

Camp Lutherlyn Passive Treatment System
SRI O&M TAG Project #1 Request #2
OSM PTS ID: PA-100

Requesting Organization: Camp Lutherlyn
 Receiving Stream: Semiconon Run
 Watershed: Connoquenessing Creek
 Municipality/County: Connoquenessing Township, Butler County
 Latitude/Longitude: 40°52'23.9988"N / 80°01'15.9996"W

In June 2014, Stream Restoration Incorporated was contacted by Camp Lutherlyn concerning a mine pool blowout that significantly increased the flow rate of the AMD, reduced performance efficiency of the passive system, increased channelization within the wetland, and potentially damaged the treatment system. Due to the system being overwhelmed, significant iron concentrations were entering the stream. The blowout occurred during the drilling of a new Marcellus gas well by XTO Energy Inc. (XTO) that went through the abandoned deep mine.

An initial site visit was conducted on 6/5/14. During the site visit, a blowout location was found and a very large flow of AMD was overwhelming the passive system. Water samples were collected for laboratory analysis and field measurements were made. Select median water quality data along with data from 6/5/14 is provided in the table below to demonstrate the change in water quality of both the discharge and the treatment system because of the blowout. Flow rate, metal concentrations and suspended solids all significantly increased while the AMD became less net-alkaline.

Sample Point	Flow	pH	F. Alk	Acidity	T. Fe	T. Mn	T. Al	TSS
CP (Median)	150	6.5	100	-49	18.8	3.4	0.1	20
WL (Median)	175	6.9	81	-49	4.2	3.3	0.0	8
CP (6/5/14)	~1000	6.5	98	-20	44.4	4.1	0.8	64
WL(6/5/14)	~1000	6.8	81	-21	34.3	4.3	0.6	56

Flow in gallons per minute (gpm); pH standard units; all other parameters in mg/L

Following the blowout, XTO asked for a list of maintenance items needed at the site. A second field evaluation was conducted on 1/22/15 to develop the list, which was then submitted to XTO. A field meeting with XTO and Lutherlyn was held on 6/18/15 to discuss those needs. Following the meeting, an updated list and cost estimate were submitted to Lutherlyn and XTO in January 2016 (See Attached). In 2017, the PA DEP and XTO developed a consent order and agreement that would address a portion of those recommendations. XTO hired a company to complete the work, which began in July 2017 and was finished in late summer.

The following maintenance items were conducted:

- The access road was significantly improved and enlarged including placement of stone.
- A pipe was installed upstream of the mine discharge to collect and transport any stream and surface runoff from entering the system to reduce sedimentation, higher flows, and erosion caused by storm events.
- A large portion of the iron sludge and sediment that had accumulated within the settling pond was removed; however, they reportedly did not remove all of the sludge because they were not able to reach all sections of the pond.
- Breaches in one of the wetland dikes were repaired by placing riprap.
- Minor repairs to address channelization within the wetland were conducted by placing stone or haybales. This is likely to be a temporary solution.

XTO consultants have reportedly conducted biological water monitoring of the stream to document the recovery. Neither Lutherlyn nor SRI have received any data or reports as of yet, but expect to in the near future. Field water monitoring conducted by Lutherlyn staff in January 2018 indicated 2.5 mg/L of iron in the wetland effluent during high flow indicating the system is working well. Volunteer water monitoring and site inspections along with the passive treatment snapshot data planned for spring of 2018 will be evaluated to assess if any additional maintenance is needed.

The project team thanks Camp Lutherlyn staff for all of their efforts including support and assistance. Funding for technical assistance and maintenance was provided by the PA DEP's Growing Greener grant program and in-kind services by project partners.



Top Left: A mine pool blowout significantly increased flow and iron concentrations to the Lutherlyn passive system.

Top Right: The blowout caused or at least enhanced breaches in the berm separating the inlet pool from the wetland as well as channelization in the treatment wetland, resulting in short-circuiting and therefore decreased treatment efficiency.

Bottom Left: In addition, during the blowout, increased flow overwhelmed the system and drastically reduced treatment performance, allowing a large iron load to enter the stream.

Bottom Right: Several site investigations and meetings were conducted as part of this project to evaluate and discuss the maintenance and repairs needed.





Top Left: XTO hired a company to complete maintenance and repairs, including expanding and improving the access road.

Top Right: Piping was installed to collect and convey surface water around the treatment system.

Bottom Left: A large portion of the sediment and iron sludge that had accumulated in the settling pond was removed.

Bottom Right: A variety of other repairs to address short-circuiting were conducted, such as the placement of hay bales; however, the long-term effectiveness is questionable and additional maintenance and repairs may be needed in the near future.

