

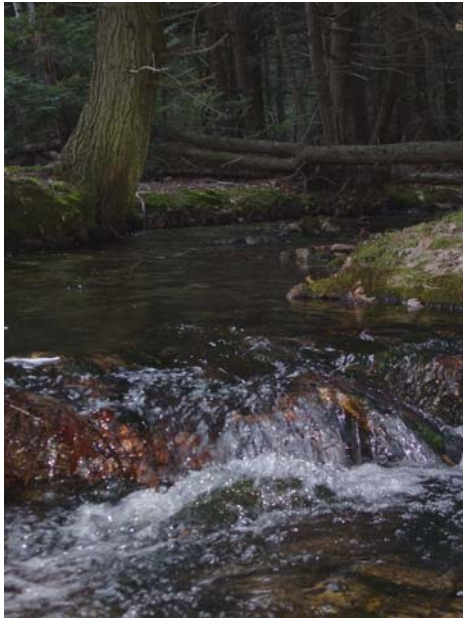
## EXECUTIVE SUMMARY

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### Overview

The Buffalo Creek Watershed Alliance (BCWA) of the Merrill W. Linn Land & Waterways Conservancy is pleased to present this Watershed Management Plan for the Buffalo Creek Watershed. The Alliance which was formed in January 2002 strives to engage stakeholders and the public in educational programs and physical projects aimed at improving the long-term sustainability and ecological health of the watershed. This Watershed Management Plan then is a blueprint or guidebook for the BCWA to consult as it continues to forge ahead with its partners to implement its mission and watershed improvement projects. The plan should not be a static document but should instead be periodically reviewed and evolve as necessary to reflect updated trends and needs within BCWA and the watershed. The priorities within the watershed are likely to change over the course of time and the plan should do the same. The plan has five chapters and includes a series of recommendations for the BCWA and other entities involved in watershed protection and conservation. There is also a set of appendices that supplement the main document. A brief summary of each chapter follows.

The first chapter, *Watershed Overview*, as the name implies provides a general summary of the Buffalo Creek Watershed including a physical description and an identification of the various land, water and biological resources, land use, infrastructure, socio-economic data, and description of historic, cultural, and recreation resources in the watershed. For example in this chapter, among other things, one will learn that the watershed is 134 square miles in land area, lies within portions of 11 local governments in two counties, and contains two subwatersheds with the highest level of statewide protection (Exceptional Value) and five tributaries with the second highest level of protection (High Quality).



The second chapter titled *Watershed Diagnostics* identifies existing reports and studies about Buffalo Creek, outlines major subwatersheds, and summarizes what is known about the physical, chemical and biological conditions of Buffalo Creek and its tributaries. In addition, known and suspected areas of watershed stream impairment are discussed along with other issues and public perceptions of watershed conditions. In this chapter, one will learn that the headwaters of Buffalo Creek are impaired due to acid deposition (acid rain). In addition, several other tributaries like Coal Run, Muddy Run, Rapid Run and Beaver Run are impaired due to agricultural influences and the main stem of Buffalo Creek is less healthy from a biological perspective as you progress downstream to the mouth of the creek at Lewisburg. This is mainly due to human influences from development and agriculture.

Chapter Three, *Goals & Subwatershed Prioritization*, establishes a series of goals, priority subwatersheds and critical restoration areas where the BCWA has determined the highest need for remediation projects to correct known impairment problems. In this section of the plan, it is noted that the subwatersheds were ranked as follows from most to least important in terms of restoration priority: 1) Buffalo Creek (main stem); 2) Coal Run; 3) Rapid Run; 4) Beaver Run; 5) Muddy Run; 6) North Branch Buffalo Creek; 7) Spruce Run; and 8) Little Buffalo Creek. Further analysis was then conducted to provide a greater level of detail in order to identify ten critical areas for restoration within these subwatersheds.

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The fourth chapter, *Restoration Projects & Implementation Schedule*, lists potential restoration projects that, if implemented, would be oriented toward mitigating sources of impairment within the subwatersheds and critical restoration areas highlighted in Chapter 3. This included identifying specific problem areas, site-specific restoration actions, responsible entities, potential partners, cost estimates for the action items, timeframes for completion, and possible funding sources.

In the *Protection Strategies and Implementation Schedule* Chapter (Chapter 5), the plan addresses protection strategies that should be implemented in the watershed that are not physical restoration projects. This includes activities such as public education, municipal ordinance reform, land conservation and others that are equally important in terms of the long-term health of the watershed. Again this includes a listing of specific actions, responsible entities, potential partners, cost estimates, timeframes for completion and possible funding sources.

### **Key Findings**

Based on data collected by the Clean Water Institute of Lycoming College, Bucknell University and the Pennsylvania Department of Environmental Protection (PA DEP) it is known that the Buffalo Creek Watershed is experiencing degraded conditions on portions of the main stem and on some tributary streams. This is attributed to acid deposition in the headwaters and agriculture and human development on the mid to lower reaches of Buffalo Creek and the valley tributaries. Biological conditions in Buffalo Creek, as indicated by benthic macroinvertebrate surveys, are generally healthy but the main stem and some tributaries could be susceptible to continued degradation by human activity in the watershed. Restoring healthy stream conditions in the tributaries will likely help the main stem maintain its water quality and achieve its protection level and designated uses. Improving alkalinity in the headwaters of Buffalo Creek should counteract the prevalence of low pH and restore a healthy and functional component of the stream system. This should also lead to improvements in downstream productivity of game fish. Implementing agricultural best management practices (BMPs) and installing riparian buffers should reduce nutrient and sediment loads to Buffalo Creek and cause lower eutrophication and improved habitat quality. Targeting reaches of streams that have been listed as impaired by the PA DEP will begin to help some of the major problems. However, many sections of the main stem and tributaries contribute to degraded conditions in Buffalo Creek and should be considered for additional long-range management. Benthic macroinvertebrates and fish can respond quickly to improvements in water quality through management, but they require action on the landscape to mitigate the negative influences humans have on streams. Due to the widespread prevalence of agricultural land use extra attention must be placed on working with farmland owners and operators in order to achieve desired results through the utilization of BMPs.

### **Level of Restoration & Protection Needed**

Through this planning exercise the BCWA has identified 26 projects that could be implemented to begin addressing some of the major sources of stream impairment. The total estimated cost of these projects would be approximately \$702,200 with the most expensive being the acid remediation in the headwaters which alone costs \$357,000. The \$345,000 balance remaining would include \$70,000 to address a dirt and gravel road and \$275,000 for problems related to agriculture such as livestock access, riparian buffers, and the like.

In terms of protection strategies 17 main projects were established with a total estimated cost of \$279,000. Many of these were in the category of education with the two largest being the need for agricultural and urban stormwater BMP demonstration areas at an estimated cost of \$200,000 and an agricultural

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information specialist to work for the BCWA and County Conservation District to assess farm conditions more fully and to work with landowners to implement corrective BMPs.

One limitation of this plan is that resources to pull the plan together are as limited as those needed to implement its findings. Therefore the BCWA focused primarily on stream segments officially recognized by the PA DEP as impaired and other stretches where data indicated a degraded condition. There appears to be more than enough restoration and protection needs to keep the BCWA and its partners dutifully engaged for the foreseeable future and beyond. This would remain the case even if funding was more accessible and nothing new emerged as a critical need in the next five to ten years. It is likely that millions of dollars of other improvements are needed throughout the watershed to address agricultural non-point source pollution, upgrades to sewage treatment plants, and the like; however, it was not possible to determine each and every problem area within the watershed.

In this plan the highest priority restoration project that has been identified is remediation of the headwaters acid deposition which has caused a low stream pH and made stream conditions intolerable for most species. The proposed solution would be a constructed treatment wetland that would release alkalinity into the stream through the interaction of limestone and compost in an artificial wetland. The second priority identified by the BCWA is the hiring, in partnership with the County Conservation District, of an agricultural specialist who could work with farmland landowners to assess non-point pollution sources and devise BMPs that would abate the pollution but at the same time not greatly reduce farm profitability.

