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Treating Agricultural Process Wastewater with Vegetated Filter Areas

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Abstract Text:

Agricultural process wastewaters such as silage effluent, milk house wastewater, and other manure contaminated (barnyard) runoff is an environmental problem on many livestock farms. These wastewaters contain high concentrations of nutrients, and have a high five-day biochemical oxygen demand. The improper treatment and discharge of this wastewater may lead to fish kills and nutrient enrichment (eutrophication) of receiving surface and/or groundwater, and thus, a common approach to managing these livestock production area wastewaters in New York is to collect and distribute it into a vegetated filter area (VFA) where some treatment and volume reduction can occur. However, once installed, little follow-up occurs regarding the expected (or actual) reduction and fate of nutrients and other contaminants, especially in regard to the potential impact to groundwater. A NRCS-CIG grant was received to evaluate three VFA's treating these process wastewaters, and this presentation will report on the current monitoring efforts underway and some of the results being obtained. Preliminary soils analysis suggests that VFA's sited near old barnyards are already enriched with nutrients, so treatment goals, especially for phosphorous removal from milk house wastewater, may be optimistic. The nitrate-nitrogen concentration in shallow groundwater wells appears to be poorly correlated with the loadings of ammonical and organic nitrogen to the VFA. The information presented will address how these research findings may be interpreted to improve VFA designs.

Impact Statement:

Direct discharges of agricultural process wastewaters to streams may cause fish kills and substantial nutrient enrichment. Treatment of these wastewaters in a vegetated filter area may significantly reduce runoff impacts to streams. However, less is known about the quality of the shallow groundwater beneath these vegetated treatment areas, and the hydrogeologic factors controlling the ultimate fate and transport of the infiltrated wastewater. This project enhances understanding of the overall surface and groundwater quality impacts of using vegetated filter areas as a best management practice.