ELK CREEK STREAM RESTORATION PROJECT

2018 IOGCC Chairman's Stewardship Award Application: Small Company

BACKGROUND

Elk Creek, a tributary to Loyalsock Creek in Sullivan County, Pennsylvania, is an exceptional value (EV) trout fishery where anglers could be found casting lines to its waters filled with hungry brown and brook trout. Flood events throughout the years have taken a toll on the stream. Much of the trout habitat has been replaced by high bed-load material filling in deeper holes, stream bank erosion and moving stream channel. Significant floods in 1972, 1975, 2006, 2008 and 2011 and 2016 have advanced the declining trout habitat.

EXPLANATION OF THE PROJECT

In order to restore Elk Creek, Chief Oil and Gas LLC partnered with the Sullivan County Conservation District and the Pennsylvania Fish and Boat Commission. The Chief team met with staff from these two organizations to plan and design the project work, obtain landowner access, and complete permitting requirements. Chief provided the funding, coordinated the scheduling of volunteers and provided meals and safety equipment for all participants.

The restoration project began in 2015 when the partnership completed Phase I which involved the placement and construction of 15 multi-log vanes over 510 feet of stream channel. The goal of the project addressed stream bank stabilization and improved in-stream habitat. The partnership began Phase II in 2016. This part of the project continued the effort of stabilizing and creating additional habitat along an 800 foot section of stream. In this portion of the creek, six multi-log vanes, two root

wad deflectors, and 220 feet of modified mud sill was constructed. Phase III was completed in July 2017. In this phase, volunteers repaired Phase I that suffered damage in a flood event in October 2016. In addition, volunteers installed more than 450 feet of additional mud sill, two multi-log vanes and installed five root wad deflectors into the bank to create additional fish habitats and provide protection from bank erosion.

PURPOSE OF THE PROJECT

The goal of the partnership project is to return trout habitat and bank stability to the stream.

PROCESS

Phase I: The process used was PA Fish and Boat Commission approved multi-log structures that were placed to create small pockets of habitat in the long shallow pool. The stream bank had its angle reset to a more stable slope decreasing erosion potential. The rebar pinning and stone placement was done to provide stability to the structure for high flow events and floods. Any disturbed areas where work occurred was leveled, seeded and mulched to restore a vegetated ground cover. Water flow-off of a vane is at a 90 degree angle to the vane and therefore forces the flow of water into the center of the stream channel, thus, taking stress off of the bank. This resulted in a series of **12 multi-log deflectors** in the stream that provides increased fishery habitat and decreased the sediment loss from the stream bank.

Phase II: Volunteers created a modified mud sill crib by pinning together reinforced rebar logs parallel to the bank. This not only created a "wall" along the bank to prevent erosion, but also offered a habitat for fish under the log structure. The modified mud sill crib is a simplified version of a mud sill crib without the use of oak planks and thus can have section lengths of up to 20 feet. These structures are linked together and span long lengths of stream bank where banks are being eroded. The structures purpose is to provide bank toe protection from erosion and creates a ledge effect for fish to escape to for shaded, cooler water. In this phase, root wad deflectors were also introduced as a stream bank protection device. Root wad deflectors are simply the roots of a fallen tree where the trunk of the tree is at least eight feet in length and trenched into the stream bank. These structures provide excellent habitat for trout and other water species and provide protection to the stream bank from erosion.

Phase III: In this phase of work, volunteers re-installed multi-log vanes that were displaced as a result of a significant flash flood event that occurred in October of 2016. Even with the displacement of the structures, much of the streambank was void of soil loss due to high water erosion. Phase III also included the installation of **two additional multi-log vanes** for habitat and water flow control, five root wad deflectors were placed into the bank, and more than **450 feet of additional modified mud sill** was constructed to provide bank stability and in-stream habitat improvement.

Phase IV: This phase of the restoration project, to be completed in *August 2018*, includes the installation of **16 multi-log vanes, a 240 foot modified mud sill, and two log cross vanes** near the mouth of Hoagland Branch.

The project will begin at the upper end where a multi-log vane will be used to start the 240 feet of modified mud sill. The sill will end on the downstream portion with a multi-log vane as well. Plans are to then install two log cross vanes in the Mouth portion of Hoagland Branch to establish grade control on this stream and better direct water flow as it enters the Elk Creek. Downstream of the cross vanes, we plan to install two multi-log vanes on the left bank to alleviate erosion and again allow water to better enter the Elk Creek.

CONTRIBUTIONS TO THE ENVIRONMENT

The partnership's efforts are producing benefits as the stream banks remain stable and vegetation flourishes. Aquatic life is also showing quantifiable improvement in and amongst the new habitat. While several multi-log vanes from Phase I were damaged in the October 2016 flood event, the stream bank held. Experts agree—without these log structures in place, bank erosion would have been much worse and several seasonal homes destroyed. Additionally, the stream bank in Phase II was unaffected by the flood, saving this area from further erosion. Finally, heavy rains one week following the Phase III construction proved the effectiveness of modified mudsill, root balls and log vanes.

ACCOMPLISHMENTS

Video: **Elk Creek Partnership Video**

https://vimeo.com/228238322

Password: COG

Articles:

Results of fish monitoring project show creek restoration efforts are a success

http://www.lycoming.edu/news/stories/2016/08/dom-novella-creek-restoration.aspx

- WOL Online: http://www.wol.news/2016/09/results-of-fish-monitoring-project-show.html

Fish Monitoring Shows Creek Restoration Efforts In Lycoming, Sullivan A Success

http://paenvironmentdaily.blogspot.com/2016/09/fish-monitoring-shows-creek-restoration.html?utm_source=feedburner&utm_medium=email&utm_campaign=Feed:+PaEnvironmentDaily+(PA+Environment+Daily+Blog)&m=1