An Update from the Discovery Farms Project

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The idea for Discovery Farms was first formulated and implemented in Wisconsin to address the concerns that environmental and water quality regulations were inconsistent with profitable agricultural production. Similar concerns also exist in North Dakota. Farmers, ranchers, researchers, policymakers and governmental agencies in the state recognize that a balance must be reached between keeping agriculture profitable and the implementation of regulations and policies that protect our natural resources. The Discovery Farms project provides a working farm setting to collect the data needed to help these decision makers strike that balance. A Discovery Farm is a working farm or ranch voluntarily cooperating with the project to demonstrate and evaluate the effectiveness of best management practices (BMPs) at reducing environmental impacts of commonly used agricultural practices. Currently there are three farms enrolled in the North Dakota Discovery Farms project (Underwood, McLean Co.; Dazey, Barnes Co.; and Embden, Cass Co.). Each Discovery Farm addresses specific grass-roots issues that are important to the cooperating producer and the region of the state where they are located.

The North Dakota Discovery Farms project began in 2007 as a partnership among the NDSU Extension Service, U.S. Geological Survey, North Dakota Department of Health, and North Dakota State Water Commission. Water samples have been collected between April and October since 2008. Samples are analyzed for selected attributes, which are used to describe water-quality in runoff and to estimate nutrients and sediments' annual loads and yields. Three instrumented stations were installed at each farm to allow for data comparisons due to the distance from the potential source of nutrients (Underwood and Dazey) and due to surface and tile drainage runoff (Embden).

The 2013 data provide some indications that the management and BMPs adopted on the farms being monitored are having a positive impact on water quality.

At the Embden site, comparing the 2011 and 2013 data (years with similar annual rainfall) we saw a decrease in yields (lbs/ac) of the constituents from 2011 to 2013, especially for the tile drainage sites (E2 and E3). Looking at this preliminary data, it seems that the levels of the constituents in the water started to drop after 2011, which coincides with the first year that the cooperator had cover crops in the half of the field drained by E3 and alfalfa in the other half drained by E2. Looking at the number of samples collected in each gaging station in the last two years (2012 and 2013) more water samples were collected on E3 than E2, due to a higher flow volume at E3. This could indicate that the alfalfa on the half of the field drained by E2 is being more efficient in the use of the water in the soil, so less water flows through the tiles. Looking at the constituents yields for site E3, and comparing the values between 2011 and 2013, it seems the change in soil management (addition of cover crops in 2011 after wheat harvest) had some impact on water quality, but it is too early to make any conclusion in that regard.

At the Dazey site D1 gaging station, which monitors the runoff that drains from a crop field and from a feedlot, the 2013 data shows that the amount of nutrients and sediments in the runoff from that area are very low. This could be due to management of the cattle herd. The cooperator feeds the cattle as long as possible on pastures or crop fields during the winter, limiting the time that the animals remain concentrated in the feedlot, which generates less accumulation of manure in the feedlot area, decreasing the potential environmental problems associated with feedlot runoff.

At the Underwood site, it seems that the clean water diversion BMP installed in 2012 is having a positive impact on the water quality. This is especially evident at the U1 gaging station, which had substantial decreases in the yields of suspended sediments, total P, ammonia and chloride from 2011 (before the clean water diversion) to 2013 (after the installation of the clean water diversion). The data suggest the BMP is working, but further monitoring is necessary to confirm these preliminary findings.

Figure 1. View of the clean water diversion system during later 2014 winter. The structure is located on the north and east side of the feedlot (partially seen on the left photo).