

Characterizing Soil Nitrogen Fate and Transport Using NLOS in Northern Whatcom County, Washington

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The Abbotsford-Sumas aquifer is a shallow, unconfined aquifer that extends from southern British Columbia, Canada to northern Whatcom County, Washington. Thin soils overlie this permeable glacial outwash aquifer creating a situation where surface contaminants readily communicate with the groundwater. Expansive nitrate contamination in excess of the EPA's maximum contaminant level for drinking water of 10 mg/L nitrate as nitrogen has been documented in both the Canadian and US portions of the aquifer. Previous studies have shown that agricultural land use is the cause of high nitrate levels in domestic drinking water wells. These studies have also attempted to distinguish between the relative contributions to nitrate contamination from northern Whatcom County and British Columbia sources, but it has not been thoroughly quantified. Differentiating between these nitrate sources is important for developing best management practices to protect public health and agribusiness. I will evaluate the mechanism and magnitude of nitrate leaching into the aquifer in northern Whatcom County through field data collection and modeling of potential nitrate leaching under various temporal and loading scenarios using the NLOS model (NLEAP [Nitrogen Leaching and Economic Analysis Package] On STELLA). Washington's Dairy Management Act (1998) requires all farms to develop and implement Dairy Nutrient Management Plans (DNMPs) by December 2003. I will calibrate NLOS to the local conditions and assess its effectiveness as a management tool for use by the Whatcom Conservation District in its assessment of the DNMPs.