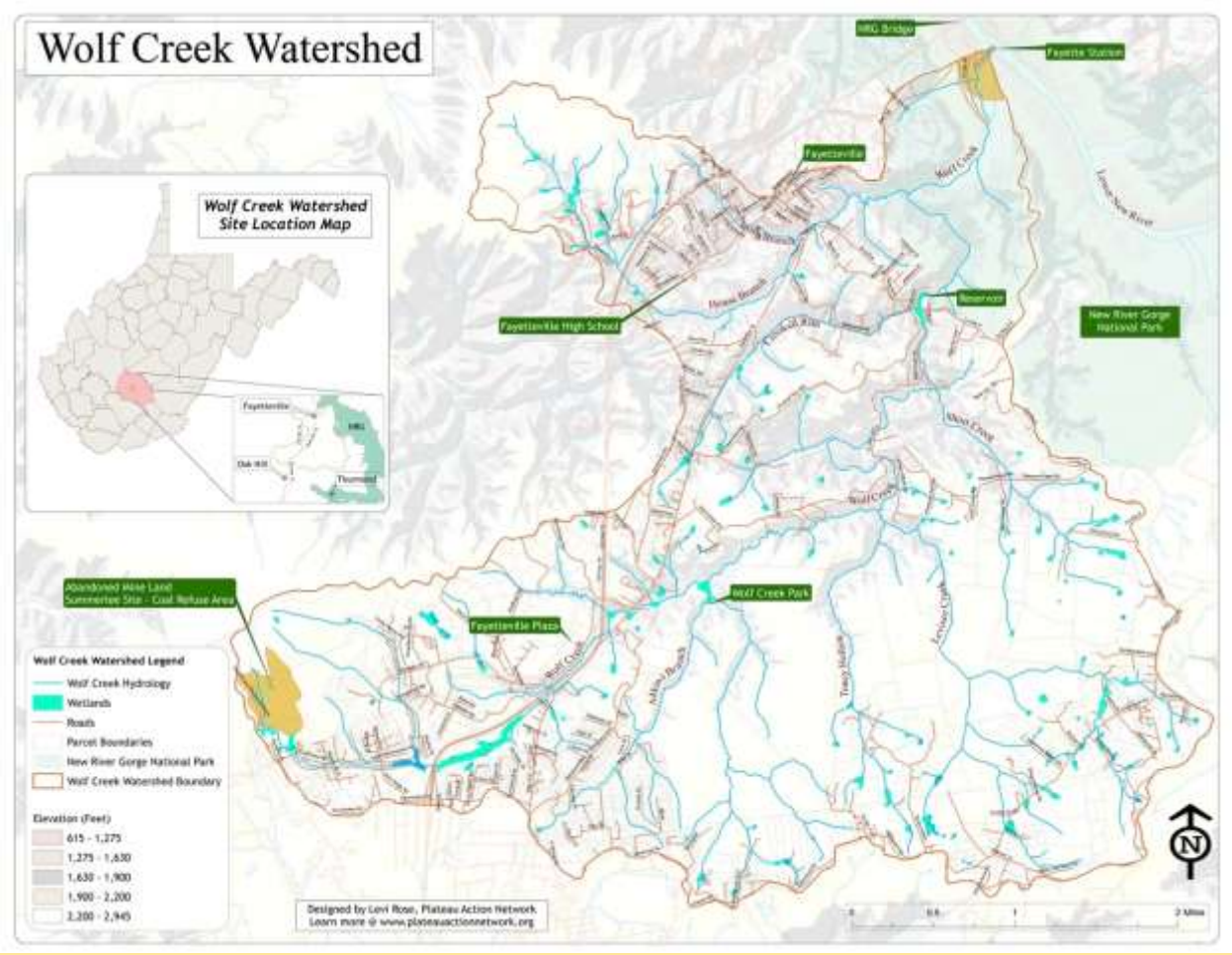
Summerlee AMD Treatment Project

Watershed description

Wolf Creek watershed is in Fayette County, West Virginia and is a sub watershed of the lower New River watershed. The headwaters of Wolf Creek start at Summerlee, an abandoned mineland site that flow downstream through parts of Fayetteville and Oak Hill. Wolf Creek and its tributaries are impaired by high levels of iron, aluminum, and fecal coliform bacteria as well as low pH. The pH impairment identified in the TMDL is caused by the organic enrichment and sedimentation and can be solved by reducing iron loads and fecal coliform. The Wolf Creek Watershed Based Plan (WBP) focuses on acid mine drainage (AMD), remediation, streambank erosion, pasture/cropland improvements, and onsite sewer system repairs. The WBP was revised in 2014, and §319 funds were used install Phase 2 and design Phase 3A.

Figure 1. Wolf Creek watershed map



Goals

Plateau Action Network (PAN), WVDEP's Watershed Improvement Branch (WIB), Abandoned Minelands (AML) and Special Reclamation Program's plan to work together to collect additional data and improve the design for phase 3A . Depending on how the Phase 3A works will determine they type of finishing system Phase 3B will have active or passive. The initial thoughts are to increase Terrace Iron Formations

(TIFs) to reduce as much iron as possible before the next phase. AML will take on this project and strive to achieve water quality standards after Phase 3B is installed. This will allow a majority of the allocated §319 funds for this project to be used to do other projects in the state.

Partnerships

PAN and its WVDEP partners have been working together to implement the next phases of this project. WVDEP's AML Program has agreed to take over the project, which also includes the operation and maintenance needs for the Summerlee project.

Project highlights

Summerlee refuse pile, located in the headwaters of Wolf Creek, is the most significant source of iron loading in the watershed. Beginning in 2007, PAN has worked to remediate and reduce the heavy metals draining into Wolf Creek. Because the mine water contains very high metals and high acidity, this project has been tackled in phases. Phase 1 was designed to capture AMD during low flows and divert through limestone channels to reduce acidity before reaching a settling pond. Phases 1.1 and 1.2 involved construction of terraced iron formations and utilize existing space to take advantage of the low-pH ferrous iron oxidation process. These efforts were funded in partner with §319 funds, Office of Surface Mining (OSM) grants, the Wolf Creek Trust and PAN.

The most recent phase, Phase 2, was constructed in November 2016 which included more channel for TIFs and the construction of automatic flushing limestone beds.

In September 2018, the Northern and Southern Basin Coordinators began monitoring to determine the outcome of Phase 2. TIFs have become well established in the limestone channel however, the Automatic Flushing Limestone Beds have become armored and require maintenance. The past few months of sampling has shown that metals are still high leaving the Summerlee site. A project meeting was held with WVDEP Special Reclamation, AML), WIB and PAN to discuss the current passive design. AML has agreed to take on the project and it will continue to be a phased approach. It is slated for construction in 2021 while monitoring will continue to help determine the next year and coordinate efforts for the last phases of this project.

Figure 2. Summerlee 2016: After Phase 2 construction

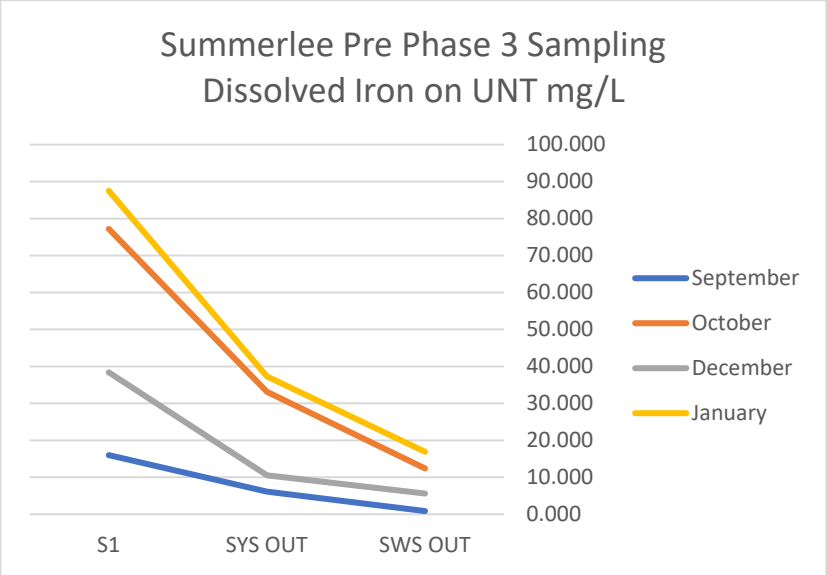
Additional site photos, water quality graphs and a WBP project summary are provided on the pages 3-5.

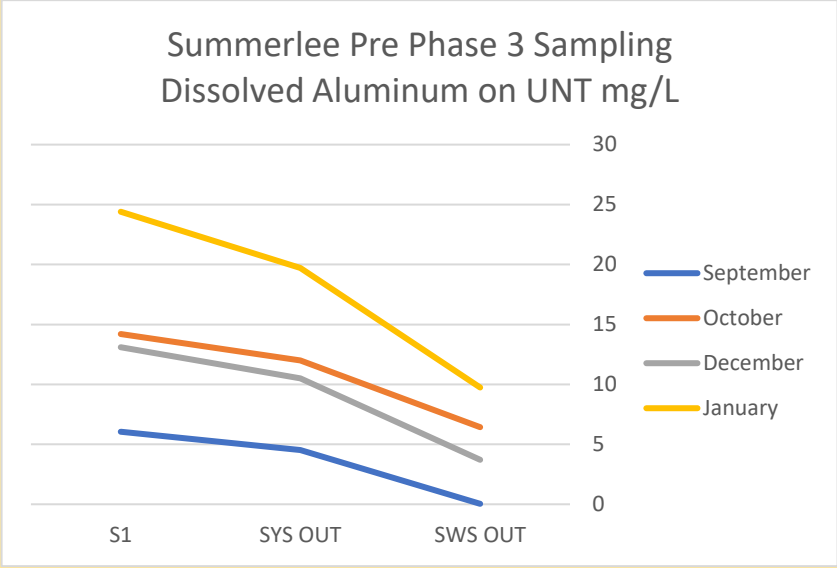
Summerlee October 2018

Low Flow Oxidation Limestone Channel

Terraced Iron Formations

Figure 3. Summerlee photos October 2018





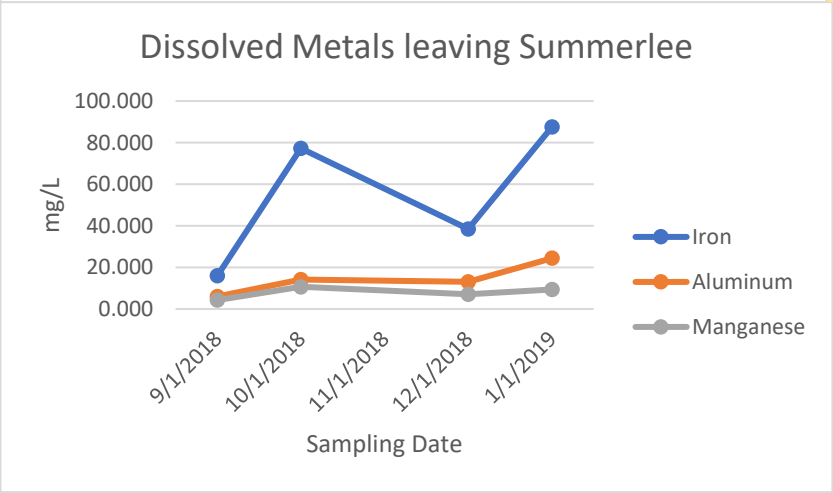


Figure 4. Summerlee water quality monitoring data

Water quality data show improvements in metals reduction on-site with increases off-site, especially for iron. Currently monitoring is occurring, but Covid-19 has limited its frequency. In the near future monthly monitoring will continue.

WIB's Southern Basin Coordinator is managing the monitoring effort using funding appropriated from a 2017 §319 grant, which expires in the fall of 2021. The monitoring information will help WVDEP's team decide how to improve and expand the treatment system.

Figure 5. WBP summary (all projects)

Plan Name	Wolf Creek		Plan date	2009/2013	Project tracking							
Project Name	HUC code	Stream code	Best Management Practices		#	Pollutants	LRs	Units	319 funds	Other funds	Total	FY
Summerlee Phase I	050500040304	WVKN-10-M	Land Reconstruction, AML			Acidity	109,447	lbs/yr	$54,456	$36,304	$90,760	2010
			AMD-Passive Treatment		Multiple	Metals (Aluminum)	7,731	lbs/yr				
			AMD-Constructed Wetland		1	Metals (Iron)	27,239	lbs/yr				
			AMD-Limestone Open Channel		1	Metals (Manganese)	3,751	lbs/yr				
Fayette Square	050500040304	WVKN-10	Urban Infiltration Basin		4	Oil and Grease	67	%	$83,553	$56,066	$139,619	2012
			Urban Grassed Swale		4	Chemical Oxygen	1					
			Urban Infiltration Trench		4	Suspended solids	406	lbs/yr				
						Nutrients	9	lbs/yr				
Summerlee Phase 1.2	050500040304	WVKN-10-M	AMD-Constructed Wetland		1	Acidity	91,409	lbs/yr	$29,733	$66,120	$95,853	2013
			AMD-Limestone Open Channel		1	Metals (Aluminum)	3,323	lbs/yr				
						Metals (Iron)	17,010	lbs/yr				
						Metals (Manganese)	1,549	lbs/yr				
Summerlee Phase 2	50500040304	WVKN-10-M	AMD-Limestone Open Channel		2	Acidity	123,064	lbs/yr	$163,412	$140,108	$303,520	2015
			AMD-Vertical Flow Treatment		2	Metals (Aluminum)	7,500	lbs/yr				
						Metals (Iron)	34,990	lbs/yr				
						Metals (Manganese)	2,992	lbs/yr				
						Total Metals	106,085	lbs/yr				
						Total Acidity	323,920	lbs/yr		**Total $**	**$629,752**	
						Other pollutants	415	lbs/yr				