



Key Antidegradation Concepts & Implementation Issues

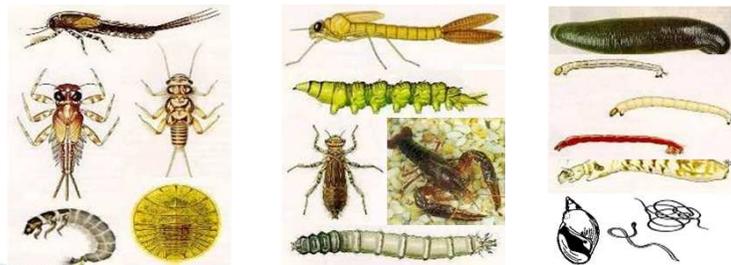
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Tetra Tech, Inc.



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Clean Water Act Goals

- ▶ "Restore and maintain the chemical, physical and biological integrity of the Nation's waters"
- ▶ "Water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water"
(fishable/swimmable goal)

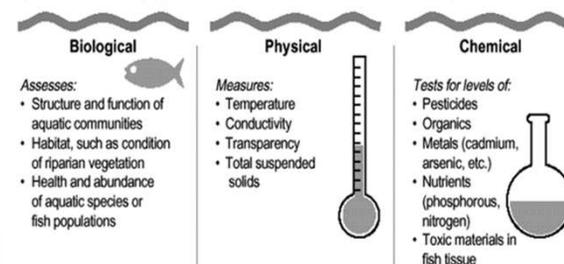


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CWA WQS: Purposes/Uses

- ▶ Benchmarks for monitoring/assessment
- ▶ Basis for water quality-based effluent limits for point sources
- ▶ Program/project evaluation (NPDES, 319, etc.)
- ▶ Goals for TMDLs (and non-CWA remediation)

Figure 6: Monitoring Types and Pollutants or Conditions That They Measure



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Water Quality Standards Consist of 3 Parts:

- ▶ **Designated uses** (e.g., aquatic life use, drinking water, agricultural water supply, recreation, etc.)
- ▶ **Water quality criteria** (dissolved oxygen, copper, whole effluent toxicity, etc.)
- ▶ **Antidegradation policy and implementation methods, 40 CFR 131.12**
 - Most states have a policy; implementation is challenging.

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Where do you find DEC's Water Quality Standards?

Alaska water quality standard (WQS) regulations are generally found in two documents:

1) [Water Quality Standards Regulations](#)

(18 AAC.70.015)

<http://www.dec.state.ak.us/regulations/index.htm>

2) Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances ([Toxics Manual](#)). The Toxics Manual is adopted by reference as a part of the WQS.

<http://www.dec.state.ak.us/water/wqsar/wqs/index.htm>

What is the purpose of Antidegradation?

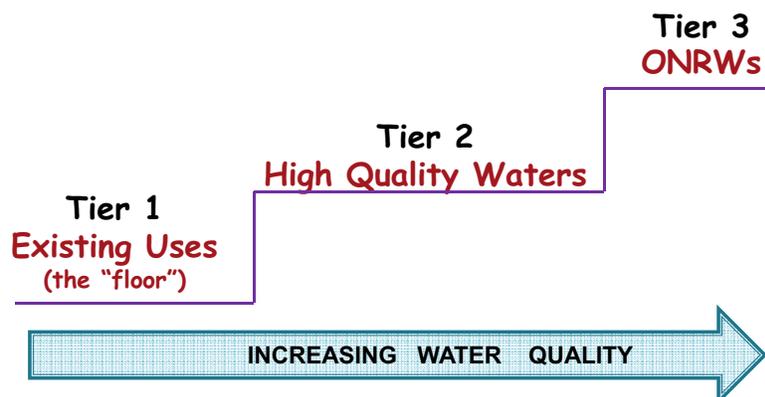
1. Protect Existing Uses
2. Protect water quality that **exceeds** that necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water; i.e., Protect "High Quality Waters"
3. Protect waters of exceptional ecological or recreational significance as outstanding national resource waters "ONRWs"

Federal Antideg Reg @ 40 CFR 131.12

- ▶ States must have both an “antidegradation policy” and “methods for implementing” the policy
- ▶ **Tier I:** “Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected”
- ▶ **Tier II:** Where “quality of the waters exceed levels necessary,” degradation allowed only after:
 - Demonstrating “important economic or social development” in area where water is located
 - Intergovernmental coordination & public participation
 - Achieving “highest statutory and regulatory requirements” for point sources and “all cost effective and reasonable” BMPs for nonpoint sources
 - Protection of minimum WQC (“Tier I”)
- ▶ **Tier III:** No permanent degradation of ONRWs allowed

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Three goals of antidegradation correspond to 3 Tiers



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Tier 1: Protect Existing Uses

- ▶ Existing uses and the level of water quality necessary to protect existing uses must be maintained and protected.
- ▶ Existing uses are those uses actually attained in the waterbody on or after 11/28/75, whether or not they are included in the WQS.

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Tier 1 Waters

- ▶ Cannot allow loss of any existing use
- ▶ Cannot allow water quality to drop below levels needed to maintain existing use
- ▶ Applies to all waters, regardless of use designation

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Tier 2: High Quality Waters

- ▶ Maintain and protect existing water quality that is better than necessary to support the goals of the CWA, **but...**
- ▶ Allows the lowering of water quality **if** the State finds that lowering of water quality is **necessary** to accommodate **important economic and social development** in the area of the water

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Tier 2: Use of Assimilative Capacity Is Not a Right

- ▶ “Brakes” slide from really good WQ to barely meeting WQC by saying you **can’t degrade** WQ **unless:**
 - Point sources are meeting relevant technology-based limits
 - Have “achieved all cost-effective and reasonable best management practices for nonpoint sources”
 - Allowing lower WQ is “necessary to accommodate important economic or social development”
 - Gone through public review and comment

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High Quality Waters

Decision to degrade High Quality Waters requires:

- ▶ intergovernmental coordination
- ▶ public participation
- ▶ demonstration that the activity is important for economic and social development
- ▶ demonstration that lowering water quality is necessary to accommodate that development

State must still meet:

- ▶ the highest statutory and regulatory requirements for all new and existing point sources
- ▶ all cost-effective and reasonable best management practices for nonpoint source control

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a(2) Allows high quality waters to be lowered by regulated activities (Tier 2)

Five elements to antidegradation analysis:

- A. **Economic and Social Development:** “Allowing lower water quality is necessary to accommodate important economic or social development in the area where the water is located”
- B. **Water Quality Criteria:** “Except as allowed under this subsection, reducing water quality will not violate the applicable criteria of 18 AAC 70.020 or 18 AAC 70.235. or the whole effluent toxicity limit in 18 AAC 70.030”
- C. **Protect Existing Uses:** “the resulting water quality will be adequate to fully protect existing uses of the water”
18 AAC 70.015 (a)(2) (A-E)

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a(2) Allows high quality waters to be lowered by regulated activities (Tier 2)

Five elements to antidegradation analysis:

- D. **Pollution Prevention and BMPs:** “The methods of pollution prevention, control, and treatment found by the department to be the most effective and reasonable will be applied to all wastes and other substances to be discharged; and”
- E. **Treatment:** “All waste and other substances discharged will be treated and controlled to achieve
 - (i) For new and existing point sources, the highest statutory and regulatory requirements; and
 - (ii) for nonpoint sources, all cost-effective and reasonable best management practices”

18 AAC 70.015 (a)(2) (A-E)

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Tier 3: ONRW

- ▶ States must provide an ONRW level of protection in their antidegradation policies, but...
 - No federal requirement that any waterbody be designated an ONRW.
- ▶ Generally means no new or increased discharges, unless short term and temporary
- ▶ Existing uses must be protected
- ▶ Existing discharges or other activities do not preclude ONRW designation

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Tier 3: No Degradation for ONRW

- ▶ Applies only to waters classified as Outstanding National Resource Waters (ONRW)
 - This classification “overlays” designated uses
 - Candidates include, but are not limited to: “waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance”
- ▶ Only minor & temporary decreases in water quality are allowed

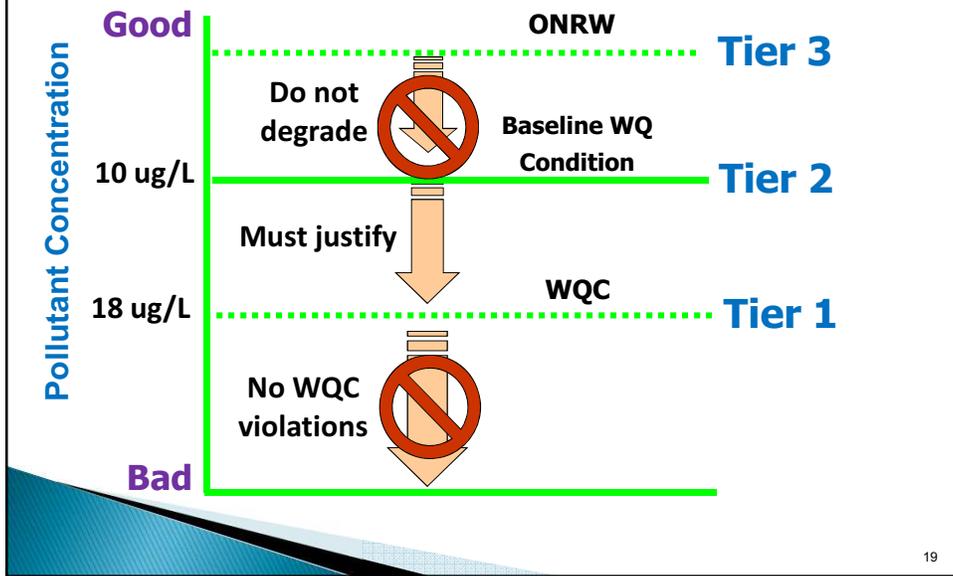
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Some ONRW Options

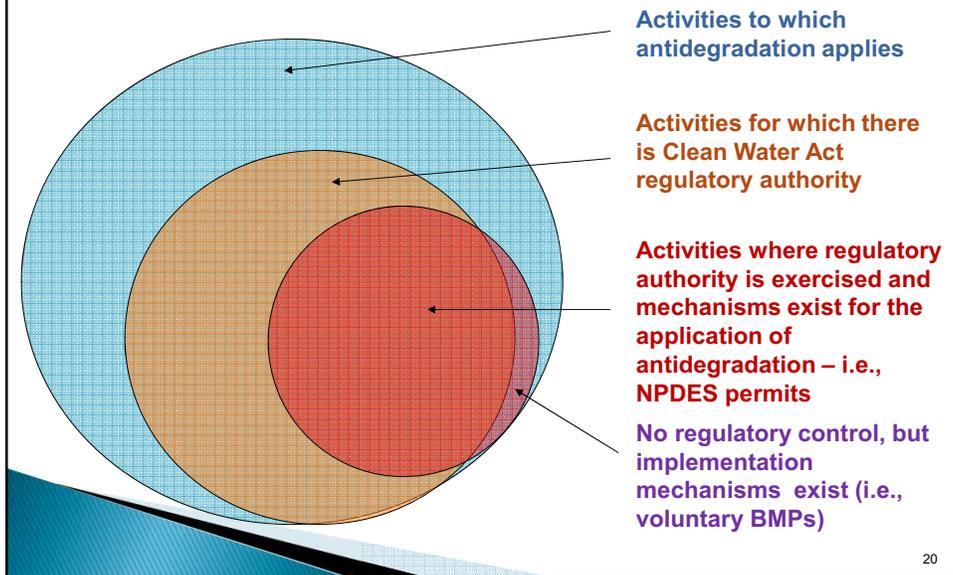
- ▶ Must meet or exceed all water quality criteria
- ▶ Outstanding water quality is not a prerequisite
- ▶ Threatened or endangered species are known to be associated with the waterbody
- ▶ Exceptional recreational or ecological significance because of its unique attributes
- ▶ Location, previous special designations, aesthetic or spiritual value, etc.
- ▶ All waterbodies within wilderness areas, state and federal parks, etc.

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Antidegradation Overview



Applicability, Authority and Implementation of Antidegradation



Antidegradation Applies to:

- ▶ **NPDES permitted activities**
 - General and individual
 - Mostly “new and/or expanded”
 - WWTPs, CAFOs, stormwater, etc.
 - Permit renewals in some cases
- ▶ **Section 404 permits**
 - Implemented through 401 certification
 - Broader assessment focus
- ▶ **Other “regulated” activities**
 - Local ordinances (septic systems, erosion/sediment, etc.)
 - State permitted or managed activities on public lands
- ▶ **Nonpoint sources**
 - Cost effective and reasonable BMPs required
- ▶ **Revision of state WQ standards, variances, etc.**

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Antidegradation Review Triggers

- ▶ **New or expanded discharges**
 - includes not only increased “pollutant loading”, but also “pollution” that causes diminished integrity of the water resource (e.g., hydrological changes impacting habitat)
- ▶ **An application to lower water quality beyond what has previously been allowed through review**
 - e.g., logging operations, new or expanded dairy operation
 - Site-specific natural condition-based water quality criteria??

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Antidegradation implementation methods may be part of the WQS regulation, or in other documents.

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What Does Antideg Mean for Permits?

- ▶ **Dilution calculations** for NPDES discharges
 - Often calculated at WQ criteria, not “antideg limit”
 - Lowering WQ to baseline WQ criteria must be accompanied by alternatives analysis and economic/social justification
 - Permits granting excessive & unused pollutant loads might be challenged
- ▶ **Management** of general/nationwide permits
 - Activities must ensure antideg protection
- ▶ **Oversight** of other state-managed activities
 - Nonpoint sources must achieve “all cost-effective and reasonable” BMPs

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What Does Antideg Mean for Water Quality Assessment?

- ▶ More emphasis on **characterizing “baseline” water quality (BWQ)** prior to issuing permits
 - BWQ is essential for measuring impacts
 - Can be based on individual parameters or waterbody “designation”
- ▶ Greater need for **watershed-wide assessments and modeling** of individual/cumulative impacts
 - Downstream effects on other waterbody segments require a holistic approach
- ▶ Increasing focus on **coordination among assessment and permitting staff**
 - Can watershed-wide assessment and permitting help?

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What Does Antideg Mean To The Courts?

- ▶ NPDES authority must conduct antideg reviews prior to allowing (i.e., permitting) degradation
- ▶ States can't issue blanket “Tier I Only” designations to waterbodies without justification
- ▶ Exceptions for certain categories of activities have been deemed unacceptable
- ▶ Activities conducted under general permits require individual antideg reviews unless otherwise justified
- ▶ States can establish a *de minimis* allowance for use of assimilative capacity (e.g., 10%) without antideg review
- ▶ Nonpoint BMPs are OK if they are installed and maintained in accordance with an established program

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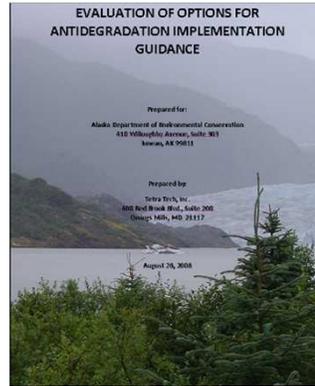
Tetra Tech - ADEC Project

✓ Provide information that could be used by DEC to develop an antidegradation implementation plan

✓ Review several other States' implementation documents

✓ Develop options for DEC's implementation methods

http://www.dec.state.ak.us/water/wqsar/wqs/pdfs/Antidegradation_tetrattech_final.pdf



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Water Quality Antidegradation Implementation Conference

Alaska Department of Environmental Conservation,
Division of Water & Tetra Tech
Anchorage, Alaska

December 2-3, 2009

<http://www.dec.state.ak.us/water/wqsar/wqs/antidegconference.htm>



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Antidegradation Final Implementing Procedures Work Plan December 2011

- ▶ DEC will establish a workgroup representing key interests in Alaska.
- ▶ Two-phase development process:
 - ▶ develop a preferred conceptual approach in Phase 1;
 - ▶ develop required rulemaking and, perhaps, legislative processes necessary in Phase 2 to enact the approach

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Questions?



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Overview of Key Implementation Issues

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Key DEC Implementation Issues Related to Antidegradation

- ▶ **What activities or proposed activities trigger an antidegradation review?**
 - Can some permitted activities be exempt from antideg review?
- ▶ **How is existing (or “baseline”) water quality determined?**
 - Suite of parameters
 - Biological measures
 - Combination of physicochemical and biological indicators
- ▶ **How are Outstanding National Resource Waters (Tier 3) identified?**
 - Determined through legislative process
 - Determined through DEC process/assignments
- ▶ **How is “important economic or social development” defined?**
 - What is considered a satisfactory demonstration?
 - What determines whether a requested activity is “necessary”?

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Key DEC Implementation Issues Related to Antidegradation

- ▶ **What should be the requirements for an alternatives analysis?**
 - Ties in with socioeconomic justification
- ▶ **How are waterbody tiers assigned?**
 - Parameter-by-parameter
 - Waterbody-by-waterbody
- ▶ **How much lowering of water quality is acceptable and how determined?**
 - de minimis
 - Predicted effects on loads or assimilative capacity
- ▶ **What process is used to meet public participation requirements?**
 - What should be included in the public notice?
 - Should there be intergovernmental coordination? EPA? USFWS (endangered species)? NOAA (essential fish habitat)? Tribal outreach?

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Baseline or Existing Water Quality

- ▶ Many State procedures are similar to those used to develop TMDLs
- ▶ For some states: where background data are limited, segment is assumed to be high quality and subject to Tier 2 protection
- ▶ In some states, applicant must collect baseline data
- ▶ **For Alaska:** monitoring data are limited; determining baseline may be challenging

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Antidegradation Baseline and Water Quality Assessment

- ▶ More emphasis on characterizing “**baseline**” water quality prior to issuing permits
 - Essential for measuring or predicting impacts
 - Can be based on individual parameters or waterbody designation
- ▶ Greater need for watershed-wide assessments and modeling of individual/cumulative impacts
 - Downstream effects on other waterbody segments require a holistic approach
- ▶ Increasing focus on coordination among assessment and permitting staff as well as with other organizations

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ONRWs – Tier 3 Waters

- ▶ States that have designated ONRWs generally locate them in national or state parks
- ▶ Alaska has **many** surface waters that are located in national or state parks
 - No Tier 3 waters designated so far
 - Stakeholder issue: little or no development allowed in Tier 3 waters (no degradation)
 - How much watershed area should be set aside for Tier 3 waters?

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The Option of Tier 2.5

- ▶ Several States identify an intermediate Tier between 2 and 3 (“2.5”)
 - Waters approaching Tier 3 quality but allows some development
 - More palatable to diverse stakeholders than Tier 3 in some cases
 - Minor degradation allowed?
 - What criteria or requirements should be in place to maintain and protect Tier 2.5 status?

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Important Economic or Social Development

- ▶ For many States, factors include:
 - Employment (i.e., increasing, maintaining, or avoiding a reduction)
 - Increased production
 - Improved community tax base
 - Housing improvement/increases
 - Correction of an environmental or public health problem

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Important Economic or Social Development

Oregon:

- ▶ Also uses local economy, household income, indirect effects to other businesses, and increases in sewer fees as indicators
- ▶ Applicant must provide enough information to allow for a financial impact analysis to assess whether lowered water quality has socioeconomic benefits that outweigh environmental costs

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Important Economic or Social Development

Wyoming:

- ▶ “If the applicant submits evidence that the activity is important for development, it shall be presumed important unless information to the contrary is submitted in the public review process.”

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What types of alternatives should be considered?

For example:

- ▶ Process changes to eliminate additional pollutant discharges
- ▶ Additional treatment facilities or structures to lower pollutant loads
- ▶ Relocating the discharge to another site or waterbody

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Should there be a cost threshold for evaluating alternatives?

For example, alternative must be adopted if:

- ▶ Its cost is within:
 - 10 percent of the proposed activity?
 - 15 percent?
 - 20 percent?

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Identification of Tiers Parameter-by-parameter or Waterbody-by-waterbody

- ▶ **Parameter-by-parameter approach**
 - relatively easy to determine (assuming data are available)
 - could present a complex “bookkeeping” exercise requiring at least some basic modeling
 - Requires criterion or numeric standard for a parameter
- ▶ **Waterbody-by-waterbody approach**
 - more holistic approach; does not require numeric criteria
 - simpler to track and maintain
 - related more directly to the beneficial uses that exist
 - requires more information to determine whether a given activity will potentially impact a Tier 2 water

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Identification of Tiers State Examples

Arizona:

- ▶ Tier 1 and Tier 2 protection are applied on a pollutant-by-pollutant basis
 - e.g., a stream can be Tier 1 for dissolved oxygen and Tier 2 for ammonia and metals
- ▶ Tier 1 protection categorically applies to all non-perennial surface waters

Oregon:

- ▶ High quality waters have water quality that meet or is better than all water quality standards

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Identification of Tiers State Examples

West Virginia:

- ▶ Protection based on minimum uses being attained, not numeric water quality
- ▶ A water segment on the state's 303(d) list may be afforded Tier 2 protection:
 - e.g., a waterbody is impaired for recreational uses due to high bacteria concentrations but still protected at Tier 2 levels for dissolved oxygen and metal concentrations if actual values for these exceeded minimum water quality criteria

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Identification of Tiers State Examples

Pennsylvania:

- ▶ Should have "suitable" chemical or biological conditions
- ▶ For chemical: high quality if long-term water quality for 12 chemical parameters better than necessary to support propagation of fish, shellfish, wildlife, and recreation
- ▶ For biological: one of these must be met:
 - site has macroinvertebrate community score \geq 83% of reference or
 - water is a designated Class A wild trout stream

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Identification of Tiers: Alaska

As of draft implementation plan (7/14/2010):

- ▶ Parameter-by-parameter approach
- ▶ Considering waterbody-by-waterbody approach
- ▶ If no baseline data available, assume water is Tier 2 when doing antideg review for a permit

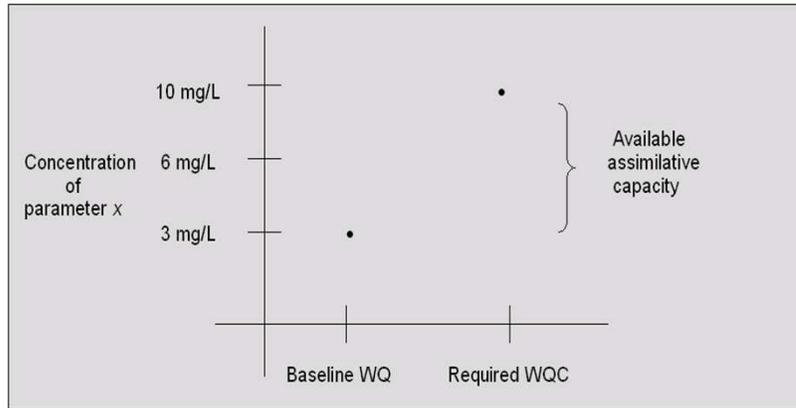
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What Constitutes Significant Degradation in Tier 2 waters?

- ▶ Percent change in ambient concentrations predicted at the appropriate critical flow condition(s)
- ▶ Difference between existing ambient quality and ambient quality that would occur if all point sources were discharging at permitted loading rates
- ▶ Percent change in loadings
 - new or expanded loadings compared to total existing loadings to the segment;
 - proposed permitted loadings compared to the existing permitted loadings for existing facilities
- ▶ Percent reduction in available assimilative capacity
- ▶ Predicted impacts to aquatic biota

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Assimilative Capacity



Simplified Representation of Waterbody Assimilative Capacity for Parameter x