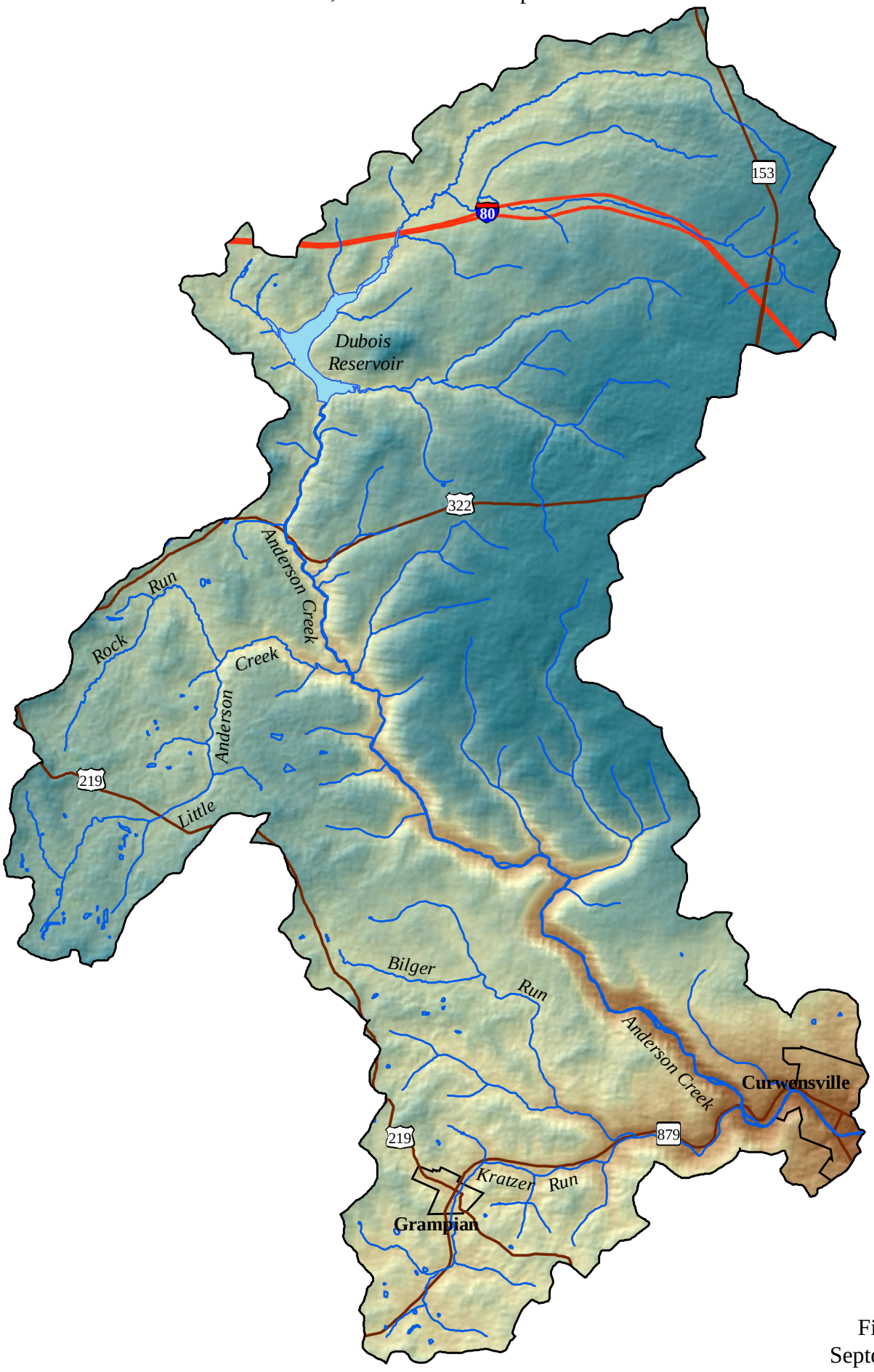
Anderson Creek Watershed

Assessment, Restoration and Implementation Plan



Final Plan
September 2006

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I. Introduction

Overview

The Anderson Creek Watershed Assessment, Restoration, and Implementation Plan was developed as a key component in the effort to address pollution problems affecting Anderson Creek and its tributaries. Anderson Creek Watershed Association (ACWA), a local, nonprofit, volunteer organization, in cooperation with numerous partners, has created this plan to provide users with valuable information that will help guide future restoration and implementation activities within the watershed. ACWA contracted with Western Pennsylvania Conservancy (WPC) to gather available data, perform the field assessment, develop a monitoring plan and coordinate monitoring activities with ACWA volunteers and the DEP Bureau of Watershed Management Nonpoint Source Pollution (NPS) program, initiate landowner contact, assist in coordinating initial restoration efforts with landowners, local, county, state, and federal agencies, and develop the implementation plan. In addition, WPC has provided technical assistance to ACWA on matters outside the specific scope of the Anderson Creek Watershed Assessment, Restoration, and Implementation Plan.

The restoration of the Anderson Creek watershed presents many challenges and users of this plan should understand that the recommendations identified within are based on the best information on restoration technologies available at the time of its creation. Due to the evolving techniques and technologies used in watershed restoration, changing priorities of government agency programs, and the availability of various funding sources used in restoration activities, a periodic review and updating of the plan is highly recommended.

Prior to the development of this restoration and implementation plan, ACWA and its various partners focused their restoration efforts on the most obvious pollution problem in the watershed, abandoned mine drainage (AMD). Several prior studies have cataloged the negative impacts mineral resource extraction activities have had on the watershed. None have recorded stream and riparian conditions as part of the study. The Anderson Creek Watershed Assessment, Restoration, and Implementation Plan is designed to include a comprehensive assessment of the watershed's stream conditions, along with an updated assessment of the AMD problems.

Because this assessment is funded through Pennsylvania Department of Environmental Protection, Bureau of Watershed Management's Section 319 Nonpoint Source Pollution program, the study is also developed to consider requirements of the U.S. Environmental Protection Agency (EPA) Section 319 program. In addition, the study will also help develop a new AMD restoration model, created in cooperation with a consulting firm, DEP, and Penn State University.

Public Information and Participation

Because long-term local support is necessary if Anderson Creek is to be restored, ACWA made every effort to create the partnerships necessary to sustain their cleanup efforts. ACWA has teamed with local citizens, nonprofit groups, local and county government, state, and federal government agencies. They are working with local mining companies to promote remining of problem abandoned mine sites. ACWA has joined with the Clearfield County Conservation District and the Environmental Alliance for Senior Involvement (EASI) to install flow-monitoring weirs on critical AMD sites throughout the watershed. They also assisted in gathering water quality data during the monitoring period of the assessment. ACWA partnered with Pike Township to develop grants and monitor water quality. Another important partner has been the Pike Township Water Authority, which draws water from Anderson Creek during critical drought conditions and provided valuable resource data. ACWA is also working with other organizations with similar goals in a much larger effort to clean up the West Branch of the Susquehanna River, into which Anderson Creek flows.

ACWA usually holds monthly public meetings and encourages all of their partners and interested local citizens to attend, assuring an open line of communication within their community. During this assessment, the group has asked WPC to make regular updates on the progress of the project at the monthly meetings. In addition, as the assessment proceeded, initiating personal contact with landowners to gain their support was a priority.

The group also developed and initiated a public outreach effort to assure local citizens are aware of the cleanup activities taking place. As part of their outreach, a display board that highlights their efforts within the watershed was created and prominently displayed at various community businesses. Local businesses have been a willing and supportive partner. As an effort to reach as many people in the community as possible, the group had several articles published in the local newspaper. They have also made presentations to local community groups.

All of these efforts have paid off in strong community support. Every landowner approached during this assessment that has an abandoned mine issue on their property indicated their willingness to work with the watershed group. Numerous landowners indicated they will allow work to take place on their properties and would permit treatment systems to be built in order to clean up the stream. ACWA is confident their outreach efforts have played a key role in developing such support.

Assessment Methodology

At the initial time of development of the Anderson Creek Watershed Assessment, Restoration, and Implementation Plan, Pennsylvania had no required methods or standards for completing a watershed assessment and restoration plan. The Pennsylvania DEP developed some methodologies for properly assessing AMD-impaired watersheds

during the mid to late 1990s but none had become a standard for watershed groups to follow.

One such effort, called "A Model Plan for Watershed Restoration," was developed by DEP in cooperation with Natural Resources Conservation Service, U.S. Army Corps of Engineers, Office of Surface Mining, Eastern and Western Pennsylvania Coalitions for Abandoned Mine Reclamation and PA Department of Conservation and Natural Resources. This plan outline was an attempt to develop a universal method that could be used by all of the different agencies, with some tweaking for their individual programs. Thus, one plan could serve several funding sources.

Prior to the "Model Plan" was a plan called "Pennsylvania's Comprehensive Plan for Abandoned Mine Reclamation," developed by DEP's Bureau of Abandoned Mine Reclamation (BAMR). Its methodology was primarily developed to meet the guidelines set by the Surface Mining Control and Reclamation Act, the federal law governing mining and reclamation, under which BAMR's reclamation program operates.

A number of assessments and restoration plans had been completed under the state's Growing Greener program, but no required format was set because of the variety of watersheds and the problems affecting them. More recently, DEP Watershed Managers, created under the Growing Greener program, developed a guide for watershed assessments called "Recommended Key Components of an Effective Watershed Assessment and Restoration Plan." This outline identifies the types of information that should be assembled to develop a good assessment and proper restoration plan. It identifies critical steps that should be completed as information is gathered, the physical assessment proceeds, and the plan is developed.

Most importantly for the Anderson Creek assessment, DEP's Bureau of Watershed Management, in accordance with EPA Section 319 guidelines, recently developed their "Elements of a Watershed Implementation Plan in Pennsylvania's Non-Point Source Management Plan" guidelines for those receiving funding through the EPA program. The outline focuses on addressing non-point source impairments identified in the Total Maximum Daily Load (TMDL) assessments, such as that recently completed for the Anderson Creek watershed.

One of the most important factors in development of the assessment and restoration and implementation plan is properly balancing the time, effort, and money necessary to complete the suggested restoration and implementation approach. Within each suggested method there are limits to the type and amount of information that can be gathered based on the goals, objectives, priorities, and the level of funding available for its development. The goals and objectives in themselves are driven by different and sometimes competing priorities, established first by the organization for which the plan is developed and secondly, but often just as important, the funding source, which usually carries its own requirements or priorities.

The comprehensive assessment approach taken for Anderson Creek under this study was primarily based on the needs and desires of ACWA, DEP's Section 319 program priorities, DEP Bureaus of Mining and Reclamation and Abandoned Mine Reclamation, and the cooperative effort between DEP Bureau of Watershed Management and Penn State University to create a restoration model for AMD-impaired watersheds. It also attempts to blend aspects of the other previously mentioned assessment plan outlines in an effort to make the plan as useful as possible.

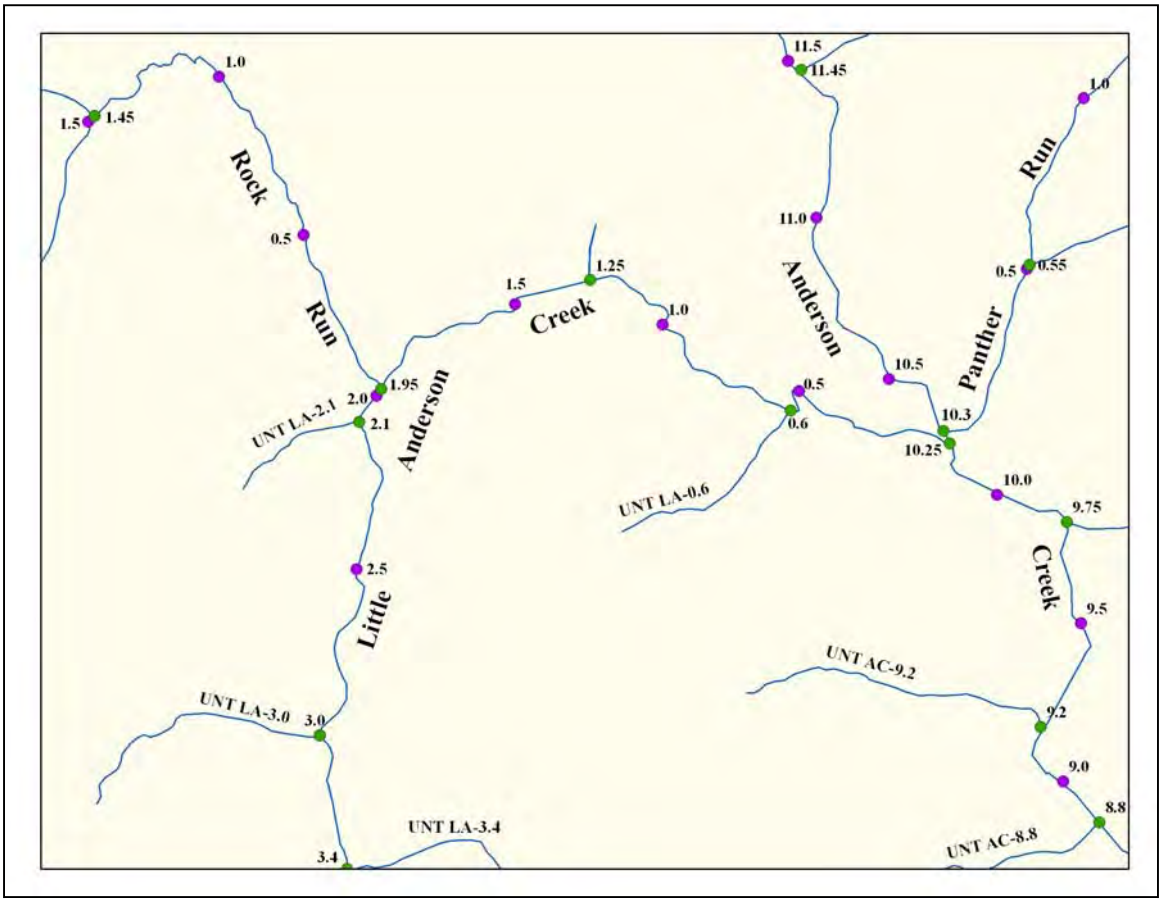
To fully assess the physical condition of the stream channels and streamside areas, all named streams and their tributaries below the Dubois Reservoir were walked. Each tributary was visually assessed as stream segments with similar characteristics. Stream segments varied in length, depending on them maintaining similar characteristics. When the in-stream or riparian area of a tributary changed noticeably, a new segment was created. For example, if the gradient of the stream changed from flat or low to something more moderate, the steeper section was considered a new segment. Similarly, if the streamside vegetation changed significantly, for example, from forested to residential, a new segment was created.

In order to have a consistent way to compare stream segments and quantify conditions within and among them, a modified version of the USDA Stream Assessment Protocol was used during the development of the Anderson Creek Watershed Assessment, Restoration, and Implementation Plan. The USDA protocol assigns a numerical value to each of the stream characteristics, or "assessment elements," equating to overall stream quality. The assigned assessment score, which is usually between 1 and 10, with 10 being highest in quality, is based on specific conditions associated with each assessment element. An example of the assessment form used can be found in the Appendices. All of the individual visual assessment scores on each segment were combined to create an overall visual assessment score. A GIS-based map was created based on those overall scores to help quickly identify the quality rating of each stream segment and is included within the report.

Anderson Creek was divided into subwatersheds for the purpose of this assessment. To identify individual tributaries within the main stem of Anderson Creek and its subwatersheds, numerical values were assigned to tributaries based on their distance, in miles, from the mouth of each named stream. ArcGIS 9.0 was used to measure the distances on electronic versions of USGS 1:24,000 scale topographic maps. The streams were traced using the ArcGIS 9.0 measuring tool set in miles and an identifier was placed on the map at each half-mile increment, beginning at the mouth of Anderson Creek. Each tributary entering the stream was then easily identified by where it fell along the continuum of the distance from the mouth to the headwaters. An alphabetic prefix was also assigned, based on the stream the tributary entered. For example, if an unnamed tributary entered Little Anderson Creek 3.4 miles upstream of its mouth, its designation would be UNT-LA 3.40 (UNT for "unnamed tributary," LA for "Little Anderson," and 3.40 for the distance in miles measured from the mouth of the stream). Using this system, it is unnecessary to designate which side of the stream a tributary entered from when using the map. No tributaries entered a stream directly across the

stream from another. Each has an individual designation based on the distance it enters upstream from the mouth of the receiving stream.

Stream monitoring points were labeled differently. Again, letters were used as a prefix to designate the type of monitoring, in this case, SMP for "stream monitoring point," the stream name, such as AC for Anderson Creek, but the numeric designation only indicated the monitoring point's relative position along the stream starting at the mouth and moving upstream. For instance, SMP-AC1 indicated the first monitoring point



Tributary identification system is based on distance in miles from the mouth of the receiving stream.

upstream of the mouth of Anderson Creek, and, in this instance, SMP-AC4 indicated the uppermost monitoring station. No mileage designation was assigned to the in-stream monitoring point.

In addition to stream monitoring stations, individual AMD discharges and groups of AMD discharges were monitored. Individual AMD discharges were labeled using the prefix DMP, which represents "discharge monitoring point." Some discharges were identified with the stream it impacted and distance from the mouth, such as DMP-BR 4.5, which indicated a monitoring point located on a discharge entering Bilger Run 4.5 miles upstream from its mouth. Others were identified by names familiar to watershed group

members, such as DMP-Drauker1, for a discharge draining from the Drauker Mine #1 in the Little Anderson Creek subwatershed.

In some instances, it was impossible to monitor each individual AMD source at a site because they were too numerous or because of difficult site conditions. In such cases, a monitoring point that captured all of the AMD discharges was chosen. Such areas were termed "problem areas," and the monitoring point was labeled PAMP, indicating it was a "problem area monitoring point." These sites were also given an identifier that indicated the stream or unnamed tributary on which it was located. For example, PAMP KR-1.45 indicated a monitoring point for a collection of discharges from a problem area located on Kratzer Run 1.45 miles upstream from the mouth of the stream.

Monitoring sites were chosen based on the best possible location to measure both pollution source loads and their effects on streams. Water samples were taken on a monthly basis for a period of twelve months to allow for a full evaluation of changes that occur throughout the seasons. In accordance with standard methods, field measurements were performed for temperature and pH using electronic meters. AMD discharge water samples were collected as grab samples, to limit the possibility of cross contamination, and transported to Mahaffey Laboratory, in Grampian. Samples were tested in the lab only. Lab samples were tested for hot acidity, alkalinity, total iron, total aluminum, total manganese, and total sulfates. Flow-measuring devices were installed by ACWA partners and volunteers on AMD discharges and included notched weirs or collection pipes that were measured using a bucket and stopwatch to determine flow. Stream flow measurements, along with associated sampling, were performed monthly and coordinated with the sampling of AMD discharges. Stream samples were collected as grab samples to limit the possibility of cross contamination. Samples were transported and analyzed by Mahaffey Laboratory. Stream lab samples were tested for hot acidity, total iron, total aluminum, total manganese, and total sulfates. Stream flows were taken using a Marsh-McBirney, Inc. Model 201 portable flow meter and used the cross-sectional area and velocity measurement and recorded in gallons per minute.

To help identify on which side of the stream pollution sources are located, a designation of "river left" or "river right" is used, which is the standard practice used by the American Canoe Association when describing locations on a stream. It is very important to understand these directions are given in relation to the observer always facing "downstream." In this way, north, south, east, and west directions are minimized, as streams are constantly shifting the direction in which they flow.

ACWA Restoration Priorities

The ACWA's priorities are to:

- improve water quality enough to re-establish a fishery in the main stem of Anderson Creek from the confluence with Little Anderson Creek to the mouth of the stream;
- re-establish a fishery in the Kratzer Run/Bilger Run subwatershed main stems;

- identify all AMD discharges and abandoned mine areas directly affecting the quality of the stream;
- identify remediation projects that will assist the group in meeting water quality improvement goals;
- identify remediation projects that will help the group sustain local interest and support for restoration efforts over the long-term;
- monitor changes in water quality and stream biology as restoration proceeds; and
- educate the public about the mission of ACWA, its ongoing involvement in restoration activities, and the importance of conserving the watershed's unique natural and cultural assets through sound land-use practices.