



## Groundwater, Soil, and Crop Nitrogen at a Field Where Dairy Manure is Used as Fertilizer in Whatcom County (July 2009) Groundwater Results - Fact Sheet

**Objective:** Evaluate the utilization of manure nitrogen for grass silage production and the relationship between manure nitrogen application, soil, and shallow groundwater.

**Methods:** A 22-acre grass field in Whatcom County has been studied since the fall of 2004. The grass field was plowed down and reseeded in the fall of 2004.

Seven monitoring wells were placed in three horizontal rows from north to south. Six wells are screened near the top of the aquifer at 13 feet, and one well is screened at the bottom of the aquifer at 38 feet. Groundwater flow is from north to south.

Shallow ground water samples have been collected monthly and analyzed for nitrate+nitrite-N, ammonia, total nitrogen, chloride, dissolved oxygen, organic carbon, and dissolved solids.



Figure 1. Placement of wells.



Figure 2. Making ground water quality measurements.

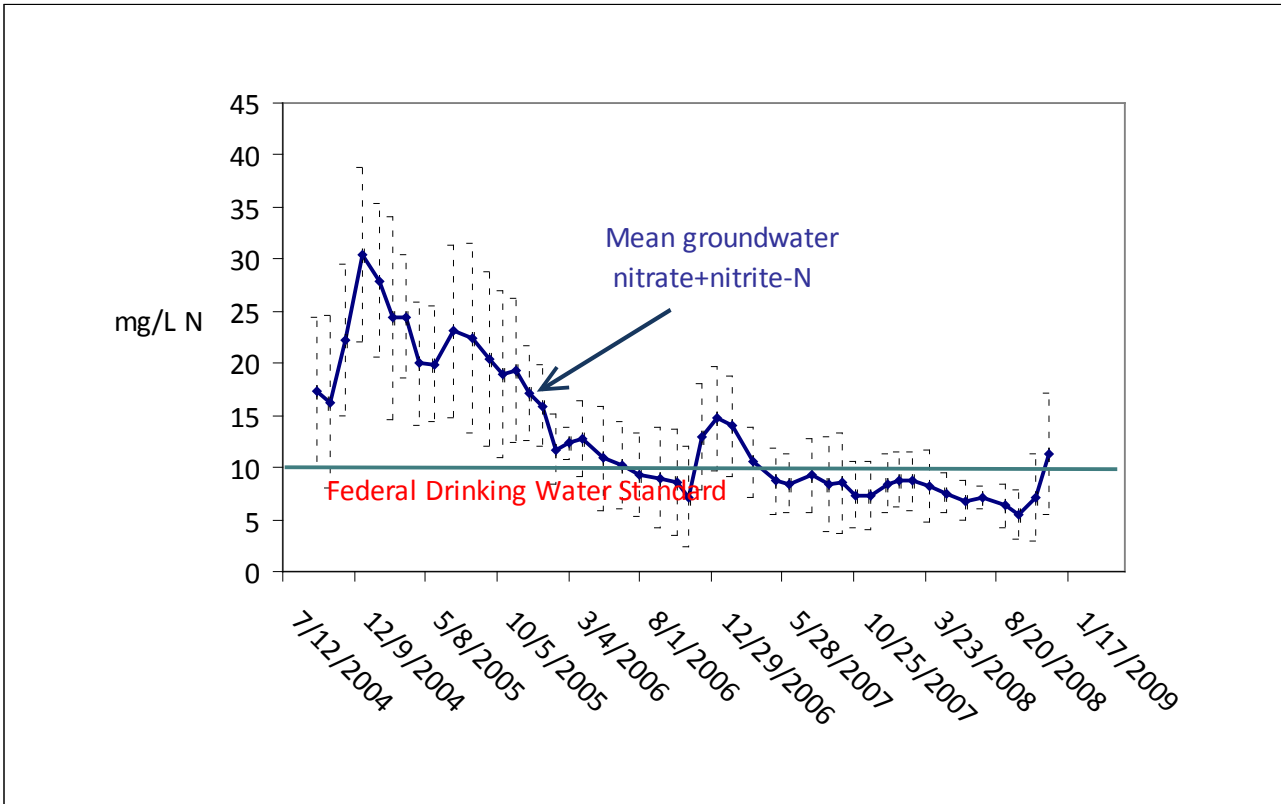


Figure 3. Groundwater nitrate+nitrite-N concentrations. Each point represents the mean of six monitoring wells.

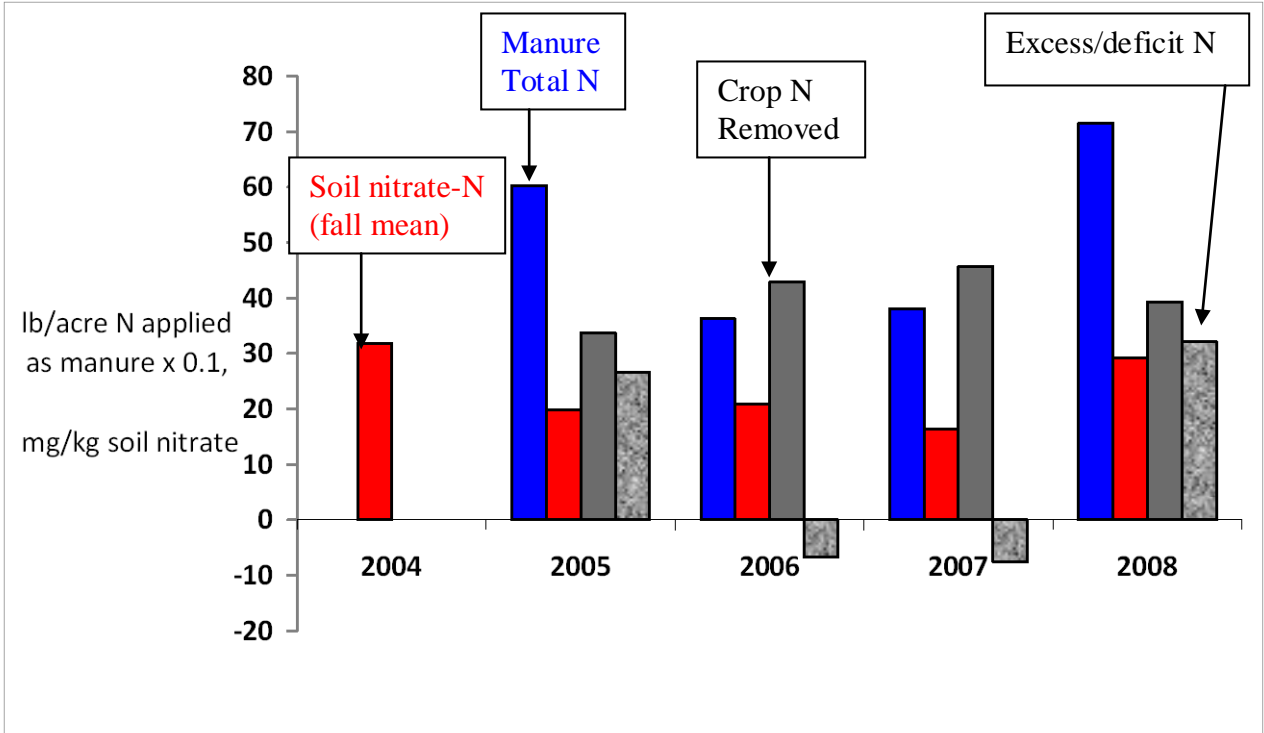


Figure 4. Manure application, soil nitrate-N, N removed in grass crop, and nitrogen removed in excess of that applied or nitrogen not taken up by the crop (excess/deficit).

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## Results of Manure Application and Groundwater Nitrate+Nitrite-N

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### Groundwater Nitrate+Nitrite-N Following Replanting

- Groundwater nitrate+nitrite-N declined since the winter after replanting from a maximum of 30 mg/L in 2004 to less than 10 mg/L until late fall of 2008.

### Grass Yields High Despite Modest Manure Application

- Although manure application has been modest in 2006 and 2007, grass yields increased through 2007. At least twice as much nitrogen has been removed in the crop as was applied as ammonia-N in 2006 and 2007.

The deficit is probably coming from soil nitrate-N that has accumulated over time or current manure organic N that is mineralizing.

*Note: Results and implications presented in this fact sheet are preliminary as the study is ongoing through 2010.*

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