



Tetra Tech, Inc., 10306 Eaton Place, Suite 340, Fairfax, VA 22030

Phone: (703) 385-6000

Fax: (703) 385-6007

Date: August 20, 2007

To: Carol Nankivel, Minnesota Pollution Control Agency

Re: Final Version of Technical Memorandum #2—Stormwater Nondegradation Analysis Project

Greetings:

Attached is the final version of Technical Memorandum #2, which addresses Task 2 in the Minnesota Pollution Control Agency's Stormwater Nondegradation Analysis Project (SNAP). The information provided in this Technical Memorandum explores the full range of federal and state antidegradation policies and implementation methods, with a special focus on how to address stormwater discharges. Key judicial rulings related to antidegradation are also included in relevant sections of this document.

The antidegradation program reviews conducted by Tetra Tech found that Minnesota's nondegradation policy is unique in some respects (e.g., it includes nonpoint sources and has a review trigger that is based on flow increases and percentage increases in toxic pollutant loadings rather than relative impacts on receiving waters). We also found that the 2003 court decision related to Minnesota's general permit for municipal separate storm sewer systems has pushed the state into the forefront regarding the development of approaches for conducting antidegradation reviews of increased stormwater discharges.

The information in Technical Memorandum #2 is organized as follows:

I. Summary of Federal Antidegradation Regulations	Page 3
II. Minnesota's nondegradation policy	Page 7
III. Key Antidegradation Policy and Implementation Issues	Page 9
IV. Applying Antidegradation Review to Stormwater Permits	Page 39
V. New Development Stormwater Program Examples	Page 47

Please review this information at your convenience. In closing out this project, please accept our thanks for allowing us to contribute to your work in this very important water resources policy area. If you have any additional comments or need any additional information from us, please let us know.

Thank you again for your consideration.

Sincerely,

Barry Tanning, Tetra Tech

Technical Memorandum # 2: Final Report

Overview of State, Federal, and Judicial Guidance on Antidegradation

Executive Summary

Technical Memorandum # 2 provides background on antidegradation policies and implementation methods and procedures in 15 selected states, supplemented by guidance issued by the U.S. Environmental Protection Agency (EPA) and relevant court decisions. This memorandum also reviews the Minnesota Pollution Control Agency's (MPCA) current nondegradation policies and compares the Minnesota approach with federal rules and programs in other states. Representatives from states selected by the MPCA with assistance from Tetra Tech were interviewed regarding their current antidegradation policies and implementation methods for conventional point source discharges (i.e., wastewater treatment plants) and for regulated (i.e., NPDES-permitted) stormwater sources.

Tetra Tech identified some areas of the Minnesota nondegradation rule that might require strengthening and collected information on state stormwater permitting programs that offer alternatives to the current approach in Minnesota. For the most part, Tetra Tech's review of stormwater permitting found that states generally focus on the selection of appropriate best management practices (BMPs) for entire classes of municipal separate storm sewer systems (MS4s), construction sites, and industrial facilities, rather than site-specific approaches. In addition, the array of BMPs offered to stormwater permittees vary from the general to those with detailed design criteria, but very few states or municipalities require that BMP performance (i.e., pollutant removal) be monitored. In fact, the concept of requiring somewhat standardized BMPs that are *presumed* to remove or treat stormwater pollutants rather than site-tailored practices that are monitored to ensure *performance* is a key challenge for stormwater permit programs across the nation.

Nondegradation vs. Antidegradation

Minnesota has implemented federal antidegradation requirements under its *nondegradation* provisions. This document uses the term *nondegradation* when referring to the Minnesota program, and the more common *antidegradation* when referring to other states and the federal rules.

In the Total Maximum Daily Load (TMDL) program, which requires the development of detailed analyses to determine the source, extent, and treatment options for specific pollutant loads, the focus for dealing with stormwater sources is the BMP-based approach. Even where a quantitative, numeric wasteload allocation has been developed as part of a TMDL and assigned to a permitted stormwater source (such as an MS4) to facilitate pollutant load reductions, the implementation approach has generally been to translate the assigned load into BMPs that are presumed to meet the load reduction targets, as indicated by literature values and other performance data. Actual monitoring of stormwater BMP effluent is relatively rare, except in the case of research studies.

For the issue that most spurred this project—the antidegradation review process for stormwater general permits—the state surveys indicate little from which the MPCA can draw. Region 5 states, in fact, exempt MS4 permitting from antidegradation review because they deem them to not qualify as a *new or expanded discharge* or they qualify for other exemptions. While other states surveyed do consider stormwater permits to be subject to antidegradation review, such review is conducted during general permit development and is based on best professional judgment (in contrast to the modeling and other technical analysis required for antidegradation review of individual permits). The survey of the states found the following

- The states generally define antidegradation as *no significant increase in loading* and appear to use qualitative evaluations in conducting the antidegradation review for general permits. No states have conducted a quantitative analysis to determine whether stormwater should be exempted from antidegradation review.
- During general permit development, no states have conducted a quantitative analysis to determine if stormwater discharges would result in significant degradation for which a Tier 2 review should be conducted. the MPCA is unique in requiring selected MS4s to conduct such a quantitative analysis.
- There is a lack of technical analysis regarding requirements for appropriate BMPs for coverage under a general permit. Again, states rely on best professional judgment and a non-qualitative evaluation of source types. Two states, West Virginia and Pennsylvania, have developed more advanced approaches to determining and requiring appropriate BMPs under general permits and serve as examples to draw from in the MPCA's future nondegradation rulemaking.

Pennsylvania, in particular, has developed an approach that is fairly straightforward and integrates stormwater permitting with other planning and analytical activities. The Pennsylvania Department of Environmental Protection (DEP) administers a reimbursement and grant program under the *Stormwater Management Act* (Act 167) for counties to prepare comprehensive watershed plans that regulate activities and new/redevelopment that might cause increased stormwater runoff. Municipalities implement the plans by enacting or amending local ordinances. Draft policies were published in February 2006 for compliance and enforcement of both Act 167 and the MS4 permitting program. Both the statute and implementation guidelines require these plans to include provisions to protect water quality, existing uses and the level of water quality necessary to protect those existing uses in all surface waters, and to protect and maintain water quality in special protection waters.

Pennsylvania DEP encourages the use of Act 167 plans to facilitate implementation of the new MS4 National Pollutant Discharge Elimination System (NPDES) permit program by including an *MS4 module* in the planning process. In this way, municipalities required to meet the MS4 requirement will be able to do so using the watershed plans, cost-share funds, and municipal ordinances available under Act 167. This provides a process by which local governments develop and implement appropriate BMPs to meet MS4 stormwater requirements, Act 167 watershed planning requirements, and antidegradation requirements. (See Section V for more details on Pennsylvania's stormwater requirements).

I. Summary of Federal Antidegradation Regulations

Section 303 (Title 33 of United States Code [U.S.C.] 1313) of the Clean Water Act (CWA) requires states and authorized tribes to adopt water quality standards for waters of the United States within their applicable jurisdictions. As stated above, such water quality standards must include, at a minimum (1) designated uses for all waterbodies within their jurisdictions, (2) water quality criteria necessary to protect the most sensitive of the uses, and (3) antidegradation provisions consistent with the regulations at Title 40 of the *Code of Federal Regulations* (CFR) 131.12. Antidegradation is an important tool for states and authorized tribes to use in meeting the CWA's requirement that water quality standards protect the public health or welfare, enhance the quality of water, and meet the objective of the Act to "restore and maintain the chemical, physical and biological integrity" of the nation's waters. EPA's regulation at 40 CFR 131.12 requires that states and authorized tribes adopt antidegradation policies and identify implementation methods to provide three levels of water quality protection.

The first level of protection at 40 CFR 131.12(a)(1) requires the maintenance and protection of existing instream water uses and the level of water quality necessary to protect those existing uses. Protection of

existing uses is the floor of water quality protection afforded to all waters. Existing uses are “those uses actually attained in the waterbody on or after November 28, 1975, whether or not they are included in the water quality standards.” This is an important distinction—waters must be protected at a level reflecting the highest use achieved since November 1975, regardless of the designated use and regardless of whether water quality has declined since then. A use attainability analysis is required for removing a designated use; removal of existing uses is not permitted.

The second level of protection is for high-quality waters. High-quality waters are defined in 40 CFR 131.12(a)(2) as waters where the quality of the waters is better than the levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water. This water quality is to be maintained and protected unless the state or tribe finds, after public participation and intergovernmental review, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing lower water quality, the state or tribe must assure water quality adequate to protect existing uses. Further, the state or tribe must ensure that all applicable statutory and regulatory requirements are achieved for all new and existing point sources and all cost-effective and reasonable BMPs are achieved for nonpoint source control.

Finally, the third and highest level of antidegradation protection is for outstanding national resource waters (ONRWs). If a state or tribe determines that the characteristics of a waterbody constitute an outstanding national resource, such as waters of national and state parks and wildlife refuges and waters of exceptional recreational or ecological significance, and designates a waterbody as such, those characteristics must be maintained and protected. Table 1 on the following page introduces and summarizes some key antidegradation terms and issues.

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

Concept	Key issues	Key Terms	Comments
Tier 1 All waters should be protected at some basic level.	In actuality, implementing an antidegradation review procedure focuses on regulated activities impacting regulated waters, i.e., waters of the state or waters of the United States.	Regulated activities Actionable activities Regulatory authority Control document Permits, certification Surface waters Waters of the state Waters of the United States.	Can include intrastate isolated wetlands and groundwater if state regulations stipulate. Regulated activities include NPDES and section 404 permits, and section 401 Water Quality Certifications; can include septic and withdrawal permits.
	The basic level of protection is defined by existing uses of the waterbody and the water quality criteria (WQC) associated with those uses.	Existing use Water quality criteria Water quality standard	Existing uses are water quality targets implicitly or explicitly attained at any time since November 28, 1975. Existing uses cannot be removed and must be protected. Designated uses are desired uses and usually cited in state water quality standards.



Table 1. Summary of federal antidegradation concepts, key issues, and terms (*continued*)

Concept	Key issues	Key Terms	Comments
	If water quality is already below the minimum WQC threshold for some pollutants, additional loadings of those pollutants should be banned if water quality will be further lowered	Use impairment Use impaired waters Applicable WQS (water quality standards) TMDLs; 303(d) list Trading	Trading may allow new loadings if the new loads are completely offset by reductions in existing loads. Loadings of other, nonproblematic pollutants are not affected if they are nondegrading or if they are subject to antidegradation reviews that provide authorization.
Tier 2 Waters that are cleaner than the <i>basic</i> level (i.e., WQC) should be protected at that existing higher level unless there is a significant local benefit	<i>Cleaner</i> can be expressed parameter-by-parameter, numerically or narratively, or through some other scheme. Tier 1 protection still applies, to keep water quality at or above threshold water quality criteria numeric or narrative values. Measuring water quality to determine when (and by how much) it is <i>cleaner</i> than the basic (WQC) level can be resource intensive; regular updates (i.e., yearly) are often needed Most states allow some non-significant impacts or degradation in these higher quality waters without requiring social or economic justification.	High-quality waters WQ better than WQS Assimilative capacity Available capacity Baseline water quality Existing water quality Ambient conditions Current conditions De minimis discharge Non-significant discharge Significant degradation Allowable degradation	EPA prefers the <i>parameter-by-parameter</i> approach, which infers that many (even most) waters are always protected at both Tiers 1 and 2 (i.e., most waters will exceed minimum levels needed to support existing uses for at least one or more parameters). Determining available assimilative capacity for each parameter provides a basis for quantitatively assessing degradation and its relative significance involves some knowledge of existing (baseline) water quality and the nature of the proposed discharge. Baseline (existing) water quality (BWQ) provides the yardstick against which degradation is measured; it can be difficult to characterize and update. Depending on the loading inputs under consideration, seasonal and/or event-based assessments might be needed. Allowable degradation might include use of some portion of the available assimilative capacity (e.g., 5%–25%) for specific pollutant(s), or characterizing BWQ at a certain percentile (e.g., 85%) of total ambient measurements and requiring new loads to meet those <i>antideg</i> concentrations at end-of-pipe. Cumulative, consecutive, multiple allowances for non-significant impacts can result in water quality criteria exceedances and use of remaining assimilative capacity incrementally, without an antidegradation review.
	Important social, economic, and local/regional benefits can be difficult to demonstrate.	Economic development Social development In the area	Guidance from federal, state, and other sources are available to conduct a wide range of analyses—from simple to complex.
	Demonstrating that degradation is <i>necessary</i> requires analyses of alternatives to the proposed activity and assurances that all legal, cost-effective, and	Highest statutory and regulatory requirements for new and existing point sources. Cost-effective and	While not requiring BMPs for NPSs, there is an expectation that the most obvious, egregious, and manageable NPS loadings are minimized under antidegradation provisions. Nondegradation applies to all regulated nonpoint sources, and to

Table 1. Summary of federal antidegradation concepts, key issues, and terms *(continued)*

Concept	Key issues	Key Terms	Comments
	reasonable point source and NPS controls are in place.	reasonable BMPs for nonpoint sources Necessary	stormwater from regulated MS4s, industrial, and construction activity. Specific procedures for conducting analyses of alternatives to the proposed activity can require significant resources, and fail to provide relevant information if they are not robust. Defining <i>cost effective</i> and <i>reasonable</i> can be difficult.
	Federal and state regulations require public participation and intergovernmental coordination under the state's Continuing Planning Process (CPP), a requirement of the CWA.	Public hearing Intergovernmental coordination Continuing Planning Process (CPP) under CWA	Public hearings on multiple issues (NPDES permit, antidegradation, and the like.) can be combined; states can use existing procedures; Continuing Planning Process procedures are sometimes old and outdated.
Tier 3	Designation of Tier 3 waters can be problematic if nearby landowners fear a ban on development.	Outstanding National Resource Waters (ONRW) and Outstanding State Resource Waters (OSRWs) Unique waters Tier 3 list Nominating Tier 3s Approval for Tier 3s	ONRWs and OSRWs are considered the most pristine in the nation. These waters are usually listed in state WQS. Some water resource organizations seek provisions allowing for the public to nominate ONRWs and OSRWs.
Some pristine or unique waters should not be degraded even if those benefits can be demonstrated.	Protection of Tier 3 waters requires upstream pollution controls and antidegradation controls.	Upstream sources Upstream loadings	This consideration can lead to treating the entire upstream area as Tier 3. However, since most Tier 3 situations involve headwaters streams, this might not be an issue.
	Most states allow some short-term, limited degradation of Tier 3 waters if long-term impacts are avoided.	Short-term impacts Limited impacts Non-significant impacts	Short-term impacts to Tier 3 waters is typically defined as "weeks and months, not years" and almost always less than a year. Limited impacts usually involve short term use of 5 to 10 percent of the available assimilative capacity for pollutant(s) of concern. Enhanced general permit requirements for minor activities (e.g., culvert replacements, utility crossings) can provide a basis for allowing "short-term, temporary, and non-significant" impacts in Tier 3 situations if the requirements are sufficiently stringent, activities are monitored, and requirements for proper BMP selection, siting, installation, operation, and maintenance are in place.



II. Minnesota's nondegradation policy

Minnesota adopted antidegradation policies in Chapter 7050.0185, *Nondegradation for All Waters* and in 7050.0180, *Nondegradation for Outstanding Resource Value Waters*, effective January 1, 1988. The policy states that

A. "Any person authorized to maintain a new or expanded discharge of sewage, industrial waste, or other waste, whether or not the discharge is significant, shall comply with applicable effluent limitations and water quality standards and shall maintain all existing, beneficial uses in the receiving waters." This is the minimum treatment required.

B. If a person proposes a new or expanded significant discharge from either a point or nonpoint source, the agency shall determine whether additional control measures beyond those required in subpart 3 (the minimum treatment requirement) can reasonably be taken to minimize the impact of the discharge on the receiving water. Significant discharges are those that discharge more than 200,000 gallons per day. In making the decision, the Agency shall consider

- the importance of economic and social development impacts on the project
- the impact of the discharge on the quality of the receiving water
- the characteristics of the receiving water
- the cumulative impacts of all new or expanded discharges on the receiving water
- the cost of additional treatment beyond what is required in the minimum treatment requirement
- other matters as shall be brought to the agency's attention.

C. For Outstanding Resource Value Waters,

No person may cause or allow a new or expanded discharge into those waters designated for prohibited discharges.

No person may cause or allow a new or expanded discharge or any sewage, industrial, waste or other waste to those waters designated for restricted discharge unless there is not a prudent and feasible alternative to the discharge.

The language of Minnesota's nondegradation policy differs somewhat from the federal rule. Table 2 provides a comparison of federal antidegradation rule and Minnesota nondegradation policies.

Table 2. Comparison of the federal and Minnesota antidegradation policies

Federal Antidegradation Rule	Minnesota Nondegradation Rule	Comments
CFR 131.12: (a) The State shall develop and adopt a statewide antidegradation policy and identify the methods for implementing such policy pursuant to this subpart. The antidegradation policy and implementation methods shall, at a minimum, be consistent with the following:	7050.0185 It is the policy of the state of Minnesota to protect all waters from significant degradation from point and nonpoint sources and wetland alterations, and to maintain existing uses, aquatic and wetland habitats, and the level of water quality necessary to protect these uses. 7050.0180 the agency will prohibit or stringently control new or expanded discharges from either point or nonpoint sources to outstanding resource value waters.	Minnesota has adopted a policy and is evaluating needed revisions to the policy. Minnesota developed guidance for implementing nondegradation requirements for all waters and outstanding resource value waters in 1988. These guidance manuals may need to be updated to reflect developments in the application of antidegradation implementation methods over the past 20 years.



Table 2. Comparison of the federal and Minnesota antidegradation policies (*continued*)

Federal Antidegradation Rule	Minnesota Nondegradation Rule	Comments
(1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.	Subc 3. Minimum treatment: Any person authorized to maintain a new or expanded discharge shall comply with applicable effluent limitations and water quality standards, shall maintain all existing, beneficial uses whether or not the discharge is significant.	EPA defines existing use as of 11/25/1978, whereas the MPCA defines existing use as of 1988. Existing uses are not the same as beneficial uses. The EPA stipulates <i>existing use</i> , whereas the MPCA stipulates <i>existing, beneficial use</i> . the MPCA's rules are open for interpretation. It is unclear whether this means existing uses and beneficial uses, or existing beneficial uses.
(2) Where the quality of the waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected...	Subp 4. If a person proposes a new or expanded significant discharge (greater than 200,000 per day, or resulting in >1% increase for instream toxic pollutants over baseline water quality) the agency will determine whether additional controls are needed.	There appears to be some difference in the trigger for EPA's Tier 2 antidegradation review (i.e., use of available assimilative capacity) and the MPCA trigger for additional requirements beyond minimum treatment (i.e., a significant discharge defined as greater than 200,000 per day, or >1% increase of toxic pollutants)
...unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process...	Subp. 8 The Commissioner shall provide notice and an opportunity for a public hearing in accordance with the permit requirements in Chapter 7001 before establishing reasonable control requirement.	In Subp 4, the Commissioner considers cumulative discharges (which may exceed baseline quality) as one of many factors in approving the proposed discharge. This may or may not be seen as adequately protecting and maintaining the baseline water quality. The state requires a public hearing rather than just <i>public participation</i> . EPA notes that the burden for demonstrating benefits "will be very high" for those "few extraordinary circumstances where the economic and social need for the activity clearly outweighs the benefit of maintaining water quality."
...that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located.	Subp 4 The agency shall determine whether additional control measures can reasonably be taken to minimize the impact of the discharge. In making the decision, the agency shall consider the importance of economic and social development impacts of the project, the impact of the discharge on the quality of the receiving water, cumulative impacts of all new or expanded discharges on the receiving water, the cost of additional treatment, and other matters.	Although similar, in tone and content, it appears that the EPA burden of proof is higher on the permit applicant than the MPCA burden of proof: Is the discharge <i>necessary</i> v can additional control measures <i>reasonably</i> be taken? The lack of a requirement of a demonstration of necessity for any lowering of water quality is considered a significant weakness in the Minnesota nondegradation rule.
In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully.	Subp 3. Minimum treatment: Any person authorized to maintain a new or expanded discharge shall ... maintain all existing, beneficial uses whether or not the discharge is significant.	Existing uses are not the same as beneficial uses. EPA stipulates <i>existing use</i> whereas Minnesota rules stipulate <i>existing, beneficial use</i> . MPCA has proposed changes to this part of its rule in Subpart 1 (Policy), adding the words "existing beneficial uses" to bring its policy more in line with the federal text.



Table 2. Comparison of the federal and Minnesota antidegradation policies *(continued)*

Federal Antidegradation Rule	Minnesota Nondegradation Rule	Comments
Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources...	No similar requirement in the MPCA rules	Lack of this provisions is considered a weakness in the Minnesota nondegradation review approach.
...and all cost-effective and reasonable BMPs for nonpoint source control.	No similar requirement in the MPCA rules	Lack of this provisions is considered a weakness in the Minnesota nondegradation review approach.
(3) Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.	7050.0180 the agency will prohibit or stringently control new or expanded discharges from either point or nonpoint sources to outstanding resource value waters.	A key difference in these sections is that EPA says the water quality shall be maintained and protected whereas Minnesota rules state that in preserving the value of special waters, the agency will "prohibit or stringently control" new or expanded discharges to outstanding resource value waters. This might be deemed to be weaker than the intended Tier 3 level of protection.
(4) In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with section 316 of the Act.	Subp. 10 If a thermal discharge causes potential water quality impairment, the agency shall implement the nondegradation policy consistent with section 316 of the CWA...	No difference.

III. Key Antidegradation Policy and Implementation Issues

The following section of the analysis highlights the key policy issues related to antidegradation. This summary of implementation issues are based on an analysis of state programs, EPA policy documents, and pertinent court rulings. Federal regulations at 40 CFR 131.12 specify that states must develop and adopt an antidegradation policy and identify the methods for implementing the policy. At a minimum, the state policy must be consistent with federal policy, which describes an approach based on three levels of protection commonly referred to as tiers. The first element identified at 40 CFR 131.12(a)(1) protects the minimum level of water quality necessary to support existing uses and applies to all waters. This element limits the extent to which water quality can be lowered in a waterbody. Lowering of water quality to the point where existing uses are impaired (i.e., not supported) is prohibited. The second level is found at 40 CFR 131.12(a)(2), and protects water quality where water quality is better than that needed to support fish and aquatic life and recreation in and on the water. Where these conditions exist, the waterbody is considered high-quality, and water quality must be maintained and protected unless lowering water quality is necessary to support important social and economic development in the area. The third element at 40 CFR 131.12(a)(3) involves the protection of water quality in waterbodies that are of exceptional ecological, aesthetic or recreational significance. Water quality in such waterbodies, identified as ONRWs, must be maintained and protected. The entire text of the federal antidegradation regulation

appears below—it is remarkable for its brevity, which masks the considerable difficulties faced by public agency staff in implementing the seemingly elegant and simple principles described:

The State shall develop and adopt a statewide antidegradation policy and identify the methods for implementing such policy pursuant to this subpart. The antidegradation policy and implementation methods shall, at a minimum, be consistent with the following:

- (1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.
- (2) Where the quality of the waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully. Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control.
- (3) Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.
- (4) In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with section 316 of the Act.

TIERS OF ANTIDEGRADATION PROTECTION

Most of the challenges faced by water resource agency personnel implementing federal and state antidegradation policies revolve around the section commonly referred to as *Tier 2*, which addresses waters that, “exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water.” Tier 1, which requires the maintenance and protection of existing uses and “the level of water quality necessary to protect the existing uses” has been interpreted and implemented through the use-based water quality criteria program, which provides numeric and narrative standards designed to support designated uses of each waterbody. Waters that do not support their designated uses are discovered through waterbody assessments and other studies and are listed as impaired as required by section 303(d) of the CWA so that a TMDL of the problem pollutant parameter(s) can be developed.

Tier 3 protection has also been relatively easy for agency personnel to address, since waters that “constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance” are typically listed by states as part of their water quality standards. Although federal antidegradation rules require that Tier 3 water quality be *maintained and protected*, it should be noted that EPA and states have made allowances for *temporary and limited* (i.e., minor) degradation of Tier 3 waters in most cases, which are defined differently by the various agencies involved in implementing antidegradation programs (e.g., the *EPA Region 8 Guidance: Antidegradation Implementation* (1993) has defined temporary and limited as “activities with a duration less than one month and resulting in less than a 5 percent change in ambient concentrations” of the pollutant(s) of concern). The operable expectation is that after the activity causing the water quality degradation has ended (e.g., maintenance of a road in a national forest), water quality will return to the previous levels.



The protection of high-quality waters under Tier 2 of the antidegradation rule is not as straightforward as the approach for Tiers 1 and 3 and causes considerable confusion and controversy. It is often interpreted incorrectly as an absolute prohibition on lowering of water quality in *high-quality* waters, i.e., those that exceed minimum levels needed to support existing uses. Such a prohibition could be interpreted as a *no-growth* policy, which EPA has noted is not consistent with its position. The Agency has noted repeatedly that existing regulations and EPA guidance do not prohibit activities that would lower water quality in high-quality waters but rather provide a structure for the systematic evaluation of activities that are expected to lower water quality in certain cases.

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

Illinois Board Denies Permit Due to Lack of Antidegradation Review

A ruling issued in April 2007 by the Illinois Pollution Control Board (Des Plaines River Watershed Alliance, Livable Communities Alliance, Prairie Rivers Network, and Sierra Club, Petitioners, v. Illinois Environmental Protection Agency and Village of New Lenox, Respondents; PCB 04-88) reversed the issuance of an NPDES permit for an expanded wastewater treatment plant in Will County, because of a failure to conduct the required antidegradation review. The board states that "the IEPA failed to properly consider the effect of the increased discharge from the New Lenox plant on Hickory Creek. Specifically, the IEPA failed to properly review the increased discharge pursuant to 35 Ill. Adm. Code 302.105(c) and as a result the issuance of the permit violates 35 Ill. Adm. Code 302.105(c) and Section 39 of the Act (415 ILCS 5/39 (2004)). In particular the Board found that the record established that the increased loading may degrade the stream, and the IEPA did not consider the impact of increased loading of phosphorus and nitrogen on the receiving waters. The Board therefore remanded the permit to the IEPA for additional review pursuant to the antidegradation provisions of the Illinois Pollution Control Board rules.

DEFINING A POLLUTANT

This term is well defined by federal and state rules. Under the CWA, *pollutant* means "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste" discharged into a surface water. EPA and the state consider certain water quality characteristics, especially those for which there are water quality standards, such as dissolved oxygen, pH, temperature, turbidity, and suspended sediment, as pollutants if they result or could result in a surface water not attaining a water quality standard. Minnesota Rules at 115.01 contain the following definitions:

Subd. 9. **Other wastes.** "Other wastes" mean garbage, municipal refuse, decayed wood, sawdust, shavings, bark, lime, sand, ashes, offal, oil, tar, chemicals, dredged spoil, solid waste, incinerator residue, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, cellar dirt or municipal or agricultural waste, and all other substances not included within the definitions of sewage and industrial waste set forth in this chapter which may pollute or tend to pollute the waters of the state.

Subd. 12. **Pollutant.** "Pollutant" means any "sewage," "industrial waste," or "other wastes," as defined in this chapter, discharged into a disposal system or to waters of the state.



Subd. 13. **Pollution of water, water pollution, pollute the water.** "Pollution of water," "water pollution," or "pollute the water" means: (a) the discharge of any pollutant into any waters of the state or the contamination of any waters of the state so as to create a nuisance or render such waters unclean, or noxious, or impure so as to be actually or potentially harmful or detrimental or injurious to public health, safety or welfare, to domestic, agricultural, commercial, industrial, recreational or other legitimate uses, or to livestock, animals, birds, fish or other aquatic life; or (b) the alteration made or induced by human activity of the chemical, physical, biological, or radiological integrity of waters of the state.

Minnesota has included elevated stormwater flow rates as a parameter that causes *pollution* in a receiving waterbody, because of the well-documented impacts of higher-flow velocities and longer-flow durations on stream channels effects caused by increases in impervious surface cover in urban drainage areas. While such an approach can generate discussion, it should be noted that dealing with faster, higher-volume flows continues to be one of the major challenges for stormwater programs.

APPLICABILITY OF ANTIDEGRADATION REGULATIONS

EPA has determined and courts have held that, at a minimum, any one or a combination of several activities can trigger an antidegradation review. Typically, antidegradation implementation methods adopted by states or supported by EPA require such reviews for "new or expanded" *regulated* discharges, e.g., those authorized by an NPDES permit under section 402 of the CWA, those related to the placement of dredged or fill materials into regulated waters under section 404 of the CWA, and those subject to other regulatory approvals—especially from state water resource agencies.

A confusing aspect of antidegradation is the applicability of antidegradation to nonpoint sources and other *unregulated* activities that have the potential to degrade water quality. EPA policy notes that water quality standards, including antidegradation, can be applied to *any* activity that might affect water quality (*Water Quality Standards Handbook* 1994; *Interpretation of Federal Antidegradation Regulatory Requirement*, memorandum from Tudor Davies, Director, Office of Science and Technology (OST), to Water Management Division Directors, dated February 22, 1994; *EPA Region 5 Guidance for Antidegradation Policy Implementation for High Quality Waters*, 1986; *EPA Region 4 Antidegradation Guidance Tier II Procedures*, undated) However, the Agency has clearly indicated that despite the broad applicability of water quality standards, mechanisms to implement water quality standards through various regulatory schemes might not exist in all circumstances. None of the antidegradation memoranda or guidance documents produced by EPA, nor existing regulations, require states to regulate nonpoint sources that are currently unregulated. However, where independent regulatory authority over nonpoint sources exists that requires compliance with water quality standards—such as in Minnesota—compliance with the antidegradation provisions is expected.

Federal Actions are Subject to State Antidegradation Rules

In *Addressing Water Pollution from Livestock Grazing after ONDA v. Dombeck: Legal Strategies Under the Clean Water Act* (2000), Peter M. Lacy notes that the courts have consistently ruled that federal activities are also subject to state antidegradation rules. For example, in 1987 the 9th Circuit affirmed federal responsibilities under the CWA in a timber harvest and road construction case. In *Oregon Natural Resources Council v. U.S. Forest Service (ONRC v. USFS)*, the plaintiffs alleged that the USFS's activities associated with a timber sale on the Willamette National Forest in Oregon violated state water quality standards and, therefore, were in violation of section 313. Specifically, ONRC claimed that the defendants violated and planned to violate both Oregon's nondegradation standard that "existing high quality waters...shall be maintained and protected" and a rule that activities in the Willamette Basin must not cause a 10 percent or greater cumulative increase in natural stream turbidities. Citing *Northwest Indian Cemetery Protective Association*, the plaintiffs argued that the 9th Circuit had already "recognized the rights of citizens to enforce state water quality standards against the [USFS]." The court accepted this duty under section 313 without further discussion.

In another case arising out of a fire-recovery timber sale on the Klamath National Forest in California, an environmental organization alleged that the proposed agency action would violate a state water quality control plan adopted by California's Water Quality Control Board. While the state plan required that turbidity must not increase by more than 20 percent, the turbidity levels from the combined effects of the fire and the project would exceed that level. Citing *ONRC v. USFS*, the 9th Circuit reaffirmed in 1990 that the USFS must comply with all state water quality standards, a duty that included violations from nonpoint sources. Finally, in 1998 the 9th Circuit stated that the requirement that all federal agencies comply with state water quality standards includes a state's antidegradation policy.

Broadly speaking, antidegradation protection applies to all surface waters. The antidegradation review procedure is designed to ensure that planned, regulated activities that have the potential to impact water quality are assessed before approval to ensure that existing uses of the waterbody—and the quality of water necessary to protect existing uses—is maintained. Most states reviewed for this analysis apply antidegradation provisions to surface waters only. However, some states (e.g., Missouri and West Virginia) consider groundwater among the many *waters of the state*, and have retained the ability to apply antidegradation protection to groundwater. No states are known to have implemented a specific procedure for protecting ground water under the antidegradation program, but the capacity to do so certainly exists. Other groundwater protection programs, such as the wellhead and source water protection programs, are more commonly used to ensure nondegradation of groundwater resources.

In Region 5 states, the definition of new or expanded discharge may vary depending on whether it is to be discharged into the Great Lakes System. For example, in Wisconsin, new and expanded discharges are defined as follows:

New discharge: Any point source which has not received a WPDES permit from the department prior to March 1, 1989.

Increased discharge: (a) *Increased discharge* means any change in concentration, level or loading of a substance which would exceed an effluent limitation specified in a current WPDES permit.

(b) Except as provided in par. (c), increased discharge does not include the initial imposition of effluent limitations for substances which were in a previous discharge but which had not been limited in a prior or the current permit unless the initial imposition of effluent limitations occurs due to a changed discharge location, other than a change in location necessary to accommodate a mixing zone as provided for in ch. NR 106.

(c) For discharges of bioaccumulative chemicals of concern (BCCs), defined in s. NR 105.03 (9), to the Great Lakes system, increased discharge means:

1. An increased discharge as defined in par. (a);



2. The initial imposition of an effluent limitation for a BCC that occurs due to an actual or expected increase in loading of the BCC; and

3. Any actual or expected increase in loading of a BCC which is caused by or will be caused by a facility expansion, a process modification, or the connection to an existing public or private wastewater treatment system of a substantial source of untreated or pretreated effluent containing BCCs, and which requires notification to the department pursuant to s. NR 205.07 (2) (a) or (3) (c) or (d). Under this subdivision, increased discharge does not include any increase in the loading of BCCs that is caused by normal operational variability, changes in intake pollutants or increasing the rate or hours of production within the existing production capacity. Normal operational variability includes, for POTWs, any additional wastewater volume within the existing capacity of the POTW from commercial, industrial or residential growth which do not normally contribute substantial quantities of BCCs to the POTW's wastewater flow.

Ohio goes further in defining a *net increase* for an existing source as:

(i) The amount by which the sum of the following exceeds zero:

(a) The increase in the mass discharge limit attributable to the activity subject to this rule; and

(b) All other contemporaneous increases or decreases attributable to other pollutant source(s) affecting the surface water segment(s) under consideration and which are stipulated as a condition of the applicant's permit and which shall occur during the term of the applicant's permit;

or

(ii) For heat, bacteria and any other regulated pollutant which, though not measurable as a mass level is nonetheless susceptible to determinations of net increase, the amount by which the sum of the following exceeds zero:

(a) The increase in an authorized discharge level attributable to the activity subject to this rule; and

(b) All other contemporaneous increases or decreases attributable to other pollutant source(s) affecting the surface water segment(s) under consideration and which are stipulated as a condition of the applicant's permit and which shall occur during the term of the applicant's permit.

Stormwater Focus: New and Expanded Discharges

The majority of the Region 5 states surveyed, Illinois, Ohio, Wisconsin, and Indiana, expressly exempt MS4 permit from antidegradation review because they consider them not to be a new or expanded discharge. Michigan also in effect exempts stormwater discharges in that its rules contain several exemptions that permit stormwater dischargers to demonstrate that antidegradation review is not required. Other state programs surveyed do not have this interpretation of MS4 discharges. For most states, stormwater permits, including those for MS4s, construction activities, and industrial facilities, are considered to new or expanded permits for which antidegradation review is conducted during the general permit development process.

For stormwater regulated under *individual permits*, the State of Washington defines new or expanded discharge as changes in the amount of polluted stormwater runoff that would reach waters beyond the stormwater treatment network. A good surrogate measure of increased polluted runoff is the change in impervious surface area, or alternatively, a change in the use of existing impervious surface to activities known to contribute greater levels of pollutants in runoff. For industrial facilities applying for an individual stormwater permit, an expected increase in impervious surface (compared to the previous landscape) of more than 10% or a significant change in the use of existing impervious surfaces should generally be considered an indication that a new or expanded discharge will have or will occur. For municipal stormwater permits, it should be assumed, absent defensible information to the contrary, that there will be new or expanded discharges of stormwater which would cause a measurable lowering of water quality.



In Oregon and most other states, a new discharge involves submission of any new NPDES permit application or 401 water quality certification (or other regulated discharges such as 404 permits) and an expanded discharge is one that goes beyond that presently allowed in an existing permit or that will lower water quality from existing water quality.

Pennsylvania directly addressed the issue of grandfathered discharges as follows:

Discharges in existence prior to the high quality (HQ) [Tier II] or exceptional value (EV) [Tier III] designation are "grandfathered" and considered to be part of the existing quality of the waterbody. "Grandfathered" flows are not subject to "the non-discharge alternatives/use of best technologies analysis" or [social or economic justification] SEJ (for HQ waters) in acknowledgment of the resources invested by municipal officials in planning for community sewage needs and corporate officials in equivalent planning to tailor treatment facilities to the wastewater volume and characteristics created by production/manufacturing processes.

Other states have various definitions of *new and expanded* discharges; however, none surveyed apply a discharge volume threshold, as does Minnesota, to indicate an expansion significant enough to *trigger* nondegradation review.

States may elect to extend their antidegradation policies to other areas and activities, including the following:

- Activities affecting groundwater
- Animal feeding operations
- Onsite wastewater treatment systems
- Other unregulated nonpoint sources of pollution
- Channel and flow alterations

For example, the California Colorado River Basin Regional Water Quality Control Board has expanded the scope of antidegradation review to sedimentation and siltation from all sources:

A prohibition of sediment/silt discharge is hereby established for the Imperial Valley, including the Alamo River, New River, all Imperial Valley Drains, and their tributaries. Specifically, beginning three months after EPA approval, the direct or indirect discharge of sediment into the Imperial Valley is prohibited, unless:

1. The Discharger is:
 - a. In compliance with applicable Sedimentation/Siltation TMDL(s), including implementation provisions (e.g., Discharger is in good standing with the ICFB Watershed Program or has a Drain Water Quality Monitoring Plan (DWQMP) approved by the Executive Officer); or
 - b. Has a monitoring and surveillance program approved by the Executive Officer that demonstrates that discharges of sediment/silt into the aforementioned waters do not violate or contribute to a violation of the TMDL(s), *the anti-degradation policy (State Board Resolution No. 68-16)*, or water quality objectives; or
 - c. Is covered by Waste Discharge Requirements (WDRs) or a Waiver of WDRs that applies to the discharge.

The Oregon Department of Environmental Quality (Oregon DEQ) considers antidegradation to apply to nonpoint source pollution, and the state's antidegradation policy has expanded the review to cover several sources. The following policy is implemented through general project review:

The following activities will not be considered new or increasing discharges and will therefore not trigger an antidegradation review under this rule *so long as they do not increase in frequency, intensity, duration or geographical extent* (emphasis added):

- (a) Rotating grazing pastures,
- (b) Agricultural crop rotations, and
- (c) Maintenance dredging.

While Oregon DEQ does not have formal procedure at this time, it intends to develop procedures for applying antidegradation policy in a nonpoint source context for those discharges that do not meet the above waiver criteria.

The issues related to application of antidegradation requirements to channel and flow alterations are complex. Clearly, altering existing stream channels or altering existing flows can and often do impact water quality (i.e., result in degradation). A strong case can be made for including these activities among the regulated activities typically subject to antidegradation reviews. In the case of channel alterations, such a review is usually required if the activity is subject to a CWA section 404 permit or CWA section 401 water quality certification. Flow alterations subject to state permitting programs can also be included among the activities requiring an antidegradation review. New Hampshire specifically includes flow alterations in its antidegradation regulation at Env-Ws 1708.02:

Antidegradation shall apply to... (an) increase in flow alteration over an existing alteration; and...all hydrologic modifications, such as dam construction and water withdrawals.

Pennsylvania also applies antidegradation requirements to activities that impact flow, such as those involving water withdrawal permits. In its 2003 *Water Quality Antidegradation Implementation Guidance*, the state's DEP notes:

For projects subject to a DEP permit or approval that may affect an (Exceptional Value) or (High Quality) surface water but do not involve a discharge, there is a somewhat different review process. This process evaluates the effect of the proposed activity on surface water and requires that the use of the surface water be maintained and protected. Addressing water quantity issues as part of DEP's permitting process is an evolving area. Activities involving surface and groundwater withdrawals which require a DEP permit under the Pennsylvania Safe Drinking Water Act (SDWA) are being addressed on a case-by-case basis and in accordance with DEP's guidance... The procedures were developed to identify those surface and groundwater withdrawals under the SDWA which may be considered to have significant impact on streams, springs, and wetlands and indicate when additional determinations relating to water quantity are important permit considerations. It provides a means for applicants and DEP to focus on situations where additional review or assessment is needed to evaluate the magnitude and likelihood of potential impacts of such water withdrawals on surface water uses. Another tool that is useful in assessing stream impacts from a proposed withdrawal on a stream which supports a cold water fishery is DEP's guidance on use of the Instream Flow Incremental Methodology (IFIM)... While these tools provide a framework for evaluation of water withdrawal projects, DEP and the applicant may also use other methods and resources to achieve the goal of protecting the uses of surface waters where projects impacting water quantity are proposed.



Some states use their definition of new or expanded discharges to expressly exempt MS4 stormwater discharges because of the fact that the municipality was in existence and discharging before their antidegradation policy effective date and before the date it was permitted as a *regulated* activity subject to antidegradation reviews. For other states, antidegradation review is applied to stormwater discharges either during general permit development or through the individual permit issuance process. For example, the State of Washington defines a new or expanded discharge as changes in the amount of polluted stormwater runoff that would reach waters beyond the stormwater treatment network.

The state inventory revealed few other states that are applying antidegradation policy to stormwater discharges, except to consider an array of BMPs believed to reduce impacts associated with expansions of the MS4 area. Some states exempt stormwater specifically or otherwise do not include them in the types of discharges subject to antidegradation reviews. A few states consider some types of stormwater discharges to be subject to antidegradation review (i.e., construction discharges); however, as noted, the review is conducted during general permit development and no quantitative analysis of site-specific discharges is conducted. Finally, several states do cite specific circumstances under which an antidegradation review would be conducted on the proposed discharge from an individual construction project (i.e., size of the project). Information on how West Virginia has crafted such an approach is provided later in this section.

DEFINING EXISTING USES

Existing uses are defined by EPA as, “those uses actually attained in the waterbody on or after November 28, 1975, whether or not they are included in the water quality standards.” (40 CFR 131.3(e)). EPA’s *Water Quality Standards Handbook* (1994) notes that an existing use

can be established by demonstrating that: fishing, swimming, or other uses have actually occurred since November 28, 1975; or that the water quality is suitable to allow the use to be attained—unless there are physical problems, such as substrate or flow, that prevent the use from being attained. An example of the latter is an area where shellfish are propagating and surviving in a biologically suitable habitat and are available and suitable for harvesting although, to date, no one has attempted to harvest them. Such facts clearly establish that shellfish harvesting is an “existing” use, not one dependent on improvements in water quality. To argue otherwise would be to say that the only time an aquatic protection use “exists” is if someone succeeds in catching fish.

EPA interprets the definition above to mean that “no activity is allowable under the antidegradation policy which would partially or completely eliminate any existing use whether or not that use is designated in a State’s water quality standards.” The *Water Quality Standards Handbook* further states that

The aquatic protection use is a broad category requiring further explanation. Non-aberrational species must be protected, even if not prevalent in number or importance. Water quality should be such that it results in no mortality and no significant growth or reproductive impairment of resident species. Any lowering of water quality below this full level of protection is not allowed.

DEFINING AND CHARACTERIZING EXISTING WATER QUALITY

Clearly, the establishment of existing water quality is necessary—not only for antidegradation reviews, but for other purposes as well (e.g., CWA section 305(b) reporting). Accurately describing existing water quality on a regular basis, however, is no simple matter. Monitoring and assessment are resource-intensive—time, money, and materials are required. Moreover, it is generally accepted that existing water quality is not static. Water quality might improve or degrade over time, affecting the waterbody’s status (e.g., unimpaired, impaired) and any antidegradation review conducted for a proposed activity during a

particular time period. EPA has issued considerable guidance for describing existing water quality (e.g., CWA section 305(b) guidance) in terms of both numeric and narrative parameters.

The fairly strong EPA endorsement of a parameter-by-parameter approach for antidegradation reviews on the basis of an analysis of available assimilative capacity for the pollutant(s) of concern in the proposed discharge assumes that data on the receiving waterbody (i.e., baseline or existing water quality data) has been collected. In an August 2005 memorandum to regional water management division directors on *Tier 2 Antidegradation Reviews and Significance Thresholds*, EPA's OST Director, Ephraim S. King, noted that, "it is important to clarify that the most appropriate way to define a significance threshold is in terms of assimilative capacity. Other approaches for defining significance, such as considering only increases in pollutant loading, may not take into account the resulting changes in water quality, and in some cases may allow most or all of the remaining assimilative capacity of the waterbody to be used without an antidegradation review."

Several EPA regions have issued guidance on how to characterize existing (baseline) water quality for the purpose of antidegradation reviews. EPA's Region 9 antidegradation guidance recommends the following approach to determining existing water quality for the purpose of antidegradation reviews:

First, the State should develop procedures to document the degree to which water quality exceeds that necessary to protect the uses. Ambient monitoring data can be used to provide this documentation. States must adopt procedures to assure that, where little or no data exists, adequate information will be available to determine the existing quality of the water body or bodies, which could be adversely affected by the proposed action. Such procedures should include both an assessment of existing water quality and a determination of which water quality parameters and beneficial uses are likely to be affected. These assessments and determinations could be performed either by the State or the party proposing the action in question.

In *Antidegradation Implementation* guidance, EPA Region 8 suggests that states focus on the pollutants of concern believed to be in the discharge and request that the applicant collect information wherever possible:

Certainly, monitoring and assessing surface water quality is a difficult and ongoing task, and projecting the water quality that will result from proposed activities can be made difficult by the inherent complexity of receiving water systems. The critical issue becomes: How much information and analysis is needed to make the required antidegradation Tier 2 findings, and where information is lacking, who should be responsible for providing it?... EPA Region VIII believes that implementation of antidegradation Tier 2 requirements need not pose an undue burden on the state and tribal agencies charged with administering surface water quality programs. The model antidegradation procedure included in this guidance has been developed to allow states and tribes to focus resources on significant problems and issues and, where necessary, place the information-gathering burden on the project applicant...with respect to any data that may be needed to make the high quality and significance findings...

EPA Region 8 guidance further notes that "the applicant may be required to provide monitoring data or other information about the affected waterbody to help determine the applicability of (T)ier 2 requirements based on the high-quality test. The information that will be required in a given situation will be identified on a case-by-case basis.... Such information may include recent ambient chemical, physical, and biological monitoring data sufficient to characterize, during the appropriate critical condition(s), the existing uses and the spatial and temporal variability of existing quality of the segment for the parameters that would be affected by the proposed activity."

Some states have also provided detailed guidance on characterizing baseline water quality. California's implementation document describes baseline water quality as the best quality that has occurred since 1968

(date of the policy adoption) unless, permitted degradation has occurred (i.e., been subject to antidegradation review). If permitted degradation has occurred, existing water quality is the quality attained at the time of the permitted action. West Virginia codified its approach for determining baseline water quality at 60 CSR 05, placing the burden of gathering information on existing water quality squarely on the applicant if data are not available, while allowing *the public or any other source* to submit assessment information “as long as the data are recent and reliable.”

Where baseline water quality has not been established for the water segment the regulated entity proposes to impact or has not been established for a parameter of concern that is reasonably expected to be discharged into the water segment as a result of the proposed regulated activity, the Secretary must determine the baseline water quality for the receiving water body. The Secretary may consider data for establishing the baseline water quality from a federal or state agency, the regulated entity, the public, or any other source, as long as the data are recent and reliable. If adequate data are not available, the agency may, in conjunction with the regulated entity or on its own initiative, establish a plan for obtaining the necessary data. The regulated entity may be required to provide baseline water quality for those parameters of concern that are reasonably expected to be discharged as a result of the regulated activity into the affected water segment to help the permitting agency determine the baseline water quality, the existing uses, and the applicable tier. The regulated entity may contact the Secretary prior to initiating a baseline water quality evaluation to seek concurrence with its determination of the parameters of concern for its proposed activity and its proposed sampling protocol.

Missouri also takes this approach in establishing what it calls *existing water quality* or EWQ. The first EWQ establishes the benchmark. All subsequent dischargers must use the same EWQ data to determine the 10 percent threshold for an antidegradation review. The Colorado Water Quality Control Division (WQCD) took a slightly different approach, deciding to set baseline water quality for all waters in the state as that water quality which existed on a certain date. In 2001 the Colorado WQCD selected September 30, 2000, as the baseline date for water quality for all regulatory purposes by stating that “the baseline low-flow pollutant concentration shall represent the water quality as of September 30, 2000. The baseline low-flow pollutant concentration is a characterization of water quality conditions that existed at the time of this regulation change.” Colorado characterizes ambient conditions by the 85th percentile of representative data. Because concentrations generally have an inverse relationship to flow (lower flows have higher concentrations), the 85th percentile is more representative of lower flow conditions and serves as the representation of baseline low-flow pollutant concentration. If sufficient representative low flow data are available, the 50th percentile of this low flow data may be used to characterize baseline conditions. Colorado regulations specify that existing water quality “shall be the 85th percentile of the data for un-ionized ammonia, nitrate, and dissolved metals, the 50th percentile for total recoverable metals, the 15th percentile for dissolved oxygen, the geometric mean for fecal coliform and *E. coli*, and the range between the 15th and 85th percentiles for pH.”

Nevada uses a somewhat similar approach for establishing baseline water quality but has not established a specific date on which existing water quality is based. Under the Nevada approach, a requirement to maintain existing higher quality or RMHQ is established when the monitoring data show that existing water quality for individual parameters is significantly better than the standard necessary to protect the beneficial uses. If adequate monitoring data exist, RMHQs are established at levels that reflect existing conditions. RMHQs are generally established at the 95th percentile of data, which is defined as the 95th ranked value of a sample population distributed into one hundred equal parts. RMHQs are only proposed or revised if there is more than 5 years of data for single value RMHQs, or more than 10 years of data for annual average RMHQs, with a minimum of two samples per year. In cases where two or more monitoring sites exist for one reach, only the data from the most downstream site is considered. Tightening of RMHQs might be appropriate if there have been significant changes on the system, such as the removal of a major point source discharge, construction of a dam, and such. In general, if the percent

improvement between the 95th percentile and the existing RMHQ is more than 25 percent, the RMHQ is revised.

South Carolina and other states define existing water quality as the water quality before the new or expanded discharge or project permit application. Under this approach, there is no set time or threshold on which existing or baseline water quality is based. This approach and others that do not establish firm baseline conditions can result in slowly deteriorating water quality, because incremental de minimis discharges slowly cause a lowering of water quality without an antidegradation review.

EPA's Great Lakes antidegradation guidance also discusses conducting reviews of potential degradation in terms that assume existing water quality data are known or will be collected. The guidance specifies that the level of protection afforded a waterbody under antidegradation will be determined on a parameter-by-parameter basis, considering each individual pollutant separately from the others present in a waterbody. EPA guidance notes that "under this approach, a discharger contemplating an action that would result in an increased loading would identify the constituents of its effluent that would increase as a result of the action. Then, *the ambient level of the pollutants of interest would be determined* and compared to the applicable criteria. Where ambient concentrations of the pollutants in question are less than criteria concentrations, the waterbody would be considered high quality for those pollutants and increases in those pollutants would be subject to the requirements applicable to high quality waters." (Emphasis added.) No detailed guidance on what constitutes "pollutants of interest" in a discharge. In general, however, states have regarded those parameters for which use-based water criteria exist as "parameters of concern" or "pollutants of concern" or "pollutants of interest" as those which should be analyzed during antidegradation reviews, if they are expected to be present in the discharge. The EPA *Water Quality Standards Handbook* notes the importance of reviewing potential degradation on a parameter-by-parameter basis, and includes several examples that illustrate antidegradation review issues as they relate to increased loadings of specific pollutants (e.g., sediment, phosphorus).

It should be noted that characterizing or otherwise describing baseline water quality for the purpose of antidegradation reviews is usually confined to an analysis of the pollutants of concern in the proposed discharge and not a comprehensive assessment of the full range of chemical, physical, and biological qualities of the receiving water. This approach somewhat limits a robust analysis of habitat degradation that might be associated with increased flows from stormwater runoff, a concept that has been incorporated into Minnesota's general NPDES permit for small MS4s.

Ohio Court Requires Protection of Existing Water Quality

In a 1992 decision in *Columbus & Franklin County Metropolitan Park District et al., Appellees v. Shank, Director of Environmental Protection, et al., Appellants* (Ohio, No. 91-1721), the Ohio Supreme Court ruled that state NPDES agencies must protect high quality (i.e., Tier 2) waters at their current levels unless antidegradation analytical and procedural requirements were fully met. The decision was related to the issuance of wastewater treatment plant permits to discharge into Blacklick Creek. Ohio EPA issued the permits based on their view that the discharges would not violate water quality standards. However, the Supreme Court found that the discharges would lower water quality, and noted that the Ohio EPA director “may not issue a permit authorizing an activity that would degrade waters which exceed water quality standards unless (1) he has complied with the public notice and intergovernmental coordination requirements of Parts 25 and 29, Title 40, C.F.R., (2) he has conducted a public hearing to consider the technical, economic and social criteria provided in Sections 1311 and 1312, Title 33, U.S. Code, and (3) as a result of the public hearing, he has chosen to allow lower water quality in the receiving stream. Where this determination has been made, the degradation of water quality must be kept to an absolute minimum by the employment of the most stringent statutory and regulatory controls for waste treatment and under no circumstances may such degradation interfere with or become injurious to any existing or planned uses of the receiving waters.”

Responding to information from the agency and permittees that the wastewater plants would employ the highest levels of treatment and preserve existing uses of the receiving waters, the court further noted that “[e]ven where the prescribed technology is applied, a point source may not discharge effluent which would violate the applicable water quality standards. In the present case, the applicable water quality standard is the *current ambient condition* of Blacklick Creek inasmuch as the antidegradation policy establishes that quality as the benchmark.” (Emphasis added.) In addition, the court emphasized the importance of the antidegradation review procedure and processes: “Limited degradation of high quality waters is permissible but only after compliance with the public hearing requirement of the rule and an administrative decision based thereon that technical, economic and social factors justify the degradation. Any economic and social analysis must consider alternative methods to accommodate the objectives of the proposed facility, the public and private investments in such alternatives and the governmental policy to promote them. If, after this analysis, the Director nevertheless concludes that technical, economic and social factors favor the proposed facility, the facility must incorporate the most stringent statutory and regulatory effluent controls, i.e., BADCT. Finally, this analysis must precede any consideration of an application for a permit to install a treatment facility.”

DETERMINING THE SIGNIFICANCE OF DEGRADATION

Dictionary definitions for degradation include (1) the act or process of degrading; (2) the state of being degraded, degeneration; and (3) a decline to a lower condition, quality, or level. However, the term *degradation* is not defined explicitly in federal or many state regulations. Federal antidegradation regulations at 40 CFR 131.12 refer to *lower water quality*, implying a departure from existing or current water quality; and describe the *tiered* water quality protection approach, which is based on protecting and maintaining existing uses (“existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected”). Existing uses are defined as “those uses actually attained in the waterbody on or after November 28, 1975, whether or not they are included in the water quality standards.”

A lowering of water quality from existing conditions to a point falling below applicable water quality standards for any existing use is not allowed (Tier 1); activities that lower water quality in better-than-baseline waterbodies can be allowed under certain conditions (Tier 2); and activities that lower water quality in Tier 3 waters are banned unless the impacts are limited, short-term, and temporary under federal rules.

The term *existing water quality*, however, is not well defined in the regulations. Some states are designating existing water quality as the quality of water measured at a particular time in the recent past. Typically, existing water quality in these cases is linked to the time of the development or renewal of the general permit. Minnesota was unique in backdating *existing water quality* to 1988 for the purpose of stormwater antidegradation review. Other states provide a method for updating existing water quality for a particular waterbody at any time, if certain quality assurance/control procedures are followed.



While explicit federal definitions for degradation are absent, there are several references that provide important guidance on the determination of water quality degradation. EPA Region 9 has developed the following list of factors that may be considered when judging water quality impacts of proposed activities. These factors do not expressly define when a finding of degradation is warranted; however, they do provide a fairly comprehensive overview of categories of impacts to consider:

- Percent change in ambient concentrations predicted at the appropriate critical condition(s)
- Percent change in loadings (i.e., the new or expanded loadings compared to total existing loadings to the segment)
- Percent reduction in available assimilative capacity
- Nature, persistence, and potential effects of the parameter
- Potential for cumulative effects

Significant degradation is generally defined by states as degradation which requires a formal antidegradation review and justification under Tier 2. Some states define any degradation of water quality as significant. For example, the Oregon DEQ defines degradation as lowering of water quality. Any activity that proposes to discharge a new or increased load beyond that presently allowed in the permit or any other activity that will lower water quality is subject to a Tier 2 review. The Oregon rules define lowering of water quality as “resulting in any measurable change in water quality away from conditions unimpacted by anthropogenic sources....”

States can subject *all* activities that result in *any* degradation of receiving waters to antidegradation reviews if they choose. However, doing so has been determined to be impractical. To focus scarce public agency resources on activities with the greatest potential for harm, EPA has endorsed and states have adopted the use of significance thresholds that are based on relative *impacts* proposed discharges will have on the receiving waterbody (i.e., not based on the *size* of the new or expanded discharge). EPA’s Region 5 antidegradation guidance, the Great Lakes antidegradation guidance, the Region 8 antidegradation guidance, the Region 4 antidegradation guidance, and the memorandum from EPA OST Director King cited above all support exemptions from antidegradation reviews for new or expanded discharges that will consume less than 10 percent of the available assimilative capacity of the receiving water for specific non-bioaccumulative pollutants of concern in the discharge. This so-called *de minimis* exemption appears in West Virginia’s antidegradation rule and was upheld by a federal court in *Ohio Valley Environmental Coalition v. Horinko*, 2003. EPA Region 6 also supported Missouri’s 10 percent *de minimis* threshold for antidegradation reviews in comments on the *Missouri Water Quality Antidegradation Policy and Implementation Procedure* (2006).

EPA’s intent in including the *de minimis* test in its various guidance documents recognizes that certain activities, although they may result in some lowering of water quality, will not lower water quality to such an extent as to result in a *significant* lowering of water quality. The goal of allowing states to identify certain increases as *de minimis* is to provide a means of reducing the administrative burden on all parties associated with activities of little or no consequence to the environment. The provisions for identifying certain small increases in loading as *de minimis* and not subject to the requirements for antidegradation review is based in general on three principles, which are articulated in the Great Lakes antidegradation guidance (1) only non-bioaccumulative contaminants of concern will be released as a result of the proposed activity responsible for the anticipated lowering of water quality; (2) the proposed lowering of water quality uses less than 10 percent of the available assimilative capacity; and (3) for pollutants included in 40 CFR 132.2, Table 5, at least 10 percent of the total assimilative capacity remains unused following the lowering of water quality.

U.S. Supreme Court Allows Increased Load if No Degradation is Detectable

A notable ruling by the U.S. Supreme Court (*Arkansas v. Oklahoma*, Nos. 90-1262, 90-1266, February 26, 1992) supported increased pollutant loadings to a waterbody that was already impaired as long as there was no further detectable degradation of the receiving water. In this case, the owners of a new wastewater treatment plant in the state of Arkansas applied for a permit to discharge up to 6.1 million gallons of effluent per day into an unnamed stream that ultimately flowed into the Illinois River in Oklahoma. Oklahoma asserted the discharge into a tributary of the Illinois River would violate its water quality standards, which provide that no degradation of water quality will be allowed in the upper Illinois River. An administrative law judge found that there would be no detectable violation of Oklahoma's water quality standards from the proposed plant and approved the permit. On appeal, the 10th Circuit Court of Appeals reversed the issuance of the permit, holding that the CWA prohibits granting an NPDES permit where applicable water quality standards have already been violated. The Supreme Court reversed the ruling, concluding that the 10th Circuit construed the CWA to prohibit any discharge of effluent that would reach waters already in violation of existing water quality standards, and that nothing in the act supported such a conclusion. The Supreme Court noted that the CWA vests in the EPA and the states broad authority to develop long-range, area-wide programs to alleviate and eliminate existing pollution.

EPA Region 4 also noted that some new or expanded activities might not pose significant risks to water quality and can proceed without an antidegradation review if certain conditions are met. In its proposed rulemaking for Kentucky in 2002, EPA Region 4 noted that

EPA's water quality standards regulation does not specify a threshold below which an antidegradation review would not be needed. However, EPA has long interpreted the antidegradation policy to allow a determination that certain proposed new discharges or increases in existing discharges may have an insignificant or de minimis impact on water quality and, therefore, may not require an antidegradation review... EPA has reflected this principle in the development of its own rulemakings.

In its *Antidegradation Guidance Tier 2 Procedure*, EPA Region 4 goes on to defend the practice of forgoing antidegradation reviews for relatively minor, or *insignificant*, activities, saying the approach

does not undercut the requirement that limitations protect existing uses, i.e., protect all applicable water quality standards. Rather, it limits the requirement to conduct an antidegradation review to situations when a source sought to increase existing permit limitations on the rate of mass loading, except as the increase is de minimis or there would be no change in ambient water quality, and thereby will limit the number of actions subject to a full antidegradation review. EPA believes this is an appropriate balance between the need to protect water quality for these substances and the burden, to both the regulated community and the regulatory agencies, of conducting an antidegradation review.

The de minimis concept used by EPA Region 8 in its 1993 *Antidegradation Implementation* manual suggests a level of 5 percent as a de minimis guideline, rather than criteria, subject to other qualifications. The memo by EPA Director Ephraim S. King cited above endorses the concept of de minimis exemptions from antidegradation reviews, but with this caveat:

Applying antidegradation review requirements only to those activities that may result in significant degradation of water quality is a useful approach....However, it is important states and tribes set their significance thresholds at a level that can be demonstrated to be consistent with the purpose of tier 2 antidegradation requirements.

The memo states that the most appropriate way to define significance is in terms of assimilative capacity, coupled with a cumulative cap. Such an approach strikes a *reasonable balance* between administrative and water quality interests and incorporates the concept that antidegradation should focus on the receiving waterbody, rather than just the proposed discharge

Evaluations of significance based solely on the magnitude of the proposed increase without reference to the amount of change in the ambient condition of the waterbody, need to be very carefully evaluated to determine how they translate to reduction in assimilative capacity in order to understand whether a significant decrease in assimilative capacity will occur.

Minnesota Court Allows Agency Discretion in Pollutant Loading Decisions

In *Cities of Annandale & Maple Lake NPDES/SDS Permit*, (A04-2033; 702 N.W.2d 768; Minn. App. 2005), the Minnesota Supreme Court ruled in May 2007 that the MPCA's interpretation of 40 CFR 122.4(i) as allowing offsets from another source in determining whether a new source will cause or contribute to the violation of water quality standards was reasonable, and that deference should be given to the MPCA's interpretation of its rules, and the agency's decision to provide permit coverage to the new wastewater treatment plant should be upheld.

The case stemmed from a requirement that under 40 CFR 122.4(i) (2004), an NPDES permit may not be issued for a new source when its discharge will cause or contribute to the impairment of waters with impaired status under the Clean Water Act. the MPCA had issued an NPDES permit for a wastewater treatment plant jointly proposed by the City of Annandale and the City of Maple Lake (the Cities). the MPCA found that the proposed plant—when operating at capacity—would increase phosphorus discharge to the North Fork of the Crow River by approximately 2,200 pounds per year over that which is discharged by the Cities' existing facilities, but the MPCA concluded that, under 40 CFR 122.4(i) (2006), this increase would not contribute to the violation of water quality standards in the Lake Pepin watershed. the MPCA reached this conclusion and issued a permit on the basis that the increased discharge would be offset by an approximate 53,500-pound annual reduction in phosphorus discharge due to an upgrade of a wastewater treatment plant in nearby Litchfield. An appeals court reversed the agency decision to permit the new facility, but the Supreme Court overruled based on the MPCA's finding that the increase in phosphorus discharge would be offset, resulting in an overall decrease in phosphorus loadings.

The memo goes on to strongly recommend that new or revised antidegradation submissions from states or tribes define significance in terms of assimilative capacity, and recommends that for large waterbodies where assimilative capacity may be vast, significance should be defined using a combination of assimilative capacity and increase in pollutant loading. King also states that a cumulative cap should be established to limit the total assimilative capacity that can be used to prevent that capacity from being used up by repeated discharges and that are small enough to not require an antidegradation review. The memo suggests that the state or tribe establish a point at which all new or expanded discharges would be required to go through an antidegradation review based on a certain percentage of the capacity being used.

Comment: should or must? (it needed a verb here)

Many states have adopted similar de minimis thresholds that are based on assimilative capacity use. Ohio, New Mexico, Washington, Missouri, and West Virginia have set the threshold at 10 percent of the available assimilative capacity (i.e., use of less than 10 percent of the remaining assimilative capacity is considered to be non-significant or de minimis, and hence not requiring an antidegradation review under Tier 2), while Wisconsin set the threshold at 33 percent.

Some states have noted the distinction between nonsignificant and significant degrading activities using other benchmarks. In the *Proposed Water Quality Guidance for the Great Lakes System* EPA defined the term *significant lowering of water quality* and discussed the concept generally. EPA considered certain chemicals to be bioaccumulative chemicals of concern (BCCs) and distinguished those chemicals from other parameters affecting water quality. For BCCs, EPA also considered any increase in mass loading of such a pollutant to result in a significant lowering of water quality. But for other pollutants, EPA included other factors such as assimilative capacity (in addition to loading) in determining whether a proposed discharge would result in a significant lowering of water quality. The proposed Great Lakes rule also noted that the decision maker can make a case-by-case determination regarding the significant lowering of water quality because of other relevant considerations.

States use other criteria, such as ratio of stream flow to discharge flow (dilution ratio), and duration of discharge, to serve as additional nondegradation test criteria. Some states evaluate these criteria quantitatively (i.e., establishing that a dilution ratio of greater than 100:1 is sufficient to assimilate an effluent without impact), while others apply such factors in a more subjective manner, on a case by case basis, eventually arriving at a *finding* of degradation or nondegradation. EPA Region 8 *Antidegradation Implementation* manual supports this finding type process, but recommends that guidelines be established, and that all relevant information (e.g. dilution ratio, duration, degree of change in instream quality, nature of pollutants—conservative vs. non-conservative vs. persistent, percentage of assimilative capacity taken, degree of confidence in evaluation procedures) be considered. This type of evaluation is applied at the Tier 2 (i.e., high-quality waters) level as a tool to screen out minor discharges which would pass antidegradation reviews.

Nevada established a baseline against which to define degradation under its “requirement to maintain higher quality” water program. A requirement to maintain existing higher water quality (RMHQ) is established when the monitoring data show that existing water quality for individual parameters is significantly better than the standard necessary to protect the beneficial uses. If adequate monitoring data exist, RMHQs are established at levels which reflect existing conditions. RMHQs are generally established at the 95th percentile of data, which is defined as the 95th ranked value of a sample population distributed into one hundred equal parts. At this time, RMHQs are only proposed or revised if there is greater than five years of data for single value RMHQs, or greater than 10 years of data for annual average RMHQs, with a minimum of two samples per year. In cases where two or more monitoring sites exist for one reach, only the data from the most downstream site is considered. Departures from RMHQs are considered to be degradation, and trigger the social and economic justification and alternatives analysis process in Tier 2 situations. According to the state, additional research is planned to better determine minimum sampling requirements for statistically valid RMHQ development. It is likely that more than two samples per year are needed to estimate the 95th percentile for most pollutants. To date, RMHQs have been set for routine parameters such as temperature, pH, phosphorus, nitrogen, chlorides, sulfates, total suspended solids, total dissolved solids, fecal coliform, and so on. No RMHQs have yet to be set for toxics such as arsenic, boron, cadmium, copper, lead, and the like.

Pennsylvania uses an evaluation procedure that is based on a more comprehensive approach to determine if a new or expanded discharge to Tier 2 or Tier 3 waters will cause degradation or demonstrates a high potential to cause degradation. The Pennsylvania DEP applies a two-part test that evaluates all facets of the discharge’s potential effect on the receiving stream to make this determination. The first part of this test evaluates each pollutant of concern in the discharge using statistical and water quality modeling procedures for appropriate parameters. The second part of the test evaluates other considerations, such as the nature of the pollutants, treatment reliability, discharge duration, and physical/location concerns. Together, these two evaluations provide a comprehensive basis for a determination on whether or not the proposed discharge will maintain the quality of the receiving water.

For the purposes of conducting antidegradation reviews of stormwater discharges, the states generally define antidegradation as *no significant increase in loading* and appear to use a more qualitative evaluation or best professional judgment in conducting the antidegradation review for the general permit. According to the surveys, no states have conducted a quantitative analysis to determine whether stormwater discharges (MS4 discharges or otherwise) should be exempted from antidegradation review. Similarly, for those state who do not exempt stormwater from review, no states have conducted quantitative analyses to determine if MS4 stormwater discharges might result in significant degradation for which a Tier 2 review should be conducted. the MPCA is unique in requiring selected Phase II MS4s to conduct such a quantitative loading analysis.

As shown above, there are many different approaches to defining degradation and establishing thresholds for triggering a Tier 2 antidegradation review. Two factors which are key in predicting the effectiveness in these approaches are whether (1) the state expressly requires consideration of cumulative discharges into the stream segment when accounting for remaining assimilative capacity (e.g., the states of Missouri, Washington, West Virginia) and (2) the state expressly establishes a baseline water quality which becomes the yardstick for all antidegradation reviews in a given stream segment (see discussion of baseline water quality below).

CONDUCTING THE ANTIDEGRADATION ANALYSIS FOR TIER 2 WATERS

EPA outlines the conceptual approach for conducting an antidegradation review and approving a lowering of water quality in Tier 2 waters in its 1994 *Water Quality Standards Handbook*:

In “high-quality waters,” under 131.12(a)(2), before any lowering of water quality occurs, there must be an antidegradation review consisting of: a finding that it is necessary to accommodate important economical or social development in the area in which the waters are located (this phrase is intended to convey a general concept regarding what level of social and economic development could be used to justify a change in high-quality waters); full satisfaction of all intergovernmental coordination and public participation provisions (the intent here is to ensure that no activity that will cause water quality to decline in existing high-quality waters is undertaken without adequate public review and intergovernmental coordination); and assurance that the highest statutory and regulatory requirements for point sources, including new source performance standards, and best management practices for nonpoint source pollutant controls are achieved (this requirement ensures that the limited provision for lowering water quality of high quality waters down to “fishable/swimmable” levels will not be used to undercut the Clean Water Act requirements for point source and nonpoint source pollution control; furthermore, by ensuring compliance with such statutory and regulatory controls, there is less chance that a lowering of water quality will be sought to accommodate new economic and social development).

Two key issues have emerged regarding Tier 2 antidegradation policy and implementation methods: which waters are subject to Tier 2 protection, and what is implied by the requirement that degradation of high-quality waters can only be allowed after a demonstration that “allowing lower water quality *is necessary* to accommodate important economic or social development...” (emphasis added). EPA has indicated in guidance and in rulemaking action regarding Kentucky’s water quality standards that most waters in a state clearly fall under the Tier 2 category. After disapproving Kentucky’s antidegradation provisions for high-quality waters in 1997 because the “the criteria for designating such waters were not sufficiently inclusive,” EPA proposed its own set of water quality standards for high-quality waters. A review of the rationale for this decision is instructive:

The Commonwealth’s provisions only apply to a limited subset of high quality waters rather than to all waters whose quality is better than the levels necessary to support propagation of fish, shellfish and wildlife and recreation in and on the water. Kentucky’s approach limits the use of the special protections for high quality waters to the Commonwealth’s exceptional waters category which comprise just 1.35 percent of all its waters. However, Kentucky’s 1998 305(b) Report shows that approximately 67 percent of the Commonwealth’s unassessed waters are candidates for the high quality water protections. This pattern is confirmed by recent intensive watershed sampling in the Kentucky, Salt and Licking River basins, as well as data from random statewide aquatic life biological sample in wadeable streams conducted by the Kentucky Division of Water over the last two years. This recent sampling shows that approximately 60 percent of the sites fully support their designated uses. The above information and analysis show that the eligibility criteria adopted by the Commonwealth for the exceptional waters category results in only a relatively small percentage of surface waters receiving the protection of the high quality water provisions at 401 KAR 5:029 section 1.(2). Therefore, EPA determined that Kentucky’s exceptional waters category does not include other waters whose quality exceed levels necessary to support propagation of fish, shellfish



and wildlife and recreation in and on the water, as required in 40 CFR 131.12(a)(2). In addition, Kentucky's implementation procedures for the use protected category (401 KAR 5:030 section 1.4)) do not require that the Commonwealth evaluate the necessity of lowering water quality, even though this category does include high quality waters.

Other EPA guidance on how to judge the *necessity of lowering water quality* has been issued, some of which alludes directly or indirectly to the need for some type of alternatives analysis to determine whether or not there are options that might not result in lowered water quality. The *Water Quality Standards Handbook* (1994) notes that "EPA's regulation also requires maintenance of high-quality waters except where the [s]tate finds that degradation is "necessary to accommodate important economic and social development in the area in which the waters are located." (Emphasis added in handbook.) The chapter goes on to note that EPA "believe(s) this phrase should be interpreted to prohibit point source 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."

Appendix G of the handbook, *Questions and Answers on Antidegradation* (August, 1985), states that allowances for lowering the quality of high-quality waters is "intended to provide relief only in a few extraordinary circumstances where the economic and social need for the activity clearly outweighs the benefit of maintaining water quality above that required for the "fishable/swimmable" water, and the two cannot both be achieved. The burden of demonstration on the individual proposing such activity will be very high."

However, the federal antidegradation rule does not mandate implementation of *any* feasible alternative, regardless of cost. The *Water Quality Guidance for the Great Lakes System: Supplementary Information Document* (USEPA 1995) indicates that generally, if a wastewater treatment plant expansion is needed, up to a 10 percent construction cost increase should be considered an appropriate cutoff to determine if degradation is *necessary*. Little guidance is available on what might constitute "important... social development" in terms of approving a lowering of water quality.



Georgia Court Mandates Higher Treatment Levels to Protect Water Quality

Late in 2004, the Georgia Supreme Court overturned the issuance of an NPDES permit to a Gwinnett County wastewater treatment plant based on the state Environmental Protection Division's (EPD) failure to use the antidegradation review to require higher levels of treatment (*Hughey et al v. Gwinnett County et al*, Case S04G0873, November 23, 2004). The original permit authorized the F. Wayne Hill Water Resources Center in Gwinnett County to discharge up to 40 million gallons per day of treated wastewater into Lake Lanier. A consortium of environmental groups challenged EPD's issuance of the permit in several venues, eventually reaching the state Supreme Court. One aspect of the case involved the question of who had the burden of proof in demonstrating that a permit complied with antidegradation rules, the permittee, the state permit-issuing authority, or challengers to the permit. The court held that the permit applicant bore the burden of proof with EPD during the permit application process, but, after the permit's issuance, the challengers were required to demonstrate that EPD's conclusion was incorrect.

In ruling on whether the state permitting agency (EPD) conducted a proper antidegradation review, the court held that the permitted discharge would degrade water quality in Lake Lanier but that EPD had demonstrated that the degradation was justified to provide several economic and social benefits. The court held that the permit was supported by the need for additional wastewater capacity due to the projected population growth, that sufficient land was not available for the land application of the wastewater, and that the cycling of treated wastewater from the Chattahoochee River system would aid negotiations concerning an interstate compact regarding the waters. Finally, the Supreme Court ruled that the antidegradation regulations prohibited Gwinnett County from discharging water that is more polluted than it reasonably needs to be by virtue of the plant's existing technology. The court held that Gwinnett County presented no evidence that it would be impracticable or infeasible for it to use the full technology available at its plant to treat the water before discharging it to Lake Lanier. The court held that the antidegradation regulation did not contain any exceptions that allowed the *convenience of the parties or fear of regulatory violations* as justifications for greater water degradation. The court held that the permit must require Gwinnett County to meet the highest and best level of treatment practicable. Because the permit did not contain such standards, the court held that the permit violated the state antidegradation regulations.

The Region 8 *Antidegradation Implementation* guidance contains a very detailed approach that is consistent with the above principles, for the most part, but provides a significant level of information regarding the process for reviewing antidegradation submittals and calculating both the water quality impacts and economic and social benefits. The *data requirements* section on Tier 2 reviews provides some insight into how the Region views the process and the distribution of work involved:

EPA Region VIII believes that implementation of antidegradation tier 2 requirements need not pose an undue burden on the state and tribal agencies charged with administering surface water quality programs. The model antidegradation procedure included in this guidance has been developed to allow states and tribes to focus resources on significant problems and issues and, where necessary, place the information-gathering burden on the project applicant. With respect to antidegradation tier 2, the Region believes and advocates that, rather than getting unduly "bogged down" with assessing and projecting water quality conditions, state/tribal programs should focus on evaluation of non-degrading and less-degrading alternatives in order to minimize the pollutant loadings that will result from the proposed activity. By focusing on the projected pollutant loadings and costs associated with each available alternative, such alternatives analyses can occur independent of the analysis of receiving water quality conditions. The Region believes that evaluation of alternatives is the proper focus on tier 2 reviews, and has developed the model procedure to achieve this focus. To this end, the model procedure:

- 1) includes an initial presumption that all surface waters are high quality and subject to tier 2 review requirements;
- 2) allows for basing high quality determinations on ancillary data such as land use information, presence of sources, biological health, etc.
- 3) establishes a low threshold or definition of "significant degradation;"

- 4) allows for determinations of significance based on simple analyses and factors which do not require modeling (such as percent change in source loadings);
- 5) provides for by-passing the significance test entirely where reasonable alternatives to lowering existing water quality are clearly available; and
- 6) allows for the data-gathering burden to be placed on the project applicant with respect to any data that may be needed to make the high quality and significance findings.

CUMULATIVE WATER QUALITY IMPACTS

Degradation in water quality over time might be insignificant when considered incrementally, but more serious when cumulative impacts are reviewed. EPA Region 9's *Guidance on Implementing the Antidegradation Provisions of 40 CFR 131.12* (1987) notes that "repeated or multiple small changes in water quality (such as those resulting from actions which do not require detailed analyses) can result in significant water quality degradation." Conversely, improvements in water quality can result in upgrades for a waterbody's existing use and the corresponding minimum water quality criteria requirements that must be met. For example, EPA *Water Quality Standards Handbook: Second Edition* notes that if an analysis "indicates that the higher water quality does result in a better use, even if not up to the section 101(a)(2) goals, then the water quality standards must be upgraded to reflect the uses presently being attained."

The antidegradation policy thus establishes existing water quality as a benchmark that can improve at any time but can only decline under certain rare conditions (e.g., if the social and economic justifications for Tier 2 waters are met; if the degradation is deemed *not significant*, and so on). Even if existing water quality is permitted to decline, there appears to be strong support for retaining the *best* measurements of existing water quality as a permanent benchmark against which to assess long-term trends in water quality. EPA Region 9 antidegradation guidance clearly supports this concept:

To prevent such cumulative adverse impacts, a baseline of water quality must be established for each potentially affected water body, prior to allowing any action which would lower the quality of that water. This baseline should remain fixed unless some action improves water quality. At such time, the baseline should be adjusted accordingly.

Upgrades in both existing water quality and existing uses can result from analyses conducted by the state agency, the applicant, or even a volunteer monitoring group, in some cases. EPA Region 8 *Antidegradation Guidance* (1993) discusses a hypothetical case study in which a citizens group "has submitted information indicating that (a) segment supports a community of certain nongame fish species and a variety of pollution-sensitive macroinvertebrate species" in a segment with no aquatic life use designation. The guidance states that the water agency "would examine the information submitted by the citizens group, any other available information such as data that the applicant has been required to submit, and make a determination regarding the existing aquatic life use." If the aquatic life use is confirmed, the Agency

is required under antidegradation requirements to ensure that the (proposed) point source control requirements will fully protect the identified aquatic life use, regardless of whether that use has been designated. A change in the state water quality standards, to upgrade the designated use, is not required to protect the existing use,. However, at the earliest opportunity the state would initiate a rulemaking to appropriately revise the designated use for the segment.

OVERALLOCATION OF ASSIMILATIVE CAPACITY TO NPDES DISCHARGERS

One problem that is now being recognized in the antidegradation review process is that many states have written treatment plant discharge permits with far higher effluent limits than needed by the facility under

current operating conditions. For example, a municipal or industrial treatment plant might have a permit limit of 1,000 pounds of pollutant *x* per month, or a concentration of 5 mg/L, when it actually averages 500 pounds discharged per month at 2 mg/L. The overallocation of available assimilative capacity through routine permitting on the basis of past practice (i.e., calculating loads on the basis of the total assimilative capacity of the receiving water, or on the ability of past technologies to remove pollutants from the effluent) can cause significant problems for antidegradation. If a significant number of facilities have *extra* capacity to discharge pollutants via their current permit limits, and they begin to exercise their legal rights to do so, a receiving waterbody could degrade quickly without any antidegradation review or opportunity for public comment.

To deal with this challenge, some states now require an antidegradation review during the renewal of an NPDES discharge permit even when there is no expansion of the discharge, particularly when actual effluent quality has been consistently better than past permit limits. Some guidance (e.g., EPA Region 9, 1987) suggests antidegradation reviews for permit renewals, but if the activity is not expanding or adding additional pollutants existing water quality incorporates the effects of past discharges, and should not change if the discharge continues at past rates of effluent flow and quality (i.e., except for bioaccumulative pollutants, metals). EPA Regions 8 and 9 have issued guidance that states that reissuing a permit with previous limits when effluent quality has been significantly better might result in degradation and should be subjected to more stringent review (1993).

The Colorado WQCD addressed this issue in its 2001 *Antidegradation Significance Determination for New or Increased Water Quality Impacts Procedural Guidance*, noting that “[a]n antidegradation review and associated significance determination, is necessary only for regulated activities that will have a new or increased water quality impact. This includes new activities or facilities; expansion of existing activities or facilities resulting in an increased load over the current authorized load; or at the time of renewal, any increase in the authorized discharge levels (effluent limits) in a permit over the current authorized discharge levels.” This guidance also lays out a case for antidegradation reviews associated with permits that were developed before the antidegradation policy was in effect

Many, if not most, existing domestic and industrial permits were initially written before the first set of antidegradation requirements were established by the Commission in 1988. Significant public and private infrastructure investments and land-use commitments were made in accordance with the implicit waste load allocations authorized by those original permits. The permits included water quality-based effluent limits established using a mass balance equation designed to result in attainment of water quality standards. In some cases, and through such permitting practices, the entire assimilative capacity (for certain pollutants) of some high quality waterbodies was allocated long ago.

There are many cases where the discharge levels have not reached the allocated level and baseline water quality does not reflect the authorized pollutant levels. Because the critical effluent flow condition employed in the mass balance equation is the maximum hydraulic capacity of the wastewater treatment plant; some permitted discharges may have not yet fully utilized their permitted waste load allocation. Therefore, the baseline water quality for the pollutants of concern

may, at present, be better than the level necessary to achieve water quality standards. Nonetheless, if the permitted discharges were to fully utilize the waste load allocations that are implicit in their permit effluent and flow limitations, presumably, the water quality standards for the pollutants of concern in the permits would just be met in the receiving waterbody at critical flow conditions. The historic waste load allocations authorized in permit limits conflict with the antidegradation concept of maintaining and protecting the baseline water quality condition.

It is the intent of this policy to reconcile past permitting decisions (that were based upon sound implementation of then-applicable regulatory requirements) with current antidegradation

requirements. Of course, if errors in implementation of permitting requirements are discovered during the permit renewal process, they will be rectified as appropriate.

At the time of permit renewal for a discharge to reviewable waters, all of the relevant factors that are important in determining the appropriate effluent limitations will be evaluated. These factors include receiving waterbody quality, waterbody low-flow information, effluent quality and quantity, applicable water quality standards, relevant facility changes, situation of neighboring facilities, etc.

If the baseline water quality of the receiving waterbody is determined to be better than the water quality standards, but the assimilative capacity of the receiving waterbody for one or more pollutants had been previously allocated, the renewal permit(s) will be written in a manner consistent with past practices, provided that there is no increased load or concentration. In short, the purpose of the antidegradation review for those pollutants of concern will be to assure the

applicable standards and classified beneficial uses are protected. For all other pollutants that have not been fully allocated through past permitting practices, the antidegradation analysis and review will be performed as detailed in this guidance document.

ALTERNATIVES ANALYSES AS A REQUIREMENT FOR DETERMINING NECESSITY OF DEGRADATION

The Minnesota nondegradation policy for significant discharge lists three factors that must be considered in making a determination whether additional control measures can reasonable be taken to minimize the impact of the discharge:

1. The importance of economic and social development impacts of the project
2. The impact of the discharge on the quality of the receiving water
3. Cumulative impacts of all new or expanded discharges on the receiving water

This section addresses the implementation procedures for number 1 above, finding that the lowering of water quality is necessary to accommodate important development. EPA has endorsed alternatives analyses as an integral part of antidegradation reviews for many years. At the outset of this discussion, it is important to note that none of the states surveyed required alternatives analyses as a part of antidegradation review for stormwater permits. This is because of the fact that alternatives analysis is part of a Tier 2 review, and no states have conducted such a review for stormwater permits.

As its proposed rule for *Water Quality Standards for Kentucky*, issued on November 14, 2002, EPA notes that

EPA considers pollution prevention and enhanced treatment alternatives analyses as an appropriate starting point and of particular importance in an antidegradation review for both industrial and municipal dischargers. Given the variety of engineering approaches to pollution control, a number of options are available that could reduce or eliminate the anticipated lowering of water quality. Some of these include substituting less-toxic or less-bioaccumulative chemicals for the toxic or bioaccumulative chemical. Another approach could involve water conservation to reduce the overall volume of waste water and possibly reduce pollutant mass loadings. Other approaches could include more careful control of the materials in the process stream, the recycle or reuse of waste byproducts, and operational changes to reduce the quantities of waste. (The state) would need to make a determination that an alternative or combination of alternatives is cost-effective. If cost-effective pollution prevention alternatives are available, there would be no need for the lowering of water quality.

States have developed a two-step process to generate findings of necessity regarding activities that propose to lower water quality. One process addresses necessity through an alternatives analysis, while the



other addresses the importance of the social and economic development that the proposed activity supports. Although the Minnesota antidegradation policy does not explicitly require an alternatives analysis, such a requirement is implied in the finding of *necessity*. The following sections provide an overview of the differing approaches to alternatives analysis; give examples from several states; and discuss the topics that should be included in Minnesota's regulations and implementation guidance to allow the MPCA and the applicant to sufficiently address the finding of necessity to allow degradation of a Tier 2 surface water.

Most antidegradation implementation documents reviewed by Tetra Tech include a Tier 2 alternatives analysis. The differences in states' approaches to alternatives analysis include (1) what triggers the alternatives analysis; (2) when the analysis is conducted in relation to the social and economic analysis (SEA); (3) the finding or decision made after the alternatives analysis; and (4) the level of analysis required.

States require alternatives analysis based on a determination of degradation as defined by the individual state's definition of degradation; this definition—or trigger—varies. Some states use a case-by-case evaluation of increased loading, increased concentration, decreased assimilative capacity, and so on. Others use a de minimis test or rule of thumb such as a 5 percent or 10 percent decrease in the assimilative capacity as measured from baseline water quality. After a finding that the proposed activity would cause or would likely cause degradation to a Tier 2 surface water, an alternatives analysis is triggered. Some states require an alternatives analysis before the SEA; some incorporate the alternatives analysis into the SEA, and one state requires it after the SEA is completed.

Another key difference in states' approaches to alternatives analysis is the finding or decision regarding necessity. In some states, if the applicant identifies a cost-effective, reasonable alternative or alternatives, the least degrading of these alternatives must be used or the permit application is denied. In other words, the state determines at this point that the degradation of the Tier 2 water is not necessary and does not allow the applicant to conduct SEA to justify the project. Other states do allow SEA even if reasonable alternatives are identified. This approach considers the findings from the alternatives analysis along with the findings from the SEA before making a final determination of the necessity of the proposed degradation.

Finally, states differ in the level of detailed and rigorousness required for the alternatives analysis. Most states simply list the categories of alternatives that must be considered and criteria that will be used by the state in its evaluation of the submittal. Some states provide much more detail their expectations of what the alternatives analysis should include, such as what should be included in the cost of the alternatives and cost methods to use in the analysis. Another approach employed by one state is to be very general and to place an emphasis on not burdening the applicant with detailed analysis. Below are summaries of the approaches taken in selected states:

DELAWARE

Delaware requires an alternatives analysis after a determination that the activity will likely cause significant degradation. This determination is based on a review of nine significance factors. Significance can be demonstrated with respect to any one (or combination) of the factors. It is also based on a general guideline that the proposed activity would lower by more 5 percent available assimilative capacity or increase pollutant loadings to the segment by more than 5 percent.

The *Antidegradation Implementation Guidance* document lists nine types of alternatives that the applicant must consider: pollution prevention; reduction in the scale of the project; water recycling or reuse; process changes; innovative treatment technology; advanced treatment technology; seasonal or controlled

discharges to avoid critical water quality periods; improved operation and maintenance of existing treatment systems; and alternative discharge locations.

If the state makes a preliminary determination that one or more reasonable alternatives to allowing the degradation exist, the state works with the project applicant to revise the project design. As a nonbinding rule of thumb, nondegrading or less-degrading pollution control alternatives with costs that are less than 110 percent of the costs of the pollution control measures associated with the proposed activity are considered reasonable. If a mutually acceptable resolution cannot be reached on the alternatives, the state documents the alternatives analysis findings and a public notice a preliminary decision to deny the activity. If no reasonable alternatives exist, the antidegradation review continues with a determination of social and economic importance.

West Virginia is very similar to Delaware in its approach. However, it uses a different definition of degradation: significant degradation is use of 10 percent of the available assimilative capacity as measured from baseline water quality or 20 percent of the remaining assimilative capacity when considering cumulative impacts.

PENNSYLVANIA

Pennsylvania requires special pre-permit analysis for proposed discharges into high-quality, Tier 2 waters. Alternatives to new, additional, or increased point source discharges to surface waters must be employed where they are cost-effective and environmentally sound. This requirement is called the nondischarge alternatives analysis. If a nondischarge alternative is not cost-effective and environmentally sound, the proposed discharger must use the best available combination of cost-effective treatment, land disposal, pollution prevention, and wastewater reuse technologies. This process is known as the anti-degradation best available combination of technologies (ABACT) and establishes a minimum level of performance for the discharger.

The state then requires an analysis to determine if nondegrading discharge alternatives exist. If the ABACT produces a nondegrading discharge, the discharge can be approved for the Tier 2 water. If it would produce a degrading discharge, a Social or Economic Justification (SEJ) Analysis is required before it could be used. The SEJ Analysis determines the approvable level of treatment technologies and the final determination of *cost-effectiveness* is not made until the SEJ analysis is complete. If the SEJ analysis has not demonstrated economic or social importance of the activity, the only approvable discharge would be one that is nondegrading.

OREGON

The state prohibits a lowering of water quality in Tier 2 waters unless all the following apply:

- All water quality standards will be met and beneficial uses protected
- No other reasonable alternatives exist
- The lowering of the water quality is necessary for social and economic benefits that outweigh the environmental costs

If the proposed activity would likely result in any measurable change in water quality away from conditions unimpacted by anthropogenic sources, then the proposed activity is considered to likely result in the lowering of water quality. The *measurable change* is based on any of the following (a) percent change in ambient concentrations at appropriate critical periods, (b) the difference between current ambient conditions and conditions that would result if the activity is allowed, (c) percentage change in loadings, (d) percent reduction in assimilative capacity; (e) nature, persistence, and potential impacts on aquatic biota, and (f) degree of confidence in modeling used.



In the alternatives analysis, the applicant must provide a discussion of the technical and economic feasibility of the alternatives. If at least one of the alternatives to lowering the water quality is technically and economically feasible, the applicant “should pursue that alternative rather than the activity that results in a lowering of water quality. If a technically, economically alternative does not exist, the antidegradation review continues to the analysis socioeconomic benefits vs. environmental costs.

Finally, Pennsylvania and West Virginia provide a very useful level of detail in their implementation guidance for alternatives analysis. Below is a description of topics covered in their guidance:

- A discussion of when alternatives analysis is required.
- A listing and description of nondegrading and less-degrading pollution control measures to consider (Pennsylvania also includes environmental consideration for each method).
- Identification of cost components and assessment of costs. This provides a consistent approach for the cost analysis by listing cost categories that may and may not be included in the analysis and the cost formulae to use.
- Evaluation of environmental impacts associated with the alternatives. This discusses the types of impacts that the applicant must address, at minimum.
- Cost and reasonableness criteria for alternatives evaluation.
- The procedure for comparing costs of various alternatives.
- A summary of the alternatives analysis process. This includes a description of how the findings of the analysis will be used in the overall antidegradation review and permitting process.

District Court Rules on West Virginia Antidegradation Procedures

The U.S. District Court in Huntington, West Virginia, issued a ruling in 2003 that addressed a range of issues related to the West Virginia antidegradation implementation program (*Ohio Valley Environmental Coalition, et. al. v. Marianne Lamont Horinko, Acting Administrator, United States Environmental Protection Agency*; Civil Action No. 3:02-0058). Among the key decisions rendered in the ruling are the following:

- The designations of certain waterbody segments for Tier 1 antidegradation protection only is not permissible, especially when monitoring data does not indicate that water quality fails to exceed levels necessary to support wildlife and recreation.
- Allowing exceptions to antidegradation reviews for publicly owned wastewater treatment plants as long as there is net decrease in the overall pollutant loading was deemed to be arbitrary and capricious.
- Requiring Tier 2 antidegradation reviews for discharges under CWA section 402 and 404 general permits only at the time of general permit issuance was deemed to be arbitrary and capricious.
- Rules that state that nonpoint sources will be deemed to be in compliance with antidegradation regulations if best management practices are installed and maintained are reasonable.
- EPA's approval of the section in the antidegradation regulations that provides that “[w]ater segments that support the minimum fishable/swimmable uses and have assimilative capacity remaining for some parameters” shall only “generally” be provided Tier 2 protection was arbitrary and capricious.
- EPA's approval of a provision that allows for a 10 percent reduction in the available assimilative capacity of individual pollutant parameters from an individual discharge before Tier 2 review is required was supported by evidence in the record and therefore was reasonable.
- EPA's approval of a provision allows for a twenty percent cumulative reduction from all discharges before Tier 2 review is required was not supported by any evidence in the record and therefore was arbitrary and capricious.
- Approval of trading provisions which can reasonably be read to require that the trade must result in an improvement to water quality in the water segment where the new or expanded discharge is located was reasonable.



REQUIREMENTS FOR DETERMINING IMPORTANT ECONOMIC AND SOCIAL DEVELOPMENT

In reviewing the state and EPA guidance regarding Tier 2 SEA, the following conclusions were noted:

- Few state guidance documents provide any detail on the SEA.
- Where procedures are provided, they are very general and qualitative in nature.
- It is estimated that a large percentage of the application could involve Tier 2 antidegradation review and socioeconomic analysis. Therefore, the tests/procedures must be practical for applicants to use and for the staff to review.
- After presenting modeling approaches to West Virginia Department of Environmental Protection (DEP), the staff indicated that models would not be appropriate for the majority of the applicants because of their complexity, as well as the level of expertise, cost, and time required. They also indicated that WV DEP staff did not have training or expertise to adequately review the applicants' analyses using such models. These could be issues for applicants and staff at the MPCA as well.
- Once economic or social changes are estimated using quantitative or qualitative approaches, the procedure must then help determine the importance or significance of the activity. Selection of any quantitative threshold or weights defining *important development* would be somewhat arbitrary and perhaps indefensible. States generally weigh evidence provided on a case-by-case basis. EPA Region IX's *Antidegradation Guidance* specifically states, "explicit criteria defining important economic or social development have purposely not been developed by EPA, because of the varying environmental, economic, and social conditions of localities throughout the country."
- EPA Region 8 and 9 provide substantial guidance on SEA for Tier 2 surface waters, as do several states.

EPA Region 4 identified factors to be considered in making a determination on whether benefits associated with a lowering of water quality qualify as "Important Social or Economic Activities in the Area in Which the Waters are Located," including the following:

- Employment (increasing, maintaining, or avoiding a reduction in employment)
- Increased production
- Improved community tax base
- Housing
- Correction of an environmental or public health problem.

Other provisions to be included in a state's methodology, according to the Region 4 guidance, include (1) a general description of the administrative process for permit issuance, modification, or denial on the basis of antidegradation Tier II provisions; (2) the name of the entity responsible for submitting information regarding alternatives, and socioeconomic considerations, (3) information on how a proposed decision will be announced in a public notice (including example language of a proposed determination referencing the state antidegradation policy), (4) the role of the state environmental agency in the review, (5) the entity who will make the final determination, and (6) a description of the process for documenting the final decision, e.g., in an amendment to the Fact Sheet at the time of final permit determination, to allow or deny the activity associated with the proposed lowering of water quality.

The states of Washington, Wyoming, and West Virginia also provide substantive guidance and offer three differing approaches for Minnesota to consider. Below are highlights from each of these states' guidance

document regarding the determination of necessity of degrading a Tier2 water and the determination of the importance of the social or economic development caused by the proposed activity. The state of Washington places high importance on water quality impacts. Wyoming is very concerned with the interest of the applicant and West Virginia's policy provides a balance between the two.

WASHINGTON

Washington requires that an applicant must consider nine alternatives to the proposed degrading discharge, and the Department of Ecology retains discretion to require that other alternatives be evaluated. This analysis is the primary focus of determining whether to allow a lowering of high-quality water parameters. The purpose is to identify site, structural, or management approaches that can be practically implemented to prevent, or minimize where prevention is not feasible, the lowering of high-quality water parameters. *Practical* and *feasible* are not defined in the guidance document. Necessity is determined on a case-by-case basis.

Then a test of importance is conducted to determine overriding public interest. This analysis considers the qualitative and quantitative benefits and costs of an action. The applicant must describe the economic and social benefits associated with lowering water quality as well as the benefits associated with maintaining high-quality water. Examples are given of factors to consider for each of these two categories. "Significant weight must be given to the value of clean water and the protection of beneficial uses to the general public and to treaty tribes at the local, regional, and statewide scales."

WYOMING

In Wyoming, the test of economic and social importance is done on a case-by-case basis. If the applicant submits evidence that the activity is *important* development, it is presumed important unless information to the contrary is submitted in the public review process. In the public comment period, substantial weight is given to determinations by local governments and land use planning authorities. If the proposed activity is determined not to be important for social and economic development, authorization is denied. If the proposed activity is determined to be important, a determination is then made whether the degradation that would result from the activity is necessary. The degradation is considered acceptable if there are no other water quality controls available that would result in no degradation or less degradation that are economically, environmentally, and technically reasonable. The determination of whether such alternatives are available is based on a reasonable level of analysis by the project proponent and any information submitted by the public. The scope of the alternatives considered is limited to those that would accomplish the proposed activity's purpose. In determining the economic reasonableness of the alternatives, the state considers

- Whether the costs of the alternative significantly exceed the costs of the proposal
- For publicly owned treatment works (POTWs), whether user charges resulting from the alternative would significantly exceed those of similarly situated POTWs
- For any discharge into the state waters, whether the treatment alternative represents costs that significantly exceed cost for other similar discharges or standard industry practices
- Any other environmental benefits

WEST VIRGINIA

West Virginia evaluates pollutant control alternatives from a list of non-discharge and nondegrading or less degrading alternatives listed in the guidance, the applicant must screen for and propose a list of available, cost-effective alternatives that will be evaluated in detail. The state may require that additional alternatives be analyzed. Environmental impacts that must be addressed are listed, and the cost and reasonableness criteria are defined.



The 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. The 110 percent cost-effectiveness criterion is a general rule. If pollution control costs for alternatives that would result in substantial water quality benefits slightly exceed the 110 percent threshold, those alternatives may be required. The base cost for NPDES permitted facilities is the cost of treating raw or otherwise untreated wastewater to a level that meets water quality criteria, or the cost of meeting federally required, technology-based requirements, whichever is more stringent and legally applicable. The base cost for activities permitted under section 404 of the CWA is the cost of pollution controls that meet minimum section 404 permit and section 401 water quality certification requirements.

The state will identify the least degrading alternative—or mix of alternatives—that does not exceed the 110 percent cost threshold. This will be the state’s preferred option. If the option will not result in significant degradation, permitting of the activity proceeds. If the preferred option will result in significant degradation, the applicant must conduct a social and economic importance analysis so the state can determine if the activity can be permitted. The applicant then completes a worksheet explaining how the proposed activity affects 12 social and economic factors. The applicant can use other economic and environmental considerations to strengthen its social and economic importance analysis. A number of example considerations are provided.

The state makes a preliminary determination primarily on the basis of the demonstration made by the applicant and may weigh the applicant’s demonstration against counterbalancing socioeconomic costs and projected environmental effects (those determined both in the alternatives analysis and the socioeconomic analysis). The state makes a preliminary determination on the facts on a case-by-case basis. If the information is not sufficient to make a preliminary determination, the state may request the applicant to submit specific information needed. The state then considers views and concerns expressed by the public and selected governmental agencies regarding the preliminary determination in making a final determination. The state makes a final determination on the facts on a case-by-case basis.

INTERGOVERNMENTAL COORDINATION AND PUBLIC PARTICIPATION

EPA *Water Quality Standards Handbook* states that “[a]ntidegradation, as with other water quality standards activities, requires public participation and intergovernmental coordination to be an effective tool in the water quality management process.” The handbook also notes that

[t]he antidegradation public participation requirement may be satisfied in several ways. The State may hold a public hearing or hearings. The State may also satisfy the requirement by providing public notice and the opportunity for the public to request a hearing. Activities that may affect several water bodies in a river basin or sub-basin may be considered in a single hearing. To ease the resource burden on both the State and public, standards issues may be combined with hearings on environmental impact statements, water management plans, or permits. However, if this is done, the public must be clearly informed that possible changes in water quality standards are being considered along with other activities. It is inconsistent with the water quality standards regulation to “back-door” changes in standards through actions on U[nited] S[tate’s], waste load allocations, plans, or permits.

In its antidegradation guidance, EPA Region 5 recommends that any public notice related to potential lowering of water quality should address or reference documents, which include information on the following:

1. Statement of the state’s antidegradation policy
2. Specific identification of substances for which effluent limit relaxation is being proposed
3. Description of the current level of water quality



4. Description of the impact that the proposed action will have on water quality
5. Summary of other actions that have lowered water quality and determination of cumulative impacts
6. De minimis test justification (if appropriate)
7. Important social and economic development demonstration in support of effluent limit relaxation or new discharge (if appropriate)
8. Type of substance involved...and known and suspected environmental effects
9. Identity of other appropriate agencies which have been notified of the proposed action

LIMITED AND TEMPORARY DEGRADATION OF TIER 3 WATERS

The state of California's implementation policy expressly states that discharges that are temporally or spatially (i.e., mixing) limited are exempt from antidegradation review, therefore considered insignificant. No guidelines are provided to measure this limitation, only best professional judgment is required to make the determination.

Missouri has a definition of temporary degradation for Tier 3 waters:

Degradation that is non-permanent and the effects can be regarded as insignificant following a review of the a) length of time during which water quality will be lowered, b) percent change in ambient conditions, c) parameters affected, d) likelihood for long term water quality benefits to the segment (e.g., as may result from dredging of contaminated sediments), e) degree to which achieving the applicable Water Quality Standards (WQS) during the proposed activity may be at risk, and f) potential for any residual long-term influences on existing uses.

The EPA Region 8 *Antidegradation Implementation* manual contains a nonbinding general rule that defines activities with durations of less than one month as temporary. The EPA *Water Quality Standards Handbook* notes that the Tier 3 rule allows "limited activities that result in temporary and short-term" impacts:

EPA interprets this provision to mean no new or increased discharges to ONRWs and no new or increased discharge to tributaries to ONRWs that would result in lower water quality in the ONRWs. The only exception to this prohibition, as discussed in the preamble to the Water Quality Standards Regulation (48 F.R. 51402), permits States to allow some limited activities that result in temporary and short-term changes in the water quality of ONRW. Such activities must not permanently degrade water quality or result in water quality lower than that necessary to protect the existing uses in the ONRW. It is difficult to give an exact definition of "temporary" and "short-term" because of the variety of activities that might be considered. However, in rather broad terms, EPA's view of temporary is weeks and months, not years. The intent of EPA's provision clearly is to limit water quality degradation to the shortest possible time. If a construction activity is involved, for example, temporary is defined as the length of time necessary to construct the facility and make it operational. During any period of time when, after opportunity for public participation in the decision, the State allows temporary degradation, all practical means of minimizing such degradation shall be implemented.

The majority of states surveyed do have definitions of limited and temporary impacts for Tier 3 waters (Pennsylvania, Washington, Oregon, New Mexico, West Virginia) that generally follow the EPA guidelines above.

West Virginia rules prohibit any lowering of water quality for Tier 3 waters unless it is limited and temporary, as determined by the Secretary of the DEP on a case-by-case basis. The state's antidegradation implementation procedures provide more details in the review process:



In approving short term, limited effect activities, DEP will ensure that:

- All practical means to minimize the impacts have been applied
- There will be no permanent degradation of the receiving water segment
- Tier 1 protection requirements will be met
- Determinations to permit activities that may have short term, limited effects will be made on a case-by-case basis and shall be made after consideration of the following factors:
 - The length of time during which the water quality will be lowered;
 - The percent change in ambient concentrations;
 - 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;
 - The potential for any residual long-term influences on existing uses; and
 - The cumulative impacts from all sources for the parameters affected.

Washington has procedures for allowing limited degradation in Tier 3 waters as follows:

The criteria and special conditions established in WAC 173-201A-200 through 173-201A-260, 173-201A-320, 173-201A-602 and 173-201A-612 may be modified for a specific water body on a short-term basis (e.g., actual periods of nonattainment would generally be limited to hours or days rather than weeks or months) when necessary to accommodate essential activities, respond to emergencies, or to otherwise protect the public interest, even though such activities may result in a temporary reduction of water quality conditions. (1) A short-term modification will:

(a) Be authorized in writing by the department, and conditioned, timed, and restricted in a manner that will minimize degradation of water quality, existing uses, and designated uses. (b) Be valid for the duration of the activity requiring modification of the criteria and special conditions in WAC 173-201A-200 through 173-201A-260, 173-201A-602 or 173-201A-612, as determined by the department. (c) Allow degradation of water quality if the degradation does not significantly interfere with or become injurious to existing or designated water uses or cause long-term harm to the environment. (d) In no way lessen or remove the proponent's obligations and liabilities under other federal, state, and local rules and regulations.

(2) The department may authorize a longer duration where the activity is part of an ongoing or long-term operation and maintenance plan, integrated pest or noxious weed management plan, water body or watershed management plan, or restoration plan.

IV. Applying Antidegradation Review to Stormwater Permits

NPDES stormwater permits use a variety of approaches to ensure that water quality standards are achieved, including (1) setting technology-based standards; (2) defining maximum extent practicable (MEP) abatement and technology standards; (3) establishing required performance standards the discharger must meet to address problem parameters; and in some cases, (4) establishing numeric effluent limits. Primarily, the stormwater program utilizes a framework which is a combination of approaches 1, 2 and 3, with permit provisions focused on applying source-control and pollution-prevention BMPs.

Despite recent legal challenges in Minnesota and Wisconsin to stormwater permits that are based on alleged noncompliance with antidegradation provisions, EPA has not issued any specific guidance regarding how to apply its preferred parameter-by-parameter, assimilative capacity-based, antidegradation

review approach to a permit program that is built on applying BMPs that are *presumed* to address parameters of concern. The agency has indicated that a *demonstrative* approach—one based on monitoring stormwater effluent—can be required to meet TMDLs for pollutants linked to urban stormwater (e.g., sediment), but to date, the use of numeric limits for stormwater discharges has been limited. Effectively implementing programs like antidegradation and TMDLs—which both proceed from quantitative analyses of the receiving environment and the relevant magnitude and nature of the pollutant sources(s)—through BMP-based stormwater permits is challenging.

However, EPA has explored various approaches for dealing with the quantitative requirements of TMDLs involving stormwater discharges and has issued several documents addressing some of the technical issues that relate directly to those encountered in the antidegradation program. These approaches seek to address the quantitative, numeric demands of the TMDL program by developing BMP performance translators that can be linked to numeric goals. The most recent and relevant of these documents are listed below.

- *EPA Memorandum: Establishing TMDL WLAs for Stormwater Sources and NPDES Requirements Based on Those WLAs.* This memorandum, dated November 22, 2002, clarifies existing EPA regulatory requirements for establishing wasteload allocations (WLAs) for stormwater discharges. It states that NPDES-regulated stormwater discharges must receive a WLA, and that WLA can be expressed as a single categorical WLA from multiple point sources when data are insufficient to assign each source a separate WLA. In addition, this memorandum states that the WLA is to be expressed in numeric form but that associated permit limits for permitted stormwater sources may be expressed in the form of BMPs. The memorandum states that the stormwater permit must specify the monitoring necessary to determine compliance with effluent limitation and BMP effectiveness and provide a mechanism for improving implementation through adaptive management.
- *EPA's Proposed Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (MSGP).* EPA has proposed an updated MSGP to provide coverage to stormwater discharges from eligible industrial categories of activity. The proposed MSGP addresses stormwater discharges to impaired waterbodies with and without an approved TMDL. The requirements pertinent to discharges to impaired waterbodies span requirements related to eligibility; stormwater pollution prevention plans; and monitoring, reporting, and correction actions. It represents one of the first stormwater permits issued by EPA to contain comprehensive requirements that will address water quality impairments required through the TMDL program.
- *EPA Region 1 Stormwater TMDL Implementation Support Manual.* EPA Region 1 led the development of a guide for stakeholders responsible for implementing TMDLs developed using the impervious cover method (ICM). Impervious cover serves as a surrogate measure of impairment due to habitat disturbance, pollutant loading, biological diversity, and stream health. Using the ICM, TMDLs provide an estimate of existing impervious cover and identify target percentages of impervious cover to improve water quality conditions and attain water quality standards. This document is intended to help stakeholders select appropriate BMPs to achieve the target percent impervious cover.
- *EPA Handbook for Developing and Implementing TMDLs for Waterbodies Impaired due to Stormwater Sources.* EPA will develop a handbook for developing and implementing TMDLs for waterbodies impaired due to stormwater sources beginning in 2007. This handbook will specifically address developing effective TMDLs and ensuring that permits are consistent with and implement TMDLs. The handbook will identify alternative approaches and provide example language for federal and state staff working on TMDLs and stormwater permit.



Finally, it should be noted that some states have attempted to exempt stormwater general permits from antidegradation reviews. In its recently drafted *Missouri Water Quality Antidegradation Policy and Implementation Procedure* (2006), the state included this language:

A. General Storm Water Permits

In order to implement the procedure for antidegradation without causing major disruption to workflow and permit timeliness, an antidegradation review will not be required for discharges covered under Missouri's general permits until the general permit templates are reissued to incorporate the procedure. General permits will be addressed as they expire after the effective date of the *Missouri Antidegradation Rule and Implementation Procedure*... Incorporating the antidegradation requirements in this manner will incrementally address all general permits within five years of the effective date of this document. Incrementally addressing the renewals avoids an excessive workload both on the public (during the required public participation on the permit renewal process) and on the department (when evaluating the various discharge alternatives and the overall socio-economic importance of the discharges authorized by each general permit).

EPA Region 6 appears to be unmoved by this appeal, responding that “[t]he draft procedure is not clear in describing how and when it applies to new or expanded storm water discharges and to other types of general permits. It is not clear how and when Missouri intends to conduct Tier 2 review for new or expanded general discharges.” No further information is available on whether the Regional office will approve this approach, which is still under review.

9th Circuit Approves BMP-Based Approach for Stormwater Permits

In *Defenders of Wildlife v. Browner* (191 F.3d 1159, 9th Circuit., 1999), a federal judge ruled that EPA can determine that strict compliance with water quality standards is not required and that compliance with BMPs established through a stormwater management planning process is appropriate for MS4 permits. The judge noted that under its discretionary powers, EPA has the authority to determine that ensuring strict compliance with state water-quality standards is necessary to control pollutants, but the Agency also has the authority to require less than strict compliance with water quality standards in some cases. The Agency's interim approach to providing MS4 permit coverage, which uses BMPs in first-round storm water permits, provides for the attainment of water quality standards, and its choice to include either management practices or numeric limitations in the permits was within its discretion. The judge further noted that Congress did not mandate a minimum standards approach or specify that EPA develop minimal performance requirements as part of the stormwater permitting program and that the Agency did not act arbitrarily or capriciously by issuing permits to several Arizona municipalities.

Oregon DEQ Named in Industrial Stormwater Permit Petition

In Oregon, a petition for review was filed in circuit court in 2006 against the DEQ by the Northwest Environmental Defense Center (NEDC) and Columbia River Keepers (CRK) challenging the issuance of the stormwater general permit for industrial facilities (*Northwest Environmental Defense Center, Columbia Riverkeeper, and Mark Riskedahl v. Oregon Department of Environmental Quality, Oregon Environmental Quality Commission, and Stephanie Hallock, Director*). The petition alleges generally that the state stormwater permit violates antidegradation policy by failing to conduct an antidegradation analysis before granting permit coverage and contains weak provisions for monitoring permittees' stormwater discharges through a system of limited benchmark monitoring rather than regularly monitored effluent limits of a broad range of parameters.



Minnesota Court Applies Nondegradation Requirements to MS4 Permits

The Minnesota Court of Appeals ordered in a 2003 ruling that the MPCA must comply with Minn. R. 7050.0185, subpart 2(B) and determine whether stormwater discharges from MS4s are expanded NPDES discharges and if so, to determine whether additional controls are needed to prevent degradation of state waters (*Minnesota Center for Environmental Advocacy, Relator, vs. Minnesota Pollution Control Agency, Respondent*; C6-02-1243; Filed May 6, 2003). This ruling is somewhat unique—Minnesota's nondegradation rules clearly state that nonpoint sources are included among the discharges covered when considering whether additional controls are needed to protect water quality. In cases where municipal stormwater was not covered by antidegradation rules before implementation of the federal Phase 1 and Phase 2 NPDES stormwater program, a state agency could argue that mere coverage of municipalities by an NPDES permit did not constitute an *expansion* in the discharge, but rather a *reclassification* of that discharge from a nonpoint source to a point source. Lacking any basis for that argument because of the comprehensiveness of its nondegradation rule, the MPCA was obliged to agree that discharges from the state's municipalities had indeed increased since the nondegradation rule was adopted in 1988. The court ruled in part that "[w]here there is a showing in the record that the discharges to be covered under a general permit are expanded discharges, the MPCA must determine whether additional control measures are necessary under Minn. R. 7050.0185 to prevent non-degradation (sic) of state waters." The court also stated that under the rule, MPCA is required to determine whether additional control measures should be taken to reduce the impact on the receiving water of new or expanded significant discharges, and pointed out that the nondegradation rule requires that "(i)f a person proposes a new or expanded significant discharge from either a point or nonpoint source, the agency shall determine whether additional control measures beyond those required by subpart 3 can reasonably be taken to minimize the impact of the discharge on the receiving water." Finally, the court concluded that "MPCA must comply with subpart 2(B) (sic) and determine whether the discharges are in fact expanded discharges. We note that even if the MPCA determines the discharges are expanded discharges, *the agency still has discretion to determine 'whether additional control measures beyond those required by subpart 3 can reasonably be taken to minimize the impact of the discharge on the receiving water.'*" (Emphasis added).

This ruling led to the development of the 2006 general permit for MS4 stormwater discharges, with its provisions requiring that 30 *selected* municipalities conduct loading analyses via various modeling or other studies and develop a nondegradation report to address increases in stormwater discharges during two time periods, ~1990 until ~2004, and from ~2004 until 2020. It should be noted that the court provided considerable opportunity for the MPCA to exercise its "discretion to determine whether additional control measures...can reasonably be taken to minimize the impacts" of stormwater runoff. This language in the court of appeals ruling allows the MPCA some latitude in determining what might be reasonable in addressing increases in stormwater runoff that occurred before issuance of the 2006 general permit and that might occur in the future.

The survey of states revealed that, in general, there is a lack of technical analysis regarding BMP requirements for stormwater discharges to effectively mitigate degradation and either eliminate the need for an antidegradation review (make the degradation insignificant) or to reduce the impacts of significant but necessary degradation to acceptable levels per the antidegradation review. No states inventoried require site-specific, performance-based BMPs for MS4 permitted discharges specifically to mitigate degradation caused by new or expanded discharges. Several states, however, have developed the more advanced approaches to determining and requiring appropriate construction and post-construction BMPs under construction general permits.

WYOMING

Wyoming incorporates an antidegradation review for construction stormwater discharges at the state's discretion on a case-by-case basis where discharges have the potential to reach a Tier 1 water. From the construction general permit

Large construction activities that have the potential to discharge storm water into a Class 1 surface water must submit the SWPPP along with their NOI to the Administrator at least 30 days prior to commencing construction activities. Large construction activities that have the potential to discharge to class 1 waters are subject to a site visit by Department personnel prior to issuing coverage under this general permit. (See Appendix A for a list of Class 1 waters.) Site visits are weather-dependent. For example site visits will not typically be scheduled to areas with heavy snow cover and a visit may not always be possible within 30 days of an NOI and SWPPP submittal.

WEST VIRGINIA

West Virginia has tailored BMP requirements on the basis of the Tier level of protection. For example, construction sites of more than one acre are required to develop or adopt a SWPPP and register for coverage under an NPDES general permit to ensure that erosion, sediment, and precipitation-induced flows from those sites do not cause impairment or significant degradation of water quality. West Virginia's implementation guidance provides a clear understanding of the management practices required under the general permit for various construction sites on the basis of their size, the duration of the project, and the protection tier assigned to the receiving water segment. This general permit, issued in 2002, was subjected to an antidegradation review during permit development.

Applicants denied coverage under the general permit are offered the opportunity to apply for an individual NPDES stormwater permit. All applications for construction activity (i.e., ≥ 1 acre) general permit coverage will be required to submit information to the DEP regarding the project size, receiving waters, duration of construction, responsible parties, and other project or applicant related details. Applications are reviewed by the DEP and a determination is made on SWPPP control measures (see Table 3 below) in part on the basis of the following:

- Project size (1 to < 3 acres; 3–100 acres; > 100 acres)
- Receiving waters (Tier 1, 2, 2.5, or 3 protection levels)
- Construction duration (one year or less/more)

Persons responsible for development or construction projects on one or more acres must register with the DEP. Depending on the size of the project and the protection tier applicable to the receiving water segment, applicants are expected to comply with various provisions designed to ensure that water quality is protected and antidegradation requirements are met. Applicants who fulfill these responsibilities may be registered under the NPDES general permit.

The DEP may reference appropriate fact sheets, design/installation/maintenance manuals, or other information in the various classes of general permit for each type of construction activity. The applicant is responsible for ensuring that flow, erosion, and sediment controls are designed, installed, and maintained appropriately to ensure the protection of water quality, compliance with antidegradation requirements, and continuing permit coverage. The DEP presumes that proper design, installation, and maintenance of appropriate flow, erosion, and sediment controls as noted in the general permit, appendices, and references should satisfy water quality and antidegradation requirements. If this proves not to be the case, the DEP reserves the right to amend the general permit, require additional water quality protection measures, or require individual permit coverage to address any identified shortcomings.

Table 3. West Virginia stormwater control measures for construction activities

Project size	Protection level	Project duration	Antidegradation requirements
1–< 3 ac.	Tiers 1 & 2	≤ 1 yr	Notice Of Intent to be submitted by applicant DEP generic SWPPP provided for guidance
3–100 ac.	Tiers 1 & 2	≤ 1 yr.	Standard SWPPP criteria Low-impact development encouraged Enhanced sediment trap/basin criteria Seeding within 7 days on reaching final grade Post-construction SW mgmt if impervious surface > 15% Emphasis on stream corridor protection
≥ 3 ac.	Tiers 1 & 2	> 1 yr.	Standard SWPPP criteria Low-impact development encouraged Enhanced sediment trap/basin criteria Emphasis on stream corridor protection Seeding within 7 days on reaching final grade Post-construction SW mgmt if impervious surface > 15% Review, public notice, and comment
>100 ac.	Tiers 1 & 2	any	Standard SWPPP criteria Low-impact development encouraged Enhanced sediment trap/basin criteria Emphasis on stream corridor protection Seeding within 7 days on reaching final grade Post-construction SW mgmt if impervious surface > 15% Review, public notice, and comment
1–< 3 ac.	Tier 2.5	≤ 1 yr.	Standard SWPPP criteria Low-impact development encouraged Enhanced sediment trap/basin criteria Emphasis on stream corridor protection Stream corridor buffer required Seeding within 7 days on reaching final grade
≥ 3 ac.	Tier 2.5	any	Standard SWPPP criteria Low-impact development encouraged Enhanced sediment trap/basin criteria Emphasis on stream corridor protection Stream corridor buffer required Seeding within 7 days on reaching final grade Post-construction SW mgmt if impervious surface > 15% Review, public notice, and comment
any	Tier 3	any	No degradation allowed except temporary and limited Review, public notice, and comment

There are a number of ways to implement erosion, sediment, and flow-control practices at construction sites. Some are well established and highly functional (e.g., mulching/seeding bare areas, trapping sediment in temporary or permanent basins) and others work well in some situations but not others. In addition, some control measures are considered experimental and require considerable design and installation expertise. The DEP recognizes that some control measures and BMP programs are still developing. As a result, information regarding the existence, effectiveness, or costs of control practices



for reducing pollution and meeting the water quality and antidegradation requirements of this section are emerging. In these instances, the antidegradation requirements of this section can be considered met for permits and programs that have a process (e.g., implemented SWPPP) to select, develop, adopt, and refine control practices (i.e., design, installation, and maintenance) for protecting water quality and meeting the intent of this section. This adaptive process must ensure that information is developed and used expeditiously to revise permit or program requirements.

The DEP will conduct a technical review for construction projects of 3 acres or larger and those that discharge to waters protected at the Tier 2.5 or Tier 3 levels. Generic SWPPPs are developed by the DEP to provide guidance for sites on 1 to < 3 acres that discharge to waters protected at the Tier 1 and Tier 2 levels. Specific plans describing how information will be obtained and used must be developed and documented before permit coverage is approved. Development and submission of pre-project erosion and sediment control plans, demonstration and application of appropriate design/installation/maintenance practices, and designation of a person at the construction site who is responsible for ensuring that stormwater and erosion/sediment control practices are installed and maintained are deemed to demonstrate compliance.

NEW JERSEY

In New Jersey, Category One waters are those waters with protection from measurable changes in water quality characteristics because of their clarity, color, scenic setting, other characteristics of aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resource(s). Special construction and post-construction stormwater runoff standards apply to these waters as follows:

1. The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:
 - i. A 300-foot special water resource protection area shall be provided on each side of the waterway, measured perpendicular to the waterway from the top of bank outwards, or from the centerline of the waterway where the bank is not defined, consisting of existing vegetation or vegetation allowed to follow natural succession is provided.
 - ii. Encroachment within the designated special water resource protection area under (h)1i above shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area or maintained lawn area). The encroachment shall only be allowed where applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable. In no case shall the remaining special water resource protection area be reduced to less than 150 feet as measured perpendicular to the top of bank of the waterway or centerline of the waterway where the bank is undefined. All encroachments proposed under this subparagraph shall be subject to review and approval by the Department.
2. All stormwater shall be discharged outside of but may flow through the special water resource protection area and shall comply with the Standard For Off-Site Stability in the "Standards for Soil Erosion and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq. (See N.J.A.C. 2:90-1.3).
3. If stormwater discharged outside of and flowing through the special water resource protection area cannot comply with the Standard For Off-Site Stability in the "Standards for Soil Erosion and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., (see N.J.A.C. 2:90-1.3), then the stabilization measures in accordance with the requirements of the above standards may be placed within the special water resource protection area, provided that:



- i. Stabilization measures shall not be placed within 150 feet of the waterway;
- ii. Stormwater associated with discharges allowed by this paragraph shall achieve a 95 percent TSS post construction removal rate;
- iii. Temperature shall be addressed to ensure no impact on receiving waterway;
- iv. The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable;
- v. A conceptual project design meeting shall be held with the appropriate Department staff and Soil Conservation District staff to identify necessary stabilization measures; and
- vi. All encroachments proposed under this section shall be subject to review and approval by the Department.

4. A stream corridor protection plan may be developed by a regional stormwater management planning committee as an element of a regional stormwater management plan, or by a municipality through an adopted municipal stormwater management plan. If a stream corridor protection plan for a waterway subject to this subsection has been approved by the Department, then the provisions of the plan shall be the applicable special water resource protection area requirements for that waterway. A stream corridor protection plan for a waterway subject to this subsection shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined above in (h)1i. In no case shall a stream corridor protection plan allow reduction of the Special Water Resource Protection Area to less than 150 feet as measured perpendicular to the waterway subject to this subsection.

5. This subsection does not apply to the construction of one individual single family dwelling that is not part of a larger development on a lot receiving preliminary or final subdivision approval on or before February 2, 2004, provided that the construction begins on or before February 2, 2009.

PENNSYLVANIA

Pennsylvania also has tailored BMPs requirements according to the Tier level of protection needed. The Pennsylvania antidegradation implementation includes the state stormwater management policy as an appendix that details general recommendations and requirements for the following:

- Post-construction stormwater discharges
- MS4 discharge
- Phase I and II earth disturbance stormwater discharges
- NPDES industrial stormwater discharges

According to the state policy, post-construction stormwater management plans required under the NPDES Stormwater Discharges Associated with Construction Activities permit program, the NPDES MS4 permit program, and stormwater management plans developed under the Act 167 program must demonstrate compliance with the antidegradation requirements at Title 25 PA Code section 93.4a to protect and maintain existing uses and the level of water quality necessary to protect those uses in all surface waters and protect and maintain water quality in special protection waters. All construction projects covered by an individual permit that discharge into high quality or exceptional value waters must submit an Antidegradation Analysis Module with the permit application submittal package. No specific BMPs are specified; however, discharge volume, quality, and rate post-construction must be equal to pre-construction conditions for these projects.



Wisconsin DNR Targeted in Stormwater Permit Antidegradation Case

A petition filed in Dane County Circuit Court in Wisconsin in early 2007 (Friends of Milwaukee's Rivers, Cheryl Nenn, Clean Water Action Council of Northeast Wisconsin, Rebecca L Katers, Glenn M. Stoddard, Christine Fossen Rades, and Charles Fisk v. Department of Natural Resources) alleges that the Wisconsin DNR failed to comply with federally mandated antidegradation regulations in issuing its 2006 general MS4 permit for municipal stormwater discharges. Among other complaints, the plaintiffs contend that the permit "contains no clear antidegradation requirement to determine whether high quality waters, such as Outstanding Resource Waters and Exceptional Resource Waters, will need additional protections to maintain their high quality...[the permit] treats all waters as the same, although this is not the case in Wisconsin." The petition also states that "[t]o ensure that the WPDES permit will meet water quality standards, the WPDES permit should require periodic ambient water quality monitoring beneath outfalls to coincide with wet weather events. This is needed to demonstrate the BMPs identified in the WPDES permit are sufficient to meet the goals of the Clean Water Act."

Specific complaints focus on the lack of requirements in the general permit requiring the DNR to determine whether any lowering of water quality in high quality waters is "necessary to accommodate important economic or social development," and that permits ensure that the "highest statutory and regulatory requirements for all new and existing point sources" be achieved, as required by federal antidegradation regulations. A hearing on the petition will be scheduled later in 2007.

V. New Development Stormwater Program Examples

The case studies below summarize issues related to the implementation of new development standards for stormwater control.

PENNSYLVANIA MS4 GENERAL PERMIT REQUIREMENTS FOR POST-CONSTRUCTION RUNOFF

Specific standards for stormwater control at new developments

Pennsylvania's General Permit for Small Municipal Separate Storm Sewer Systems (PAG-13) contains specific requirements controlling flows and pollutant load runoff from new development and redevelopment. The requirements are linked to the antidegradation level protection tiers identified in the state's water quality standards regulations. Below are some of the key requirements contained in the general permit:

- For High Quality and Exceptional Value watersheds, the applicant for a building permit or land development or redevelopment project must, during the stormwater construction permitting process, calculate a pre-and post construction water budget. In general, post construction infiltration must, at a minimum, equal or exceed preconstruction infiltration.
- For HQ watersheds, infiltration BMPs must be used unless the applicant demonstrates, during the storm water construction permitting process, that their use is precluded.
- For EV watersheds where the applicant cannot meet the post construction infiltration requirement on site, an offsite compensation project that protects the base flow of the EV surface water must be implemented.



- Under current regulations, for any direct discharge to an HQ or EV surface water, the applicant must demonstrate that post construction discharge will not degrade the physical, chemical or biological characteristics of the surface water. Discharge to HQ waters may result in some degradation if the requirements for Social and Environmental Justification (SEJ) are met. Discharge to other waters must be managed to prevent flooding and preserve and protect the stream bank, streambed and structural integrity of the waterway to protect the existing uses of the receiving waters.

STORMWATER MANAGEMENT MANUAL FOR WESTERN WASHINGTON (SWMMWW)

Specific technical standards for stormwater control at new developments

BACKGROUND

Stormwater management in Washington State is driven largely by the listing of 15 salmon species under the Endangered Species Act. The Governor's Salmon Recovery Office (<http://www.governor.wa.gov/gsro/default.asp>) coordinates efforts and has developed statewide strategies to recover salmon.

Washington's Department of Ecology has been progressive in addressing stormwater issues for many years. Ecology developed its first stormwater management manual in 1991 in a response to a directive of the Puget Sound Water Quality Management Plan. The SWMMWW was developed to update the previous manual and address concerns with BMPs necessary to protect salmon.

RESULT

The SWMMWW, issued in 2001 and revised in 2005, is actually a set of 5 volumes that address

Volume I - Minimum Technical Requirements and Site Planning

Volume II - Construction Stormwater Pollution Prevention

Volume III - Hydrologic Analysis and Flow Control Design/BMPs

Volume IV - Source Control BMPs

Volume V - Runoff Treatment BMPs

IMPLEMENTATION

The requirements in the SWMMWW are implemented either through local municipal programs or through federal or state permits. Ecology requires Phase I and II municipalities to either adopt the SWMMWW or an *equivalent* manual. NPDES permits, ESA conditions, and other regulatory programs reference this manual for BMP design criteria.

The first volume addresses 10 minimum requirements that apply to most projects

Minimum Requirement #1: Preparation of Stormwater Site Plans

Minimum Requirement #2: Construction Stormwater Pollution Prevention (SWPP)

Minimum Requirement #3: Source Control of Pollution

Minimum Requirement #4: Preservation of Natural Drainage Systems and Outfalls

Minimum Requirement #5: On-site Stormwater Management



TETRA TECH, INC.

Minimum Requirement #6: Runoff Treatment

Minimum Requirement #7: Flow Control

Minimum Requirement #8: Wetlands Protection

Minimum Requirement #9: Basin/Watershed Planning

Minimum Requirement #10: Operation and Maintenance

The treatment of the 6-month, 24-hour storm is generally required for project with more than 5,000 sf of *pollutant generating* impervious surfaces or $\frac{3}{4}$ acre of *pollutant generating* pervious surfaces. For flow control, stormwater discharges are required to match developed discharge durations to pre-developed durations for the range of pre-developed discharge rates from 50 percent of the 2-year peak flow up to the full 50-year peak flow. The pre-developed condition to be matched is generally required to be forested land cover. The manual can be downloaded at

<http://www.ecy.wa.gov/programs/wq/stormwater/manual.html>

VENTURA MS4 PERMIT STANDARDS

Numeric effluent limits in a draft Phase I MS4 permit

BACKGROUND

Numeric effluent limits have been an issue in the stormwater program for almost 20 years, beginning with the 1987 amendments to the CWA that added stormwater permitting requirements. In 1996, EPA issued an *Interim Permitting Approach for Water Quality-Based Effluent Limitations in Stormwater Permits*, which used BMPs in NPDES stormwater permits except where adequate information exists to develop more specific conditions or limitations. In 2002, EPA issued a memo on *Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs* that stated in part that “most [water quality based effluent limits] for NPDES-regulated municipal and small construction storm water discharges will be in the form of BMPs, and that numeric limits will be used only in rare instances.” More recently, the state of California convened a panel of stormwater experts to discuss whether it is technically feasible to develop numeric limits or other quantifiable measures for inclusion in storm water permits. This panel released a report on June 19, 2006 (<http://www.waterboards.ca.gov/stormwtr/numeric.html>) that stated it is generally not feasible to develop numeric effluent limits for stormwater permits.

RESULT

There is still significant pressure, especially from environmental groups, to include numeric effluent limits in NPDES permits. The Los Angeles Regional Water Quality Control Board issued a draft Phase I permit for Ventura County that includes *Municipal Action Levels (MALs)*. The Permit states in Part 2 that, after permit year 3, “two or more exceedences of a MAL will create a presumption that the implementation of measures to reduce the pollutant(s) in MS4 discharges to the MEP is inadequate. The Permittee is affirmatively required to augment measures to reduce the discharge of the pollutant(s) to not violate the MEP. The ‘end-of-pipe’ compliance points for MALs are at 36 inches in diameter or greater discharge pipes with outfalls to the receiving waters, with receiving water mass emission measurements at default compliance points.”

MALs for selected pollutants are based on nationwide, Phase I MS4 monitoring data for pollutants in stormwater. (Reference: <http://unix.eng.ua.edu/~rpitt/Research/Research.shtml>). The MALs were computed using the statistical-based population approach, one of three approaches recommended by the California Water Board’s Storm Water Panel in its report, *The Feasibility of Numerical Effluent Limits*



TETRA TECH, INC.

Applicable to Discharges of Storm Water Associated with Municipal, Industrial and Construction Activities (June 2006). The MALs were obtained by multiplying the Median (central tendency measure) with the Coefficient of Variance (estimate of variance measure).

While California's Stormwater Panel did not recommend numeric effluent limits in stormwater permits, it did support the concept of using *upset* or action levels to help identify *bad actor* watersheds to receive additional attention.

IMPLEMENTATION

MALs have been set in the draft Ventura permit for several metals and the following conventional pollutants and bacteria:

Pollutant	Municipal action level
pH	7.5 (median)
TSS (mg/L)	106.2
COD (mg/L)	58.3
Total Coliform (mpn/100 ml)	12,000 (median)
<i>E. Coli</i> (mpn/100 ml)	1,750 (median)

A copy of the first draft Ventura MS4 permit (12-27-02006) is at:
<http://www.swrcb.ca.gov/rwqcb4/html/programs/stormwater/venturaMs4.html>

The concept of MALs is likely to be significantly revised when a final permit is issued. The primary concern appears to be whether the MALs are used to determine compliance with the NPDES permit or used to indicate a need to implement additional or different BMPs in that watershed.

In the Chesapeake Bay watershed, MALs could be used to indicate municipal watersheds of concern and a need for additional resources. These MALs could be referenced in a tributary strategy-like document, but including the MALs in MS4 permits could result in significant concerns from the municipalities.

NOTE: A major concern of the municipalities is that limited stormwater resources will be spent focusing on the pollutants identified in the MALs instead of higher priority pollutants such as pesticides.

BIG DARBY CREEK TMDL ALLOCATIONS FOR CONSTRUCTION STORMWATER SOURCES

Construction general permit with specific standards to comply with TMDL allocations

BACKGROUND

The Big Darby Creek watershed is among the most biologically diverse stream systems of its size in the Midwest. Befitting this distinction, Ohio water quality standards regulations assign the most stringent aquatic life use designations (exceptional warmwater habitat and coldwater habitat) and the outstanding state water antidegradation category to many of the larger streams in the watershed. The watershed is home to several endangered species and Big and Little Darby Creeks are designated state and national scenic rivers. However, recent studies document declines in water quality and stream habitat, some of which have been found to be directly related to construction activity.



RESULT

A TMDL for Big Darby Creek was approved by EPA in March 2006. TMDLs are established for phosphorus, sediment, fecal coliform bacteria, dissolved oxygen, ammonia, floodplain capacity, bedload, and habitat. Since adopting the TMDL, Ohio has developed an alternative general permit for construction activity within the Big Darby Creek watershed (available at http://www.epa.state.oh.us/dsw/permits/GP_ConstructionSiteStormWater_Darby.html).

This alternative general permit is more specific in terms of the controls required than EPA or the Region 3 state's construction general permit. For example, the SWPPP must identify a riparian setback distance (based on a formula in the permit, a minimum of 100 feet) and no construction activity is allowed within the setback. For silt fences, the permit prohibits their use as a primary sediment control BMP for construction sites greater than 5 acres. Silt fence is allowed for sites less than 5 acres but specifies a maximum drainage area per 100 linear feet of silt fence on the basis of slope (for example, on slopes less than 2 percent, only one-half acre may drain to a 100-foot section of silt fence).

For post-construction, sites greater than 5 acres are required to treat the water quality volume (WQv) from a 0.75-inch rainfall. The permit includes an equation to calculate the WQv and tables of runoff coefficients on the basis of land use type. An additional volume of 20 percent of the WQv is required for sediment storage and target drawdown times for different BMPs are specified. For sites less than 5 acres, the requirements in the permit are not as specific.

IMPLEMENTATION

Part III.G of the Big Darby Creek construction general permit includes SWPPP requirements to comply with the TMDL. These requirements include the following:

- Riparian setback requirements—generally at least 100 feet (Part III.G.2.b)
- Groundwater recharge requirements (Part III.G.2.d)
- Sampling requirements for sediment settling ponds—a performance standard of 45 mg/L TSS is used (Part III.G.2.h)
- Post-construction control of the water quality volume (Part III.G.2.i)

MINNESOTA STORMWATER MANUAL

Credits to provide incentives for better site design

BACKGROUND

MPCA convened a group of public and private stakeholders to form a Stormwater Steering Committee (SSC). The immediate goal of the SSC was to enhance the effectiveness of existing and emerging state and local stormwater regulatory management programs to build an efficient and understandable regulatory and implementation framework (see <http://www.pca.state.mn.us/water/stormwater/steeringcommittee/index.html>).

RESULT

The SSC formed a Stormwater Design Team, which oversaw the development of a *Stormwater Manual*. The manual was released in September 2006 and is intended as a guidance document to help users identify and appropriately use the best practices to protect Minnesota's water resources from adverse impacts associated with stormwater runoff.



IMPLEMENTATION

The Minnesota *Stormwater Manual* provides guidance on Unified Sizing Criteria for designing stormwater BMPs. Chapter 11 describes a series of stormwater credits that can sharply reduce water quality and stormwater management BMP size requirements and recommendations. This translates directly into cost savings for developers because the size and cost of stormwater conveyance and treatment systems needed for the site are reduced, and less land area is needed for BMPs. The six better site design approaches that could be eligible for water quality volume reduction stormwater credits include:

- Natural area conservation
- Site reforestation or prairie restoration
- Drainage to stream or shoreline buffers
- Surface impervious cover disconnection
- Rooftop disconnection
- Use of grass channels

The manual recommends that a minimum water quality volume of 0.2 watershed inches be required, regardless of the number of credits that a project qualifies for. The *Stormwater Manual* is available at <http://www.pca.state.mn.us/water/stormwater/stormwater-manual.html>.

PORTLAND, OREGON, PHASE I MS4 PERMIT AND TMDL REQUIREMENTS

Demonstrating progress toward achieving assigned Wasteload Allocations (WLAs)

BACKGROUND

Portland was issued its first Phase I MS4 permit in September 1995, and this permit expired in August 2000. The permit was administratively extended while a new permit was developed. Oregon DEQ issued a new Phase I MS4 permit to Portland in July 2005. In the Portland area, TMDLs have been developed for the Columbia Slough watershed and the Tualatin River watershed.

RESULT

The Portland Phase I MS4 permit includes a process by which the MS4 must demonstrate progress toward achieving WLAs by identifying *performance measures* and *pollutant load reduction benchmarks* developed in its stormwater management plan (SWMP).

The relevant language on TMDLs from the Portland permit follows:

- i) Progress towards reducing TMDL pollutant loads must be evaluated by the co-permittee through the use of performance measures and pollutant load reduction benchmarks developed and listed in the SWMP.
- (1) Performance measures are estimates of the effectiveness of various best management practices (BMPs) implemented by the co-permittees as per the SWMP; and they are not numeric effluent limits. Performance measures must, where appropriate, be pollutant reduction estimates. The performance measures for the BMPs addressing TMDL pollutants may be based on the same metrics developed in accordance with the program effectiveness monitoring requirements in Schedule B(1)(c)(i).



- (2) A benchmark is a total pollutant load reduction estimate for each parameter or surrogate, where applicable, for which a WLA is established at the time of permit issuance. A benchmark is used to measure the overall effectiveness of the storm water management plan in making progress toward the wasteload allocation (this estimate will be related to the statistical variability of the underlying data and may be stated as a range), and is intended to be a tool for guiding adaptive management activities. A benchmark is not a numeric effluent limit; rather it is a goal that is subject to the maximum extent practicable standard. The co-permittee must provide the rationale for the proposed benchmark, which includes an explanation of the relationship between the benchmarks and the TMDL wasteload allocations. Any limiting factors related to the development of a benchmark, such as data availability and data quality, must also be included in this rationale.
- ii) The SWMP must describe a program that includes BMPs, monitoring triggers, narrative conditions, or other elements, designed to achieve reductions in the TMDL pollutants. The SWMP must include a specific strategy for implementing monitoring designed to enable the co-permittee to gauge the effectiveness of the SWMP in reducing TMDL pollutant loads to the maximum extent practicable.

IMPLEMENTATION

Portland's SWMP includes the following *performance measures* for new development (these are essentially reporting measures):

- Location (by watershed), number, and type of stormwater management facilities constructed
- Location (by watershed) and number (and percentage of total constructed) of inspections, including overall compliance rate (number and percentage in compliance and number and percentage corrected), by type of stormwater management facility
- Location (by watershed), number, and type of source control measures required by the Stormwater Management Manual

The SWMP includes information on the *pollutant load reduction benchmarks* in Appendix A (summary on page 139 of the SWMP). The benchmarks are expressed with an upper and lower value range and are set for the various parameters in each TMDL watershed.

Portland's Phase I MS4 permit is available at <http://www.deq.state.or.us/wq/stormwater/municipalpl1.htm>. A copy of Portland's SWMP is available at <http://www.portlandonline.com/bes/index.cfm?c=37842>.

BALTIMORE RECOMMENDED MODEL DEVELOPMENT PRINCIPLES

General principles for addressing new development

BACKGROUND

A partnership of stakeholders initiated a process to systematically examine local codes and ordinances to promote more environmentally sensitive and economically viable development.

RESULT

Over a 12-month period, the Baltimore County Roundtable reviewed existing codes and regulations, worked in subcommittees, and reached group consensus on a final set of recommendations. The recommendations were documented in *Recommended Model Development Principles for Baltimore County, Maryland—Consensus of the Builders for the Bay Site Planning Roundtable*.

IMPLEMENTATION

The model development principles for stormwater include the following:

- SW1. Vegetated Open Channels* - Flexible design criteria to promote open section roads and use credits more widely
- SW2. Parking Lot Runoff* - Revise County Landscape Manual
- SW3. Rooftop Runoff* - Direct rooftop runoff to pervious areas rain barrels, cisterns or Green roof
- SW4. Stormwater Management for Infill Projects* - Develop stormwater criteria for infill development
- SW5. Watershed-Based Stormwater Criteria* - Meet with Maryland Department of the Environment to develop revised stormwater criteria for certain watersheds - Develop watershed-based stormwater criteria to reflect receiving water goals
- SW6. Stormwater Management for Open Space Design* - Revise LOSM FS/R
- SW7. Stormwater Infrastructure Maintenance* - Establish a technical group to assess feasibility of stormwater utility
- SW8. Fee-In-Lieu for Redevelopment* - Grant fee-in-lieu only as a last option and review and approve new practices that are appropriate for redevelopment
- SW9. Pollution Prevention* - Establish nonstructural criteria that can be used as credits to apply toward stormwater criteria
- SW10. Rooftop Runoff for Infill and Redevelopment* - Encourage use of green roofs in redevelopment situations
- SW11. Courtyards and Plazas for Infill & Redevelopment* - Site layouts will dictate where this can be used
- SW12. Parking and Streetscapes for Infill & Redevelopment* - Develop impervious cover reduction credits for alternative paver use in certain areas

The recommended model development principles can be downloaded from

http://www.cwp.org/BFB_Maryland.htm

