SLIPPERY ROCK WATERSHED COALITION

DE SALE PHASE I RESTORATION PROJECT

Venango Township, northern Butler County, PA

"A Public-Private Partnership Effort"

PROJECT PARTICIPANTS:

PA DEP Knox District Mining Office	Amerikohl Mining, Inc.
Grove City College	Stream Restoration Inc.
BioMost, Inc.	Slippery Rock University
Private Landowners	WOPEC
Quality Aggregrates Inc.	Scrubgrass Generating Plant
Aquascape	SRWC Volunteers

SITE HISTORY:

Pre-act mining on the Middle Kittanning coalbed left a barren landscape with severely degraded acid mine drainage issuing from the toe of spoil. The discharge emanating from this site impacts approximately 3 miles of Seaton Creek, the major tributary most heavily impacted by abandoned mine drainage within the Slippery Rock Creek Watershed headwaters.

LAND RESTORATION:

About 8 acres of barren spoil were reclaimed using 35,058 tons of alkaline, circulating, fluidized-bed, coal ash. (12/99 to 5/00)

DRAINAGE ABATEMENT:

Passive treatment system installed in six weeks (3/29/00 to 5/10/00) included four components: Anoxic Collection System with Inlet Control Structure, two Vertical Flow Ponds(operating in parallel), Settling Pond/Wetland Complex, and Horizontal Flow Limestone Bed.

Water is collected using a french drain-type subsurface collection system. The water is directed into the top of two Vertical Flow Ponds operating in parallel. The water flows vertically (top to bottom) through a 6" layer of spent mushroom compost and a 4' layer of limestone (1500 tons per pond, AASHTO #1limestone aggregate, 90% CCE). The treatment media generates alkalinity.

Two tiers of perforated plastic pipe installed in the aggregate collect the water flowing through the Vertical Flow Ponds. The treated water discharges through the outlet control structures into a 3/4-acre settling pond/wetland. This settling pond allows periodic flushing of the Vertical Flow Ponds in order to remove accumulated metal precipitates (mainly iron and aluminum). The wetland facilitates additional iron oxidization and settling of iron and aluminum precipitates. Finally, the water passes through a Horizontal Flow Limestone Bed, adding alkalinity and removing a large portion of the manganese, which then discharges through an 8" perforated underdrain.

WATER QUALITY (representative):

	pH	alkalinity (mg/l)	acidity (mg/l)	Fe (mg/l)	Mn (mg/l)	Al (mg/l)
raw	3.5	0	420	65	40	15
treated	7.0	168	0	4	8	<1

total metals reported; insignificant dissolved Fe and Al in final effluent; 100 gpm design flow; 35 gpm average flow

FUNDING SOURCE:

Commonwealth of Pennsylvania "Reclaim PA" initiative (Watershed Restoration and Partnership Act)
Contributions from partners

SLIPPERY ROCK WATERSHED COALITION

DE SALE PHASE II RESTORATION PROJECT

Venango Township, northern Butler County, PA

"A Public-Private Partnership Effort"

PROJECT PARTICIPANTS:

- PA DEP Knox District Mining Office
- Grove City College
- BioMost, Inc.
- Private Landowners
- Quality Aggregrates Inc.
- Urban Wetland Institute
- Amerikohl Mining, Inc.
- Aquascape
- SRWC Volunteers
- WOPEC
- Stream Restoration Inc.

SITE HISTORY: Half-century old, abandoned surface coal mining activities severely impacted a tributary to Seaton Creek within the headwaters of the Slippery Rock Creek Watershed. The flow from this essentially "dead" stream was one of the major pollution contributors to Seaton Creek.

DRAINAGE ABATEMENT: Passive treatment system installed in six weeks (7/13/00 to 8/29/00) included six components: stream intake (3' ht.); forebay (8000 SF); two Vertical Flow Ponds (in parallel with two-tier underdrain system with 2 miles piping and 4400 tons, AASHTO #1, 90% $CaCO_3$, limestone aggregate overlain by ½-foot spent mushroom compost); Settling Pond (0.2 ac., 5' depth); Constructed Wetland (1.5 ac.); Horizontal Flow Limestone Bed (2900 tons, AASHTO #1, 90% $CaCO_3$, limestone aggregate).

The treatment media generates alkalinity. Two tiers of perforated plastic pipe installed in the aggregate collect the water flowing through the Vertical Flow Ponds. The treated water discharges through the outlet control structures into a settling pond. This settling pond allows periodic flushing of the Vertical Flow Ponds in order to remove accumulated metal precipitates (mainly iron and aluminum). The wetland facilitates additional iron oxidization and settling of iron and aluminum precipitates. Finally, the water passes through a Horizontal Flow Limestone Bed, adding alkalinity and removing a portion of manganese, which discharges through a 8" perforated underdrain.

WATER QUALITY (representative)**:**

	Flow (gpm)	pH	Alk (mg/L)	Acid (mg/L)	Fe (mg/L)	Mn (mg/L)	Al (mg/L)
Pre-construction Raw	85/150	3.5/3.0	0/0	179/420	9/20	36/81	7/14
Post-construction Final	85/200	7.3	72	0	2	3	<1

total metals reported; 200 gpm design flow

FUNDING SOURCE:

Commonwealth of Pennsylvania "Growing Greener" initiative
Contributions from project partners