

Dane County Land and Water Resources Land Conservation Division

2014 Adaptive Management Phosphorus Reductions

Background

As part of the 2014 Adaptive Management Pilot Project goals Dane County Land and Water Resources – Land Conservation Division (LCD) continued to assist agricultural producers in the Yahara and Badfish Creek Watersheds (see Appendix A for watershed location) with implementing conservation practices. The county also expanded its phosphorus reduction quantification and verification protocols, from the pilot watershed, throughout both watersheds. By expanding these verification methods LCD staff was able to begin laying the foundation for how phosphorus reductions will be recorded and reported in a full-scale adaptive management project. Dane County also set a phosphorus reduction goal of 3,500 pounds for 2014 based on the anticipated conservation projects scheduled to be implemented that year. This reduction goal was successfully accomplished with 3,552 pounds of phosphorus reduced this past year.

Practice Implementation

Resulting phosphorus reductions in 2014 can be broken down into two broad categories defined as “soft” management practices and “hard” engineering practices. Soft practices are primarily dependent on landowner or manager decisions to function properly while hard practices rely on appropriate design and construction for efficient phosphorus reductions. Nutrient management and harvestable buffers were the soft practices that contributed to the overall verified phosphorus reductions in 2014. Hard practices implemented include; grassed waterways, a roof runoff structure, closure of waste storage structures, a water and sediment control structure, and grade stabilization structures.

Soft Practices

A total of 32 nutrient management plans were verified within the Yahara River watershed in 2014. These 32 plans covered 10,280 acres of cropland and consisted of 633 individual fields. Although the county receives a much larger number of nutrient management plans and nutrient management plan check lists each year (93,700 acres) not all of them can be reviewed due to limited resources and information. However, all plans associated with either State, Federal, or Dane County cost-share assistance programs are reviewed for compliance with the NRCS 590 standard. The 10,280 acres reported above fall into this category and were spatially mapped in order to report phosphorus reductions by TMDL Reach (see Appendix A for TMDL Reach locations). This review and reporting process also provides a reasonable level of assurance to both the Madison Metropolitan Sewage District (MMSD) and Yahara Watershed Improvement Network (WIN's) that associated phosphorus reductions resulting from reviewed nutrient management plans are credible and can be counted towards the overall phosphorus reduction goals. The amount of nutrient management acres verified in each TMDL reach is provided in Table 1.

Harvestable buffers were also implemented in three of the eight TMDL reaches in 2014. Once installed, harvestable buffers were surveyed using GPS equipment and spatially located within each TMDL Reach. Each buffer was evaluated using the SNAP-Plus tool to determine appropriate phosphorus reductions. A total of 15.2 acres was established with 7.3 acres in Reach 63, 3.5 acres in Reach 64, and 4.4 acres in Reach 69 (Table 1).

TABLE 1 A LIST OF SOFT CONSERVATION PRACTICES AND CORRESPONDING UNIT AMOUNTS BY TMDL REACH WITHIN THE YAHARA RIVER AND BADFISH CREEK WATERSHEDS. A MAP CONTAINING EACH TMDL REACH IS AVAILABLE IN APPENDIX A.

TMDL Reach	Practice Type	Practice Units	Amount
62	Nutrient Management	acres	505
63	Nutrient Management	acres	1,779
	Harvestable Buffer	acres	7.3
64	Nutrient Management	acres	7,833
	Harvestable Buffer	acres	3.5
65	-----		
66	-----		
67	Nutrient Management	acres	37
68	Nutrient Management	acres	26
69	Harvestable Buffer	acres	4.4

Six of the eight identified TMDL Reaches had verified phosphorus reductions from soft practices in 2014. Reach 64 had the largest soft practices phosphorus reductions with 1,679 pounds. A complete list of all phosphorus reductions by TMDL Reach is provided in Table 2. All totaled soft practices reduced 2,435 pounds of phosphorus from the Yahara and Badfish Creek Watersheds.

TABLE 2 TOTAL PHOSPHORUS REDUCTIONS FOR SOFT CONSERVATION PRACTICES IMPLEMENTED BY TMDL REACH. A MAP CONTAINING EACH TMDL REACH IS AVAILABLE IN APPENDIX A.

TMDL Reach	Pounds of Phosphorus Reduced from Soft Conservation Practices Implemented in 2014
62	101
63	507
64	1,679
65	0
66	0
67	7
68	5
69	136
Total for the Yahara River Watershed	2,435

Hard Practices

Four different types of hard conservation practices were installed within the Yahara in 2014. Each practice was designed and installed according to the appropriate NRCS standard and specification. Once installed, each practice was spatially mapped to ensure any associated phosphorus reductions would be credited to the appropriate TMDL Reach. Agreed upon models/tools by both MMSD, Dane County and WI DNR were used to determine the corresponding phosphorus reductions from each practice. The BARNY barnyard model was used to determine phosphorus reductions from the roof runoff structure practice. Closure of waste storage structure currently does not have a corresponding phosphorus reduction associated with it. However, this practice does address other significant resource concerns such as groundwater contamination and was included within the list of practices but was not given any phosphorus reduction credit towards adaptive management. Water and sediment control structures and grade stabilization structures were evaluated using the P8 urban catchment model. To determine phosphorus reductions from the installation of grassed waterways physical measurements of existing gully erosion were taken and used to calculate resulting sediment and phosphorus losses. These losses were then transferred to credits once the erosion was stabilized with the installation the grassed waterway. Individual unit amounts for each hard practice implemented by TMDL Reach are available in Table 3.

TABLE 3 A LIST OF HARD CONSERVATION PRACTICES AND CORRESPONDING UNIT AMOUNTS BY TMDL REACH WITHIN THE YAHARA RIVER AND BADFISH CREEK WATERSHEDS. A MAP CONTAINING EACH TMDL REACH IS AVAILABLE IN APPENDIX A.

TMDL Reach	Practice Type	Practice Units	Amount
62	Roof Runoff Structure	number	1
63	Closure of Waste Storage Structure	number	2
	Water and Sediment Control Structure	number	1
64	Grassed Waterway	acres	1.6
	Grade Stabilization Structure	number	2
65	-----		
66	Grassed Waterway	acres	3.0
67	Grassed Waterway	acres	0.8
68	-----		
69	-----		

Total phosphorus reductions from all hard conservation practices implemented in 2014 was 1,117 pounds. Reach 66 had the largest phosphorus reduction with 781 pounds when compared to all eight reaches. Phosphorus reductions by TMDL Reach resulting from hard conservation practice implementation is available in Table 4.

TABLE 4 TOTAL PHOSPHORUS REDUCTIONS FOR HARD CONSERVATION PRACTICES IMPLEMENTED BY TMDL REACH. A MAP CONTAINING EACH TMDL REACH IS AVAILABLE IN APPENDIX A.

TMDL Impaired Reach	Pounds of Phosphorus Reduced from Hard Conservation Practices Implemented in 2014
62	18
63	26
64	115
65	0
66	781
67	187
68	0
69	0
Total for the Yahara River Watershed	1,117

Total Phosphorus Reductions

Combining the phosphorus reductions from both soft and hard conservation practices in 2014 resulted in a total of 3,552 pounds. This total exceeds the 3,500 pound goal that was set for 2014. These phosphorus reductions were calculated using the best available methodologies and tools that were available and agreed upon by both Dane County, MMSD, and WI DNR. By using these methods and tools Dane County is able to provide reasonably assured verifiable phosphorus reductions to both MMSD and Yahara WIN's partners that can in turn be credited to the overall adaptive management goals.

Farmers continue to implement many conservation practices without assistance from Dane County that reduce phosphorus; however, since these practices are not verified by Dane County they are not included in the total phosphorus reductions presented in this report. By not accounting for these farmer implemented practices the phosphorus reductions reported here are

conservative and underestimate what was actually reduced in 2014. Dane County continues to work on developing additional methods for capturing these non-county assisted implemented conservation practices.

Lastly, it is important to acknowledge not only the environmental benefits these conservation practices have on reducing phosphorus but also on preventing suspended sediments and nitrogen from reaching nearby surface and groundwater. For example, nutrient management not only mitigates phosphorus loss but also maximizes nitrogen use efficiency greatly reducing the likelihood of nitrogen converting to nitrate. Nitrate has been identified as a major contaminant in many drinking water wells throughout the county and it is important to encourage practices that help reduce this contamination risk. Even though adaptive management goals currently do not focus heavily on these secondary environmental benefits their importance from a biological and human health stand point need to still be recognized.

Appendix A – Map of the Yahara River and Badfish Creek Watersheds identified by corresponding Rock River TMDL Reach.

