Identifying Critical Source Areas through AGNPS Pollution Modeling of Phosphorus Emissions in Koppl

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Watershed management and monitoring provide evaluations on the ecological impact of water quality and environmental sustainability. During storm events, agriculturally dominated watersheds have the potential to release nutrients through non-point source pollution (NPS). One way to assess nutrient emissions is through NPS pollution modeling. This modeling technique describes the loading of nutrient emissions that originate from an unknown source.

Annualized Agriculture Non-Point Source (AnnAGNPS) pollution modeling program aides in the production of NPS watershed modeling. AnnAGNPS has been used to model NPS pollution and identify critical source areas (CSA) within Koppl catchment. Single and continuous event-based modeling scenarios were tested to determine if P emissions increased during storm events.

Critical source areas were defined on the susceptibility of high P concentration emissions within a particular sub-catchment zone. The single event-based model resulted in low P concentrations under intense rainfall conditions. The single-storm simulation does not support evidence that heavy rainfall causes an increase of P concertation.

However, measured data states that there is a relationship between heavy rainfall and increased P concentrations directly after manure application. While the continuous event-based model successfully identified grassland landscapes as a CSA for Koppl catchment. The continuous event simulated one year of data and was validated based on measured discharge values. The model highlighted areas of monthly and annual P loading within the sub-catchment regions and outlet point of Koppl. Grassland areas are the major cause for P emissions within Koppl catchment.