

**CONSERVATION INNOVATION GRANTS**  
Final Grant Report

Grantee Name: <b>Chester River Association</b>	
Project Title: Upper Chester Conservation Initiative	
Agreement Number: <b>69-3A75-10-125</b>	
Project Director: Robert Parks, Exec. Dir., until 1/31/12; Heather Forsyth, Exec. Dir., until 9/6/13	
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Period Covered by Report: <b>up to August 31, 2013</b>	
Project End Date: July 31, 2013	

**PROJECT DESCRIPTION AND LESSONS LEARNED**

The goal of the project funded under this grant was to demonstrate new approaches to reduce nitrogen loads from cropland to the Chesapeake Bay, by the way of the immediate Chester River watershed. The grantee sought to engage 20 producers for switchgrass planting and the use of GreenSeeker (precision ag technology) on cropland in the Chester River watershed by engaging EQIP eligible producers in planting switchgrass buffers to reduce nitrogen runoff and the GreenSeeker technology to reduce nitrogen application. The grantee agreed to collect baseline data on participating farms and note the conservation practices implemented; conduct two peer networking sessions on the results of selected producers; document findings and analyze environmental and economic data on each conservation practice; produce and distribute a CI fact sheet on each practice; and attend at least one CIG showcase or comparable NRCS event during the period of the agreement.

The Upper Chester River watershed has been the focus of a USDA-led effort to provide resources in a small area and leverage partnerships in order to increase conservation adoption. The project set out to identify strategies that could be applied successfully on a larger scale. The 23,000 acre watershed is divided between Kent and Queen Anne's counties on Maryland's Eastern Shore. Agriculture makes up 65% of the land use (54% mainly used for growing corn, soybeans, small grains, and nursery crops). Nutrient leaching is the primary resource concern because the land in the watershed is characterized by low slopes and silt loam soils.

Greenseeker

In Year One (April 2011) two RT200 GreenSeekers, computerized variable rate application systems, were purchased at a cost of \$23,900 each and installed with two farmers in the Upper Chester watershed, Louis McDonald and Casey Owings. These two producers farm over 3,000 combined acres of traditional row crops, and used the

GreenSeeker on a 500 acres. GreenSeeker is a new technology being researched by a number of local agricultural universities. It applies nitrogen at a variable rate based on its readings of crop health. This technology has the potential to increase the efficiency of every pound of fertilizer that it applies. The challenge in using GreenSeeker in the showcase project is that being ready for university research is much different than being ready for on-farm usage and sale. The participating farmers have helped work out a number of problems with the technology. Their efforts and the fact that the systems were purchased and installed by CRA mitigated some of these problems, but not all of them.

To move GreenSeeker from the “on the horizon” category to be ready for widespread use category will take a greater commitment from the industry manufacturer and local service company. Despite these challenges, the research and data collected from GreenSeeker use is applicable to all mid-Atlantic farmers. Not only does it help promote future GreenSeeker purchases, but it also helps with improving nutrient applications recommendations. Farmers that were involved with this GreenSeeker program are working with the University of Maryland and University of Delaware to promote the technology. Dr. McGrath, a University of Maryland agronomist, presented findings from the GreenSeeker use at two CRA-hosted Farmers breakfasts (over 100 farmers in the watershed attend this annual event). He has also used the data and research plots at both 2012 and 2013 Precision Agriculture Days held in Caroline County (MD) and attended by farmers from Maryland, Delaware, Virginia, and Pennsylvania.

### Switchgrass Buffers

In Year One, 13 producers were engaged under agreements that permitted the grantee to rent 10 or more acres of marginal cropland for switchgrass planting, for a total of 200 acres prepared, sprayed, and seeded with switchgrass.

The switchgrass project is developing into a true success story. Acres have been planted, product has been sold, profitability has been achievable, and lessons have been learned. The first lesson is always to have multiple markets. When CRA started the switchgrass program, the plan was to develop and supply a biomass heating market. The biomass market is a minimum of five years in the future. The markets needed are ones that are ready for product today. These markets will help develop the acres needed to make future markets (biomass and ethanol) a realistic option. CRA found a new market in mushroom farms in southeast Pennsylvania. This is a large industry that accounts for roughly half of all mushrooms produced in the nation. The mushrooms are grown on a bed of fresh compost. To make compost you need two things: a nitrogen source and a carbon source. Switchgrass harvested in late fall and winter is an ideal carbon source for mushroom compost. The entire 2012 switchgrass crop went to mushroom farms, except for 10 acres that CRA donated to a joint University of Maryland and University of Delaware research project.

The research project studied using chopped switchgrass (2.5 to 5 cm) pieces as an alternative bedding material in modern poultry houses. The purpose of the study was to ensure that product and quality were not hurt when replacing current bedding materials

(pine shavings) with chopped switchgrass. After a one-year study and multiple flocks, the study found that switchgrass was a good alternative bedding material in comparison to pine shavings, with a 25% cost savings. As the logistics of getting the material from field to poultry house are developed, this market has a large growth potential, with the potential for becoming the primary market for switchgrass grown on the Delmarva Peninsula. Since the study was released, CRA has successfully installed chopped switchgrass for bedding in three chicken houses. A point to note is that different markets require different moisture content in the switchgrass which dictates when the switchgrass is harvested and how it is stored and transported. For example, the mushroom industry desires a product with much higher moisture content for compost than the poultry industry, which needs a drier product so that it can be successfully chopped and blown into the poultry houses.

During Year 2 of the grant, CRA produced a webinar on the growing and marketing switchgrass that engaged nearly 100 participants. One result from the webinar was that CRA was contacted by The Nature Conservancy about promoting the use of switchgrass on the lower Eastern Shore. The Nature Conservancy is now invested in having several hundred acres of switchgrass planted over the next few years on the lower shore, which is the primary home of poultry production in Maryland.

Moving forward, CRA envisions poultry farms growing an environmentally friendly crop of switchgrass in buffers and stormwater areas that can then be harvested for use on site for bedding needs. Grown on site, the producers would not have to pay the expense of transporting the switchgrass and could realize an even greater cost-savings over traditional pine shavings.

## FARM ASSESSMENTS

One of the key partnership projects in the Upper Chester river watershed was a Farm Assessment – a significant effort which served several objectives: identify and document conservation practices, especially those practices that farmers installed without technical or financial assistance; provide outreach for partners' programs; and identify opportunities for conservation work by following up on natural resource concerns that participants identified on their farms.

The Farm Assessment form and protocol were carefully planned to ensure that the effort produced valuable results. The Assessment itself was conducted by the conservation districts in Kent and Queen Anne's counties with funding from the Maryland Department of Agriculture. Nearly every farmer agreed to answer the questionnaire about their farm management practices and 87% of the agricultural land in the watershed is represented on the Farm Assessment. One of the outcomes of the Assessment was identifying practices that farmers installed without financial or technical assistance. In the Upper Chester River watershed, 38% of all the conservation practices identified were not funded through cost-share programs. Since these non-cost shared, or farmer-funded practices were installed outside of traditional funding programs, they were often unknown and not tracked through existing systems. As such, the practices were not given

credit in Maryland's Watershed Implementation Plans. This new information is significant because the WIPs take into account all of the sources of nutrients and sediments that are contributed to a waterway and, in turn, assigns pollution reduction goals to each source sector such as stormwater, wastewater, and agriculture. The inclusion of this new information will ensure that the goals established in the WIPs are accurate, realistic, and equitable among the different source sectors.

## MONITORING THE BENEFITS

One of the factors that made the Upper Chester River watershed a good candidate as a showcase was that there was a sufficient body of data to define a baseline for water quality. Numerous groundwater sites has been established by the US Geological Survey (USGS) at various points in time. Maryland's Department of Natural Resources has a long-term fixed station in the watershed that takes monthly samples focused on benthic and biological parameters. In addition, trained volunteers for CRA monitor water quality in the Chester River through its Chester Testers program. Established in 1993, the programs volunteers currently sample bimonthly at 26 sites through the watershed. CRA puts out an annual Watershed Report Card that identifies trends in water quality based on dissolved oxygen, pH, nitrate and ammonia nitrogen, organophosphates, and turbidity. Three of those sites are within the showcase watershed.

For all three of the showcase watershed, USDA and USGS partnered to evaluate increased conservation efforts. USGS leads the water quality monitoring effort, working with partners in the watershed to identify appropriate sites and develop monitoring strategies. USGS reestablished a stream gage on Chesterville Branch in 2011 that monitors continuous streamflow, pH, dissolved oxygen, turbidity, nitrate nitrogen, and specific conductance. USGS has also conducted two synoptic surveys around the tributaries I the watershed – one in the summer of 2011 at low baseflow conditions and one in the spring of 2012 at high baseflow conditions. These surveys look at field parameters, major ions and nutrients, and nitrogen and oxygen isotopes. The data that USGS is gathering will be used to determine the average residence time of groundwater in the watershed, the sources of nutrients, and the effects of natural processes on the concentration of nitrogen. Analysis of these data can help restoration partners determine the most significant nutrient sources in the watershed, the most appropriate practices to address those sources, and the estimated length of time until the results of those changes become evidence in surface water quality.

## CONCLUSION

The focused effort in the Upper Chester River showcase watershed began with strong leadership and dedicated resources to facilitate increased conservation adoption. One of the most valuable resources available to the project was the considerable time that the partners dedicated to the effort to set goals and objectives, to establish a strategy and partnerships, and also to sustain progress throughout the project. That time investment helped in addressing challenges during the project such as staff turnover, data sharing and privacy concerns, or avoiding redundant outreach efforts. As unique as every watershed,

county, state, and region is, every area can benefit from a focused effort to bring partners together, establish common goals and strategies, and work together to implement the goals and evaluate progress. In the three years since the Upper Chester River was established as a showcase watershed, implementation of conservation practices doubled when compared to three years prior to the project. By building on the successes of the showcase watershed, other watershed partnerships can develop an approach to increase conservation adoption that's bet suited to their region and community.

The future potential of the projects in this particular showcase is significant and with the help of these programs, CRA hopes that eventually all farms in the Chester and Chesapeake Bay watersheds will be known as sustainable, profitable, and environmentally friendly operations.