

RESTORATION PRIORITIES AND RECOMMENDATIONS

DRURY RUN

In the Drury Run Watershed, Sandy Run and Stony Run are recommended as priority restoration projects. Stony Run contributes a majority of the total AMD loading but because its impacts are coming mainly from diffuse groundwater sources and not a surface discharge, it would be more difficult to treat. Sandy Run contributes only 10 percent of the watershed AMD loading; however, Discharge No. 5 is the first discharge in the watershed and a large section of Sandy Run and Drury Run could be restored upon its treatment.

The discharge on Sandy Run (Discharge No. 5) can be characterized as a low-moderate flow, acidic discharge that contains slightly elevated concentrations of aluminum and manganese. Sandy Run itself contains almost no buffering capacity, so the input from Discharge No. 5 has immediate detrimental effects on the water quality and biology of Sandy Run. The recommended treatment for Sandy Run would include an oxic limestone drain (OLD) followed by a small settling pond or wetland. The cost associated with this treatment would be approximately \$150,000 for capital costs and up to \$7,000 per year in operation and maintenance costs. The implementation of this system could potentially restore nearly 2 miles of



AMD water flows into the oxic limestone drain (OLD) and dissolves limestone, which increases the alkalinity and pH of the water.

Sandy Run and 0.5 miles of the mainstem of Drury Run. In addition, it would significantly improve the assimilation capacity of Drury Run to handle the AMD inputs of Woodley Draft and Whiskey Run. Not only would water quality be improved, but the brook trout population that is currently isolated above Discharge No. 5 could be reconnected to Drury Run, and brook trout could be restored to the entirety of Sandy Run.

Stony Run presents different challenges. There are limited surface AMD discharges within the Stony Run Watershed. Past mining practices in the area have polluted the groundwater, and that heavily impacted groundwater is the dominant source of impairment to Stony Run. Treatment of the surface stream water is the only viable method to treat Stony Run for improving water quality conditions prior to entering Drury Run. A lime dosing silo on Stony Run could neutralize acidic conditions enough to allow for attainment of water quality standards in the mainstem of Drury Run. Capital costs for the lime dosing silo are estimated at \$125,000, in addition to an annual cost of \$9,000 for hydrated

lime product to refill the silo each year. This will not restore Stony Run, but it should considerably improve conditions in Stony Run and restore the final mile of Drury Run.

Upon completion of any restoration activities, water quality monitoring would be recommended to assess the conditions of Drury Run from the confluence of Sandy Run to the mouth. If water quality standards are not met and biological communities still show impacts, then two additional restoration opportunities would be recommended. Woodley Draft and Whiskey Run could be treated with similar lime dosing silos as described for Stony Run, at a slightly lower costs based on the lower AMD loading produced by these smaller tributaries. Passive treatment could be a potential option in the headwaters of Whiskey Run; however, difficult access and steep topography limit the possibilities.

In all, the four recommended restoration activities could result in the restoration of 11.2 stream miles in the Drury Run Watershed, and the removal of those miles from the Integrated List of Impaired Waters. In addition, water quality conditions for an additional 8.9 miles of stream would be improved. The total capital costs are estimated at \$520,000, with annual costs of just under \$20,000.



BIRCH ISLAND RUN

Treatment of the AMD in Little Birch Island is a difficult problem since there is not one primary source, but many small sources. The recommended option is to add alkalinity into Little Birch Island Run so it can assimilate the AMD loading that is coming from these many sources. As a result, a lime dosing silo either on or above the unnamed tributary to Little Birch Island Run would meet this need. It would improve the water quality conditions for the last mile of Birch Island Run mainstem, and improve the connectivity of biological communities from the West Branch Susquehanna River and Birch Island Run. However, it would not restore Little Birch Island Run to water quality standards. But before this can happen, more data need to be collected to better characterize the acidity loading from these AMD sources. Previous sampling results from PADEP show a much higher acidity loading than more recent SRBC data. Accurate loadings are necessary before any treatment can begin, as costs for treatment are based on loading. The current discrepancy between PADEP and SRBC data, which could be due to seasonal variations or differences in stream flow, needs to be further assessed to avoid a miscalculation of the cost of treatment options.

Additionally, of the five AML features in the Little Bougher Run AML site, three remain un-reclaimed due to their designation as Priority III - Dry Strip Mines. These strip mines could be hydrologically connected to the seeps that are impacting Little Birch Island Run downslope. A recommended course of action would include coordinating with the PADEP- Moshannon District Mining Office on possible reclamation of these three Priority III features.