

An Evaluation of Biological and Chemical Improvements at Various Spatial Scales in the West Branch Susquehanna River Watershed, Pennsylvania¹

S.M. Rummel*, A. Wolfe, R. Kester, K. Lavelle, and A. Lutz²

Abstract: The West Branch Susquehanna River watershed in northcentral Pennsylvania drains approximately 18,130 km² of mostly forested land. Although the watershed contains some of the most pristine coldwater habitat in Pennsylvania, historic coal mining operations left a legacy of approximately 1,900 km of streams impaired by abandoned mine drainage. Over the past 14 years, numerous abandoned mine drainage restoration projects have been completed. In 2017 and 2018, Trout Unlimited completed a watershed-wide assessment of water chemistry, benthic macroinvertebrate communities, and fishery communities to document water quality and biological changes associated with restoration efforts. This study replicates and expands a 2009 study and included 80 replicated sample sites in AMD impaired tributaries and main-stem river sites within the West Branch Susquehanna River watershed and included 30 reference sample sites with no known water quality impairments and supporting a Class A trout fishery. Preliminary results suggest that water quality improvements have continued throughout the watershed since the 2009 study, particularly increases in pH and reductions in heavy metal concentrations at sites downstream of completed AMD restoration projects. Biological improvements have also continued throughout the watershed. Restoration projects on small tributaries within the watershed have led to significant improvements in the mainstem of the West Branch Susquehanna River. This study demonstrates the importance of monitoring to evaluate project effectiveness. It also provides a case study on water quality and biological improvements at several spatial scales, ranging from individual stream restoration to the cumulative downstream impact of numerous AMD restoration projects at the sub-basin scale. The results of this study will provide insight into the prioritization of AMD restoration projects for large-scale remediation of water quality and biological communities.

Additional key words: effectiveness monitoring, benthic macroinvertebrate communities, water quality, cold-water fisheries

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2. Shawn M. Rummel, Ph.D. (* presenter), Lead Science Advisor, Trout Unlimited, Northeast Coldwater Habitat Restoration Program, Lock Haven, PA 17745; Amy Wolfe, Director, Trout Unlimited, Northeast Coldwater Habitat Restoration Program; Rachel Kester, Project Coordinator, Trout Unlimited, Pennsylvania Coldwater Habitat Restoration Program; Kathleen Lavelle, Field Coordinator, Trout Unlimited, Pennsylvania Coldwater Habitat Restoration Program; and Allison Lutz, Field Crew Leader, Trout Unlimited, Pennsylvania Coldwater Habitat Restoration Program.