National Municipal Stormwater Alliance

Municipal stormwater professionals
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June 17, 2016

Water Docket
U.S. Environmental Protection Agency
Docket No. EPA-HQ-OW-2015-0335-0001

RE: Draft EPA-USGS Technical Report: Protecting Aquatic Life from Effects of Hydrologic Alteration EPA-HQ-OW-2015-0335-0001

The National Municipal Stormwater Alliance (NMSA) appreciates the opportunity to comment on the Agency's Draft EPA-USGS Technical Report: Protecting Aquatic Life from Effects of Hydrologic Alteration EPA-HQ-OW-2015-0335-0001.

NMSA is a new organization comprised of and focused on the issues and concerns of MS4 permittees throughout the United States. Our member organizations are state and regional-level coalitions of MS4 permittees.

We have found this Report to be a valuable and sound technical document. It provides useful information on an important topic that is of great interest and concern for professionals working in the fields of water quality and surface water management. This Report is a timely contribution to our fields and we appreciate the efforts of EPA and USGS to produce it.

Our specific comments on this Report are as follows:

1. Page 29 of the Report includes this text: "In addition, impervious surfaces reduce base flow in the days or weeks after a storm event as a result of reduced infiltration and groundwater recharge."

   This statement, and all the conclusions and recommendations supported by this concept, may be inaccurate or incomplete. Studies on the Upper Vermillion River in Minnesota showed that water sources associated with urbanization (lawn watering, irrigation, septic systems, leakage from drinking water and sanitary sewer pipes) offset

the reduced infiltration and groundwater recharge because of impervious surfaces associated with urbanization.

1. Erickson, T.O., Stefan, H.G. 2008. Streamflow analysis on the Upper Vermillion River in Dakota County, Minnesota. Saint Anthony Falls Laboratory Project Report no. 507. University of Minnesota, Minneapolis, Minnesota
2. Erickson, T.O., Stefan, H.G. 2009a Groundwater recharge in a coldwater stream watershed during urbanization. Saint Anthony Falls Laboratory Project Report no. 524. University of Minnesota, Minneapolis, Minnesota
3. Erickson T.O., Stefan, H.G. 2009b. Projecting natural groundwater recharge response to urbanization in the Vermillion River watershed, Minnesota. Journal of Water Resources Planning and Management 135(6) 512-520

The result of this offset was that there was no reduction in base flow to the stream because of urbanization. It should be noted that these studies covered a long period of time (1982 to 2006) that included the significant urbanization of the watershed for the Upper Vermillion River. The water utility pipes that were partial sources of the offsetting leakage were mostly new systems installed as part of the urbanization during this time period. These were not old and deteriorated piping systems.

The concept that urbanization results in reduced shallow groundwater and base flow is widely believed. This Report appears to suggest that this concept should be part of the basis for the development of water quality standards and water regulatory provisions. We urge EPA and USGS to reconsider the validity of this concept in light of the Minnesota studies. If additional research is needed, please complete that research before moving ahead with conclusions and recommendations based on this concept. Please revise this Report to include a discussion on the potential impacts imported water have in urban areas on groundwater balance.

2. The Report refers to “engineered drainage systems” and associates them with urban systems (pg. 29, “engineered drainage systems (for example, municipal stormwater systems)”). Agricultural drainage systems should also be viewed as “engineered drainage systems”, including drain tile, ditch systems, and the loss of wetland storage. These agricultural engineered drainage systems can have a significant impact on flow regimes and hydrologic alteration. Please revise the Report to broaden the definition of the phrase “engineered drainage systems.”

3. On page 62 of the Report, there is a discussion of post-construction requirements in MS4 permits. On page 63 of the Report, there is a text box with an example of post-construction volume retention requirements from West Virginia. The last sentence on page 62 is: “This proactive approach using prior planning and design for the minimization of contaminant concentrations and erosive flows is a cost-effective approach to stormwater management.”

The last sentence cited above and the example from West Virginia appear to constitute a policy recommendation that post-construction volume retention requirements be included in MS4 permits. We question whether such a policy recommendation is appropriate for a technical report such as this. We request that EPA and USGS reconsider whether this type of policy language should be included in this Report.

In the course of discussing post-construction volume retention requirements, please include a discussion of whether such requirements may be necessary or appropriate for:

- discharges to ephemeral Western streams
- discharges to higher order rivers
- discharges to large lakes or wetlands

4. On page 63 of the Report, an example of a post-construction volume retention requirement from West Virginia is provided. This example is quite short and incomplete.

   The example lists a number of techniques that can be used to achieve runoff volume reduction. In practical terms, engineered infiltration is the most widely used and most effective technique, and will be for the foreseeable future.

   It needs to be noted that there are a number of appropriate limitations to using engineered infiltration to reduce runoff volume. These limitations are based on protecting drinking water sources, preventing groundwater contamination, controlling mosquito breeding, ensuring soil stability, and assuring the feasibility and effectiveness of the installed systems.
   For example, the following are requirements and limitations to the use of infiltration techniques in the Minnesota Construction Stormwater General Permit:
   - "Use the most restrictive infiltration rate within 5 feet of the bottom of the BMP
   - For measured infiltration rates, apply a safety factor of 2
   - Provide pretreatment for infiltration systems
   - Infiltration is prohibited when the infiltration system will be constructed in:
     - Areas that receive discharges from vehicle fueling and maintenance.
     - Areas with less than three (3) feet of separation distance from the bottom of the infiltration system to the elevation of the seasonal high water table or the top of bedrock.
     - Areas that receive discharges from industrial facilities which are not authorized to infiltrate industrial stormwater under an NPDES/SDS Industrial Stormwater Permit issued by the MPCA.
     - Areas where high levels of contaminants in soil or groundwater will be mobilized by the infiltrating stormwater.
     - Areas of predominately Hydrologic Soil Group D (clay) soils unless allowed by a local unit of government with a current MS4 permit.
     - Areas within 1,000 feet up-gradient, or 100 feet down-gradient of active karst features unless allowed by a local unit of government with a current MS4 permit.

- Areas within a Drinking Water Supply Management Area (DWSMA) as defined in Minn. R. 4720.5100, subp. 13., unless allowed by a local unit of government with a current MS4 permit.
- Areas where soil infiltration rates are more than 8.3 inches per hour unless soils are amended to slow the infiltration rate below 8.3 inches per hour or as allowed by a local unit of government with a current MS4 permit"

The current Minnesota MS4 General Permit includes prohibitions and restrictions ("higher engineering review" required) as limitations to the use of infiltration techniques. Additionally, there is a considerable body of information in the Minnesota Stormwater Manual about the limitations to the use of infiltration techniques.

The National Cooperative Highway Research Program has an active project underway titled "Limitations of the Infiltration Approach to Stormwater Management in the Highway Environment" (NCHRP 25-51). This research project has a budget of $500,000 and an expected completion date of 2/10/2018. We recommend that the Report authors contact Eric Strecker, the principal investigator for this project. (http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=3891)

The brevity of the material provided in the Report on post-construction volume retention requirements leaves the reader with the impression that such requirements can be simple and concise. Our experience has been that this is not accurate, complete, or safe. If infiltration techniques are to be widely required and implemented, limitations and design factors must be addressed to assure public health, avoid groundwater contamination, minimize mosquito breeding, ensure soil stability, and lead to effective BMPs.

If this Report is going to provide information about and/or recommend post-construction volume retention requirements, we urge that these limitations and design factors be addressed in the Report.

5. Climate Change

The Report correctly identifies climate change as a significant potential factor in flow alteration ("Climate change is an important and complex source of flow alteration", pg 30).

a. It is striking that climate change is not mentioned in Sections 5.2 and 5.3 of the Report. Flow alteration due to climate change should be a clear and specific factor in identifying impaired waters and developing TMDLs. In the Upper Midwest, increased intensity storms and longer periods of drought, both associated with climate change, appear to be factors in flow alteration in streams and rivers. We request that climate change be discussed in these sections and guidance be provided about methodologies for quantifying and including the flow alterations due to climate change in identifying impaired waters and developing TMDLs.

Please note that care should be taken in factoring climate change into the impaired waters and TMDL programs. These programs are based on current conditions of our water resources. Climate change may have been a factor in changes to flow alterations (and the associated impacts) that are manifest today (see item "5.c." below). In this context, it may be appropriate to include climate change as a factor in identifying impaired waters and developing TMDLs. Additionally, as discussed in item "6.c." below, future flow alterations associated with climate change could be a factor in future decisions related to adaptive management and permit changes, after the passage of time and upon future reassessment of the receiving waters.

b. We are particularly concerned about having flow alterations due to climate change quantified and included in the process of developing TMDLs. As an illustrative example, please consider a large-scale sediment TMDL that includes flow alteration as a stressor causing high sediment loads. In such a TMDL, three major sources of flow alteration might be identified:
   - higher stream flows because of higher intensity storms due to climate change,
   - higher stream flows because of changes to the agricultural drainage systems – drain tile, ditches, changes in cropping, and the loss of wetland storage, and
   - higher stream flows because of land use changes due to urbanization.

   Ideally, the TMDL loading estimates, WLAs, and corresponding load reductions would be based on the quantifications of these three separate sources. Each source of the additional loading would be quantified and listed. Each source would be expected to achieve an appropriate load reduction.

   We request that this Report be revised to provide sufficient information and guidance to support the identification and quantification of flow alteration due to climate change in the development of TMDLs. Without this information and guidance, we believe that an inappropriate responsibility for the loading and the load reduction will be assigned to the permitted parties (in this example, MS4 stormwater permittees). Providing this information and guidance is an appropriate function of this Report.

c. We recommend that EPA and USGS consider the historical record in the context of understanding and quantifying flow alteration due to climate change. In the Upper Midwest, for example, climate change projections predict that we will see higher intensity storms and longer periods of drought.

   These trends may be manifest in the historical record. NOAA recently completed Atlas 14, Volume 8. This provides new precipitation frequency estimates, replacing

TP-40 (1961), TP-49 (1964), and NWS HYDRO-35 (1977). The 100-year storm for the Twin Cities changed from about 6" in TP-40 to almost 8" in Atlas 14. This historical trend appears to confirm the climate change projection predictions.

If this is true elsewhere in the U.S., it should be presented in this Report and used to support the assertions related to climate change as a factor in flow alteration. It may also serve as part of the basis for quantifying climate change as a factor in flow alteration. We request that these concepts be considered in the context of this Report.

6. TMDLs

Section 5.2 and 5.3 (impaired waters & TMDLs) seem surprisingly short in this Report. Flow alterations present unique challenges in the context of impaired waters and TMDLs. We request that the following items be addressed in this Report.

a. Flow alteration can be addressed as a pollutant or as a stressor, in the context of TMDLs. We request that EPA provide information in this Report related to this choice.
   i. Pros and cons for each approach
   ii. How each approach could be reflected in various types of TMDLs
   iii. EPAs preference between the two choices
   iv. Case law supporting or contradicting each approach

b. Please clarify the first full paragraph on page 51, including addressing the following questions:
   i. In the first sentence, is the basis of this recommendation the assertion that hydrologic alteration is a pollutant ("impairments due to pollution")? If "yes", what is the basis for this assertion? If no, what is the basis for the recommendation?
   ii. If the Report's recommendation is stated in the first sentence, what is the meaning and intent of the third sentence ("Where the specific pollutant causing the impairment has not been identified…")?
   iii. How can a water be placed in both Category 4c and Category 5, as suggested in the last sentence? How can a water be in a category "not requiring a TMDL" (4c, first sentence) and another category "requiring a TMDL" (5, third sentence) simultaneously?

c. Please address how flow alterations due to climate change and agricultural systems should be quantified and included in the process of developing and implementing TMDLs.

As an illustrative example, please consider a large-scale sediment TMDL that includes flow alteration as a stressor causing high sediment loads. In such a TMDL, three major sources of flow alteration might be identified:

- higher stream flows because of higher intensity storms due to climate change,
- higher stream flows because of changes to the agricultural drainage systems – drain tile, ditches, changes in cropping, and the loss of wetland storage, and
- higher stream flows because of land use changes due to urbanization.

Ideally, the TMDL load estimates, WLAs, and corresponding load reductions would be based on the quantifications of these three separate sources as part of the TMDL report. Each source of the additional loading would be quantified and listed. Each source would be expected to achieve an appropriate load reduction.

Also, please consider how these sources of flow alteration may be addressed in adaptive management strategies and/or permit changes that may be appropriate after the passage of time and the reassessment of the impaired water 10 years after the TMDL is issued. It is not difficult to postulate a situation where the water quality has not improved enough to meet the water quality standard, and:

- the flow alteration due to climate change has not diminished or has increased.
- the flow alteration due to the agricultural drainage systems has diminished only slightly or not at all.
- the flow alteration due to urbanization has been reduced significantly because of responses from MS4 permittees.

The entity implementing the TMDL and/or setting permit requirements for dischargers in the drainage area will struggle to determine appropriate responses to address the continued impairment.

We request that this Report be revised to provide sufficient information and guidance to support the identification and quantification of flow alteration due to climate change and agricultural drainage systems in the development and implementation of TMDLs. Without this information and guidance, we believe that an inappropriate responsibility for the loading and the load reduction will be assigned to the permitted parties (in this example, MS4 permittees). Additionally, we also believe that permit requirements could be changed for MS4 permittees after future reassessment and insufficient water quality response because the permits provide the only regulatory leverage and the other sources are inadequately understood or quantified. Providing this information and guidance is an appropriate function of this Report.

7. Provide additional information about flow alteration due to changes in agricultural drainage systems (drain tile, ditches, cropping changes, loss of wetland storage) in this Report. Please address remedies for and responses to these alterations. The land areas drained by agricultural systems are vastly larger than those drained by urban stormwater conveyance systems. The contributions to flow alterations from agricultural systems, therefore, are likely larger than the contributions from urban stormwater conveyance systems. Agricultural drainage systems deserve more attention and discussion in this Report.

   We especially recommend that EPA and USGS look to recent work done in the Minnesota River system by Dr. Peter Wilcock, Dr. Karen Gran, Dr. Peter Belmont, and Pat Baskfield.

8. Appendix B. Legal Background and Relevant Case Law

   Please clarify the intent and content of this section. Please address the following items:

   a. This section appears to address only "reduced stream flow", "minimum flow conditions", and "minimum streamflow requirements". While these flow regimes and their case law are very appropriately included and discussed, there are other flow regimes that should be considered. For instance, conditions where there are significant increases in flow magnitude can be associated with headwater stream degradation/impacts. We encourage the Report authors to consider addressing this, and other, flow regimes when presenting case law and legal/policy arguments and viewpoints.

   b. A significant ruling (Virginia DOT v. EPA, E.D. Va., No. 1:12-cv-775, 1/3/13, http://www.accotink.org/Accotink_Case_Decision.pdf), which was handed down by the U.S. District Court for the Eastern District of Virginia in January, 2013, should be considered for inclusion in the case law section of the report. Unlike the case law currently covered in the report focusing on minimum flow levels that show a close legal link between flow quantity and quality (i.e., "pollution"), the finding in this ruling is that flow in the context of the TMDL program was found not to be a pollutant. We suggest that consideration be made to include information about this ruling, and the implication on flow-based management, in the final version of the Report.

9. We urge EPA and USGS to consider using this Report to promote a more commonsense approach to setting stormwater management targets that include flow/volume control. Such an approach would be based on the recognition that full hydrologic mimicry of the natural flow regime is impractical in most settings and beyond the technological capacity of most modeling professionals. This approach would focus on the parts of the natural flow regime that are most ecologically and geomorphically relevant, as well as those that have clear, mechanistically-based management targets.

Building on a volume of relevant literature (Poff, 1992; Booth and Jackson, 1997, Hawley and Vietz, 2016) this approach could present a management framework that:

a. shows why a one-size-fits-all approach for "channel protection controls" is unlikely to succeed in protecting streams from erosion due to the inherent variability of channel resistance in different stream settings (Utz et al., 2016).
b. offers a geomorphically-principled approach to identify the ranges of flows that are most important for channel stability in a stream or region, as well as the types of stormwater management strategies that are most suited to protect channels in such settings.

It is important to note that many of these ideas are already being incorporated into the Hydromodification Management Plans of MS4 permittees in California, Oregon and Washington, which have some of the more progressive approaches for managing hydromodification.

We appreciate the opportunity to provide comments on this Report. If EPA or USGS has questions about these comments or wishes to have clarification or additional information about any of these comments, please contact Randy Neprash at 651-604-4703 or randy.neprash@stantec.com.

Sincerely,

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