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Date: August 20, 2007

To: Carol Nankivel, Minnesota Pollution Control Agency

Re: Final Version of Technical Memorandum #3 – Recommendations for Rulemaking

Greetings:

Attached is the final version of Technical Memorandum #3, which addresses Task 3 in the Minnesota Pollution Control Agency's Stormwater Nondegradation Analysis Project (SNAP). The information provided in this Technical Memorandum provides general recommendations on ways to adjust current stormwater permitting programs to accommodate and incorporate nondegradation requirements.

The stormwater permitting and nondegradation program reviews conducted by Tetra Tech found that Minnesota MS4s are conducting the Loading Assessments required by the 2006 General Permit and are moving to address the six minimum control measures for stormwater runoff. We also found that some efficiencies in these processes could be achieved by granting Loading Assessment waivers to MS4s that can demonstrate steady or improving receiving water quality over the past 20 years, and by establishing a framework for watershed-based stormwater permitting through existing watershed districts, joint powers organizations, and other entities.

The information in Technical Memorandum #3 is organized as follows:

Please review this information at your convenience. We are concurrently submitting Technical Memorandum #1 (Review of Modeling Approaches in 30 Selected Municipalities) and Technical Memorandum #2 (Overview of State, Federal, and Judicial Guidance on Antidegradation). The submittal of this final version of this Technical Memorandum completes our obligations under this project. Thank you for offering us the opportunity to work with you in this effort. If you have any additional questions or need more information from us, please do not hesitate to contact me. Thank you for your consideration.

Sincerely,

Barry Tonning, Tetra Tech

Technical Memorandum # 3: Final Report

Recommendations for Nondegradation Rulemaking

I Executive Summary

The Minnesota Pollution Control Agency (MPCA) is considering changes in its stormwater permit requirements regarding nondegradation compliance, which consists of regulatory policy and implementation methods adopted to comply with federal antidegradation rules supporting the Clean Water Act. Although the current Minnesota policy and implementation methods for nondegradation include both point and nonpoint sources, they were developed in 1988 primarily to address municipal and industrial wastewater treatment facilities that discharge into regulated waters. As such, the policy and implementation methods focus mostly on sewage and other waste discharges that are 1) relatively easy to characterize in terms of flows and pollutant loads, 2) subject to strict effluent pollutant limits, and 3) responsive in a predictable manner to treatment system upgrades and alterations.

Applying the existing state nondegradation rules and implementation methods to stormwater discharges permitted as point sources under federal and state law is difficult due to a variety of factors. Stormwater flows and pollutant loads vary widely in accordance with precipitation patterns, the rate of pollutant build-up on the land surface, construction activities, the unique land uses and cover associated with particular drainage areas, and the performance of stormwater pollution prevention and treatment practices. In addition, the current rule lacks specific guidance in how to conduct the analyses required, how they apply to stormwater discharges, and how to establish key benchmarks such as baseline water quality and what constitutes "reasonable" control measures for reducing stormwater impacts on receiving waters. The existing rule may also be deficient in providing Tier II protection to high-quality waters by exempting some new or expanded discharges from nondegradation reviews based on the volume of those discharges, rather than their significance in terms of lowering water quality. In addition, the current rule does not require sponsors of projects that will degrade water quality to demonstrate that they are "necessary," a requirement codified in federal antidegradation rules.

Because of these and other challenges that are described in subsequent sections of this *Technical Memorandum*, Tetra Tech is recommending a multi-pronged approach for addressing nondegradation requirements related to stormwater and other pollutant sources. The recommendations can be summarized as follows:

- Continue to implement the 1988 – 2005 "look back" review of expanded stormwater discharges from MS4s, but grant waivers in areas where receiving water quality improved or remained stable during that period.

- For areas where MS4 stormwater discharges degraded but did not impair water quality, focus MS4 resources on addressing drainage areas with an obvious and high potential for degrading water quality rather than on analytical studies that do not result in stormwater or receiving water quality improvement.

- Continue to implement the general permit program for MS4s through application of the six minimum control measures and targeted management measures that reduce stormwater pollution to the maximum extent practicable.

- Develop a framework for watershed-based permitting that allows MS4s to further integrate their stormwater programs with multi-jurisdictional watershed planning and management activities.

- Consider moderately strengthening the existing Construction General Permit requirements for post-construction runoff controls, and requiring MS4s to incorporate them into the MS4 General Permit minimum control measure which addresses post-construction impacts.

- Incorporate the federal multi-sector general permit monitoring and benchmarking requirements into the industrial stormwater permit program where water quality data indicate potential impacts.

- Review and amend the current Minnesota nondegradation rules to achieve greater consistency with federal antidegradation regulations and US EPA guidance.

It should be noted that in general, the analytical and procedural approach for nondegradation reviews roughly parallels the approach for developing and implementing Total Maximum Daily Loads, with two important distinctions: 1) for nondegradation, the programmatic target is *existing water quality*, rather than use-based minimum *water quality criteria* limits; and 2) dischargers can petition the permit-granting agency to relax nondegradation water quality requirements to accommodate important economic or social development, as long as minimum criteria limits are not exceeded.

In light of these perspectives, the focus for implementing a nondegradation program clearly rests on prevention of water quality degradation through strict controls on activities with the potential to lower water quality, requirements for demonstrating clear benefits when water quality is to be degraded, and engagement of the public and governmental entities in evaluating whether or not the proposed degradation is justified. Supporting these principles requires a robust regulatory program with the capacity for evaluating management practices, establishing oversight requirements, monitoring water quality trends, and assuring compliance with program rules. It is recognized that addressing the recommendations contained in the following sections would require additional resources for reviewing stormwater pollution prevention plans, new development proposals, and so on. The scope of this project does not include these very important concerns, which would require additional analyses of internal resources, program priorities, and potential support for increased workloads.

II Review of Research Findings

As part of this project, Tetra Tech conducted an in-depth review of how the 30 selected municipalities were implementing requirements contained in the draft *Guidance Manual for Small Municipal Separate Storm Sewer Systems* (MPCA, 2006a) which aids permittees in complying with the general permit for municipal separate storm sewer systems (MS4s). Technical Memorandum #1, which was submitted to the MPCA separately, summarizes Tetra Tech's analysis on how the 30 Selected MS4s are complying with the nondegradation modeling and reporting requirements contained in Part X, Appendix D of the draft guidance manual. The basic requirements outlined in the manual include analysis of changes in average annual flow and loading of solids and phosphorus.

Technical Memorandum #2 examined antidegradation policies, regulations, implementation methods, and opinions from federal, state, and judicial sources to determine how they compare to existing Minnesota nondegradation rules. Part VI of this memorandum summarizes some of those findings, which include a determination that there is some lack of consistency between Minnesota rules and the federal antidegradation regulations.

Review of MS4 Loading Analysis Procedures

Technical Memorandum #1 found that the MS4 stormwater permit and the associated draft guidance document require relatively simple analyses that do not address peak flows or other changes in storm hydrographs, site-specific increases in loading, or alterations to the temporal pattern of pollutant loading. While modeling is the preferred approach, the guidance document indicates that other methods, such as the comparison of aerial photography or satellite imagery, could be used if documentation was provided that showed the method to be as effective as modeling and if results were verified by field inspections and or other collaborative data. The guidance document notes that estimating relative changes in annual loads is more important than accurately measuring actual load increases. In addition, the Loading Assessment specified in the guidance does not need to include annual rainfall tables, storm hydrographs, and/or storage and release calculations. Finally, the Loading Assessment does not have to demonstrate pollutant removal from BMPs that have been installed – or that might be installed in the future – or take into consideration ambient water quality conditions or the assimilative capacity of receiving waters.

Tetra Tech reported in Technical Memorandum #1 that the Loading Assessment approaches used by consultants supporting the Selected MS4s appears to be adequate for generating technically acceptable estimates of relative stormwater loads for the selected parameters for baseline, current, and future conditions. The relatively simplified modeling tools being used by the MS4s provide an adequate level of detail and analysis for purposes of the Loading Assessment – detailed/dynamic water quality and watershed models are likely too complex and too expensive for estimating relative changes in stormwater loads over time. The evaluation did not produce specific recommendations for improving the Loading Assessment process for MS4s, but did note that limiting the focus of the analyses on TSS, phosphorus, and flow volumes/rates ignores other parameters, such as pathogens, metals, nutrients, and sediment. In addition, stormwater runoff

can contribute to physical and biological impacts that have the potential to degrade overall watershed health by destabilizing stream channels due to alterations in the storm runoff hydrograph. Tetra Tech's evaluation also noted that the current approach does not directly consider the immediate or cumulative effects of the increased storm flows on the receiving waters, i.e., there is no requirement to assess the assimilative capacity of the receiving waters, or to monitor the receiving waters to track changes in chemical, physical, or biological conditions.

Review of Antidegradation Policies, Guidance, and Court Rulings

A number of legal challenges to state antidegradation policies and procedures have been mounted across the country, including one involving the MPCA. The Minnesota Center for Environmental Advocacy (MCEA) challenged the general stormwater permit for municipal separate storm sewer systems (MS4s) issued by MPCA as not meeting federal and MPCA nondegradation requirements. This led MPCA to begin reevaluating its existing nondegradation policy and procedures and to revise its MS4 permit.

Under the Stormwater Nondegradation Analysis Project, Tetra Tech reviewed the Minnesota nondegradation rules codified at Minn. R. part 7050.1085 and 7050.1080 and other regulations, guidance, and rulings issued by various states, the U.S. Environmental Protection Agency (US EPA), and the courts. Technical Memorandum # 2, which was produced by Tetra Tech as part of this project for the MPCA and submitted separately, contains detailed information collected from the state, federal, and judicial sources targeted for analysis. One section of the memorandum provides a side-by-side comparison of the Minnesota and federal rules.

In general, Tetra Tech found that there were some inconsistencies between the Minnesota nondegradation rules and the federal antidegradation regulation published at 40 CFR 131.12. The portions of the Minnesota regulations that appear to diverge somewhat from the federal rules include the lack of a demonstration of necessity for proposed activities that would lower water quality, which implies at least a rudimentary alternatives analysis; a clear focus on receiving water impacts, generally implemented through assimilative capacity allocations; and other inconsistencies, such as applicability of nondegradation rules to certain regulated activities

Review of the Construction and Industrial General Permit Programs

Tetra Tech also reviewed the general permit programs for construction sites and industrial facilities to determine whether or not they could better accommodate and implement nondegradation policies and procedures. The construction general permit for stormwater discharges appears to be fairly comprehensive, and includes some notable post-construction requirements designed to reduce impacts on receiving waters. Tetra Tech has listed some recommendations for implementing nondegradation requirements into the construction general permit in Section V. The industrial general permit expired in 2002, and is being redrafted by an MPCA workgroup that appears to be using the US EPA multi-sector general permit as a model. Implementation of a permit program based on the federal approach will likely address nondegradation requirements if water quality in the receiving waters is checked periodically as part of a broader program to monitor trends and provide assessment data for watershed management or other water resource programs.

III Recommendations for Adjusting the 1988 – 2005 MS4 Nondegradation Review

Stormwater discharges from all of the Phase II (small) municipal storm sewer systems (MS4s) are covered under the general stormwater permit for MS4s (MPCA, 2006b). All MS4s regulated under the general permit are to develop stormwater pollution prevention programs that meet the requirements of the permit. In addition, the MPCA commissioner selected 30 MS4s for more detailed nondegradation review than the minimum required in the Permit. MPCA based the selection of the 30 cities on the estimated and projected population growth for communities in Minnesota during three time periods: 1990-2000 (based on census data); 2000-2003 (based on projections by the state demographer and metropolitan council); and 2000-2020 (also based on projections from the state demographer and metropolitan council). The MPCA considered the size of the community, as represented by the 2000 census, as well as the growth of the community – both factors the MPCA believes to be closely correlated with increased stormwater flows and pollutant loading.

Requirements for Selected MS4s

The Selected MS4s must submit a Loading Assessment which estimates changes in average annual flow, total suspended solids, and phosphorus from 1988-1990 to the present (2000-2005), and from the present to 2020. The assessment is to be used to help develop a Nondegradation Report, which selects appropriate BMPs that address nondegradation, determines whether additional control measures can reasonably be taken to reduce pollutant loading, and for a few selected MS4s who wish to do so, evaluates the significance of the new or expanded discharge. If pollutant loadings and flow cannot be reduced to levels attained in 1988, the nondegradation report must describe reasonable and practical best management practices (BMPs) that the MS4 plans to incorporate into its modified SWPPP.

The MS4 must then conduct an alternatives analysis and explain which stormwater management alternatives have been studied but rejected, and why. The report must give high priority to BMPs that address future growth. Where increases in pollutant loading and flow have already occurred due to past development, the report must consider retrofit and mitigation options that the MS4 considers to be reasonable, practical, and appropriate to the community.

The MS4 is responsible for developing site specific cost/benefit , social, and environmental information. The proposed modifications to the Stormwater Pollution Prevention Program must go to public notice in the local community, allowing time for comment and revision before submittal to the MPCA. The public comments must be submitted along with the loading assessment, nondegradation report, and proposed modifications to address nondegradation.

Recommendations for adjusting the current approach

In general, Tetra Tech found that the nondegradation compliance approach outlined in the *Guidance Manual for Small Municipal Separate Storm Sewer Systems (MS4s) for General Permit Number MNR040000* (MPCA, 2006a) and the *General Permit Authorization to*

Discharge Storm Water Associated with Municipal Separate Storm Sewer Systems Under the National Pollutant Discharge Elimination System / State Disposal System Permit Program. (MPCA. 2006b) was reasonable and should be continued with some relatively minor adjustments which are presented below. In addition, the requirements for MS4s with increased stormwater flows and pollutant loadings to conduct analyses to determine which BMPs might be appropriate and reasonable in reducing impacts on receiving waters also appears to be logical and practical.

In determining how to proceed forward with Loading Assessments and Nondegradation Reports for the remaining MS4s – and how to evaluating the findings from those activities, it is helpful to review the appeals court decision (*MCEA v. MPCA,* Minnesota Court of Appeals, 2003) that prompted the recent focus on nondegradation requirements for MS4s stormwater discharges. The court ruling provides a considerable degree of latitude for the agency in determining how to address the degradation of receiving waters linked to stormwater discharges from communities containing NPDES-permitted MS4s. The court upheld "MPCA's determination that numerical effluent limitations are not feasible" for stormwater discharges. Of equal importance, however, was the ruling regarding what was required of MS4 dischargers with expanded significant discharges since 1988:

> We conclude that MPCA must comply with subpart 2(B) and determine whether the discharges are in fact expanded discharges. We note that even if 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." Minn. R. 7050.0185, subp. 4. (Emphasis added.)

The MPCA responded to the court's directive to "comply with subpart 2(b) and determine whether the discharges are in fact expanded discharges" by developing the Part X, Appendix D *Nondegradation for Selected MS4s* as part of the *General Permit Authorization to Discharge Storm Water Associated with Municipal Separate Storm Sewer Systems Under the National Pollutant Discharge Elimination System / State Disposal System Permit Program* (MPCA, 2006b). As noted, the nondegradation implementation procedure developed by the MPCA includes a pilot program that requires 30 selected MS4s to conduct a Loading Assessment to determine if the MS4 meets the definition of a new or expanded discharger because of increases in stormwater runoff and pollutant loads for total suspended solids (TSS) and phosphorus since 1988. If a selected MS4 determines that it has a significant new or expanded discharges, Part X requires the MS4 to develop a Nondegradation Report that specifies what best management practices (BMPs) will be reasonably required to return stormwater discharges to 1988 levels, and to propose modifications to the stormwater pollution prevention plan to address nondegradation. In determining which BMPs might be reasonably required, the MS4s and the MPCA are guided by the criteria contained in Minn. R. part 7050.0185 subpart 4:

> 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, the characteristics of the receiving water, the cumulative impacts of all new or expanded discharges on the receiving water, the costs of additional treatment beyond what is required in subpart 3, and other matters as shall be brought to the agency's attention.

In effect, the nondegradation compliance approach for the "look-back" period (i.e., 1988 – 2005) now being implemented on a pilot basis with the 30 Selected MS4s consists of a series of

analyses – the modeling exercise to determine whether or not pollutant flows/loads increased (Loading Assessment), the review of BMPs that might be reasonably applied to address degradation (Nondegradation Report), and consideration of economic and social development linked to degradation caused by increased stormwater flows/loads and the "reasonableness" of any proposed BMPs that might address the degradation.

In some cases, MS4s that expanded their stormwater flows/volumes/loads during 1988 – 2005 have caused or contributed to water quality degradation to the point of use impairment, and will be subject to mandatory flow/volume/load control BMPs as part of their total maximum daily load (TMDL) wasteload allocation in their new stormwater NPDES permit. This process is fairly well established, and results in actions (e.g., required BMP installation) that will likely improve stormwater and receiving water quality over a period of time. Excellent guidance on the general procedure for MS4s to implement load reductions as part of a TMDL-driven, BMP-based wasteload allocation can be found in the *Lake Nutrient TMDL Protocols and Submittal Requirements* (MPCA, 2007).

However, where MS4 stormwater flows/volume/loads have caused degradation but not impairment, the analytical steps summarized above may not result in improvements to stormwater or receiving water quality, i.e., if the municipalities demonstrate that BMPs needed to address stormwater-caused degradation are prohibitively expensive, and that the degradation was caused by activities linked to "important economic and social development" (i.e., expansion in housing, retail sales, commercial growth, etc.), there is no requirement at present that the degradation be reversed. In these cases, nondegradation compliance risks becoming a series of analytical exercises with no guarantee that stormwater or receiving waters will improve.

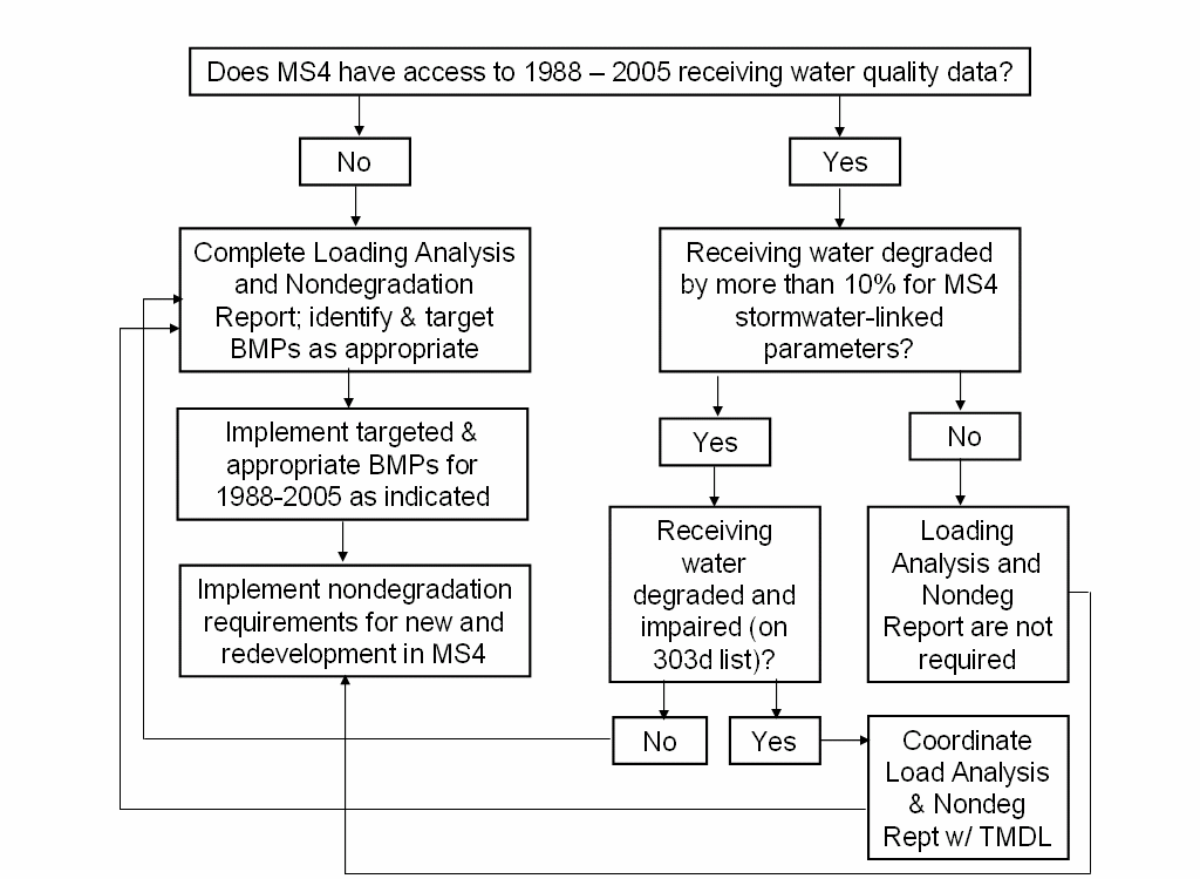
In order to prevent allocation of resources to a process with no clear prospects for improving stormwater or receiving water quality, Tetra Tech recommends that the MPCA focus on receiving water quality trend data in addition to stormwater flows/loads when determining which MS4s need to do "look-back" modeling of 1988 – 2005 stormwater discharges. Because nondegradation – at its core – focuses on impacts to receiving waters, Tetra Tech is recommending that receiving water quality trends be considered as a screening criterion in deciding whether or not specific MS4s must complete Loading Assessments and Nondegradation Reports. Many Minnesota cities have access to water quality data dating back to the mid-1980s and beyond. Municipalities that can cite water quality assessment data that indicate steady or improving water quality during the 1988-2005 "look-back" period should not be required to complete the Loading Assessment and Nondegradation Report unless the data clearly show degradation in receiving waters for a parameter closely linked to municipal stormwater runoff, and there are indications that the municipality might be a significant source of the parameter(s).

Tetra Tech also recommends that all analyses related to BMP review, selection, siting, design, installation, operation, and maintenance be based on the current version of the *Minnesota Stormwater Manual* (e.g., MPCA, 2006). Any future regulations developed that specify such a requirement should specifically mention the *current version* of the manual, so that updates to the manual can be made and can apply immediately without revising the regulations. An additional recommendation involves degradation to stream channels that receive municipal stormwater flows – where expansion of the urbanized area since 1988 has caused significant streambank

erosion and habitat destruction, those flows should be mitigated through BMPs that reduce peak flows and channel banks should be restored, where possible.

For municipalities with expanded discharges to waters that have significantly degraded – but have not become impaired, Tetra Tech recommends that the Nondegradation Reports identify stormsewersheds with high, moderate, and low potential as causes of the degradation. Municipalities would then be required to address the high-potential areas first, and apply appropriate BMPs selected and designed to reduce flows and pollutant loads. If receiving water quality does not improve after the first cycle of BMP applications, the moderate-potential areas would then be addressed during the next permit cycle. The flow chart below summarizes the approach discussed above for addressing degradation that occurred during the 1988 – 2005 "look-back" period.

Figure 1. Recommended Procedure for Nondegradation Compliance Related to the Regulatory "Look-Back" Period (1988 – 2005)



Tetra Tech is recommending that the MPCA build upon the current approach in the construction general permit to address nondegradation compliance issues as urbanized (i.e., MS4) areas expand in the future. For MS4s, the general approach to nondegradation will require that newly developed and redeveloped sites attempt to match pre- and post-development stormwater flows and pollutant runoff to the maximum extent practicable. This approach, which is incorporated into the so-called "low impact development" design principles, can be implemented through the construction general permit requirements for permanent stormwater management

IV Recommendations for Implementing Future MS4 Nondegradation Requirements

The Minnesota Court of Appeals ruling in 2003 required the MPCA to address discharges from MS4s that expanded during the 1988 – 2005 time period, but provided little guidance on how the agency should implement nondegradation policy in the future. The court did uphold the MPCA's determination that additional monitoring requirements are applicable to the circumstances, and that specific monitoring requirements in Minn. R. part 7001.0150 subp. 2 are not applicable to stormwater permits. In light of the court's ruling and in the context of stormwater and antidegradation program implementation across the nation, Tetra Tech recommends that the MPCA continue to implement stormwater permitting and management through a best management practices (BMP) based approach that reduces the discharge of pollutants to the maximum extent practicable. In the absence of any numeric effluent limits for stormwater discharges, municipalities must implement the six minimum control measures in accordance with state and federal guidance. The BMP based approach should be supplemented with modeling studies to predict and address stormwater impacts from large expansions of the MS4 and related increases in stormwater discharges, and tracking water quality trends in the receiving water to ensure that nondegradation objectives are being met. Coordinating stormwater and watershed management would also help address nondegradation and other water resource objectives.

Background on the BMP-Based Approach to Stormwater Management

As noted previously, the analytical and procedural approach for nondegradation reviews roughly parallels the approach for developing and implementing Total Maximum Daily Loads, with two important distinctions: 1) for nondegradation, the programmatic target is *existing water quality*, rather than use-based minimum *water quality criteria* limits; and 2) dischargers can petition the permit-granting agency to relax nondegradation water quality requirements to accommodate important economic or social development, as long as minimum criteria limits are not exceeded.

Because of the difficulties encountered in characterizing stormwater impacts, state and federal regulatory agencies have adopted a BMP-based approach to managing stormwater runoff. This approach lacks the analytical rigor of effluent sampling and effluent limits that control pollutant concentrations/loads in the discharge, but has been deemed to be effective and practical. Moreover, the BMP-based approach can be strengthened to address persistent receiving water quality degradation, or even impairment. A November 2002 memorandum from Office of Wetlands, Oceans and Watersheds Director Robert Wayland III and Office of Wastewater Management Director James Hanlon to the US EPA regional water division directors outlined the agency's expectations for establishing TMDL wasteload allocations for stormwater sources. The approach outlined by Wayland and Hanlon (US EPA, 2002) can be generally applied to nondegradation implementation, because as noted above nondegradation and TMDL analyses share many similarities, except that the analytical endpoints for TMDLs are the water quality criteria, while the endpoints for nondegradation are existing water quality.

> EPA expects 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. When a non-numeric water quality-based effluent limit is imposed, the permit's administrative record, including the fact sheet when one is required, needs to support that the BMPs are expected to be sufficient to implement the WLA in the TMDL . . . . The NPDES permit must also specify the monitoring necessary to determine compliance with effluent limitations . . . Where effluent limits are specified as BMPs, the permit should also specify the monitoring necessary to assess if the expected load reductions attributed to BMP implementation are achieved (e.g., BMP performance data). The permit should also provide a mechanism to make adjustments to the required BMPs as necessary to ensure their adequate performance.

The quantitative approach laid out in the memorandum melds the analytical rigor of numeric standards with the more qualitative BMP-based approach, with a significant caveat: performance of the BMPs must be quantified, at least via literature values or other reasonable estimates, presumably during the planning and modeling stages. The memorandum specifies how this is accomplished for TMDLs that address stormwater discharge wasteload allocations (WLAs) and nonpoint/other pollutant source load allocations (LAs). The text illustrates how stormwater nondegradation requirements might also be met:

> Decisions about allocations of pollutant loads within a TMDL are driven by the quantity and quality of existing and readily available water quality data. The amount of storm water data available for a TMDL varies from location to location. Nevertheless, EPA expects TMDL authorities will make separate aggregate allocations to NPDES-regulated storm water discharges (in the form of WLAs) and unregulated storm water (in the form of LAs). It may be reasonable to quantify the allocations through estimates or extrapolations, based either on knowledge of land use patterns and associated literature values for pollutant loadings or on actual, albeit limited, loading information. EPA recognizes that these allocations might be fairly rudimentary because of data limitations. . . . EPA recommends that for NPDES-regulated municipal and small construction storm water discharges effluent limits should be expressed as best management practices (BMPs) or other similar requirements, rather than as numeric effluent limits . . . The Interim Permitting Approach Policy recognizes the need for an iterative approach to control pollutants in storm water discharges. Specifically, the policy anticipates that a suite of BMPs will be used in the initial rounds of permits and that these BMPs will be tailored in subsequent rounds. EPA's policy recognizes that because storm water discharges are due to storm events that are highly variable in frequency and duration and are not easily characterized, only in rare cases will it be feasible or appropriate to establish numeric limits for municipal and small construction storm water discharges. The variability in the system and minimal data generally available make it difficult to determine with precision or certainty actual and projected loadings for individual dischargers or groups of dischargers. Therefore, EPA believes that in these situations, permit limits typically can be expressed as BMPs, and that numeric limits will be used only in rare instances.

Under the Phase I NPDES Stormwater Program, MS4 permittees conducted stormwater discharge characterization monitoring as part of the permit application process. Phase I MS4s used the sampling data to create a stormwater management program that addressed specific pollutants of concern found in their stormwater collection systems. Phase II MS4s do not have any stormwater discharge characterization requirements, and develop stormwater pollution prevention programs using best professional judgment on the pollutants of concern affecting their systems based on land use and other information. As a result, many SWPPPs are often generic in nature and do not attempt to address specific pollutants found in stormwater discharges. A challenge for the MPCA and MS4s in the state will be to select, site, install, operate, and maintain BMPs that address stormwater impacts to the maximum extent practicable. The *Minnesota Stormwater Manual* (MPCA, 2006c) provides excellent guidance on the full range of MS4 and construction site BMPs, including information on BMP selection, sizing, and

design. It is recommended that the Phase II MS4s incorporate the current version of the *Minnesota Stormwater Manual* into their local BMP selection, design, installation, operation, and maintenance ordinance requirements. Consistency with the standards in the manual is presumed to appropriately address nondegradation requirements for MS4 stormwater discharges.

Prescriptive, Predictive, and Proven Methods for Nondegradation Implementation

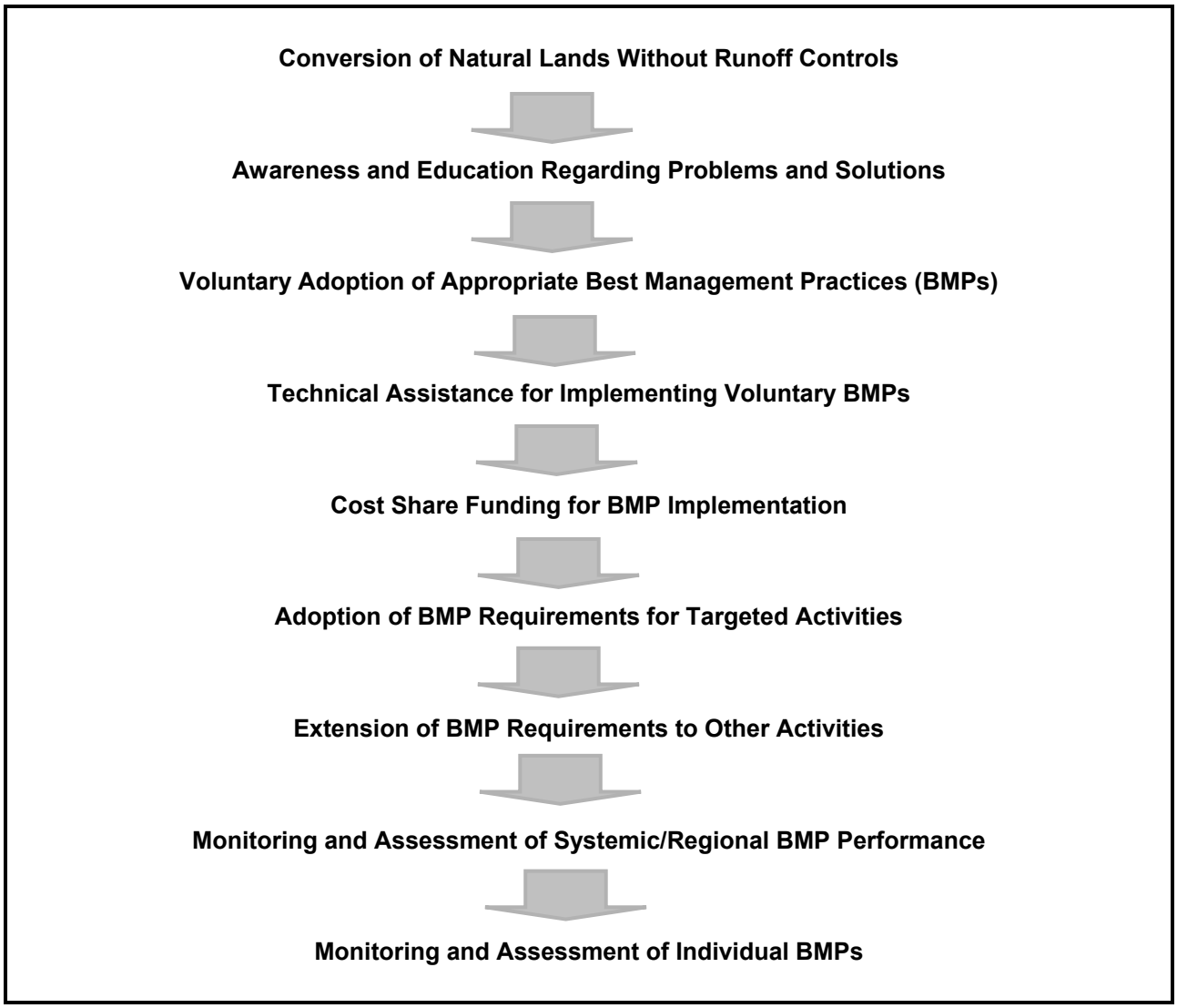
In order to prevent nondegradation implementation methods from becoming a series of analytical exercises without any clear prospects for protecting or improving water quality, Tetra Tech recommends that the MPCA continue to prescribe stormwater BMPs for MS4s, construction sites, and industrial facilities based on the latest version of the *Minnesota Stormwater Manual* (e.g., MPCA, 2006), other technical guidance, and examples from states with similar challenges (e.g., Washington, Pennsylvania, Maryland). In addition, Tetra Tech recommends that large expansions of the MS4 area – and the discharges associated with that expansion – be subject to predictive modeling to ensure that site and regional BMPs can match post development stormwater flows/loads with predevelopment flow/loads. This concept is currently incorporated into the Nondegradation Reports required by the MS4 general permit. Establishment of a goal of no net increase in stormwater peak flows and pollutant loads from large developments (e.g., 20 acres or more) might also be considered, and implemented through site modeling tools and offsets in flows/loads older developed areas, if necessary. This approach is now being contemplated by the Chesapeake Bay New Development Task Group as an approach for addressing nutrient impacts on the bay.

Finally, it is recommended that MS4s partner with watershed districts, joint powers organizations, and/or other public/private entities collecting receiving water quality data to ensure proven compliance with nondegradation policy objectives. This approach – implementation of nondegradation policy through methods that are prescriptive, predictive, and proven – provides a balance between efforts targeting BMP-mitigated discharges and those focused on impacts to the receiving water, and the consumption of assimilative capacity for pollutants of concern. Implementation of this approach involves the establishment of BMP requirements by the MPCA through stormwater permits (e.g., post-construction controls in the current construction general permit),

Nondegradation implementation methods that are prescriptive, predictive, and proven – i.e., that are based on site-specific BMPs, modeling studies of large stormwater-generating areas (where appropriate and/or indicated), and ongoing monitoring of receiving waters to track water quality trends – offer a practical approach for protecting receiving water quality. All of the states – including Minnesota – have adopted a BMP-based approach for meeting US EPA's requirements that small regulated MS4s "develop, implement, and enforce a storm water management program designed to reduce the discharge of pollutants from (their) MS4 to the maximum extent practicable (MEP), to protect water quality, and to satisfy the appropriate water quality requirements of the Clean Water Act" (40CFR122.34). The alternative – implementing monitored BMPs with specific, numeric effluent limits – has been somewhat rare in the stormwater permitting arena. There are a growing number of cases where municipalities have received a numeric wasteload allocation for stormwater as part of a TMDL, but the calculated load has been generally applied to effluent from designated stormwater outfalls collectively,

without any requirements for effluent monitoring or sampling of the output of specific BMPs. The diagram on the following page presents a conceptual approach of how management practices are incrementally strengthened to address water quality degradation or impairment.

Figure 2. Conceptual BMP Approach for Addressing Water Quality Degradation



Integrating Stormwater and Watershed Management

Because BMP based approaches for addressing water quality degradation are somewhat limited, it is imperative that some attention be focused on receiving water quality trends. Collecting and analyzing surface water quality data and producing assessments based on those data are beyond the current requirements for small MS4s – but these activities are being conducted by watershed districts and other entities in Minnesota involved in water resource management. Partnerships between MS4s and these entities could help to address nondegradation policy and other regulatory and nonregulatory objectives.

The MPCA has demonstrated strong leadership in overseeing programs that are clearly under the purview of the state's major water resources regulatory agency. Staff from the MPCA have developed policies, procedures, guidance, and other technical requirements for monitoring water quality, issuing effluent discharge and other permits, conducting Total Maximum Daily Load (TMDL) and other studies, and complying with state and federal regulations. Because of this leadership and the agency's capacity for establishing technical standards for regulatory compliance, Tetra Tech recommends that the MPCA continue with current activities related to the development of watershed-based permitting for stormwater and other water resource permits. Implementation of this recommendation will require significant cooperation, coordination, and communication among the state's various public agencies, such as the MPCA, the Department of Natural Resources (DNR), Bureau of Water and Soil Resources (BWSR), and others. In addition, for such an approach to function locally, strong commitment will be needed from the watershed districts, watershed management organizations, and other entities involved in water resource management in Minnesota (e.g., joint powers organizations, lake improvement districts, conservation districts, etc.). US EPA regulations and guidance allow states wide flexibility in structuring and operating their MS4 permit programs (Code of Federal Regulations, 40CFR122.33-35; USEPA, 2003).

Tetra Tech and Schilling Consulting Services conducted detailed research on various issues and approaches for pursuing such a framework in the 2006 study entitled *Framework for Integrated Watershed-Based Stormwater Permitting in Minnesota*. In general, the document describes a variety of scenarios whereby municipalities could be regulated as individual or multiple permittees under the strict oversight of the MPCA, with the ability to enter into legally binding agreements that could enable a watershed district or consortium of municipalities to serve as the permittee, if approved by the MPCA. The prospect of coordinating permit activities and implementing solutions to water resource challenges on a watershed basis, through the engagement of local entities, was also endorsed by the Minnesota Office of the Legislative Auditor in its 2007 *Evaluation Report: Watershed Management*, which notes that

> Minnesota's water problems require effective local-level management . . . According to PCA, 86 percent of Minnesota's water pollution now comes from nonpoint sources, the combined effects of runoff from individual land parcels. Further, more rapid runoff can also cause flooding. Locally-based entities are better positioned than state agencies to work with individual landowners to address runoff. First, land-use planning and regulation, which are local functions in Minnesota, have a large impact on nonpoint source pollution and flooding. Second, local officials are often better equipped than state officials to work with local landowners and encourage them to reduce runoff by carrying out best management practices on their land.

Watershed-based permitting could help to address impacts from privately owned urban infrastructure that contribute to water quality degradation, but are not part of the MS4 and are not currently covered under other NPDES permit programs. [Note: Privately owned infrastructure (parking lots, shopping centers, etc.) discharging into an MS4 – so called "non-NPDES permitted point sources" – can be designated by the state NPDES director as requiring NPDES stormwater permit coverage under 40 CFR 122.26 under certain conditions. Legal petitions requesting that such infrastructure be covered by NPDES permits have been filed in some states, and will be continued to filed where privately owned facilities discharging to MS4s are believed to causing or contributing to a violation of water quality standards (Kilian, personal communication, 2007).]

Implementing a watershed-based permit program would likely require the development of an MPCA-approved, locally-managed water quality monitoring and assessment system that is capable of multi-parameter analyses, trend-tracking, and compliance reporting. States are building similar programs by integrating data from multiple sources and organizing the results via metadata-defined tiers developed to accommodate various data uses (e.g., screening or compliance level data). With its plethora of watershed districts, organizations, associations, and other public/private entities, Minnesota may be well-positioned to craft such a system, which could aid in determining whether or not degradation was occurring in waterbodies that receive stormwater discharges from MS4s, construction sites, and/or industrial facilities.

A framework for watershed-based stormwater management is being implemented in Pennsylvania, and addresses both antidegradation and NPDES permit requirements. Under Pennsylvania's Stormwater Management Act (Act 167), counties are required to develop a watershed based stormwater management plan that is implemented by affected municipalities through municipal ordinances. 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. The Pennsylvania Department of Environmental Protection (DEP) administers a reimbursement and grant program under the Stormwater Management Act for counties to prepare the comprehensive watershed plans to regulate activities and development that may cause accelerated stormwater runoff. Municipalities implement the plans through the enactment or amendment of local ordinances.

In 2002, DEP updated the stormwater policy to address the need to improve water quality, sustain water quantity (including groundwater recharge and stream base flow) and integrate stormwater permitting requirements. DEP adopted a best management practices approach to stormwater management that generally encourages the minimization of runoff by allowing stormwater to infiltrate the ground whenever possible and requires the management of any net increases in quantity of runoff. The approach is designed to reduce surface water pollution, provide for groundwater recharge, enhance stream flow during times of drought and reduce the threat of flooding and streambank erosion resulting from storms. Stormwater management plans for more than a hundred watersheds have been approved by DEP. All plans approved since 2001 include specific components to enhance protection of water quality, groundwater recharge, and groundwater recharge areas.

The MPCA does not have a watershed based permit at present, but has been funding and participating in long-term studies addressing the coordination/integration of planning efforts in a manner which would more effectively accommodate regulatory requirements. Further development of an MPCA-approved framework for integrating stormwater permitting and watershed management activities would help to address nondegradation, permitting, and other programs in an efficient and effective manner. Integrating stormwater, nondegradation, and watershed management programs would particularly aid in detecting degradation in the receiving waters. In the event water quality is confirmed as trending downward, the management program would respond by conducting focused studies on the source of the degradation, and address the sources through targeted BMPs as discussed in the first part of this section.

V Recommendations for Implementing Future Construction and Industrial Stormwater Nondegradation Requirements

Implementation of MS4 nondegradation policy in the future will largely be driven by best management practices applied to new development, redevelopment, with some additional requirements for industrial facilities that are regulated separately, under the industrial stormwater permitting program. This section discusses a BMP-based approach for nondegradation policy implementation, supplemented by modeling for large developments and receiving water quality trend-tracking to provide some assurance that nondegradation objectives are being met, as discussed in the preceding section.

Implementing Nondegradation Policy for Construction Stormwater Permits

Minnesota's construction general permit (MPCA, 2003) provides a significant tool for addressing degradation in waters that receive stormwater runoff from construction sites, new development, and redevelopment. This permit, which expires in 2008, can be strengthened to ensure that water quality impacts linked to newly developed and redeveloped areas is kept below levels that would degrade receiving waters.

The current construction general permit contains provisions that appropriately address construction phase impacts from erosion and sediment runoff to receiving waters. Tetra Tech has identified some proposed measures that should be considered to address nondegradation policy objectives for construction phase, good housekeeping, and post construction runoff for newly developed and redeveloped areas. These recommendations are summarized below. It should be noted that the MPCA is currently reviewing the existing construction stormwater general permit in anticipation of permit renewal in 2008. The recommendations below are provided to supplement the discussions pertaining to the permit review, and have not been subjected to a full analysis of potential implementation issues such as cost and feasibility. It is expected that such analyses will be part of the permit review and nondegradation implementation discussions.

- The permit should express an overall goal that newly developed or redeveloped sites match predevelopment flows and pollutant loads as closely as possible to address the potential for degradation from those areas. This goal would be expressed as a general goal for all sites initially, with requirements for meeting the goal applied to large sites during the next permit cycle (see below), and to smaller sites over the next permit cycles. Pennsylvania includes similar requirements for new development and redevelopment as part of its small MS4 (i.e., not construction) General Permit

- Part II B.1.b of the construction general permit requires that "(f)or certain projects or common plans of development or sale disturbing 50 acres or more, the application must be submitted at least 30 days before the start of construction activity. This requirement pertains to projects that have a discharge point on the project that is within 2000 feet of, and flows to, a special water listed in Appendix A, Part B. or waters listed as impaired under section 303(d) of the federal

Clean Water Act." Tetra Tech recommends that MPCA consider lowering the threshold for this requirement to 25 acres, to ensure a more thorough review of projects with the potential to degrade special waters and impaired waters. It is also recommended that the submittal period be increased to 60 days prior to the start of construction activity, to allow adequate time for review of the stormwater pollution prevention plans. This recommendation also applies to Part II B.3.b of the construction general permit. Some states are considering a requirement that construction projects that disturb more than 25 acres seek individual permit coverage, a consideration that might also be part of the MPCA's construction general permit discussions. The MPCA might also consider individual permits for construction projects of five acres or more that discharge to outstanding resource value waters.

- It is recommended that a pre-construction meeting of the permittee, excavation contractor, SWPPP preparer, and permittee's inspector be conducted at the site prior to any earth disturbing activities for all projects that will disturb ten acres or more. The purpose of the meeting will be to review the SWPPP, outline permittee, contractor, and other responsibilities, and establish how permit compliance and SWPPP implementation will be handled as the project phases roll out.

- Part III B. of the construction general permit specifies requirements for temporary sediment basins where ten or more acres drains to a common location. Tetra Tech recommends that one or more (i.e., sequential) sediment traps be installed to treat runoff where five to ten acres of disturbed area drains to a common location. Temporary sediment traps with earthen berms and rock outlets should be specified for these areas, using the same sizing criteria as those listed for sediment basins. Where sediment basins or traps are not attainable (see Part III B.5), it is recommended that disturbed areas be stabilized within ten days after grading work in the area has ended.

- Part III C. of the construction general permit addresses the permanent stormwater management system. The introduction to this section states that "Where a project's ultimate development replaces vegetation and/or other pervious surfaces with one or more acres of cumulative impervious surface, a water quality volume of ½ inch of runoff from the new impervious surfaces created by the project must be treated by one of the methods outlined" in the section. Tetra Tech recommends that the MPCA consider lowering the threshold for treating runoff from these areas to 20,000 sq ft of impervious area to ensure that newly developed and redeveloped areas do not contribute to receiving water quality degradation. Under the current approach, an acre of pervious area in a MS4 could be replaced with nearly an acre of impervious surfaces without any post construction runoff controls being required. After private development occurs, the built facility will begin discharging to the municipality's separate storm sewer system as an unpermitted source of stormwater, and the MS4 will have no leverage to require runoff controls unless the facility is designated by the MPCA director as requiring stormwater permit coverage. Instituting stormwater management controls during the development phase provides at least some assurance that stormwater impacts to the receiving waters will be reduced.

- Also in Part III C., the MPCA should consider that excavation and compaction of soil in areas that will be landscaped might significantly affect the infiltration potential of those areas,

making their classification as "pervious areas" somewhat misleading. Areas of undisturbed vegetation and soil should be considered pervious areas for the purposes of Part III C.; areas that have been excavated, compacted, and landscaped should be assessed to determine the extent of their infiltration potential.

- The current construction general permit post construction stormwater management system requirements do not address potential phosphorus loadings from the site, except loads transported via soil erosion and sediment loss. Tetra Tech recommends that projects that disturb 20 acres or more develop a model calculating the potential phosphorus load in stormwater runoff from the site after construction has been completed, and specify management practices designed to address those loads. This modeling could include provisions similar to those enacted in Pennsylvania, that specify that persons involved in the development of post-construction stormwater management plans prepare a comparative pre- and post-construction stormwater management analysis. Planning objectives for this analysis include a demonstration that post-construction infiltration equals or exceeds pre-construction infiltration, maximum use of infiltration and water quality treatment BMPs, and management of volume and rate of stormwater discharges. The approach outlined above should be phased in over the next two permit cycles to address sites larger than 10 acres, and sites larger than 5 acres that drain to an ORVW.

- Part IV E. of the construction general permit addresses inspection requirements for the site. The inspection report should include some indication of inspector qualifications (i.e., experience, training, certification, etc.).

- Part IV F. of the construction general permit addresses pollution prevention management measures. This part should clearly (re)state that discharges not composed entirely of stormwater are prohibited. Detailed management measures for material storage (e.g., fertilizers, etc.), concrete truck washout, paint and stucco cleanup, fuel storage, and other good housekeeping practices should be incorporated into the new permit.

- The permittee should designate who will own, operate, maintain, and manage the permanent stormwater management facilities, and provide property access easements for all stormwater management facilities that will be discharging into any publicly owned stormwater system or waterbody. This information should be provided in a permanent stormwater control plan that discusses how the project intends to provide permanent BMPs for the control of pollution from stormwater runoff after construction has been completed. Operation and maintenance task and schedules for all structural components should be included in the plan.

- Currently, the MPCA does not require that the construction general permit requirements be incorporated into the post construction ordinances of the local MS4s as part of their general permits. Incorporating these requirements – even by reference – would facilitate the development of local MS4s as qualifying local programs under the US EPA guidance, and promote consistency in state and local development plan reviews. If the MPCA implements a watershed based permitting system that includes MS4 and construction stormwater requirements, this provision could be extended to the designated regulatory authority in those areas as well.

- Tetra Tech staff were not able to determine whether or not construction and post construction requirements in the construction general permit were to be designed, constructed, operated, and maintained in accordance with the current MPCA *Minnesota Stormwater Manual* (e.g., MPCA, 2006) if design requirements were not otherwise noted. This requirement should be specified.

- For projects that will disturb more than 10 acres, Tetra Tech recommends that an MS4 or MPCA stormwater staff member meet with the developer and project design engineer at the site for a pre-design conference before any project designs or plans are produced. This meeting would provide an opportunity for the developer to discuss plans for the site, and for the group to discuss existing site features, the proposed project, and how to meld objectives from all parties into a plan that reduces stormwater impacts. The meeting will also help to ensure that permanent stormwater management structures (swales, ditches, ponds, etc.) are sited in a manner that facilitates post construction operation, maintenance, and management.

- Construction site runoff monitoring is being instituted in some states (e.g., Washington) during the next permit cycle. Guidance for construction site monitoring is available from the Washington Department of Ecology (2006).

In developing these and other modifications for the new construction general permit, Tetra Tech recommends that the MPCA consider the shifts identified by the Center for Watershed Protection (2005) regarding how stormwater runoff is managed at development sites:

1. A greater emphasis on on-site runoff reduction using innovative site design practices;
2. A unified approach to manage stormwater employing four to five defined sizing criteria;
3. Increased runoff volume requirements for water quality treatment and pollutant removal;
4. New requirements that promote greater infiltration and groundwater recharge at the site;
5. New storage and release requirements to protect urban streams from severe erosion; and
6. Explicit numeric guidance on how to use modeling tools to size stormwater BMPs.

The Center for Watershed Protection also identified five key factors that comprise an ideal approach to stormwater sizing criteria, i.e., those that will:

1. Perform Effectively: Manage enough runoff volume to actually solve the stormwater problem it is intended to address.
2. Perform Efficiently: Manage just enough runoff volume to address the problem, but not over-control it. More storage is not always better, and can greatly increase construction costs. In most cases, the cost of a particular sizing criteria is a direct function of the storage volume required for a best management practice.
3. Be Simple to Administer: The criteria should be understandable, relatively easy to calculate with current hydrologic models, and workable over a range of development conditions and intensities. In addition, criteria should be clear and straightforward to avoid needless disputes between design engineers and plan reviewers when they are applied to development sites.
4. Promote Better Site Design: The criteria should be structured in a manner so that designers have real incentives to reduce storage volumes (and costs) by minimizing site impervious cover and applying better site design techniques.
5. Be Flexible to Respond to Special Site and Watershed Conditions. A "one size fits all" approach should be avoided in a state-wide stormwater management approach. Criteria need to be flexible (expanded or reduced) to account for unique water resource objectives, and to be modified or eliminated in certain development situations where they are inappropriate or infeasible.

Recommendations for Industrial Stormwater Nondegradation Reviews

The goal of the industrial stormwater permit program is to reduce the amount of pollution that enters surface and ground water from industrial facility stormwater runoff through developing and implementing an effective storm water pollution prevention plan that specifies best management practices for managing stormwater runoff, or by meeting the requirements for certifying a condition of "no-exposure" of potential contaminants to stormwater. Stormwater discharges associated with 11 categories of industrial activities are regulated through the use of National Pollutant Discharge Elimination System (NPDES) permits. Facilities that need a permit must develop and implement a SWPPP that is designed to eliminate or minimize stormwater contact with significant materials that may result in polluted stormwater discharges from the industrial site. The SWPPP must incorporate specific BMPs applicable to the site. US EPA and delegated states – such as Minnesota – issue permits to specified industrial facilities and ensure compliance with program rules. Public (municipal) and private operators of industrial facilities included in one of the 11 categories of industrial activity defined in the federal regulations by an industry's Standard Industrial Classification code or a narrative description of the activity found at the industrial site must apply for a permit. Facilities may be eligible for the conditional no-exposure exclusion from permitting provided their industrial materials and activities are entirely sheltered from stormwater. The conditional no-exposure exclusion applies to all regulated categories of industrial activity, except construction activity. Regulated sites must obtain an NPDES permit or certify eligibility for the no-exposure exclusion.

Minnesota's NPDES General Stormwater Permit for Industrial Activity (MN G611000) expired in 2002. A work group has been meeting to discuss development of a new permit, based in part upon the recently issued US EPA proposed *Multi-Sector General Permit for Stormwater Discharges Associated With Industrial Activity* (2006). A review of the meeting notes posted by the work group indicates a fairly comprehensive discussion regarding nondegradation and industrial stormwater discharges to impaired waters. It was not clear whether or not the group had discussed specific nondegradation thresholds, e.g., use of a certain percentage of assimilative capacity for parameters such as TSS or temperature, restricting flow velocities/volumes to prevent erosion of the receiving channels, etc.

In general, Tetra Tech would consider consistency with the US EPA multi-sector general permit (MSGP) as meeting basic nondegradation requirements. The requirements for no exposure, SWPPPs, good housekeeping, benchmark monitoring, spill prevention/control, and other aspects of the federal MSGP provide adequate assurance that facilities complying with permit provisions will not significantly degrade water quality. In addition, the MSGP provisions for industrial stormwater discharges to impaired waters or waters subject to a TMDL provide a framework for implementing nondegradation reviews in cases where regulated industrial facilities are believed to be a significant source of receiving water degradation. As a general rule, the MPCA could determine that de minimis pollutant discharges from regulated industrial facilities would not be subject to further nondegradation review if the facility is complying with its stormwater discharge permit. De minimis could be defined as use of no more than ten percent of the available assimilative capacity for the parameter of concern in the receiving water segment, calculated at the storm flow associated with the discharge under review.

If MPCA decides to conduct nondegradation analyses of industrial stormwater impacts through an assimilative capacity approach, the permittees could estimate current stormwater pollutant loads from the permitted area through representative stormwater sampling and determine the impact on water quality conditions by examining the subsequent reduction in the assimilative capacity of the receiving waterbody for the specific parameters in the facility's stormwater runoff. Depending on the amount of assimilative capacity consumed by the estimated stormwater loads, industrial and construction stormwater permittees could identify and implement additional control measures to achieve the needed load reductions.

VI Recommendations for Improving Consistency with Federal Antidegradation Rules

The objective of nondegradation policies and implementation methods are to ensure that receiving waters are not degraded by new or expanded activities that are governed by state permit or other regulatory programs. In Minnesota, the nondegradation rules also include impacts from nonpoint sources of pollution, but there does not appear to be any effort to apply nondegradation compliance actions (e.g., loading assessments, nondegradation reports) to these sources (row crop agriculture, timber harvesting, etc.).

Tetra Tech reviewed the Minnesota nondegradation rules codified at Minn. R. part 7050.1085 and part 7050.1080, and other regulations, guidance, and rulings issued by various states, the U.S. Environmental Protection Agency (US EPA), and the courts. Technical Memorandum # 2, which was produced by Tetra Tech as part of this project for the MPCA and submitted separately, contains detailed information collected from the state, federal, and judicial sources targeted for analysis. One section of the memorandum provides a side-by-side comparison of the Minnesota and federal rules (see Technical Memorandum #2).

In general, Tetra Tech found that there were some inconsistencies between the Minnesota nondegradation rules and the federal antidegradation regulation published at 40 CFR 131.12. The portions of the Minnesota regulations that appear to diverge somewhat from the federal rules are addressed in the following subsections.

Demonstrating necessity of degradation through analysis of alternatives

Minnesota rules do not contain a requirement that a proposed lowering of water quality by a regulated activity "is *necessary* to accommodate important economic or social development in the area in which the waters are located" (40 CFR 131.12(a)(2). (Emphasis added.) Minnesota's rule at Minn. R. 7050.0185 Subp. 4, which roughly parallels the section of the federal antidegradation rule cited above, does not contain a requirement to demonstrate the *necessity* of a proposed discharge that would presumably lower water quality, but rather states that "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."

The Minnesota rules adds that 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." The distinction between requiring a demonstration of necessity for the lowering of water quality vs. a requirement that MPCA determine whether or not "additional control measures . . . can reasonably be taken" avoids any implication that the person proposing to lower water quality conduct an *analysis of alternatives* to the proposed project, to show that it is necessary for providing some sort of community benefit(s). Many states – and US EPA guidance – have adopted the view that a demonstration of necessity for the proposed project requires an alternatives analyses. The Pennsylvania Department of Environmental Protection's (DEP) *Water Quality Antidegradation Implementation Guidance* (2003) clearly spells out what an alternatives analysis might include:

> With regard to (high quality and exceptional value) waters, existing quality must be protected by applicants proposing discharges directly to these waters or upstream from these waters. A pre-permit nondischarge alternatives analysis must be conducted prior to DEP considering a proposed discharge. Alternatives to new, additional, or increased point source discharges to surface waters must be used where they are cost-effective and environmentally sound . . . These alternatives, depending on the nature of the activity, may include land application of wastewater, an alternative discharge location, the use of holding facilities coupled with wastewater hauling, and buffer zones for proposed earth disturbance.

The US EPA *Region 8 Guidance: Antidegradation Implementation* (1993) also highlights the importance of an alternatives analysis for Tier 2 (i.e., high quality) waters:

> 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

It should be noted that any non-discharge alternative would include at least some consideration of a discharge to soil, for new or expanded NPDES permitted activities such as stormwater and wastewater discharges (e.g., soil-discharging decentralized wastewater management systems rather than expansion of a surface water discharging treatment plant). Of course, such analyses would necessarily consider the infiltrative properties of the soil, the nature of the discharge, its compatibility with soil discharge/treatment, and regulatory requirements of the underground injection control (UIC) program for Class V injection wells.

Projecting impacts via assimilative capacity analysis

The Minnesota nondegradation rules at 7050.0185 Subp. 2(G) contain other inconsistencies with the federal rule and some provisions that make the rules difficult to apply to stormwater discharges. For example, the Minnesota nondegradation rules define a significant discharge as "(1) a new discharge of sewage, industrial, or other wastes greater than 200,000 gallons per day

to any water other than a class 7, limited resource value water; or (2) an expanded discharge of sewage, industrial, or other wastes that expands by more than 200,000 gallons per day and that discharges to any water other than a class 7, limited resource value water; or (3) a new or expanded discharge containing any toxic pollutant at a mass loading rate likely to increase the concentration of the toxicant in the receiving water by greater than one percent over the baseline quality."

While the third part of the definition above introduces and endorses the concept that assimilative capacity of the receiving waterbody is an important consideration for nondegradation of those waters, the approach outlined in the rule and in the 1988 MPCA *Guidance Manual for Applying Nondegradation for All Waters (Non-ORVW) in Minnesota* and the *Guidance Manual for Applying Nondegradation Requirements on Outstanding Resource Value Waters in Minnesota* (1988a) generally does not apply an assimilative capacity approach to considering receiving waterbody degradation for non-toxic pollutants, do not contain any information on how to apply the rules to NPDES permitted stormwater discharges, and do not consider habitat factors (substrate quality, habitat structure, channel stability, riparian conditions, etc.) in the nondegradation review.

In applying an assimilative capacity approach, it will be necessary to define how baseline water quality will be defined (e.g., based on 1988 water quality assessments if known, extrapolation of 1988 water quality from nearly waters, sampling over one or two years, etc.). In addition, the MPCA should consider defining what constitutes "significant" degradation (e.g., use of 10 percent or more of the available assimilative capacity of the receiving water), and how to address cumulative impacts and degradation caused by elevated temperatures linked to pavement runoff or other sources.

Application of nondegradation requirements to regulated activities

In terms of guidance for applying the nondegradation rules, the first manual cited above states that

> the MPCA conceivably could use this rule to establish regulatory controls on activities that heretofore have not been routinely regulated by means of NPDES and state disposal system permits. For example, the nondegradation provision could be applied to dredge and fill activities (§ 402 and § 404 permits), § 401 of the Clean Water Act certifications, stormwater management, state feedlot permits, and superfund actions. Presently, the MPCA does not intend to rigorously apply nondegradation review to all new or expanded discharge activities that may degrade water quality.

This approach is not consistent with current guidance from US EPA and diverges from existing practice in many of the states, which do apply antidegradation rules to dredge and fill (Clean Water Act § 404) permits, for example.

Tetra Tech found other inconsistencies between the federal and state rules, ranging in actual and perceived significance, that further warrant some consideration of a nondegradation rule revision, which the MPCA is now reviewing. Improving consistency with the federal rule, clarifying the nondegradation policy, including procedures for stormwater analyses, addressing temperature and cumulative impacts of certain pollutants, specifying protocols for establishing

baseline water quality, and developing a new document outlining implementation methods for the policy would help both dischargers and agency staff in the execution of their responsibilities.

Defining Criteria for Tier 3 Protection

Minnesota rules divide the highest quality waters (outstanding resource value waters or "Tier 3" waters) into two categories: prohibited discharge and restricted discharge. Fifteen water bodies are designated for no new or expanded discharge. This is the approach other states use for Tier 3 waters. Approximately 85 water bodies are designated for restricted discharge (i.e. when there is not a "prudent and feasible alternative to the discharge.") This is the approach other states use for Tier 2 waters. It is recommended that the MPCA clearly designate special protection requirements for the so-called "Tier 2 ½" waters; i.e., setting de minimis impacts at 5 percent, requiring that alternatives be considered that cost 20 percent more than the proposed, degrading alternative, etc.

For the prohibited discharge (Tier 3) waters, the rules need to establish that any degradation be minimal and temporary – i.e., that impacts be confined and controlled, and that they occur for weeks rather than months, and in no case more than six months. Enhanced general permit requirements for minor activities (culvert replacements, utility crossings, etc.) can provide a basis for allowing "short-term, temporary, and non-significant" impacts in Tier 3 situations if the requirements are sufficiently stringent and activities are monitored.

Proposed Minnesota Nondegradation Rule Changes

On July 16, 2007, MPCA proposed a number of changes to the state's water quality standards, including the text of the nondegradation requirements for all waters and outstanding resource value waters. The revisions of Minnesota Rules, Chapter 7050 includes the addition of the following text to 7050.0185, Nondegradation of All Waters, under Subpart 1, Policy:

> Existing beneficial uses and the water quality necessary to protect the existing uses must be maintained and protected from point and nonpoint sources of pollution. It is the policy of the agency that water quality conditions that are better than applicable water quality standards and are better than levels necessary to support existing beneficial uses must be maintained and protected unless the commissioner finds that, after full satisfaction of this part, a lowering of water quality is acceptable. In allowing a lowering of water quality, the existing beneficial uses must be fully maintained and protected and the provisions in subpart 3 must be applied.

The addition of this text will help improve general consistency between state and federal antidegradation requirements. However, it should be noted that where the proposed Minnesota regulation allows "a lowering of water quality" when it is found to be "acceptable," the federal regulations permit degradation of so-called "Tier 2" or "high quality" waters only after the state finds:

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.

According to the Statement of Need and Reasonableness (SONAR) which accompanies the propose rule revisions, the insertion of the text above and other minor changes to the nondegradation regulations for all waters will not alter the existing approach. The SONAR states that "(t)he Agency's intent is to correct these two defects in Minn. R. 7050.0185 without changing the level of nondegradation protection that the current rule provides, or how nondegradation to all waters is implemented. That is, the proposed changes will make the nondegradation language neither more lenient nor more stringent."

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