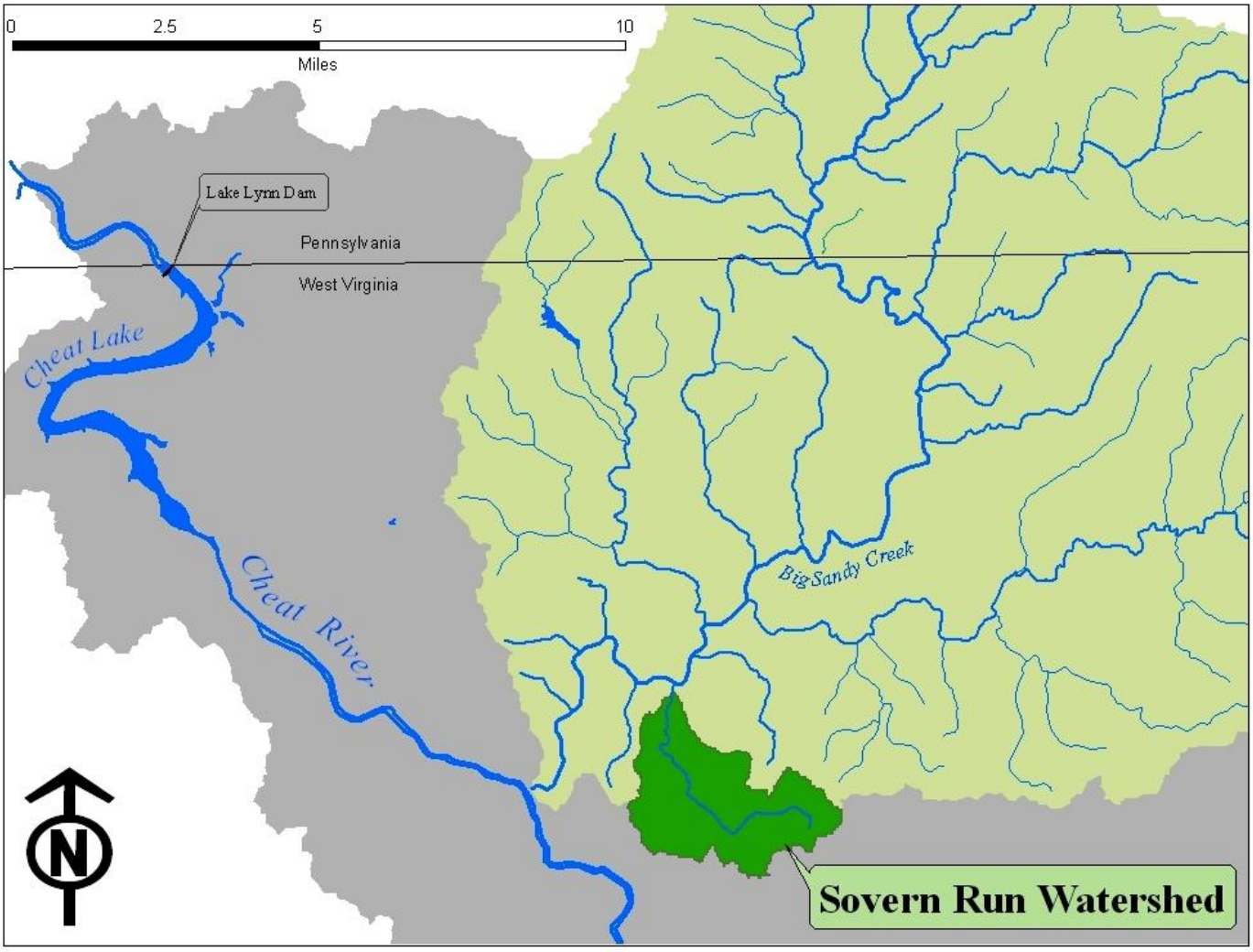
I. TITLE

The Restoration of Sovern Run through Stakeholder Collaboration

II. WATERBODY IMPROVED

Sovern Run, a tributary to Big Sandy Creek in the Cheat River watershed, flows through the Valley Point community of Preston County, West Virginia. The Sovern Run and lower Cheat River watersheds are severely impaired by acid mine drainage (AMD) pollution from abandoned coal mines. Sovern Run is 4.7 miles in length and joins Big Sandy Creek just upstream of a popular recreation area (Figure 1).

Figure 1 – Map of Sovern Run Big Sandy Creek watersheds.



In 1995 the River of Promise, a partnership of state and federal agencies, academia, concerned citizens and Friends of the Cheat (FOC), was formed to assess and remediate AMD in the lower Cheat River watershed. Since then, five passive AMD treatment systems have been installed in the Sovern Run watershed with cooperation from private landowners. Additionally, one new system and improvements to an old system are set for 2013. The combined pollution reductions from these efforts has resulted in dramatically improved water quality in Sovern Run; pH levels

near neutral have been recorded at the stream's mouth, assessments of benthic macroinvertebrate communities show improvement, and fish have been spotted in the lower reaches for the first time in **30 years**.

III. PROBLEM

The Sovern Run watershed is a sub-watershed of the Big Sandy Creek watershed and greater Cheat River watershed. The confluence of Sovern Run and Big Sandy Creek is at Rockville. The Sovern watershed drains approximately 5.36 square miles. In 1998 the entire length of Sovern Run, 4.7 miles, was listed on the West Virginia Department of Environmental Protection's (DEP) 303(d) list for impairments related to acid mine drainage (AMD). The 2001 Total Maximum Daily Load (TMDL) report for the Cheat River watershed provides load allocations (LAs) for aluminum, iron and manganese, and also an increase in pH. The 2010 TMDL provides LAs for aluminum, and iron, an increase in pH (net acidity) and biological impairment (Table 1).

Table 1 Load allocations from the Cheat River TMDLs

Constituents	2001 TMDL	2010 TMDL	Notes
Aluminum (lbs/year)	1,136	2,881	2010 WQ standard change
Iron (lbs/year)	788	16,239	
Manganese (lbs/year)	5,580		2010 WQ standard change
Total metals (lbs/year)	**7,504**	**19,120**	By implementing projects that reduce metals loads and add alkalinity to the stream it is assumed that pH and biological integrity will improve.
pH impairment	Noted	- 160*	
Biological impairment		Noted	

* Daily net acidity load

The main source of pollution is from abandoned coal mining and its legacy of coal refuse piles, deep mines, and surface mines discharging AMD. The headwaters of Sovern Run are heavily impacted from several deep mine discharges and acidic seeps throughout the watershed. For the past decade, FOC and its many partners have been working to remove Sovern Run from the 303(d) list for mining-related impairments.

IV. PROJECT HIGHLIGHTS

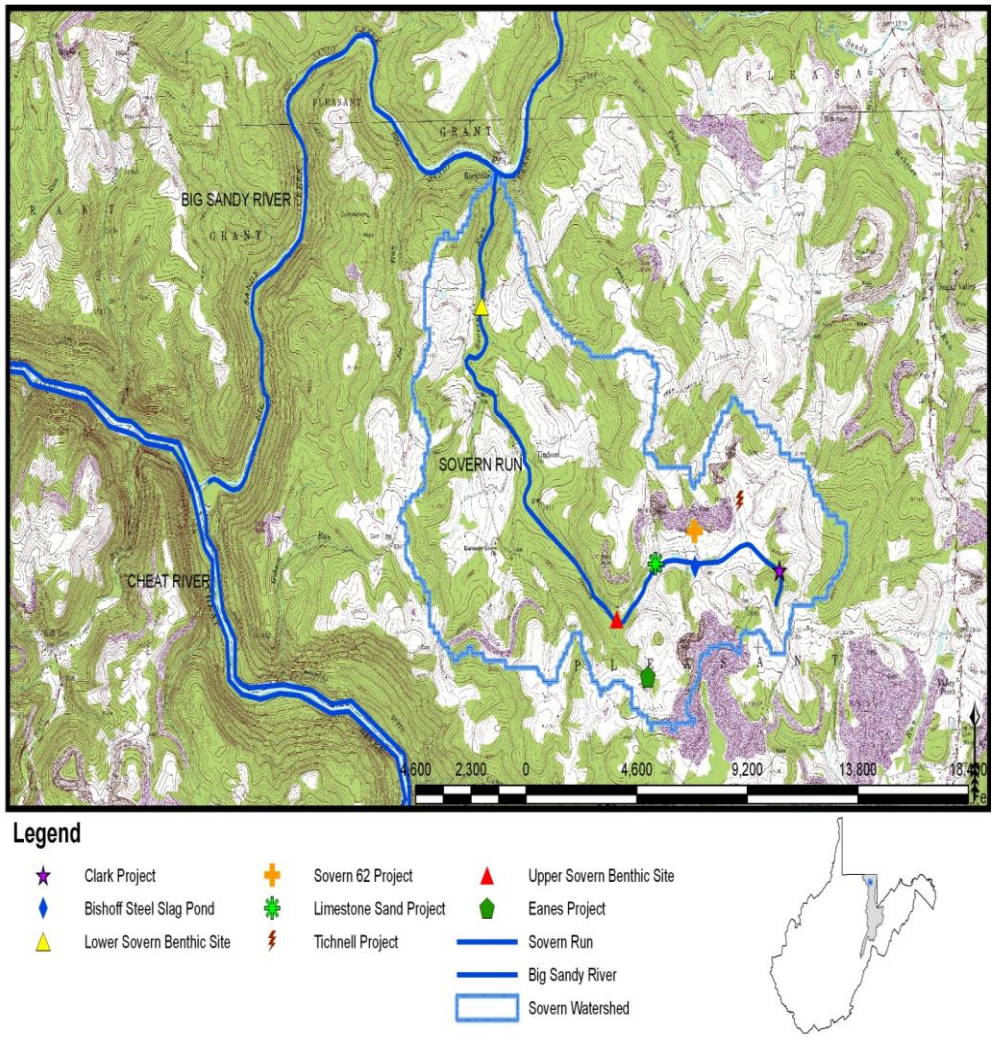
Bishoff steel slag bed

In 2005, a decade after the formation of the River of Promise taskforce, a Watershed Based Plan (WBP) for the Lower Cheat River watershed was developed and approved by US Environmental Protection Agency (EPA). This enabled FOC and West Virginia University's National Mine Land Reclamation Center (NMLRC) to continue the pursuit of §319 funding from DEP's Nonpoint Source (NPS) Program for AMD system design, construction, and monitoring.

Since this time, five passive AMD treatment systems have been installed in the Sovern Run watershed. These systems reduce the metal and acidity loadings from abandoned mine lands within the Sovern Run

watershed. The implementation of these projects involved many River of Promise members including NMLRC, several DEP contributors (NPS Program, Office of Abandoned Mine Lands and Reclamation (AMLR) and the Stream Partners Program), Office of Surface Mining (OSM), private businesses, other stakeholders and landowners.

1. Titchnell Passive System: This system utilizes open limestone channels, limestone leach beds, steel slag check dams, and natural ponds and wetlands to neutralize acidity, add alkalinity, and capture metals before they reach the mainstem.
2. Clark Passive System: The Clark treatment system improves water via a series of steel slag check dams and open limestone channels. These features add alkalinity and encourage metal oxidation and precipitation, thus increasing pH and reducing acid and metal loadings in the headwaters.



Sovern Run project map

3. Sovern 62 Passive System: This system was refurbished in 2010 and includes a steel slag leach bed, open limestone channels, limestone separation dam, and series of settling ponds including a final wetland polishing pond. The steel slag and limestone dam add alkalinity to neutralize pH while the open limestone channels encourage oxidation and ponds capture precipitating metals.
4. Sovern Bishoff Steel Slag Bed: The Bishoff steel slag bed was constructed in 2010 to add excess alkalinity to the main stem of Sovern Run.
5. Sovern Sands: Sovern Sands is a passive treatment site that utilizes limestone fines to add excess alkalinity to the main stem of Sovern Run. The dump site was recently moved and improved in 2011 by volunteer landowners.

These five passive treatment systems have been effective at reducing metal and acidity loadings and adding alkalinity to Sovern Run (Table 2).

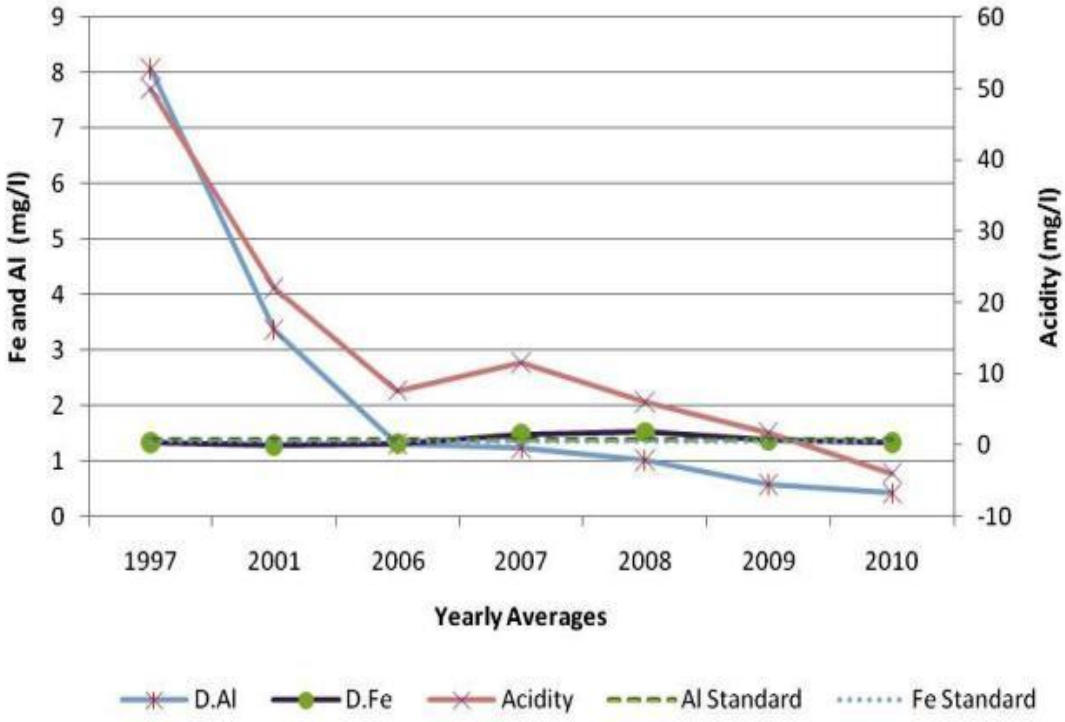
Table 2 - Load reductions from the Sovern Run projects.

Projects	Pollutants (lbs/year)				Year completed
	Acidity	Al	Fe	Mn	
Sovern 62	72,000 43%	4,800 32%	9,800 61%	-	2003
Clark Passive	22,000 95%	1,200 93%	1,200 90%	3,200 95%	2005
Titchnell Passive	184,000 73%	24,000 75%	6,600 72%	-	2005/2013
Sovern 62	164,000 96%	15,200 84%	16,200 95%	-	2010
Sovern Bishoff	NA	NA	NA	-	2010
Sovern Sands	NA	NA	NA	-	2007/2011
Totals	442,000	45,000	33,800	3,200	

Note: The Sovern Bishop and Sands projects are designed to add alkalinity to the mainstem of Sovern Run. Long-term load data is not yet available however, pH has dramatically improved and acidity has been reduced.

FOC and its partners have been collecting data on Sovern Run since the late 1990's. Notable improvements in quality water have been recorded, particularly between 1997 and 2006, coinciding with the installation of the first three treatment systems (Figure 2).

Figure 2 - Reduction in metal concentrations from samples collected at the mouth of Sovern Run.



Property owners have noted that aquatic plants have returned to the stream in addition to fish sightings at the mouth of Sovern Run.

"The work of Friends of the Cheat is materializing. Small fish are living this past fall [2010], near the end of the Sovern Run, in the pond by the little waterfall at the wooden bridge. We have had the cabin there for over 30 years with no aquatic life whatsoever. I cannot tell you what a thrill it was to see them for the first time! When the other two long-term landowners nearby, came by this summer, we were all like kids. We found some bread and began throwing it in to see the little guys rise." - Paul and Betty Connelly

As a result of improved water chemistry, we have seen an increase in numbers of benthic macroinvertebrates, as well as greater diversity of macroinvertebrate species in the main stem of Sovern Run. FOC has recently completed its bi-annual benthic macroinvertebrate sampling to monitor changes in biological integrity. This data is still being analyzed but field observations give reason to be positive. Sovern Run has not yet been delisted but 3.3 miles of the 4.7 impaired miles have been dramatically improved. In 2013, one new passive treatment project in the **Beech Run watershed** is set for construction and improvements to the Titchnell passive system are planned.

VI. PARTNERS and FUNDING

The implementation of these projects involved River of Promise partners including FOC, NMLRC, DEP's NPS and AML Programs, OSM, private businesses, landowners and many volunteers.

FOC staff and former NPS Program Basin Coordinator (Lou Schmidt) near the mouth of Sovern Run.

The chemical and field sampling for these projects was completed by FOC staff and volunteers in cooperation with NMLRC staff. The conceptual designs for these systems were generated by NMLRC. The surveying, engineering and construction were bid out to private consultants and contractors. The Sovern Sands site was constructed by volunteer landowners Mark Dixon and Brian Sell.

Major funding for these projects came from EPA §319 program, through DEP's NPS Program. Cost share support has been provided by the OSM's Watershed Cooperative Agreement Program (WCAP) and private industry funds from mitigation administered by the DEP's AMLR Program. DEP also provided support through the Division of Mining and Reclamation Stream Restoration Fund (SRF). The Sovern Sands site funding was provided by the NiSource Environmental Challenge Fund. Thus far the total restoration costs are approximately $2.2 million with 319 accounting for about 40% (Table 3).

Table 3 – Sovern Run restoration costs

Project	Funding source	Amount	Projects	Funding source	Amount
Sovern 62	319	$97,068	Clark	319	$185,999
	OSM	$80,000		OSM	$73,366
	AMLR	$682,750	Titchnell	319	$185,999
	OSM	$13,872		OSM	$76,694
	State	$15,557	Sands	NiSource	$3,000
	319	$150,000	Sands/Titchnell	SRF	$202,466
	SRF	$192,231	Jeff Eanes	319	$271,860
	Total	$1,231,478		Total	$999,384
	Total 319	$247,068		Total 319	$643,858

All projects were located in Congressional District 1.

Projects in EPA's Grants Reporting and Tracking System (GRTS)

Fiscal Year	Project #	Title
1998	16	Cheat River Passive AMD Treatment
1998	13	Sovern Run Watershed Project
2003	23	Passive AMD Treatment in the Lower Cheat Watershed
2006	14	Sovern Run Site 62
2010	08	Jeff Eanes Beech Run Rd. Remediation

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