

FARM AND SITE SELECTION

The initial farm visit occurred in the spring of 2011 with a tour of the fields to evaluate potential sites for both surface water and sub-surface water (drainage tile) monitoring. This farm was selected as a Discovery Farm because the dairy herd, manure management and soils are representative of the region and the field site is capable of generating a robust dataset. Also, Sean Groos is a great cooperater that is eager to learn through this program.

The site selected for monitoring provides a single edge-of-field location for both surface and sub-surface water monitoring evaluation of fields with an alfalfa-corn rotation with manure application. Separate instrumentation is used to monitor surface and sub-surface runoff. The monitoring site captures surface water from a 24 acre area and sub-surface runoff from a smaller area of the field.



SOIL

Soils in the monitored field are primarily of the Lester series with a small area of Glencoe series. The Lester soils were formed on calcareous glacial till. Soil texture at the surface is a loam. Internal drainage is medium and permeability is moderate. Overall, water readily infiltrates and moves through this soil profile. The Glencoe soil has a silty clay loam texture and has poor drainage requiring tiling for optimum yields

Soil Sample Analysis of the Monitored Field	
SOIL PROPERTY	VALUE
pH	7.4
Organic Matter Content, %	4.9
Phosphorus (Bray Test), ppm	59
Soil Test Potassium, ppm	266

Soil pH and organic matter content values are typical for soils in the area. Soil test values for both phosphorus and potassium are very high and reflect repeated application of dairy manure.

EQUIPMENT INSTALLATION

Installation of the combined surface and sub-surface monitoring equipment occurred in November 2011. A four foot Agri Drain structure, 2.5 foot H flume, berms, wingwalls and equipment needed for automatic, routine measurement of combined surface water runoff and sub-surface drainage was installed. Water monitoring is conducted 365 days a year using automated equipment. Weather station equipment used to measure precipitation, temperature and other climatic variables was also installed at this time. The monitoring site at Minkota Holsteins LLC was fully operational for snowmelt and spring runoff in 2012.

Collected samples are analyzed for sediment, total nitrogen, ammonia nitrogen, nitrate-nitrogen, total kjeldahl nitrogen, total phosphorus, phosphate phosphorus, and chloride. By combining a measure of water flow with sediment and nutrient concentrations, it is possible to calculate total nutrient and sediment movement.

CONCLUSION

The Discovery Farms Minnesota project at Minkota Holsteins LLC is designed to provide information to better understand how farm management practices can impact sediment and nutrient loss to surface waters. Throughout the five to seven year duration of this project, this site will provide information on surface and sub-surface water flows and nutrient and sediment loss in these types of landscapes. Work at Minkota Holsteins will help identify some of the strengths and challenges of similar farming systems.

FOR MORE INFORMATION, PLEASE CONTACT

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MINKOTA HOLSTEINS LLC Farm, Site and Study Design



OVERVIEW OF OPERATION

Minkota Holsteins LLC is a dairy farm located in east-central Minnesota in Wright County. The operation started as a partnership in 1993. In 2002, Sean Groos assumed full ownership of this family farm corporation. He and his wife Linda live on the farm with their four children Rebecca, Ethan, Luke and Bethany.



There are numerous lakes in Wright County and many of them are used for recreation by residents of the nearby Twin Cities. The farm is adjacent to Lake Ann and Lake Emma, both popular fishing lakes that have been placed on Minnesota's impaired water list for excess nutrients. Farming near a major metropolitan area presents unique challenges for animal agriculture because of the multiple demands for land use and heightened public concern about the potential effect of farming on the quality of the surrounding environment.

Soil conservation and environmental protection is important at Minkota Holsteins LLC. Sean Groos believes it is his responsibility to use all available Best Management Practices and to conserve soil as much as possible. Sean leaves crop residue and ridges in the fields following fall tillage in an effort to minimize water runoff and soil erosion. When possible, manure application is followed by incorporation. Manure does not stay on top of frozen soil through the winter since this is a critical time for nutrient movement and runoff. Many of the soil conservation practices are coordinated with the Wright County Soil and Water Conservation District.

Sean was eager to participate in the Discovery Farms Minnesota program because it provides site specific data that will help improve his management and an opportunity to demonstrate that farmers are willing to do their part in protecting Minnesota's waters. He wants to know how his farming practices might be affecting nearby lakes. If changes are needed, he feels obligated to address those needs.



FARMING SYSTEM: MANURE AND CROP MANAGEMENT

The dairy cows are the central focus of Minkota Holsteins LLC. Approximately 180 cows are milked twice a day and housed in a freestall barn. Heifer calves are raised for replacements as needed. Sand is used as bedding for the milking herd. The sand is separated from the liquid manure and the liquid manure is injected into fields with a drag hose. Manure solids are spread on corn fields in the fall and incorporated with fall tillage. Manure is analyzed and rates of fertilizer are adjusted accordingly.

Minkota Holsteins uses a corn-alfalfa rotation, growing approximately 80 acres of alfalfa and 120 acres of corn each year. Alfalfa is the major crop and is used as a feedstock for cattle. The typical rotation on any given field is four years of alfalfa followed by two years of corn. Depending on the need for cattle feed, the corn is used for either grain or silage. Primary tillage is achieved with the use of the chisel plow in the fall. Stalks are baled prior to tillage and used for bedding. When corn follows corn or alfalfa, the fall chisel is followed by secondary tillage in the spring prior to corn planting.



For corn production, a mixture of diammonium phosphate (18-46-0) and ammonium sulfate (21-0-0-24) is blended and applied in a band near the seed at corn planting. If needed, additional nitrogen is applied as a sidedress treatment as either anhydrous ammonia (82-0-0) or urea-ammonium nitrate (28-0-0). For alfalfa, special attention is placed on potash and sulfur needs. Potash applications are based on the results of a routine soil testing program.

The fields where alfalfa is plowed up and planted to corn have the highest priority for manure application. Sean believes that accurate soil sampling and analysis is essential for optimum utilization of dairy manure.

LOCATION AND CLIMATE

Wright County is located in east-central Minnesota and is bordered by the Mississippi, Clearwater and Crow Rivers.

Minkota Holstein LLC is located in the central hardwood forest region. The region is characterized by rolling plains with a mix of woodlands, row crops and pasture. The operation is located in the North Fork Crow Watershed, approximately seven miles from the river.

The climate of Wright County is representative of the climate of east-central Minnesota. The average summer temperature is 70° F. Average annual precipitation is 30.5 inches with 56% coming in the months of June, July, and August.