



The area outlined in blue delineates the monitored field. All surface runoff in this area moves in the same direction and flows through a water monitoring station. The star indicates the location of the water monitoring station.

The soil in the field selected for monitoring is classified as a Cushing loam. This soil type is considered to be well drained. Permeability in the top 18 inches of the profile is described as moderate. Below 18 inches, permeability is described as being moderately slow; this soil has a high water holding capacity. In November 2010, soil samples (0 to 6 inches) were collected from the monitored field and the results of the analysis of these samples are summarized below. The phosphorus value is classified as very high with the potassium test being classified in the medium range. Usually, it's difficult to achieve high or very high potassium soil test for soils in east-central Minnesota.

Soil Sample Analysis of the Monitored Field	
Soil Property	Value
pH	6.4
Organic Matter, %	1.6
Soil Test P (Bray), ppm	39
Soil Test K, ppm	119

## EQUIPMENT INSTALLATION

Installation of the edge-of-field surface water monitoring site occurred in November 2010. The flume, wing-wall, berm and equipment needed for automatic, routine measurement of surface water runoff was installed at this time. Weather station equipment to record precipitation, temperature and other climatic variables was also installed. The surface water monitoring site at SCF was fully operational in March of 2011. Surface water runoff from the edge-of-field site will be monitored year round for the 5 to 7 year duration of this project.



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

## CONCLUSION

The Discovery Farms Minnesota project at SCF is designed to provide information to better understand how farm management practices can impact sediment and nutrient loss to surface waters. Throughout the 5 to 7 year duration of this project, this site will provide information on surface water flow and nutrient and sediment loss in these type of agricultural operation. Work at SCF will help to identify some of the strengths and challenges of similar farming systems and landscapes.

## FOR MORE INFORMATION, PLEASE CONTACT

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# SPRING CREEK FARMS Farm, Site and Study Design



# DISCOVERY FARMS MINNESOTA

## OVERVIEW OF OPERATION

Spring Creek Farms (SCF) is a grain operation located near North Branch, Minnesota in Chisago County. It has been owned and operated by John and Jewell Peterson since the mid-1970s. Their two sons, Nate and Nic, are directly involved in the operation. The farm produces corn and soybeans with a small amount of vegetable production. Vegetables are sold locally.



The farm is close to the St. Croix River and the rural/urban interface of the Twin Cities metropolitan area. This location presents unique challenges for production agriculture because of the multiple demands for land use and a heightened interest in the potential effects of farming practices on the quality of the surrounding environment.

The Peterson's have always been innovative and great environmental stewards. Their operation has continuously utilized a no-till planting system since the mid-1990s. John, Nate, and Nic are constantly working to make the no-till system better and if a new idea requires equipment that's not on the market, John and his sons will build it themselves.



## Cropping System

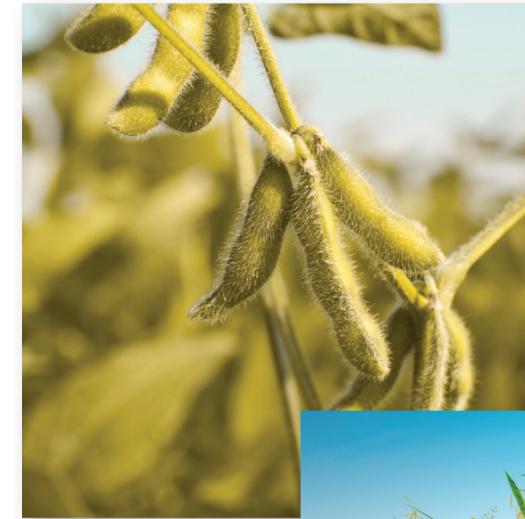
SCF utilizes a corn-soybean rotation, growing approximately 700 acres of corn for grain and 700 acres of soybeans each year. Drying and storage facilities are located on-site at SCF. A modified no-till planting system is used for both the corn and soybean acres. For corn acres, two applications of nitrogen and sulfur are used during the growing season. The first occurs after corn emergence while a second application occurs when the corn is in the V6 or later stage of development.

Phosphate and potash are applied according to the results of a regular soil sampling program. John has recently modified SCF's phosphate and potash application techniques by building an applicator that will place the phosphate and potash in a band at a depth of about 6 inches in the soil. Using RTK guidance, the corn and soybean crop will be planted directly over the band. This placement should increase the amount of nutrients taken up by the crop. In addition, this precise placement of immobile nutrients below the soil surface reduces the potential for movement of phosphorus to surface waters.

To ensure protection of their land and local water resources, SCF works closely with the Chisago Soil and Water Conservation District (SWCD). The no-till system and fertilizer banding techniques help to limit nutrient and sediment loss to surface waters. In 2002, SCF won the Chisago SWCD Outstanding Conservationist Award.

## Location And Climate

SCF is located in the north central hardwood forest region of Minnesota. The region is characterized by rolling plains with a mix of woodlands, row crops and pasture. The farm is located in the Sunrise River watershed, approximately 5 miles from the St. Croix River. Area soils consist mainly of loamy till or sandy outwash deposits. Mean daily temperatures are 16°F and 69°F for the winter and summer months, respectively. Average annual precipitation is about 30 inches, most of which occurs during the growing season. On average 26.5 inches are in the form of rain and 3.5 inches are in the form of snowfall.



## FARM AND SITE SELECTION

The initial farm visit occurred in the summer of 2010 with a tour of the fields to evaluate potential sites for surface water monitoring. This was the first Discovery Farm selected for this region because cropping practices and landscape at SCF are typical of the area and there was a field site capable of generating a robust dataset.

The site selected for monitoring provides an edge-of-field evaluation a corn-soybean rotation and no-till management system. The purpose of this study design is to determine the quality of water coming off of the agricultural fields and how cropping and management decisions affect sediment and nutrient loss. The monitoring site was installed in a waterway seeded to alfalfa (Roundup tolerant) with the alfalfa providing a permanent stand throughout the corn-soybean rotation. Surface water runoff from approximately 6 acres flows through the monitoring site. These acres were planted into corn in the spring of 2011 and soybeans in the spring of 2012.

