

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

Soil-Forage-Manure Nitrogen Dynamics - Fact Sheet

Objective: Evaluate the utilization of manure nitrogen for grass silage production and the relationship between manure nitrogen application 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.

Manure has been applied according to normal farm practices during the study.

Soil samples have been taken monthly, except during the months of August through November, when soil samples have been taken weekly.



Figure 1. 22-acre field under study.



Figure 2. Forage yield estimate taken at each cutting.

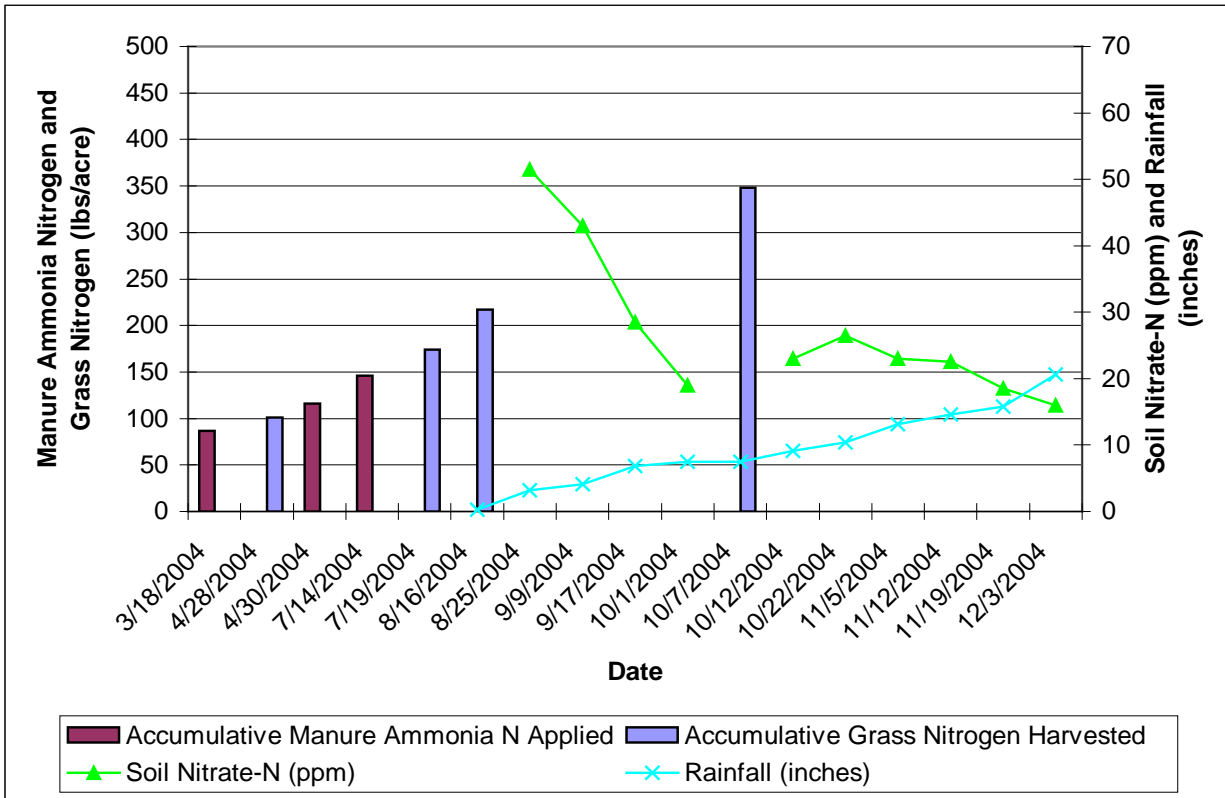


Figure 3. 2004 data for manure ammonia applied, grass nitrogen yield, rainfall, and soil nitrate-N.

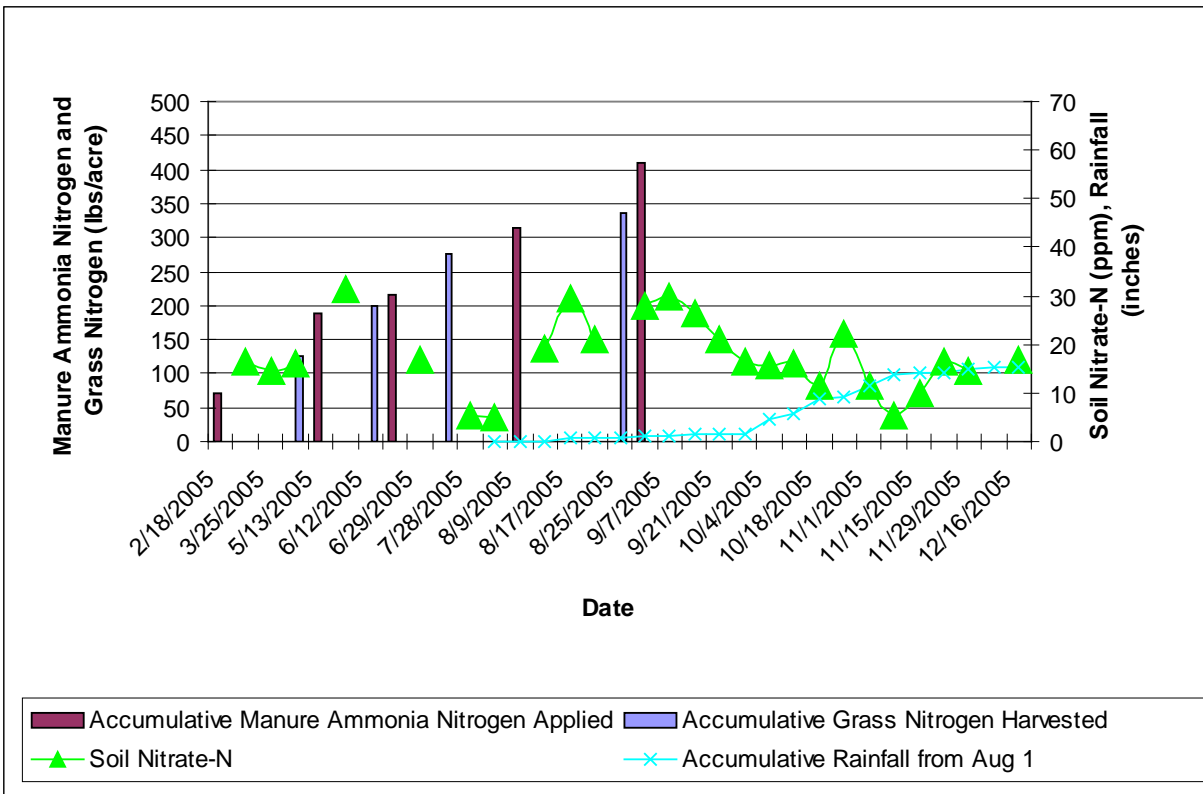


Figure 4. 2005 data for manure ammonia applied, grass nitrogen yield, rainfall, and soil nitrate-N.

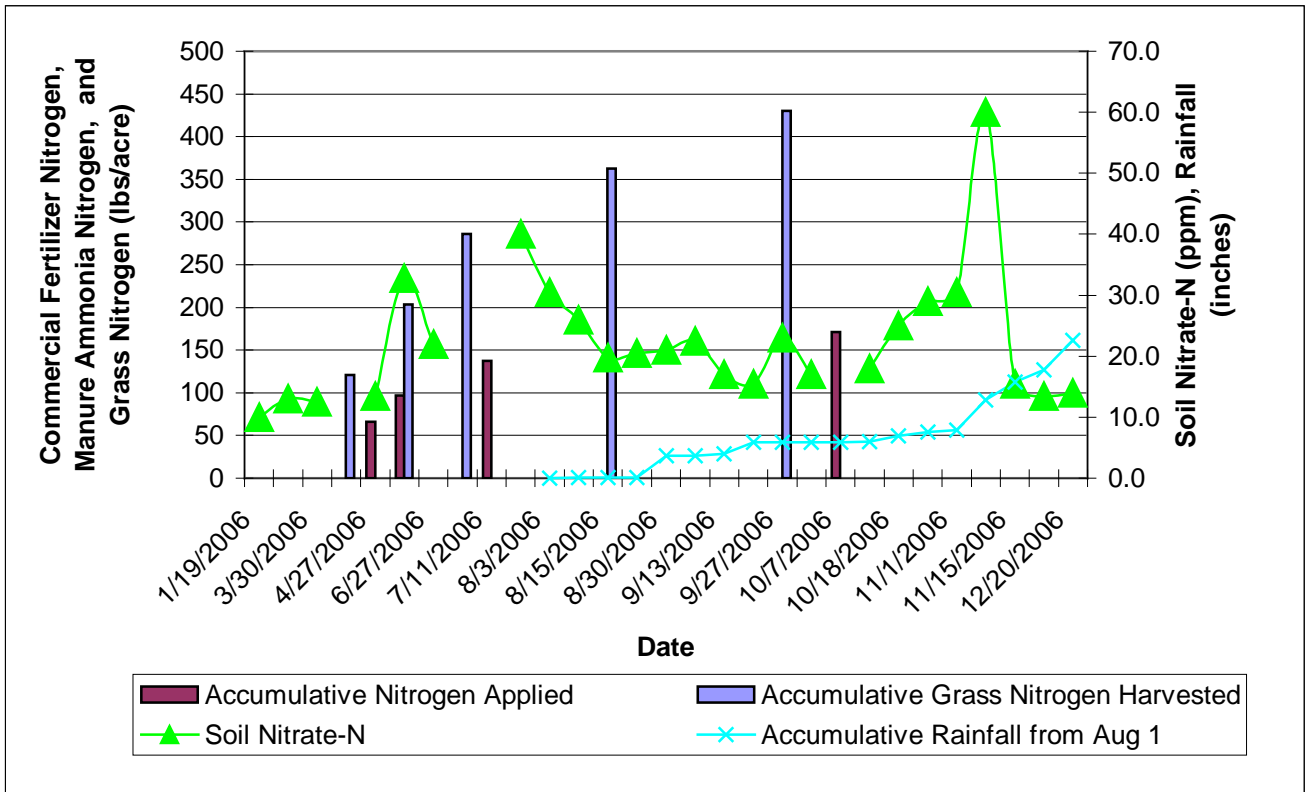


Figure 5 - 2006 data for manure ammonia and fertilizer applied, grass nitrogen yield, rainfall, and soil nitrate-N.

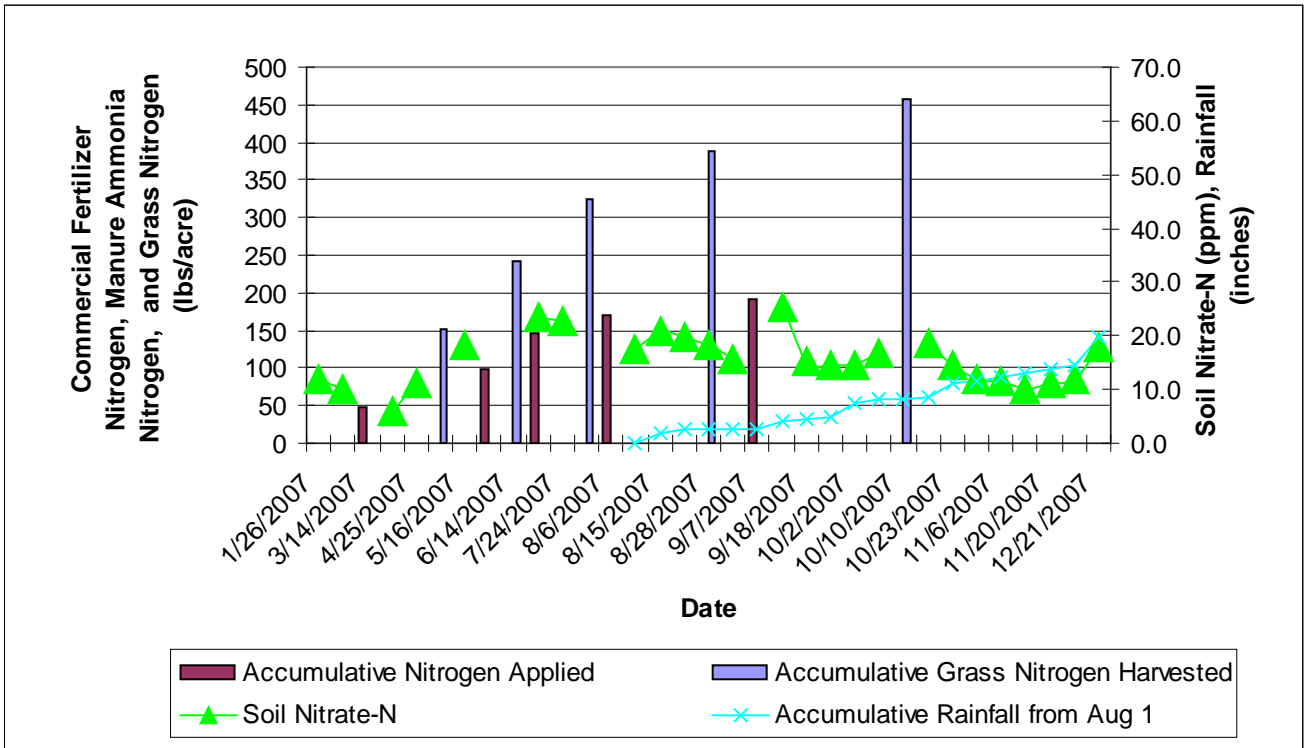


Figure 6 - 2007 data for manure ammonia and fertilizer applied, grass nitrogen yield, rainfall, and soil nitrate-N.

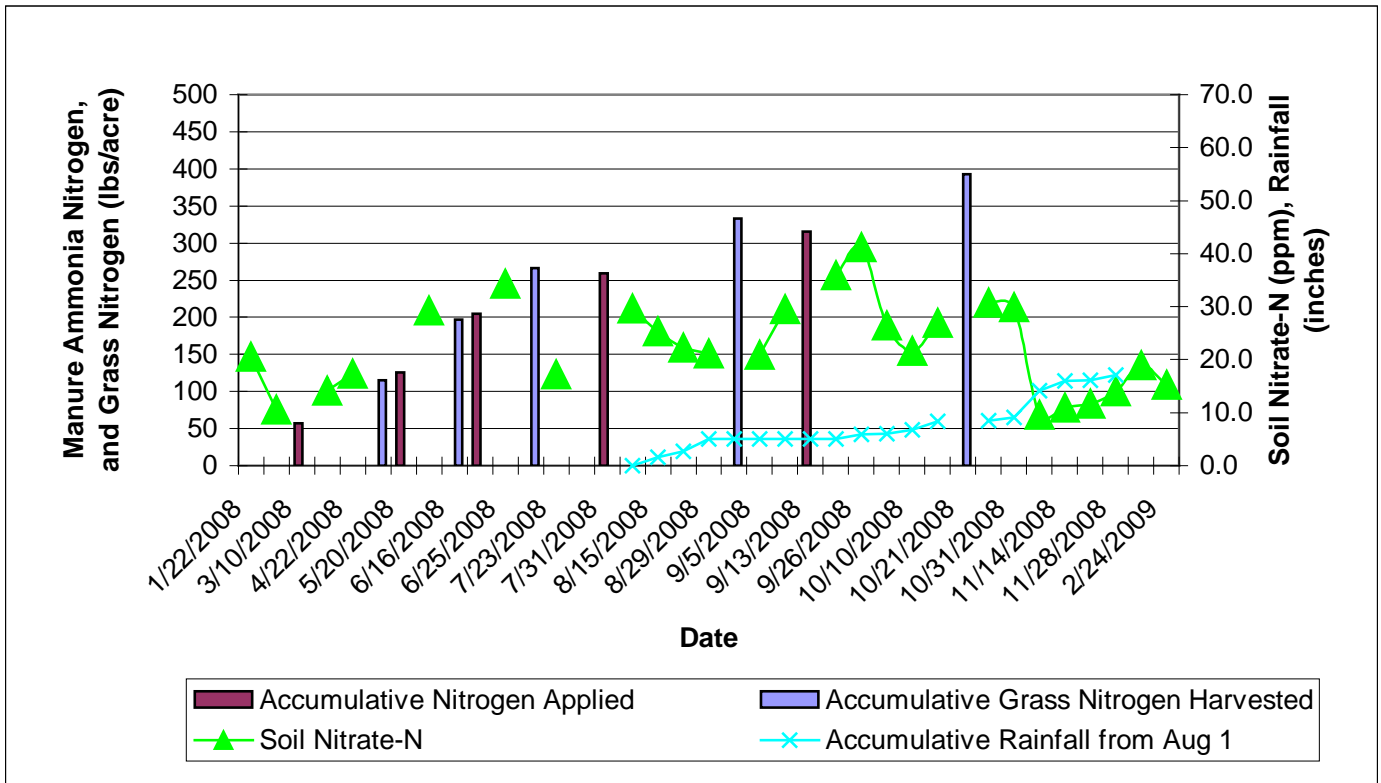


Figure 7 – 2008 data for manure ammonia and fertilizer applied, grass nitrogen yield, rainfall, and soil nitrate-N.

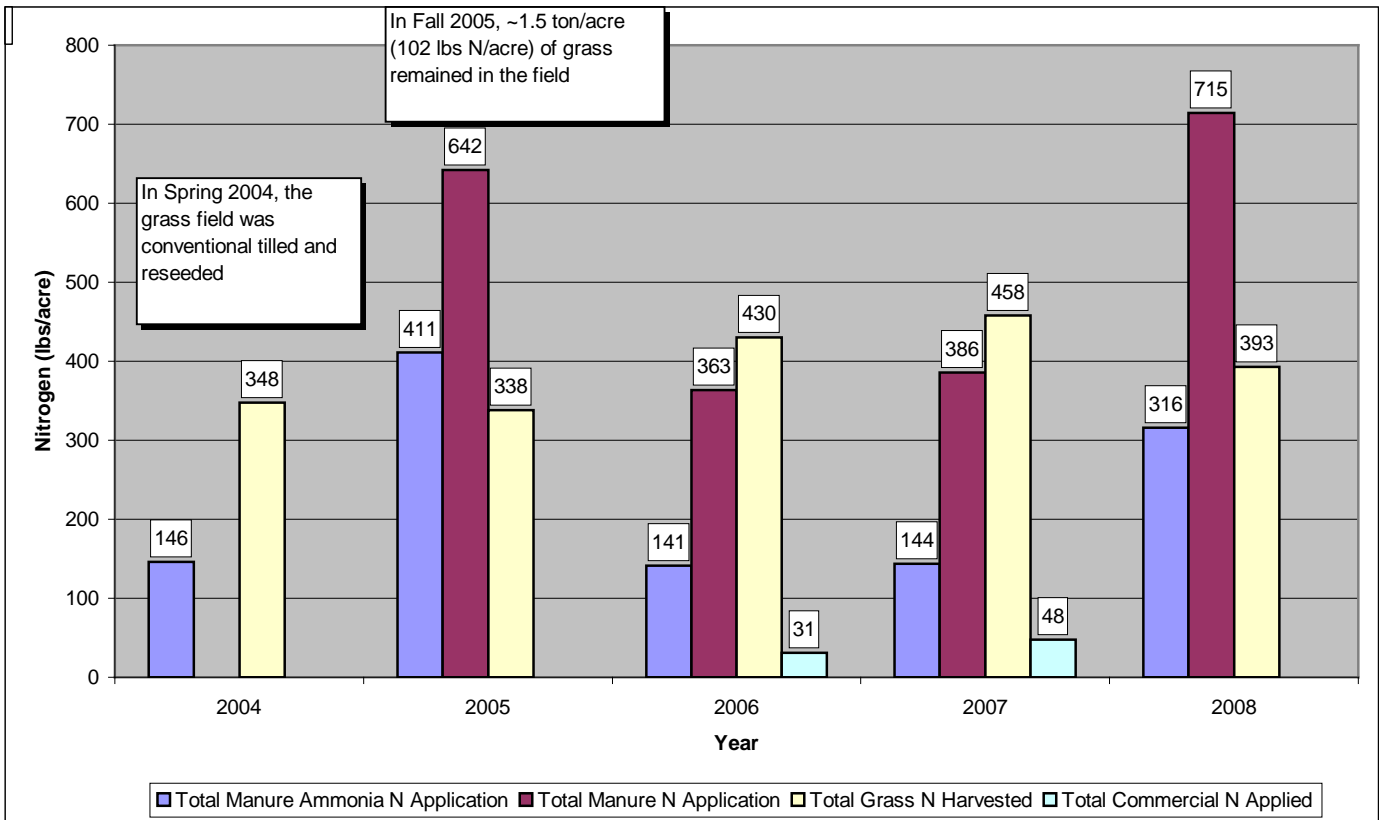


Figure 8 – Annual manure total N and ammonia N applied and grass nitrogen harvested

Results of Nitrogen Application, Grass N Yield, Rainfall, and Soil Nitrate

Grass N Yields and Nitrogen Application

- Grass N yields ranged from ~ 330 to 460 pounds per growing season.
- Ammonia N and Ammonia N plus fertilizer N ranged from ~ 145 to 410 pounds per year

Rainfall and Soil Nitrate

- Accumulative rainfall during the fall season was ~ 20 inches each year.
- The 1-ft soil nitrate levels ranged from ~ 5 to 60 ppm and varied by year.

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

Contact information: Joe Harrison, Washington State University, Puyallup; (253) 445-4638;
jhharrison@wsu.edu

Lynn Johnson- VanWieringen, Washington State University, Puyallup;
(360)-966-0216; vanwieringen@wsu.edu

Barb Carey, Washington State Department of Ecology; (360) 407-6769,
bcar461@ecy.wa.gov

Chris Clark, Whatcom Conservation District, CClark@whatcomcd.org