

Project Description – Walnut Spring Run

State College, Centre County

Walnut Spring Run in State College Borough has substantial urban development in its watershed and thus tends to be flashy and have water quality challenges. It receives significant stormwater from the Easterly/Westerly Parkway corridor resulting in severely degraded streambanks and significant sediment flowing downstream. Walnut Spring Run is a tributary to Spring Creek and subsequently drains to the Susquehanna River and Chesapeake Bay; thus, water quality is of high concern.

This project will improve the health of the watershed and contribute to the Environmental Protection Agency's reduction goals for the Chesapeake Bay by eliminating 125 tons of sediment, 213 pounds of nitrogen and 39 pounds of phosphorus pollution annually. It will restore 2,498 feet of stream (3,503 feet of streambank). These estimates were calculated using a Pennsylvania Field Office of the U.S. Fish and Wildlife Service's model that calculates sediment based upon the erosion reduction on this reach of Slab Cabin Run. The nitrogen and phosphorus reductions are based on the Stroud's "Model-My-Watershed".

The work will install structures to limit erosion and reconnect the stream to the floodplain. The creek has entrenched banks and severe erosion problems. In several areas, frequent flooding has created a sinuous channel that progressively worsens every year. This project will stabilize the stream banks without armoring with "hard material" such as rip rap, correct the stream's bankfull width, and reconnect the stream to the floodplain. Benefits of this work include increased oxygenated water, increased overhead cover for aquatic life, decreased stream temperatures, reduced sediment resulting in clean gravel, restored macroinvertebrate habitat, and establishment of native riparian habitat.

This project is focused on re-connecting the stream with the floodplain in the marsh and providing structures to limit erosion of the banks. Re-connecting Walnut Spring Run with floodplain will serve to moderate peak flows from significant storm events and allow the marsh to moderate downstream flows.

The design is based on natural stream channel design principles. Hydraulically, the reconnection of the streams to their floodplains will allow adjacent oxbows and low pockets to hold water for longer periods and function in the longer term to recharge the water table. This reconnection will furthermore reduce the shear stress on the stream banks and allow the floodplain to function to reduce the energy of flood flows, diminishing lateral erosion and stream migration.

The structures that are planned for this project include 639 feet of moundsills and 27 feet of brush mattresses. These structures help to stabilize the eroding banks while providing protection for aquatic life. There are 12 cross vanes and seven single vanes planned for the project. These structures help to control the gradient and assist in connecting Walnut Spring Run to the flood plain. They will also increase the water's oxygenation at spillover and increase depth downstream and allow for movement of stream-dependent wildlife such as wood turtles. The project also includes 126 feet of rock toe – designed to reach bankfull, assist in controlling high stream flow, and reducing erosion. There will be three restored riffles that improve habitat for aquatic life. Nine random boulder clusters will be placed which improve oxygenation and three existing log jams will be removed and the debris reused as part of the project.