

## Introduction to Water Quality Standards

Webcast Sponsored by EPA s Watershed Academy

Thursday, September 10, 2009 1–3 pm Eastern

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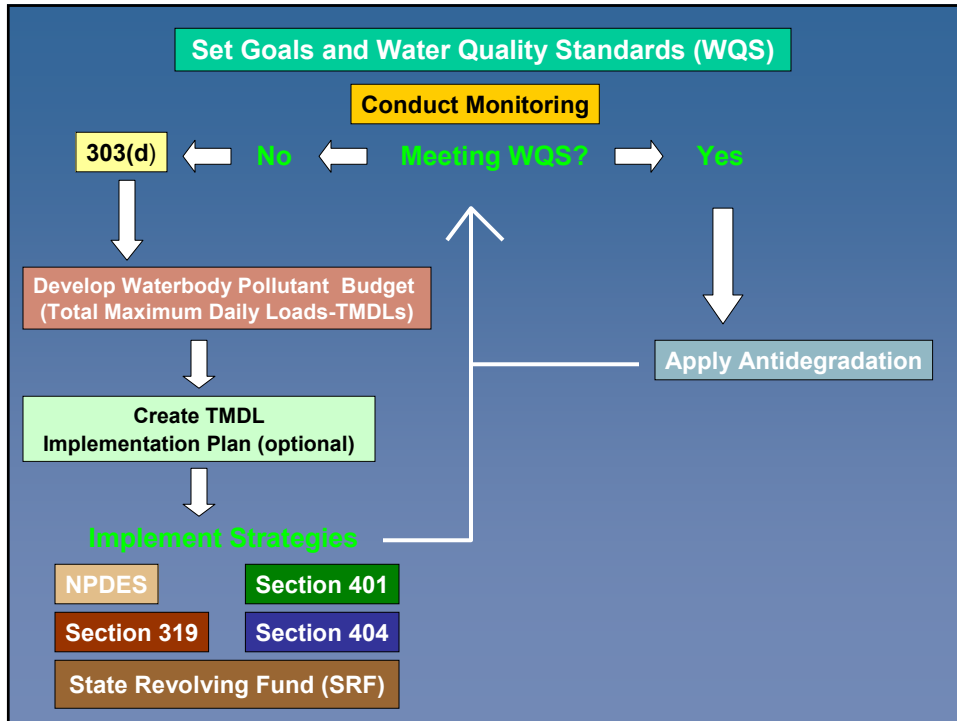
Minnesota Pollution Control Agency



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 **Topics for Today's Webcast**

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- What are Water Quality Standards (WQS)?
- Designated Uses
- Water Quality Criteria
- Antidegradation
- General Policies
- Case Study: Minnesota's Work to Strengthen its Antidegradation Provisions



## Designated Uses and Water Quality Criteria



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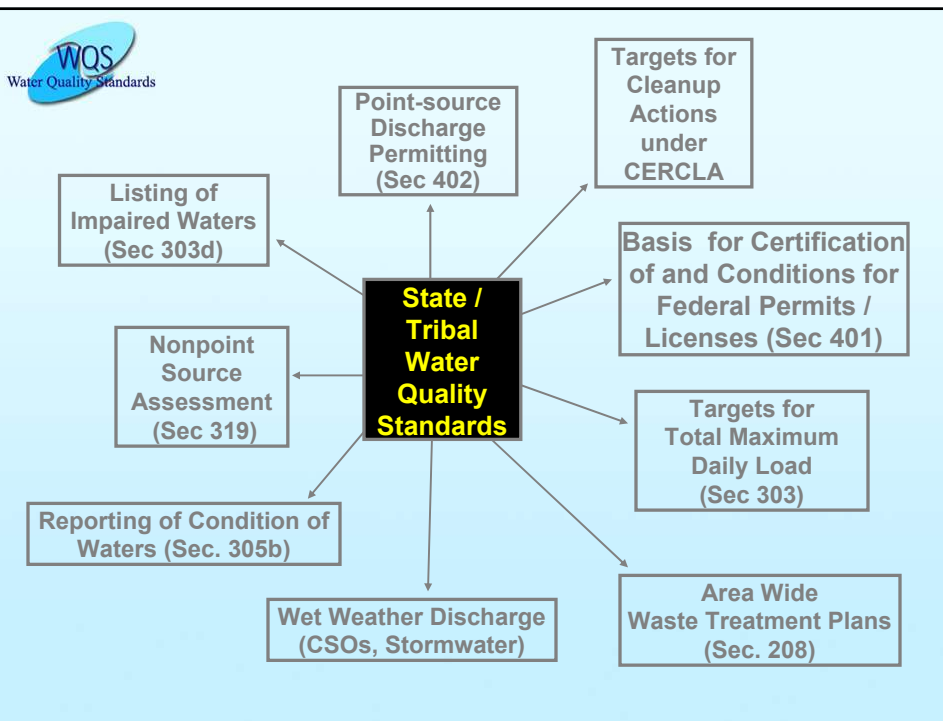
## The Clean Water Act

- **Objective: Restore and maintain the chemical, physical, and biological integrity of the nation's waters (Sec 101 (a))**
- **Interim goal: "water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water", wherever attainable (Sec 101 (a)(2))**



## CWA: Two Approaches to Pollution Control

- A Technology-Based Approach, based on the performance of treatment and control technologies
- A Water Quality-Based Approach, based on meeting a designated use for the waterbody





## Water Quality Standards (see 40 CFR 131.3)



### Water Quality Standards:

- Establish water quality goals for a waterbody
- Provide a regulatory basis for controls beyond technology-based limits



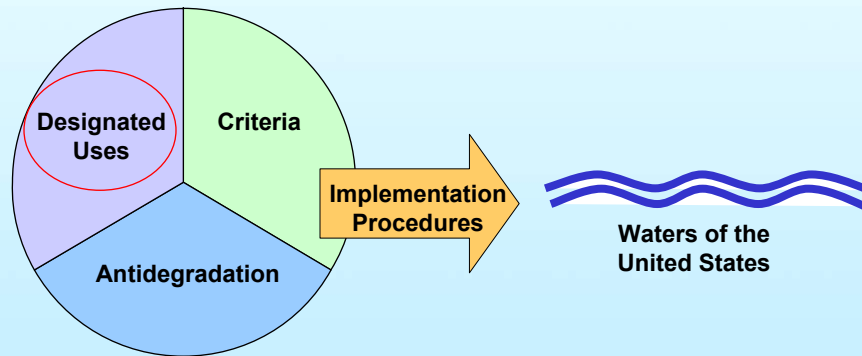
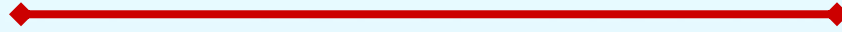
## Water Quality Standards



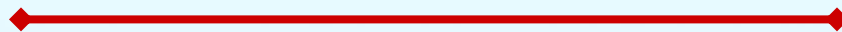
- Provisions of State / Tribal (or Federal) Law:
- Designated Uses (40 CFR 131.10)
- Criteria to protect those uses (40 CFR 131.11)
- Antidegradation (40 CFR 131.12)
- General Policies (40 CFR 131.13)



## Water Quality Standards: Designated Uses



## Designated Uses: Definition (see 40 CFR 131.3(f))



### Regulatory:

- Those uses specified in state or tribal water quality standards regulations for each water body or segment, whether or not they are being attained.

### Plain language:

- A concise statement of management objectives and expectations for each of the individual surface waters under state/tribal jurisdiction.



## Why are Designated Uses Important?

- Getting WQS right starts with getting designated uses right
- Designated uses determine the criteria needed to protect use
  - Criteria are the regulatory basis for management actions like attainment decisions, Total Maximum Daily Loads, and NPDES permit limits



## Designated Uses (40 CFR 131.10)

- Protection and propagation of fish, shellfish and wildlife
- Recreation in and on the water
- Public water supply
- Agriculture
- Industry
- Navigation
- Others



## Designated Uses

invented example: "Tom's Beautiful Bay"



Tom's  
Beautiful  
Bay

Designated Uses:  
Aquatic Life

Primary Contact  
Recreation



## Definition Of UAA

40 CFR 131.3(g)

- "A Structured Scientific Assessment of the Factors Affecting the Attainment of the Use, Which May Include the Physical, Chemical, Biological, and Economic Factors as Described in 40 CFR 131.10(g)"
  - Involves determining the feasibility of attaining the use in the future
  - May be conducted by any individual or entity
  - State / Tribe initiates adoption of any new or revised water quality standards



## UAA MUST Be Conducted When: (40 CFR 131.10(j))

- Designating uses that do not include CWA 101(a)(2) goals
- Revising designated uses to remove 101(a)(2) goal uses
- Adopting sub-categories of 101(a)(2) uses for specific water bodies which require less stringent criteria



## Is The Use “Attainable”? (40 CFR 131.10(d))

At a minimum, a use is attainable IF:

- It is an existing use, OR
- It can be attained with:
  - technology-based controls (sec. 301 and 306 of CWA) and,
  - cost effective and reasonable best management practices for nonpoint source control.

No, IF

- Use not feasible due to any factor at 131.10(g)



## What is an Existing Use?

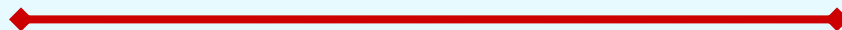


The water quality standards regulation (40 CFR 131.3 (e)) defines existing uses as:

“Those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards”



## The Six Factors Preventing Attainment Of A 101(a)(2) Use That Is Not An Existing Use (40 CFR 131.10(g))



- |   |   |
|---|---|
| <b>1. Naturally occurring pollutant concentrations ... OR</b> | <b>4. Dams or other hydrologic modifications ... OR</b>             |
| <b>2. Natural low flow conditions or water levels ... OR</b>  | <b>5. Natural physical conditions for aquatic life ... OR</b>       |
| <b>3. Human caused conditions or pollutant sources ... OR</b> | <b>6. ... Substantial and widespread economic and social impact</b> |

## 40 CFR 131.10(g)'

- g) States may remove a designated use which is not an existing use, as defined in § 131.3, or establish sub-categories of a use if the State can demonstrate that attaining the designated use is **not feasible** because:
- 1) **Naturally occurring pollutant concentrations** prevent the attainment of the use; **or**
  - 2) **Natural**, ephemeral, intermittent or **low flow conditions** or **water levels** prevent the attainment of the use, **unless** these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; **or**
  - 3) **Human caused conditions** or **sources of pollution** prevent the attainment of the use and **cannot be remedied** or **would cause more environmental damage to correct** than to leave in place; **or**

## 40 CFR 131.10(g) (cont.)'

- 4) **Dams, diversions or other types of hydrologic modifications** preclude the attainment of the use, **and it is not feasible** to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use; **or**
- 5) **Physical conditions related to the natural features of the water body**, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, **unrelated to water quality**, preclude attainment of **aquatic life** protection uses; **or**
- 6) Controls more stringent than those required by sections 301(b) and 306 of the Act would result in **substantial and widespread economic and social impact**.



## Where can I find the “Six Factors” in Detail?

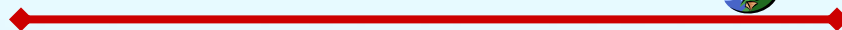


[www.epa.gov/waterscience/standards/uses/uaa/about\\_uaas.htm](http://www.epa.gov/waterscience/standards/uses/uaa/about_uaas.htm)

(links to more information on UAAs and Case Studies)



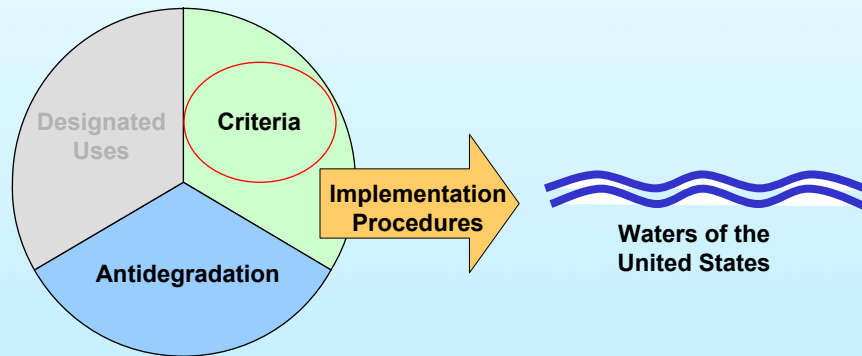
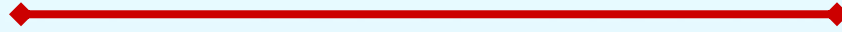
## UAAs: Summary



- A designated use can be removed if:
  - it is not an existing use, and
  - implementation of tech. based limits and cost effective and reasonable BMPs would not result in attainment, and
  - attaining the use is “not feasible” because of at least 1 of the 6 factors at 40 CFR 131.10(g)
- A UAA is required when designating uses or sub-categories that do not protect 101(a)(2) uses
- Agreement between all involved parties on what and how much information is needed and how it will be interpreted is a key factor in successful UAAs



## Water Quality Standards: Criteria



## Water Quality Criteria (40 CFR 131.3)



- A numeric value (e.g., magnitude, duration and frequency) or narrative statement
- Represent a level of water quality that supports a particular use
- When criteria are met, water quality will protect the designated use



## Water Quality Criteria 1 Word – 2 Meanings

- **Scientifically defensible guidance developed and published by EPA per CWA § 304(a)**
  - Basis for Federal promulgation when necessary
- **Adopted part of State/Tribal WQS**
  - Section 303(c)



## Water Quality Criteria Requirements (40 CFR 131.11; CWA Sec. 510)

- **States/Tribes Must adopt criteria that protect the designated use:**
  - Based on a sound, scientific rationale
  - Sufficient parameters to protect the designated use
  - Must support the most sensitive use (for waters with multiple use designations)
- **May be more stringent than EPA's recommendations**



## Water Quality Criteria: Forms (40 CFR 131.11b)

- **States and Tribes should adopt numeric criteria based on:**
  - 304(a) guidance
  - 304(a) guidance modified to reflect site specific conditions
  - Other scientifically defensible methods
- **States/Tribes should adopt narrative criteria:**
  - Where numeric criteria cannot be established
  - Or to supplement numeric criteria



## Types of Water Quality Criteria

- **Aquatic Life Criteria**
- **Human Health Criteria**
- **Bacteria Criteria**
- **Biological Criteria**
- **Nutrient Criteria**
- **Others**



## Criteria

invented example: "Tom's Beautiful Bay"



Include...

Aquatic Life

Criteria for Zn

90 µg/L (acute),  
81 µg/L (chronic)

Primary Contact Rec:

Enterococci: 35  
per 100ml, Geo.  
Mean Density



## Questions





# Antidegradation



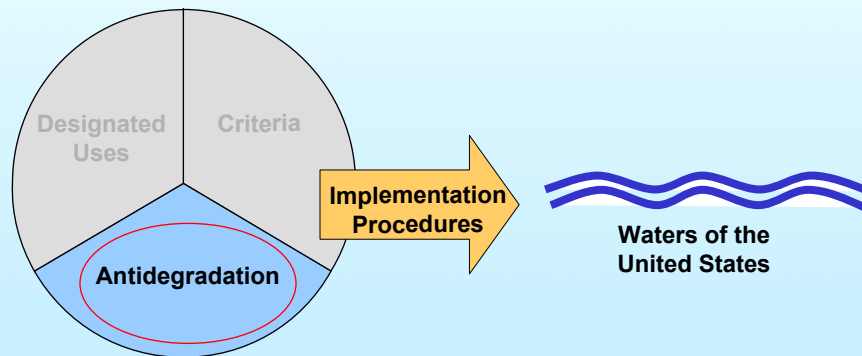
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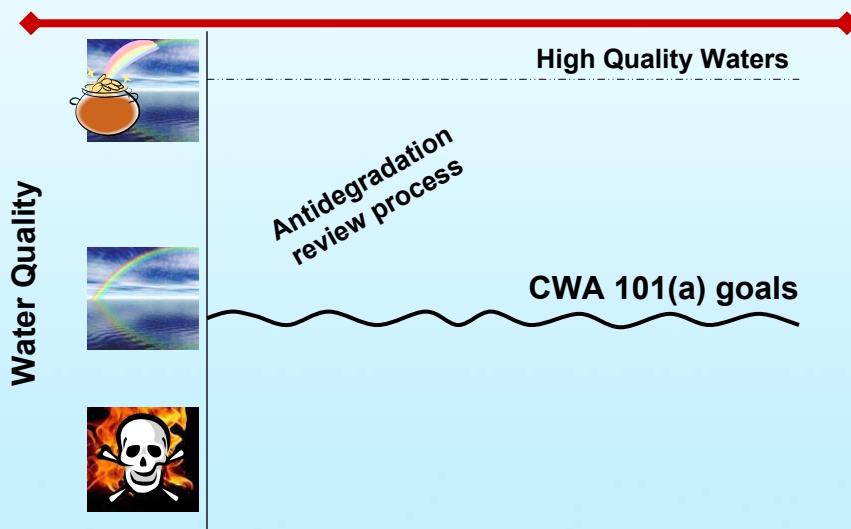


# Water Quality Standards: Antidegradation





## Antidegradation and the WQS Program



## Antidegradation Requirements (40 CFR 131.12)

- States and authorized Tribes must develop and adopt a statewide antidegradation policy to protect:
  - existing in-stream uses for all waters of the U.S.;
  - high quality waters (water quality that is better than the levels necessary to support propagation of fish, shellfish and wildlife and recreation in and on the waters (i.e., CWA 101(a) goals)); and
  - Outstanding National Resource Waters (ONRWs) designated by the state.



## Antidegradation Requirements (40 CFR 131.12)

- States and authorized Tribes must also identify implementation methods. They can be:
  - part of their policy regulations, or
  - in other documents, such as a guidance directive
- Implementation methods should describe
  - how high quality waters will be identified
  - what activities will trigger an antidegradation review
  - the components of the antidegradation review process



## Policy vs. Implementation

\*invented example\*

- A state's Policy might include something like this:  
“Where the quality of the waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected.”
- Their implementation methods could then include:
  - Which waters in the state are high quality waters
  - Forms for a permit applicant to submit to provide details on alternatives to the discharge that were considered
  - Description of how the public will be involved in decisions about what will be done with the high water quality



## The 3 Tiers of Antidegradation (40 CFR 131.12)



Water Quality for:



## Two Ways to Identify High Quality ("Tier 2") Waters



- **"Waterbody-by-Waterbody"**
  - State/Tribe Tiers its water bodies upfront
  - Tiering is based on characteristics observed using biological, chemical and/or aesthetic quality information
  - Each water body is classified as one Tier only
- **"Parameter-by-Parameter"**
  - State/Tribe determines Tier on a case-by-case basis
  - Determination of whether water quality is better than the criterion for specific parameters of concern using chemical or biological data.
  - A water body can be Tiered differently for parameters



## Existing Uses (“Tier 1”)

- “Tier 1” protection is the baseline of protection for all waters of the U.S.
- For waters in Tier 1: Existing uses and the level of water quality necessary to protect existing uses shall be maintained and protected.
- For waters in Tiers 2, 3: Existing uses generally reflect CWA 101(a) goals already achieved. These waters also have additional protections; protection of existing uses is the baseline of protection.



## Outstanding National Resource Waters (ONRWS, “Tier 3”)

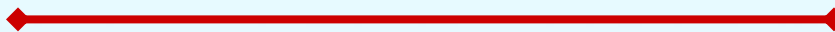
- “Tier 3” protection for Outstanding National Resource Waters (ONRWS) is the most stringent level of protection.
- What are ONRWS?
  - A State/Tribe identifies its own ONRWS
  - A State/Tribe can designate any water body an ONRW
  - List typically includes National Parks, waters of exceptional recreational or ecological significance
- What does Tier 3 protection mean?
  - No degradation is allowed in ONRWS, except on a short term or temporary basis if allowed by the State/Tribe’s policy and procedures



## Outstanding National Resource Waters (ONRWS, “Tier 3”)



## High Quality Waters (“Tier 2”)

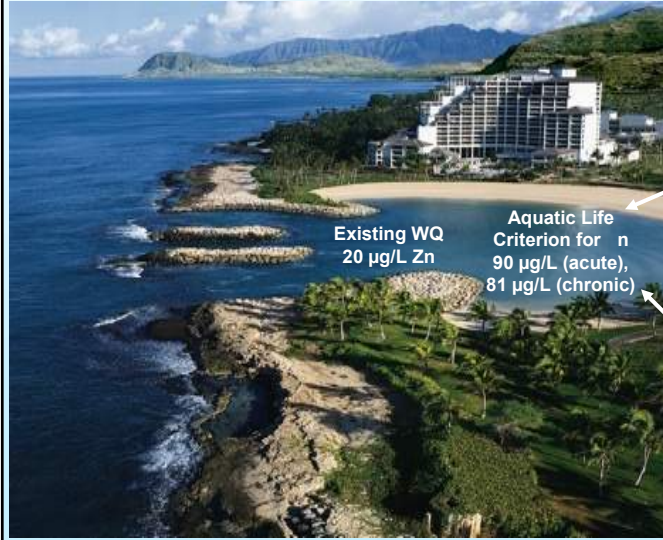


- For water bodies where water quality exceeds the CWA 101(a) goals, that quality shall be maintained and protected.
- High water quality may be lowered only if State/Tribe finds lowering to be “necessary to accommodate important economic or social development.”
- Tier 2 antidegradation review is the process through which a State/Tribe makes an informed choice about a proposed activity that would lower water quality.



## Antidegradation

invented example: "Tom's Beautiful Estuary"



Existing WQ  
20 µg/L Zn

Aquatic Life  
Criterion for Zn  
90 µg/L (acute),  
81 µg/L (chronic)

Heather's Widget  
Factory proposed  
discharge:  
predicted new  
Water Quality = 50  
µg/L Zn



## Antidegradation Review Process

- Identify the high water quality in question
- Alternatives analysis: is degradation "necessary"?
- Social / economic analysis: is the activity "important"?
- Ensure protection of existing uses (Tier 1 protection)
- Ensure achievement of the highest statutory and regulatory requirements for point sources
- Ensure implementation of cost-effective and reasonable BMPs for non-point sources, where required by State/Tribe
- Coordinate with intergovernmental entities
- Complete public participation process
  - Only after this process can State/Tribe make a determination on whether to grant the request.



## State example: Alabama

- **POLICY includes: Three-tiered system parallel to 131.12**
  - Tier 1- automatically applies to impaired waters on 303 (d) list and waters less than “fishable/swimmable”
  - Tier 2- by default, all waters not Tier 1 or 3
  - Tier 3- ONRWs specifically designated
- **IMPLEMENTATION METHODS include:**
  - Description of the how antidegradation reviews should occur concurrently with permitting process
  - Forms (alternatives analysis and social and economic impacts) to be submitted with application for permit



## State example: Ohio

- **POLICY includes: Many-tiered system different from 131.12**
  - Limited Quality Waters (Tier 1)
  - High Quality Waters (Tier 2)
    - General High Quality Waters (default)
    - Superior High Quality Waters
    - Lake Erie
    - Outstanding State Waters
  - ONRWs (Tier 3)
- **IMPLEMENTATION METHODS include:**
  - Detailed public involvement process – notice, factsheet, hearing
  - Detailed worksheets on alternatives analysis for applicant to demonstrate the non-degradation, minimal degradation and mitigative technique alternatives considered



## Words to the wise on antidegradation...

- **If your State/Tribe is developing or revising antidegradation implementation methods...**
  - **Provide ample evidence, data, and analysis to support how the implementation methods will be consistent with your State/Tribe policy and §131.12.**
  - **Discuss questions or concerns with your EPA Regional Office early on in the process.**



## General Policies



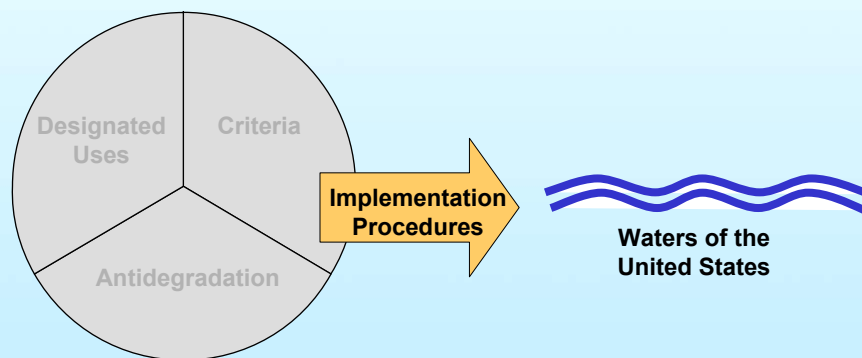
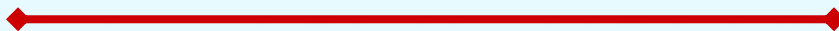
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US EPA's Water Quality Standards Branch, Office of Science and Technology



## Water Quality Standards: General Policies



## General policies (40 CFR 131.13)



- States and authorized tribes may include in their standards policies affecting application and implementation, such as:
  - Mixing zones
  - Low flows
  - Variances
- Subject to EPA review and approval
- To be considered water quality standards, the policies must relate to uses, criteria or antidegradation



## **State/Tribal Submittal Must Include: (40 CFR 131.20(c))**

- **Use(s) for each waterbody**
- **Criteria sufficient to protect those uses**
- **An antidegradation policy and identification of implementation methods consistent with 40 CFR 131.12**
- **Certification that the standards were duly adopted according to state or tribal law**
- **Other general supporting information**



## **How does EPA review adopted new and revised standards? (1)**

- **Authority Delegated to Regional Administrator**
  - **Informal participation by EPA Headquarters**
- **Approval of WQS requires “consultation” under the Endangered Species Act**
- **Approval/Disapproval records of decision based solely on CWA and WQS Regulations**



## How does EPA review adopted new and revised standards? (2)

- EPA has 60 days to approve and 90 days to disapprove
- New/Revised Standards are not effective until approved by EPA (as of May 30, 2000)



## Federal Promulgations (40 CFR 131.22)

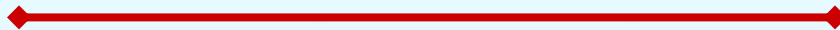
- If EPA disapproves AND
- If state or tribe does not adopt specified changes within 90 days...
- THEN the EPA Administrator must promptly propose and promulgate a replacement standard
- OR in any case where the Administrator determines new or revised standards are necessary to meet the requirements of the CWA



## Questions?



## Revising Minnesota's Antidegradation Provisions



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Minnesota Pollution Control Agency**



## Minnesota's Current Policy

- **Policy includes: Multiple-tiered system consistent with 40 CFR 131.12**
  - **Nondegradation for All Waters (Minn. R. 7050.0185)**
    - Tier 1 – protection of existing beneficial uses
    - Tier 2 – protection of water quality conditions that are better than applicable water quality standards
  - **Nondegradation for Outstanding Resource Value Waters (ORVWs) (Minn. R. 7050.0180)**
    - **Tier 2.5 - Restricted ORVWs**
      - New or expanded discharges are allowed where there is not a “prudent or feasible” alternative
    - **Tier 3 - Prohibited ORVWs**
      - New or expanded discharges are not allowed



## Minnesota's Current Implementation Procedures

- **Tier 2 procedures**
  - **Tier 2 reviews required for significant discharges**
    - **Significance discharges are those where:**
      - new or expanded discharges are greater than 200,000 gallons per day, or
      - mass loading rate of a toxic pollutant likely to increase the concentration by greater than 1% over baseline quality
    - **Significance determination based on water quality conditions established on date of rule adoption (Jan. 1, 1988), baseline quality**



## Minnesota's Current Implementation Procedures

- Tier 2 procedures, continued
  - Alternatives analysis specified in rule as additional control measures that can reasonably be taken to minimize discharge impact
  - Public participation occurs through public notice of draft permit
    - 30-public comment period
    - Identification of procedures for contested case hearing



## Minnesota's Current Implementation Procedures

- Tier 2 procedures, continued
  - Determination of whether significant lowering of water quality is acceptable is based on:
    - The importance of economic and social development impacts (jobs, taxes, recreational opportunities, etc.)
    - Impact of discharge on the quality and characteristics of receiving water
    - Cumulative impacts
    - Cost of additional treatment



## Minnesota's Current Implementation Procedures

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### • Tier 3 procedures

- Outstanding Resource Value Waters (ORVWs) designated through rule adoption
- Need to control upstream discharges to protect ORVWs
- Prudent and feasible alternatives for discharges to Restricted ORVWs are described in guidance



## Why the revision?

- 
- Last major revision to rule and guidance was in 1988
  - Current provisions are orientated toward NPDES-permitted wastewater discharges
  - Legal challenge - 2003 Minnesota Court of Appeals' decision requiring determination of expanded MS4 stormwater discharges and nondegradation reviews of expanded discharges
  - Petition for rulemaking
  - Improve procedures for how waters are protected

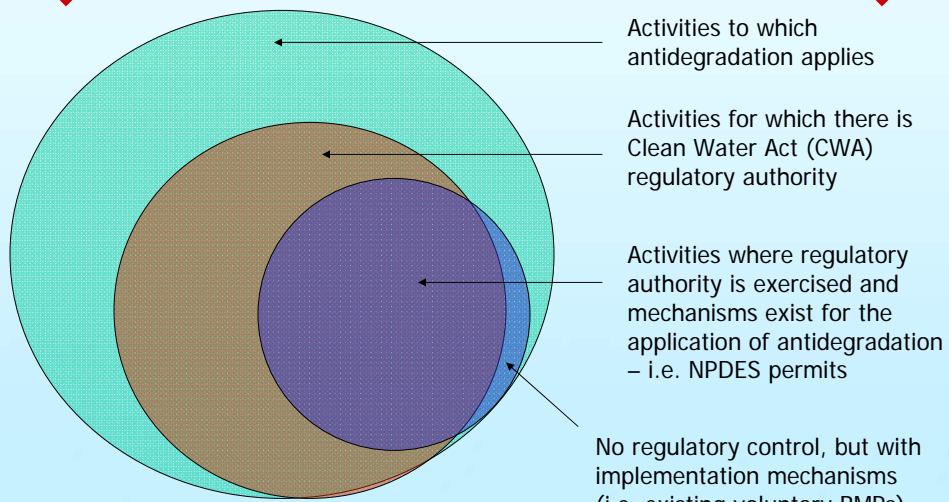


## Rule Revision Topics/Challenges

- Applicability of antidegradation
- Protection of high quality waters
- NPDES-permitted stormwater activities
- Process improvement



## Applicability, Regulatory Control and Implementation - Minnesota



Note: Circle sizes are not intended to represent "size" of activities relative to each.



## Applicability of Antidegradation

- **Antidegradation:**
  - applies to any activity that lowers water quality,
  - is enforceable only where there is Clean Water Act (CWA) regulatory authority, and
  - is implemented where there are mechanisms to do so.
- **Need to examine other currently regulated activities where antidegradation can be implemented and enforced, e.g. 401 certifications**
- **Are there other opportunities to implement antidegradation?**
  - Antidegradation requirements tied to state-funded water quality projects
  - Point/nonpoint trading



## Protection of High Quality Waters

- **Greater emphasis on alternatives analysis**
  - Formal consideration of non-degrading alternatives
  - Significance test (if used) would be bypassed where non-degrading alternative is employed
- **Define Parameters of Concern**
  - Risk-based
  - Consider fate and transport
  - Use of surrogate or proxy measures



## Protection of High Quality Waters

- Better understanding of impacts to receiving waters before making decisions regarding lowering of water quality
- Work toward establishing adequate baseline water quality conditions to assess cumulative impacts
- Significance tests
  - Current flow-based threshold is inadequate
  - Any de minimis provisions must consider impacts to the receiving water and account for cumulative impacts



## Protection of High Quality Waters

- Public participation may occur earlier in the process
- Provide improved guidance on how the “need for important social and economic development” will be determined



## NPDES-Permitted Stormwater Activities

- Unique characteristics of stormwater discharges compared to wastewater discharges
- Each stormwater type (municipal, industrial, construction) is unique
- General permits:
  - Ensuring permit conditions will protect water quality
  - Two options for permit conditions: quantitative thresholds and prescribed control measures
  - Validation that permit conditions are being met is essential

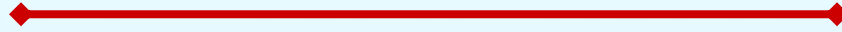


## Process Improvement

- Better integration with other water protection efforts, both internal and external
- Greater transparency in review/decision process
- Explore how antidegradation can be better implemented on a watershed scale



## Stakeholder Process



- Six sets of stakeholder meetings held between June 2008 and June 2009
- Strong public interest, wide potential impact
- Stakeholder input required balance between being inclusive and having focused, meaningful discussion
- Use of Issue Papers to frame discussions
- Opportunities for individual meetings



## Questions?





## Speaker Contact Information

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## Next Watershed Academy Webcast

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### Working Together to Address Effects of Climate Change on Water Resources

Tuesday, October 27, 2009



Registration will open approximately three weeks prior to the Webcast at:

[www.epa.gov/watershedwebcasts](http://www.epa.gov/watershedwebcasts)



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- You can type each of the attendees names in and print the certificates