Early data presented on Owings' stormwater system

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CENTREVILLE, Md. — After a year of study, preliminary data of a farmer-pioneered stormwater management practice was presented last week to a stakeholder group focused on improving the Corsica River in Queen Anne's County.

Presenting to the Corsica River's Implementation Committee, Rosie Myers, a research assistant for Dr. Allen Davis, University of Maryland professor of civil and environmental engineering, detailed the project and what observations she and Davis have made so far.

The research is set to continue another year with a report of their findings to follow including a cost-benefit analysis.

The research is looking at an agricultural stormwater cascading system installed in 2011 by Sam Owings on his farm near Chestertown, Md.

The system is a series of four shallow basins each about 35 feet wide by 140 feet long that have been seeded with a fescue and annual ryegrass mix. Other native plants have naturally seeded in the basins as well.

During a rain storm, the system's job is to channel runoff through the basins slowing it down so it can filter into the soil or evaporate and keep it from leaving the farm and carrying nutrients and sediment to waterways.

In Owings' case, the system drains about 76 acres of farmland and about 80 percent of it is controlled by another farmer north of Owings. The system's storage capacity is estimated at 400,000

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gallons or about 0.8 inches of rain, though that doesn't account for infiltration as water moves toward the system, Myers said.

Through his non-profit group, High Impact Environmental, Owings received a Maryland Industry Partnership grant fund for about half of the research.

For the research project, measurement devices at beginning and end of the system were installed to catalog how much water is coming in to and discharged from the system and water quality samples were taken in each basin after storm events.

Myers said the research objectives were to study the system's effectiveness of removing phosphorus, nitrogen and sediment from storm water as it passes through the four cells, to gain more data on nutrient levels of agricultural runoff and to explore viable best management practice options for treating runoff.

With data from all the storms factored in, the system kept 64 percent of the water that entered the system from leaving it. Nutrient reductions were lower with an 11 percent reduction in nitrogen and 5 percent on total phosphorus.

But, when the two largest storm events were removed from the data set, efficiency rose above 95 percent across the board, leading Myers to speculate that the large "washout" rains may have resuspended and discharged solids and nutrients captured from previous rain events.

"If we find a way to reduce the washouts, this can be a very effective system," Myers said.

In the discussion period after Myers' presentation, the idea of installing a bypass mechanism around the system for large rain events was offered.

Other design suggestions that came up were to add ridging to the basins' floor to further slow runoff through the system and make the first basin smaller with the idea of better containing sediment as water continues into subsequent basins.

"There are clear opportunities to do optimizations to the system depending on how much detail you want to get into," Davis said.

Owings said he has been pleased with how the system has performed so far, noting soon after it was first installed, a 5.5 inch rain over 5 days did not lead to a discharge from the system.

"I'm just trying to do something to help clean up the Bay. That's pretty much what I'm accomplishing here to a certain extent."

He added whether or not there is a discharge, depends on many things, including how saturated the soil already is. He also said he didn't think the large rain events were washing out what previous rains had left behind, only that water was moving too fast through the system to be treated.

Moving forward, consideration as a state certified best management practice will need more definitive data — multiple years of study from multiple sites — that shows what nutrient and sediment reductions can be expected, according to John Rhoderick, administrator for resource conservation operations at the Maryland Department of Agriculture. Rhoderick said the project is encouraging and it's often the case where preliminary research leaves more questions than answers but now researchers can "tighten up monitoring" to address variables in the system.

"We need to definitively say, 'this is how the system is acting,'" Rhoderick said.

Myers said as more data is taken, improvements to the system will be explored.

Owings said he's been contacted by several farmers interested in installing a similar system but so far, getting additional funding has been the main obstacle.