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ASSESSMENT OF WATER QUALITY IMPACTS OF LAND USE AND MANAGEMENT PRACTICES IN A SUBURBAN WATERSHED

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Abstract

While the water quality issues in suburban watersheds have been greatly attributed to rapid urban development and stormwater runoff, pollution contribution from agricultural practices are still significant but often overlooked. The objective of this study is to assess water quality impacts of managing both agricultural and urban lands in a suburban watershed. Neshanic River watershed is a headwater watershed with mixed land uses located in Hunterdon County, New Jersey, USA. It has 40% of agricultural lands and 33% of urban lands, which represents typical natural resource conditions and water quality problems in suburban New Jersey, USA. Soil and Water Assessment Tool (SWAT) is used to evaluate the potential water quality impacts of agricultural and urban land use and management practices in this suburban watershed. Four management scenarios (baseline, best-case and worst-case I and II) are developed through interviews and meetings with farmers and natural resource conservation professionals to represent achievable, ideal and worst operation conditions in urban and agricultural lands in the watershed. The specific water quality parameters assessed are soil, total nitrogen and phosphorus losses. The modeling results demonstrate that mismanagement in urban and agricultural lands in suburban watersheds (worst-case I and II) could significantly exacerbate the existing water quality problems while no-till in row crops (best-case) doesn't necessarily improve water quality. Agriculture is still the primary source of water pollution and attention should continuously be paid to implement agricultural BMPs to reduce agricultural nonpoint source pollution in suburban watersheds.

Key words: nonpoint source pollution, stormwater runoff, SWAT, suburban watershed management

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