

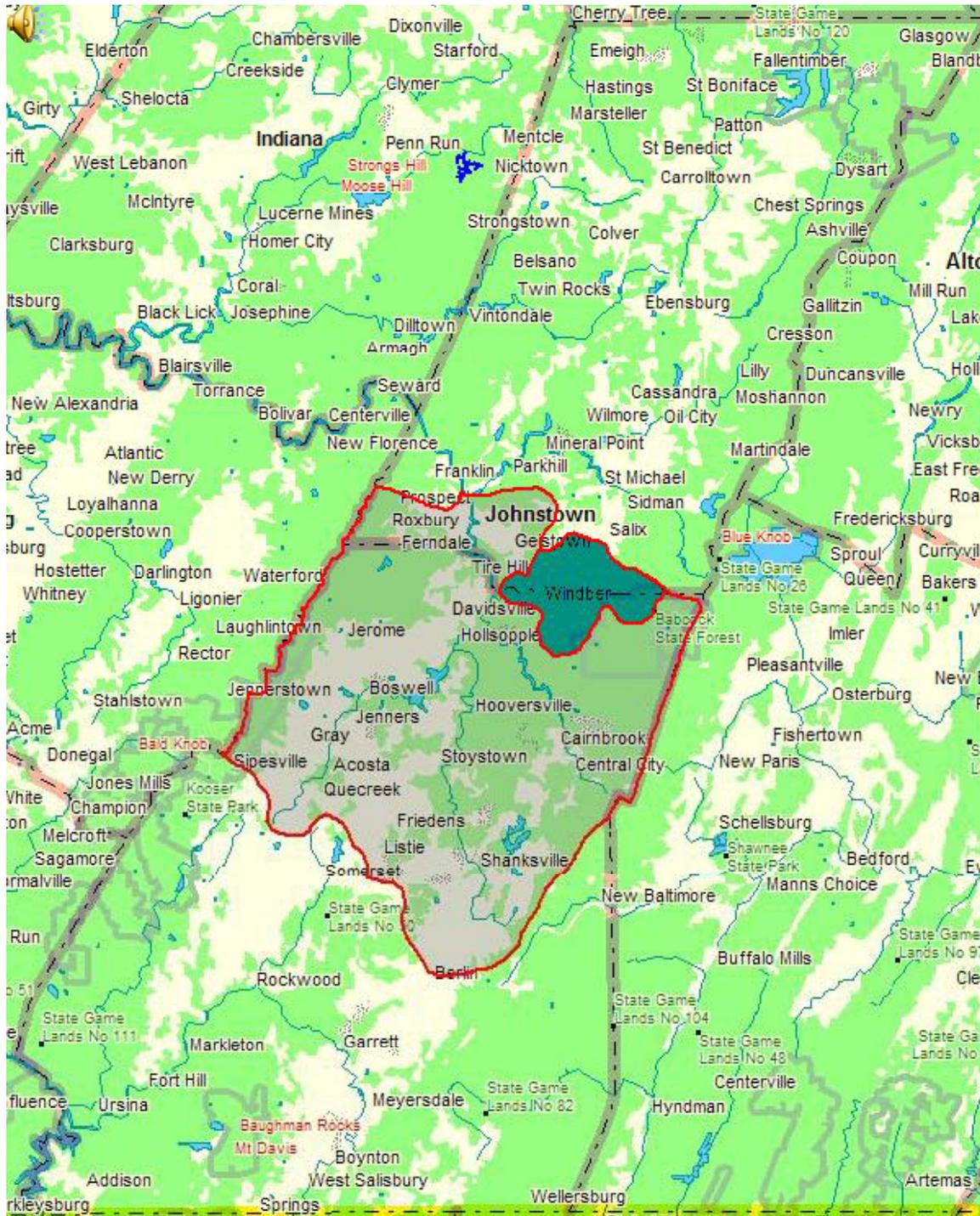
2009 PA Conference on Abandoned Mine Reclamation and Coal Mine Heritage

Restoration of the Paint Creek Watershed: Results of a Three Year Study

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And

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Paint Creek Watershed

- 38 Square Mile Watershed, approximately 12% of the Stonycreek Watershed
- Begins on Babcock Ridge in Cambria County and concludes at its confluence with the Stonycreek River in Paint Township
- Municipalities in the watershed include:
Adams Township, Richland Township, Paint Township, Ogle Township, Paint Borough, Scalp Level Borough, and Windber Borough
- Major tributaries include:
Little Paint Creek, Seese Run, and Babcock Creek

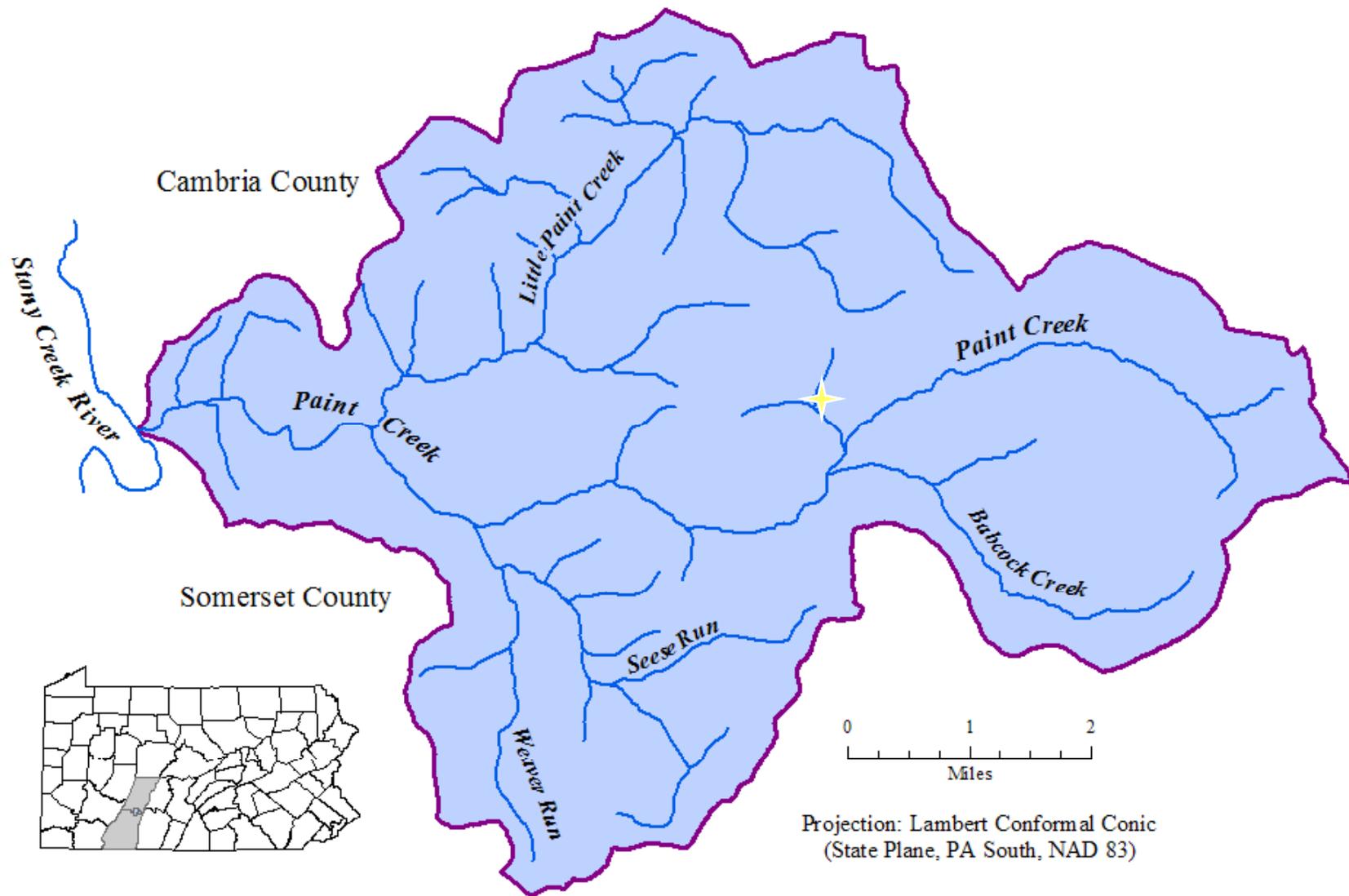


Figure 1. Paint Creek Watershed, located in southern Cambria and northern Somerset counties, Southwest Central Pennsylvania.



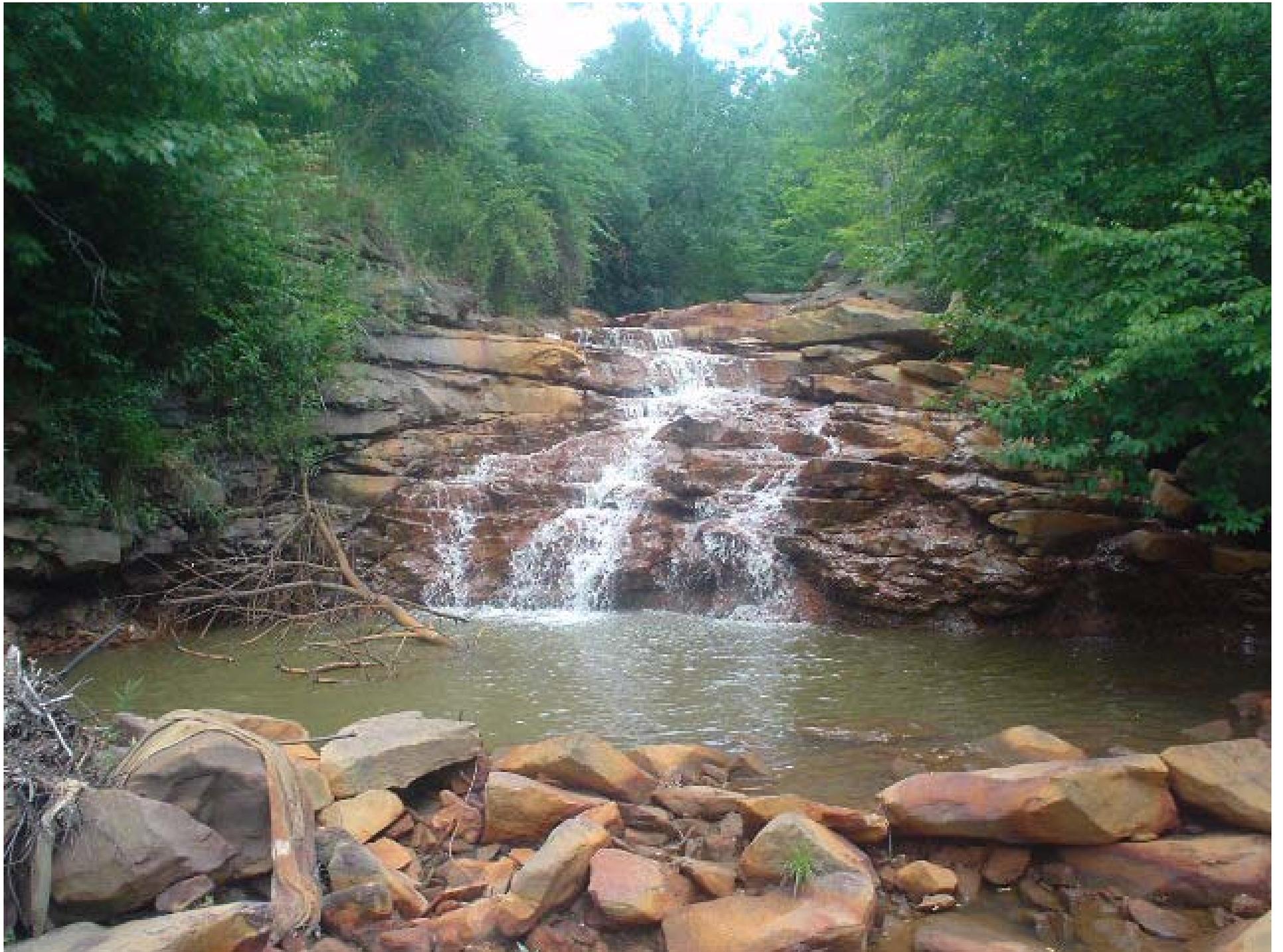


















Paint Creek Restoration Plan

- Funded by a \$60,000 Growing Greener Grant.
- Goal to locate and prioritize all pollution sources, focusing on AMD.
- Partnered with the University of Pittsburgh at Johnstown on A GIS database.
- Restoration plan completed in 2006.
- Now being used by the Paint Creek Regional Watershed Association for planning.

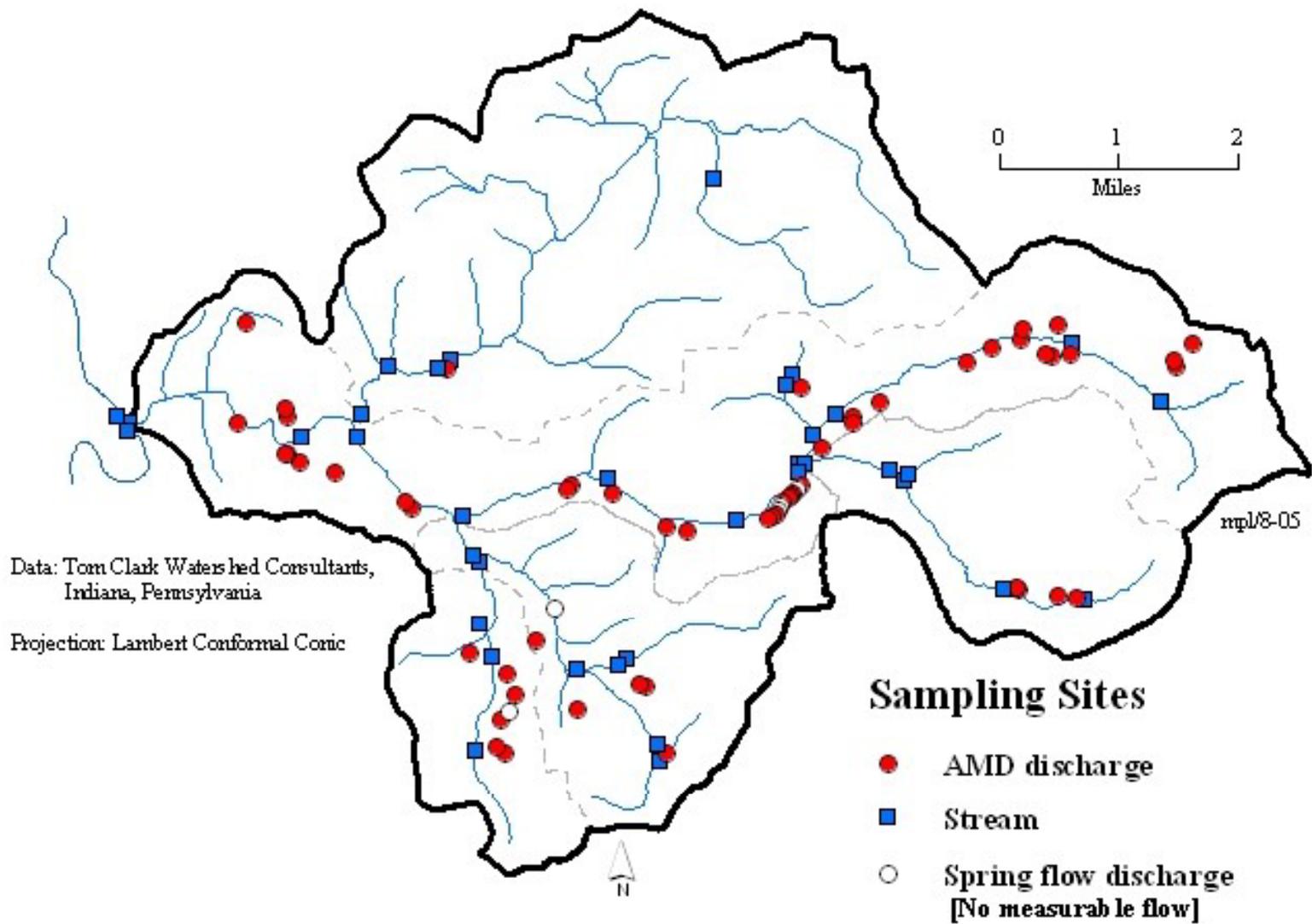


Figure 2. Data Collection Locations, Paint Creek Watershed Study, 2003-2005.

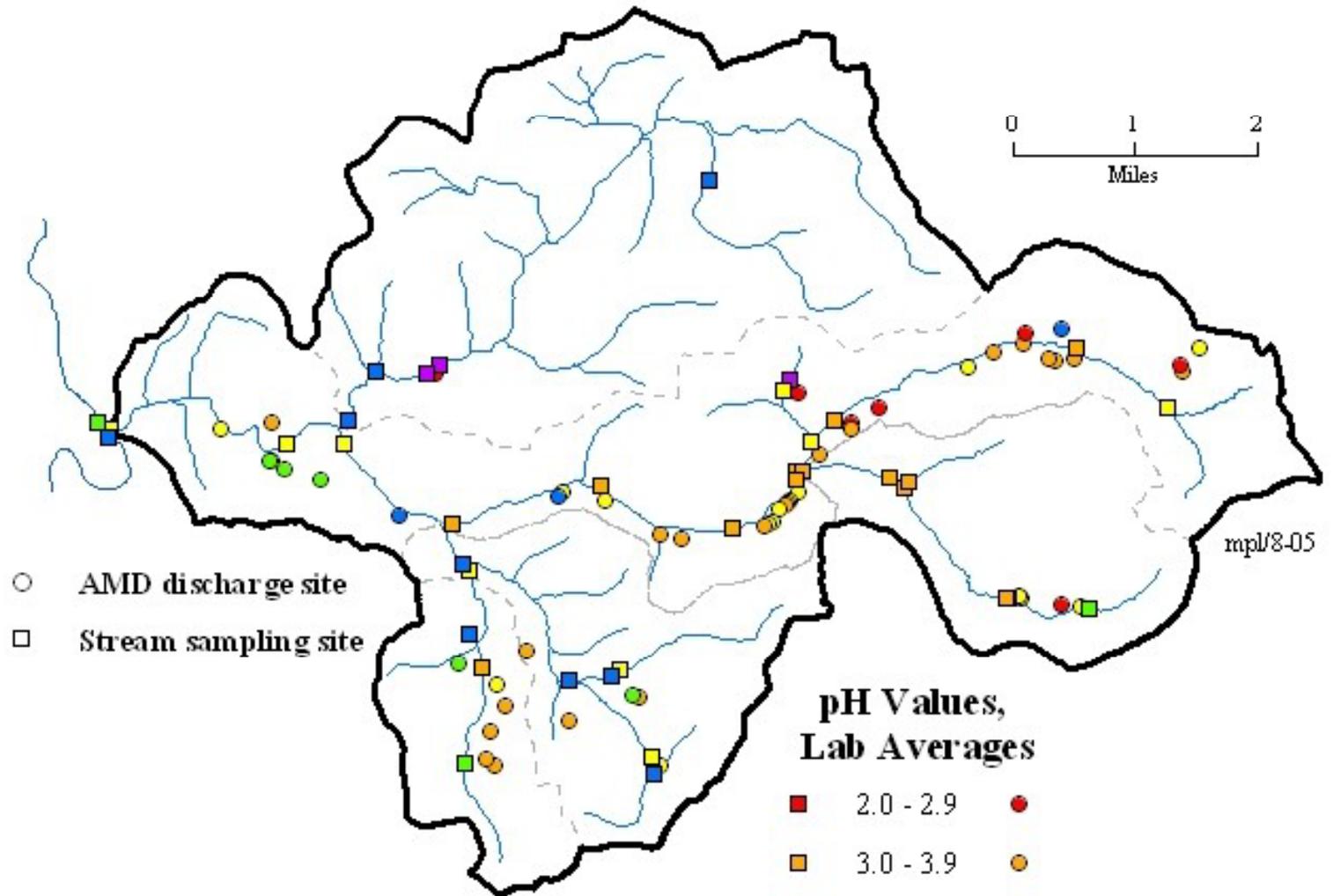
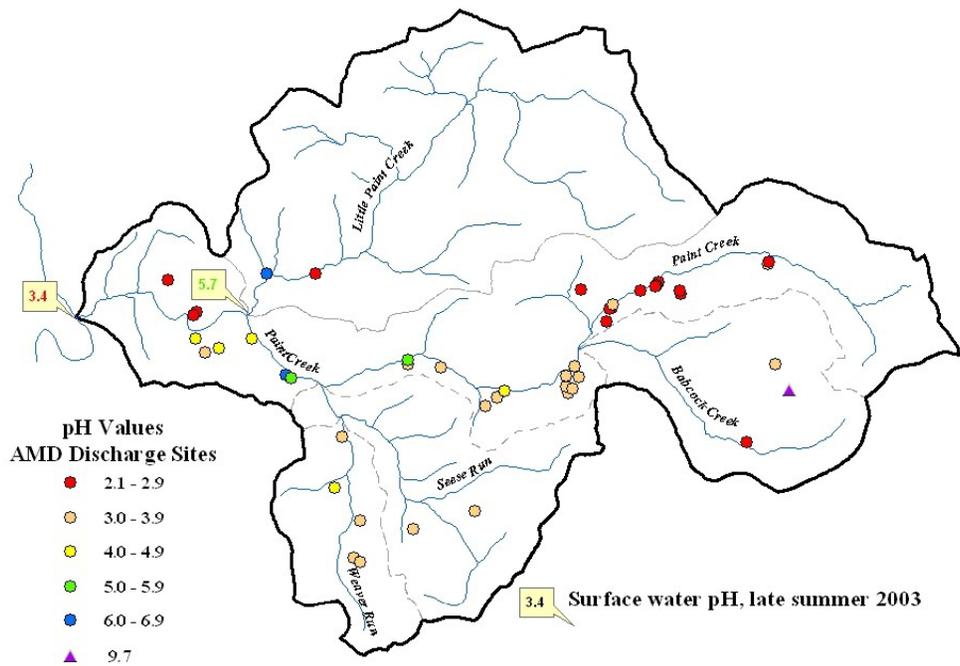
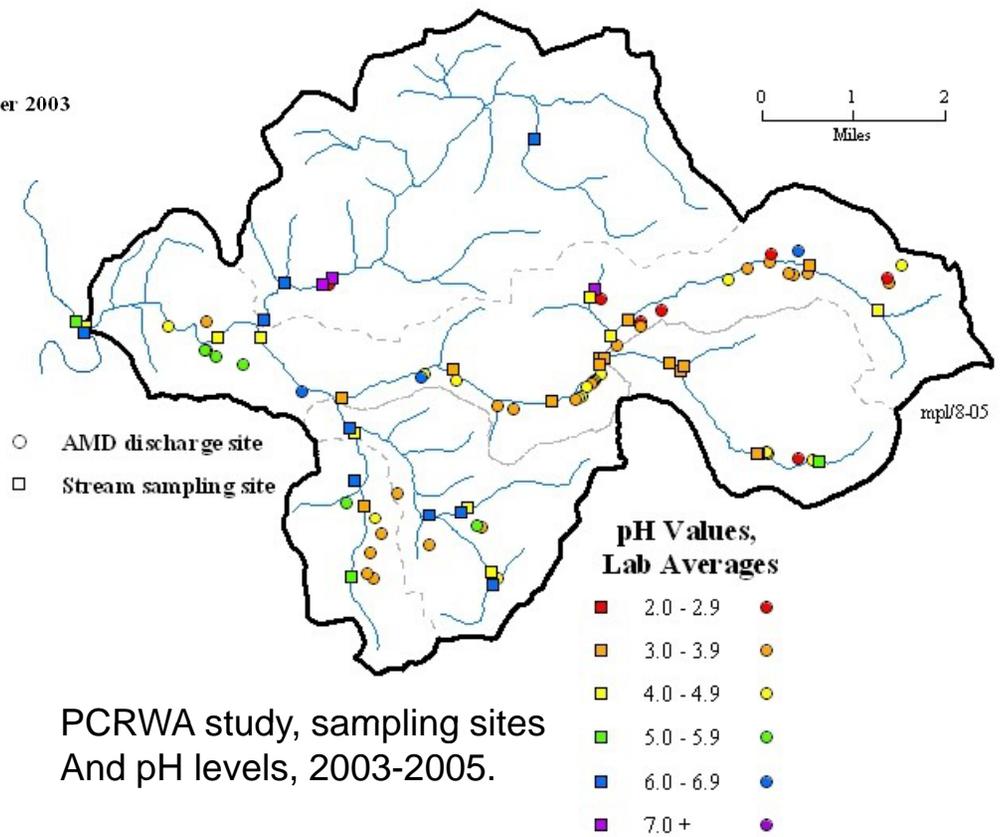


Figure 3. Lab pH values based on averages. Paint Creek is substantially impacted upstream of Seese Run and improves gradually downstream. Paint Creek also substantially impacts the Stonycreek River.



USGS sampling sites and pH levels, early 1990s.



PCRWA study, sampling sites
And pH levels, 2003-2005.

Figure 4. Some improvement in pH levels have occurred over the past decade, due to a combination of modest treatment efforts and mother nature.

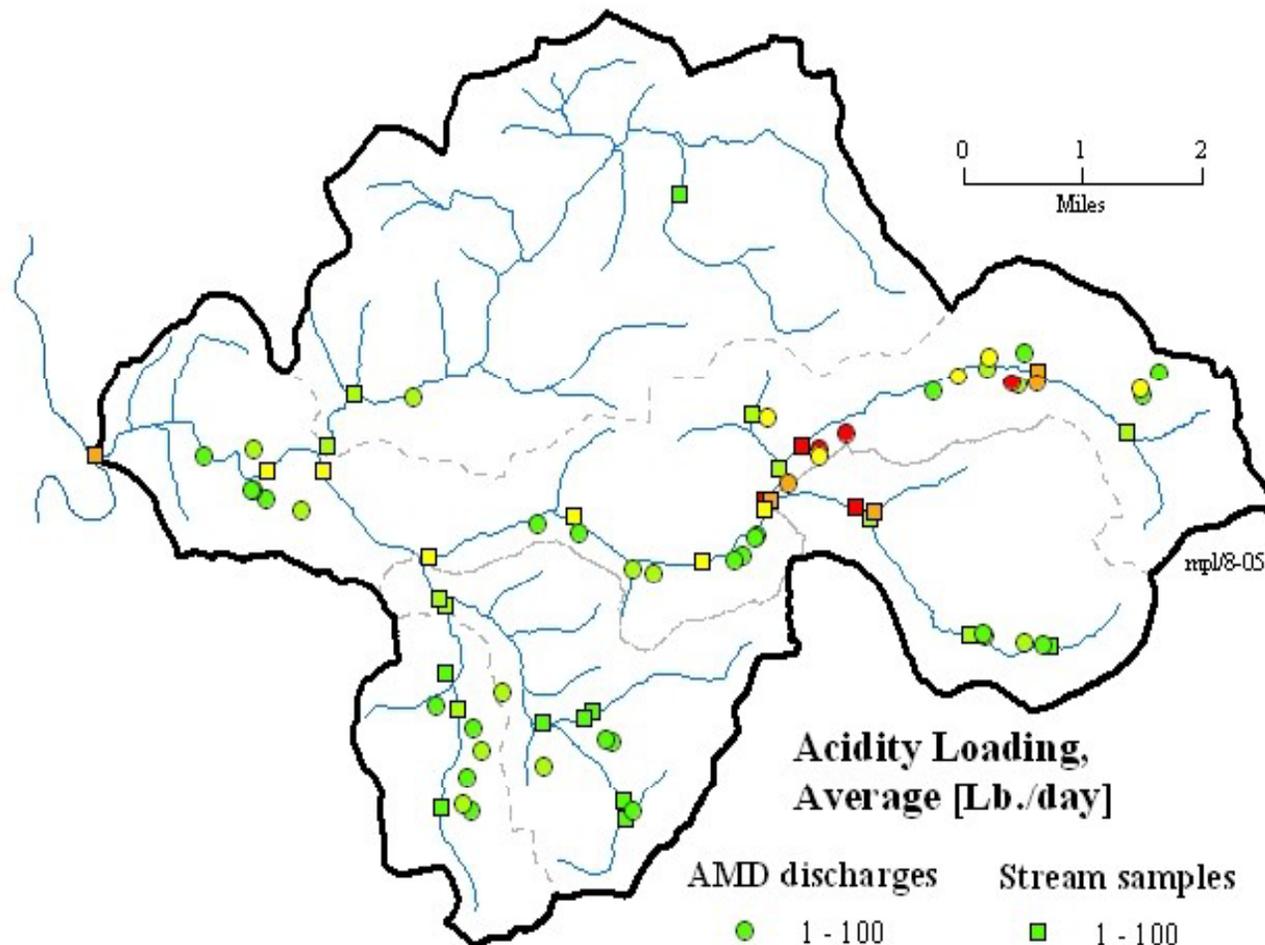


Figure 5. Total acidity loadings based upon lab averages. Acidity loadings are very high above Babcock Creek and slightly decline and hold steady thereafter.

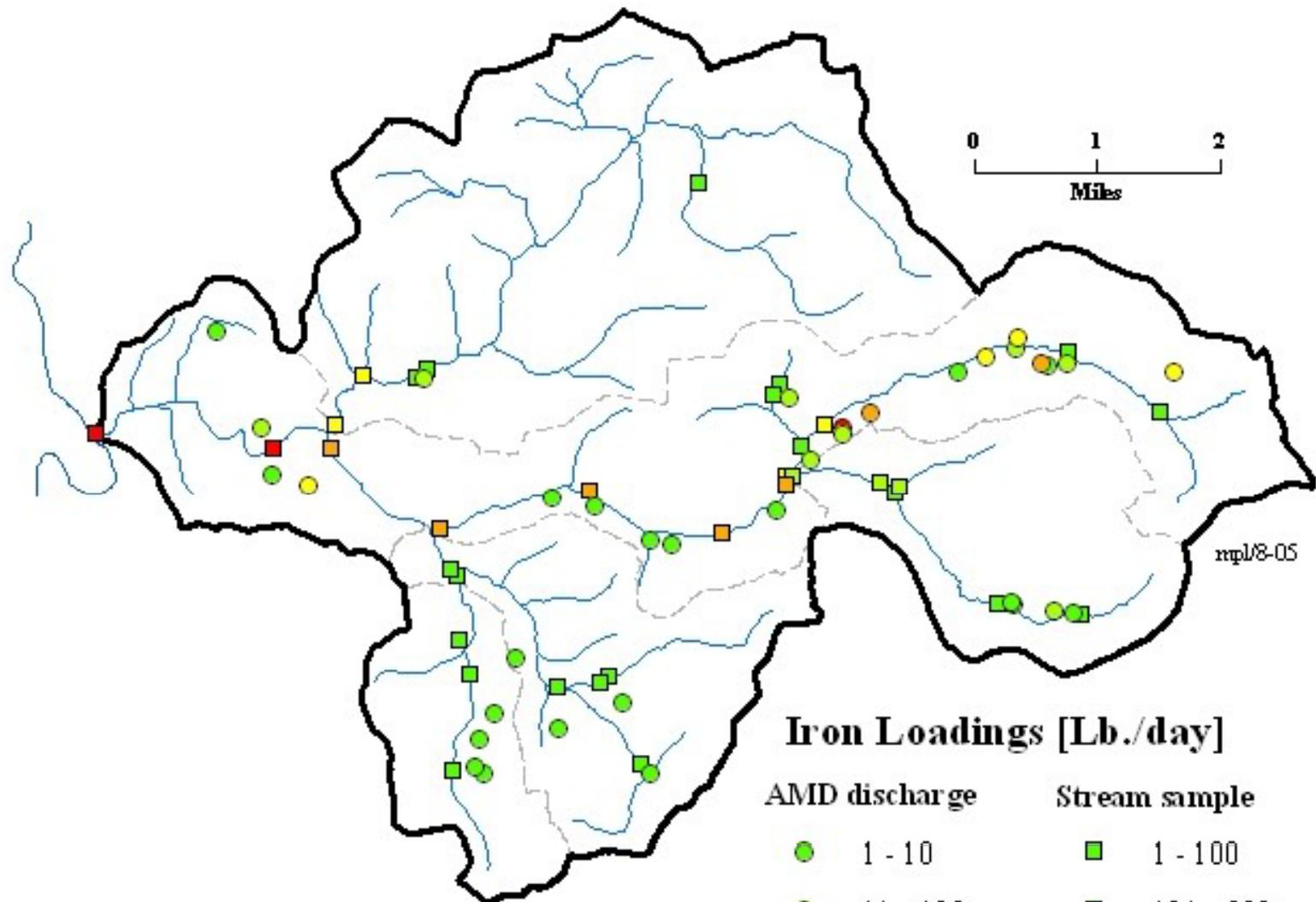


Figure 6. Cumulative effect of numerous AMD discharges is evident in the high iron concentrations on Paint Creek and lower Little Paint Creek.

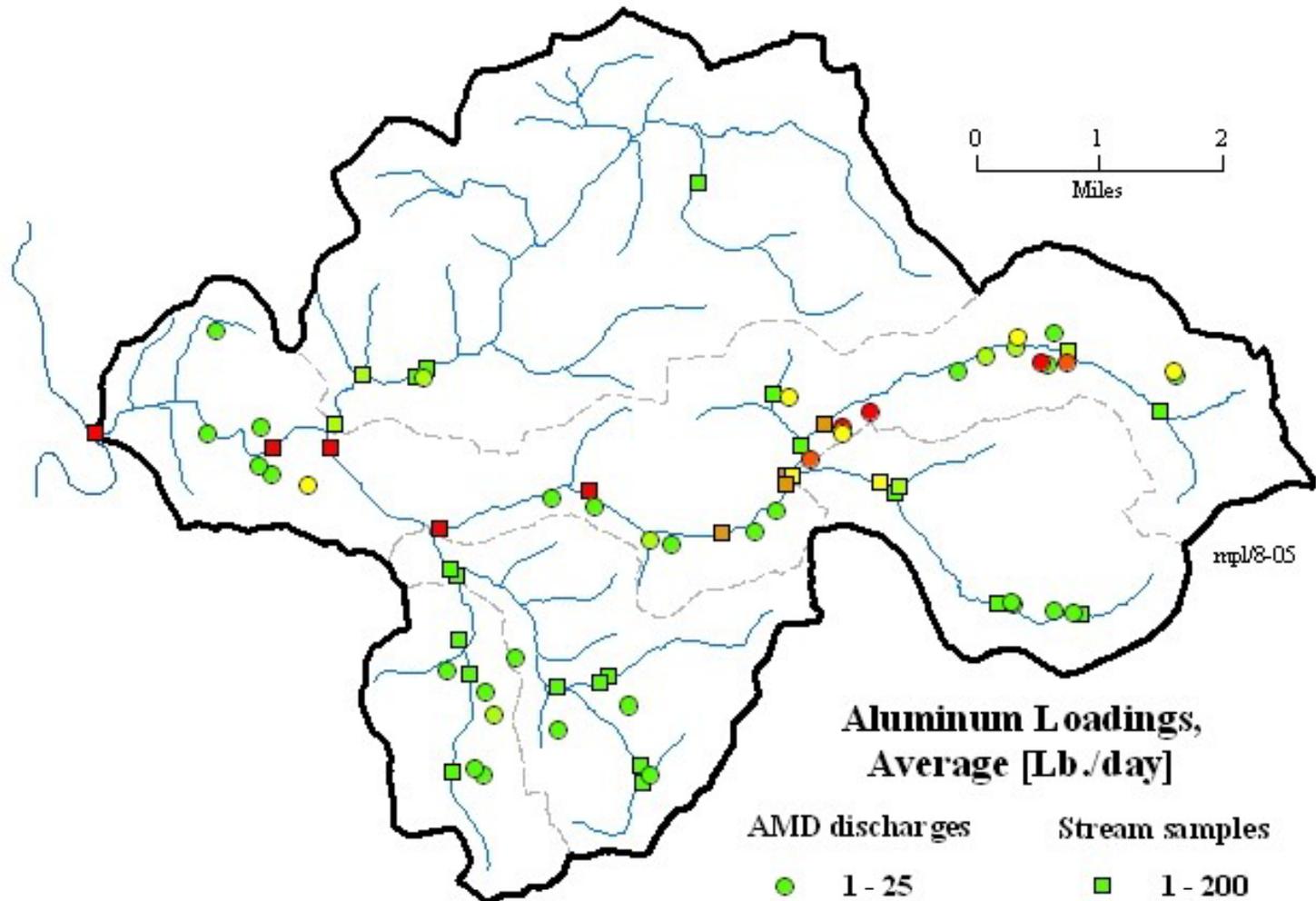


Figure 8. Despite increased volume of flow downstream, Paint Creek never manages to recover from the aluminum released by strip mining in its headwaters, while most of its tributary streams have only modest impact.

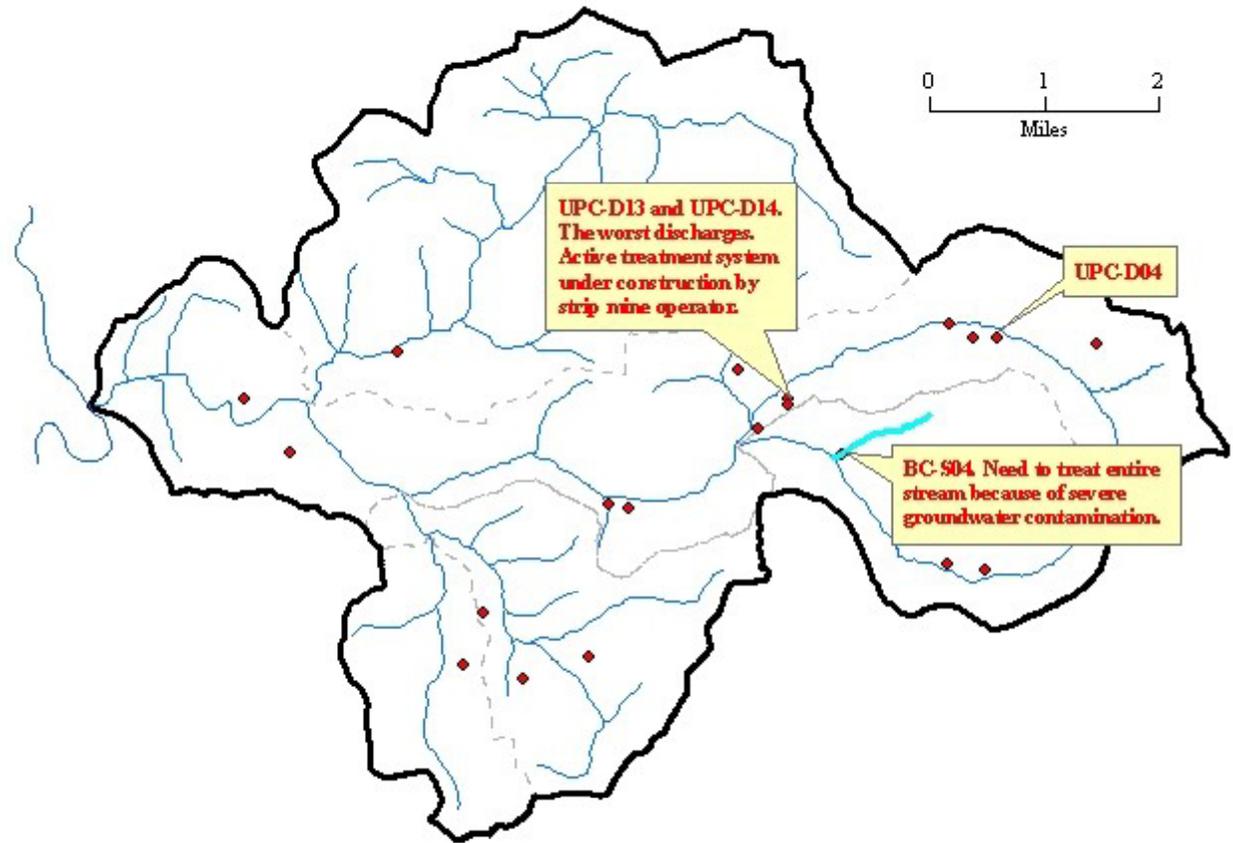
The Problem

Paint Creek's contribution to the Stonycreek:

- 3992 tons/year of acidity
- 510 tons/year of Fe
- 552 tons/year of Al

The 18 Culprits

Discharge	Flow (GPM)	pH (Lab)	Acidity Load	Fe Load	Al Load	% Total Acid	% Total Fe	% Total Al
UPC-D13 & UPC-D14	986	3.08	6813	613	465	29.11	35.50	25.01
UPC-D07	353	3.14	5395	255	426	23.01	14.76	22.92
MPC-D19	4290	5.20	494	211	100	2.11	12.22	5.38
BC-S04	2028	3.30	1604	117	108	6.85	6.77	5.81
UPC-D04	222	3.05	1744	42	177	7.45	2.43	9.52
UPC-D16	341	3.03	1448	90	130	6.19	5.21	6.99
UPC-D02	130	2.90	1091	122	87	4.66	7.06	4.68
UPC-D15	265	2.86	856	68	55	3.66	3.94	2.96
MPC-D12 & MPC-D13	559	3.36	765	11	65	3.27	0.64	3.50
UPC-D08	219	3.14	431	25	41	1.84	1.45	2.21
LoP-D04	56	2.90	245	55	14	1.04	3.18	0.75
LPC-D01	21	2.90	254	38	21	1.09	2.20	1.13
BC-D02	38	2.75	239	52	4	1.02	3.01	0.22
SR-D10	525	3.40	449	3	33	1.92	0.17	1.78
SR-D04	261	3.49	229	1	20	0.97	0.05	1.08
SR-D03	258	3.50	197	2	13	0.84	0.12	0.70
SR-D02	176	3.44	149	3	12	0.64	0.17	0.65
BC-D03	166	3.57	132	3	13	0.56	0.17	0.70
Total			22535	1711	1784	96.23%	99.05%	95.99%



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UPC-D04	222	3.05	1744	42	177	7.45	2.43	9.52

Figure 9. Strip mine operator Cooney Bros. is responsible for the treatment of these sites. These four locations account for roughly 39% of AL, 54% of FE, and 43% of acidity at the mouth of Paint Creek where it joins the Stonycreek River.

The Plan: Part I

Discharge	Flow (GPM)	pH (Lab)	Acidity Load	Fe Load	Al Load	% Total Acid	% Total Fe	% Total Al
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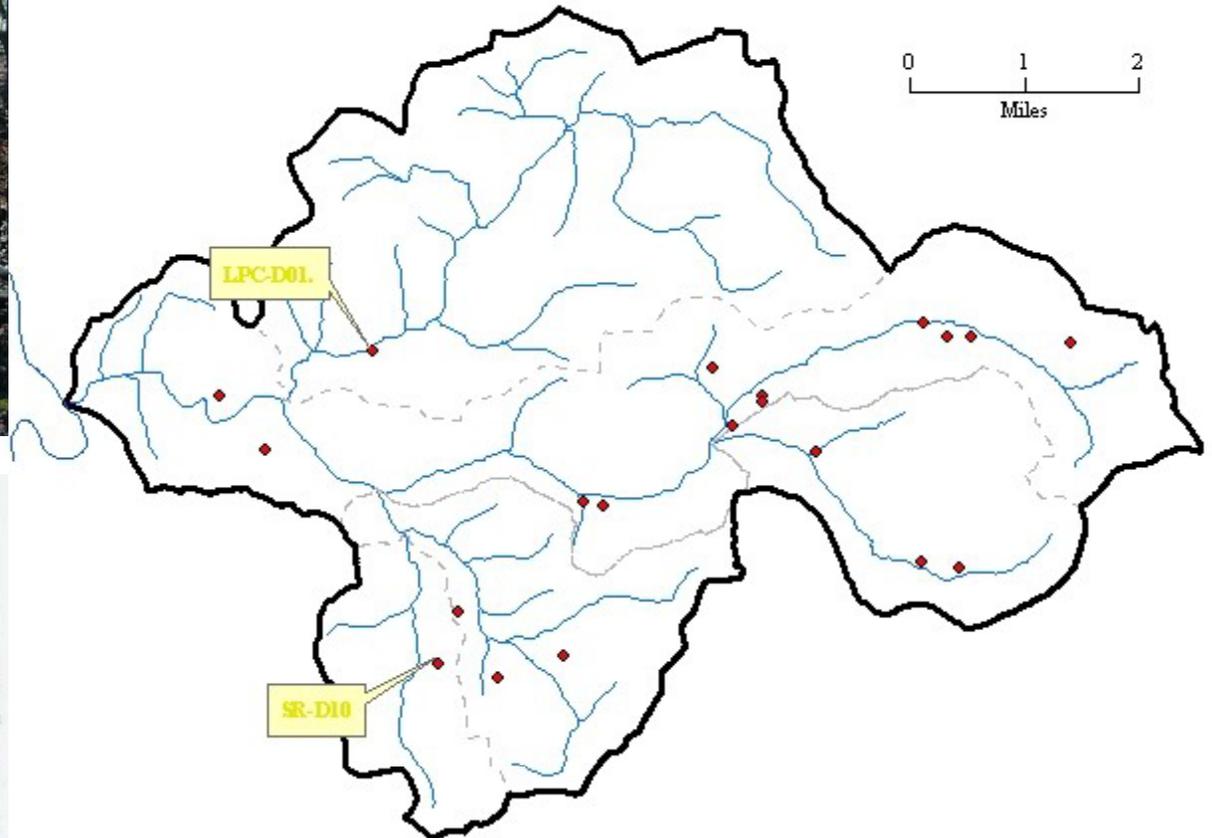


Figure 10. Discharges with passive treatment systems currently being designed. SR-D10 and LPC-D01 only contribute approximately 3% of the acidity loading, 2.5% of the iron loading, and 3% of the aluminum loading entering Paint Creek, but they are the largest contributor of AMD in both the Little Paint and Seese Run sub-watersheds with vast stretches of stream being restored upon treatment.

The Plan: Part II

Discharge	Flow (GPM)	pH (Lab)	Acidity Load	Fe Load	Al Load	% Total Acid	% Total Fe	% Total Al
UPC-D13 & UPC-D14	986	3.08	6813	613	465	29.11	35.50	25.01
UPC-D07	353	3.14	5395	255	426	23.01	14.76	22.92
MPC-D19	4290	5.20	494	211	100	2.11	12.22	5.38
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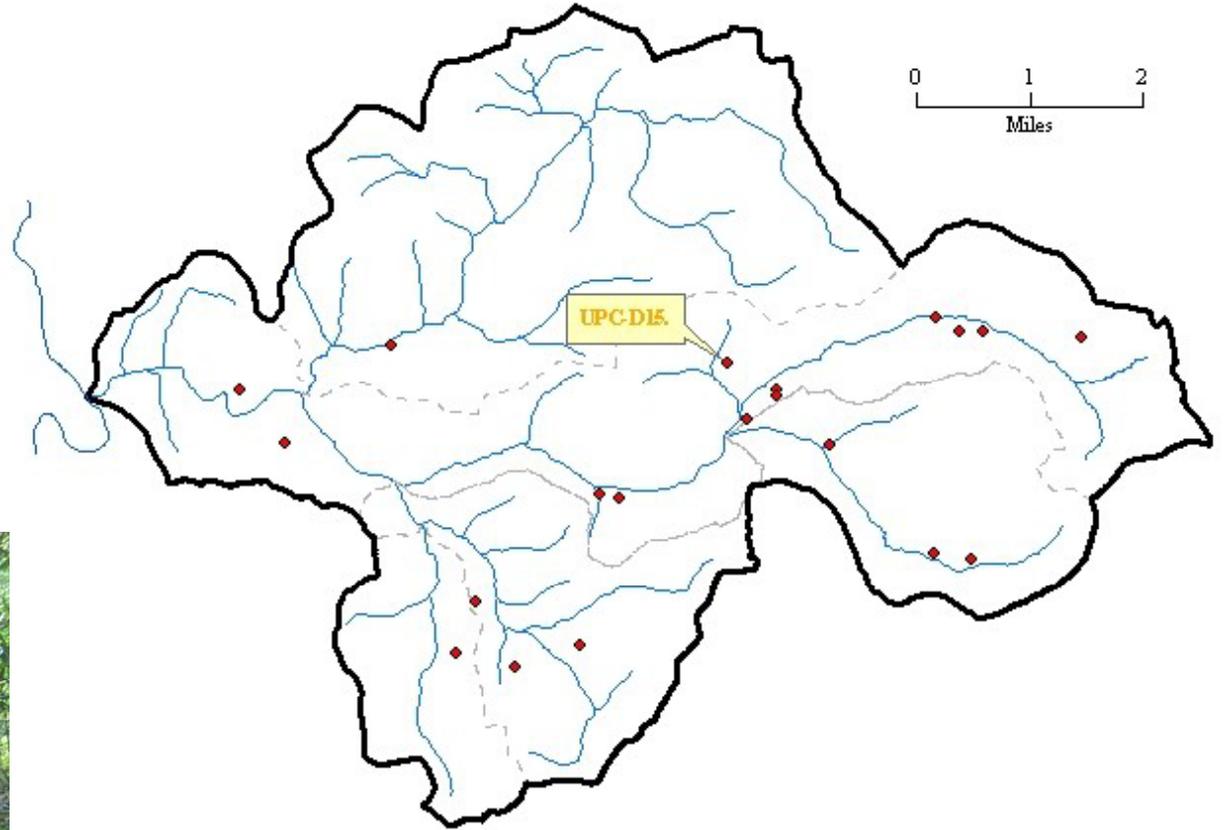


Figure 11. UPC-D15 (Mine 42 Discharge) was denied design funding from PA DEP Growing Greener. It contributes approximately 3.5% of the acidity loading, 4% of the manganese loading and 3% of the aluminum loading into Paint Creek. However, it is the only discharge impacting Picnic Ground Creek, consequently being completely restored upon treatment.

The Plan: Part III

Discharge	Flow (GPM)	pH (Lab)	Acidity Load	Fe Load	Al Load	% Total Acid	% Total Fe	% Total Al
UPC-D13 & UPC-D14	986	3.08	6813	613	465	29.11	35.50	25.01
UPC-D07	353	3.14	5395	255	426	23.01	14.76	22.92
MPC-D19	4290	5.20	494	211	100	2.11	12.22	5.38
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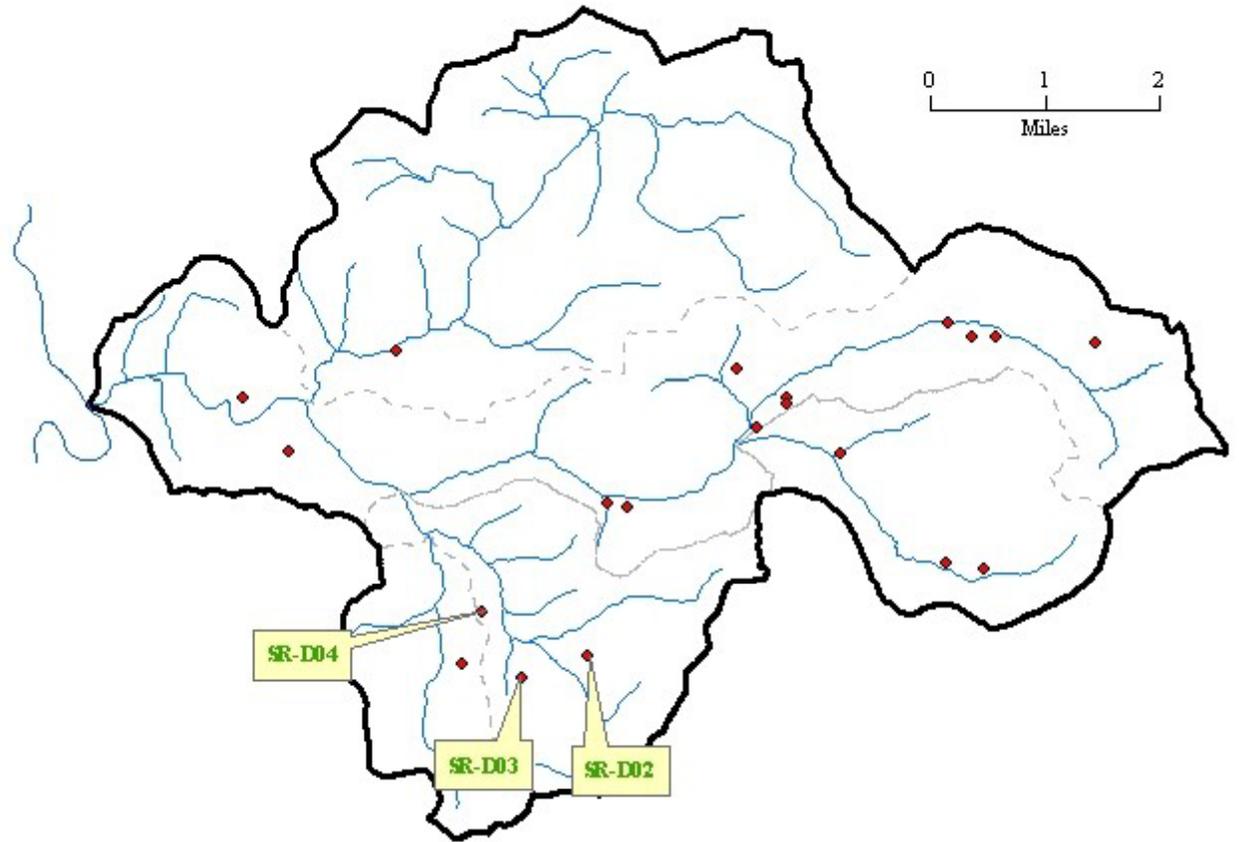


Figure 12. After funding is received for UPC-D15, focus will be turned to the three remaining priority discharges impacting Seese Run. Upon treatment trout will once again likely survive in the Seese Run sub watershed.

The Plan: Part IV

Discharge	Flow (GPM)	pH (Lab)	Acidity Load	Fe Load	Al Load	% Total Acid	% Total Fe	% Total Al
UPC-D13 & UPC-D14	986	3.08	6813	613	465	29.11	35.50	25.01
UPC-D07	353	3.14	5395	255	426	23.01	14.76	22.92
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Plan Results

- 52.5% reduction in acidity loading.
- 51.4% reduction in iron loading.
- 48.6% reduction in aluminum loading.
- Little Paint Creek, Seese Run, and Picnic Ground Creek ~ restored.
- Hopefully during this 4-5 year time frame, mine refuse reprocessing and reclamation will continue.

Plan Results

- Current conditions at mouth of Paint:

Acid – 52.75 mg/l

Fe - 6.74 mg/l

Al - 7.30 mg/l

- Future projected conditions at mouth of Paint:

Acid - 23.08 mg/l

Fe - 4.60 mg/l

Al - 5.12 mg/l

Conclusion

- This short-term plan is just the tip of the iceberg!
- The treatment of the remaining discharges must be planned, starting with the large flow/easy to treat quality discharges of the Middle Paint Creek.
- Mine refuse repossessing and reclamation must continue.

Questions/Comments

