TMDL Prioritization Strategy for USEPA's 2022-2032 Vision
Pennsylvania Department of Environmental Protection
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INTRODUCTION

Section 303(d)(1)(A) of the Federal Clean Water Act mandates that states create a priority ranking for waterways that require Total Maximum Daily Load (TMDL) development. This priority ranking must include the cause of the impairment and take into account both the severity of the pollution and the uses to be made of the waterbodies. This document contains Pennsylvania's prioritization rationale for the United States Environmental Protection Agency (USEPA) TMDL program's 2022-2032 Vision. This rationale will help guide the selection of specific waterbodies in Pennsylvania for TMDL development on a two-year cycle, in accordance with 40 CFR 130.7(b)(4), for the remainder of USEPA's 2022-2032 Vision, beginning October 1, 2024. In addition to TMDLs, this priority ranking also envisions the use of other types of restoration plans where appropriate, including Advance Restoration Plans (ARPs) and Protection Plans, which are described below. While useful for planning future work in an organized and thoughtful manner, this prioritization strategy is not meant to rigidly limit projects over this timeframe, as unforeseen needs and opportunities may arise.

A key practical consideration for efficient TMDL development is the substantial resource investment needed to develop methodologies for specific pollutant/use combinations. For instance, the methods used to develop TMDLs for Aquatic Life Use impairments due to siltation will likely differ greatly from the data and methods used to address Recreational Use impairments due to pathogens. To maximize the efficient use of programmatic resources, it is sensible to focus on one specific pollutant/use combination at a time, and to develop many similar TMDLs before switching focus to other pollutant/use combinations. As such, the Pennsylvania Department of Environmental Protection (DEP) is organizing this proposed priority ranking based on a short list of targeted pollutant/use combinations for this USEPA vision cycle.

DESIGNATED USES AND POLLUTANTS OF CONCERN

A review of Pennsylvania's final 2022 Integrated Water Quality Report and draft 2024 Integrated Water Quality Report revealed that impairments for Aquatic Life Use were most common, followed by impairments for Recreational Use. In contrast, impairments for Fish Consumption and Water Supply uses were far less common. Within the Aquatic Life Use category, siltation impairments were most common, followed by metals, pH, and nutrient impairments. Pathogens/*Escherichia coli* (*E. coli*) were the only listed pollutant cause within the Recreational Use category. Further discussion of the rationale for prioritizing each of these pollutants for TMDL/ARP development in the upcoming years is provided below.

EXTENT AND OTHER PRACTICAL CONSIDERATIONS

Sediment/Siltation

Over the past several years, the focus of DEP's TMDL Program has been Aquatic Life Use impairments due to siltation. Even so, the number of siltation impairments in Pennsylvania continues to grow with each new Integrated Water Quality Report, and there are still many siltation TMDLs needed (Figure 1). Excessive siltation is also known to be detrimental to many types of aquatic organisms, including algae, macroinvertebrates, and fish, in addition to decreasing the recreational and aesthetic value of waterbodies. Given these problems, along with DEP's well-established methodology, it is practical to continue focusing TMDL/ARP efforts on this pollutant in the near future.

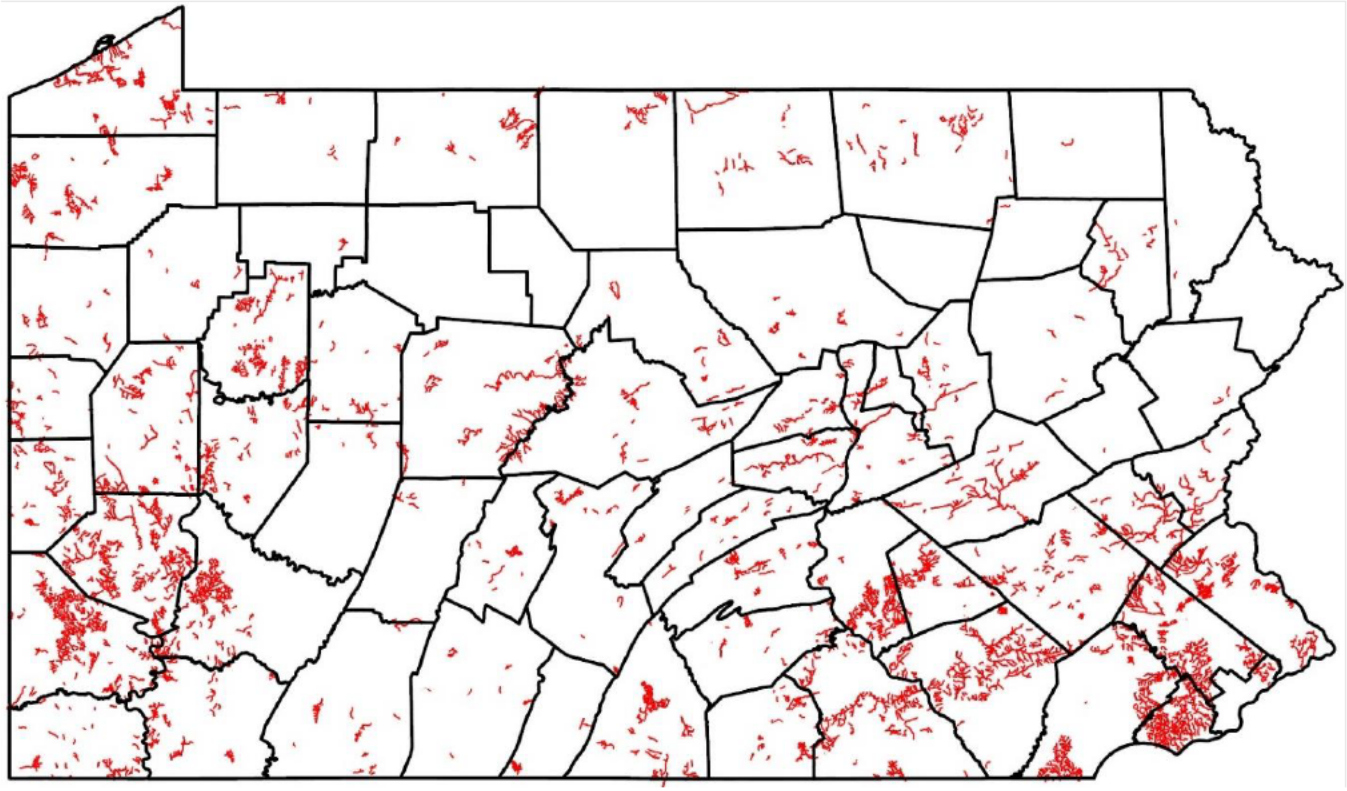

Figure 1. Approximation of stream segments listed or proposed to be listed as impaired for Aquatic Life Use due to siltation, and not covered by a relevant TMDL or ARP as of September 2023. This figure may include preliminary information.

In addition, there are other compelling reasons to focus on siltation at this time. Since it is one of the three pollutants covered under the Chesapeake Bay TMDL, there has been massive recent investment in understanding, preventing and remediating siltation pollution in Pennsylvania.[1] This creates further opportunity to improve water quality locally. Another reason to focus on siltation is that it may act as a sort of "keystone pollutant" whereby preventing siltation

[1] The Chesapeake Bay TMDL uses the term "sediment" rather than "siltation," which is the term used in Pennsylvania's Integrated Water Quality Reports, but these two terms are describing essentially the same causes of pollution.

may provide co-beneficial water quality improvements, such as reducing nutrients and other pollutants and improving habitat. Since other pollutants such as organic matter, pathogens, phosphorus, pesticides, and metals often co-occur with, or are even bound to sediment eroded from uplands, the same best management practices that are effective against sedimentation/siltation may also help resolve these other pollution problems.

When choosing specific waterbodies for siltation plan development, DEP's TMDL Program plans to preferentially work in watersheds where the primary source of impairment is agriculture rather than urbanization. Agricultural systems may offer greater potential for restoration, as there tends to be more high-impact, cost-effective, best management practice opportunities compared with more urbanized settings.

Pathogens

DEP has been making rapid advances in assessing waters for Recreational Use due to pathogens (fecal coliform and *E. coli* bacteria, see Figure 2) and pathogen impairments may soon overtake siltation as the most commonly recognized cause of impairment in future Pennsylvania Integrated Water Quality Reports. This, along with the fact that pathogen impairments suggest a public health risk, strongly argues for the inclusion of pathogens as a priority pollutant for TMDL/ARP development within the timeframe of this strategy. DEP's increased efforts to assess waters for Recreational Use also provides the opportunity to develop data-driven pathogen TMDLs/ARPs for what is now the second leading cause of impairment statewide.

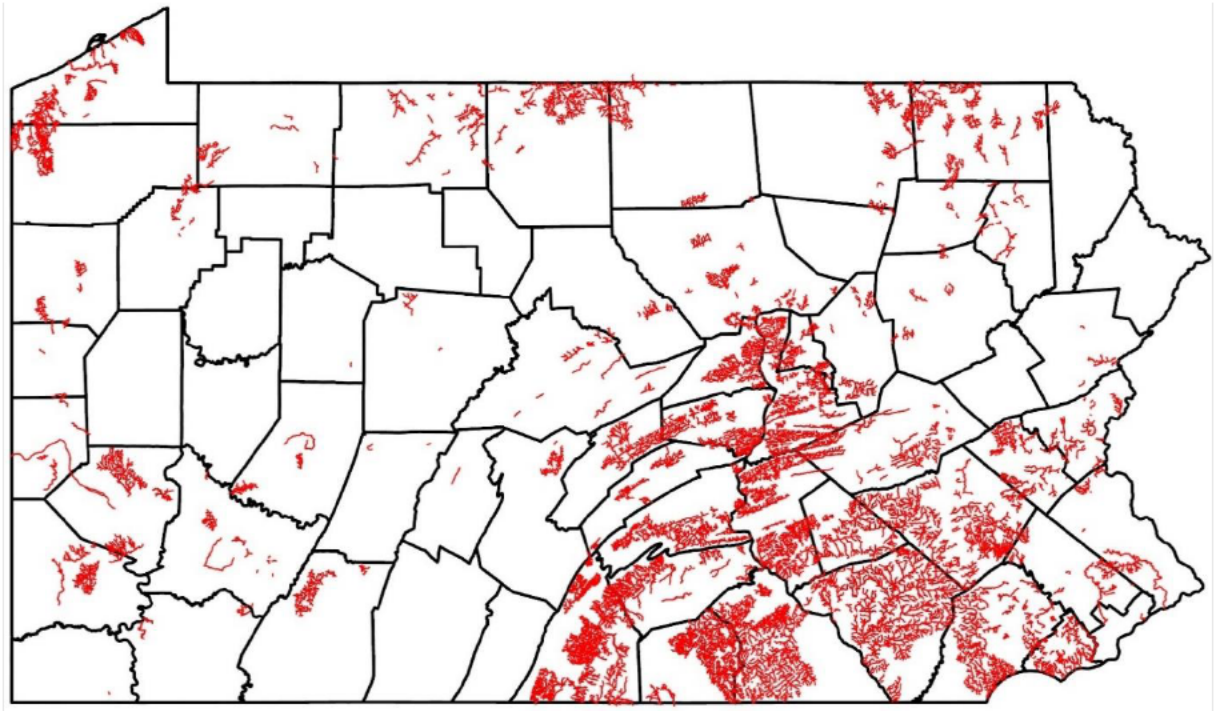

Figure 2. Approximation of stream segments with impaired Recreational Use due to pathogens as of September 2023. No relevant TMDLs or ARPs have yet been developed for this pollutant type in Pennsylvania. This figure may include preliminary information.

As was the case with siltation, the efforts to restore the Chesapeake Bay may make this a particularly good time to also focus on ameliorating pathogen impairments. While pathogens are not directly a part the Chesapeake Bay TMDL, pathogen pollution tends to co-occur with pollution by nitrogen and phosphorus, which are directly addressed by the Chesapeake Bay TMDL. Furthermore, the Federal Bipartisan Infrastructure Law makes funding available to develop and upgrade wastewater treatment and collection systems as well as stormwater sewers that may be contributing to pathogen impairments.

Nutrients/Eutrophication

In Pennsylvania's 2022 Integrated Water Quality Report, nutrients were the sixth leading cause of stream impairment in Pennsylvania, but DEP expects that recognized nutrient impairments could increase as other more prevalent causes of impairment are addressed. For example, waterbodies affected by historic mining may not show evidence of nutrient-related issues until the metals inhibiting plant (algae) growth are reduced. DEP has recently developed a Eutrophication Cause Method (ECM) to identify eutrophication as a cause of an Aquatic Life Use impairment. DEP is also in the midst of developing numeric water quality criteria for nutrients. The combination of the ECM and numeric criteria for nutrients will allow for both an objective, quantitative means by which a nutrient-related cause of impairment (such as Eutrophication) can be assigned to a waterbody, and for the calculation of endpoints in future restoration plans. As with siltation, nutrients are primary components of the Chesapeake Bay TMDL, which could result in funding opportunities for implementing nutrient-focused restoration plans.

Specific Metals

In Pennsylvania, pH and metals impairments are typically a result of abandoned mine drainage (AMD). These problems are common in some regions of the state and have extreme adverse impacts on aquatic communities. DEP has developed TMDLs for many waters to address impairments with a general cause listing of "metals" from AMD. DEP's TMDL Program collected chemical data to support the TMDLs that were assigned, or not assigned, to specific metals associated with mine drainage (that is, Iron, Aluminum and Manganese). However, new listing guidance from USEPA recommends a more detailed assessment that includes water column chemistry data to support impairment listings for the specific metals causing the impairment (either Aquatic Life Use or Potable Water Supply). Therefore, newer assessment data is resulting in such impairments for specific metals and DEP may choose to shift focus back to this area of work to clarify, revise or redo existing TMDLs or develop restoration plans for waters ahead of TMDLs over the lifespan of this prioritization strategy.

TYPES OF PLANS

Since the Federal Clean Water Act specifies the development of TMDLs for waterbodies impaired by pollutants, TMDLs will remain the default plan type developed by DEP's TMDL Program. However, USEPA recognizes that in some cases other plan types may be more immediately beneficial for achieving restoration. Thus, DEP's TMDL Program also develops

ARPs, which include both water quality improvement goals and a plan for working with stakeholders to achieve those reductions. DEP proposes to continue to use such ARPs at DEP's discretion, especially in cases where: (1) a watershed is of special interest – for instance, having a notable recreational use, or of particular conservation concern; (2) the cause of the pollution problem appears to be correctable in the short term (within about a decade); and (3) where there may be actively engaged implementation partners. However, should an ARP be unsuccessful at fully ameliorating the pollutant impairments, subsequent TMDL development will be necessary. DEP may also choose to develop separate "Protection Plans" or incorporate protection planning elements within other plan types. These plans may be used to spur protective actions for waterways that, while not presently impaired, may be threatened by future impairment, or for waterways that are degraded, though perhaps not to the point of impairment.

ADDITIONAL FOCUS AREAS

When choosing specific watersheds for plan development, priority could be given to: waterways not currently covered by a relevant TMDL or restoration plan; waterways of particular interest, such as those with highly valued fisheries, recreational uses or within drinking water source protection areas; waterways with especially severe problems; waterways with a high potential for recovery; and/or Environmental Justice areas. USEPA's 2022-2032 Vision includes a focus on Environmental Justice areas, or areas where disadvantaged communities may be facing disproportionate adverse environmental impacts. For instance, streams within some low-income areas, both urban and rural, may be at greater risk for pathogen impairments due to a lack of sufficient sewage conveyance and treatment infrastructure. As a basis for identifying Environmental Justice areas in Pennsylvania, DEP has also developed an Environmental Justice Mapping and Screening Tool, PennEnviroScreen, based on a suite of metrics that assess the pollution burdens and population characteristics of communities across Pennsylvania to derive an Environmental Justice score for each community. Preferentially choosing Environmental Justice areas for TMDL/ARP development could contribute to progress towards resolving these issues. DEP is in the process of evaluating the overlap of Environmental Justice areas, waterbodies with impairments caused by the pollutants discussed above as priorities for restoration plan development, and other factors affecting the potential remediation of these waterbodies.

USEPA's 2022-2032 Vision also includes a focus on climate change. Thus, DEP's TMDL Program has also begun exploring updating the primary modelling program for developing sediment and nutrient TMDLs/ARPs (Model My Watershed) to incorporate more recent climate data.

USEPA's 2022-2032 Vision also includes a "partnerships goal" of meaningful communication and collaboration with other governmental programs and non-governmental stakeholders. In Pennsylvania, the *Pennsylvania Bulletin* is used to advertise the availability of draft TMDLs/ARPs for public review. Furthermore, forming collaborative partnerships is an essential

part of ARPs. For instance, DEP has been specifically writing such plans to qualify projects for the Federal Clean Water Act Section 319 Nonpoint Source Management Grant Program funding, in which case the plans and their periodic progress reports will be reviewed by both state and federal section 319 programs. Such plans may also use funding from various other sources, such as Pennsylvania's Growing Greener Plus Grants program, the United States Department of Agriculture, or the National Fish and Wildlife Foundation. Organizations such as county conservation districts, the United States Geological Survey, and the Pennsylvania Fish and Boat Commission may provide technical assistance. Nonprofit organizations, such as Trout Unlimited and the Nature Conservancy, may serve as implementation partners to work with landowners and contractors. DEP's TMDL Program also provides technical assistance to National Pollutant Discharge Elimination System permit writers or groups that wish to develop watershed restoration plans.

CONCLUSION

For USEPA's 2022-2032 Vision, DEP's TMDL Program proposes focusing on Aquatic Life Use impairments caused by siltation and Recreational Use impairments caused by pathogens. DEP's TMDL Program may also prioritize Aquatic Life Use impairments caused by nutrients (nitrogen and phosphorus) and specific metals, as impairments are refined and methodologies are developed. When choosing specific watersheds for plan development, priority could be given to: waterways not currently covered by a relevant TMDL or restoration plan, waterways of particular interest, waterways with especially severe problems, waterways with a high potential for recovery, and/or Environmental Justice areas.

Through the additional filter process, DEP will create a list of watersheds with the highest priority for TMDL/ARP development. The list of watersheds will be found in the "RESTORATION PRIORITES" subsection of each of Pennsylvania's biennial Integrated Water Quality Reports. This list will include the development status of each TMDL/ARP. It will also identify which TMDLs/ARPs are planned to be developed within the next two years. Watersheds that have ARPs are ranked low for TMDL development; however, ARPs do have a high priority for restoration implementation. Any watershed not ranked as a high TMDL development priority or a low TMDL development priority is ranked as a medium TMDL development priority.