Overview of dairy

Saxon Homestead Farm, LLC (SHF) is a spring seasonal calving, pasture based dairy farm located one mile west of the town of Cleveland in Manitowoc County, Wisconsin. SHF is a fifth-generation family partnership operated by Robert and Kathleen Block-Klessig, Karl and Elizabeth Klessig, Gerald and Elise Klessig-Heimerl, and their families. Homesteaded in 1850, the current operators represent the fifth generation of farmers at Saxon Homestead. In 1980, Karl Klessig and Jerry and Elise Klessig-Heimerl entered into a partnership with Karl and Elise's parents Edward and Margret. In 1989, Robert Klessig joined the growing business. The fifth generation partners expanded the confinement farming operation to 150 cows and farmed conventionally through 1990. Since 1991—after careful deliberation and planning—Saxon Homestead farmers cautiously and incrementally "step-stoned" from conventional dairying to management-intensive rotational grazing and spring seasonal calving.

SHF consists of approximately 425 Holstein-based, Brown Swiss-Jersey cross cows, 400 young stock, and 200 stocker and feeder steers. Cows start calving in March, and most have finished by June 30th of each year. Approximately 400 calves are housed in two hoop buildings until they are old enough to graze in nearby pastures. In the hoop barns, the calves are bedded with chopped straw. Older young stock are housed during winter on set stock paddocks that are rotated annually. These set stock paddocks are located off the main farm but are still managed by SHF. During the spring, summer, and fall of the year, the young stock are rotationally grazed on paddocks managed by the farm. Milking cows are housed in freestalls during the winter when rotational grazing is not feasible. Two freestall barns with a total of 335 stalls are available to house the adult animals. The barn is bedded with Lake Michigan Sand. This sand is replaced twice a month from October through March. The freestall barns are utilized only during the winter months, and are not utilized during the warmer months of the year. In addition to milk, the farm produces and merchandises replacement dairy cattle and stocker and feeder steers.

Sources of manure and wastewater at the farm include manure from the freestall barns in the winter, pen-pack from calf housing in the spring and early summer, milking parlor washwater, and washwater used in the holding area. Annual manure production on the farm is about 3.5 million gallons. This includes about one million gallons of washwater from washing the holding and parlor areas.

Since this operation is a spring seasonal calving pasture based dairy, the animals on the farm are only housed during the winter. Approximately 50 percent of the total manure production is collected as liquid or pushed into a pile; the rest is naturally deposited by the cows in the paddocks. The breakdown of liquid and solid manure is as follows: 47 percent of total manure is stored and hauled as liquid manure and 3 percent of total manure is stored in a pile and spread as a semisolid with a 10-ton manure spreader. Liquid manure sampling is conducted once every year.
This farm operates approximately 925 acres of owned and rented cropland and applies nutrients in accordance with an approved phosphorus-based Nutrient Management Plan. Livestock graze 600 acres managed under an intensive rotational grazing system, with excess feed grown on this land being harvested and stored in bunker silos. The remaining 325 acres are planted into crops each year with about 92 – 140 acres grown as corn and 92 – 140 acres grown as alfalfa. Fields are not harvested as corn silage for more than one year, and then seeded to pasture or alfalfa. None of the acreage in the farming system remains as continuous crop or pasture, and the entire system evolves and rotates from year to year. The cropland or pasture acreage per animal unit is approximately 2.2:1.

SHF is located in the Centerville Creek watershed, which is part of the Lake Michigan Basin (Figure 2). Surface water features on the farm include a farm pond, as well as a tributary to Centerville Creek. Centerville Creek is an intermittent stream which flows throughout SHF. Much of this surface water flows underground due to the extensive tile drainage which runs through the farm (a 12” tile main). Centerville Creek becomes a perennial stream at the tile discharge site, approximately 800 feet from the edge of the farm. SHF uses no irrigation; therefore, there are no irrigation wells on site.

The climate in Northeastern Wisconsin is typically continental, with some modifications due to the air currents from Lake Michigan and Lake Superior. The winters are cold and snowy, while the summers are generally warm.

Farm and site selection

The initial farm visit occurred on March 11, 2004 with a tour of the fields to evaluate potential sites for surface and tile water monitoring. In general there are four types of monitoring projects done by the Discovery Farms Program: edge-of-field surface water, small watershed, tile monitoring and upstream/downstream. This farm was selected to represent this region of the state because it was a grazing farming system that contained several potential field and tile sites.

The sites selected for water monitoring provided an upstream/downstream study design which allowed for the evaluation of the impact of the grazing system. This study design involves testing the water prior to entering the paddocks to determine the quality and quantity of water before it comes in contact with the animals. Another monitoring system is placed at the end of the farm where the water flows off the farm. Contributions of sediment and nutrients from the farm in the monitored area can be calculated by subtracting what is coming in from what is exiting. The upstream (Figure 3) and downstream (Figure 4) monitoring sites were installed in a grassed waterway which
Surface and tile water monitoring – equipment installation

flowed as an intermittent stream during high runoff periods. Prior to a new tile main installed by SHF in this grassed waterway, flow occurred for much longer periods of time.

A third monitoring site was installed in a road ditch that delivered water to an area very near the upstream site from an intensively tilled field. This site was added to the study design to assess a different farming system that could potentially skew the results at the upstream site.

It was important to monitor water coming from this neighboring farming system to accurately assess the independent contributions of a grazing farm system. The monitoring equipment was installed in a road ditch, just up gradient from the upstream monitoring site (Figure 5).

In an effort to further understand the annual water budget of the grazing system, a tile drainage monitoring site was installed at the outlet of the farm, adjacent to the downstream surface water monitoring site (Figure 6).

Figure 5. Road ditch monitoring equipment installation

Figure 6. Tile monitoring equipment installation

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The installation of surface water monitoring equipment for the upstream, downstream and road ditch sites began in late July 2004 and was completed October 2004. The upstream and ditch sites required significant earthwork downstream of the flume because the relatively low slopes caused poor getaway conditions. We found this to be a common landscape feature in Manitowoc County. Getaway condition refers to anything that prohibits water movement through and away from the flume. Sites with poor getaway conditions have an increased potential for water pooling in or near the flume. An ideal monitoring site has adequate slope away from the equipment, which allows rapid water removal. The tile monitoring site was initiated and completed in December 2004 (Figure 7).

The monitoring equipment installation at the four sites required extensive field work; and we need to recognize the tremendous cooperation provided by SHF. These monitoring sites could not have been installed without their assistance and cooperation. Installation was finished in October (Figure 7), and the first flow event occurred in early December 2004. The tile monitoring site was running at approximately 50 percent capacity at the time of installation and continued to flow during the duration of the testing period. Data collection at SHF began in October 2004 and the first phase of the study was conducted at the downstream surface water and the downstream tile site until the end of November 2006. The upstream surface water and ditch site remained active until the end of snowmelt 2007.

**Conclusion**

The SHF special project provided information on the impact and comparison of a grazing farming system to a conventional tillage system. In addition, surface water runoff quality and quantity was compared to tile drainage flow at the downstream location of the grazing farm system. This project provided information on tile drainage flow periods and the times and amounts of water that drains from these landscapes (surface and tile). Through the work on SHF we are now able to better identify some of the strengths and challenges facing grazing farm systems in comparison with other agricultural systems and determine management practices that fit grazing farming systems.

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This fact sheet is part 1 of a 9 part series and can be found along with the rest of the fact sheets on the web at: www.uwdiscoveryfarms.org or by calling the UW-Discovery Farms Office at 715-983-5668.