



Understanding Nutrient & Sediment Loss on Grazing-Based Dairy Systems

Information Available for Breneman Farms - 8

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Introduction

In order to learn about environmental challenges and opportunities for grazing based dairies on the Wisconsin landscape, the UW Discovery Farms Program conducted research on the Bob and Karen Breneman Farm near Rio, Wisconsin, from 2002 to 2007. This on-farm research provided opportunities for specialists at UW–Madison, Stevens Point and River Falls to better understand surface water runoff and groundwater quality implications on a grazing based dairy farm.

Impact of out-wintering dairy cattle on surface water runoff

Surface water runoff was monitored from paddocks that were grazed all season long, and then also used through the non-grazing season to out-winter dairy cattle. This project was conducted in cooperation with the UW - Biological Systems Engineering department, resulting in a master of science degree thesis: Environmental Outcomes Originating from Over-Wintering Areas on Management Intensive Rotational Grazing Pasture Systems, by Amanda D. Crowe. For more information contact Dr. Anita Thompson, UW-Biological Systems Engineering, 460 Henry Mall, Madison, WI 53706. 608-262-0604. Amthompson2@wisc.edu.

Does management intensive grazing protect groundwater by denitrification

A Sustainable Agriculture Research and Education project was conducted to explore how MIG may impact groundwater nitrogen chemistry. The final report for SARE Project LNC01-181 can be found at: http://www.sare.org/reporting/report_viewer.asp?pn=LNC01-181&ry=2004&rf=1. For more information contact Nancy Turyk, UW-Stevens Point, College of Natural Resources, 800 Reserve St., Stevens Point, WI 54481. 715-346-4155. nturyk@uwsp.edu.

Phosphorus in groundwater below out-wintering areas and seasonally used paddocks

Phosphorus in groundwater below seasonally used paddocks was investigated on the Breneman Farm. A final report can be found on the UW-Discovery Farms website: <http://www.uwdiscoveryfarms.org>. For more information contact Nancy Turyk, UW-Stevens Point, College of Natural Resources, 800 Reserve St., Stevens Point, WI 54481. 715-346-4155. nturyk@uwsp.edu.

Nutrient management planning for dairy farms practicing management intensive rotational grazing

A Sustainable Agriculture Research and Education project was conducted to explore dry matter intake and manure production for dairy cattle managed within grazing farming systems. The final report for SARE Project LNC03-237 can be found at: http://www.sare.org/reporting/report_viewer.asp?pn=LNC03-237&ry=2008&rf=1. For more information contact: Dr. Dennis Cosgrove, UW– River Falls, Dept of Plant and Earth Science, 410 S 3rd St, River Falls, WI 54022. 715-425-3745. Dennis.r.cosgrove@uwrf.edu.

Surface water quantity and quality data

One surface water runoff monitoring site was maintained by the UW -Biological Systems Engineering Department, 2004-2007. For each rain or snowmelt induced surface water runoff event, the following information is available: 1) surface water runoff start and stop times, storm / runoff event type, runoff total volume and volume per watershed area; 2) concentration, load and yield for: total dissolved P, total P, dissolved reactive P, dissolved organic P, total suspended solids, chlorine, nitrate and nitrite, ammonium, unfiltered total Kjeldahl N, and filtered TKN, DRP, TSS, and SS; 3) runoff / storm event hydrographs; 4) sample information and photos; and 5) daily precipitation and temperature. For more information, contact Dr. Anita Thompson, UW-Biological Systems Engineering, 460 Henry Mall, Madison, WI 53706. 608-262-0604. Amthompson2@wisc.edu.

Groundwater quantity and quality data

Six groundwater monitoring wells were maintained by the UW - Stevens Point, College of Natural Resources, 2002-2006. Wells were sampled in Feb. and monthly from May – Sep. The following information is available: 1) water table elevation; 2) upper level groundwater analysis for nitrite + nitrate N, ammonium N, total dissolved P, dissolved reactive P, chlorine, as well as the dissolved gasses of argon, nitrogen, oxygen, nitrous oxide, methane, and carbon dioxide; 3) root zone soil gas (argon, nitrogen, oxygen, nitrous oxide, methane, and carbon dioxide) analysis; 4) soil analysis from beneath manure pats and urine spots for pH, inorganic N, and dissolved organic C; 5) sequential depth soil sample analysis along two paddock transects (pH, OM, total P, Bray P, and water soluble P); and 6) daily precipitation and temperature. For more information, contact Nancy Turyk, UW-Stevens Point, College of Natural Resources, 800 Reserve St., Stevens Point, WI 54481. 715-346-4155. nturyk@uwsp.edu.

Meteorological data

Additional meteorological data referenced for projects on Breneman Farms are from the National Climatic Data Center, and the National Oceanic and Atmospheric Administration for Portage, Columbia County, Wisconsin, 12 miles NW from the farm: <http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwDI~StnSrch~StnID~20021025>.

Discovery Farms data

- Runoff photos, sample photos, monitoring site photos and farm photos
- Soil test results, fall 2001 and fall 2006
- USDA-NRCS soil resource report for Breneman Farms and surrounding land, Columbia County, WI.
- Farm Field Maps:
 - Breneman Paddock configuration # 1 (2002), and Paddock configuration # 2 (2007)

- GIS – GPS points for whole farm soil testing, fall 2001, and fall 2006
- Soil test value P, K, OM maps for soil test results fall 2001 and fall 2006

Final Report Fact Sheets

1. Grazing based dairy systems
2. Farm, site and study design
3. Equipment, procedures and sampling
4. Understanding surface water runoff
5. Sediment and nutrient loss from an out-winter paddock area on a grass-based dairy
6. Management intensive grazing and groundwater quality
7. Dry matter intake and manure production for management intensively grazed dairy cattle

Tools and decision aids

A spreadsheet based calculator has been developed to help dairy producers determine best out-wintering stocking rate to meet the estimated P removal of next season's forage crop. The calculator is available at the UW - Discovery Farms Program website: www.uwdiscoveryfarms.org.

A fact sheet and associated spreadsheet has been developed by Dr. Dennis Cosgrove and Dr. Dennis Cooper, UW-Extension Specialists, University of Wisconsin - River Falls: 1) Estimating Dry Matter Intake of Grazing Dairy Cattle, <http://www.uwex.edu/ces/crops/uwforage/GN-EstimatingDMintake.pdf>, and 2) Pasture Forage Intake Calculator for Dairy Cows, <http://www.uwrf.edu/grazing/DMI.xls>.

Wisconsin nutrient management planning software SNAP-Plus has been updated to reflect the information generated from this study, downloadable at <http://www.snapplus.net/>.

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This brief was developed from information contained in a two-page fact sheet which is available along with six other factsheets, detailing on-farm research conducted on the Breneman Farm, Rio, Wisconsin. Factsheets are available for download on the web at www.uwdiscoveryfarms.org or by calling the UW Discovery Farms Office at 715-983-5668.

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