

## **Quittapahilla Creek Watershed Implementation Plan**

### **Introduction**

Founded in 1997, the Quittapahilla Creek Watershed Association has been working with landowners, private organizations and public agencies to improve the water quality and aquatic habitat of Quittapahilla Creek.

Until 2001, there had been no comprehensive assessment, nor coordinated effort to identify and prioritize water quality, habitat and stream channel stability problems throughout the watershed. As a consequence, targeting of stream reaches for improvements had been on a project-by-project basis. There was no Master Plan for the Quittapahilla Creek Watershed that served to focus funding and restoration and management efforts where they are most needed.

Supported by Growing Greener Grants between 2001 and 2003, a watershed assessment was conducted by an interdisciplinary team of consultants and government agencies. In 2006, Clear Creeks Consulting delivered to the Watershed Association the Quittapahilla Creek Watershed Assessment Findings Report and Quittapahilla Creek Watershed Restoration and Management Plan. This four volume document summarized the findings of the assessment and provided restoration and management strategies for addressing the problems identified in the Quittapahilla Creek Watershed.

Starting in 2008 the Quittapahilla Watershed Association began applying for Growing Greener Grants to initiate design and implementation of the first of the urban BMP and stream restoration projects identified in the Restoration and Management Plan. Funded by a Growing Greener Grant design and permitting for the first restoration project was completed in 2012. Funded by Growing Greener and PA Fish & Boat Commission Cooperative Habitat Improvement Program construction was completed in February 2015 along Quittapahilla Creek in the Quittie Creek Nature Park. Inspired by the success of this project and an interest in participating in future projects expressed by other Townships, the Watershed Association resolved to accelerate their efforts to implement other projects.

During a recent planning meeting of the Quittapahilla Watershed Association it was the consensus of the group, that in accordance with PADEP recommendations the Watershed Association will focus their efforts on restoration projects along the mainstem Quittapahilla Creek and in the priority subwatersheds. A consensus also emerged that their long range strategy should be to pursue grants in two phases; (a) apply for a grant to fund survey, design and permitting for a given project, followed by (b) application for a second grant to do the construction work. Finally, it was agreed that the Association should pursue funding from sources in addition to Growing Greener (e.g., EPA 319, PA Fish & Boat Commission Cooperative Habitat Improvement Program, NRCS Conservation Reserve Program, etc.).

The U.S. Environmental Protection Agency (EPA) requires that all watershed restoration projects funded under Section 319 be supported by a Watershed Implementation Plan (WIP).

The Quittapahilla Creek Watershed Association believes that their best chance of moving forward with their future projects is to prepare the EPA 319 Watershed Implementation Plan (WIP). This approach will facilitate their ability to secure funding and focus their future efforts with clearly defined schedules, costs and objectives. The funding requested under this grant application would be utilized to develop the Watershed Implementation Plan (WIP).

### **Statement of Environmental Need**

- Quittapahilla Creek Watershed

Quittapahilla Creek is a tributary to Swatara Creek and is part of the Susquehanna River Basin. Its headwaters begin just southeast of Lebanon, Pennsylvania and it enters the Swatara Creek near North Annville, Pennsylvania. The major land use in the 77 square mile watershed is agricultural. There are significant areas of urbanization along the Route 422 corridor in the City of Lebanon, West Lebanon, Cleona, and Annville. In addition, new development in the watershed is replacing farms with suburban communities. Past and current land use and land management practices in the rural areas, suburban communities, and urban centers have resulted in degraded water quality, stream bank and bed erosion, sedimentation, flooding, and the loss of riparian and in-stream habitat throughout the Quittapahilla Creek Watershed.

The Pennsylvania Department of Environmental Protection (PADEP) conducted studies in the 1980's and 1990's that clearly indicate the aquatic resources in the Quittapahilla Creek Watershed are impaired. In fact, the mainstem as well as all of the major tributaries to the Quittapahilla Creek are listed as impaired in the 303(d) listings. The 2000 305(b) Report prepared by PADEP indicated that there are 88.9 miles of stream in the Quittapahilla Creek Watershed. Only 1.82 miles of stream (2%) were found to support designated aquatic life uses. The 2000 305(b) report and 303(d) listings indicated that the land use activities contributing to impairment include: agriculture, crop related agriculture, urban/storm sewers, and bank modifications. Causes of impairment include nutrients, siltation, suspended solids, organic enrichment/low dissolved oxygen concentrations, flow alteration, and other habitat alterations.

Total Maximum Daily Load (TMDL) was developed for sediment for Quittapahilla Creek and for phosphorus for the tributaries of Bachman Run, Beck Creek, Killinger Creek, and Snitz Creek (PADEP, 2000). The document cites excessive sediment and nutrient levels as a major water quality problem in the Quittapahilla Creek Watershed. It indicates that these pollutants are causing increased algae growth, large accumulations of fine sediments on the streambed, and degradation of in-stream habitat. The document attributes the excessive sediment and nutrient levels principally to agricultural activities. Submitted by PADEP to the U.S. Environmental Protection Agency in 2001 for final agency review, the TMDL document was approved in 2002.

- Swatara Creek Watershed

As the second largest tributary to Swatara Creek, Quittapahilla Creek has a significant impact on the overall water quality of the Swatara. According to the Watershed Restoration Action

Strategy (WRAS) State Water Plan for the Swatara Creek Watershed (PADEP, 2004) three non-point pollution sources exist within the Swatara watershed:

- Abandoned mine drainage (AMD) from coal mining operations in the northern main stem watershed,
- Nutrient enrichment from agricultural runoff primarily in the central sub-basin.
- Urban runoff in the lower region.

The most highly urbanized and commercial land is along the US Route 422 corridor which passes through the boroughs or villages of Lebanon, Cleona, Annville, Palmyra, Hershey, and Hummelstown. Most of this urban and commercial land is located within the Quittapahilla Creek watershed.

The WRAS document indicates that the upper Swatara watershed should improve with the installation of additional treatment systems to address abandoned mine discharges. The document also notes that impacts from agriculture should decrease in surface waters as installation of BMPs by the watershed associations continue. However, the increasing population and the expanding urban areas in the lower two-thirds of the sub-basin have the potential to increase impairment from urban runoff. These concerns emphasize how critical restoration and management efforts in the Quittapahilla Creek watershed are to the goal of restoring and managing the Swatara Creek watershed.

- Quittapahilla Creek Watershed Assessment

Funded by Growing Greener grants an interdisciplinary team of consultants and government agencies that included Clear Creeks Consulting; Skelly & Loy, Inc.; U.S. Fish & Wildlife Service, Chesapeake Bay Field Office; Penn State Institutes of the Environment, Pennsylvania State University; Department of Biology, Lebanon Valley College; and U.S. Geological Survey, New Cumberland Field Office conducted a detailed watershed assessment of the Quittapahilla Creek Watershed. The assessment included: field reconnaissance surveys, geomorphic stream assessments, in-stream habitat assessments, sampling of fish and macroinvertebrate communities, water quality monitoring, developing a sediment-discharge rating curve, and hydrologic and water quality modeling. Sixty five miles of tributaries were assessed and mapped utilizing a method similar to the USDA-NRCS Stream Visual Assessment Protocol. Eighteen miles of Quittapahilla Creek were assessed utilizing Level II, III, and IV Rosgen stream classification and channel stability assessment methods. The location, nature and causes of channel instability, habitat, and water quality problems were identified. The fieldwork was completed between 2001 and 2004.

- Quittapahilla Creek Watershed Restoration and Management Plan

Based on the findings of the watershed assessment a Restoration and Management Plan was developed for the Quittapahilla Creek Watershed. The restoration and management strategies outlined in the Plan were developed to achieve the overall project objectives of improving the water quality and habitat of the Quittapahilla Creek watershed. The Plan presents strategies

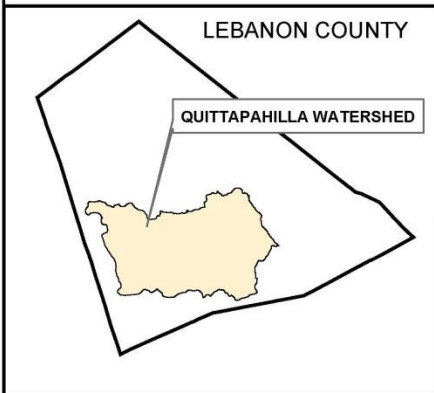
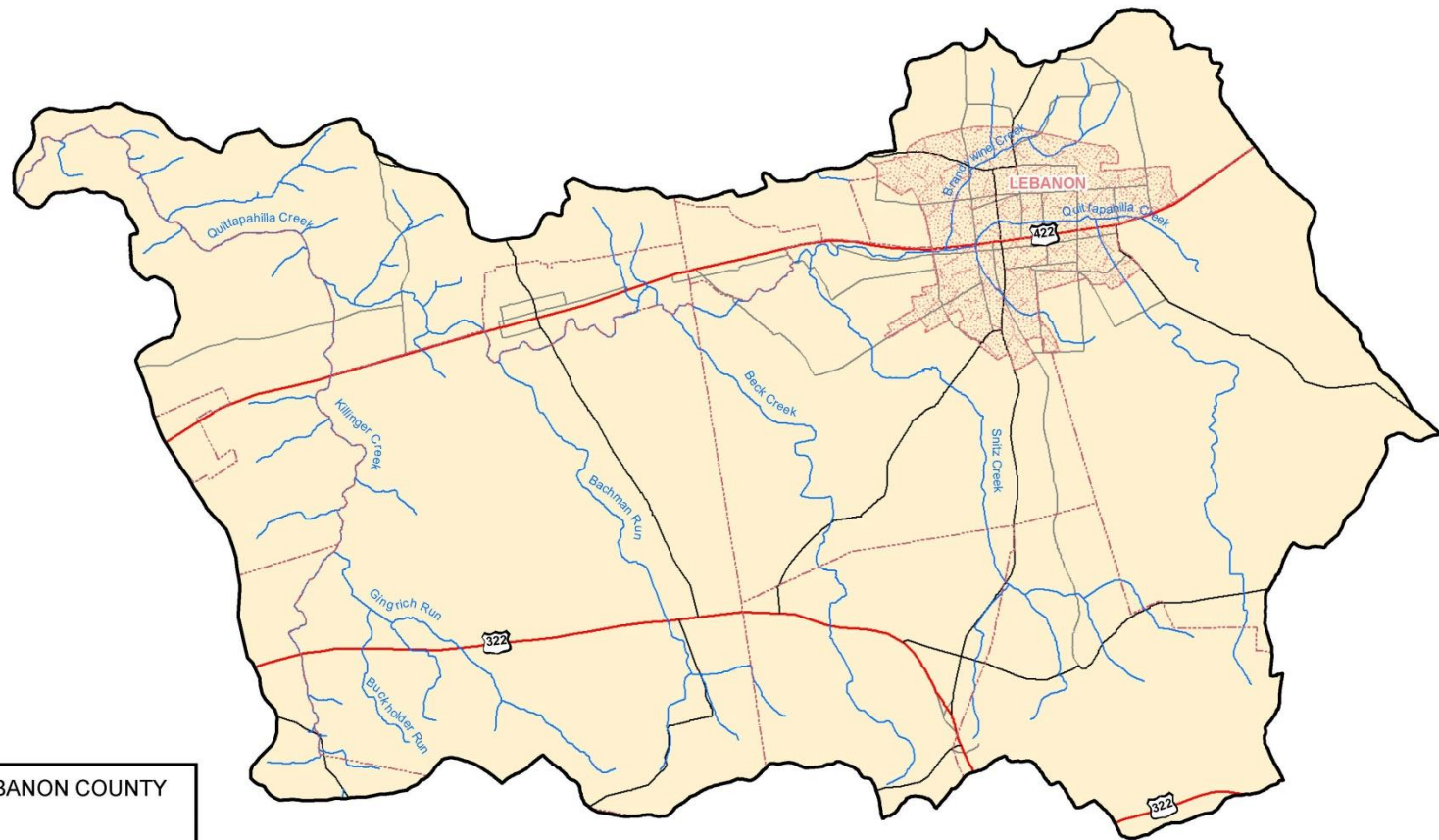
designed to address existing hydrologic, water quality, in-stream habitat, and channel stability problems. These include best management practices for controlling runoff from agricultural land, best management practices for controlling runoff from urban land and channel stabilization measures focused on restoring and stabilizing stream reaches impacted by livestock grazing, urban runoff and channel alterations along Quittapahilla Creek and its tributaries.

The Plan prioritized problem areas and developed long-term restoration and management strategies to address those problems. The plan identified a wide variety of restoration and management strategies tailored to the specific problems identified.

Agricultural best management practices (e.g., cropland protection, conservation tillage, strip cropping, contour farming, conversion of agricultural land to forest, conversion of agricultural land to wetland, nutrient management, grazing land management -streambank fencing, terraces and diversions) were targeted to the rural subwatersheds. Regional, as well as site-specific urban best management practices (e.g., stormwater wetlands, infiltration, and bio-retention stormwater facilities) were targeted to the suburban and urban subwatersheds.

Stream restoration, wetland creation, and riparian buffer projects were targeted in rural, suburban, and urban areas where livestock impacts, runoff and channel stability problems had been identified. These projects were evaluated to determine reductions in nutrients and sediment loadings that could be achieved by implementing these practices. For example, nitrogen, phosphorus and sediment loadings that derive from stream bank erosion could be reduced by 42.8%, 42.8% and 43.9%, respectively by implementing the recommended stream stabilization measures. Implementation of stream stabilization has the potential to reduce sediment loadings in the Quittapahilla Creek watershed by as much as 521 tons annually.

The Plan also provides recommendations for agricultural programs and development policies and regulations intended to prevent and/or minimize future problems including conservation easements, land acquisition, and local ordinances focused on stream, wetland, and floodplain protection.



Legend	
	Municipal Boundary
	Roads
	Streams
	Quittapahilla Watershed



SKELLY and LOY, Inc.	March 2003	Plate 1
Quittapahilla Watershed Project Study Area		
<b>WATERSHED MAP</b>		
Lebanon County, Pennsylvania		
Job No: 1503038	Scale: 1" = 6000'	

## Justification for Funding

As outlined in DEP's 2015 Growing Greener Plus: Watershed Protection and Surface Mining Conservation and Reclamation Act Grant Application Package, Department-wide Watershed Management priorities include:

- Implementation of restoration activities that result in pollutant load reductions in watersheds for which Total Maximum Daily Loads (TMDL) have been developed.
- Implementation of restoration and/or protection activities that are recommended in watershed based plans that address sources of pollution of stream segments identified on the Integrated List of all Impaired Waters.
- Projects that support sustainable riparian buffers through establishment of permanent easements, maintenance and monitoring programs.
- Projects that support MS4 communities implementing BMPs consistent with their stormwater, TMDL, or Chesapeake Bay Pollution Reduction Implementation Plan.

Although not on PADEP's 2015 Priority Watersheds list, Quittapahilla Creek was previously identified as one of the Priority Watersheds for the South Central Region. Accordingly, PADEP has expended considerable funds supporting the Watershed Association's restoration efforts over the past 14 years.

Development of an EPA 319 Watershed Implementation Plan will allow the Watershed Association to seek an alternative source of funding through the EPA's 319 Program. Although the 319 Program previously funded the development of Watershed Implementation Plans, that is no longer the case. Therefore, the Watershed Association is requesting Growing Greener funding under this grant application that will be utilized to develop the EPA 319 Watershed Implementation Plan (WIP).

We are providing more than the 15% funding match with contributions of in-kind services from the Quittapahilla Watershed Association and our consultant, Clear Creeks Consulting. The Quittapahilla Watershed Association will continue the close working relationship it has formed with Clear Creeks Consulting. They have provided many hours of in-kind services over our fifteen-year relationship.

## **Project Scope of Work and Deliverable**

The U.S. Environmental Protection Agency (EPA) requires that all watershed restoration projects funded under Section 319 be supported by a Watershed Implementation Plan (WIP) that includes the following nine minimum elements, known as the “a-i criteria”: a) Identification of the causes and sources that will need to be controlled to achieve the load reductions estimated in the watershed plan, b) Estimates of pollutant load reductions expected through implementation of proposed nonpoint source (NPS) management measures, c) A description of the NPS management measures that will need to be implemented, d) An estimate of the amount of technical and financial assistance needed to implement the plan, e) An information/education component that will be used to enhance public understanding and encourage participation, f) A schedule for implementing the NPS management measures, g) A description of interim, measurable milestones, h) A set of criteria to determine load reductions and track substantial progress towards attaining water quality standards, and i) A monitoring component to determine whether the watershed plan is being implemented.

Although many of the elements required for inclusion in the WIP were components of the Restoration and Management Plan (2006), the Plan does not follow the format required by the EPA and certain key elements are missing (i.e., anticipated pollutant load reductions associated with implementation of restoration projects, an implementation schedule for prioritized projects, costs associated with implementation of projects, and appropriate funding sources for specific categories of projects).

Developing an EPA 319 Watershed Implementation Plan (WIP) that meets the EPA’s criteria will require completion of the following tasks:

1. Identify and prioritize restoration projects to be implemented along the mainstem Quittapahilla Creek and in the Priority Subwatersheds.
2. Convert the calculated pollutant loadings reductions developed for priority subwatersheds in the Quittapahilla Creek Watershed Restoration and Management Plan (2006) into pollutant loadings reductions for restoration project reaches.
3. Develop pollutant load reductions evaluation criteria to measure progress in meeting the water quality objectives.
4. Develop implementation schedule for the prioritized projects
5. Develop cost estimates for a) survey, design and permitting and b) construction of the prioritized projects.
6. Develop a public education, participation and outreach strategy.
7. Prepare the narrative, tables, graphs, and other exhibits for the Watershed Implementation Plan (WIP) and format the document.

Deliverable – EPA 319 Watershed Implementation Plan approved by PADEP and USEPA.

## **Commonwealth Investment Criteria**

Consulting firms, construction contractors, landscape companies, nurseries, and other suppliers associated with the construction industry depend primarily on private development and publicly funded projects for business opportunities. The recent economic downturn was devastating for many companies. Although the economy is recovering slowly, publicly funded projects are critical for sustaining these businesses.

Developing this EPA 319 Watershed Implementation Plan will allow the Quittapahilla Watershed Association to continue implementing restoration projects in the Quittapahilla Creek Watershed. In turn, implementation of these restoration projects will have a significant economic impact on the consulting firms, construction contractors, nursery and landscape companies directly involved, as well as the quarries; heavy equipment leasing, parts and maintenance; fuel suppliers; and erosion control products materials and equipment suppliers.