

As participants of the Stream Restoration Group 2, the Environmental Protection Agency (EPA) and the Maryland Department of Natural Resources (MD DNR) have several concerns regarding the *Final Draft Recommendations for Crediting Outfall Restoration Projects* (Final Draft Memo or ORP Memo). While we can agree that addressing vertical incision is important to maintaining and improving downstream conditions, and it may be appropriate to receive total maximum daily load (TMDL) credit, we cannot concur with the findings in the Final Draft Memo. The reasons for this are primarily due to potential adverse ecological effects from the practice as proposed, and we find that the Final Draft Memo is inconsistent with 2014 Expert Panel’s recommendations, including the lack of qualifying conditions for when credits should be conferred. Without appropriate changes to the Final Draft Memo which address our concerns, we request to have our names removed from the report.

As outlined in the Outfall Restoration Protocol (ORP) Final Draft Memo, the *Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects* (hereinafter referred to as the “Stream Restoration Expert Panel Report” or “Stream Restoration Report”) created four protocols to define the pollutant load reductions associated with stream restoration projects. Protocol 1: Credit for Prevented Sediment during Storm Flow is an annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion from an actively enlarging or incising urban stream. Protocol 1 calculations are based on lateral erosion.

The ORP (also known as Protocol 5) is based on the assumption that the dominant erosion in headwater channels is from vertical incision (progressive bed-lowering), which is not accounted for in the existing Protocol 1 of the Chesapeake Bay Stream Restoration Expert Panel Report. The purpose of establishing an additional credit calculation for ORPs seeks to fill the need to give credit to practices that prevent nutrient and sediment erosion from down-cutting channels.

The Urban Stormwater Workgroup (USWG) formed four ad-hoc Workgroups (Groups 1-4) to revisit the Stream Restoration Expert Panel Report. Because Protocol 1 could not be used for outfall restoration projects, Group 2 was charged with developing definitions and establishing removal rates for TMDL crediting associated with outfall restoration activities. This ad-hoc group approach was determined to be appropriate instead of initiating a full expert panel review as the ORP was presented as a restoration approach that fit within the qualifying conditions outlined in the Stream Restoration Report. As the Final Draft Memo states, Group 2 was “asked to adapt the existing crediting protocols contained in the original stream restoration expert panel report” in order “to recommend methods to credit pollutant removal achieved by individual outfall restoration practices.”

However, the Final Draft ORP Memo put forth by Group 2 does not correspond with the basic conditions included in the final Stream Restoration Report. In the Stream Restoration Report, the Expert Panel outlined a series of conditions that must be met for a project to be eligible for Chesapeake Bay TMDL reductions. The definition of “stream restoration” in the Stream Restoration Report is tied to these conditions (“*Stream Restoration - Refers to any NCD, RSC, LSR or other restoration project that meets the qualifying conditions for credits, including environmental limitations and stream functional improvements.*”). The definitions, qualifying conditions, and

eligible design criteria proposed in the Draft Final Memo for the ORP do not align with those conditions. For example, the Expert Panel indicated that the restored stream reach must be greater than 100 feet in length and be actively enlarging or degrading. The proposed ORP would allow credit for any length on sites that are not actively enlarging or incising. In addition, the proposed protocol would credit armoring, piping, and other hard engineering techniques which are not eligible for nutrient and sediment removal credit under Protocol 1 and are inconsistent with the commonly understood definitions of restoration, such as that found in the 2008 Mitigation Rule. However, the Draft Final Memo does not provide supporting justification for these modifications to the qualifying conditions.

Adverse and unintended consequences

The Final Draft Memo does not fully address the charge given to Group 2. In addition to determining credit as outlined above, Group 2 was also tasked to “evaluate any unintended consequences associated with the practice, with an emphasis on the quality of downstream ecosystems, and issues regarding iron flocculation” (page 3). Given the lack of restrictions or qualifying conditions, a number of unintended consequences are not only possible, but highly likely, including habitat degradation due to armoring and piping, incentivizing cheaper hard armoring techniques, and incentivizing the use of ORPs when stream restoration techniques (e.g. NCD) may be more appropriate.

Restoration and stabilization practices should be tailored to individual site conditions. However, due to the potential TMDL credit and fewer basic qualifying conditions, it may unintentionally incentivize the use of the ORP even if that is not the most appropriate course of action. Furthermore, by allowing the ORP to be combined with Protocol 4 of the Stream Restoration Report related to crediting dry-channel RSC practices, it will further create a preference to use the combination of Protocols 4 and 5 over other Protocols.

Limitations on placement of practices

Given the potential for unforeseen consequences in streams and downstream, we recommend the ORP Memo clearly state that outfall restoration projects only be allowed above stream channels. The ORP Memo does not define specific areas where projects seeking to utilize the Outfall Restoration Protocol can be installed, but states that “[p]rojects are typically restricted to zero order stream channels that lack perennial or seasonal flow” (page 11). Additionally, the schematic on page 4 indicates that outfall restoration would be allowable from the upland area to the stream corridor. However, there is no text within the Final Draft Memo itself that unequivocally states that this protocol cannot be applied directly to streams, whether ephemeral, intermittent, or perennial. In fact, the definition of “Headwater Transition Zone” states “[t]he slope or channel that extends from a storm drain outfall to the **perennial** stream network” (page 10, emphasis added). We have previously requested to have the word “perennial” removed from this definition and have Section 6 to clarify this issue, however, those recommendations were not included in the final ORP Memo.

Furthermore, Figure 3, Examples of Outfall Restoration Projects (page 7), includes projects that appear to be in stream channels. A number of these photos raise concerns. While the first photo

appears to show improvement, the environmental benefit in the remainder of the photos is questionable. (See further comments in “Predictive Indicators.”)

By combining the unrestricted placement of these practices with heavy armoring and piping, it is not inconceivable that a “qualifying” project could involve placing a drop pipe structure in an intermittent stream channel below a road crossing. This is unacceptable as it may significantly harm the downstream network and local ecosystem and does not meet our Agencies’ understanding of projects defined as restoration, let alone the definition included in the Expert Panel Report. Such a “restoration” will create barriers to fish passage and would be in direct opposition to the Bay Agreement goal to increase fish passage. In addition, this “restoration” could also negatively impact other Bay Agreement goals supported by the Partnership, such as fish habitat, stream health, and brook trout.

Hard Engineering Practices

The use of hard armoring practices as a restoration activity for TMDL credits is not acceptable for this protocol. The ORP Memo contradicts the basic qualifying conditions established in the original Stream Restoration Report on hard engineering. As stated on Page 11 of the ORP Memo, “[p]rojects that armor or harden the outfall channel ARE eligible for credit...” Furthermore, the definition of Outfall Restoration Practices (Page 6) was expanded to include both drop structures and ‘storm drain enclosures’, along with boulder revetments. At the same time as Group 2 was tasked with drafting the ORP Memo, Group 3 was tasked to define the limits of armoring acceptable within the existing Stream Restoration Protocol 1. Group 2 has moved ahead of Group 3’s final recommendations which should inform Group 2’s outcomes. These two groups are clearly related. As such, the proposed ORP Memo does not incorporate or fully recognize the efforts and decisions that may be made by Group 3. The only concession to the Group 3 armoring definition is on Page 19, “...any crediting of projects in **jurisdictional** waters is subject to the armoring limits established by Group 3” (emphasis added).

Practitioners obviously want flexibility, and our Agencies fully support that desire; however, the ORP Memo has to balance flexibility with practices that are also environmentally sound. Hard armoring and piping have well-documented adverse ecological impacts. Piping completely eliminates habitat; habitat in armored reaches is reduced or eliminated. Piping and armoring increases velocity, causing or exacerbating erosion, flooding, habitat loss, and other adverse impacts downstream. Hard armoring practices have been known to lack nutrient retention benefits, habitat benefits, are prone to failure, and in some cases even have safety issues. Mitigation may be required as part of permitting for these types of impacts. On the other hand, daylighting a stream from a pipe or removing riprap and grading a channel to reconnect to a floodplain are both stream restoration practices.

At this time, we do not know if we would support the recommendations of Group 3 as the work is ongoing. At a minimum, the two groups should be consistent. Hard armoring and storm drain piping should be non-creditable practices given their known adverse impacts to downstream systems.

Project Monitoring

The charge to determine the extent to which functional uplift will be measured and achieved by the practice was also not addressed. The ORP Memo does not require outfall restoration projects to be monitored beyond post-construction except for stability. Page 11 of the document specifically states that “ORPs do not require special project monitoring to assess stream function because these functions are usually minimal or absent in the headwater transition zone prior to any restoration.” This would imply that the headwater transition zone is above the stream network, because we know that headwater streams (whether they are perennial, intermittent, or ephemeral) have a number of functions. If ephemeral and intermittent headwater streams are included in the headwater transition zone, project monitoring for impacts and ecological uplift should be included.

The sole points regarding ecological monitoring post-construction are listed in the ORP Memo on page 9, “[p]ractices that armor or harden the outfall channel ARE eligible for credit if they...do not adversely impact ecological functions below the project reach,” and on page 12, “[a] visual inspection of downstream perennial streams should occur after construction to ensure that the upstream ORP projects contribute to their function and stability.” There are no conditions or specifications regarding the type, frequency, or determination of ecological functions and adverse impacts listed in the Final Draft Memo, nor are there any inspections required, since the text uses the term “should” rather than “must.” Additionally, inspections of streams should not be limited to “perennial” streams. An ORP could also be constructed above an intermittent or possibly ephemeral stream channel. Adverse impacts to any stream would be a concern. However, it is also unclear if adverse impacts occur, how they will they be addressed since monitoring and adaptive management actions are not required.

Predictive Indicators

The Final Draft Memo states that an outfall restoration project will qualify for credits if the channel or slope below the outfall exhibits “**predictive indicators** for severe erosion or hill-slope failure and be actively enlarging or degrading as demonstrated through equilibrium slope analysis or comparable method,” (page 11) and defines channel conditions as “the current **or future** potential for erosion of the channel bed or banks...” (page 9, emphasis added). In addition to modeling “predictive indicators”, we recommend that observable erosion also be present at a project location for a practice to be eligible for credit instead of being based on modeling or predictive indicators.

Basing the criteria for credit eligibility primarily on modeling would expand the purpose of ORPs to “fix” anything that has potential to erode in the future and could incentivize poor design and installation and/or promote work that will have minimal benefit. This could have the unintended consequence of disincentivizing sound design of new outfalls so they do not cause erosion. It would also skew projects towards outfalls that may exhibit minimal erosion, but where permittees would receive large credit reductions based on modeling, rather than addressing actively eroding channels or gullies in need of repair.

This can be seen in the Final Draft Memo at Figure 3, Examples of Outfall Restoration Projects, on page 7: only one of the five examples shows the active erosion and channel conditions in the “Pre-restoration” photo that were originally intended for the need for and development of Protocol 5. The examples for “rock outlet protection” (example 2) and “plunge pool/step pool structures” (example 4) show little to no erosion in the “Pre-restoration” photo; the before conditions of “step-pool sequence and vegetative plantings” in example 3 shows significant bed deposition. During our early discussions, the purpose of ORPs had been presented as a way to address severe and widespread erosion from older outfalls via a more comprehensive, solution. These examples appear to illustrate that in practice, minimal benefit and potential adverse impacts may occur. It appears as though the purpose of the protocol has shifted to performing an exercise in modeling, modifying calculations, and crediting for permit compliance purposes rather than improving water quality.

Conclusion

The Group review process was set up to quickly reach a consensus in a few quick phone discussions. However, consensus was not achieved. This ORP would have benefited from a thorough review and a robust discussion by a range of experts and stakeholders.

In closing, while we appreciate the substantial work done by Chesapeake Stormwater Network to lead this effort and move it forward, we disagree with the recommendations and definitions outlined in the *Final Draft Recommendations for Crediting Outfall Restoration Projects*. For the above reasons, EPA Region 3 and MD DNR do not support an ORP that provides TMDL credits for sites with predictive or potential erosion, nor do we support crediting designs that rely on piping and hard engineering as stream restoration.