

**Wingfield Pines Passive Treatment System**  
**SRI O&M TAG Project #24 Request #1**  
**OSM PTS ID: PA-276**

Requesting Organization: Allegheny Land Trust (in-kind partner)  
Receiving Stream: Chartiers Creek (Chartiers Creek Watershed)  
Hydrologic Order: Chartiers Creek→Ohio River  
Municipality/County: Upper St. Clair Township, Allegheny County  
Latitude/Longitude: 40°20'26.9988"N / 80°06'34.9992"W  
Construction Year: 2009

The Wingfield Pines Passive Treatment System was installed in 2009 to treat an alkaline, metal-bearing, discharge from an abandoned underground coal mine in Upper St. Clair, Allegheny County, PA. The system is located on property owned by the Allegheny Land Trust (ALT) that also functions as a park, providing recreational and educational opportunities. On 11/12/12, Emilie Rzotkiwicz of ALT contacted Stream Restoration Incorporated (SRI), for assistance regarding maintenance issues at the system. On 11/28/12, Cliff Denholm and Shaun Busler met with Emilie to visit the site and discuss maintenance issues. The primary concerns regarding the treatment system were the following:

- Rusting of the lid and locks on the in-line water level control structure that sets the mine pool elevation and flow rate into the system
- Erosion around the final effluent weir structure
- Decrease in treatment performance during winter months
- Lack of vegetation within the final wetland
- Overgrowth of muskgrass and resulting channelization
- Muskrat damage

A review of available water quality data did show a decrease in iron removal during some winter months, but overall the system had been performing well. Data collected by Hedin Environmental demonstrated that dissolved iron was not significant by the end of the first pond, which indicated that the primary problem was settling of the iron solids. During the growing season, the muskgrass probably acts as very good filter, while during the winter months, after the vegetation begins to die off, short-circuiting pathways in the form of channels develop in the pond resulting in decreased treatment. Within the final treatment wetland, the water level was noted to be high during the site visit, which could contribute to the limited vegetation observed in the wetland. Most wetland plants prefer a water depth of 6" to 8" and even cattails, which are tolerant plants, typically do not grow in greater than about 18" of water. Removing boards from the final weir would be expected to lower the water level within the wetland and increase vegetation. Increasing vegetation, especially persistent vegetation such as cattails could also help to filter the remaining iron solids especially in the winter months. The muskrats at the site may also contribute to the limited vegetation.

On 5/21/13, Bryan Page of BioMost, Inc. met with ALT volunteers to perform maintenance on the Wingfield Pines Passive Treatment system. As this is a highly-visited site, regular maintenance includes keeping the treatment components aesthetically-pleasing. Shortly after system installation, the cover for the in-line water level control structure box began to rust due to

exposure to mine water, hydrogen sulfide gas, and the elements. The locking mechanism on the water level control box became severely rusted, providing a possible opportunity for vandalism, which was a significant concern as the box controls the mine pool elevation. The rusting lid was replaced with a new, custom-made, plastic box lid with new locking mechanism.

Erosion at the wetland outlet was also addressed on the same day. The wetland outlet was re-designed to raise the berm elevation on either side of the wetland outlet. A cement barrier was installed at the sides of the wetland outlet. Previously, stepping stones were placed beside the wetland outlet to allow access to either side of the berm. Those stones were no longer usable as a walking path during high flow events. Boards were installed on top of the wetland outlet to function as a pathway across the wetland.

The project team thanks the Allegheny Land Trust and their volunteers for all of their efforts including support and assistance. Funding for technical assistance and maintenance was provided by the PA DEP's Growing Greener and the Foundation for Pennsylvania Watersheds grant programs and in-kind services by project partners.

#### **Additional Recommendations & Considerations:**

- To establish and maintain vegetation within the wetlands in order to provide a filtering mechanism for removing iron solids, the recommendation is to keep the water level within most of the wetland less than 18" and ideally between 6" and 12". This will likely require removing boards from the weir structure unless previously completed. Note, however, that having some areas in a wetland where the water is deeper is often acceptable and adds to habitat diversity.
- Additional planting or seeding may be necessary to re-establish portions of the wetland once the proper water level is re-established.
- Muskrats can be a problem by substantially limiting wetland vegetation (especially cattails) and by damaging berms. The recommendation includes working with local volunteers to establish a muskrat trapping program and to repair damage as necessary.
- The use of haybales, compost filter socks, or even directional baffle curtains can be used to reduce channelization and increase the area available for settling of iron solids.
- Options for addressing the muskgrass issue include herbicide use that could cause ecological harm or the introduction of species that may be invasive. An aquatic harvester could be utilized; however, the cost will probably be significant and the problem is not eliminated. At the present time, none of these potential solutions are recommended unless a significant water quality issue develops. Application of the other recommendations listed above may provide the maintenance needed to restore and to sustain treatment performance.





At the Wingfield Pines site, the lid and locks on the In-line Flow Control structure had become badly rusted (*top left*). A new lid and locking mechanism was constructed and installed (*bottom right*). High water levels within the wetland were eroding around the final outlet weir structure (*top right*). A portion of the embankments were dug by hand (*middle left*) and forms built in order to create a cement barrier (*middle right*) which was keyed into the ground to stop erosion. After installation a board was placed on top of the structure to allow volunteers to cross from one side to the other (*bottom left*).