

SMART ASSESSMENTS: REDUCED MAINTENANCE, CLEANER WATER AND FEWER COMPLAINTS

By Matt Meersman¹, John Kerr², Mary Fales³ and Erin Fuller⁴



George Kusmack, Joe Parman and Matt Meersman

➤ Bill Mihelich understood the importance of soil conservation. His family has been farming in Van Buren County for close to a century. Bill knew the value of minimizing soil loss and the evidence lies in his fields, which have been planted without tillage for 27 years. It frustrated him to see neighbors getting paid through conservation programs to adopt practices he had been using for years while he was told he wasn't eligible. Most conservation programs only fund the implementation of new practices, so Mihelich never received financial incentives for his efforts to protect the land and water. That changed in 2014, when the Van Buren County Drain Commissioner introduced a pilot program that integrated a land management factor into the methodology for calculating drain assessments for the first time. Mihelich passed away in October of 2014, but not before he learned that

the cost of his drain assessment would be cut in half because of the way he managed his land. Including a land management factor when calculating drain assessments rewards individuals like Mihelich, who reduce the amount of sediment and runoff leaving their property. Ultimately the entire drainage district benefits from reduced maintenance costs.

The pilot program is the product of a shared vision between Van Buren County Drain Commissioner Joe Parman, the Van Buren Conservation District (VBCD) and The Michigan Chapter of the Nature Conservancy (TNC). All three entities share a common interest in preventing excessive sedimentation of local waterways and they understand that prevention is more effective for reducing maintenance costs and improving water quality than removing sediment after it reaches

the water. The Great Lakes Protection Fund and Michigan State University have provided funding and technical support for the pilot program since 2012.

WORKING WITHIN THE DRAIN CODE AND OVERCOMING CHALLENGES

The flexibility of the Michigan Drain Code allows Drain Commissioners to consider a wide variety of factors when determining the benefit a parcel derives from the drain and thus the apportionment of the total drain project cost. Typically, Drain Commissioners have considered only static factors like acreage, proximity to the drain and property tax class, etc. In contrast, the Van Buren County pilot program recognizes that the benefit a parcel derives from the drain will change over time, depending on how the parcel is used and managed.

The primary objective of the project was to develop an apportionment methodology that provides an incentive for conservation practices, which reduce drain maintenance costs over time and ultimately improve water quality. The VBCD assisted the Van Buren County Drain Commissioner in developing this new apportionment methodology to ensure that it accurately and objectively estimates the benefits derived by each parcel at the time of assessment. It was critical for the program to make sense to constituents and be legally defensible under the Michigan Drain Code.

HOW IT WORKS: WHAT MAKES OUR ASSESSMENT “SMART”?

In the pilot program, we determined assessments by combining a base allocation with a benefit allocation that considers how each quarter-acre of land on a parcel is used (land cover), how much it needs drainage (hydric soils) and how it is managed (conservation practices). We took advantage of the latest tools and data to classify features within a parcel, estimate sediment loading and give landowners the opportunity to reduce their assessment by utilizing conservation practices.

1. BASE ALLOCATION

The base allocation addresses the benefits that each property derives equally including mailings, publications, staff time, etc. We generated about 60% of the project cost with our base allocation (\$3.12 per parcel) because project costs were low in 2014 and there are a large number of parcels in the pilot area. The portion of the project cost funded by the base allocation can change or be eliminated depending on project scope, district



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size and the inclination of the Drain Commissioner. We allocated the remaining 40% of the project cost to each parcel based on a combination of the three factors below.

2. LAND COVER (USE FACTOR)

Land cover is important because it greatly affects sediment delivery and runoff. We used the annually updated National Cropland Data Layer to calculate the area of each land cover type on every parcel. We categorized land cover into four general classes and assigned a per acre weighting factor based on differences in runoff and sediment loading:

- *Natural* (Forest, Shrubland, Wetland, Grassland, etc.) = 0.35
- *Low Intensity Agriculture* (Pasture, Hayland, Tree Crops, etc.) = 0.5
- *Developed* (Residential, Commercial, Industrial, Transportation, etc.) = 1.0
- *High Intensity Agriculture* (Row Crops, Vegetables, Berries, etc.) = 1.0

The weighting factors increase with each category and reflect the magnitude of the drainage system benefits to the land cover type. In this project, we presumed developed and high intensity agricultural acres receive the same level of benefit from the presence of a county drain. There could be different land cover weighting factors developed for each non-agricultural land use (commercial, industrial, residential, etc.).

3. HYDRIC SOIL (NEED FACTOR)

Hydric soils are found where wetlands are present or where they were historically located. Drainage is typically necessary to use hydric soils for agriculture or development because they are too wet for these land uses without it. Accordingly, we assigned the weighting factors below to address the increased benefit of drainage to certain land uses depending on soil type.

Table 1. Summary of need factor values as determined by combination of land cover and soil type.

Soil Type	Land Cover Type			
	Natural	Low Intensity Agriculture	High Intensity Agriculture	Developed
Hydric	0.7	1.0	1.0	1.0
Non Hydric	0.7	0.7	0.7	0.7

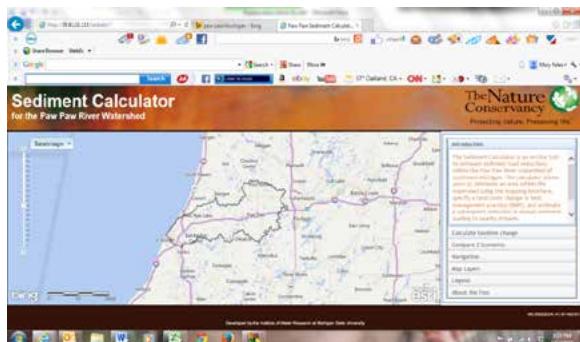
4. CONSERVATION PRACTICES (MANAGEMENT FACTOR)

The presence of conservation practices like filter strips, cover crops and reduced tillage can significantly decrease the amount of sediment and runoff that enter a drain. Less sediment and runoff entering the drain leads to reduced drain maintenance costs. We developed a baseline management factor of 1.0 and applied it equally to every parcel. We then invited landowners to enroll in a certification program for conservation practices being implemented on their land. The VBCD managed the certification program, which included verifying the practice was in place and estimating its sediment loading reduction. For the portion of the parcel where conservation practices are in use and meet certification requirements, the management factor was reduced in proportion to the sediment load reduction.

For the pilot program, the VBCD used the online “sediment calculator” tool (described below) to model each conservation practice and estimate its sediment reduction benefits (% reduction in annual sediment loading). For example, we assigned a management factor of 0.6 for all the acres of a parcel influenced by a conservation practice that reduces 40% of the sediment load. Likewise, we assigned a management factor of 0.8 for a conservation practice reducing 20% of the sediment load.

It is important to note that we did not allow management factors to go lower than 0.5 for *High Intensity Agriculture* acres, and 0.7 for *Low Intensity Agriculture* acres. By capping the management factor, we ensured that acres of a higher land use class were not allowed to score more favorably than a lesser land use class. For example, an acre of *High Intensity Agriculture* land cover with conservation practices estimated to be reducing 80% of the sediment load should not score lower than an acre of *Natural* land cover. While we only considered certain agricultural conservation practices in the pilot program, urban stormwater management practices could also be used to adjust the management factor if a certification program with runoff reduction calculations were developed.

LINKING MANAGEMENT TO SEDIMENTATION



It may seem like a daunting task to calculate the sediment reducing benefits of all the conservation practices in a drainage district, but tools are becoming available to make the job more manageable. In collaboration with TNC, and with funding from Coca-Cola, MSU's Institute of Water Research (MSU-IWR) developed an online tool called the Sediment Calculator that makes estimating the environmental benefits of various conservation practices relatively easy. Initially, they developed the Sediment Calculator solely for the Paw Paw River Watershed in Van Buren County (www.iwr.msu.edu/sedcalc). More recently, MSU-IWR expanded and updated the tool, now called the Great Lakes Watershed Management System (GLWMS), to encompass the entire Saginaw Bay Watershed (www.iwr.msu.edu/glwms).

The "sediment calculator" incorporates the Revised Universal Soil Loss Equation (RUSLE) and a model called SEDMOD, which uses a parcel's soil type, slope and proximity to a waterway, to estimate the portion of the eroded sediment that actually enters nearby waterways. The Sediment Calculator uses a web-based GIS interface in which users can define the boundaries of a field or parcel on the map and quickly estimate differences in erosion and sediment loading under different management and land cover scenarios. The tool is publically available for anyone to use free of charge by visiting the websites noted above.

PILOT PROGRAM RESULTS

The drainage district in the pilot area covered about 23,000 acres and included about 2,500 parcels. Fifty-seven percent of the land is used for agriculture, 34% is natural and 9% is developed. The drainage district supplies most of the water for Maple Lake, an important amenity for the Village of Paw Paw. Nutrient-rich sediment from upstream runoff is contributing to excessive weed

growth in Maple Lake, greatly diminishing its value to area residents. Providing incentives for better land management through the pilot program has not only reduced sediment in the drain, but has also become an important part of a larger effort to restore the lake.

Landowners responded well to the pilot program. Several people attended the Day of Review or called to ask questions about their assessments. The VBCD also heard from farmers who said that even though their overall apportionment may have increased, they agreed that how they use and manage their land should affect their assessment. The program was especially helpful for explaining assessments to landowners who contribute less directly to the drain, such as those who own residential property not adjacent to the drain or forested land used for hunting. The Drain Commissioner was able to explain that their rates were lower than others in the district.

The Drain Commissioner worked with VBCD to develop a conservation practice certification program. During the pilot program, a grant from the Great Lakes Protection Fund supported the efforts of the VBCD. They met with interested landowners and created a simple two-page certification agreement that includes compliance standards for some of the most common conservation practices like filter strips, cover crops, grassed waterways and reduced tillage. The certification agreement obligates the landowner or farm operator to maintain the certified practice for one growing season and gives the VBCD permission to share the information with the Drain Office. Conservation District offices in other counties could likely implement a similar program provided they have staff available to perform the field inspections and sediment load reduction calculations.

In 2014, the VBCD certified 600 acres of no-till, 495 acres of cover crops, and 12.7 acres of filter strips on 43 parcels. These landowners saved an average of 21% on their drain assessments by utilizing conservation practices that prevent an estimated 192 tons of sediment from entering the drain annually.

GETTING "SMART" WITH YOUR ASSESSMENT

Any Drain Commissioner could adopt a "smart assessment" approach if the following issues are addressed:

1. They conduct a Day of Review each time a drainage district is assessed because management practices and land cover

change frequently. Incorporating dynamic factors into the apportionment methodology implies that a district will be reapportioned each time it is assessed.

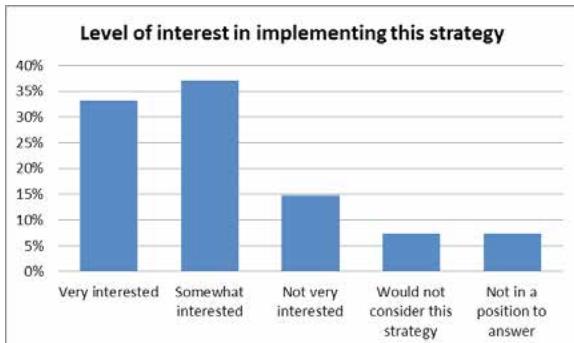
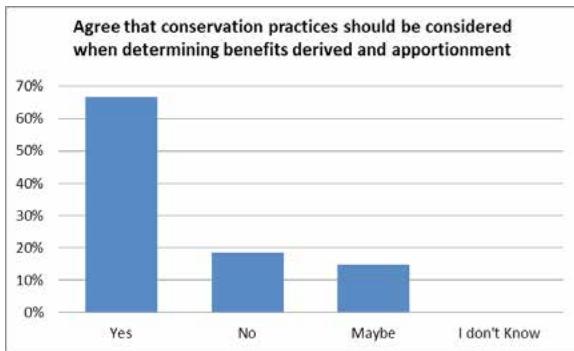
2. They employ technology such as a Geographic Information System (GIS) to process the data associated with the use, need and management factors.
3. They have a simple way to estimate the effectiveness of conservation practices. Tools like the Sediment Calculator used in this project are currently available in the Paw Paw River Watershed, the Saginaw Bay Watershed and the Maumee River watershed (Michigan and Ohio). In areas where a tool like the Sediment Calculator is not available, it may be feasible to calculate RUSLE by hand.
4. They develop a program for certifying conservation practices to provide documentation of practice compliance for the Drain Office.



BMP Certification, Matt Meersman and Steve Holden

We believe addressing these issues can be part of a comprehensive drain inspection program, with which partners like Conservation Districts and engineering firms can assist. The Michigan Drain Code allows for costs associated with drain inspections to be included in the total project cost and be recouped via drain assessment.

MACDC RESPONSE



We delivered a presentation on the pilot program

at the 2015 Winter Meeting of the Michigan Association of County Drain Commissioners. Sixty-seven members of the audience participated in a survey, including 30 individuals who were either Drain Commissioners or Drain Office staff (results from this group displayed at right). The results indicate that 67% of this subgroup agreed that conservation practices that reduce sediment and runoff should be considered when determining assessments and 76% indicated they would be “very interested” or “somewhat interested” in at least considering implementing a similar strategy in their county. Participants identified Days of Review (56%), fear of legal challenges (39%), and lack of a conservation practice certification program (36%) as the biggest obstacles to implementing such a program in their county. Fourteen percent indicated they do not see any obstacles to implementing a similar program (percentages exceed 100% because respondents were asked to give two answers to the question).

CONCLUSION

By incorporating dynamic factors like land use and management, the “smart assessment” method recognizes that the benefit a landowner receives from the drain changes over time. This method allows Drain Commissioners to more accurately allocate costs to their customers based on the benefits they derive from the drain at the time of assessment. Rewarding individual landowners for minimizing their impact on the drain ultimately benefits the entire drainage district because it leads to lower maintenance costs in the future. Based on the success of the pilot program, Van Buren County Drain Commissioner Joe Parman plans to continue and expand the program in 2015. For more information about the project please visit <http://nature.ly/GLWESS>.



Great Lakes Protection Fund