Impact of BAMR's AMD Passive Treatment Facility on the Middle Branch of Big Run, Beech Creek Watershed, Clinton County, PA

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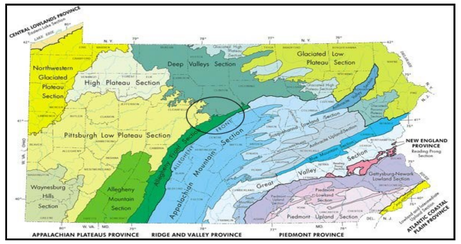
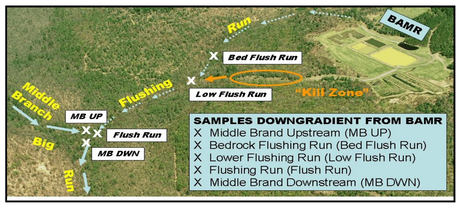
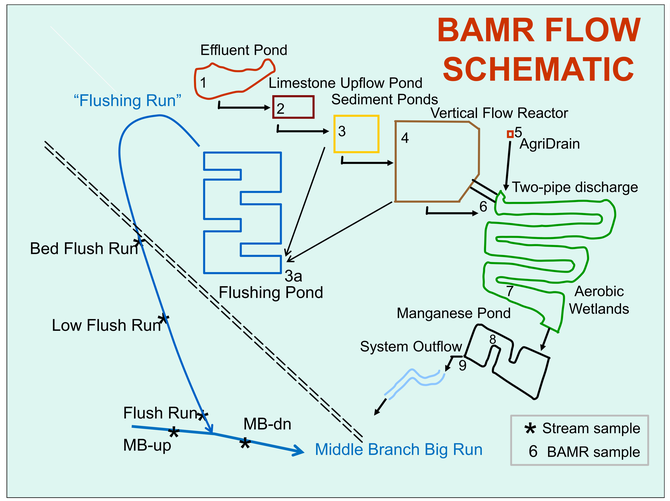
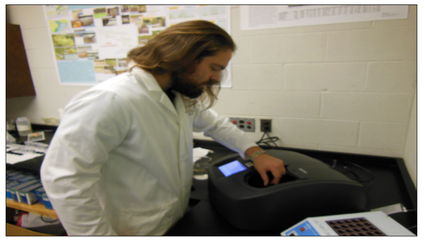




DESCRIPTION OF PA DEP's BAMR AMD TREATMENT FACILITY

This BAMR treatment facility comprises three subsystems: (A) the untreated acidic ground water, (B) the active ponds and plumbing system, and (C) the extended wetland system (EWS). AMD-impacted ground water, collected in the effluent pond (#1), moves through a series of ponds (#2, the limestone up-flow pond; #3, two sediment ponds; and #4, the vertical flow reactor) and treated waters (from the bottom of #4) emerge through two pipes (#6) at the head of the aerobic wetland. Additional ground water beyond the effluent pond's collection system is channeled via the Agri Drain (#5) into the head of the EWS (near #6). The sinuous aerobic (#7) and manganese (#8) wetlands continue to treat the water until it emerges at the facility's outlet (#9) where it runs down-gradient toward the Middle Branch of Big Run. Beginning in 2008, the Flushing Pond (#11) has been receiving water piped directly from the vertical flow reactor. This partially treated water (it bypasses the entire EWS) is channeled into an unnamed tributary in the NW corner of the facility (called herein Flushing Run) and moves downstream into the Middle Branch of Big Run.





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ABSTRACT

Acid mine drainage (AMD) plagues most tributaries throughout the heavily forested plateau of the Beech Creek watershed, a north-central PA basin contributing net acidity to the West Branch Susquehanna River. As part of a multi-year, community-based research project, water samples have been collected from PA DEP BAMR's Abandoned Mine Land Reclamation Project (BF 438-102.1), an AMD passive treatment facility, since it went online in the spring, 2006. The 2006-12 field seasons yielded geochemical data from this site, including pH, conductance, net acidity, alkalinity, DO, ORP, Chlorophyll-a, major anions, cations, and several trace metals, from collection and treatment ponds, artificial wetlands, and its natural, down-gradient drainage system. In our field season, 2012 we deployed two data Sondes in Flushing Run, and at a downstream location on the Middle Branch of Big Run to collect hourly data for a one week period.

The Sonde data provided insight into the relationship between weather events and the chemical parameters in the observed streams. Based on Sonde data, it is also concluded that the effluent water from the treatment facility that runs through Flushing Run negatively impacts the quality of the water in the Middle Branch. Data analyses and field observations demonstrate that the effectiveness of this passive treatment system has declined progressively throughout the sampling period. This facility does not appear to be achieving its original design goal, specifically--to provide significant water-quality improvement to its surface discharge watercourse, the Middle Branch of Big Run. Currently, this facility requires major maintenance in order to return it to original design functionality. As a direct result of this ongoing monitoring program, several concerns have been communicated to the local watershed association and to the DEP. The findings of this study also have implications applicable to the standard designs used for other passive AMD-treatment facilities in Pennsylvania and elsewhere.