Mr. Brian Clevenger
Acting Program Manager
Maryland Department of the Environment
Sediment, Stormwater and Dam Safety Program
1800 Washington Boulevard
Baltimore, MD 21230
Sent via email: bclevenger@mde.state.md.us

Re: Comments on Proposed Maryland Department of the Environment National Pollutant Discharge Elimination System Municipal Separate Storm Sewer Discharge Permit Number: 11-DP-3315 MD0068292

Dear Mr. Clevenger:

As Executive Director of the Anacostia Watershed Restoration Partnership, I have two main duties: to help coordinate the restoration of the Anacostia watershed across a number of federal, state and local jurisdictions working to restore it, and to advocate for its restoration. Today I submit these comments in the role of advocate. As such, these views are my own and I am not speaking on behalf of the Partnership's members.

I urge you to insure that the Municipal Separate Sanitary Storm Sewer (MS4) permits issued by the Maryland Department of the Environment (MDE) reflect current science, so that they can be the best they can to help restore Maryland's waters and the Bay. I focus my comments today on the "restoration" provision of the proposed permit, and the draft Guidance that is incorporated by reference that interprets what the restoration requirement means. The comments are attached.

Thank you very much for your service to protect and restore the waters of the State of Maryland and for your consideration of my comments.

Sincerely,

Dana Dunmire Minerva, JD, MSP
Executive Director
Anacostia Watershed Restoration Partnership

Attachment

A Strong MS4 Restoration Requirement Is Necessary to Restore Maryland's Rivers and Streams

MDE is to be congratulated for recognizing the need for and providing for restoration in its permits. The proposed MS4 permit for the City of Baltimore contains the following provisions relating to restoration:

> Within one year of permit issuance, Baltimore City shall submit an impervious surface area assessment consistent with the methods described in the MDE document "Accounting for Stormwater Wasteload Allocations and Impervious Areas Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits" (MDE, June 2011 or subsequent versions). Upon approval by MDE, this impervious surface area assessment shall serve as the baseline for the restoration efforts required in this permit.
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> By the end of this permit term, Baltimore City shall commence and complete the implementation of restoration efforts for twenty percent of the City's impervious surface area consistent with the methodology described in the MDE document cited in paragraph a. that is not already restored to the MEP.[1]

A similar provision to this latter provision was included in the current MDE Montgomery County MS4 permit.

As noted above, MDE is to be congratulated for recognizing the need for and providing for restoration in its MS4 permits. Restoration is needed to restore Maryland's streams and rivers as almost all of them are in "poor" or "fair" condition, according to the state's own data. Only two are in good condition.[2] The State of Maryland's website explains why stormwater from impervious surfaces is a key cause:

> The problem with impervious surfaces is that they prevent the natural soaking of rainwater into the ground and slowly seeping into streams. Instead, the rain water accumulates and flows rapidly into storm drains. This results in severe harm to streams in three important ways:
>
> Water Quantity: storm drains deliver large volumes of water to streams much faster than would occur naturally, resulting in flooding and bank erosion. Stream inhabitants are stressed, displaced, or killed by the fast moving water and the debris and sediment it brings with it.

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[1] Proposed Maryland Department of the Environment National Pollutant Discharge Elimination System Municipal Separate Storm Sewer Discharge Permit Number: 11-DP-3315 MD0068292 (for the City of Baltimore), page 8.

[2] State of Maryland, "Stream Health" accessed at http://www.streamhealth.maryland.gov/stream_health.asp.

Water Quality: pollutants (gasoline, oil, fertilizers, etc) accumulate on impervious surfaces and are washed into the streams.

Water Temperature: during warm weather, rain that falls on impervious surfaces becomes superheated and can stress or kill stream inhabitants.[3]

Importantly, the state has concluded that it is not only the speed at which impervious surfaces deliver polluted stormwater to our streams, but the *large volumes* that these surfaces deliver *over land*. In undeveloped forests and fields, stormwater seeps into the ground and recharges filtered water into streams through the ground. In developed areas, large volumes travel over land, eroding land away and picking up urban pollutants as it goes.

Maryland's conclusions about the impact of imperious surfaces and the role of the vast volumes of polluted runoff from impervious surfaces are well-documented by articles from peer reviewed scientific journals cited on the website of the Maryland Department of Natural Resources, which are incorporated by reference into these comments.[4] The more impervious surface in a watershed, the greater the volumes of polluted runoff, with concomitant effects: higher levels of impacts of higher levels of nutrients, sediments and other pollutants, unstable and eroded stream banks and incised channels, decreased biological diversity and increased dominance of species that tolerate pollution well. There is even a term for this phenomenon that has been coined by scientists: urban stream syndrome.[5]

MDE's Must Include Key Standards in the Permit Itself

As noted above, MDE has developed a draft guidance entitled "Accounting for Stormwater Wasteload Allocations and Impervious Areas Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits." It purports to define the types of "restoration" required by the MS4 permits. Principles of good government and the law require that fundamental requirements and standards for MS4 permits be in the MS4 permits themselves and not in draft guidance.

There are multiple reasons for this. The law provides the City and other interested parties the right to have notice of and to review, comment upon, and legally challenge the provisions of MS4 permits. By putting perhaps the most important element of the restoration requirement in draft Guidance, e.g. the definition of what "restoration" is, MDE could be viewed as attempting to side-step these procedural protections provided by law, which I am sure that MDE would not want. Further, this document is apparently a "draft" as denoted on its cover

[3]State of Maryland, "How Impervious Area Affects Stream Health, accessed at http://www.streamhealth.maryland.gov/impervious.asp

[4] Maryland Department of Natural Resources, Carter Library and Information Resource Center, "Effects of Development and Impervious Surfaces on Watersheds," accessed at http://www.dnr.state.md.us/irc/bibs/effectsdevelopment.html

[5] Walsh, C. J., A. H. Roy, J. W. Feminella, P. D. Cottingham, P. M. Groffman, and R. P. Morgan II. 2005. The urban stream syndrome: current knowledge and the search for a cure**.** *Journal of the North American Benthological Society* 24(3): 706–723.

page. If the document is a "draft" then presumably MDE may change it at any time. That aspect also deprives both the City and citizens of their ability to participate effectively, in the various ways provided to them by law. They may think they understand MDE's definition of "restoration" now, but MDE can change that without the process that the law provides for their participation. In short, MDE should adopt key standards for what MS4 permittees must do in the permit itself.

Please note that I'm not suggesting that MDE cannot provide helpful information to MS4s and others outside the four corners of the permit, but that key standards, such as the kinds of restoration that are required under the permit, must be in the permit.

MDE's Draft Guidance on Restoration Has Numerous Serious Problems, the Most Significant of Which Are that It Equates Water Quality Treatment with Restoration and Endorses Detention

The proposed permit promises restoration as well as water quality treatment. As I noted above this is a very good thing. However, what the permit gives, the draft Guidance takes away. The draft Guidance, by defining restoration as water quality treatment, eliminates restoration from the requirements of the permit.

Here are some provisions of the draft Guidance that say that "restoration" means water quality treatment:

> With the inclusion of total maximum daily loads (TMDLs) and specifically the Chesapeake Bay TMDL in municipal stormwater permits, the answer to "what constitutes restoration?" becomes fairly easy to answer. This means meeting TMDL requirements and water quality criteria.[6]
>
> Jurisdictions will need to determine the total impervious surface area that they are legally responsible for and delineate the portions that are either treated to the maximum extent practicable (MEP), partially treated, or untreated and available for retrofit. This assessment will provide the baseline from which the 20% restoration requirement may be calculated. A good place to start is 2002 because this is when Maryland regulations and local ordinances began requiring BMPs to address a specific suite of volumes [recharge (Rev), water quality (WQv), and channel protection (Cpv)] and it can therefore be justified that water quality treatment has been provided to the MEP.[7]
>
> Development after 2002 should not be counted toward impervious surfaces that need to be restored. BMPs from this stormwater program era are deemed state-of-the-art

[6] MDE Guidance, p. 1.
[7] MDE Guidance, p. 8.

> and need to be maintained, but will provide limited opportunity for water quality improvement.[8]
>
> As stated above, impervious area caused by development after 2002 will not be required to be restored provided that current State regulations are met. This is because the design criteria in the *Manual* results in more than sufficient stormwater management and there will be limited opportunity for improving water quality through retrofitting.[9]
>
> An acre for acre impervious credit will be given when a structural BMP is specifically designed to provide *treatment* for the full WQv (one inch), or a proportional acreage of credit will be given when less than the WQv is provided: (percent of the WQv achieved) x (drainage area impervious acres).[10] (Emphasis added)

This latter quote is the apparent standard for and definition of "restoration," provided by the draft Guidance. According to the draft guidance, restoration is water quality treatment. To emphasize this point, the draft Guidance goes on to include practices that may improve water quality but which are not restoration: street sweeping, catch basin cleaning, nutrient management, septic system enhancement, and storm drain cleaning. These may improve water quality, but they are not "restoration."

In the Montgomery County permit and in the draft City of Baltimore permit, the restoration provisions and the provisions relating to meeting water quality standards and waste load allocations are completely separate and distinct requirements. (This is similar to the MS4 permit adopted by EPA for the District of Columbia—where EPA both requires specific types of green restoration practices *as well as* water quality treatment.)

Eliminating the restoration provision by the way of defining it as water quality treatment is inconsistent with MDE's commitment that the Montgomery County permit would serve as a "floor" for all future Maryland MS4 permits. More importantly, it also does not appear to take the condition of Maryland's waters described above into account. They are desperately in need of restoration. It is also important that as our MS4s embark on the expenditure of hundreds of millions of dollars that the techniques they use are going to work the best they can. As demonstrated below, restoration works best.

Reducing Destructive Volumes of Water, and Not Just Peak Flow, is the Best Approach for Both Restoration and Water Quality Improvement

While water quality treatment is not "restoration," there is a growing body of scientific evidence that indicates that "restoration" or "runoff reduction" using Environmental Site Design is the best kind of water quality treatment, reducing a greater mass of pollutants. Both

[8] MDE Guidance, p. 8.
[9] MDE Guidance, p. 7.
[10] The alternative "restoration" practices are summarized in the MDE Guidance, p. 22

MDE's draft Guidance and the draft report of the Chesapeake Bay Program's Stormwater Working Group concluded that runoff reduction measures achieve higher pollutant reductions than treatment practices.

A study of a project called the Jordan Cove Subdivision is extremely significant. The National Research Council's Report on stormwater called this subdivision one of the most extensively studied in the United States. Jordan Cove is a subdivision that has both detention practices and Environmental Site Design (ESD) practices. The National Research Council found that while concentrations of pollutants discharged from the ESD portion of the subdivision were higher, the mass of pollutants discharged was *dramatically* lower, because of the greatly decreased volumes.[11] This study and others find that ESD reduces pollutants more effectively than detention practices.[12]

The draft Guidance's endorsement of detention as a restoration measure is extremely problematic. It is hard to read the National Research Council's report on stormwater, the scientific articles relied on in that report, and EPA's interpretations of it and not draw the conclusion that detention is now perceived by scientists to be an obsolete practice, to be used only in those rare circumstances when no other practices can be implemented. Detention practices do not protect water quality and certainly do not protect the biological integrity of our rivers and streams. The reasons are many:

- Detention does not reduce the overall volume of polluted runoff, which as noted above, means that it does not reduce as great a mass of pollutants.[13]

- Detention may delay the peak flow from a particular site but in combination with the polluted runoff from detention systems across the watershed, the impacts of the volume are merely delayed and not mitigated.[14]

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[11] Committee on Reducing Stormwater Discharge Contributions to Water Pollution, National Research Council, *Urban Stormwater Management in the United States* (2008), pp. 396-8.

[12] In particular, see the discussion and the many studies cited in the Fact Sheet for EPA Region 3's District of Columbia (DC) Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) Final Permit, October 7, 2011, that stand for the proposition that ESD reduces larger amounts of pollutants than detention at http://www.epa.gov/reg3wapd/npdes/dcpermits.htm. The most important discussion of this issue starts on page 9.

[13] National Research Council, p. 33: "Mitigation of urban-induced flow increases have followed this narrow approach, typically by endeavoring to reduce peak discharge by use of detention ponds but leaving the underlying increase in runoff volumes—and the associated augmentation of both frequency and duration of high discharges—untouched. This partly explains why evaluation of downstream conditions commonly document little improvement resulting from traditional flow- mitigation measures (e.g., Maxted and Shaver, 1997; Roesner et al., 2001; May and Horner, 2002)."

[14] USEPA, Guidance for Federal Land Management in the Chesapeake Bay Watershed, Chapter 3 Urban and Suburban (EPA841-R-10-002), May 12, 2010 p. 3-17: "Simply reducing the peak flow rate, and extending the duration of the predevelopment peak flow, is not effective because as the different

- Detention practices are often designed and constructed on an “ad hoc” or “site by site”, basis without analysis of the appropriateness of the practice in light of the conditions in the watershed.[15]

- Concentrations of pollutants leaving detention ponds may be reduced but the volume of the stormwater flows leaving them keeps pollutant discharges high, and

- Detention does not protect downstream channels from the erosive effects of stormwater volume which mobilizes sediments and destroys biota.[16]

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discharge sources enter a stream, the hydrographs are additive, and the extended predevelopment peak flows combine to produce an overall higher than natural peak. The result is the pervasive condition of channel incising, erosion, and loss of natural stream biological and chemical function as observed in Figure 3-8.”

National Research Council, p. 341: “Detention basins can control peak flows directly below the point of discharge and at the property boundary. However, when designed on a site-by-site basis without taking other basins into account, they can lead to downstream flooding problems because volume is not reduced (McCuen, 1979; Ferguson, 1991; Traver and Chadderton, 1992; EPA, 2005d). In addition, out of concerns for clogging, openings in the outlet structure of most basins are generally too large to hold back flows from smaller, more frequent storms. . . . Because of the limitations of on-site detention, infiltration of urban runoff to control its volume has become a recent goal of stormwater management.”

[15] National Research Council, p. 457. “Past practices of designing detention basins on a site-by-site basis have been ineffective at protecting water quality in receiving waters and only partially effective in meeting flood control requirements.”

[16]EPA, p. 3-17: “Detention systems generate greater flow volumes for extended periods. Those prolonged, higher discharge rates can undermine the stability of the stream channel and induce erosion, channel incision and bank cutting.”

National Research Council, p. 372: “It should be noted that there are important, although indirect, water quality benefits of all runoff-volume-reduction SCMs—(1) the reduction in runoff will reduce streambank erosion downstream and the concomitant increases in sediment load, and (2) volume reductions lead to pollutant load reductions, even if pollutant concentrations in stormwater are not decreased.” See also the original paper on the Jordan Cove Subdivision: Dietz, M. E., and Clausen, J. C. 2008. Stormwater Runoff and Export Changes with Development in a Traditional and Low Impact Subdivision, Journal *of Environmental Management* 87(4):560-566. This study concluded that a subdivision with LID controls controlled nitrogen and phosphorus as well as forested land in large part because of the volume of runoff that was controlled.

See also:

Emerson, C. H., C. Welty, and R. Traver. 2005. Watershed-scale evaluation of a system of storm water detention basins. *Journal of Hydrologic Engineering* 10(3):237-242. (“This paper has quantitatively demonstrated that the stormwater management method of peak flow rate control now widely implemented is flawed when viewed in terms of the impacts on the main receiving water body of a watershed. This result points to the need for fundamental reevaluation of the basis for stormwater management if the goal is protecting natural resources on the watershed scale. Modeling results indicated that the volume-control approach shows promise for attaining this goal . . . “ p. 241.)

Despite these credible scientific statements about the ineffectiveness of detention, about 80% of the "restoration" or retrofit projects planned in my watershed's two counties, Montgomery and Prince George's, are detention and other gray infrastructure approaches. Given that according to the Anacostia TMDL, 75% of the sediment in its waters is associated with streambank erosion related to volume, I am not sure that this is going to work well to reduce either sediments or to restore aquatic life.

The Clean Water Act and Maryland Regulations Appear to Require Both Water Quality Improvements and Restoration.

It is not my intent to try to give a scholarly exposition of the Clean Water Act, Maryland Statutes, or the Code of Maryland Regulations. I will just say that I have read the comments prepared by the NRDC and find them compelling and associate myself with them. Particularly, the Clean Water Act requires MS4 permittees to manage stormwater "to the maximum extent practicable," which would surely entail using techniques that are effective and practicable and not those of *very* limited utility. I will also say that after reading the provisions related to water permitting in the Code of Maryland Regulations, I note two things. First, Maryland water quality standards protect aquatic life (which is destroyed by the large volumes of stormwater flowing through many of Maryland's streams) and other uses. Second, the regulations require that permits protect those uses:

> A. The Department shall issue or reissue a discharge permit upon a determination that
>
> 1. The discharge or proposed discharge specified in the application is or will be in compliance with all applicable requirements of:
>
> (a) Effluent limitations,
>
> (b) Surface and ground water quality standards,

Ferguson, B. K. 1991. The Failure of Detention and the Future of Stormwater Design. *Landscape Architecture* 81(12):76-79.

Maxted, J. R., and E. Shaver. 1997. The use of retention basins to mitigate stormwater impacts on aquatic life. Pp. 494-512 in: *Effects of Watershed Development and Management on Aquatic Ecosystems.* L. A. Roesner (Ed.). New York: American Society of Civil Engineers. (Study of the areas downstream of eight stormwater ponds showed that the ponds were no better than no controls in terms of protecting downstream aquatic life.)

McCuen, R. H. 1979. Downstream effects of stormwater management basins. *Journal of the Hydraulics Division* 105(11):1343-1356. ("If stormwater management is to be effective, stormwater management basins are going to have to be complemented with other stormwater management measures that more closely duplicate the storage characteristics of the predevelopment land use conditions. For example, grass-lined swales, rooftop detention, and porous pavement are stormwater management measures that provide storage that is more spatially representative of natural storage and more closely approximates the temporal distribution of storage depletion that existed prior to development." P. 1356.)

(c) The Federal Act,

(d) State law or regulation,

(e) Best available technology, and

(f) Federal effluent guidelines;[17]

Conclusion

Given the prevailing scientific view that detention does not work well and that ESD approaches that control volume are much more likely to be effective, MDE's MS4 permits should contain standards that create a strong requirement for restoration (ESD, or if you prefer the term, "runoff reduction") practices that substantially reduce volume through infiltration, evapotranspiration, and reuse. This approach has a much greater chance of restoring Maryland's rivers and streams.

I urge you to withdraw the Guidance, due to the published science relating to ESD concluding that it both removes the most pollutants and would better restore our streams, and specify in the permit that "restoration" entails the reduction of 1 inch or more of stormwater volume using ESD. It may not be practicable for the MS4 jurisdictions to retrofit 20% of their poorly managed impervious surface in each MS4 permit term. But surely the use of practices supported by science is what is needed, even if that takes a bit more time.

Thanks very much for your consideration and thanks for your ongoing work to restore the Bay and our urban rivers and streams that are so polluted, like those in the Anacostia watershed.

[17] COMAR 26.08.04.02 (A).