

A COMPARISON OF STREAM CHEMISTRY IN THREE RESTORED ILLINOIS COAL BASIN STREAMS: INITIAL CONDITIONS VS. 10 AND 20 YEARS POST-RESTORATION¹

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Abstract: Can water quality in streams relocated during surface mining be restored following reclamation? Three large streams and riparian ecosystems – Galum, Bonnie, and Pipestone Creeks – were relocated at the Burning Star #4 and Denmark Mines in Perry County, Illinois. The reclamation plan included restoring the streams and adjacent riparian wetlands in a similar location and configuration as pre-mining. Now, more than 10 years (Burning Star #4 mine) and 20 years (Denmark mine) after reconnecting the streams to their upstream watershed a comprehensive reassessment of the water quality and biological communities of the streams is being conducted. Grab samples were collected from 1979-2012 and included samples taken before mining, during mining, and after mining. Samples were analyzed for sulfate, dissolved oxygen, temperature, specific conductivity, total suspended solids, total dissolved solids, manganese, iron, zinc, alkalinity, nitrate, fluoride and chloride. Qualitative multi-habitat macroinvertebrate sampling was conducted using a dipnet; riffles and pools at Pipestone Creek were sampled quantitatively using a mini-ponar dredge and a surber sampler. Preliminary data from sampling conducted immediately following the reconnections indicated the streams were recovering to a condition similar to other un-mined Southern Illinois streams. Using the additional data collected during 2012-2013, temporal and spatial trends will be analyzed statistically. Grab samples collected over the last year and from the 5 year post-restoration sampling are being used to show whether or not water quality is continuing to improve. Preliminary sulfate and temperature data indicate increasing sulfate levels and temperatures as the streams progressed through the mines. In the Burning Star #4 streams a significant decrease was seen in sulfate levels since the 5 year post-restoration sampling. Temperature did not change significantly since the 5 year post-restoration sampling in any of the streams.

Additional Key Words: Stream Restoration, Water Quality, Aquatic Macroinvertebrates

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