West Virginia Bond Forfeiture Program
Law Suite Surrounding Violations of the CWA

- WV entered into two identical consent decrees as both the WV northern district court and the southern district court ruled that WV was in violation of the CWA.

- WV is now required to apply for and obtain NPDES permits at 192 bond forfeiture sites state wide.

- As a requirement of the consent decrees OSR was to develop a treatment cost report indicating capital cost and O&M cost for treating the water discharged from each site to meet WQBELs.

Treatment Cost Report

- To accomplish this OSR looked at efficiencies of each existing treatment system.

Percent Treatment Efficiency based on Final Discharge

Wednesday, January 26, 2011
11:38:54 AM

Site Nom	Project Name	Sample #	PH (>6, <9)	T_FE (<1.42)	MN (<2)	AL (<0.43)	Total # of Samples	WQ Const Completed
S-6032-86	ALPHAINE CORP.	1	100.00%	100.00%	100.00%	0.00%	1	9/26/2005
S-6032-86	ALPHAINE CORP.	3	83.33%	88.89%	100.00%	61.11%	18	9/26/2005
S-6032-86	ALPHAINE CORP.	4	46.15%	100.00%	100.00%	76.92%	13	9/26/2005
S-6032-86	ALPHAINE CORP.	5	97.37%	97.37%	100.00%	92.11%	38	9/26/2005
S-6032-86	ALPHAINE CORP.	6	100.00%	100.00%	100.00%	0.00%	1	9/26/2005
O-43-84	B & S Constracting	14	100.00%	100.00%	100.00%	100.00%	10	6/1/2007
R-668	B & S CONTRACTING, INC.	6	98.53%	97.06%	100.00%	98.53%	68	10/18/2004
U-3055-87	B & S CONTRACTING, INC.	100	100.00%	96.67%	100.00%	98.33%	60	8/28/2004
R-737	BARRETT FUEL CORP.	11	100.00%	98.15%	98.15%	96.30%	54	6/7/2005
S-1087-86	BEEFSTEAK MINING CO.	16	100.00%	100.00%	100.00%	100.00%	1	10/11/2004
S-37-81	BJORKMAN MINING CO.	1	100.00%	93.10%	100.00%	79.31%	29	8/19/2004
S-37-81	BJORKMAN MINING CO.	2	100.00%	100.00%	100.00%	81.82%	44	8/19/2004
13-79	BLACK DIAMOND MINING CO	4	92.59%	64.81%	100.00%	100.00%	54	8/1/2005
S-1024-88	BOLINGREEN MINING COMP	2	95.83%	86.11%	84.72%	76.39%	72	9/10/2003
EM-32	BORGMAN COAL CO.	10	33.80%	61.97%	100.00%	21.13%	71	11/18/2003
EM-97	BRADY CLINE	30	95.52%	100.00%	100.00%	44.78%	67	10/31/2004
S-3046-91	C. C. CONLEY & SONS, INC.	4	90.00%	90.00%	100.00%	90.00%	10	1/27/2006
S-3046-91	C. C. CONLEY & SONS, INC.	9	98.25%	100.00%	96.49%	98.25%	57	1/27/2006
S-3046-91	C. C. CONLEY & SONS, INC.	10	100.00%	87.50%	40.63%	96.88%	32	1/27/2006
S-3046-91	C. C. CONLEY & SONS, INC.	11	98.11%	96.23%	96.23%	94.34%	53	1/27/2006
S-3046-91	C. C. CONLEY & SONS, INC.	19	78.95%	100.00%	91.23%	21.05%	57	1/27/2006
S-3046-91	C. C. CONLEY & SONS, INC.	25	25.00%	96.43%	17.86%	17.86%	28	1/27/2006
R-3022-87	COWACO, INC.	6	100.00%	100.00%	100.00%	100.00%	4	7/3/2008

Treatment Options

- OSR Evaluated options needed to meet presumed NPDES compliance limits:
  - Additional ponds down gradient
  - Acquiring property
  - Improving mixing efficiencies
  - Bringing in Electricity
  - Pumping raw water to beginning of treatment
  - Adding baffles
  - Combining outlets

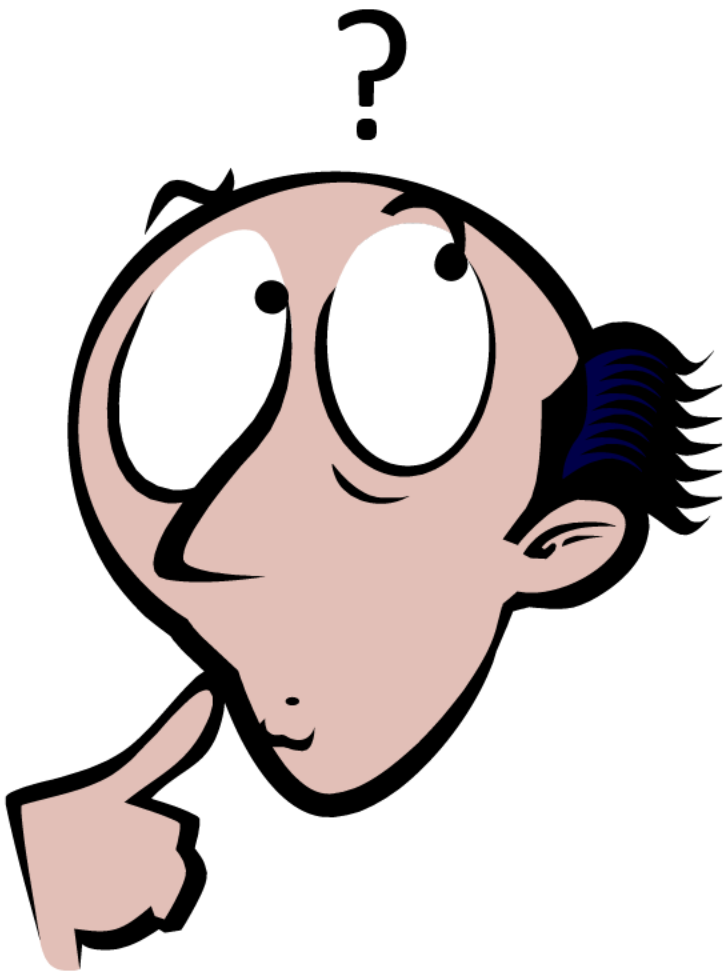
Treatment Cost Report
(as of 6-29-2012)

New Capital Cost Estimates to complete construction of remaining treatment sites and retrofit existing treatment sites = **$35,463,323**

Newly Estimated O&M Cost = **$6,649,008**

Additional Cost

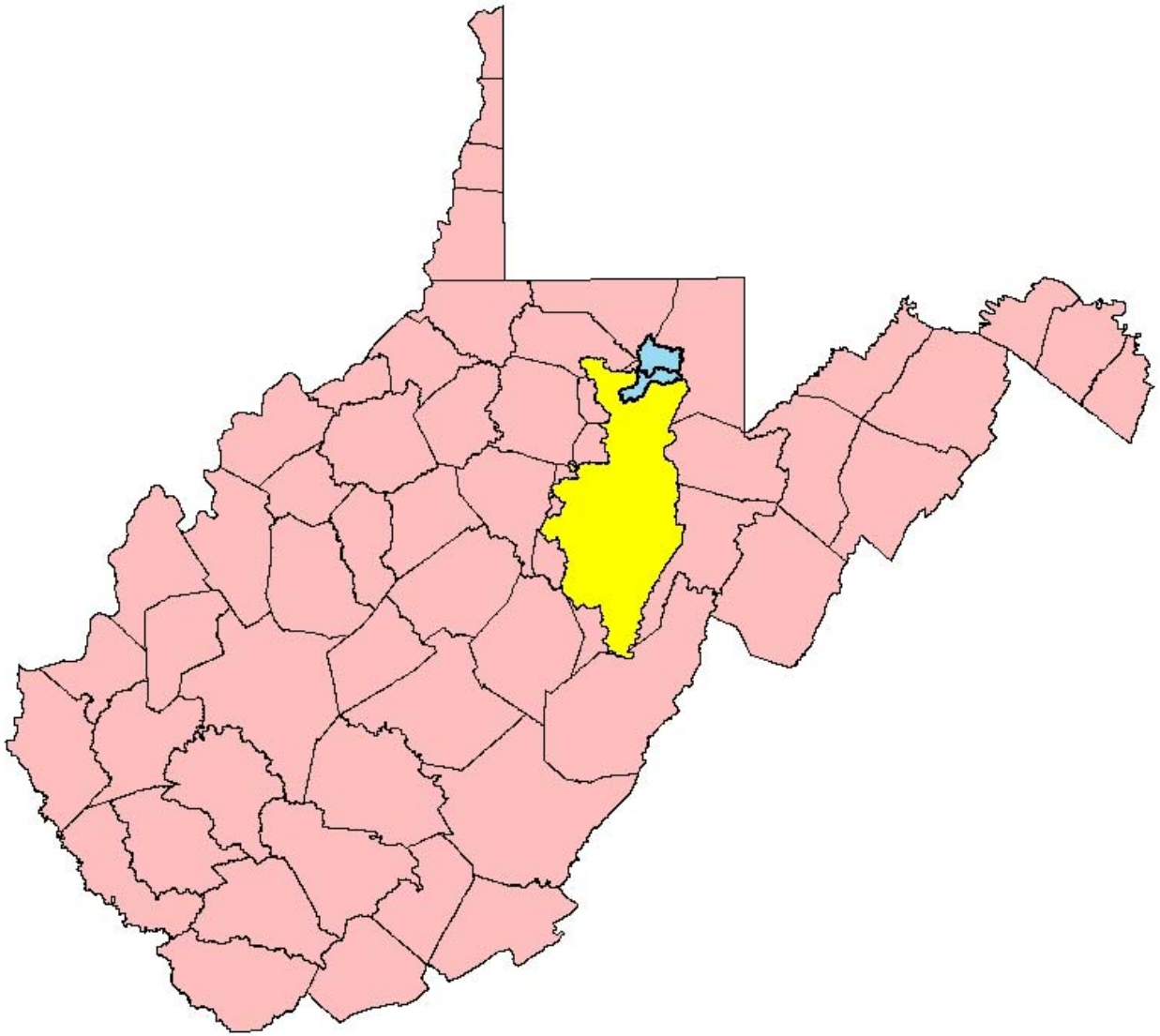
- NPDES Fees:
  - ✓ $144,000 for NPDES Filling Fees @ $1,000/each
  - ✓ $10,500 for NPDES Modification Fees @ $500/each
  - ✓ Reissuance Fee of $1,000 paid for each permit every five years
- Reality Cost:
  - ✓ Surveying - $183,460
  - ✓ Land/Easement Purchases - $79,331



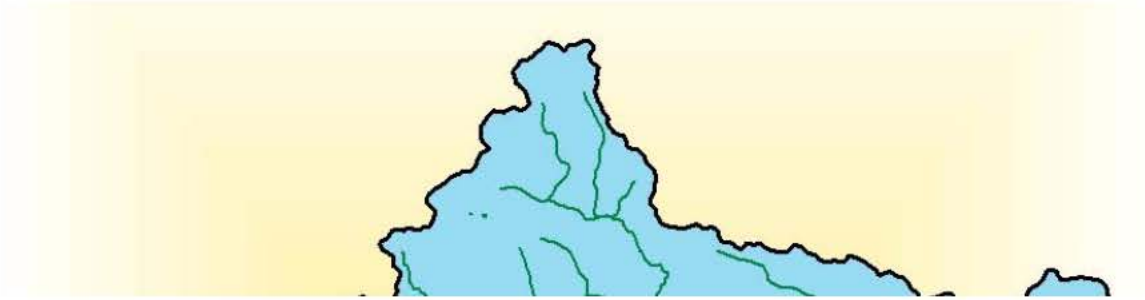
Are we using our limited resources wisely?

To help understand this we have to look at two watersheds

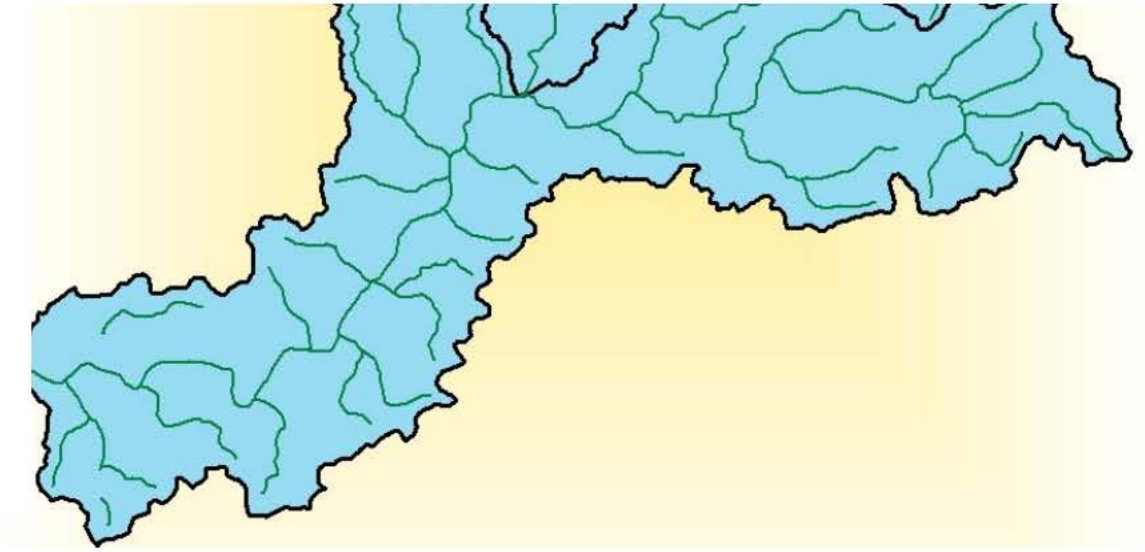
Tygart Valley River



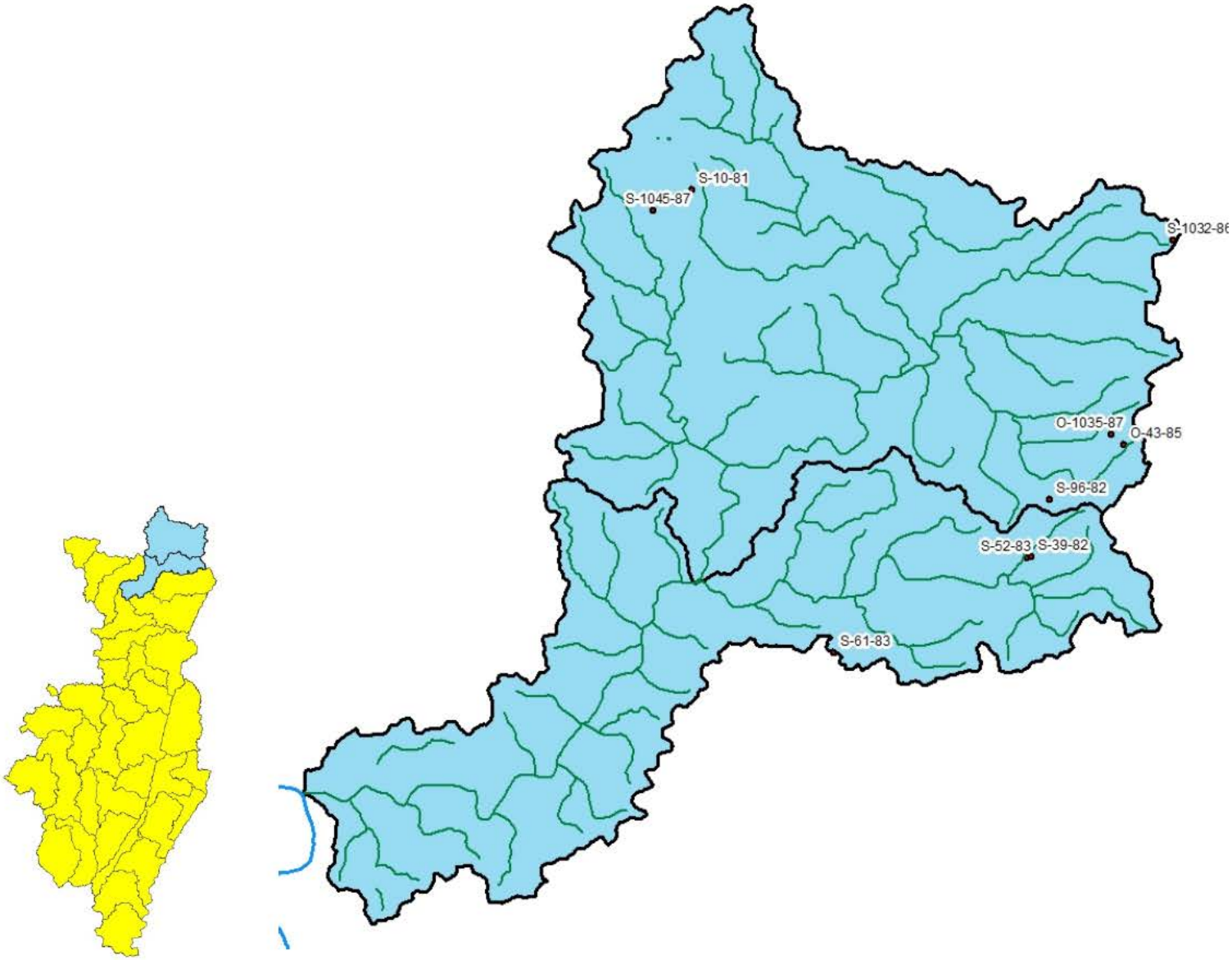
Three Forks Watershed



WV has been treating mine drainage at forfeited mine sites within the Three Forks watershed as early as 2001. The Office of Special Reclamation (OSR) has constructed 6 active treatment sites and 3 passive treatment systems at nine bond forfeiture sites within the watershed and we now have eleven NPDES outlets.

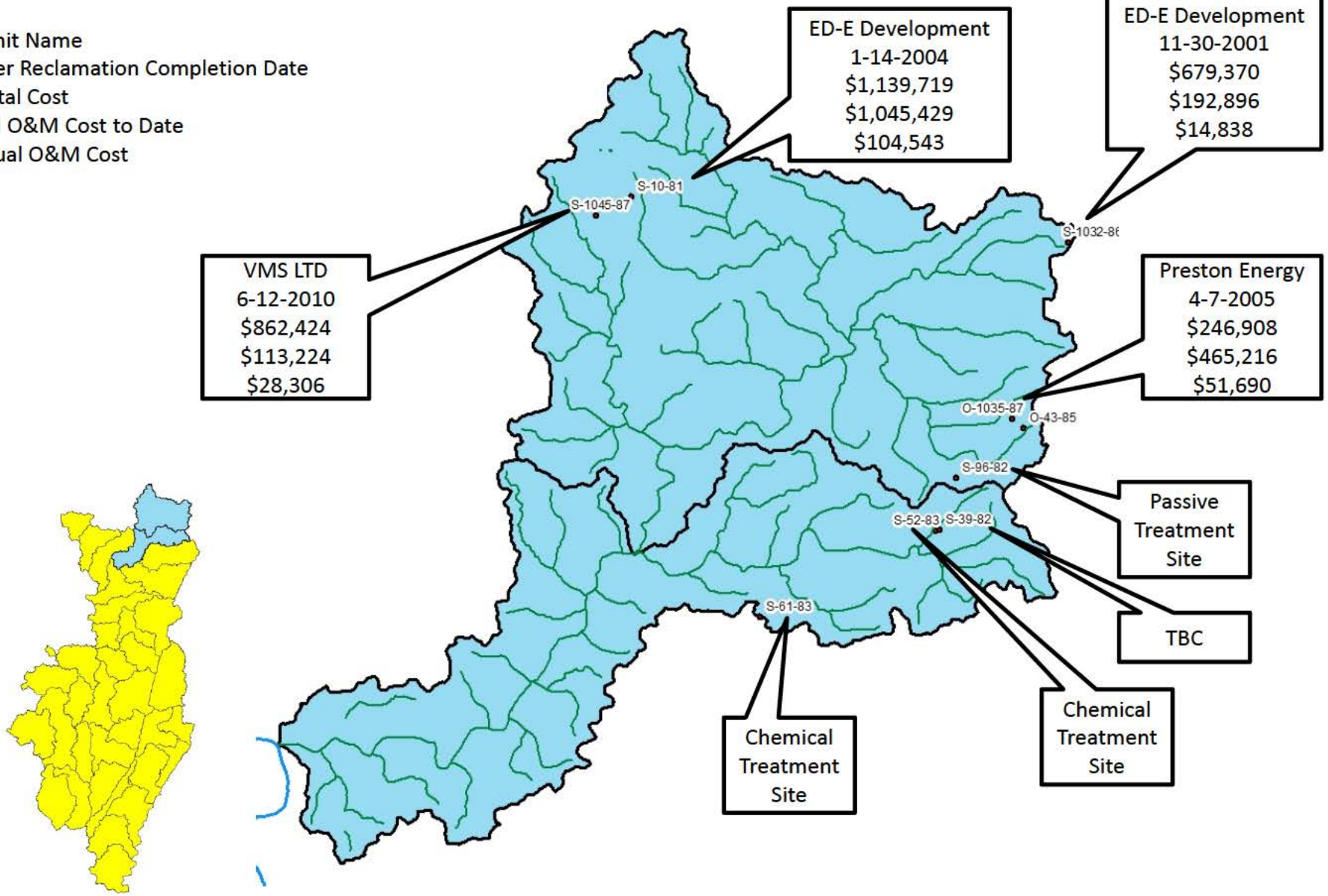


Three Forks Creek Watershed
Bond Forfeiture Site Locations



Three Forks Creek Watershed
Bond Forfeiture Site Locations

Permit Name
Water Reclamation Completion Date
Capital Cost
Total O&M Cost to Date
Annual O&M Cost

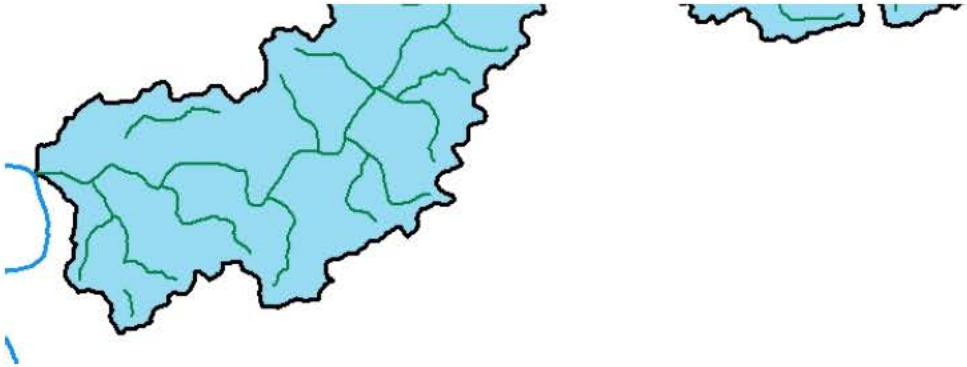


Three Forks Creek Watershed
Bond Forfeiture Site Locations

In 2010 benthic macro-invertebrate surveys and fish surveys were conducted by the WVDEP Watershed Assessment Branch (WAB) at four locations along the mainstem of Three Fork Creek.

Results indicated a diminished benthic population at all four locations. WAB only identified Eight taxa and three EPT species.

Results of the fish survey were even more discouraging having only found one fish, a green sunfish caught at 0.4 miles from the confluence with the Tygart Valley River.



In July of 2010 WVDEP's AML program stepped up to address the AMD problem initiating the:

Three Fork Creek Watershed Restoration Project

Preston County, West Virginia

Three Fork Creek Watershed Restoration Project

Preston County, West Virginia

- **Project Start Date: July 19, 2010**
- **Project Completion Date: April 15, 2011**
- **Initial Construction Cost: $750,491.15**

Three Fork Creek Watershed Restoration Project

Preston County, West Virginia

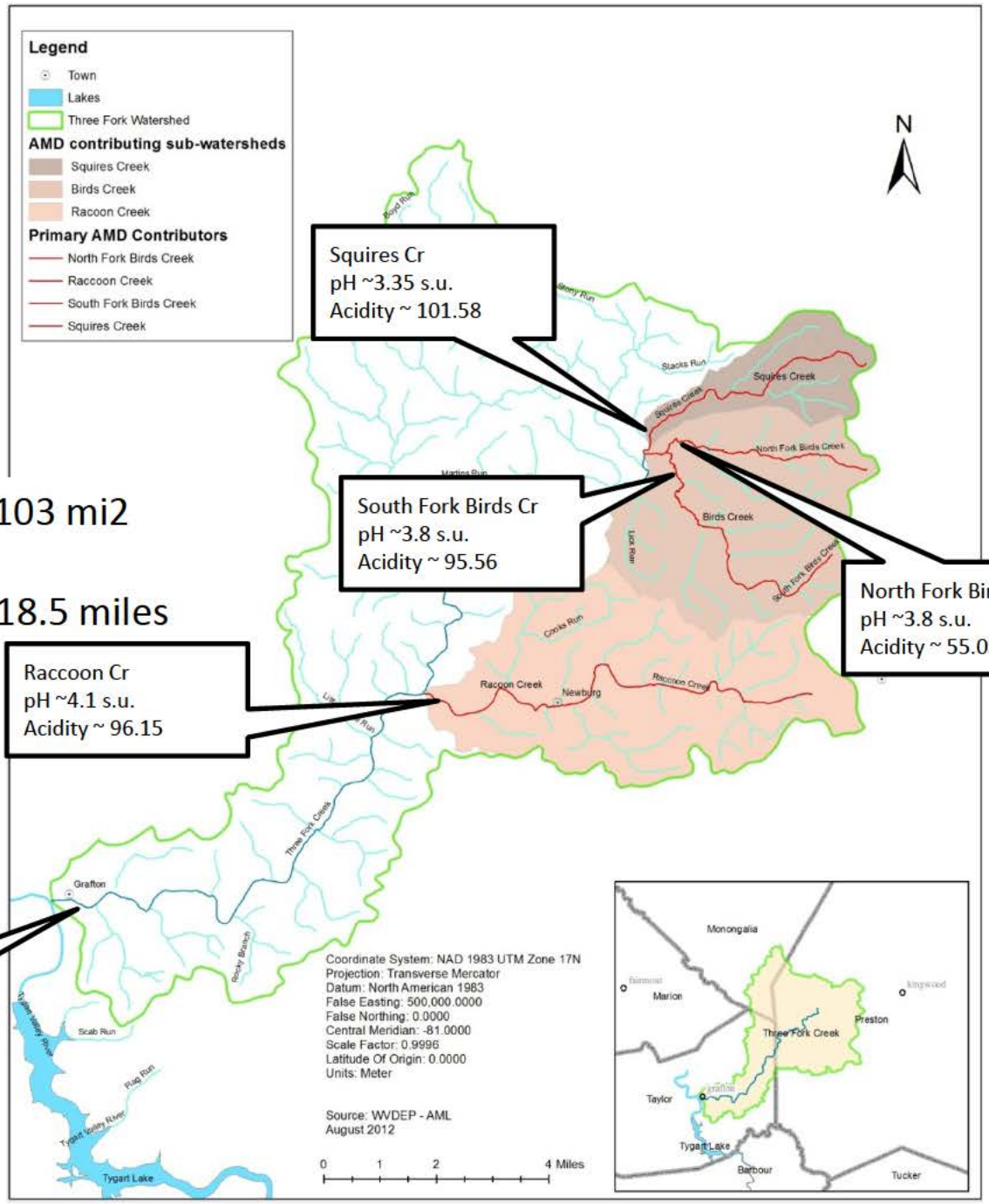
Restoration Goals

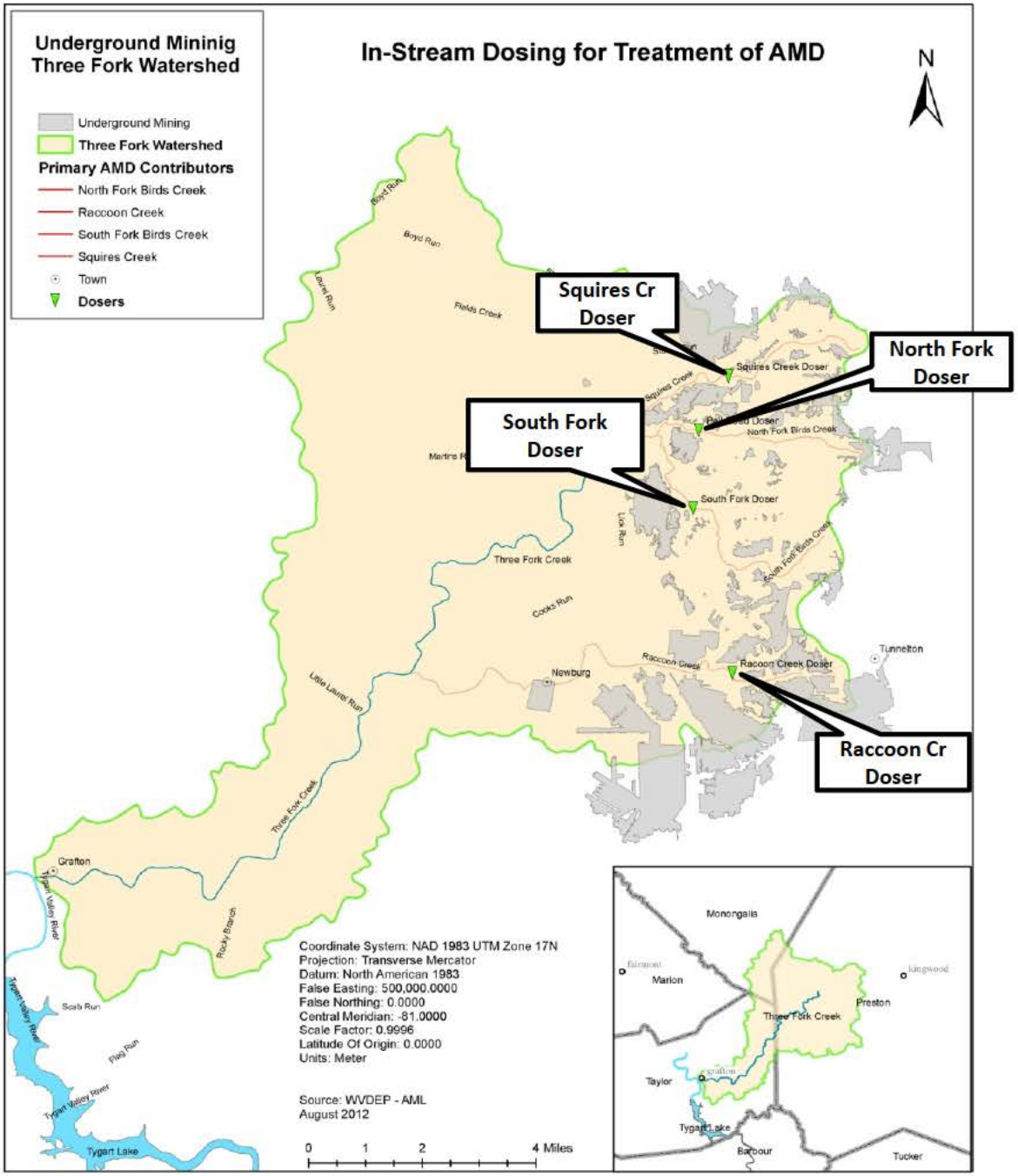
The Three Fork Creek Watershed Restoration Project was initiated through a combined effort of AML, West Virginia University (WVU) and the Save the Tygart watershed group.
The goal of the project was to return Three Fork Creek mainstem to its designated stream usage by decreasing the water quality impairment of multiple pre-SMRCA coal mine discharges within the watershed.
Objectives for obtaining this goal were to:

- Improve water chemistry and aesthetics to support recreational water activities in Three Fork Creek mainstem, and
- Restore benthic macro-invertebrates and fish in Three Fork Creek mainstem.

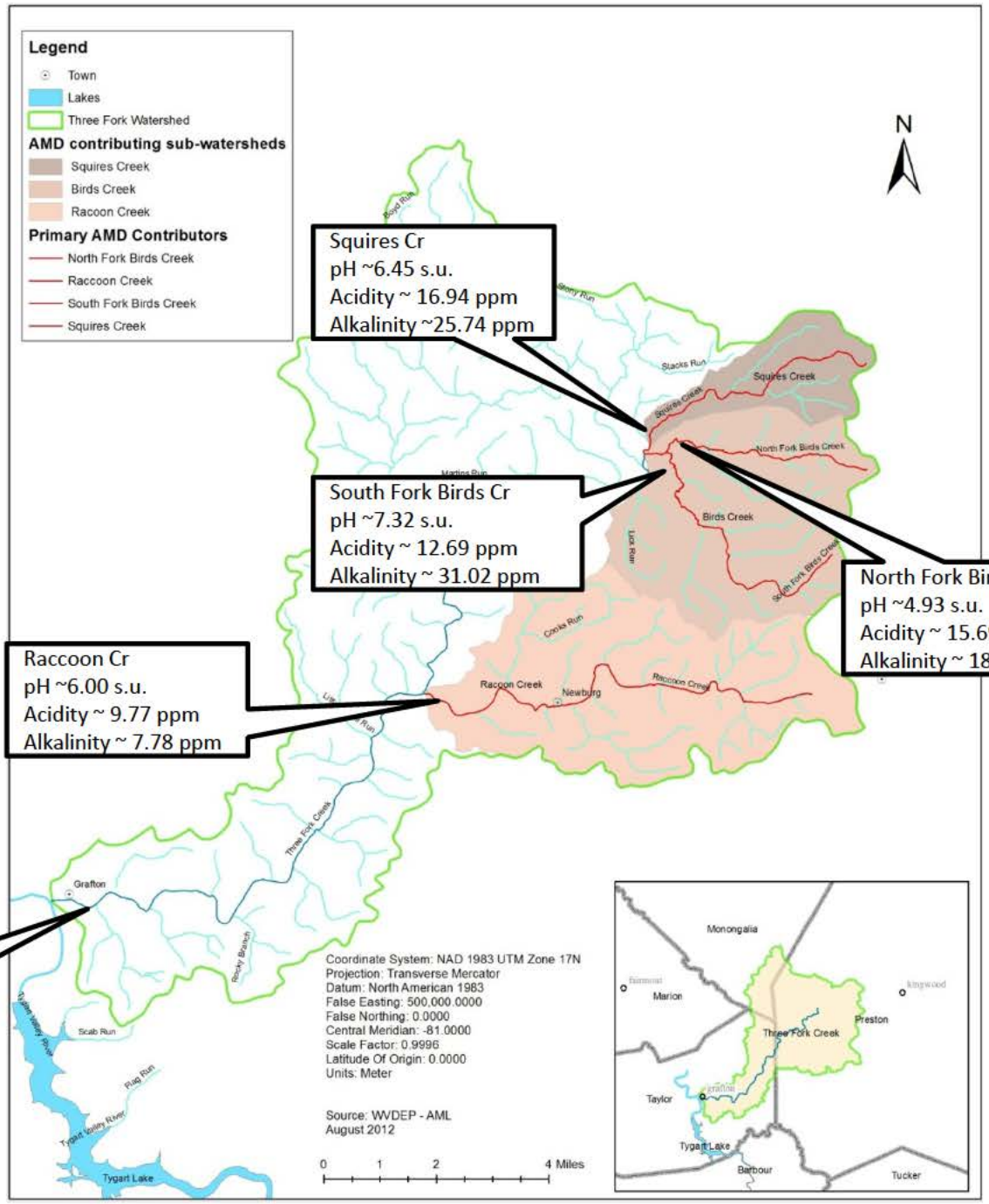
Drainage area = 103 mi2

Stream length = 18.5 miles





Underground Mininig
Three Fork Watershed
Underground Mining
Three Fork Watershed
Primary AMD Contributors
North Fork Birds Creek
Raccoon Creek
South Fork Birds Creek
Squires Creek
Town
Dosers
In-Stream Dosing for Treatment of AMD
N
Squires Cr Doser
North Fork Doser
South Fork Doser
Raccoon Cr Doser
Squires Creek Doser
Palmwood Doser
North Fork Birds Creek
South Fork Doser
South Fork Birds Creek
Raccoon Creek Doser
Raccoon Creek
Three Fork Creek
Cooks Run
Newburg
Tunnelton
Grafton
Tygart Valley River
Tygart Lake
Coordinate System: NAD 1983 UTM Zone 17N
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -81.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter
Source: WVDEP - AML
August 2012
0 1 2 4 Miles
Monongalia
Marion
Preston
Three Fork Creek
Taylor
Tygart Lake
Barbour
Tucker


Legend
Town
Lakes
Three Fork Watershed
AMD contributing sub-watersheds
Squires Creek
Birds Creek
Racoon Creek
Primary AMD Contributors
North Fork Birds Creek
Raccoon Creek
South Fork Birds Creek
Squires Creek
N
Squires Cr
pH ~6.45 s.u.
Acidity ~ 16.94 ppm
Alkalinity ~25.74 ppm
South Fork Birds Cr
pH ~7.32 s.u.
Acidity ~ 12.69 ppm
Alkalinity ~ 31.02 ppm
North Fork Birds Cr
pH ~4.93 s.u.
Acidity ~ 15.69 ppm
Alkalinity ~ 18.2 ppm
Raccoon Cr
pH ~6.00 s.u.
Acidity ~ 9.77 ppm
Alkalinity ~ 7.78 ppm
Three Fork Cr
pH ~7.08 s.u.
Acidity ~ 5.36 ppm
Alkalinity ~ 19.59 ppm
Stacks Run
Squires Creek
North Fork Birds Creek
Birds Creek
Lick Run
South Fork Birds Creek
Cooks Run
Raccoon Creek
Newburg
Raccoon Creek
Three Forks Creek
Grafton
Rocky Branch
Scab Run
Flag Run
Tygart Valley River
Tygart Lake
Coordinate System: NAD 1983 UTM Zone 17N
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 500,000.0000
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Central Meridian: -81.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter
Source: WVDEP - AML
August 2012
0 1 2 4 Miles
Monongalia
Marion
Preston
Three Fork Creek
Taylor
Tygart Lake
Barbour
Tucker

Three Fork Creek Watershed Restoration Project

Preston County, West Virginia

In 2012 benthic macro-invertebrate surveys and fish surveys were conducted by WAB at the same four locations along the mainstem of Three Fork Creek.

Benthic results were impressive, increasing the total taxa to fifteen with eight EPT taxa.

Three Fork Creek Watershed Restoration Project

Preston County, West Virginia

Results of the fish survey were even more dramatic. **Less than two years after the initiation of in-stream treatment** 1,605 fish were caught representing 21 species of predator and prey species at the same four locations.

Three Fork Creek Watershed Restoration Project

Preston County, West Virginia

More impressive was the presence of numerous young fish, indicating natural reproduction within the watershed.

Three Fork Creek Watershed Restoration Project

Preston County, West Virginia

Improvements to the aesthetics of the watershed

Three Fork Creek Watershed Restoration Project

Preston County, West Virginia

Raccoon Creek prior to dosing

Raccoon Creek after dosing

Three Fork Creek Watershed Restoration Project

Preston County, West Virginia

Birds Creek prior to dosing

Birds Creek after dosing

Three Forks Creek Watershed

Projects like the Three Forks Creek Watershed Restorations Project truly reveal how wasteful the WV bond forfeiture program has been. Within two years this restoration project has brought life back into the streams, while OSR spent nearly ten years discharging compliant (or nearly compliant) water into dead streams.

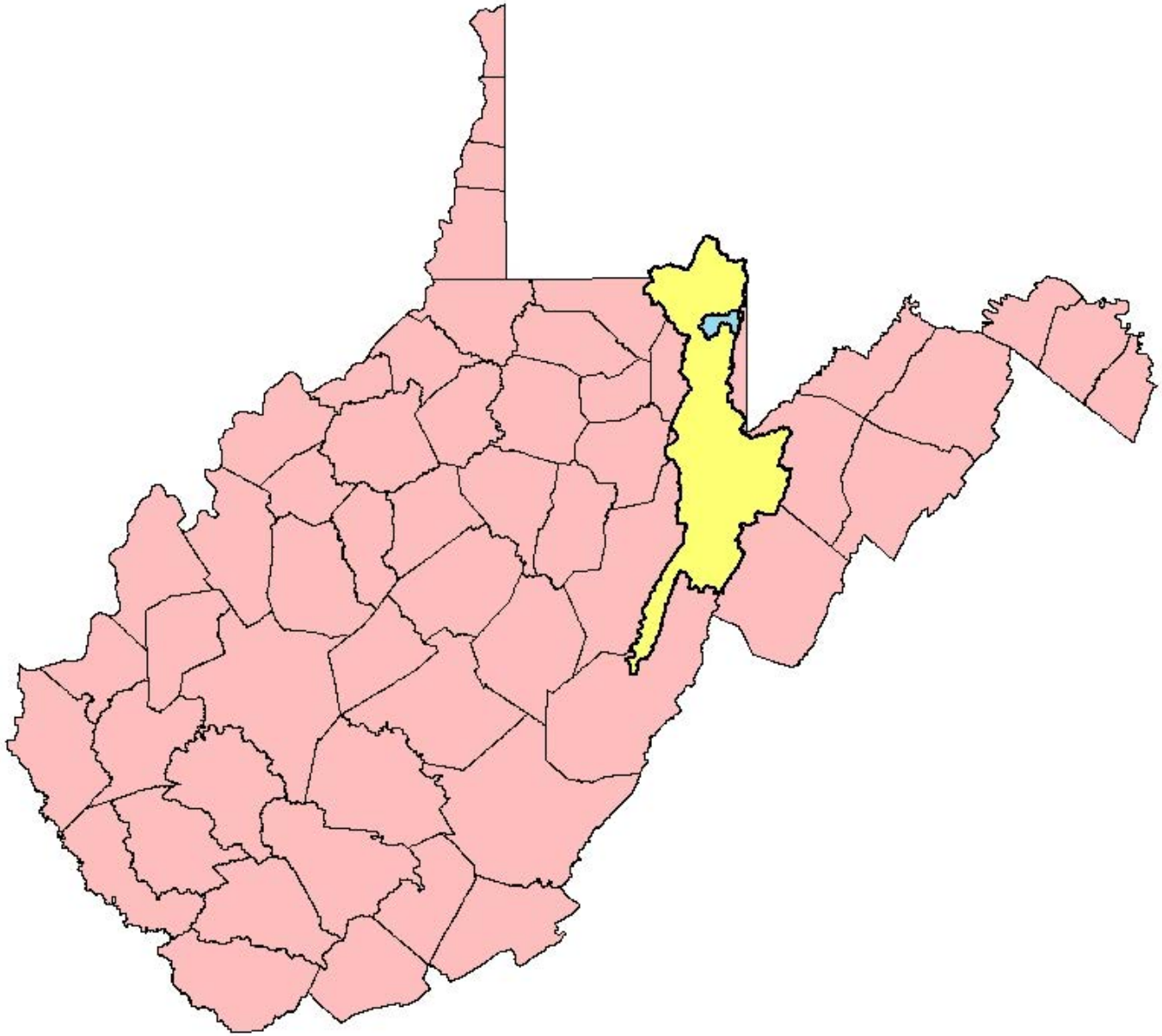
We are here today to discuss how we can get bigger benefits for comparable cost.

Are there provisions within the CWA that allow for effective trading programs between point source and no point source contributors?

Can partnerships be formed between; OSR, AML, OSM and, yes, EPA, that will allow for these programs to combine resources to reach a common goal.

LET’S LOOK AT A DIFFERENT WATERSHED

Cheat River Basin

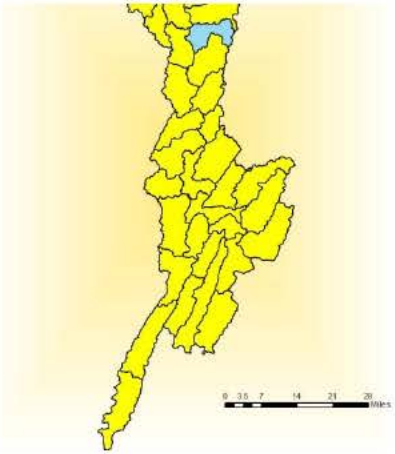


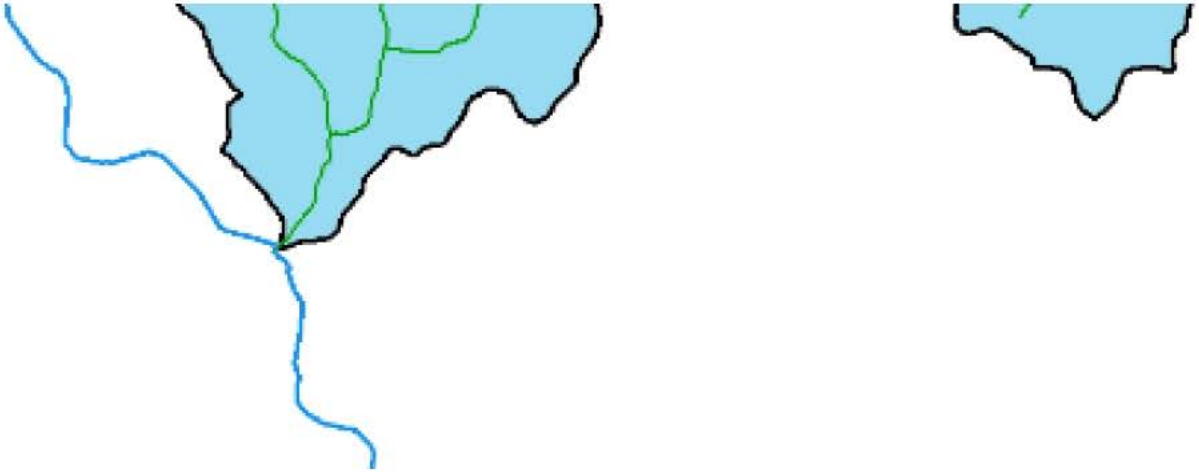
Muddy Creek Watershed

Drainage area = 33.5 mi2

Stream length = 15.6 miles

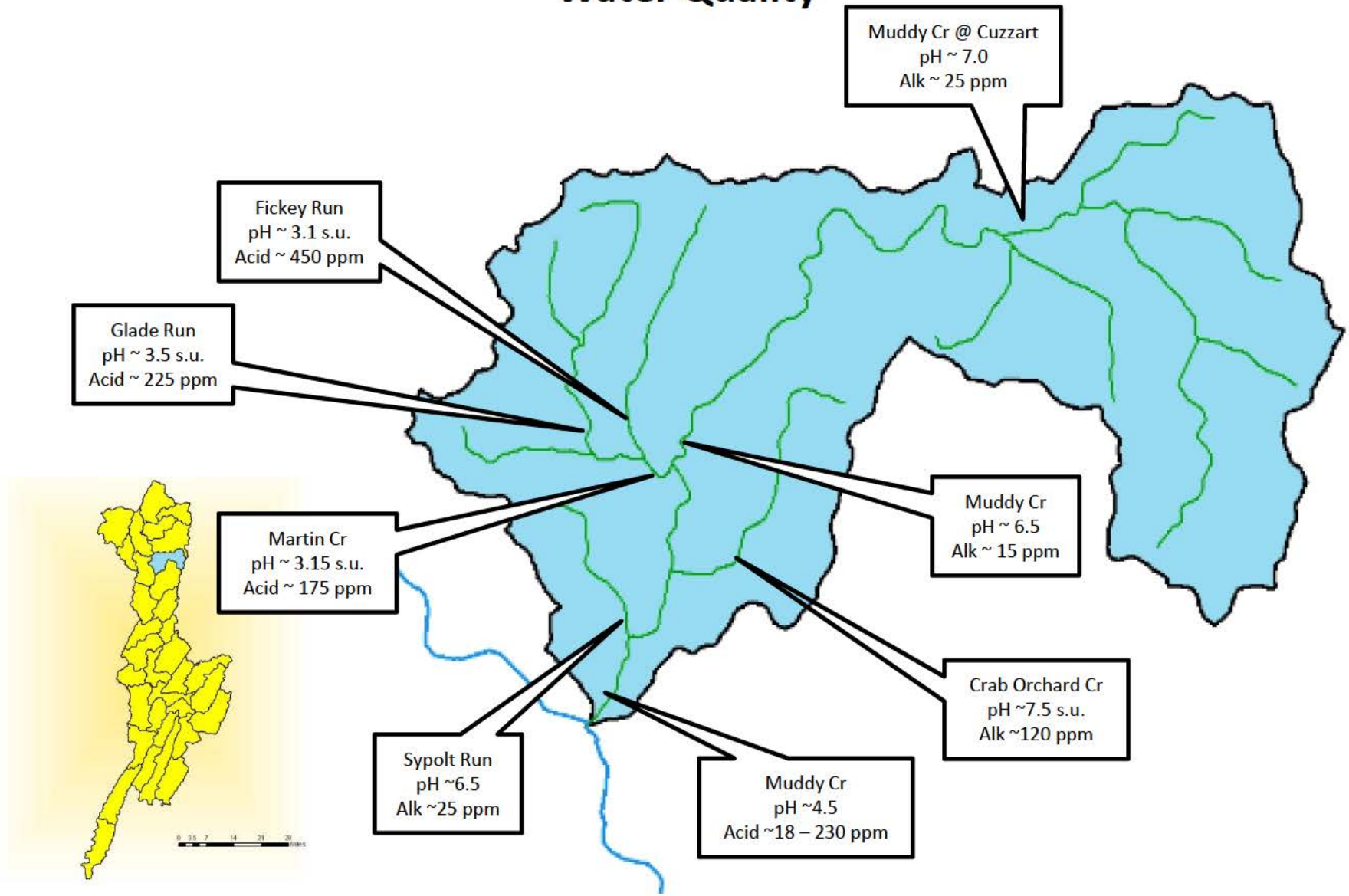
WV has been treating mine drainage at forfeited mine sites within the Muddy Creek watershed as early as 1995*. OSR has constructed 9 active treatment sites and 1 passive treatment systems at six bond forfeiture sites within the watershed and we now have ten NPDES outlets.





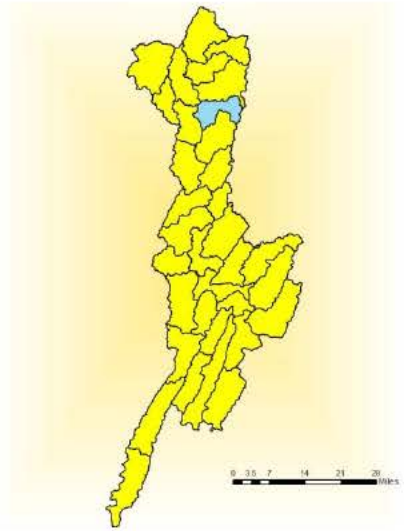
* OSR resumed water treatment upon forfeiture of T&T Fuels in 1995

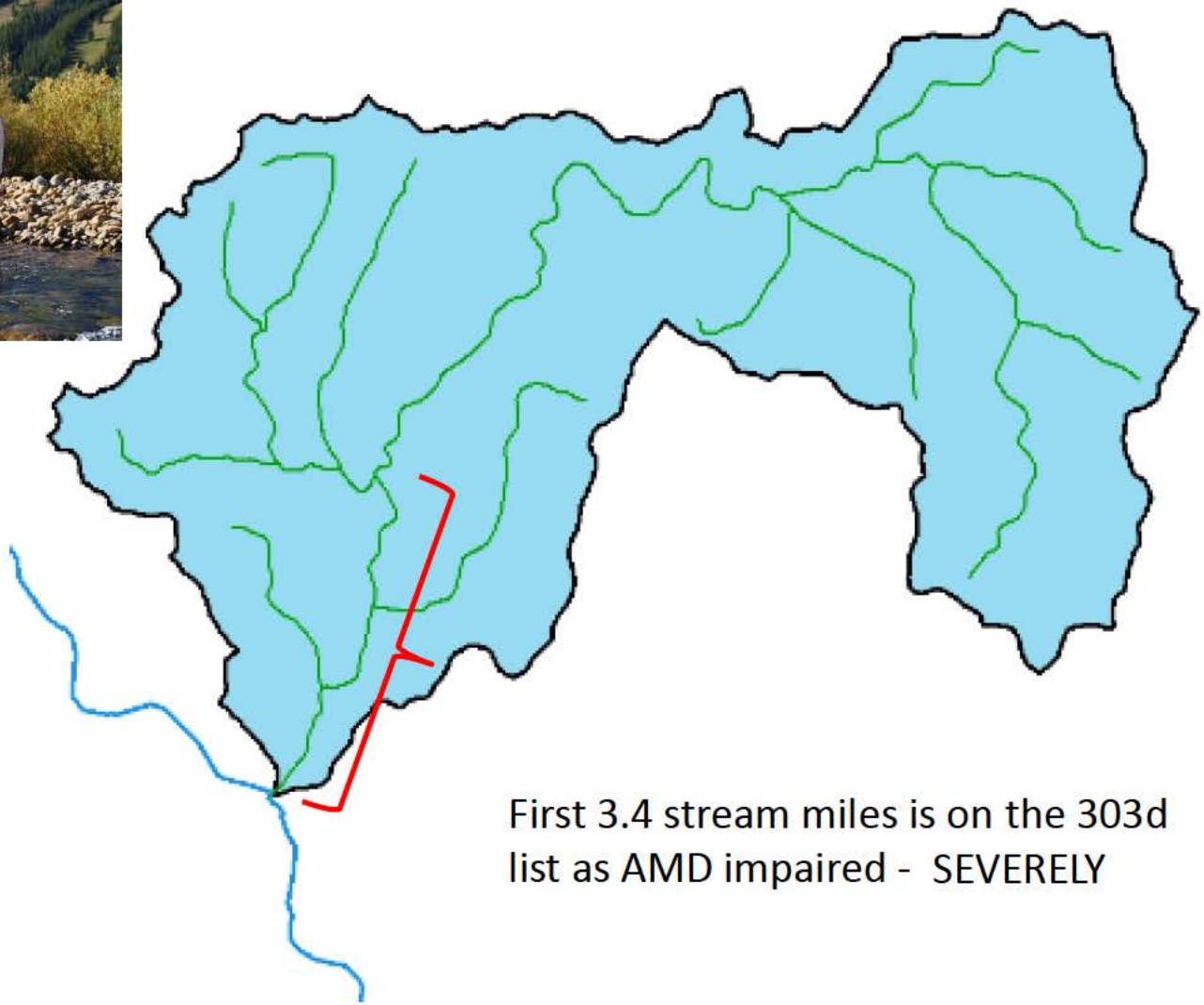
Muddy Creek Watershed
Water Quality



Muddy Creek Watershed

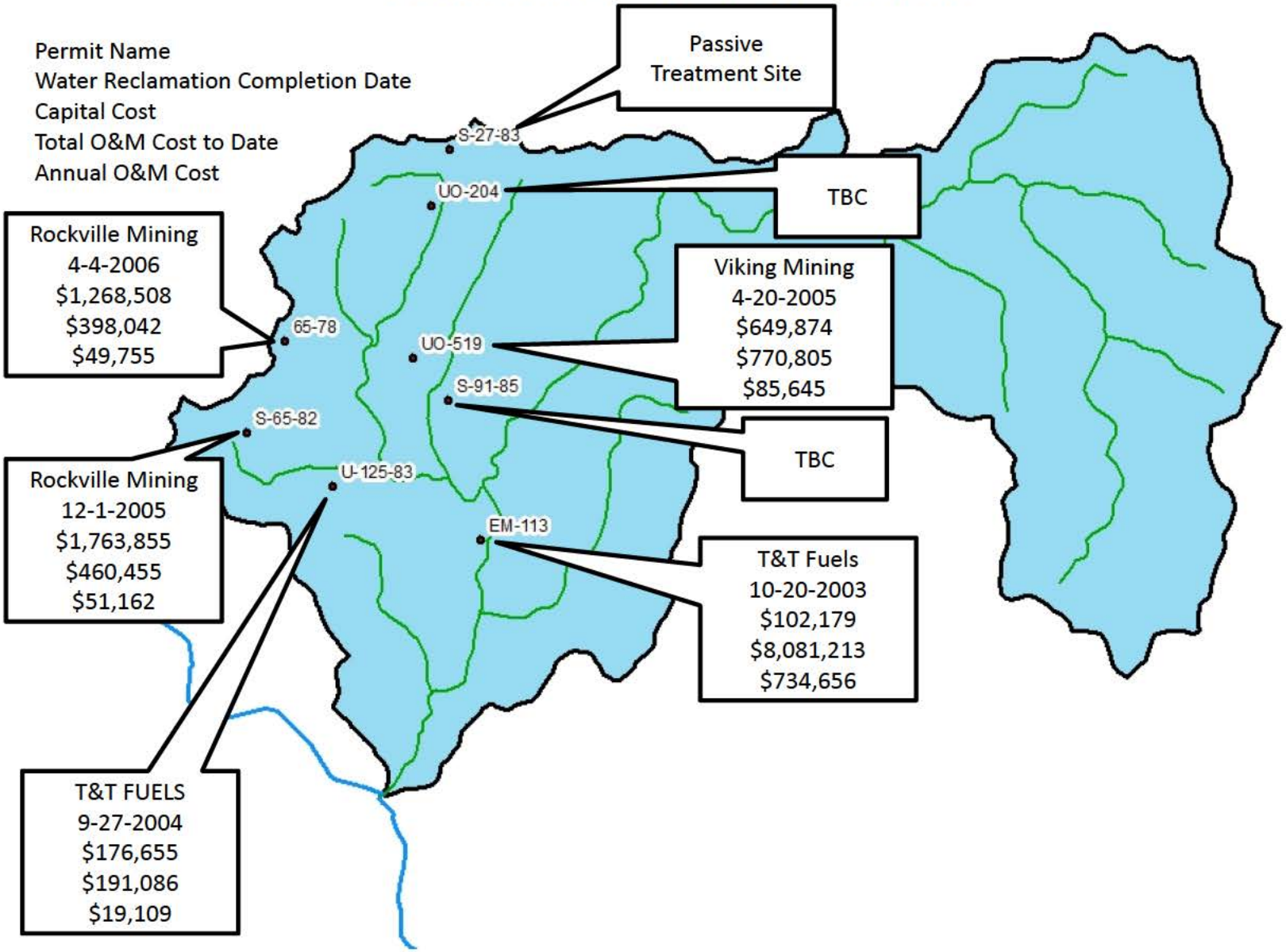
Remaining 12.2 miles considered a trout stream

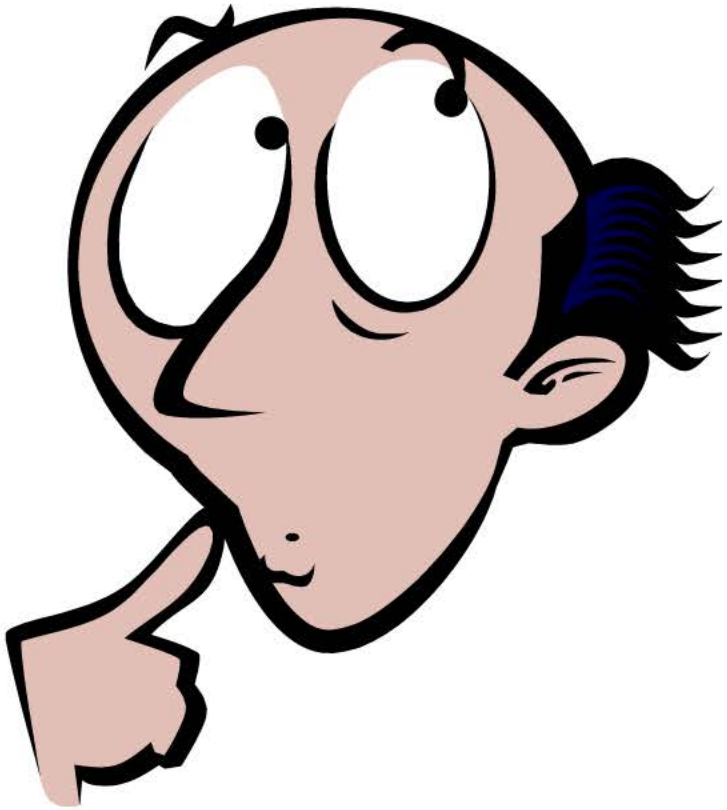




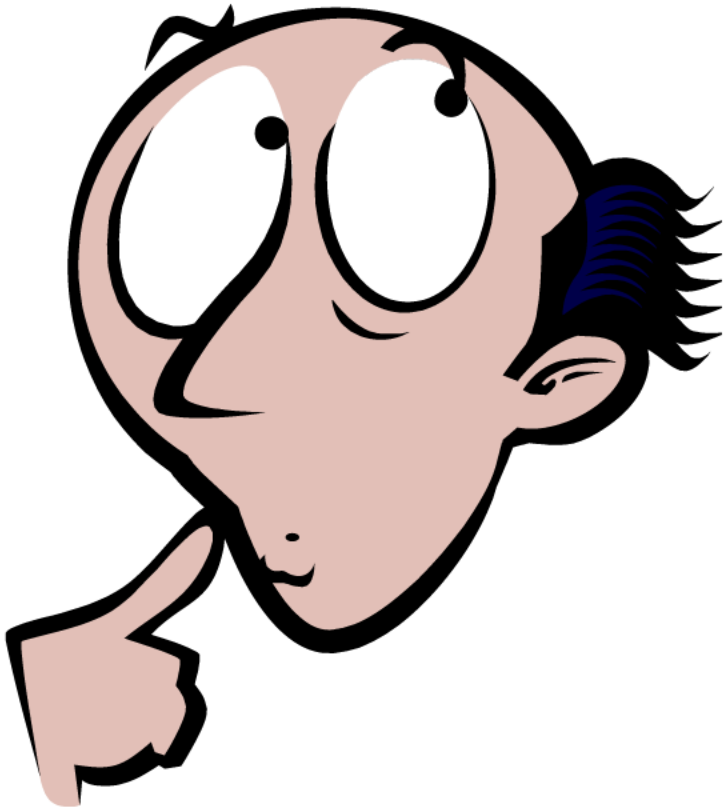
First 3.4 stream miles is on the 303d list as AMD impaired - SEVERELY

Muddy Creek Watershed
Bond Forfeiture Site Locations



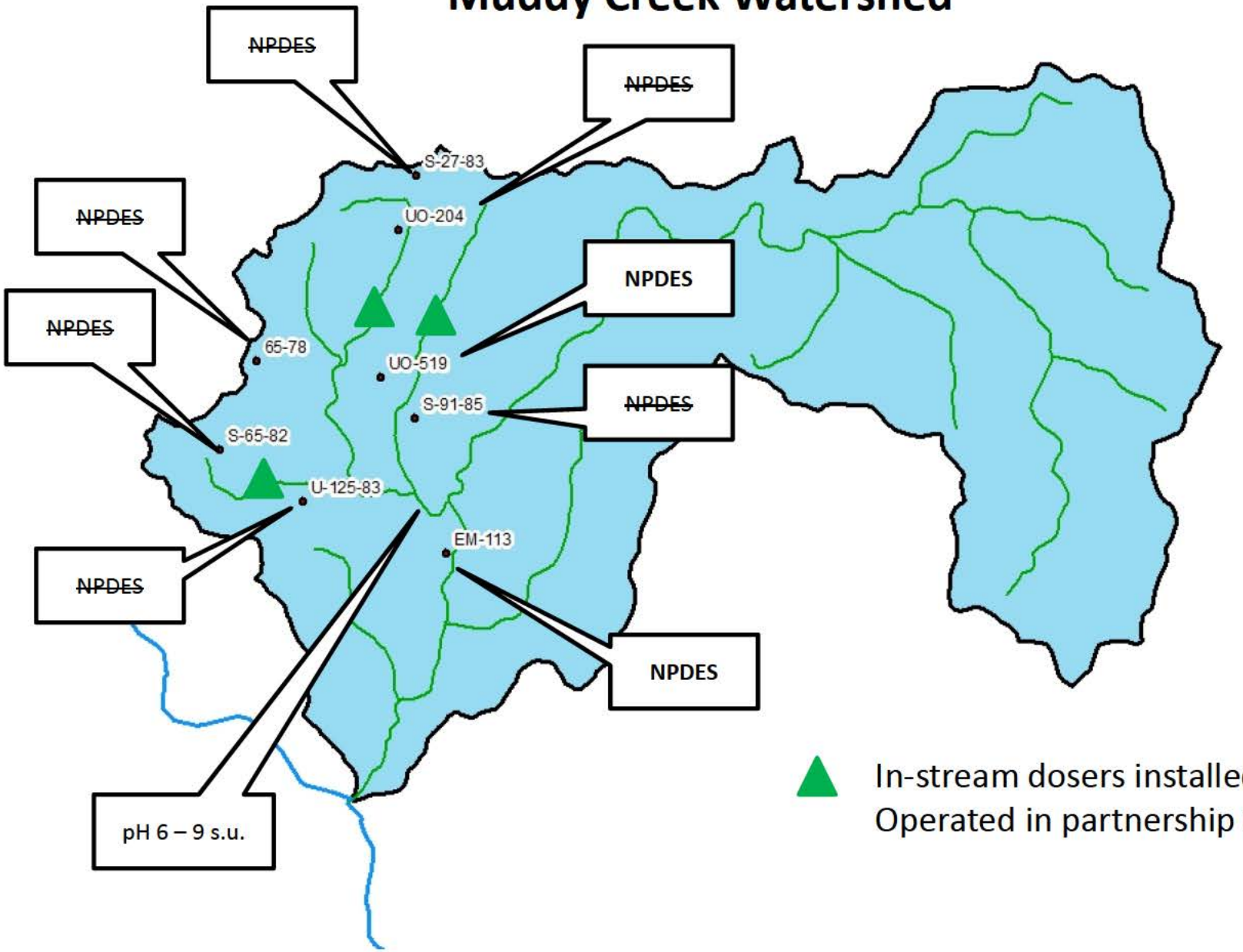


Are we using our limited resources wisely?



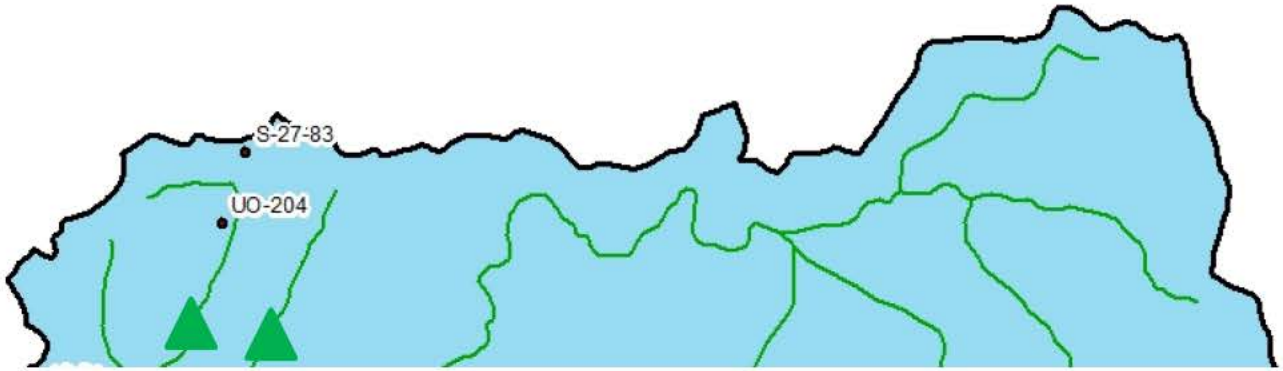
Is there language within the CWA that would allow for an in-stream compliance point(s) rather than at-source NPDES permits at low to moderate impact sites?

Muddy Creek Watershed



In-stream dosers installed and Operated in partnership w/ AML

Muddy Creek Watershed



Restoring the lower 3.4 mile section of Muddy Creek would bring life back to the entire 15.6 miles.

AML can not accomplish this alone – they simply do not have the money.

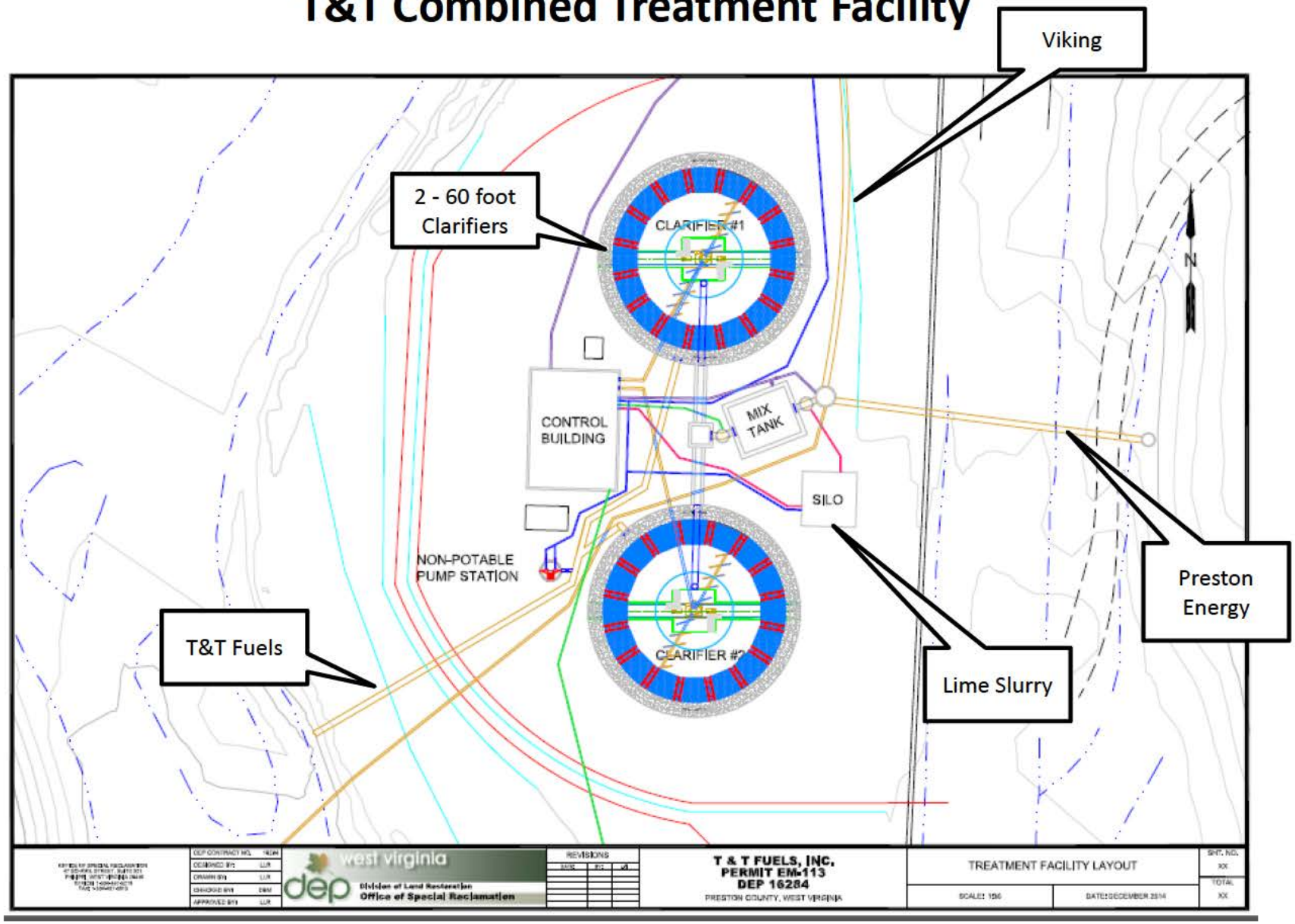
In-stream dosers installed and Operated in partnership w/ AML

Larger Contributors of AMD

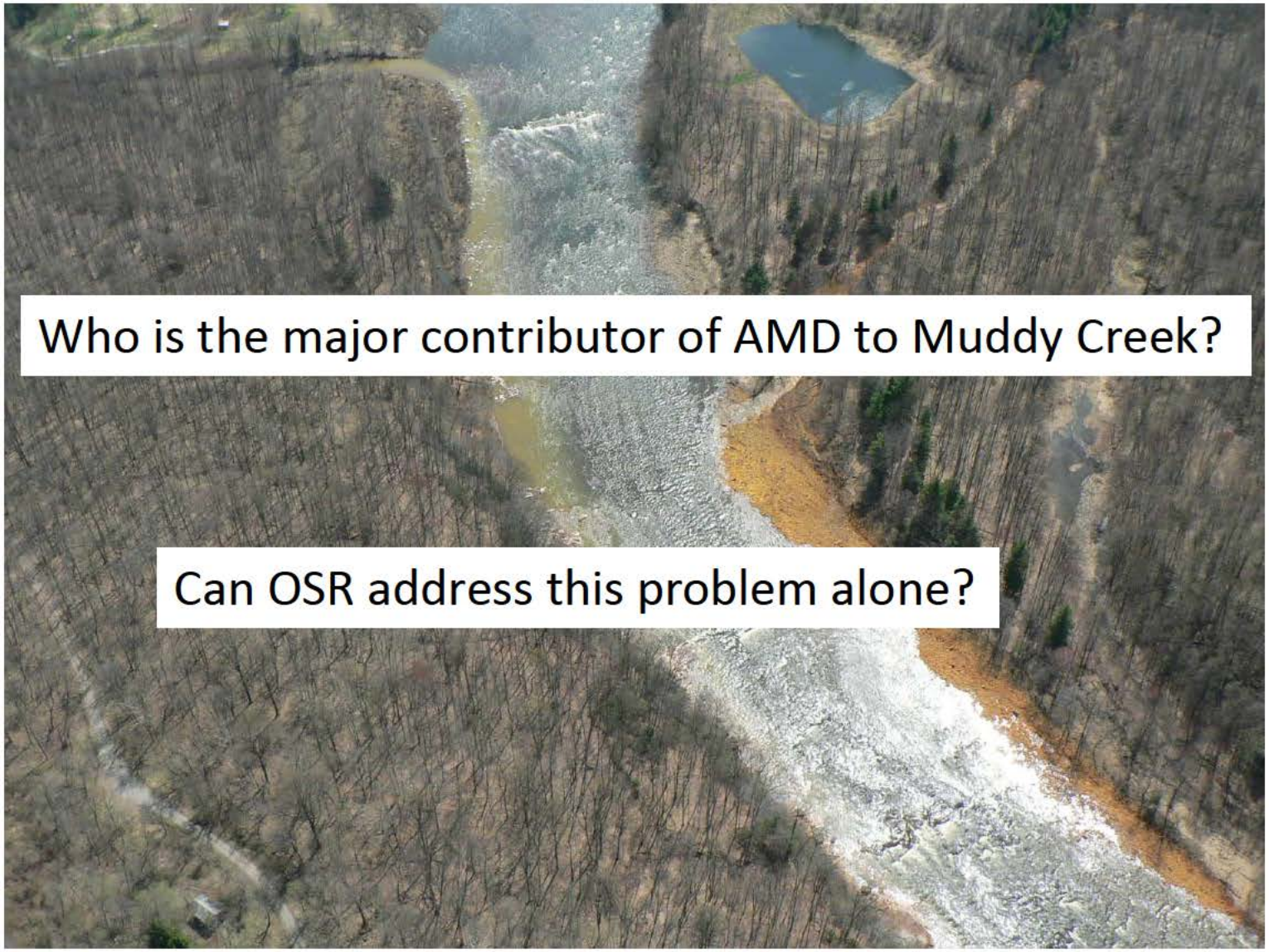
T&T EM-113										
Sample 3	GPM	PH	ACIDITY	Acidity_LD lbs/day	T_FE	Fe_LD lbs/day	MN	Mn_LD lbs/day	AL	Al_LD lbs/day
Min:	98.56	2.58	286.00	497.57	34.13	52.33	0.95	2.05	1.59	11.39
Max:	851.20	3.02	800.00	5672.62	106.00	1033.16	26.83	192.16	65.90	637.44
Average:	425.02	2.80	397.23	2064.87	53.56	298.63	2.28	13.05	27.68	154.46
T&T EM-113										
Sample 1	GPM	PH	ACIDITY	Acidity_LD lbs/day	T_FE	Fe_LD lbs/day	MN	Mn_LD lbs/day	AL	Al_LD lbs/day
Min:	0.00	2.40	5.00	0.00	53.91	0.00	0.67	0.00	21.88	0.00
Max:	551.04	2.87	1000.00	3616.43	133.77	614.66	2.00	0.06	73.64	13.70
Average:	95.09	2.63	567.13	567.34	84.40	95.47	1.29	0.02	42.80	3.74
Viking UO-519										
Sample 1	GPM	PH	ACIDITY	Acidity_LD lbs/day	T_FE	Fe_LD lbs/day	MN	Mn_LD lbs/day	AL	Al_LD lbs/day
Min:	0.00	2.75	0.00	0.00	0.48	0.00	0.08	0.00	0.00	0.00
Max:	197.12	6.90	360.00	824.55	23.60	55.92	4.72	11.18	46.00	108.99
Average:	66.20	4.55	169.38	240.25	11.21	16.31	2.26	3.26	21.42	31.19
Preston Energy UO-235										
Sample 16	GPM	PH	ACIDITY	Acidity_LD lbs/day	T_FE	Fe_LD lbs/day	MN	Mn_LD lbs/day	AL	Al_LD lbs/day
Min:	119.48	2.77	3.00	12.74	39.60	63.91	1.05	1.58	18.40	29.15
Max:	1102.08	3.08	622.00	8239.63	119.00	1576.39	2.41	31.93	53.00	702.09
Average:	513.88	2.93	314.72	2039.27	61.44	393.69	1.34	8.66	26.28	174.35

T&T FUELS
EM-113

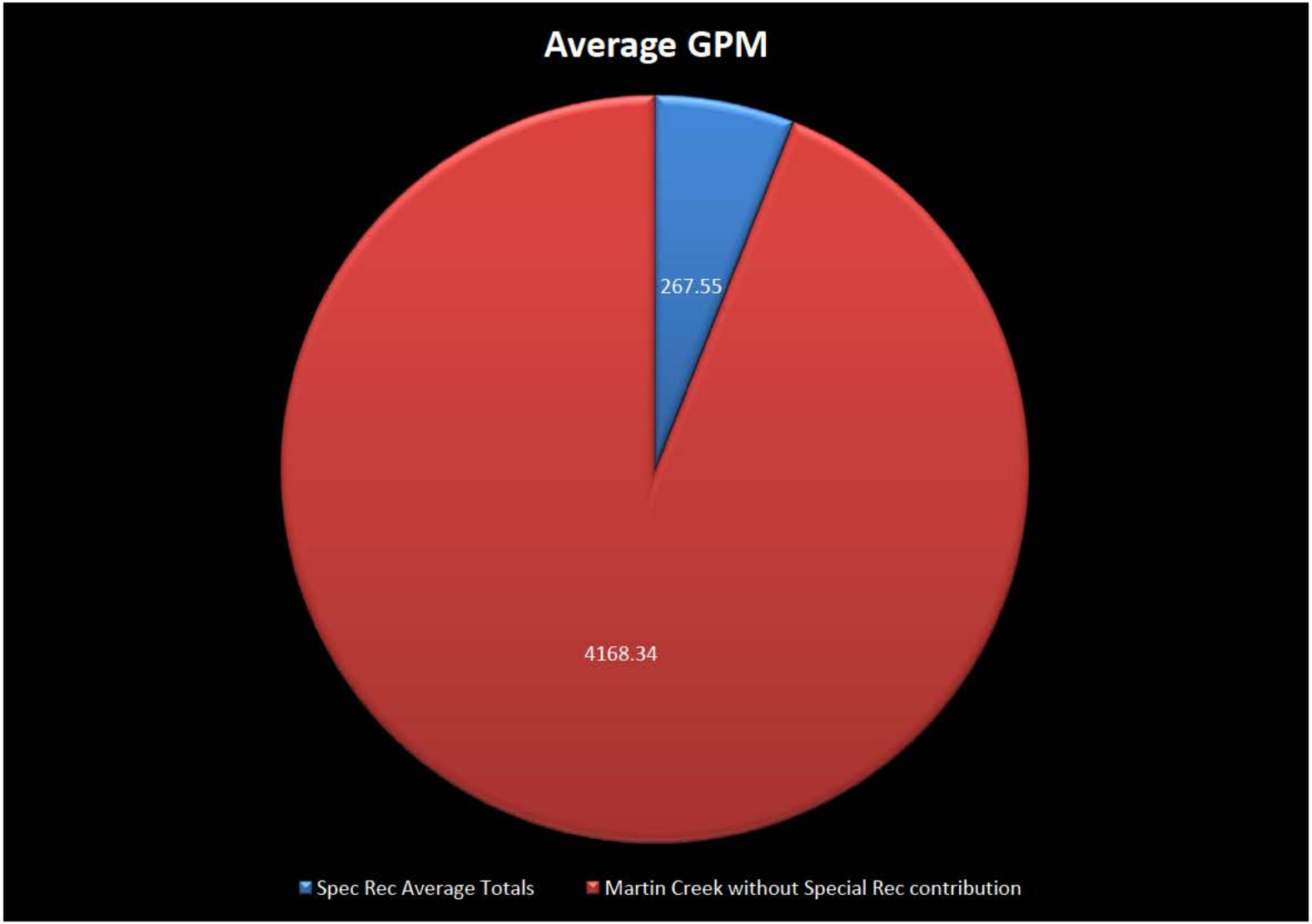
T&T Combined Treatment Facility



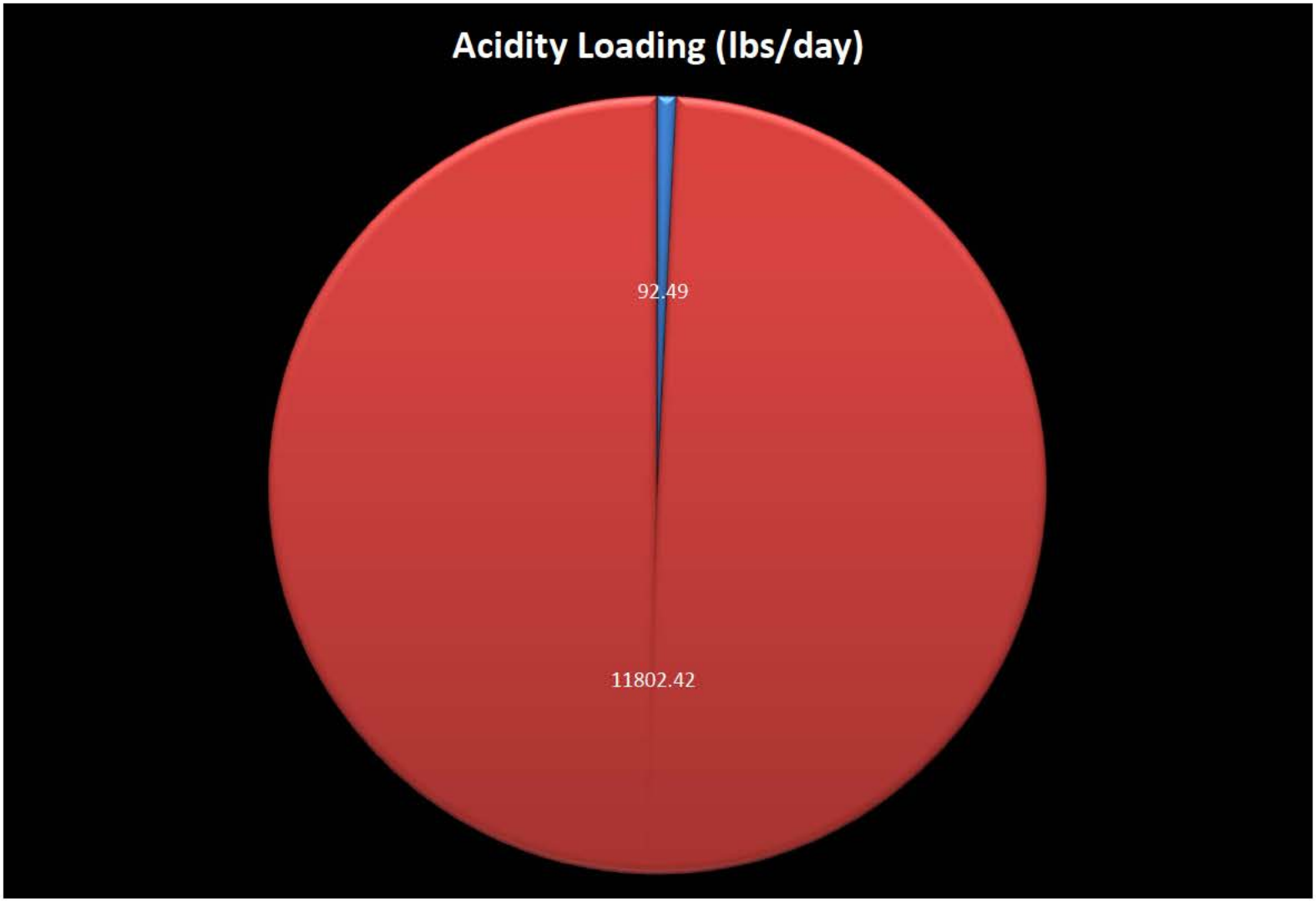
Muddy Creek Entering the Cheat River



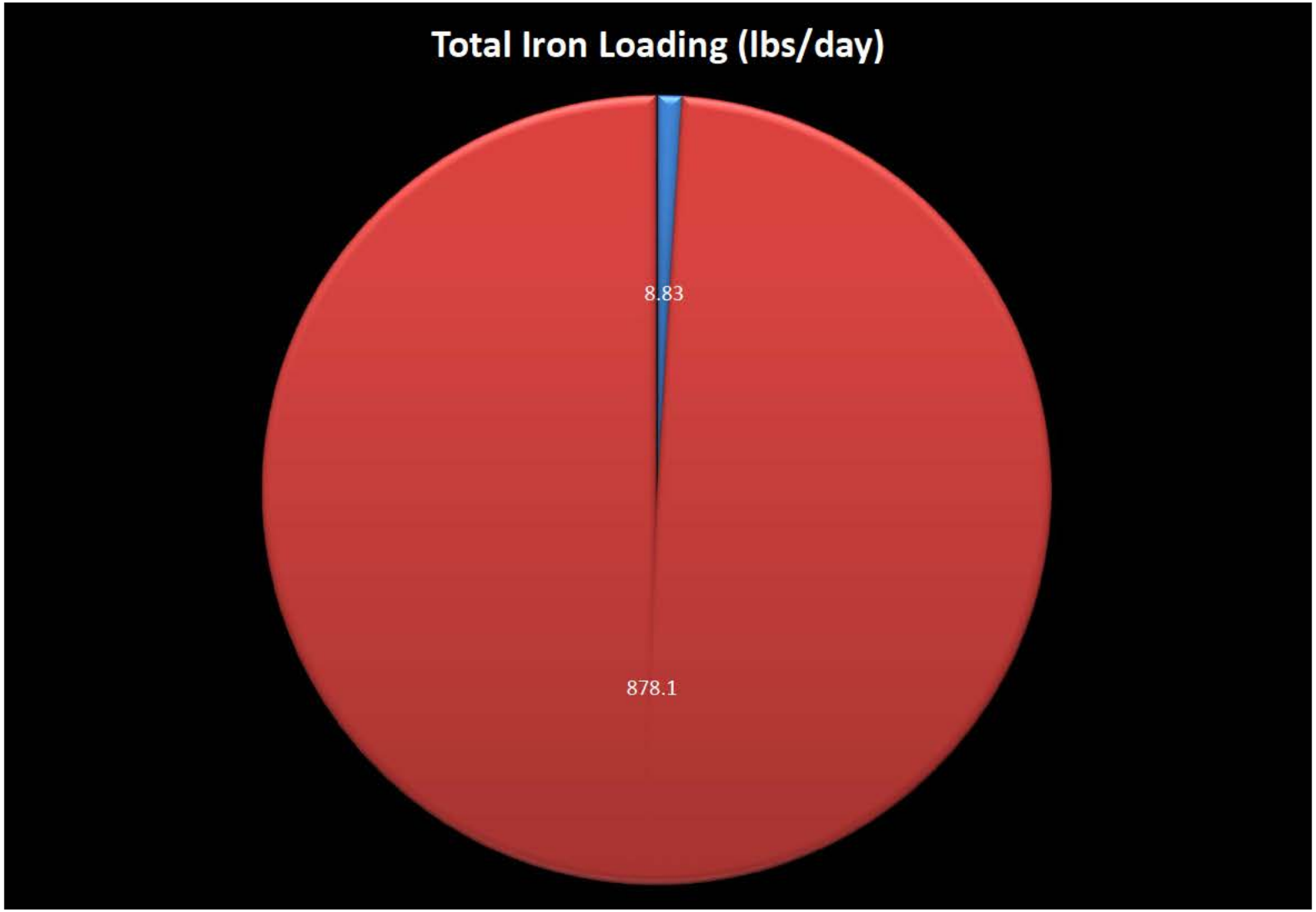
Contribution of AMD to Martin Creek by Bond Forfeiture Sites



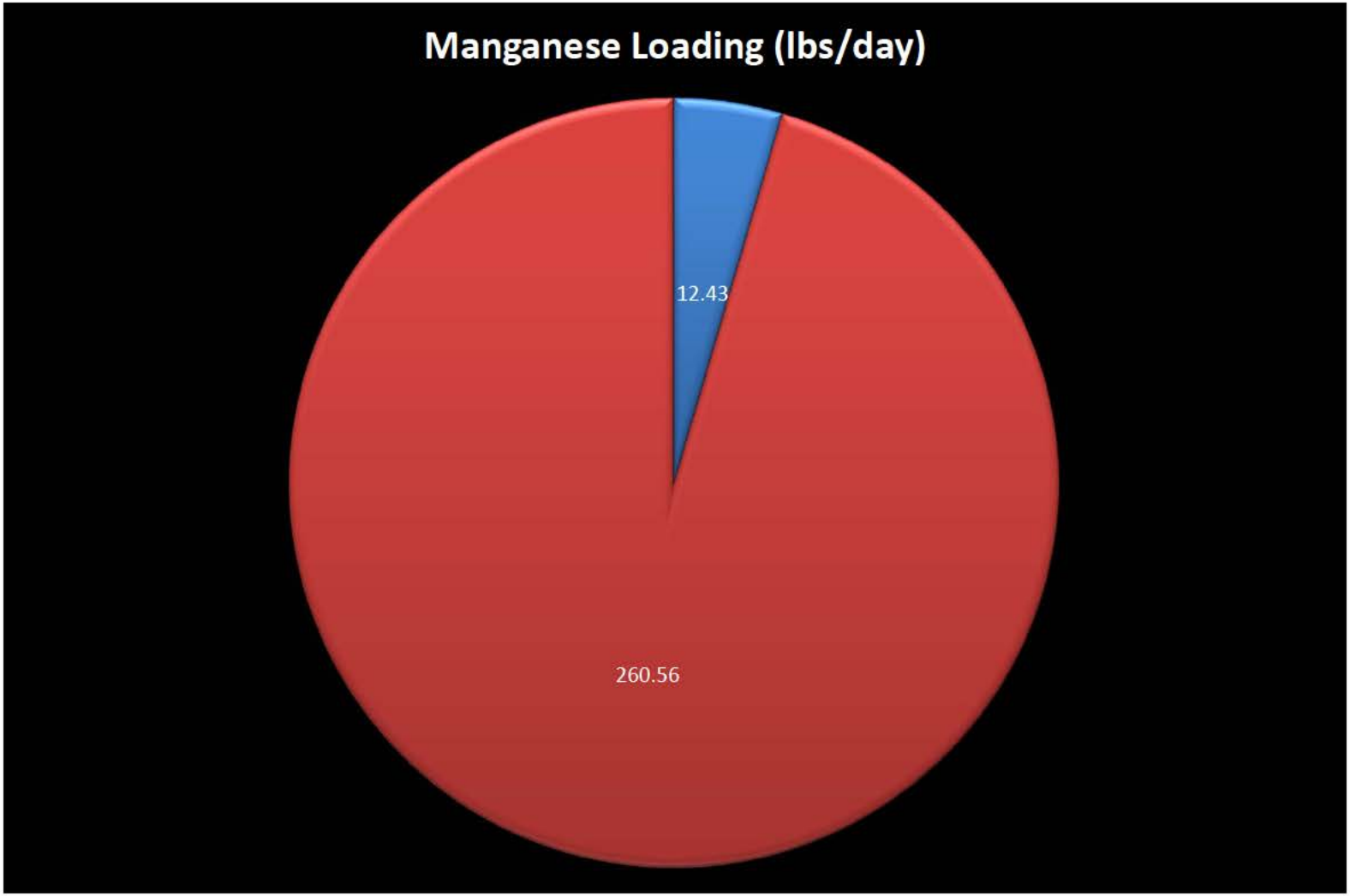
Contribution of AMD to Martin Creek by Bond Forfeiture Sites



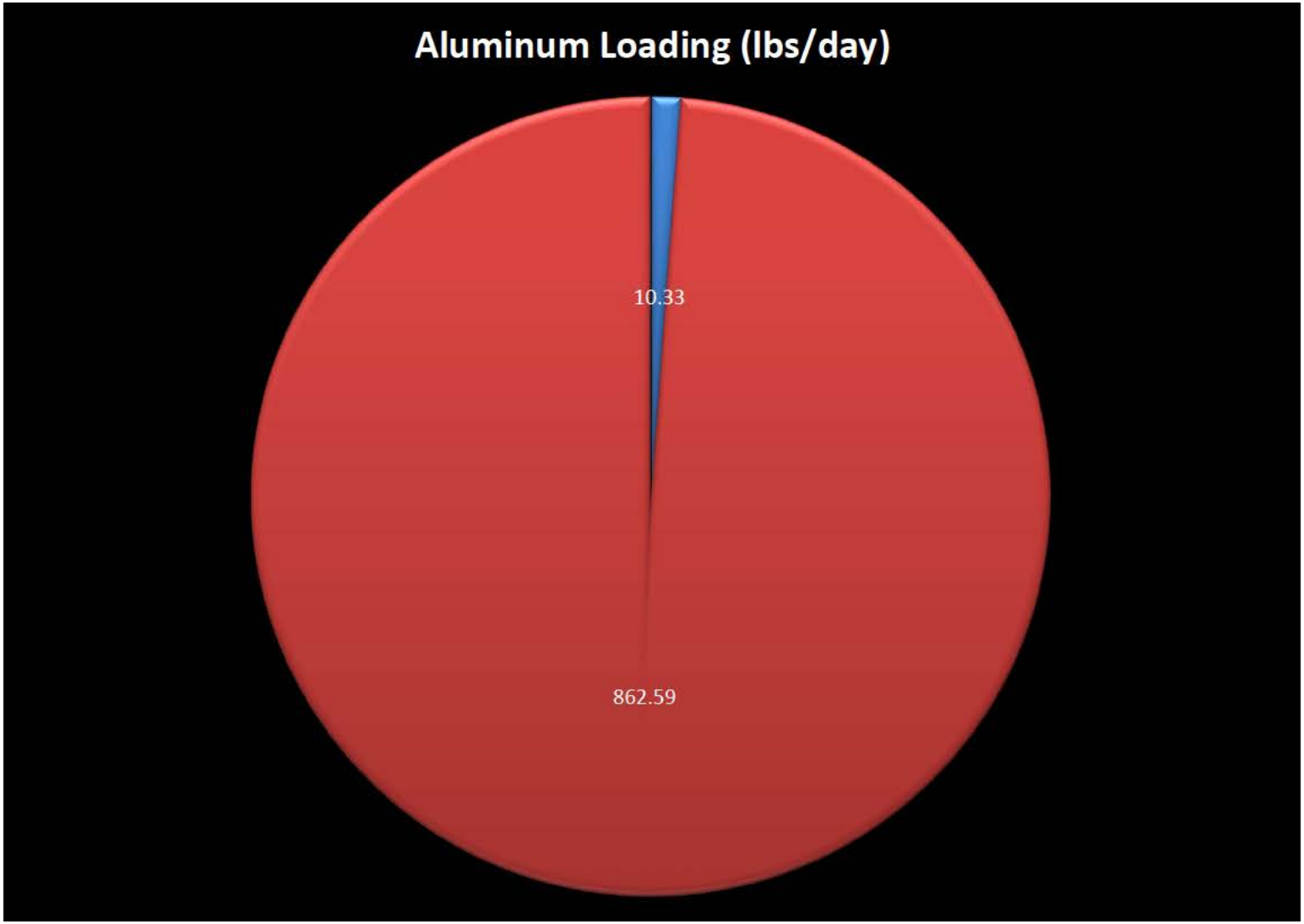
Contribution of AMD to Martin Creek by Bond Forfeiture Sites

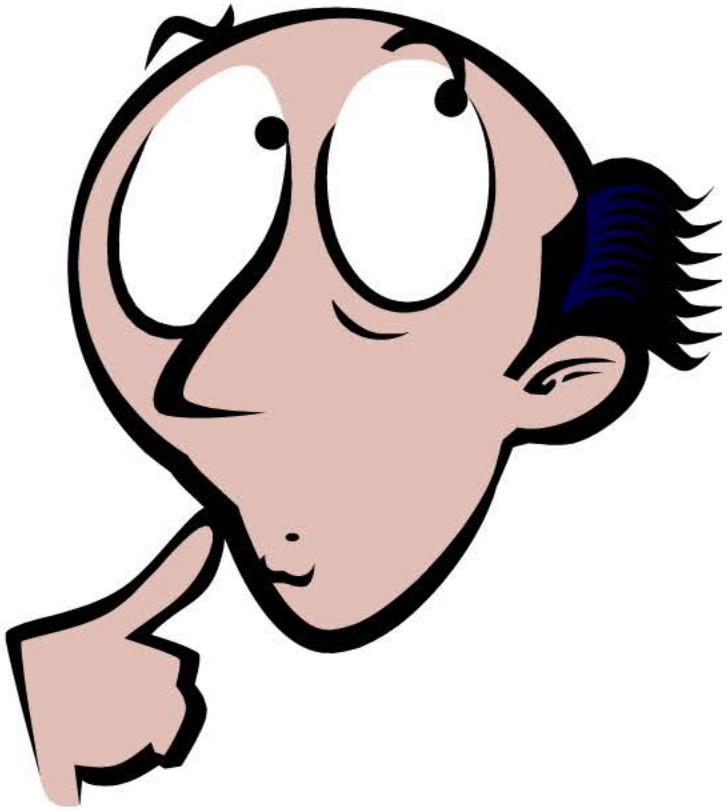


Contribution of AMD to Martin Creek by Bond Forfeiture Sites



Contribution of AMD to Martin Creek by Bond Forfeiture Sites





Can OSR address this problem alone?

We’ll End With A Bird’s Eye View Of The Muddy Creek AMD Treatment Sites

Viking Mining
UO-519

Rockville Mining
65-78, Site 1

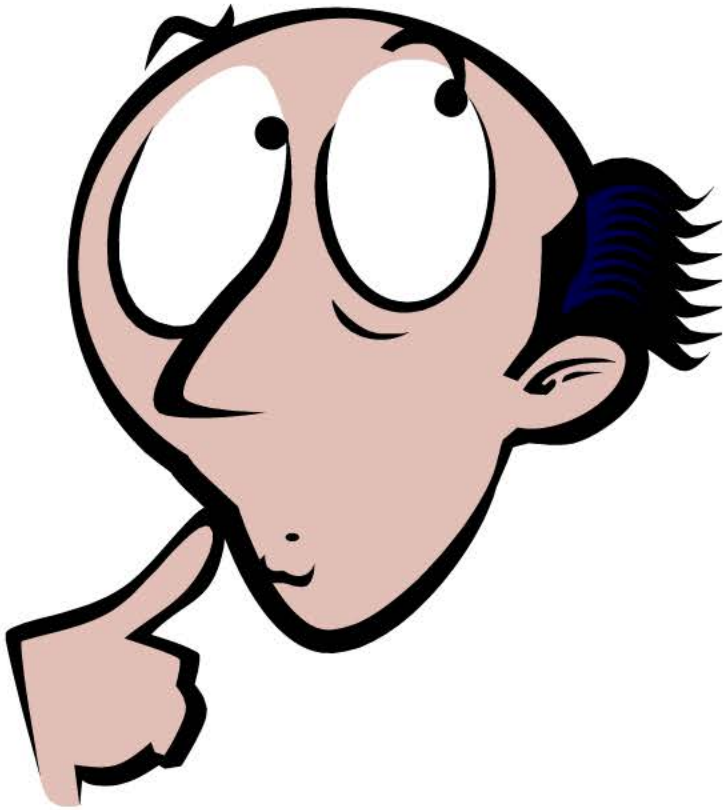
Rockville Mining
65-78, Site 2

Rockville Mining
65-78, Site 4

Rockville Mining
S-65-82, Site 1

Rockville Mining
S-65-82, Site

Rockville Mining
S-65-82, Site 4



So, are we using our limited resources wisely?