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Total Maximum Daily Load (TMDL) Narrative and Strategy
Nutrients and Sediment TMDL's
Sawmill Run Watershed, Brentwood Borough

Background and Purpose

Sawmill Run (SMR) is in the Ohio River Basin which is located within Allegheny County, Pennsylvania, HUC 05030101. Approximately 1,114 acres (6.59% of MS4 watershed area, 3% of overall watershed) of which are located in the Borough of Brentwood. Following the guidelines of Section 303(d) of the Clean Water Act for TMDLs, the United States Environmental Protection Agency (EPA) established a TMDL in the Borough of Brentwood for Sediment on April 4, 2007 and for Nutrients on July 1, 2008. The U.S. EPA developed TMDLs for Sediment and Nutrients for both point and non-point sources in SMR.

SMR is comprised of 10 Municipal Separate Storm Sewer (MS4) Permits which include the following:

MS4 Permit Holder	Acres	%
Baldwin Borough	6	0.10
Baldwin Township	318	5.54
Bethel Park Borough	612	10.67
Brentwood Borough	378	6.59
Castle Shannon Borough	1,003	17.49
Dormont Borough	491	8.56
Green Tree Borough	292	5.09
Mt. Lebanon Township	1,483	25.85
Scott Township	39	0.68
Whitehall Borough	1,114	19.42
Total	**5,736**	**100%**

SMR also includes the following Municipalities which are considered Combined Systems and therefore do not hold an MS4 Permit:

MS4 Permit Holder	Acres
Crafton Borough	2
Ingram Borough	2
Mt. Oliver Borough	29
Pittsburgh City	6,663
Total	**6,696**

The purpose of this TMDL Strategy is to discuss the methodology used by the Borough of Brentwood and The Gateway Engineers, Inc. to reduce or eliminate the sources of Sediment and Nutrients from the SMR Watershed to meet water quality standards.

Potential Sources of Pollution in the Borough of Brentwood

This strategy was developed to reduce or eliminate sources of nutrient and sediment pollution in the SMR Watershed. In the Borough of Brentwood, the SMR Watershed includes commercial and residential land uses. The watershed includes mainly Turf Grass, as well as Low and High Intensity Development. The EPA document recommends a total reduction of 72.2% of Sediment and 95% of Nutrients for the Borough of Brentwood.

In this watershed, the EPA has TMDLs for PCB, Chlordane, Acid Mine Drainage and Metals. At this time, EPA has not allocated any wasteload through the MS4 program; therefore, the Borough of Brentwood is not responsible for these pollutants through their MS4 program.

TMDL Strategy

During the next twenty (20) to thirty (30) years, the Borough of Brentwood will begin the implementation of their TMDL Plan; the plan includes items that will occur immediately as well as items that will take many years to implement. The Plan includes the following:

A. Public Involvement/Stakeholder Input

The Borough of Brentwood recognizes that pollution reduction within the SMR Watershed can occur only if members of the Borough and adjacent municipalities work together to actively understand the characteristics of the overall watershed. Due to the existing land use of the watershed, it is likely that the only way to accomplish the goals of the TMDL Plan is to actively engage members of the Community.

The Borough has already been working with members of the watershed who are part of the SMR/PWSA integrated watershed team. This team is currently run by a Watershed Coordinator, hired by Economic Development South, funded by PWSA. The team has begun meeting to discuss a watershed sampling program and preliminary projects which could be implemented. During the first five (5) years of the TMDL Plan, the Borough will complete the following as part of the Immediate Action Plan:

1. Implement a Stakeholder Advisory Group, potential members include:

    a. Municipal Staff
    b. Engineer
    c. Council Member
    d. School Board Member
    e. Planning Commission Member
    f. Large land owners
    g. Other Municipalities within the SMR Watershed

2. Hold three (3) public review workshops to review the TMDL plan, propose projects and obtain feedback from residents and stakeholders. The first of which will occur as part of the implementation of this strategy.

    a. Publish in newspaper a public notice containing a statement describing the plan, where it may be reviewed by the public, and the length of time the permittee will provide for the receipt of comments.
    b. Accept public comments for a minimum of 30 days from the date of public notice.
    c. Accept comments from any interested member of the public at a public meeting or hearing, which may include a regularly scheduled meeting of the governing body of the Borough authority that is the permittee.
    d. Consider and make a record of each comment received from the public during the public comment period concerning the plan, identifying any changes made to the plan in response to the comment.

3. Work with the Watershed Coordinator to develop an informational website for the SMR Watershed separate from the Municipal website.

4. Encourage the development of a SMR Watershed Group or continue to attend the SMR/PWSA integrated watershed group.

B. Watershed Characterization and Evaluation

The Borough believes that the best way to understand the SMR Watershed would be to better understand the sources of impairment and potential solution alternatives to develop the most cost-effective approach to achieving the TMDL reduction requirements. In order to understand the problems within each portion of the Watershed within the Municipal boundaries, the Borough will implement the following items in the first five (5) years as part of the Immediate Action Plan:

1. Known pollution area projects

    a. Borough will focus on potential pollutant areas. These could include:
        i. Areas with highest ratio of pervious/impervious area.
        ii. Known Stormwater Management Facilities
    b. Identify potential projects in these areas.
    c. Examine existing facilities and good housekeeping programs to see how they are working and if they are removing pollutants as expected.
    d. Identify rehabilitation projects on existing facilities that are not functioning as intended.
    e. Quantify anticipated reduction of projects (range) of each pollutant.

2. Delineation of the watershed into sub-watersheds

   Further delineate the overall watershed into sub-watersheds, as each sub-watershed may have its own unique characteristics contributing to sources of pollutants and consequently unique mitigation strategies.

3. Prioritize sub-watershed based on potential known pollutant areas

4. Watershed characterization

   Characterize the watershed in detail including land use type, land cover, soil types, existing stormwater infrastructure, surface drainage network, stream characteristics, transportation networks, and major utilities.

5. Sub-watershed reconnaissance

   a. Complete field reconnaissance of the watershed to determine a better understanding of the watershed's issues.
   b. Identify what types of sediment are contributing to problems downstream (e.g. road sediment or stream bank erosion).
   c. Conduct resident interviews during field reconnaissance visits to obtain local knowledge of issues.
   d. Identify any potential candidate projects

6. Inventory existing Stormwater Management BMPs and assess their condition

   a. Review as-built drawings (if available) on all existing facilities.
   b. Field inspect existing facilities to ensure accuracy of as-built drawings and make corrections, if required.
   c. Obtain information on all existing stormwater management facilities such as BMP type, condition, maintenance needs and retrofit opportunities.

7. Evaluate efficiency of existing BMP programs

   a. Make use of tools such as Soil and Water Assessment Tool (SWAT) to model soil erosion, identify soil erosion prone areas and assess the impact of BMPs on sediment reduction for the existing conditions scenario.
   b. Review of existing programs (i.e. street sweeping, inlet cleaning, salt storage and distribution, etc.) and determine efficiency of program and potential mitigations. Examples of mitigations could include changing the frequency of existing programs, and utilizing DEP BMP Pollution Reduction worksheets.

8. Rank sub-watersheds

   Rank and prioritize sub-watersheds for further evaluation as well as develop and design of alternatives. Initially the Borough will review the outfall testing completed through the MS4 program to determine potential problem areas. Land uses of properties will also be used in conjunction with the test results to target possible 'hot' areas.

C. Watershed Management Strategies

During the implementation of the TMDL Plan, the Borough will need to develop strategies to Identify, Evaluate and Design projects that cost-effectively reduce the TMDL pollutants within the SMR Watershed. The strategies, as outlined below, will be continuously evaluated throughout the entire TMDL Plan.

9. Preliminary sub-watershed strategies

   a. Inventory potential BMP types to reduce pollutant loads and assist in watershed rehabilitation
   b. After baseline conditions (Section D) are obtained and existing programs are reviewed (as identified in previous sections) BMP types will be further evaluated regarding anticipated effectiveness.

10. Investigation of candidate projects

   a. Classify projects – Structural vs. Non-structural
   b. Field evaluation for appropriateness, constructability, access, etc.

Figure 1 - Structural and Non-Structural Solutions

Structural Solutions
- Rain gardens
- Rain barrels
- Bioretention
- Stormwater quality wetlands
- Green parking areas and streets
- Green alleys, driveways, and walkways
- Biofiltration drainage inlets
- Green roofs
- Planter boxes
- Permeable/porous pavement
- Streambank stabilization and restoration
- Vegetated buffers
- "Naturalized" stormwater basins

Non-Structural Solutions
- Maximized green spaces
- Trash/debris removal
- Land management and restoration
- Infill and redevelopment initiatives
- Private and public land programs
- Public education programs
- Tree planting
- Water conservation
- Green ordinances (planning, building and zoning) and policies
- Overlay districts
- Plan review processes and design criteria
- Tax and rate incentives
- Cost sharing

11. Evaluation and ranking of candidate structural projects.

    a. Determine benefits of candidate projects
    b. Determine feasibility of candidate projects
    c. Rank and prioritize candidate projects
    d. Discussions with the watershed group to review potential partnering opportunities
    e. Claimed reductions must be supported by the Pennsylvania Stormwater Best Management Practices Manual or other credible sources.

       Projects could be based on the following criteria: cost, potential pollutant load reduction, stakeholder involvement, etc.

12. Evaluation and ranking of non-structural candidate projects.

    a. Review land use management of sites
    b. Review municipal ordinances (stormwater, subdivision and land development, and zoning ordinances)
        i. Purpose is to identify inconsistencies which would restrict the implementation of green stormwater management.
        ii. Update ordinances for areas of re-development requiring updates to stormwater controls on the site or requiring new ones.
        iii. Apply credits (on the stormwater management fee) to users who install privately owned stormwater management facilities.
    c. Review municipal policies
    d. Discussions with the watershed group to review potential partnering opportunities
    e. Prioritize projects
    f. Claimed reductions must be supported by the Pennsylvania Stormwater Best Management Practices Manual or other credible sources.

       Projects could be based on the following criteria: cost, potential pollutant load reduction, stakeholder involvement, etc.

13. Analysis and evaluation of alternative scenarios

    a. Develop criteria to evaluate project effectiveness and use DEP BMP worksheets to project anticipated load reductions
    b. Determination of implementation plans with budgets for review with Stakeholders Group, the Borough, property owners, etc.

14. Evaluation of funding methods

    a. Determine how projects will be funded
    b. Determine planning level cost estimates
    c. Discussions with the watershed group to review potential partnering opportunities

D. Watershed Monitoring

In order to fully understand the SMR Watershed, a baseline condition should be established within the Municipal borders and in the watershed as a whole. In order to achieve this goal, the Borough will complete the following within the first (5) years, under the Immediate Action Plan:

1. Outfall screenings

    a. As per the MS4 Requirement – all Priority outfalls will be screened two times a year.
    b. Non-priority outfalls will be screened at minimum once every five (5) years.

2. Qualitative monitoring

    a. Observe watershed/stream conditions at minimum one (1) time per calendar year and after significant rain events
    b. Note changes to land cover, infrastructure, conveyance systems and stream systems

3. Quantitative monitoring

    a. Sampling program – the SMR integrated watershed group will be conducting sampling during the 2015 and 2016 recreation season. The sampling will take place throughout the SMR watershed at points selected by the watershed group.

        i. Obtain samples during/after significant rain events
        ii. Complete laboratory testing
        iii. Evaluate pollutants and stream conditions
        iv. Establish seasonal baseline conditions
        v. Identify areas of significant pollutant sources

E. TMDL Strategy & Implementation Plan Development

1. Immediate Action Plan (0-5 years)

    a. Identify funding opportunities
    b. Form a Stakeholders Group
    c. Develop a watershed website
    d. Identify projects in areas of known potential pollutants
    e. Examine existing facilities and identify any rehabilitation projects
    f. Estimate a range of reduction in pollutants for given projects.
    g. Complete base line sampling efforts
    h. Identify types of sediment contributing to problems downstream
    i. Complete up to five (5) structural projects within the Borough.

Projects could include, but are not limited to, the following: Rain Gardens, Sumps in Inlets, Stormceptors, upgrades to existing facilities, etc.

j. Review of non-structural BMP's and develop up to five (5) non-structural projects

Projects could include, but are not limited to, the following: Encourage re-development over new development, updates to existing Good Housekeeping Practices, minimizing additional impervious areas, etc.

2. Short-Term Implementation Strategy (5-10 years)

a. Identify funding opportunities
b. Identify high priority/high benefit-cost ratio projects
c. Complete up to five (5) structural projects within the Borough
d. Develop a plan to track previously completed projects and their benefits to the watershed

a. Quantify the effectiveness of best management practice (BMP) implementation on runoff, sediment, and nutrient yields from the sub-watersheds
b. Distributed parameter watershed models are often used for evaluating the effectiveness of various best management practices (BMPs).
c. Complete any maintenance or upgrades to existing BMPs to assure effectiveness.

e. Review non-structural projects and make updates if appropriate

3. Long-Term Implementation Strategy (10-30 years)

a. Identify funding opportunities
b. Complete most cost effective projects; those which require most amount of coordination/collaboration and the least amount of funding and design work.
c. Develop a monitoring plan to track previously completed projects and their benefits to the watershed
d. Continue to develop and track previously completed projects and their benefits to the watershed

a. Quantify the effectiveness of best management practice (BMP) implementation on runoff, sediment, and nutrient yields from the sub-watersheds
b. Distributed parameter watershed models are often used for evaluating the effectiveness of various best management practices (BMPs).
c. Complete any maintenance or upgrades to existing BMPs to assure effectiveness.

e. Review non-structural projects and make updates if appropriate

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