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## Evaluation of Non-Point Source N and P Loads in a Small Mixed Land Use Land Cover Watershed

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### Author(s)

Ashok Mishra, Rajendra Singh, Vijay P. Singh

### ABSTRACT

Non-point source pollution (NPS) of water resources has become a major problem in recent years due to more human interactions and disturbances to natural landscapes. The problem can have more impacts in sub-humid subtropical regions where high intensity monsoon rains have greater effects on hydrologic processes and thus the assessment of those effects is necessitated for strategic water resources and environmental management. Since spatial and temporal changes of NPS pollutants are difficult to assess on a watershed scale, the assessment can be done effectively using a suitable water quantity-quality model coupled with GIS and remote sensing that incorporates spatial variations. The objective of this study was to assess the N and P loads from a small mixed type watershed comprising different land use land covers with the aid of Soil and Water Assessment Tool (SWAT)-a hydrologic-water quality model. The model was calibrated for runoff and sediment transport and then simulation of associated N and P loads as NPS pollution was done and compared with measured values at the outlet of the watershed which is part of the DVC Command, Hazaribagh, India. The calibrated SWAT model was used to estimate the water soluble NO<sub>3</sub>-N, NH<sub>4</sub>-N, P, organic N and or-ganic P loads being transported as pollutants by runoff and percolated water. The estimates of these pollutants provided information on the extent of NPS pollution of water downstream. The results of the study reveal that the NPS pollutant load in runoff varies with seasonal rainfall patterns and ranges from 2.57 to 4.52 kg/ha in case of NO<sub>3</sub>-N which accounts for a maximum load of 7661.40 kg of NO<sub>3</sub>-N in surface runoff from the watershed under study. The total loss of N from the watershed accounts for as high as 8.84 kg/ha, whereas the P load is 0.02 kg/ha. These losses can be as high as 14984.14 kg of total N and 50.85 kg of total P when estimated as NPS pollutants from the watershed. The study is therefore important to get an estimate of the extent of these pollutants and develop measures for mitigating the losses as nutrient as well as pollution of water resources.

### KEYWORDS

Modeling, Watershed, Swat, N&amp;P Nutrient Load, NPS Pollution

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