

Hydrology and Agricultural sediment Pollution in the Bloody Run Swamp of Ohio¹

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Abstract: Intensive agricultural practices on farmlands leading to discharge of sediments and nutrients (nitrogen and phosphorus) creates several environmental problems which accounts for almost half of all U.S water pollution challenges. The movement of sediments and nutrients from these agricultural lands to streams and watersheds causes eutrophication, water quality degradation, alteration of water flow, siltation and, consequently, a reduction in water depth. The Bloody Run Swamp in Ohio; an historical swamp that was drained for agriculture and the resulting stream and ditch network is affected by sediments, hydromodification, and altered water flow. Planned stream restoration and wetland construction to mitigate nutrient and sediment pollution is planned on a former agricultural field that drains to Bloody Run with the aim of retaining water, sediment, and nutrients on the 80-acre site. Pre-restoration hydrology and sediment loading behavior were assessed at 2 sites on channels in the former Bloody Run Swamp. For this study, flow measurements and water depths were measured in the ditch network and downstream on the receiving river, the South Fork of the Licking River. The meteorological data from Newark Heath Airport station in Licking Country, Ohio was used to calculate Antecedent Precipitation Index. Flashy flow response to precipitation drives erosion, thereby resulting in transportation of higher concentrations of sediments and nutrients. The site in the ditch network had a high-water depth in summer compared to the South Fork of the Licking River and with respect to API, showing the flashy response to precipitation and increased sediment loading in the ditches. At the pre-construction stage, sediment movement increases with the water level in the ditches. The sites are expected to retain sediments and water as well as a reduction in flashiness with the stream restoration and wetland construction that will begin at the site in mid-2022.³

Additional Keywords: Water quality, Sediment, Nutrients, Hydrology.

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 3. Work reported here was conducted near 39° 56' 2.04" N; -82° 28' 51.41" W.