

Appendix C: Agricultural Edge-of-Field Targets and Water Quality Trading

The Lake Pepin TMDL: Total Maximum Daily Loads for Total Phosphorus

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1 INTRODUCTION AND NEED

Total Maximum Daily Load (TMDL) load allocations (LA) for agricultural sources can be challenging to incorporate into TMDL implementation planning efforts due to: 1) the dependence of nonpoint source pollutant loading on weather, soil, and land management practices that vary widely in space and time; and 2) conceptual differences between watershed models used for TMDL development and field-scale models used by agricultural producers to estimate nutrient and sediment losses under differing management scenarios.

The Wisconsin Department of Natural Resources (WDNR) has developed a framework for communicating the portion of the LA associated with agricultural sources through translating results of the watershed model used for TMDL development to edge-of-Field values consistent with field scale model outputs generated by SnapPlus (Soil Nutrient Application Planner) that are better understood by the agricultural community. The framework serves as a tool for producers to evaluate management practices to implement on their own fields to meet the TMDL LAs.

This Appendix reports target phosphorus yields for agricultural sources in the Lake Pepin TMDL study area that are comparable to outputs from SnapPlus, the standard nutrient management planning software used by Wisconsin agricultural producers. Appendix D details the analysis methods.

2 USE OF THIS APPENDIX

2.1 Meeting TMDL Load Allocations on Agricultural Lands

SnapPlus is Wisconsin's nutrient management planning software. The program helps farmers make the best use of their on-farm nutrients, as well as make informed and justified commercial fertilizer applications. By calculating potential soil and phosphorus runoff losses on a field-by-field basis while assisting in the economic planning of manure and fertilizer applications, SnapPlus provides Wisconsin farmers with a tool for protecting soil and water quality.

With the TMDL LAs expressed as an Edge-of-Field target, producers can use SnapPlus software to verify whether their management plans are meeting TMDL targets for phosphorus. First, producers need to determine the appropriate target phosphorus yield defined by the TMDL for their location. The phosphorus yields are provided for each of the 18 TMDL subbasins as well as the 12-Digit Hydrologic Units (HUC12s). HUC12s are the smallest watershed unit in the National Watershed Boundary Dataset maintained by the US Department of Agriculture Natural Resources Conservation Service (USDA NRCS). HUC12s are commonly used for watershed planning by government agencies and watershed groups. The Lake Pepin TMDL study area encompasses 15 HUC12s.

Producers can determine which TMDL Subbasin or HUC12 their fields are located within. If maps located throughout the TMDL report are too coarse for locating farm fields, either WDNR's Surface Water Data Viewer or Watershed Restoration & Protection Viewer can be used instead (on WDNR's website, type either "surface water data viewer" or "watershed restoration & protection viewer" into the search bar at <http://dnr.wi.gov>). Similarly, users can identify which HUC12 their field is located within by using the interactive Water Condition Viewer (type "water condition viewer" into the search bar at <http://dnr.wi.gov>). Table C1 lists the appropriate target phosphorus yields by both TMDL subbasin and HUC12 based on the TMDL baseline load and the assigned percent reduction.

Producers can then use SnapPlus to create or modify a database for each field within their farm to (a) reflect actual (not planned) cropland practices (e.g., tillage, crop rotation, nutrient applications) they have implemented; and (b) ensure all fields within the SnapPlus "Fields" menu use the predominant soil as the critical soil type (within SnapPlus, the critical soil type is used to generate soil and P loss estimates). Once SnapPlus reflects (a) and (b), producers can use SnapPlus reports to compare each crop rotation they manage to the TP targets. If annual average TP losses for a given crop rotation exceed the TP targets in Table C1, then that crop rotation exceeds the TMDL agricultural LA, and additional reductions are needed. Details concerning the analysis used to calculate the TP baseline can be found in Appendix D.

Table C1: Agricultural Edge of Field Targets for Total Phosphorus by TMDL Subbasin and HUC12

TMDL Subbasin	TMDL Subbasin Name	HUC12	HUC12 Name	County Name(s)	TP Baseline (lbs./ac/yr)	TMDL % Reduction	TP Target (lbs./ac/yr)
1	Trimbelle River—mile 19.0 to headwaters	70400010301	Goose Creek-Trimbelle River	Pierce, St. Croix	4.4	20.0	3.52
2	Rush River—mile 34.3 to headwaters	70400010501	Village of Baldwin-Rush River	St. Croix	4.7	23.7	3.54
3	Rush River—mile 25.9 to mile 34.3	70400010502	Town of Martell-Rush River	Pierce, St. Croix	3.5	20.0	2.80
4	Cave Creek	70400010503	Cave Creek	Pierce	5.0	20.0	4.00
5	Lost Creek (tributary to Rush River)	70400010504	Lost Creek	Pierce	3.9	20.0	3.12

TMDL Subbasin	TMDL Subbasin Name	HUC12	HUC12 Name	County Name(s)	TP Baseline (lbs./ac/yr)	TMDL % Reduction	TP Target (lbs./ac/yr)
6	Rush River—mile 13.4 to mile 25.9	70400010505	Brush Creek- Rush River	Pierce	3.7	20.0	2.96
7	Rush River—mouth to mile 13.4	70400010506	Township of Salem- Rush River	Pierce	4.5	20.0	3.60
8	Pine Creek	70400010702	Pine Creek	Pierce, Pepin	4.5	20.0	3.60
9	Mississippi River	70400010403	City of Red Wing- Mississippi River	Pierce	2.2	20.0	1.76
10	Lake Pepin	70400010705	Lake Pepin	Pierce, Pepin	3.8	20.0	3.04
11	Mississippi River	70400010102	Lock and Dam No. 3- Mississippi River	Pierce	3.8	20.0	3.04
12	Trimbelle River—mouth to mile 19.0	70400010303	Spring Creek- Trimbelle River	Pierce	4.8	20.0	3.84
13	Big River	70400010101	Big River	Pierce	3.7	20.0	2.96
14	Little Trimbelle River	70400010302	Little Trimbelle River	Pierce	4.9	20.0	3.92
15	Rush River—mouth to mile 7.4	70400010507	Crystal Springs Coulee- Rush River	Pierce	4.9	20.0	3.92
16	Isabelle Creek	70400010701	Isabelle Creek	Pierce	4.7	24.6	3.49
17	Bogus Creek	70400010705	Lake Pepin	Pepin	3.8	20.0	3.04
18	Lost Creek (tributary to Lake Pepin)	70400010705	Lake Pepin	Pepin	3.8	72.8	1.03

3 WATER QUALITY TRADING AND TMDLS

Water Quality Trading (WQT) may be used by Wisconsin Pollutant Discharge Elimination System (WPDES) permit holders to demonstrate compliance with water quality-based effluent limitations (WQBELs). Generally, WQT occurs when a point source facing relatively high pollutant reduction costs compensates another party to achieve less costly pollutant reduction that yields the same or greater water quality benefit. In other words, WQT provides point sources with the flexibility to offset their pollutant load reductions by providing financial resources to reduce pollutants from other sources in the watershed.

Point sources can receive credit for reducing phosphorus losses on agricultural fields. In the Lake Pepin TMDL study area, credit generation and the type of credit (interim or long-term) will depend on whether the adoption conservation practices reduce annual phosphorus losses below the TP Target shown in Table C1. Additional information can be found in the WDNR WQT guidance document.