

**Water Quality Improvements  
Growing Greener - C990002548  
Columbia County Conservation District**

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**Project Description**

The Water Quality Improvements project was geared towards reducing nutrients and sediment and, therefore, improving local water quality with an emphasis on Ten Mile Run, a small tributary to the Susquehanna River that is rated as a High Quality stream. Two stream projects, which utilized in-stream habitat structures to stabilize banks and provide habitat for native trout, were completed in Ten Mile Run. One at Arnold's Golf Course, which is located on the downstream end of the Run close to the mouth, and Steve Hartzel's, which is closer to the headwaters of the Run. Arnold's project was completed in February 2022 and Hartzel's was completed in June of 2022. That fall, utilizing Ten Million Tree seedlings, small riparian buffers were planted at both projects.

Three Conservation Nutrient Management Plans (CNMPs) were also completed for three agricultural operations in the County. These plans were written to help the operators properly control nutrients and sediment on their farms to help improve local water quality.

In addition to the original scope of work, leftover funds in the grant budget were utilized towards the implementation of a manure storage stacking structure on a different operation, Fritz, located in Benton Township. The design of the manure storage, will help reduce nutrients and sediment entering a local waterway drastically. Currently, there is a high number of cattle grazing on a steep hill that has a small tributary of Fishing Creek that flows at the bottom. The structure that is being design will help remove the cattle from this steep hill and contain manure from entering the stream.

**Project Goals**

Improve water quality by reducing nutrients (nitrogen and phosphorous) and sediment to the Susquehanna River and ultimately the Chesapeake Bay via streambank stabilization, in-stream habitat structures, riparian buffers, CNMPs, and partial installation of a manure storage.

**Project Results**

Parameter	Estimated Reduction
Nitrogen	78.01 lb/yr
Phosphorus	38.14 lb/yr
Sediment	34.67 tons/yr

Approximately 100 seedlings were planted to enhance an existing riparian buffer at Hartzel's.

The project included approximately 800 linear feet of streambank stabilization via in-stream habitat structures, including toe rock, modified muddsill, single- and multi-log vane deflectors, and a log cross vane. These two projects are estimated to reduce 34.67 tons/year of sediment, 78.01 lb/year of nitrogen, and 38.14 lb/year of phosphorous.

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Three CNMPs were completed for three different operations. If the operators follow the plans as written, water quality should improve by reducing the amount of nutrients and sediment being released from the farm and into local water bodies.

Remaining funds were utilized to pay for the partial installation of a 32x48 foot manure storage for the Fritz project. This structure is estimated to reduce nitrogen loss into Fishing Creek by 178.77 pounds per year. However, these numbers are not included in the summary table above since this grant money was only utilized for partial implementation. Reductions will be captured in that grant reporting.

**Pictures**



Arnold's looking downstream before project



Same section of Arnold's approximately 8 months after single log deflectors were installed and a few months after a buffer was planted.



Example of how eroded Hartzel's banks were before



Picture of a section of Hartzel's after the project

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**Project Costs**

\$60,732.00 Growing Greener Grant

**Lessons Learned**

Communication with landowners is imperative to make sure they understand the project, why we are doing it, and what their role is. We had a staff change in the middle of the project, and it was hard to tell what was previously communicated to the landowner and what was not. There were parts of the project, like a buffer and educational signage, that were part of the project proposal, but that the landowner was not interested in. This should have been discussed with the landowner prior to the grant application being submitted and upon being awarded the grant. We did our best to persuade him to allow us to do these things and were somewhat successful. We got a very small buffer planted, one row of shrubs along the bottom of the graded bank in one area, but not the ideal buffer width.

**Partners**

Native Creations: planted riparian buffer at Hartzel's in 2019 prior to the implementation of stream structures. Was included as in-kind match.

Keller's Small Stream Solutions: Dave Keller provided designs and construction oversight for both Arnold's and Hartzel's stream projects. His time and travel spent for the initial site inspections, designs, and some additional time were donated as in-kind match.

Keystone Ten Million Trees: We ordered seedlings for the buffers from K10 trees.

Trout Unlimited: While their time was not documented, Trout Unlimited members volunteered their time to help plant trees at the Arnold's site.

Arnold's Golf Course – landowner

Steve Hartzel – landowner

Landowners who received CNMPs: Each of the farmers who received CNMPs provided cash match towards the plans. Landowners were Levan, Miller, and Fritz.

**Contact Information**

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