

2014 WATER SUCCESS STORY

Bureau of Water Quality



DNR mapping software is a powerful new tool to reduce agricultural erosion and phosphorus pollution

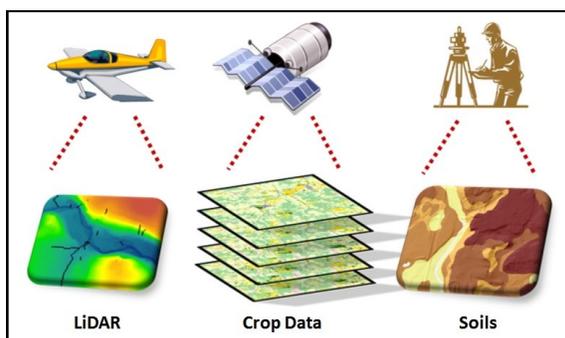
By Jennifer Sereno and Theresa Nelson, Wisconsin DNR

Software Tool Integrates Data

In increments as small as three square meters or as large as 30 square miles, a new software tool developed by the Water Evaluation Section in the Bureau of Water Quality promises to help reduce agricultural runoff and erosion.

Developed to integrate satellite imaging and geographic information system or GIS technology, the erosion vulnerability assessment for agricultural lands tool -- known as EVAAL -- clearly depicts areas susceptible to erosion based on topography, land cover and soils. While the software will be used by environmental professionals ranging from consulting engineers and nutrient management planners to county conservationists and academic researchers, it is expected to produce very real benefits for citizens statewide.

EVAAL uses readily available inputs that include detailed topographic information (LiDAR), multiple years of crop type data, and digital soils data.



Maps Help Prioritize Areas for Conservation Efforts

"We know clean rivers, lakes and streams are a priority for Wisconsin residents," said Theresa Nelson, a water resources engineer and EVAAL project team leader.

"Reducing agricultural runoff conserves topsoil and cuts down on the amount of phosphorus entering our surface waters. The new software helps prioritize lands with the greatest vulnerability, saving time and money for farmers by identifying the most significant opportunities to cut sediment and phosphorus runoff."

The results of EVAAL show relative vulnerability to erosion and associated nutrient export at the grid scale. Watershed managers can use those areas of highest vulnerability to prioritize their conservation efforts.

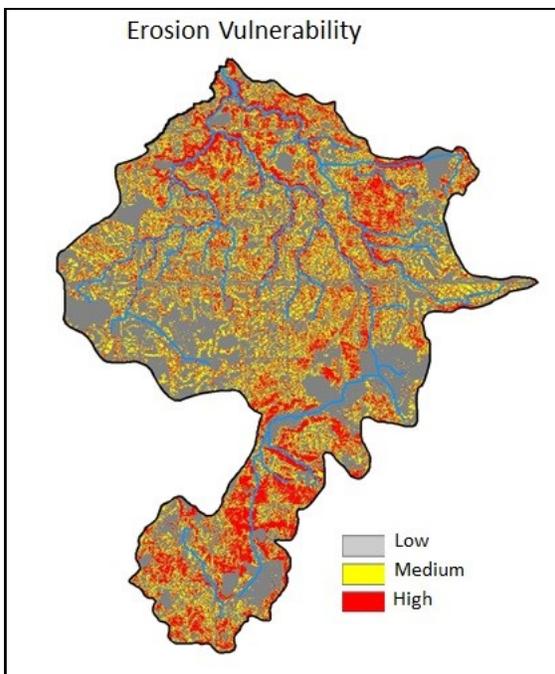


The installation of a grassed waterway is a soil conservation practice that would have helped prevent erosion on these agricultural lands. Photo by Mike Sorge.

EVAAL Software Tool Benefits (Continued)

More Erosive Soils are Identified

Detailed maps produced by the software highlight areas where large gullies or tiny rills may carry nutrients away from fields and toward bodies of water. Other elements, such as large internally drained areas that help capture runoff also appear. The EVAAL tool allows private landowners and county planners to consider these features at both the grid scale - down to three square meters - and at the broader field or watershed level.



AN EXAMPLE OF A EROSION VULNERABILITY MAP PRODUCED BY EVAAL.

"Modern farm technology allows for the precise application of nutrients down to the grid level, but until now, these grids accounted for soil quality rather than differences in topography and the potential for water movement," Nelson said. "With the EVAAL tool, practicing precision agriculture becomes an opportunity to achieve precision conservation. Beyond identifying simple changes, such as slightly expanding a buffer area or adding vegetation to a gully, the software allows for broader efforts aimed at improving a watershed."



Vegetation on each side of a stream (called a buffer) helps decrease delivery of sediment and phosphorus. Photo by Julia Riley.

Data Aids in Development of Pollutant Reduction Plans

Phosphorus has long been recognized as the controlling factor in plant and algae growth in Wisconsin lakes and streams. Small increases in phosphorus can fuel substantial increases in aquatic plant and algae growth, which in turn can reduce recreational use, property values and public health.

Greg Baneck, county conservationist with Outagamie County, said his team has been using an early version of the EVAAL software for several months in their efforts to develop a plan that addresses nonpoint source pollution issues. "The maps and data produced by the program allow us to focus our efforts and work more efficiently than ever before," Baneck said. "This is a huge benefit with limited staffing resources, helping us to assist the landowners who need it the most."

The new software is available for download by visiting dnr.wi.gov and searching for "EVAAL." The package includes methods documentation, a tutorial and practice datasets.

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