement in a qualified newspaper with the largest circulation for the county where the discharge will occur. The notice will identify the action being considered, list all existing uses identified of the surface water, and call for comments from the public regarding the proposed discharge.

All antidegradation review findings shall be documented by ADEQ and made part of the administrative record. Review documents – including baseline water quality assessments, existing uses, the level of review conducted, alternatives analyses, social/economic studies, impacts analyses, and any decisions or findings – will be made available to the public.

8.2 OPPORTUNITIES FOR PUBLIC PARTICIPATION

Public participation in Arizona's water quality antidegradation program can be broad or specific. Opportunities for broad participation include involvement in the triennial review of the water quality standards program (i.e., use designations, water quality criteria determinations, antidegradation implementation procedures) and participation in rule development relative to permitting processes. In addition, any interested party may nominate a water segment for protection at the Tier 3 level by following the procedure for consideration outlined under R18-11-112 (see Chapter 2). Finally, interested groups can conduct volunteer monitoring to support baseline water quality determinations.

Wherever possible, ADEQ will seek to integrate public participation regarding antidegradation reviews with existing ADEQ public participation procedures (e.g., NPDES permitting procedures).

Public notice, opportunity for public comment, and opportunity for a public hearing will be provided for all activities approved after a Tier 1, 2, or 3 antidegradation review, as noted above. Public hearings and the collection of public comments on antidegradation reviews related to permit actions will be integrated into the existing hearing and comment provisions of permit processes.

When antidegradation reviews and notices of findings related to such reviews are incorporated into permit hearings or collection of public comments under the permit process, any required notice of the permit hearing or solicitation of comments shall note that elements of the antidegradation review (e.g., decisions, analyses, studies, water quality impacts) are also under consideration. ADEQ public participation processes that may include opportunities for antidegradation review and public involvement include:

- ◆ The permit issuance process for individual or general permits, which must abide by the requirements of A.A.C. Title 18, Chapter 9.
- ◆ Publicly funded POTW permitting, planning, or funding actions, which require public notices, comment opportunities, and meetings as part of the application process and planning requirements.

- ◆ Individual Clean Water Act §401 water quality certifications, which specify public participation requirements executed by ADEQ.

Provisions for public participation in antidegradation reviews and related matters are outlined in the state's Continuing Planning Process.

8.3 INTERGOVERNMENTAL COORDINATION AND REVIEW

Intergovernmental coordination is required prior to approving a discharge that would significantly degrade a surface water protected at the Tier 2 level. This requirement seeks to ensure that all relevant public entities at the local, state, and federal levels are aware of any proposal to significantly lower water quality and are provided with an opportunity to review, seek additional information, and comment on the proposal. The intergovernmental coordination and review process occurs prior to the issuance of any final determination on the social and/or economic importance of the proposed discharge, and may occur in tandem with public notice procedures outlined in the previous section. The time period afforded to commenting agencies will be consistent with the requirements for submission of public comments.

Intergovernmental coordination requirements will be satisfied by providing a written notice and request for comment to the appropriate agencies listed in Appendix E. Such notice will include summary information on the proposed activity, the receiving water segment, the baseline water quality of the receiving water segment, the tier designation, estimated impacts of the proposed activity upon the receiving water, the alternatives reviewed, and the projected social or economic importance of the proposed activity. In providing notice to these agencies, staff should note the importance of circulating the notice to local or regional constituents of the agencies involved so that ADEQ receives timely and complete responses from governmental entities that might have information regarding the proposal or might be affected by it.

Comments from the intergovernmental coordination process will be forwarded to the appropriate permit writer or other ADEQ staff for summarization and reporting to management. Once the intergovernmental coordination and public notice requirements outlined above are satisfied, ADEQ shall make a determination concerning the social or economic importance of the proposed activity in the area in which the affected receiving waters are located. All determinations, including determinations to prohibit the activity, shall be documented and made a part of the public record. The state's Continuing Planning Process outlines key elements of the intergovernmental coordination process, including the process for providing notice and collecting comments.

8.4 APPEALS OF ANTIDegradation REVIEW DECISIONS

Final decisions made by the agency (e.g., approval/disapproval notices) after public comment can be appealed to ADEQ. Provisions for appeals are found in the Arizona Administrative Procedures Act, defined at A.A.C. Title 41, Chapter 6, Articles 1-10.

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Appendix A. Antidegradation Review Flow Chart

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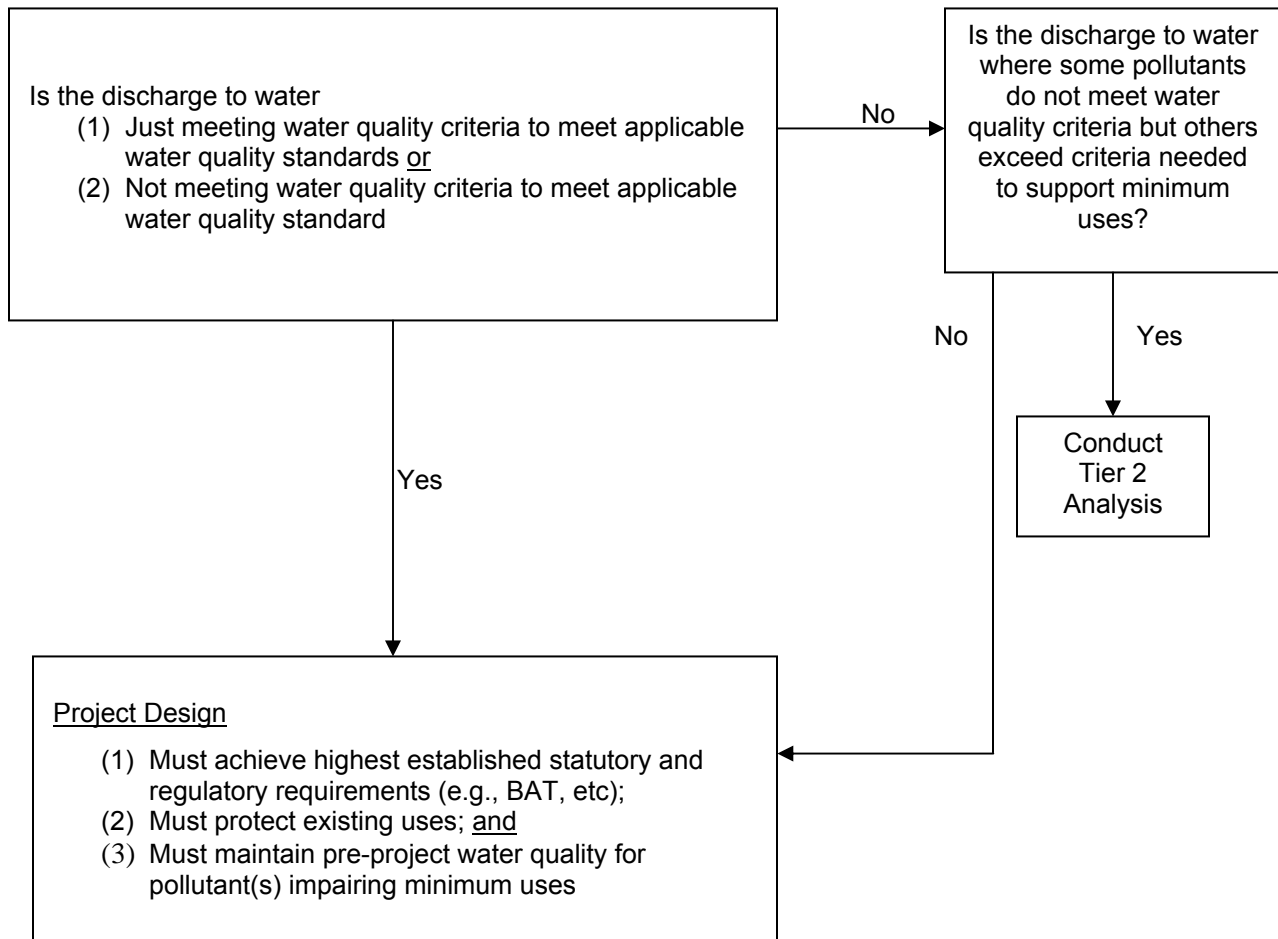
Tier 1

Applies to:

- ◆ All waters (as minimum protection level)
- ◆ 303(d) listed waters
- ◆ All intermittent streams, ephemeral streams, effluent dependent waters, and canals

Level of protection:

- ◆ Existing uses and water quality needed to protect existing uses
- ◆ Where existing water quality does not meet applicable water quality standard, no lowering of water quality is allowed with respect to pollutant causing impairment



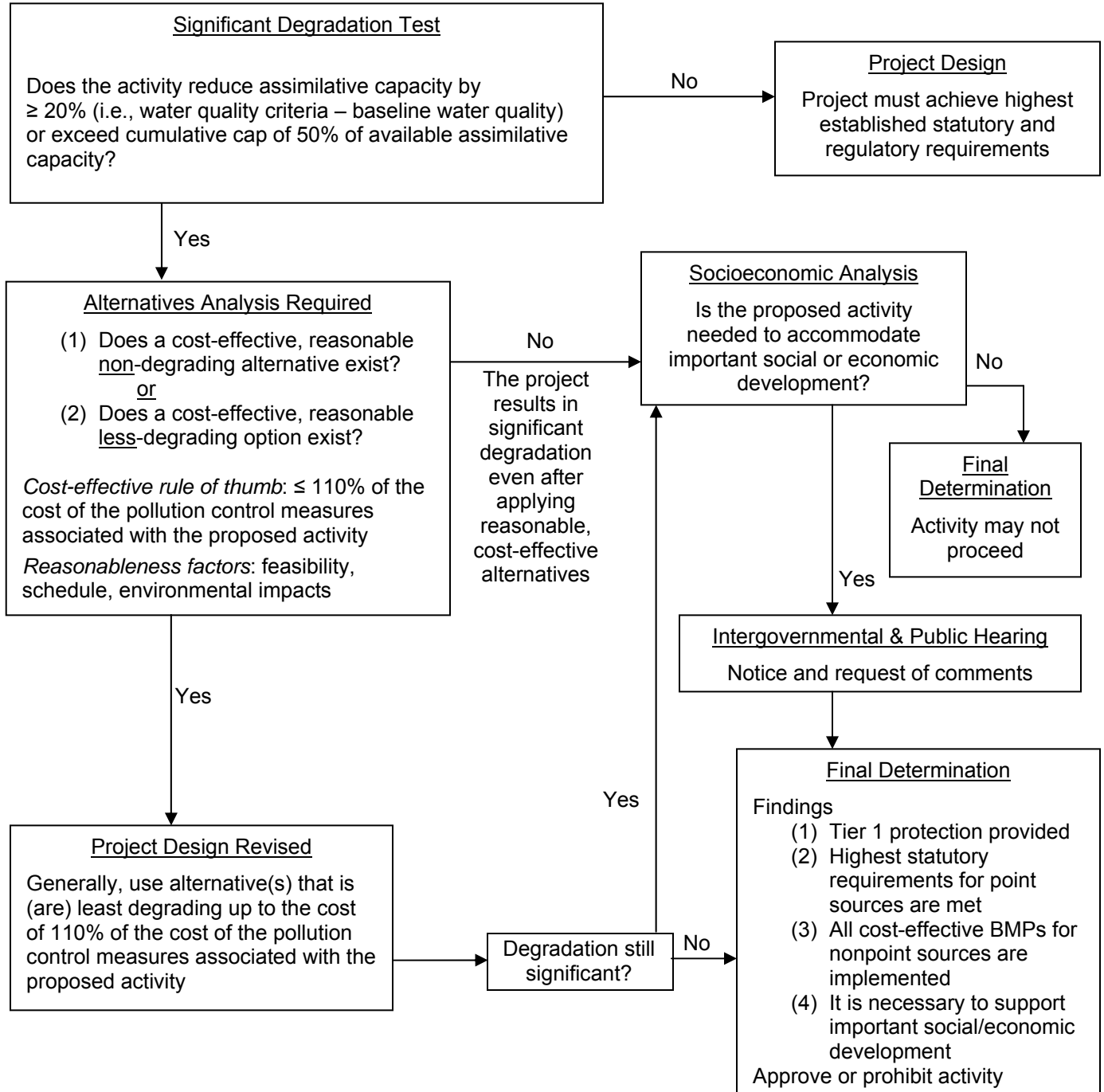
Tier 2

Applies to:

- ◆ High quality perennial waters (water quality is better than the applicable WQSs), lakes, reservoirs

Level of protection:

- ◆ 20% reduction in assimilative capacity allowed as measured from baseline water quality (without requiring alternatives analysis).
- ◆ Greater reduction is allowed if justified by socio-economic analysis
- ◆ Protection of existing uses required at a minimum (Tier 1)



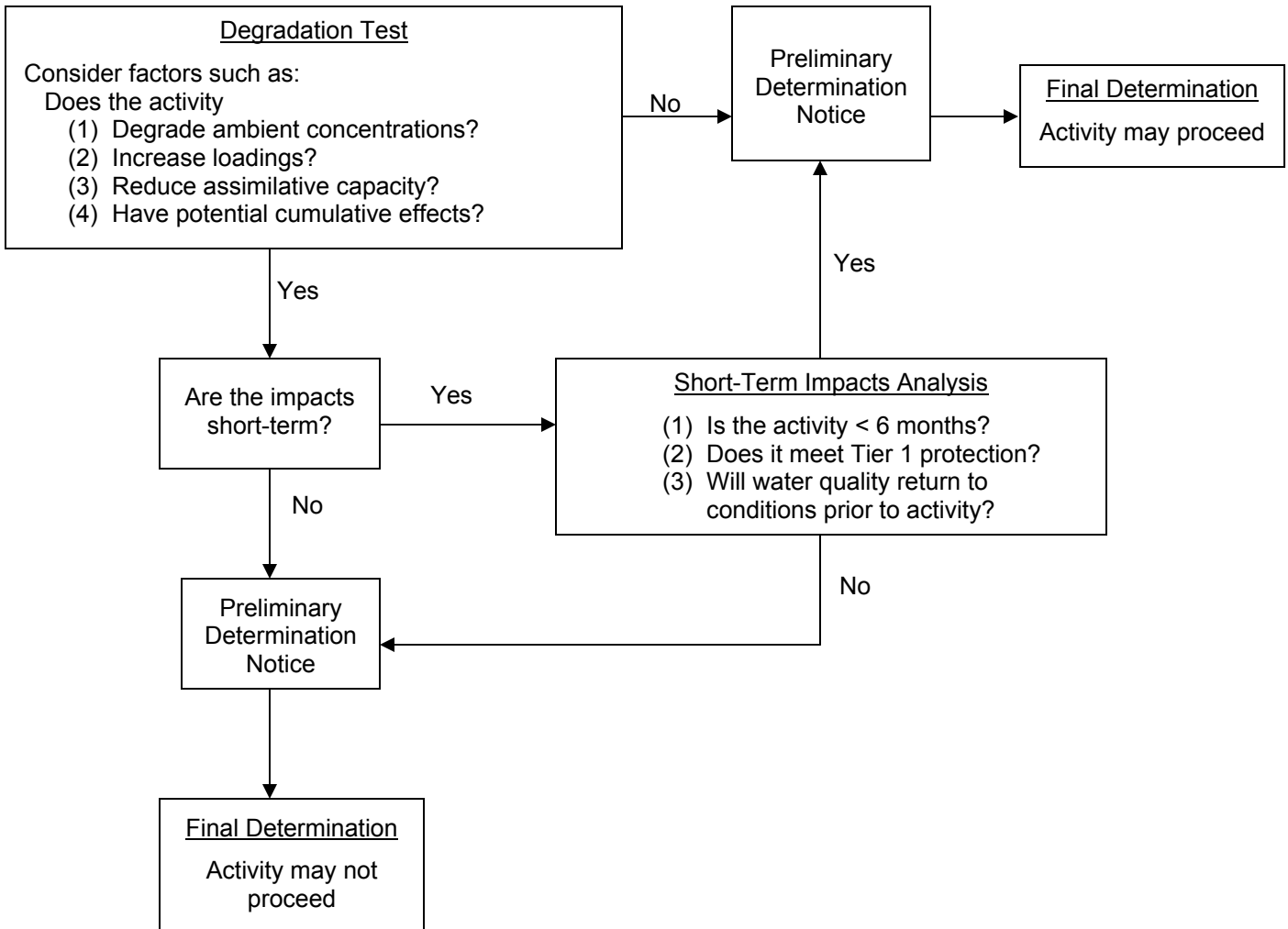
Tier 3

Applies to:

- ◆ Unique Waters

Level of protection:

- ◆ No degradation of water quality allowed except temporary



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Appendix B. Direct Comparison of Alternatives

Direct cost comparisons of alternatives are typically performed on the basis of present worth calculations or calculations of uniform annual cost (if the useful life of each alternative is different), using an applicable interest (discount) rate. The present worth calculation is a well-established method for integrating the upfront capital costs (and associated indebtedness) of a project with its ongoing annual costs of operation, and transforming the integrated costs to one equivalent value. The calculation yields the total equivalent dollars which would have to be invested at the beginning of a project in order to finance it for the life of the facility. The monetary costs considered in the calculations include the total value of the resources, which are attributable to the wastewater treatment, control, and management systems and the component parts. To determine these values, all monies necessary for capital construction costs, operational costs, and maintenance costs should be identified.

Capital construction costs used in cost comparison analysis consist of estimates of the construction costs, including overhead and profit; costs of land (including land purchased for the treatment works site and land used as part of the treatment process or for ultimate disposal of residues), relocation expenses, and right-of-way and easement acquisitions; costs of design engineering, field services (including cost of bond sales); startup costs such as operator training; financing costs and interest during construction; and the costs of any other site-related environmental controls, such as erosion and sediment control practices.

Operational and maintenance costs are usually considered on an annual basis and include operational staff salaries, cost of energy and fuels, cost of treatment chemicals, cost of routine replacement of equipment and equipment parts, and other expenditures necessary to ensure effective and dependable operation over the life of the facility. Annual operation and maintenance costs should be averaged to account for variations, which might occur, year-to-year due to varying production or wastewater volume.

The salvage value of equipment, tankage, and materials from the treatment works is part of the present worth calculation. Salvage value is estimated using straight-line depreciation during the useful life of the project, and can generally only be claimed for equipment where it can be clearly demonstrated that a specific market or re-use opportunity will exist. Salvage value estimation should also take into account the costs of any restoration or decommissioning of treatment units and final disposal costs. It is possible in some cases that these costs may be high enough that the net salvage value will be negative.

Land purchased for the treatment works site is also assumed to have a salvage value at the end of the project useful life equal to its market value at the end of the analysis period. The local inflation rate for land in the use area should be used to project the market value at the end of the analysis period.

It is also important to evaluate any opportunity cost associated with different alternatives. Opportunity costs should not be considered for speculative growth or production increases claimed by an applicant. Any costs claimed should be clearly associated with integral portions of projects, which are realistically available, and are otherwise locally approvable.

The discount rate used in the present worth or uniform annual cost calculation for public sewerage projects should be that rate published by the Arizona Department of Environmental Quality (ADEQ) and associated funding agencies for the planning review and evaluation of water resource projects. The rate is published on an annual basis and is available from ADEQ. For private sector projects, the interest rate utilized should be that rate at which the applicant can borrow funds. Since the present worth calculation is being performed more to compare alternatives rather than to obtain a very accurate estimation of actual costs, the fact that the same

interest rate assumption be utilized for each alternative is more important than the actual interest rate selected.

Cost estimates have an associated level of precision. The cost estimates prepared by the project sponsor should include an estimate of the error for each alternative. The applicant is responsible for documenting and defending all cost estimates used in the analysis.

Cost estimate equations:

The equations below are the basic expressions of the present worth and equivalent annualized cost concepts. Additional mathematical factors and apportionment of costs are incorporated into the equations where appropriate.

- I. The basic present worth calculation should be performed in accordance with the following equation:

$$P = C + O + [A * (P/A,d,n)] - S - L$$

where,

- P = present worth
- C = capital cost
- A = annual operating costs
- (P/A,d,n) = equal series present worth factor $[(1 + d)^n - 1] / [d (1 + d)^n]$
- d = discount rate
- n = useful life in years
- S = present worth of salvage value of facilities
- L = present worth of salvage value of land
- O = other costs (if any)

A gradient factor may be added into the equations to account for inflation of annual operating costs, as opposed to using an average value throughout the project life, by simply adding the additional following term onto the right hand side of the above equation:

$$[G * (P/G,d,n)]$$

where,

- G = uniform increase in annual costs
- (P/G,d,n) = present worth factor for a gradient = $\{(1 - nd) [(1 + d)^n - 1] / [d^2 * (1 + d)^n]\}$.

- II. If the alternatives have different useful lives, the cost comparison may be performed using the Equivalent Uniform Annual Cost Method. The equation for this method is:

$$EUA = (C + O) * (A/P,d,n) + A - [(S + L) * (A/F,d,n)]$$

where,

- EUA = equivalent uniform annual cost
- (A/P,d,n) = capital recovery factor $[(1 + d)^n - 1] / [d (1 + d)^n]$
- (A/F,d,n) = uniform series sinking fund factor $d / [(1 + d)^n - 1]$

To add a gradient factor, the following additional term is simply added to the right hand side of the above equation:

$$[G * (A/G,d,n)]$$

where,

$$(A/G,d,n) = \text{EUA factor for a gradient} = [(1 + d)^n - 1 - nd] / d * [(1 + d)^n - 1].$$

Additional cost factors:

Other costs, such as opportunity costs, while presented above as one-time present losses, may also have an annual lost revenue component, which could be accounted for by apportioning the costs as both upfront and annual costs.

In general, it is the responsibility of the applicant for a permit or approval to prepare detailed cost estimates for all appropriate and approvable discharge, nondischarge, and combination discharge/nondischarge alternatives. The cost estimates may be prepared by a licensed professional engineer, accountant, economist or other professional qualified in the field, but they must be submitted under a professional engineer seal as part of the permit application.

The sources and rationale for all data and assumptions must be clearly indicated. ADEQ will review the cost estimates for completeness, accuracy, and validity of assumptions. Where deficiencies are discovered, ADEQ will either request additional information or obtain the information on its own, or both. Following the review process, ADEQ will advise the applicant on which alternatives (or combination discharge/nondischarge alternatives) are cost-effective, and processing of a permit application will proceed on that basis. In general, an alternative or suite of alternatives is considered to be cost-effective and reasonable if it is feasible and the cost is less than 110 percent of the base costs of pollution control measures for the proposed activity (present worth costs).

Other factors:

While the basic concept behind the direct comparison is the present worth method, which has traditionally been used, other approaches and factors may be proposed by applicants and will be considered by the Department.

US EPA's Water Quality Standards Handbook – "Interim Economic Guidance for Water Quality Standards," EPA-823-B-95-002 (1995) presents an approach which looks at the absolute value of the alternative rather than at comparisons. The approach separates projects into two basic types: publicly and privately financed. The approach assumes that publicly financed projects provide a public service by a non-profit public entity, and that privately financed projects are proposed by persons or private-sector entities which require certain profit margins to stay in business.

For public proposals, which are being financed directly by public ratepayers or taxes, the criterion for cost-effectiveness in the EPA manual is the affordability of the project to the ratepayers. If the alternative is affordable, regardless of its relative cost compared to other alternatives, it is cost-effective and must be implemented. The actual criterion for affordability is outlined in the manual. It suggests 1 percent of the median household income of the rate paying public as a first screening for presumptive affordability. When projected annual rates are higher than 1 percent of the median income, secondary tests of affordability, including debt indicators (like bond ratings), socioeconomic indicators (like unemployment rate), and community financial management indicators (like property tax revenue collection rate) are factored into the determination. Criteria for these secondary tests are applied in a "scored" matrix.

For private-sector proposals, the approach measures the impact which a nondischarge alternative would have upon profit and financial operation of a facility. The primary test estimates how much profits would decline due to the implementation of a nondischarge alternative. While no specific criterion is given, the approach involves comparing the reduced profit level to past operating profit levels shown in the same or similar type developments or industries, and to operating profit levels which would be maintained with utilization of other wastewater disposal alternatives. The

approach implies that where reduction in projected profit level is small compared to industry standard or other alternatives, then the nondischarge alternative is deemed to be cost-effective. The secondary tests described in the EPA manual involve more complicated financial factors including liquidity, solvency, and leverage. As with the profitability test, no specific criteria are given for these financial elements, other than their utility as subjective evaluation measures of a private-sector facility's financial status.

Combined approach:

Aspects of the EPA evaluation concept can be integrated or combined with the direct comparison approach. For instance, in the evaluation of a public project, the 1 percent of median household income user-fee criteria can be applied as a first test of cost-effectiveness, even before the direct cost comparisons are considered. Only if the user-fees exceed the screening criteria would the direct comparison of the alternative come into play. Likewise, for the private-sector projects, a primary screening test can be added to evaluate profit level. The test would require private developers or businesses to submit an analysis, which estimated the profit levels resulting from the use of each alternative, and compared these to each other and to typical profit levels for the nature of the activity or business proposed. Only if a reduction in profits were deemed to be significant would the direct comparison of alternative costs be considered.

Where appropriate, ADEQ may require that the submitted demonstration of cost-effectiveness include information to support both a primary screening/affordability evaluation as well as a secondary alternative-to-alternative cost comparison.

Appendix C. Social and Economic Importance Worksheet

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SOCIAL & ECONOMIC WORKSHEET

Social and Economic Benefits

Does your proposed activity:

1. Create or expand employment?

Yes Describe _____

No Describe _____

Don't Know _____

Not Applicable _____

2. Reduce the unemployment rate?

Yes Describe _____

No Describe _____

Don't Know _____

Not Applicable _____

3. Increase median family income?

Yes Describe _____

No Describe _____

Don't Know _____

Not Applicable _____

4. Reduce the number of households below the poverty line?

Yes Describe _____

No Describe _____

Don't Know _____

Not Applicable _____

5. Increase needed housing supply?
Yes _____ Describe _____
No _____ Describe _____
Don't Know _____
Not Applicable _____
6. Increase the community tax base?
Yes _____ Describe _____
No _____ Describe _____
Don't Know _____
Not Applicable _____
7. Provide necessary public services (e.g., fire department, school, infrastructure)?
Yes _____ Describe _____
No _____ Describe _____
Don't Know _____
Not Applicable _____
8. Correct a public health or environmental problem?
Yes _____ Describe _____
No _____ Describe _____
Don't Know _____
Not Applicable _____
9. Improve quality of life for residents in the area?
Yes _____ Describe _____
No _____ Describe _____
Don't Know _____
Not Applicable _____

Environmental Protection Benefits

Explain how your proposed activity positively or negatively affects the following:

1. The societal and economic benefits of better health protection.

Describe _____

Don't Know _____

Not Applicable _____

2. Fishing, recreation, and tourism industries.

Describe _____

Don't Know _____

Not Applicable _____

3. The general societal value of maintaining the quality of the environment.

Describe _____

Don't Know _____

Not Applicable _____

4. Threatened and endangered species.

Describe _____

Don't Know _____

Not Applicable _____

5. Increased flood control and sediment trapping through maintaining wetlands and riparian zones.

Describe _____

Don't Know _____

Not Applicable _____

6. Reservation of assimilative capacity for future industry and development.

Describe _____

Don't Know _____

Not Applicable _____

If you would like to address other considerations in your social and economic justification assessment, please attach an additional sheet to this form. For possible considerations, please refer to Appendix D.

Appendix D. Summary of Other Economic and Environmental Impact Categories

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- 1. Public Need/Social Service**
 - Health/Nursing Care
 - Police/Fire Protection
 - Infrastructure Need
 - Education (primary)

- 2. Consistency with Local Zoning and Planning**
 - Sewage Facility Planning
 - Zoning Requirements
 - Land Use Plans
 - Patterns of Growth/Development

- 3. Quality of Life**
 - Educational (post-secondary)
 - Cultural
 - Recreational

- 4. Housing**
 - Quantity
 - Affordability

- 5. Employment**
 - Number and Type of Jobs Relative to Local Unemployment Rate and Local Labor Force
 - State Local Mean Qualified Income

- 6. Tax Revenues**
 - Tax Revenue Income for Relative to Increased Private Demand for Services
 - Public and Private Change in Property Value or Tax Status

- 7. Development Potential**
 - Potential to Spur Increased Growth

- 8. Sensitivity of Water Use**
 - Presence of Threatened and Endangered Species
 - Public Water Supply Use
 - Water Contact Sports

- 9. Nature of Pollutants**
 - Synthetic
 - Bioaccumulative
 - Naturally Occurring

- 10. Proposed Degree of Change in Water Quality**
 - Available Dilution
 - Amount of Assimilative Capacity Used

11. Proximity to Wetlands or Floodplain

- Presence of Wetlands
- Location with Respect to Stream Channel

12. Duration of Discharge

- Permanent
- Continuous
- Short-term

13. Reliability of Treatment Technology

- High Tech/Experimental
- Energy Intensive
- Maintenance Intensive
- Natural System
- Overall Reliability

14. Compliance Record

- Current Violations
- Historical Violations
- Overall Record

15. Secondary Beneficial Impacts

- Groundwater Recharge
- Post-Construction Storm Water
- Hydromodifications
- Thermal Modification
- Construction on Previously Undisturbed Lands
- Discharge to Previously Undegraded Waters

Appendix E. List of Agencies Involved in Intergovernmental Coordination

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Interagency Coordination for Antidegradation Review

Public participation and interagency coordination will follow R18-9-A907, which deals with public notice for NPDES Permits. R18-9-A907(A)(3)(a) through (g) requires that a copy of the public notice of the availability of the draft permit (which contains the antidegradation review) be sent to:

- ◆ the NPDES permit applicant or permittee;
- ◆ any user identified in the permit application of a privately owned treatment works;
- ◆ any affected federal agency, such as EPA Region 9, the U.S. Fish & Wildlife Service and affected federal public land managers (i.e., U.S. Forest Service, BLM, and National Park Service);
- ◆ any affected state agency, such as the Arizona Department of Water Resources, Arizona Game & Fish Department, State Land Department, and Arizona State Parks;
- ◆ any affected tribal agency;
- ◆ any affected local agency, including each applicable county department of health, environmental services or comparable department;
- ◆ any affected Council of Government (COG);
- ◆ any federal and state agencies with jurisdiction over fish, shellfish, and wildlife resources;
- ◆ the Arizona Historic Preservation Office;
- ◆ the U.S. Army Corps of Engineers;
- ◆ any person who requests public notice in writing; and
- ◆ the Secretaria de Medio Ambiente y Recursos Naturales and the U.S. Section of the International Boundary and Water Commission if the discharge is expected to reach Sonora, Mexico.

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Appendix F. Antidegradation Rule (R18-11-107)

Antidegradation Rule [A.A.C. R18-11-107]

- A. The Director shall determine whether there is degradation of water quality in a surface water on a pollutant-by-pollutant basis.
- B. Tier 1: The level of water quality necessary to protect existing uses shall be maintained and protected. No degradation of existing water quality is permitted in a surface water where the existing water quality does not meet the applicable water quality standard.
- C. Tier 2: Where existing water quality in a surface water is better than the applicable water quality standard, the existing water quality shall be maintained and protected. The Director may allow limited degradation of existing water quality in the surface water, provided that the Department holds a public hearing on whether degradation should be allowed under the general public hearing procedures prescribed at R18-1-401 and R18-1-402 and the Director makes all of the following findings:
 - 1. The level of water quality necessary to protect existing uses is full protected. Water quality shall not be lowered to a level that does not comply with applicable water quality standards.
 - 2. The highest statutory and regulatory requirements for new and existing point sources are achieved.
 - 3. All cost-effective and reasonable best management practices for nonpoint source pollution control are implemented.
 - 4. Allowing lower water quality is necessary to accommodate important economic or social development in the area where the surface water is located.
- D. Tier 3: Existing water quality shall be maintained and protected in a surface water that is classified as a unique water under R18-11-112. The Director shall not allow limited degradation of a unique water under subsection (C).
- E. The Department shall implement this Section in a manner consistent with §316 of the Clean Water Act [33 U.S.C. §1326] if a potential water quality impairment associated with a thermal discharge is involved.