Figure 1: View of Roller Mill Dam with stored sediment.

Phase 3 WIP; Legacy Sediment, Dam Removal and Threats to Water Quality in Lancaster County

DEP Growing Greener Grant Final Report

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Phase 3 WIP; Legacy Sediment, Dam Removal and Threats to Water Quality in Lancaster County

FINAL REPORT

Narrative Description

What was the project supposed to accomplish?

The project was designed to examine the effects of dam removal in the Chiques Creek Watershed of Lancaster County, Pennsylvania and develop data and discussion on how to better accomplish water quality goals related to the Commonwealth's Phase 3 Watershed Implementation Plan (WIP).

What was accomplished and how does it differ from the plan?

The project developed field data thru site surveys, soil analysis, UAV flights, and game camera footage. Extensive discussion and review of existing and proposed dam removal projects was initiated with stakeholders to develop a baseline for areas of collaboration on dam removal. The field collection and collaborative discussion were organized into three separate deliverables: a joint paper authored by Franklin and Marshall College with data from the Water Science Institute Growing Greener project, (WSI); a story map entitled Legacy Landscapes; and The Pennsylvania Dam Removal Forum hosted at the Susquehanna River Basin Commission Conference Center. All deliverables are on the WSI website and have been made available to other stakeholders and interested parties upon request. www.waterscienceinstitute.org

The plan had originally called for the hosting of 6 webinars to be produced by the project which, with the permission of DEP, was modified to develop the Dam Removal Forum. This change was driven by the Covid pandemic health safety protocols instituted by the Commonwealth and other stakeholders and the nearly 50 % reduction in funding requested in the original application.

What were the successes and reasons for success?

Overall, the deliverables were successful compilations of the acquired data that allowed the project to communicate its findings to general and scientific audiences. The project approach was to accept that every stakeholder had a valid interest in dam removal and no one outcome was necessarily better than another. However, it is understood that dam safety concerns are a priority for regulators that may justify removal regardless of other potential environmental benefits or consequences.

What problems were encountered and how were they handled?

Managing a remote workforce and coordinating with other stakeholders during the pandemic was the main challenge. Health protocols restricted travel and data acquisition during portions of the project and placed additional burdens on field research and administrative staff who were required to reconfigure schedules for remote communication. The reduction in project funding challenged the team's research and communication schedule which was exacerbated by the pandemic. Despite these challenges the project was able to develop additional field research that allowed the team to continue its outreach and education goals.

How did the project contribute to solution of original problems?

Previous research, supplemented by project data and heightened awareness of dam removals in the watershed, highlighted that significant erosion was occurring over long periods of time following removal, not just from the initial channel sediment release, but from bank retreat that followed lower stream levels. Because the project occurred during a period of actual removals, various stakeholders had begun communicating their knowledge of stream conditions following removals. Often this was the result of active investigation of dam removal sites but in at least one instance a dam was intentionally breached with limited communication with stakeholders. The result was the loss of water quality monitoring equipment and concern about a Log Perch restoration project which were directly impacted by the large release of channel sediment following the breech. Discussion among stakeholders following this event led to the recommendation that subsequent dam removals incorporate an "alternative analysis" into dam removal projects to determine the long-term effects of sediment release, identify potential downstream impacts, consider investments in floodplain restoration and habitat improvement, and develop cost effectiveness scenarios to fund alternatives. That recommendation is now being implemented at the Roller Mill dam site.

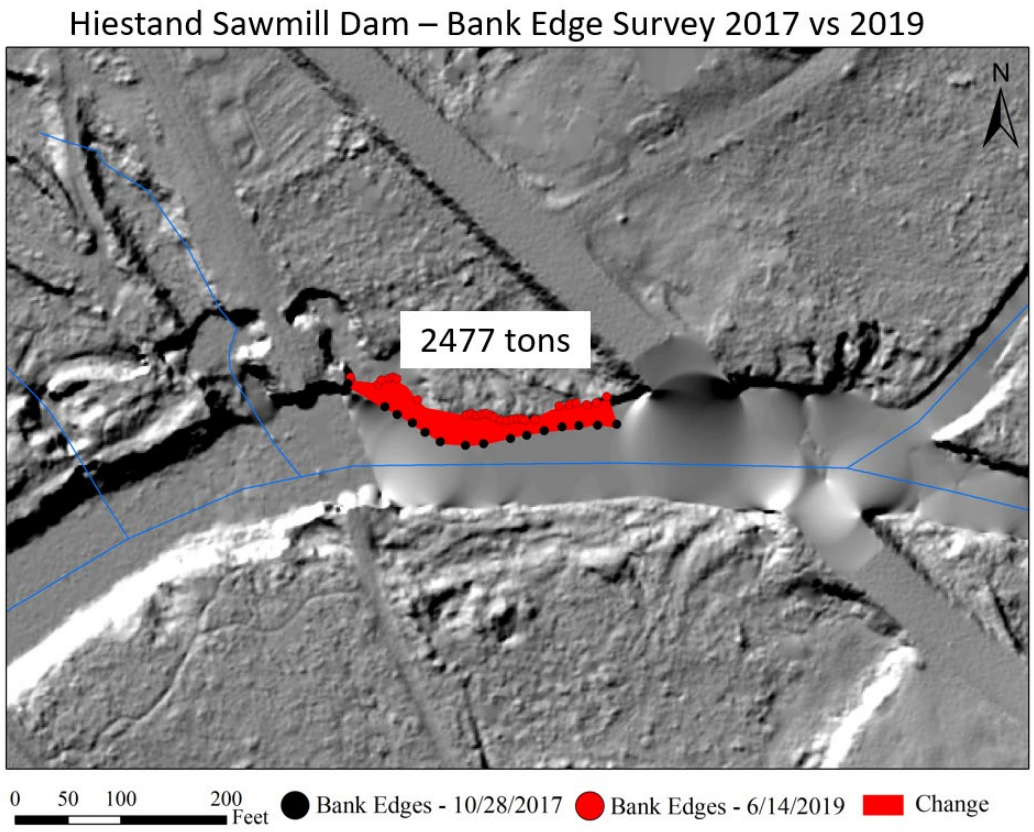

Figure 2: Erosion mapping with Digital Elevation Model differencing

What else needs to be done, and what additional efforts are underway or planned?

The alternative analysis recommendation has been complimented by additional efforts that are contributing to the development of a more comprehensive removal policy. Awareness among stakeholders has substantially increased and led to greater engagement with dam removal professionals and funders. Pa DEP, the Natural Resources Conservation Service (NRCS), the Susquehanna River Basin Commission (SRBC), academic institutions and local officials have contributed personnel, funding, research, equipment, and regularly participate in stakeholder discussions. PADEP has taken the lead in reviewing dam removal practices with the goal of promoting a wider range of beneficial environmental outcomes. NRCS has increased its financial and technical support of dam removal practices, recognizing that investment in upland conservation practices is being offset by short- and long-term sediment loading following breaches.

Municipal officials and the Lancaster Clean Water Partners (LCWP), the coalition of county organizations responsible for implementing the local TMDL reduction strategy, have suggested that crediting for dam removals be considered by the Commonwealth and the Chesapeake Bay Program. This approach has been precipitated by two contradictory requirements of the Chesapeake Bay WIP: MS4 permitting and the proposed Conowingo Dam TMDL. Municipalities are increasingly frustrated that they're investing large sums of taxpayer dollars into sediment reduction/prevention programs while a permitted dam removal in their jurisdiction/watershed can annually release thousands of tons of sediment and nutrients. The LCWP, in written testimony commenting on the proposed Conowingo Dam TMDL

strategy, expressed concern that resources could potentially be diverted from existing sources to address the Conowingo storage capacity issue while tens of thousands of tons of sediment were being mobilized in county watersheds by current and past dam removal practices.

The Water Science Institute recently convened a forum (see attached program) to discuss the current state of dam removal that focused primarily on the Chiques watershed but with lessons applicable to other removal projects. A list of areas for future examination and discussion was developed by conference presenters and participants (attached w audio of session on WSI website) and there was general agreement that follow up discussion and additional stakeholder participation would be useful.

What are the plans for disseminating the project results?

Project deliverables have been released as they are produced. The Chesapeake Bay Program and the Pennsylvania Environmental Digest published the release (see attached media advisory) of the Legacy Landscapes story map which remains available on the Institute's website. Several reports using WSI project data and personnel have been produced and are available on the WSI website as are most recordings and presentations from the May 17, 2022, Forum. The project presented at numerous venues, provided regulatory and policy comment, conducted dam site tours, and was the subject of several media stories on dams and dam removal.

How well did spending align with the budget request?

We spent considerably more to produce the project deliverables largely because of the pandemic induced time constraints and the budgetary modifications required by the reduction in the original funding request.