



Annual Dane County Yahara WINS Adaptive Management Report



Annual report on Dane County Land and Water Resources Department efforts assisting agricultural producers with implementing conservation practices that reduce phosphorus runoff for the Yahara WINS Adaptive Management project.

2016 Report Year

TABLE OF CONTENTS

Figures.....	ii
Tables.....	ii
Executive Summary _____	1
Overview.....	1
Key 2016 Accomplishments.....	1
Contacted Landowners and Producers _____	2
Planning Activities _____	3
Practices Implemented _____	4
Verification Checks _____	8
Nutrient Management _____	9
Innovative Conservation Practices _____	12
Cost Share _____	13
Phosphorus Reductions _____	15
Yahara Watershed Phosphorus Reductions.....	15
TMDL Reach 62 Phosphorous Reductions.....	16
TMDL Reach 63 Phosphorous Reductions.....	16
TMDL Reach 64 Phosphorous Reductions.....	17
TMDL Reach 65 Phosphorous Reductions.....	17
TMDL Reach 66 Phosphorous Reductions.....	18
TMDL Reach 67 Phosphorous Reductions.....	18
TMDL Reach 68 Phosphorous Reductions.....	19
TMDL Reach 69 Phosphorous Reductions.....	19
Additional Accomplishments _____	20
Service Agreement	20

TABLE OF CONTENTS

FIGURES

Figure 1. Number of annual landowner/producer contacted within the Yahara watershed since 2014.	2
Figure 2. Number of annual planned conservation practices within the Yahara watershed identified in the Dane County Land and Water Resources Department annual work plans submitted to Yahara WIN's.....	3
Figure 3. General location of conservation practices implemented in the Yahara watershed since 2008.	7
Figure 4. Total acres of nutrient management plans mapped within the Yahara watershed since 2014. Internally drained areas are removed.	9
Figure 5. Map of TMDL Reaches and internally drained areas within the Yahara watershed.	10
Figure 6. Map of 2016 submitted nutrient management plans within the Yahara watershed. Fields located in internally drained areas are removed.	11
Figure 7. Number of cost share agreements by funding source entered into each year within the Yahara watershed since 2014.	13
Figure 8. Amount of cost share funding allocated by year since 2014.	14

TABLES

Table 1. Amount of calculated phosphorus reducing conservation practices implemented in the Yahara watershed by TMDL Reach and year since 2008.	4
Table 2. Acres of nutrient management plans mapped within the Yahara watershed since 2014. Acres located within internally drained areas are removed.	11
Table 3. Amount of harvestable buffers implemented within the Yahara watershed by TMDL Reach since 2014.	12
Table 4. Reduction of new and carryover pounds of phosphorus by TMDL Reach and year.....	15
Table 5. Dane County Land and Water Resources Department annual phosphorus reduction goals per the Yahara WINs Service Agreement.	20

EXECUTIVE SUMMARY

Executive Summary

OVERVIEW

This past year (2016) marks the fifth year that Dane County Land & Water Resources Department (the County) has collaborated with the Yahara Watershed Improvement Network (WINs), Madison Metropolitan Sewage District (MMSD), and other partners on furthering the adaptive management effort in the Yahara watershed. Since 2012, the County has been assisting Yahara WINs and MMSD in pilot testing watershed adaptive management as a permit compliance option for meeting the phosphorus requirements for MMSD's Wisconsin Pollutant Discharge Elimination System (WPDES) permit. This option takes a holistic approach in reducing all sources of phosphorus pollution (point and non-point) within a watershed in order to improve water quality. Although the pilot project concluded in 2015, the County used 2016 as a "transition year" to apply lessons learned from the pilot and prepare for full scale implementation starting in January 2017.

KEY 2016 ACCOMPLISHMENTS

- Aided 295 landowners/producers in the Yahara watershed with practice implementation, environmental compliance, and cost share assistance.
- Conducted planning activities for the implementation of more than 80 conservation practices for 2017 and beyond.
- Implemented and tracked over 313 conservation practices and systems that reduce phosphorus delivery to nearby surface waters.
- Tracked over 39,600 acres of nutrient management plans within the Yahara watershed.
- Reduced and tracked a total (new + carryover) of 18,392 pounds of phosphorus from conservation practices implemented.
- Entered into 24 cost share agreements for conservation practices and systems within the Yahara watershed.
- Allocated over \$677,000 in cost share assistance within the Yahara watershed.
- Signed a 5 year agreement with Yahara WIN's for adaptive management related services.



Photo of lake Mendota and Monona

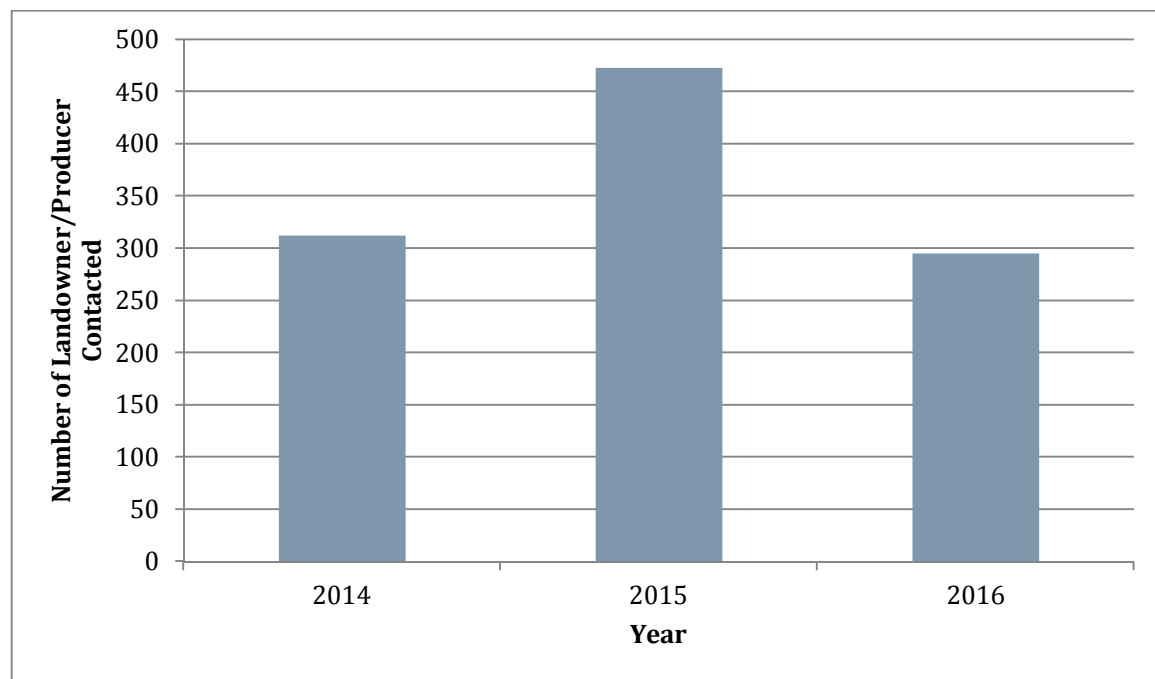
CONTACTED LANDOWNERS AND PRODUCERS

Contacted Landowners and Producers

The County staff work with landowners and producers on a regular basis. Services provided include planning and technical assistance in identifying and addressing various resource concerns. These resource concerns can range from soil and phosphorus delivery to nearby streams to upland and instream habitat improvements. Other services provided include: cost share program administration, local ordinance and state performance standard implementation, and farmland preservation program compliance certification.

In 2016, LWRD worked with 295 landowners/producers within the Yahara watershed (Figure 1). This is lower than the number in 2015 but similar to 2014. The 2015 reporting year had higher numbers as a result of a large number of land owners requesting Farmland Preservation Program certificates of compliance.

Figure 1. Number of annual landowner/producer contacted within the Yahara watershed since 2014.



PLANNING ACTIVITIES

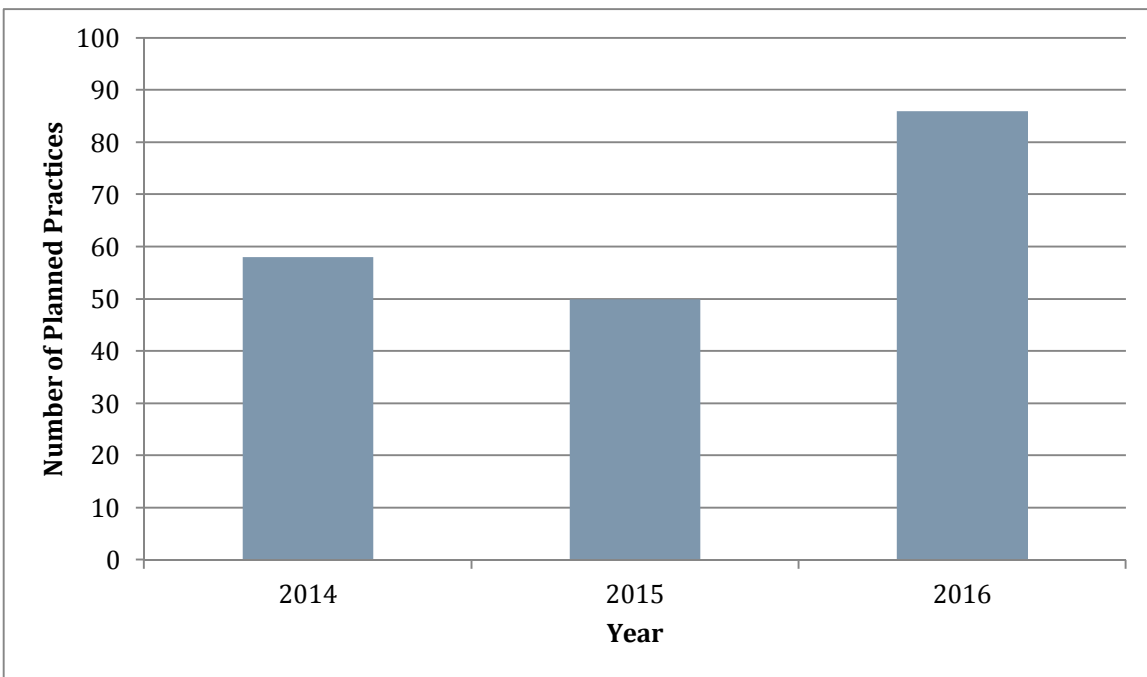
Planning Activities

Planning efforts associated with the implementation of conservation practices is an ongoing process. Project work plans are typically developed during the winter months for the subsequent construction season. The County's work plan associated with implementing Yahara WINS adaptive management is submitted by January 31st of each year in accordance with the service agreement. A landowners' implementation of conservation practices is voluntary and the number of planned practices versus implemented practices varies each year. More than 80 conservation practices were planned for implementation by LWRD staff in 2016 and beyond for the Yahara watershed (Figure 2).



Photo of staff working with a landowner

Figure 2. Number of annual planned conservation practices within the Yahara watershed identified in the Dane County Land and Water Resources Department annual work plans submitted to Yahara WIN's.



PRACTICES IMPLEMENTED

Practices Implemented

Conservation practices are implemented to address a wide variety of resource concerns. The Yahara WINs adaptive management project is focusing on the implementation of conservation practices to reduce phosphorus delivery to nearby lakes and streams located in the Yahara Watershed. In 2016, landowners and producers in the watershed implemented a variety of phosphorus reducing practices including: cover crops, critical area plantings, waste storage structures, grassed waterways, stream crossings, and harvestable buffers (Table 1). In total, 57 conservation practices and systems that reduce phosphorus were implemented and verified in 2016 bringing the total number of tracked practices, since 2008, up to 313.

Table 1. Amount of calculated phosphorus reducing conservation practices implemented in the Yahara watershed by TMDL Reach and year since 2008.

TMDL Reach	Practice	Unit	2008 to 2012	2013	2014	2015	2016	Total Amount
62	Cover Crop	Ac	0	0	0	25	0	25
	Grade Stabilization Structure	No	1	0	0	0	0	1
	Grassed Waterway	Ac	2.7	0	0	0	0	2.7
	Pasture and Hay Planting	Ac	5.5	0	0	0	0	5.5
	Roof Runoff Structure	No	0	0	1	0	0	1
63	Waste Storage Facility	No	1	0	0	0	0	1
	Cover Crop	Ac	0	0	0	146.8	126.5	273.3
	Closure of Waste Impound	No	0	0	2	0	0	2
	Filter Strip	Ac	0	0	7.3	0	0	7.3
	Grassed Waterway	Ac	3.8	0	0	1	0	4.8
	Roof Runoff Structure	No	2	0	0	0	0	2
	Heavy Use Area Protection	Ac	4	0.2	0	0	0	4.2
	Water and Sediment Control Structure	No	0	0	1	0	0	1
	Dane County Perpetual Easement	Ac	3	0	0	0	0	3

PRACTICES IMPLEMENTED

TMDL Reach	Practice	Unit	2008 to 2012	2013	2014	2015	2016	Total Amount
64	Waste Storage Facility	No	2	1	0	2	2	7
	Conservation Cover	Ac	0	0	0	0	2	2
	Cover Crop	Ac	0	0	0	256.2	167.9	424.1
	Critical Area Planting	Ac	3.1	0	4.5	0	0.5	8.1
	Diversion	Ft	900	250	0	1350	290	2790
	Filter Strip	Ac	0	1.5	3.46	7.3	6.2	18.46
	Grade Stabilization Structure	No	2	1	1	1	0	5
	Grassed Waterway	Ac	14.5	0.5	1.6	4.05	0.25	20.9
	Lined Waterway or Outlet	Ft	0	0	0	0	606	606
	Access Control	Ac	0	0	0	0	2.9	2.9
	Pasture and Hay Planting	Ac	32.8	1.7	0	0	0	34.5
	Prescribed Grazing	Ac	32.8	0	0	0	0	32.8
	Roof Runoff Structure	No	3	0	0	1	0	4
	Heavy Use Area Protection	Ac	3.2	0	0	0.1	0	3.3
	Animal Trails and Walkways	Ft	147	0	0	0	331	478
	Stream Crossing	No	0	0	0	0	1	1
	Streambank and Shoreline	Ft	1310	0	0	0	0	1310
	Manure Transfer	No	3	1	0	0	0	4
	Wastewater Treatment Strip	Ac	0.6	0	0	0	0	0.6
	Water and Sediment Control Structure	No	1	0	0	1	0	2
Wetland Restoration	Ac	0	78	0	0	0	78	
65	Grassed Waterway	Ac	0	0	0	0	3.3	3.3
66	Conservation Cover	Ac	6.3	0	3.6	1	0	10.9
	Diversion	Ft	2050	0	0	300	0	2350
	Filter Strip	Ac	4.1	0	0	41.2	11.3	56.6
	Grassed Waterway	Ac	8.4	9.9	2.98	4.95	0	26.23
	Forage Harvest Management	Ac	0	45.1	0	0	0	45.1
	Pasture and Hay Planting	Ac	8.8	0	0	0	0	8.8

PRACTICES IMPLEMENTED

TMDL Reach	Practice	Unit	2008 to 2012	2013	2014	2015	2016	Total Amount
	Tree/Shrub Establishment	Ac	0	0	8.2	10.6	0	18.8
	Water and Sediment Control Structure	No	1	0	0	0	0	1
	Shallow Water Development	Ac	0	0	1.7	0	0	1.7
	Wetland Restoration	Ac	3.2	0	0	6	0	9.2
67	Filter Strip	Ac	5.2	0	0	23.2	3.7	32.1
	Grassed Waterway	Ac	1	0	0.8	0	0	1.8
	Pasture and Hay Planting	Ac	4.2	0	0	0	0	4.2
	Tree/Shrub Establishment	Ac	0	0	4.7	0	0	4.7
68	Grade Stabilization Structure	No	1	0	0	0	0	1
	Grassed Waterway	Ac	3.8	0	0	0	0	3.8
	Tree/Shrub Establishment	Ac	0	1	0	0	0	1
	Wetland Restoration	Ac	10	0	0	0	0	10
69	Conservation Cover	Ac	60.5	0	0	0	24.8	85.3
	Filter Strip	Ac	12.8	3	4.4	0	0	20.2
	Grassed Waterway	Ac	5.8	0	0.4	1.4	1.2	8.8
	Water and Sediment Control Structure	No	0	0	0	1	0	1
	Wetland Wildlife Habitat	Ac	0	9.6	0	0	0	9.6
	Shallow Water Development	Ac	0	0	0	0	3.51	3.51

VERIFICATION CHECKS

Verification Checks

All 57 conservation practices constructed in 2016 were verified as part of post-construction requirements to meet technical standards and specifications. Information regarding the verification and continued maintenance of implemented conservation practices with design life's greater than one year will be included in future reporting in accordance with the service agreement between the County and Yahara WINS.



Photo of a rock lined waterway and animal trail and walkway



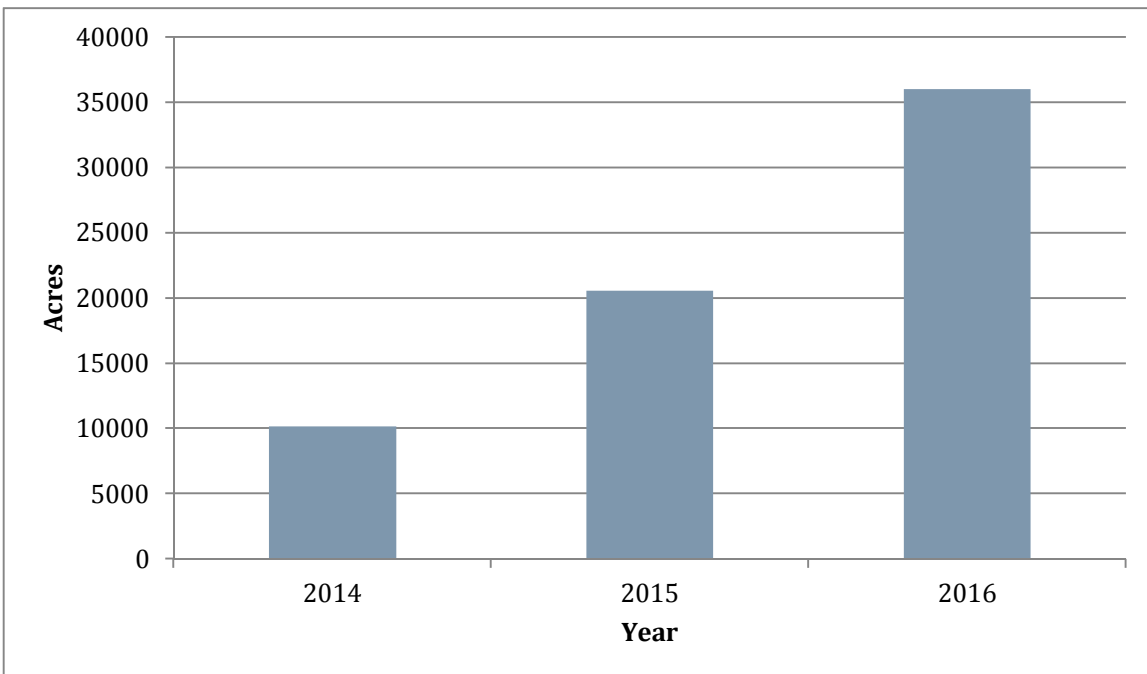
Photo of a stream crossing and rock lined waterway

NUTRIENT MANAGEMENT

Nutrient Management

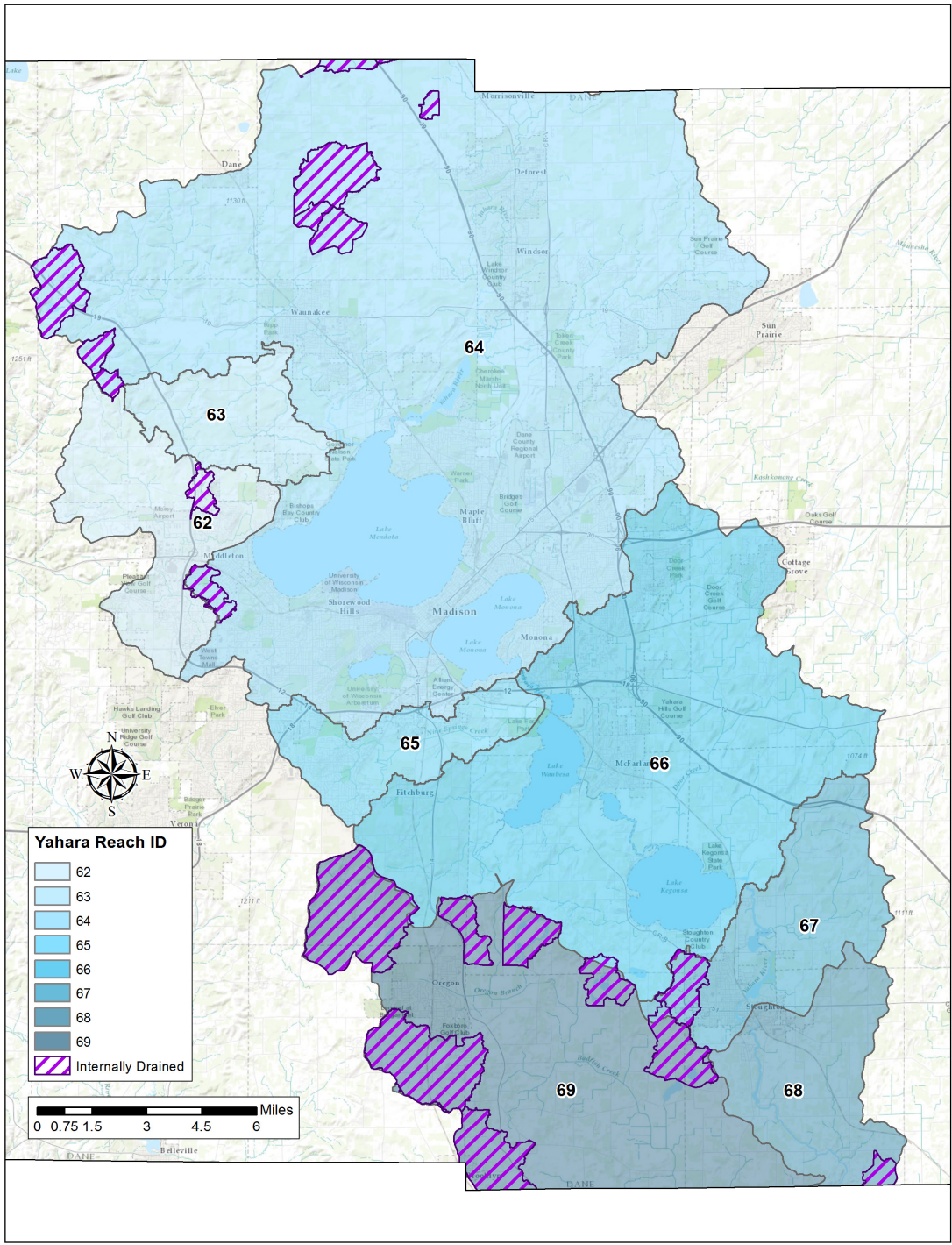
Landowners and producers submit Nutrient Management Plans (NMP) to the County for a number of different reasons including: a condition of receiving cost share, participation in Farmland Preservation Program, a condition of a permit, or voluntary submittal from a landowner or producers. Since 2014, the County has been spatially tracking the extent in which NMP data is available. The total number of acres mapped on an annual basis is increasing with over 39,600 acres within the Yahara watershed. Approximately 36,000 acres are located in areas that are not internally drained which is 15,429 more acres than in 2015 (Figure 4). Internally drained areas are those areas within the Yahara watershed that are not hydrologically connected to the outlet of the Yahara watershed (Figure 5) due to impeding landscape features. These areas are important to identify since any phosphorus reducing practices implemented within them will not be counted in the overall phosphorus reductions reported to Yahara WINS. The total number of acres for each TMDL Reach can be seen in Table 2 as well as the general location of fields with NMPs in Figure 6.

Figure 4. Total acres of nutrient management plans mapped within the Yahara watershed since 2014. Internally drained areas are removed.



NUTRIENT MANAGEMENT

Figure 5. Map of TMDL Reaches and internally drained areas within the Yahara watershed.

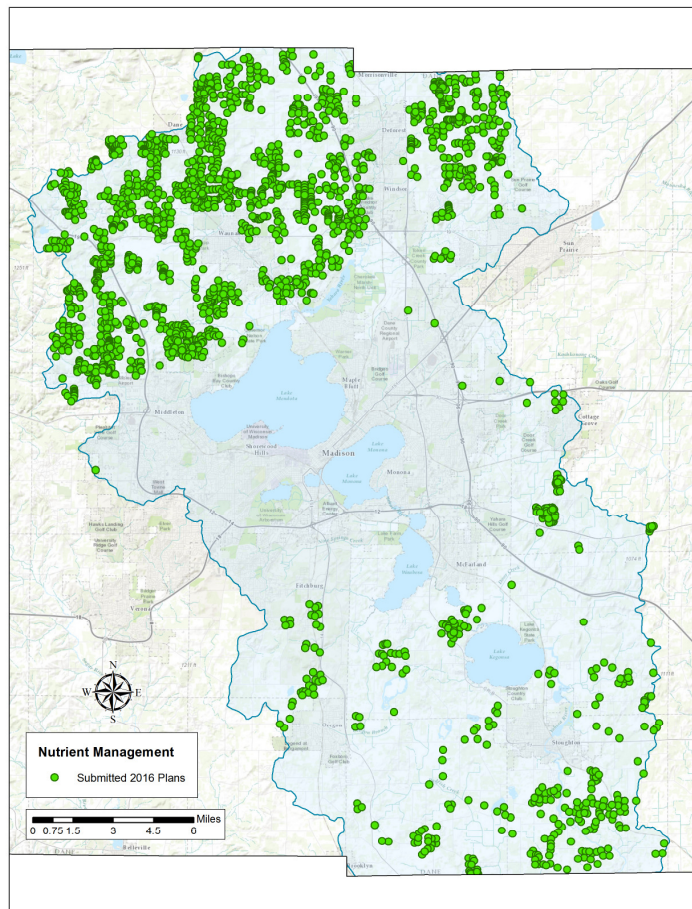


NUTRIENT MANAGEMENT

Table 2. Acres of nutrient management plans mapped within the Yahara watershed since 2014. Acres located within internally drained areas are removed.

TMDL Reach	2014	2015	2016
62	505	2,077	2794
63	1,779	3,757	2,112
64	7,833	14,574	23,015
65	0	0	0
66	0	104	2,213
67	37	37	915
68	26	26	2,348
69	0	0	2,606
Total	10,180	20,574	36,003

Figure 6. Map of 2016 submitted nutrient management plans within the Yahara watershed. Fields located in internally drained areas are removed.



INNOVATIVE CONSERVATION PRACTICES

Innovative Conservation Practices

The County and its partners are continually exploring new and innovative ideas related to phosphorus reducing conservation practices and systems as well as strategies to promote and encourage their adoption. In 2016, the County continued assisting landowners with implementing harvestable buffers which has been one of the more popular innovative practices to date. More than 21 acres of harvestable buffers were installed in 2016 bringing the total amount of acres within the Yahara watershed up to 88 (Table 3) since 2014. These 88 acres are preventing more than 2,000 pounds of phosphorus from reaching nearby surface waters annually.

A County cost share program to promote the implementation of Low Disturbance Manure Injection (LDMI) was also developed in 2016. This practice is designed to allow for the injection of manure into the soil while providing minimal soil disturbance and subsequent soil and nutrient loss during runoff events. No agreements were entered into in 2016; however, modifications were made to the program in 2017 with the intention of attracting more interest.

Table 3. Amount of harvestable buffers implemented within the Yahara watershed by TMDL Reach since 2014.

TMDL Reach	Practice	Unit	2014	2015	2016	Total Amount
63	Harvestable Buffer	Ac	7.3	0	0	7.3
64	Harvestable Buffer	Ac	3.5	0	6.2	9.7
66	Harvestable Buffer	Ac	0	28.9	11.3	40.2
67	Harvestable Buffer	Ac	0	23.2	3.7	26.9
69	Harvestable Buffer	Ac	4.4	0	0	4.4



Photo of a harvestable buffer

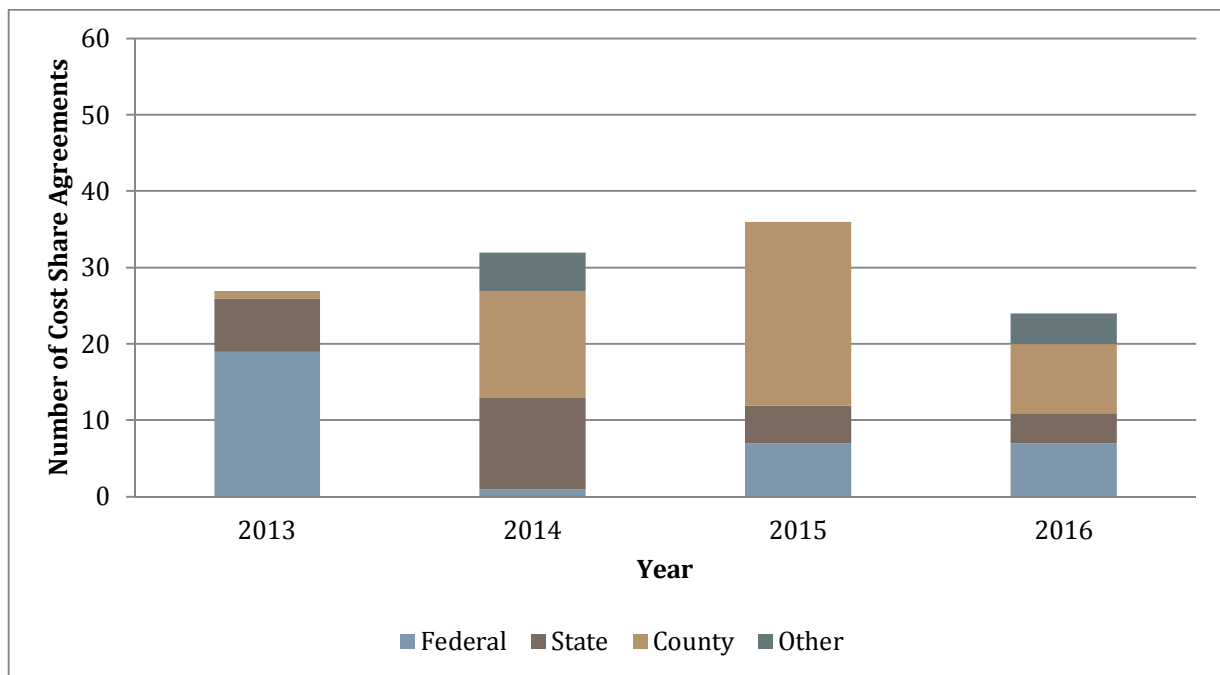
COST SHARE

Cost Share

Cost share is provided to producers using a number of different funding sources including *Federal, State, County, and Other* (i.e. Yahara WIN's, CLA, etc.). Available funds and conditions vary based on the source of funds. The County strives to utilize and leverage all funding sources available to landowners and producers.

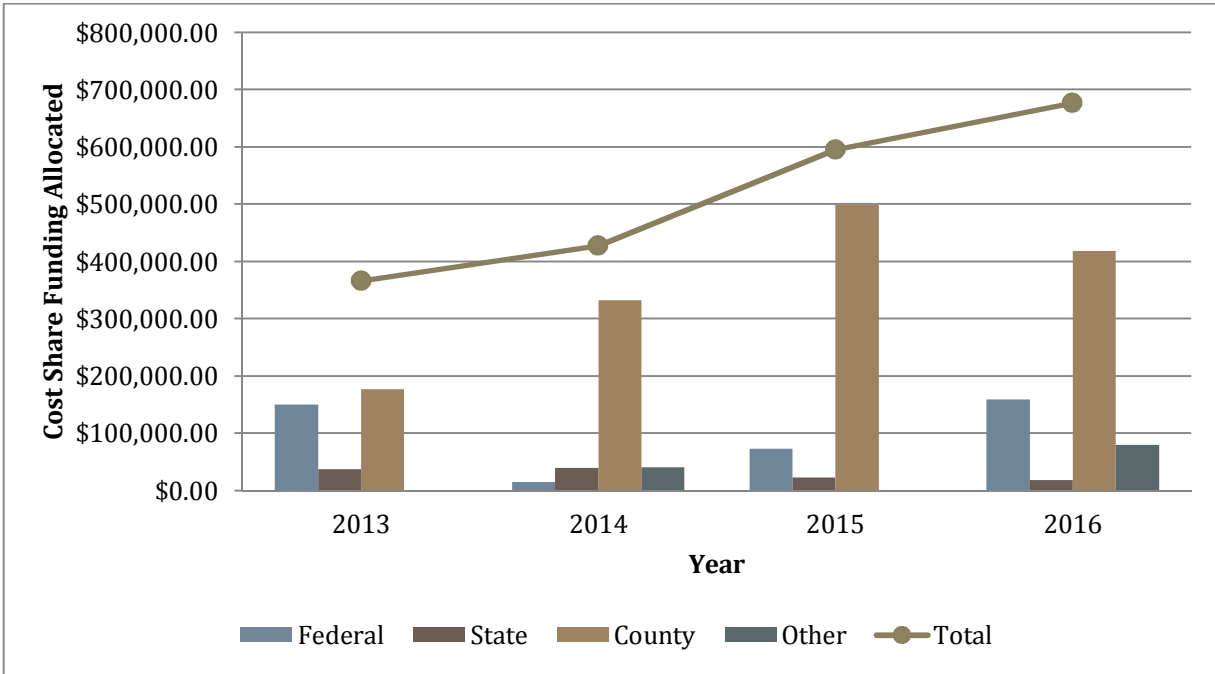
The number of cost share agreements executed each year also varies. This is often limited by available annual funding and interest from producers. In 2016, there were a total of 24 new cost share agreements with landowners that utilized *Federal, State, County, and Other* funding sources (Figure 7) within the Yahara. This was lower than the number of contracts in 2015; however, the total dollar amount in 2016 was higher than the preceding three years (Figure 8). The total cost share funding allocated in 2016 was just below \$700,000.

Figure 7. Number of cost share agreements by funding source entered into each year within the Yahara watershed since 2014.



COST SHARE

Figure 8. Amount of cost share funding allocated by year since 2014.



PHOSPHORUS REDUCTIONS

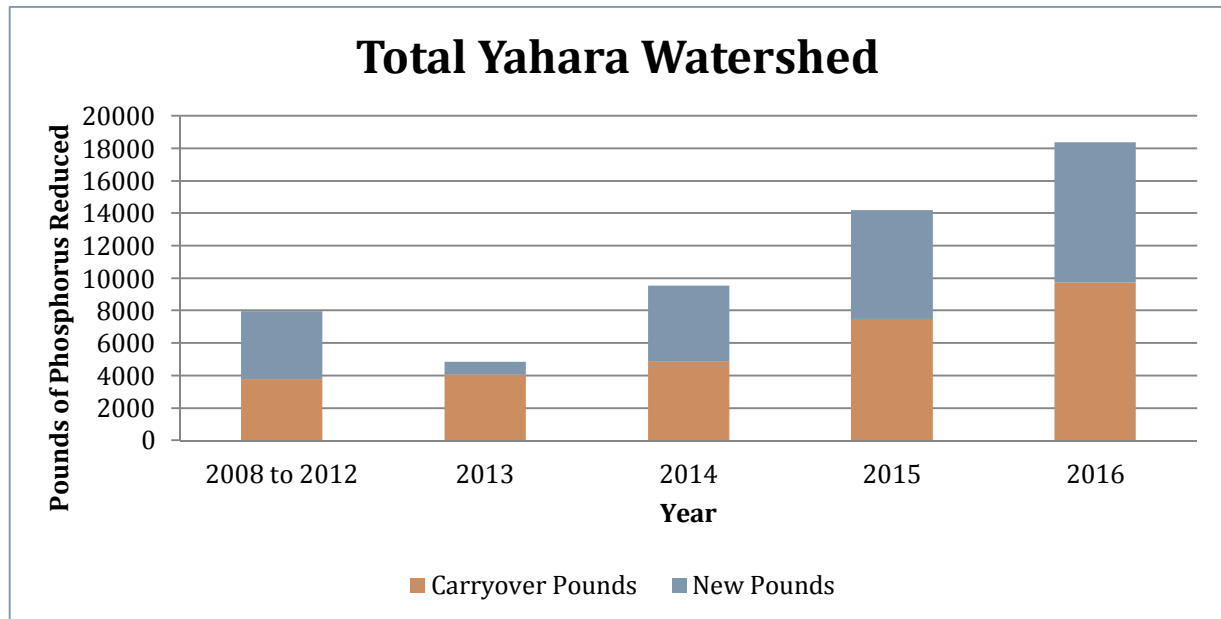
Phosphorus Reductions

Total phosphorus reductions for the Yahara watershed in 2016 was 18,392 pounds. This included 9,750 pounds from carryover practices and 8,642 pounds from new practices. Carryover pounds are generated from conservation practices implemented prior to 2016 that are still functioning and reducing phosphorus. New pounds are from practices implemented in the 2016 calendar year. Phosphorus reductions for the Yahara watershed and subsequent TMDL Reaches over time are presented in figures below. Table 4 also has both new and carryover pounds of phosphorus reduced over time.

Table 4. Reduction of new and carryover pounds of phosphorus by TMDL Reach and year.

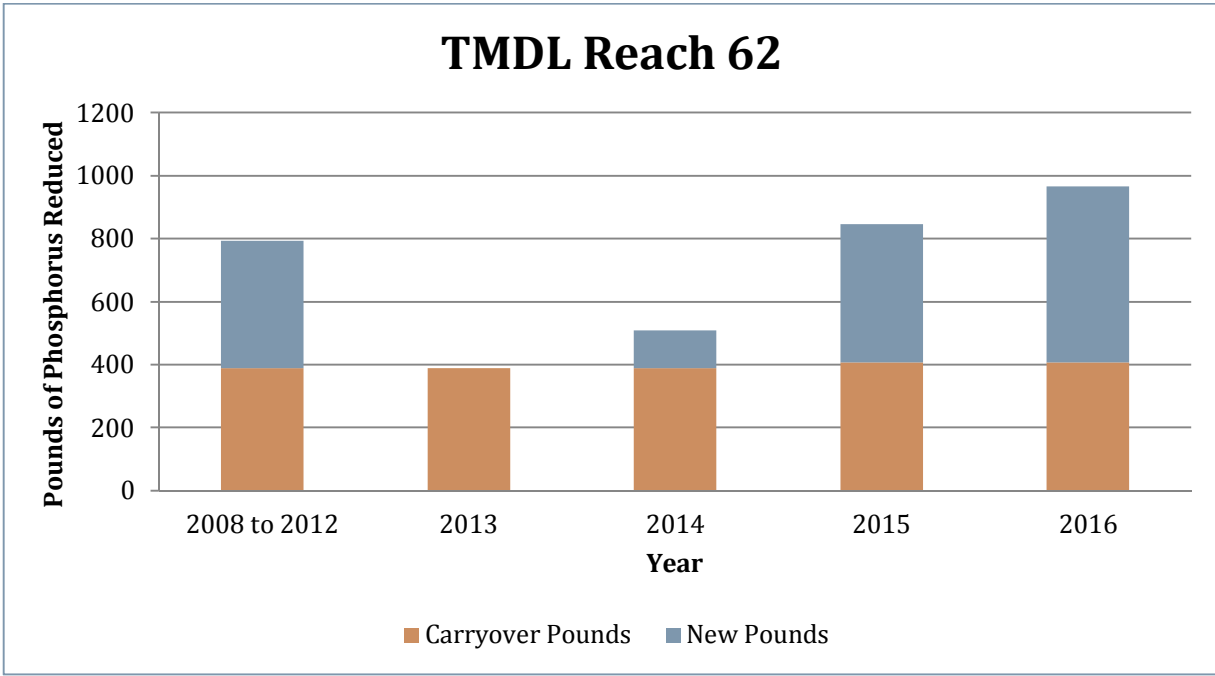
TMDL Reach	2008-2012		2013		2014		2015		2016	
	New	Carryover	New	Carryover	New	Carryover	New	Carryover	New	Carryover
62	402.9	390.2	0	390.2	118.7	390.2	440.4	407.9	558.8	407.9
63	1272.8	1219.3	26.6	1272.8	1503	1299.4	957.7	2446.6	548.9	2506.1
64	1653.9	1450	301.2	1578.5	1934.2	1875.8	3568	2243.4	5355.4	2712.9
65	0	0	0	0	0	0	0	0	182.2	0
66	494.6	448.1	432.6	474.3	812.7	906.9	1408.7	1719	733.5	3106.9
67	65.5	55.8	0	55.8	205.5	55.8	277.1	253.9	206.9	523.6
68	189.1	141	2.3	189.1	5.2	191.4	5.2	191.4	469.6	191.4
69	95.2	95.2	29.1	95.2	136.1	124.3	41.1	260.4	586.3	301.5

YAHARA WATERSHED PHOSPHORUS REDUCTIONS

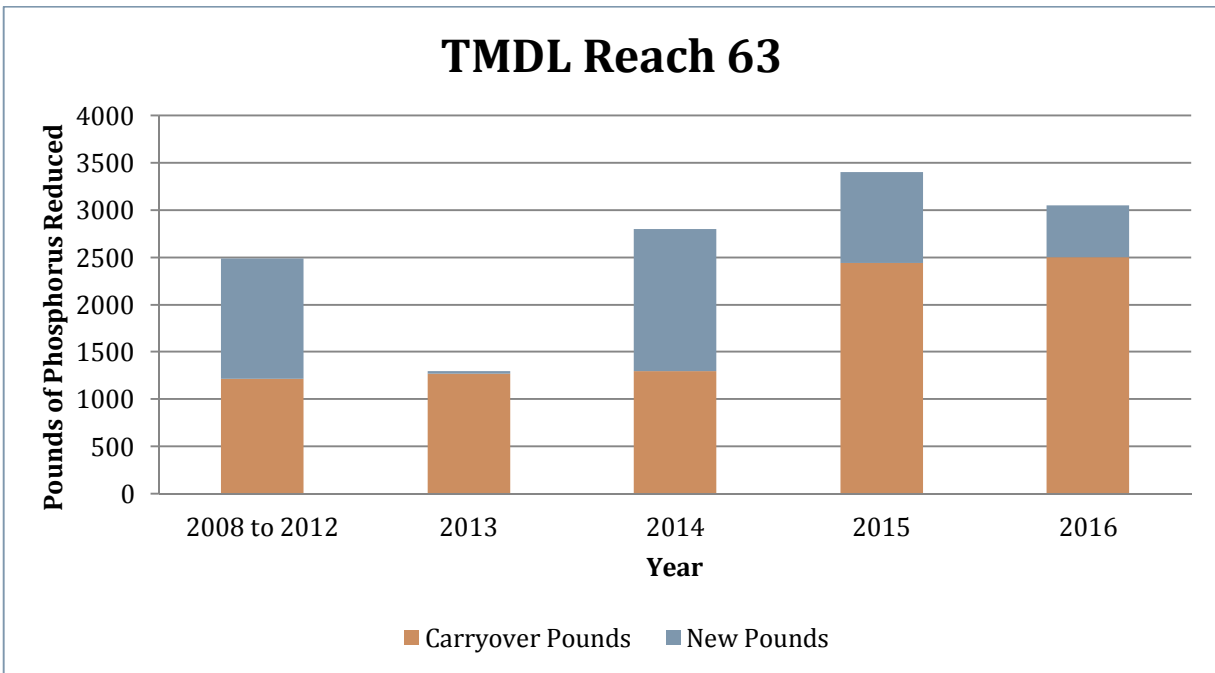


PHOSPHORUS REDUCTIONS

TMDL REACH 62 PHOSPHOROUS REDUCTIONS

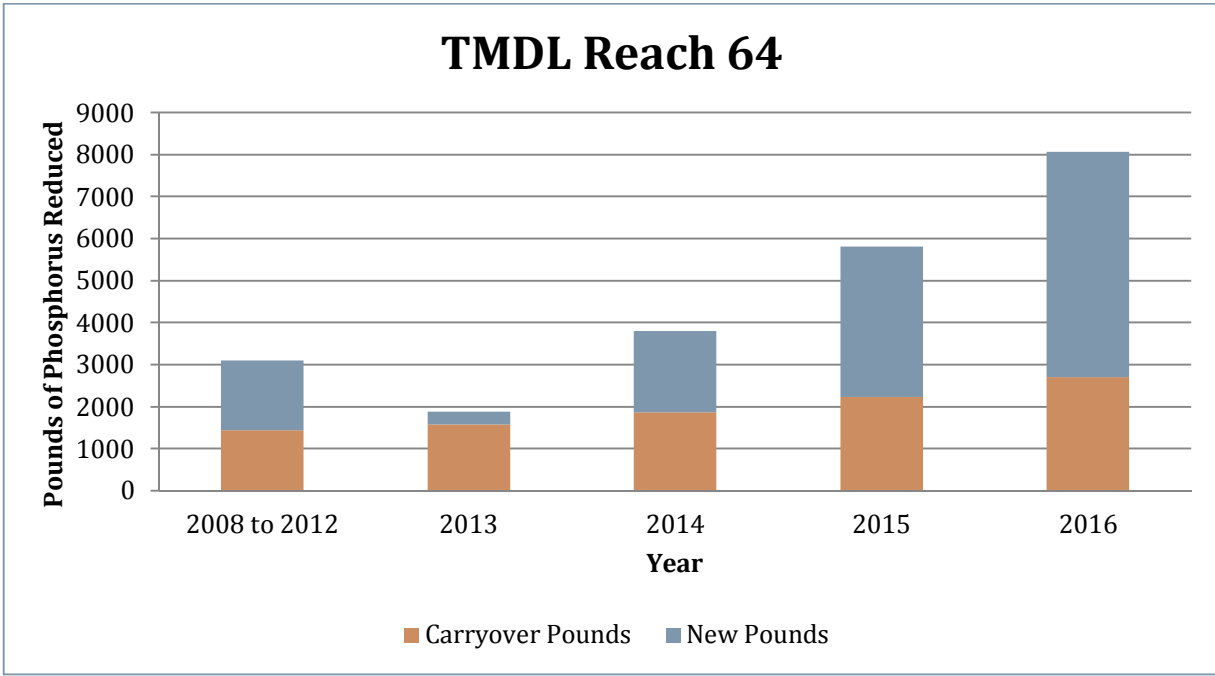


TMDL REACH 63 PHOSPHOROUS REDUCTIONS

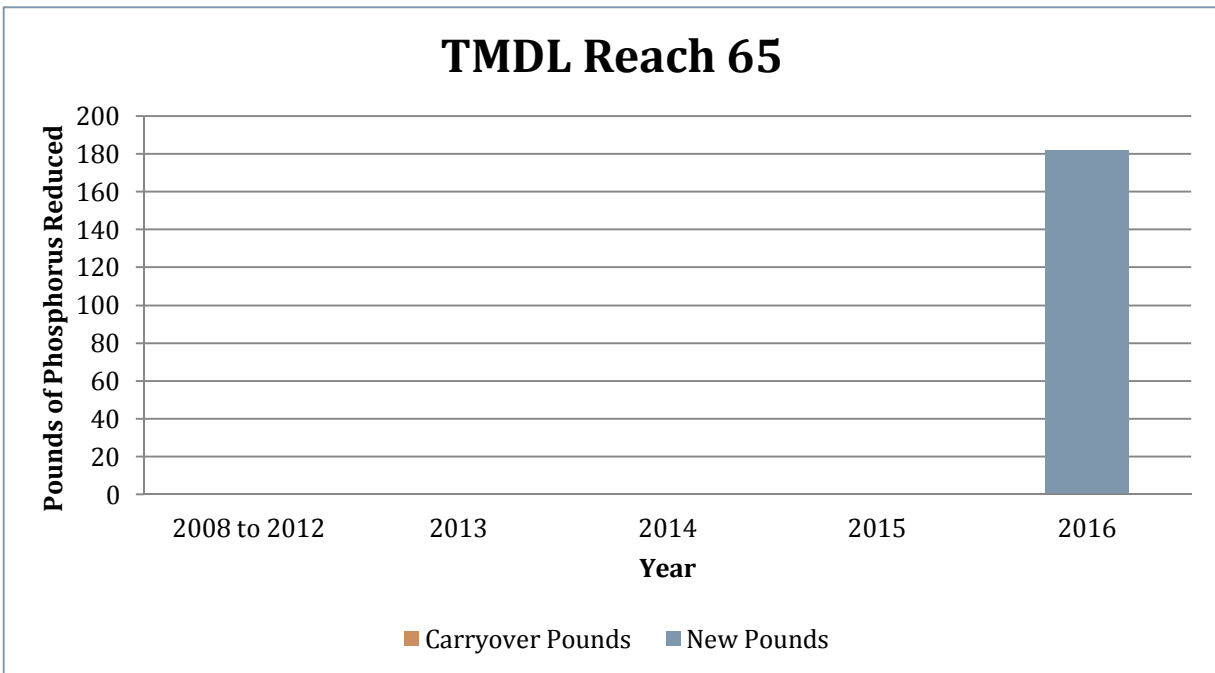


PHOSPHORUS REDUCTIONS

TMDL REACH 64 PHOSPHOROUS REDUCTIONS

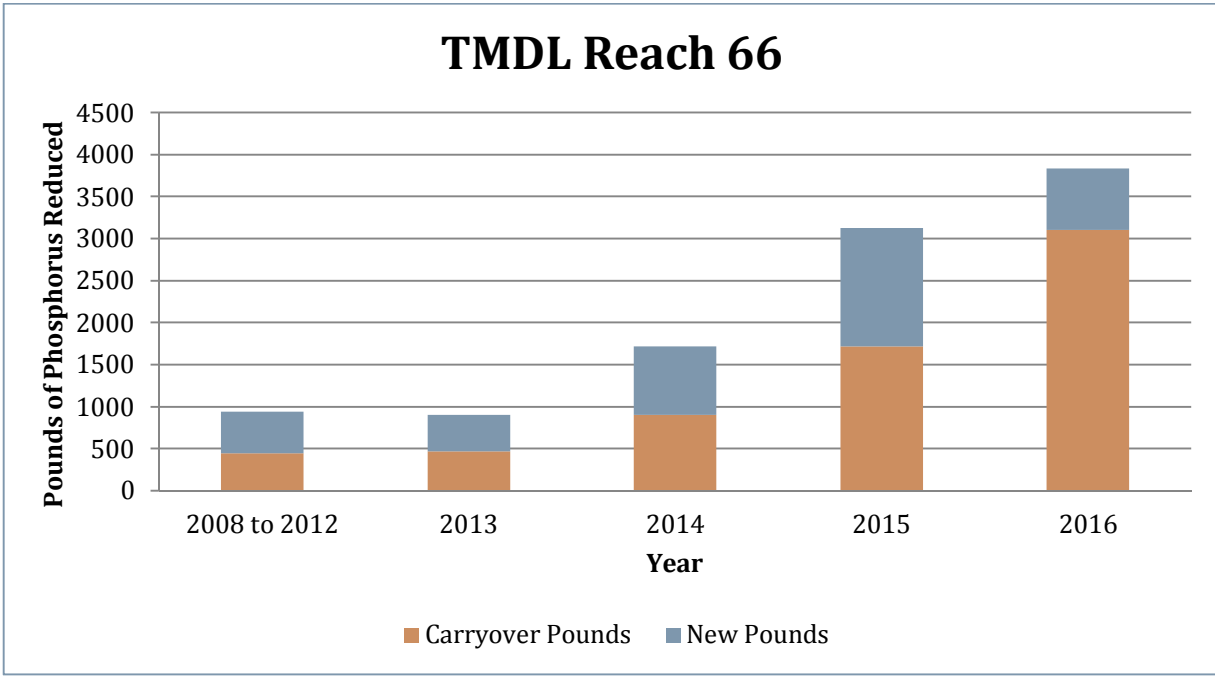


TMDL REACH 65 PHOSPHOROUS REDUCTIONS

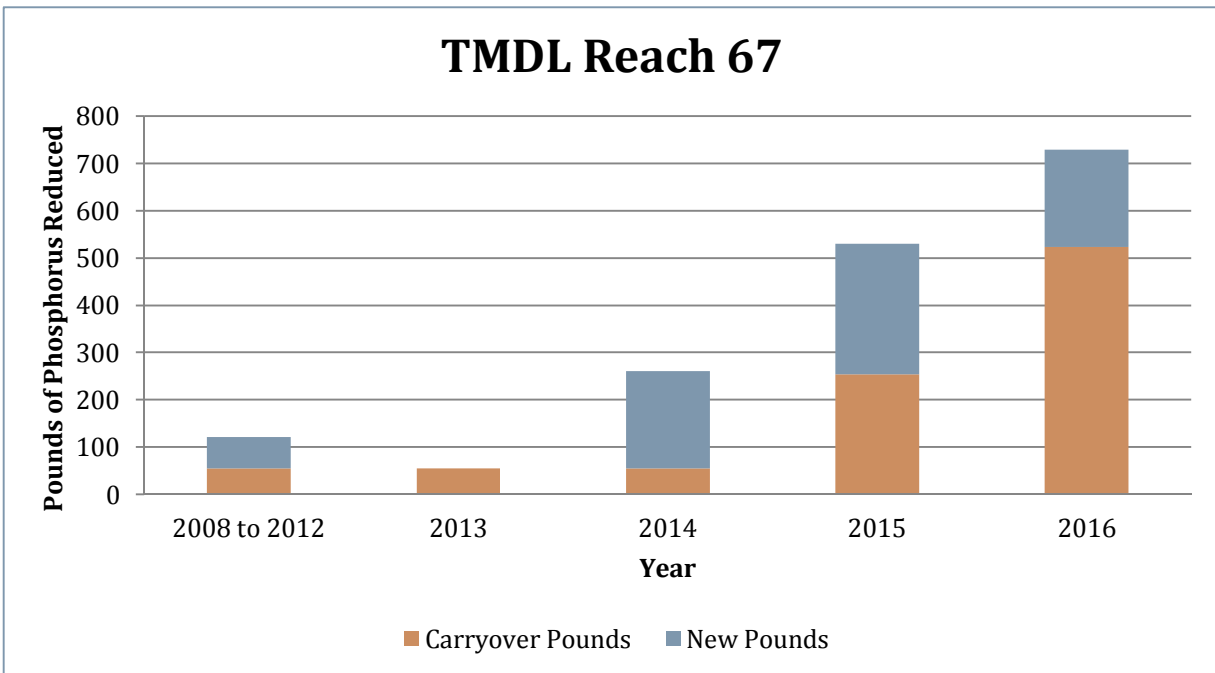


PHOSPHORUS REDUCTIONS

TMDL REACH 66 PHOSPHOROUS REDUCTIONS

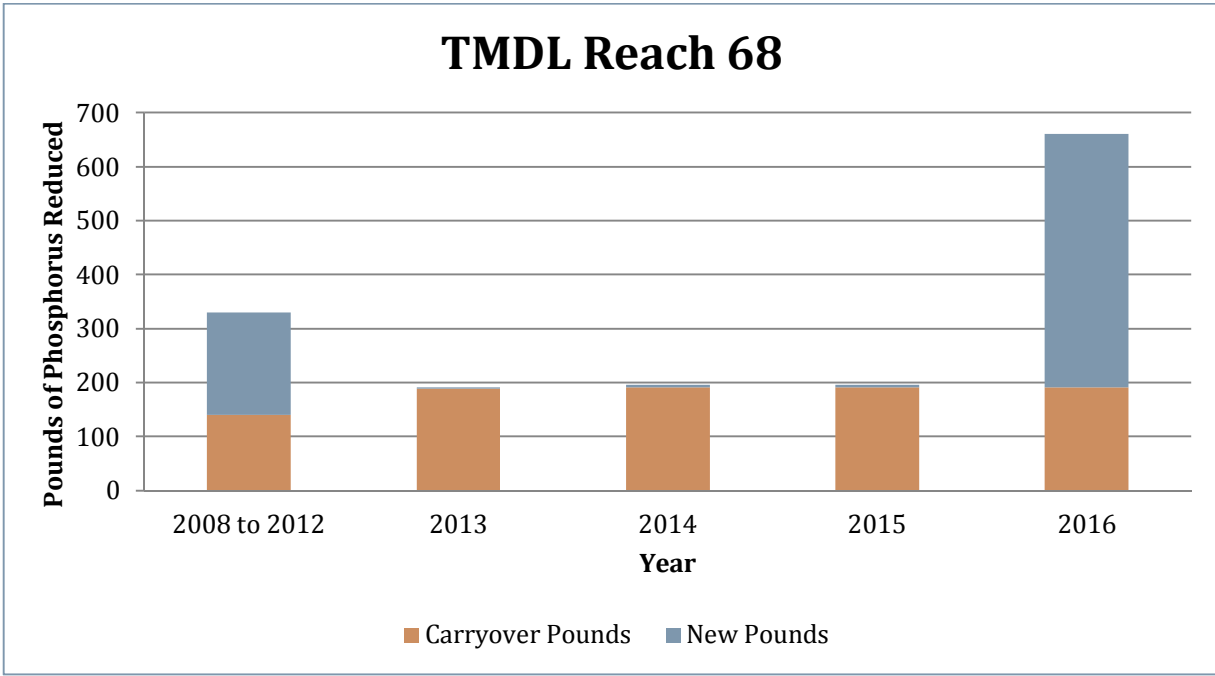


TMDL REACH 67 PHOSPHOROUS REDUCTIONS

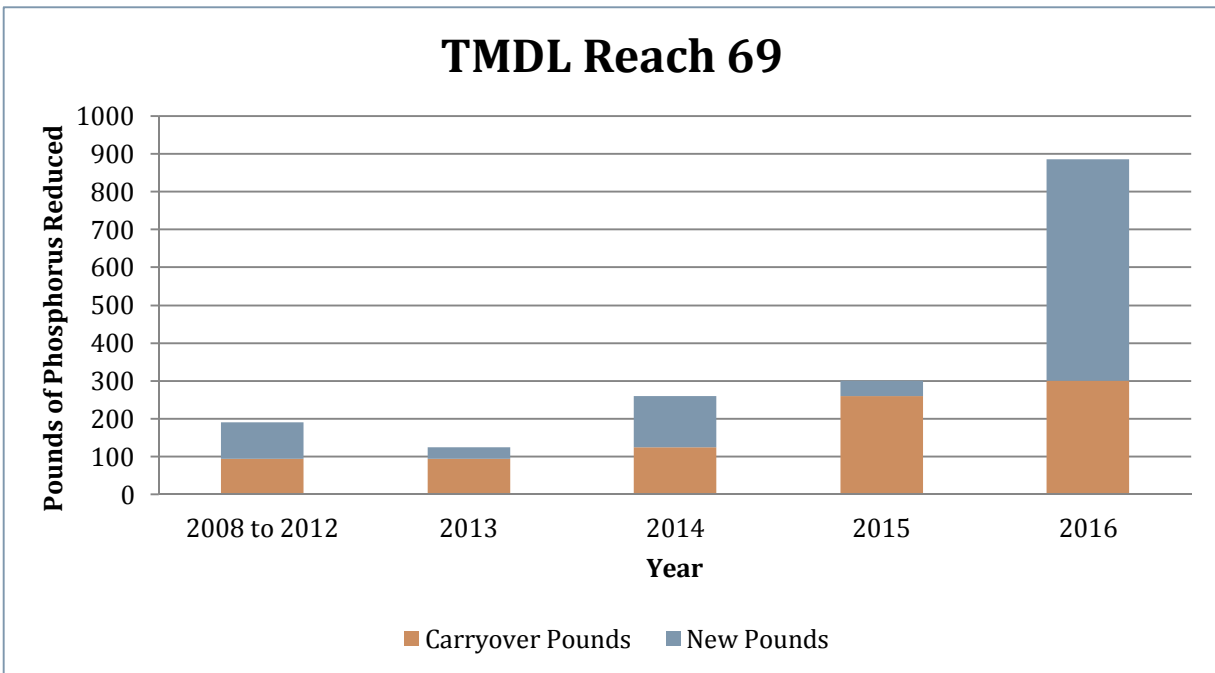


PHOSPHORUS REDUCTIONS

TMDL REACH 68 PHOSPHOROUS REDUCTIONS



TMDL REACH 69 PHOSPHOROUS REDUCTIONS



ADDITIONAL ACCOMPLISHMENTS

Additional Accomplishments

SERVICE AGREEMENT

In December of 2016, the County and Yahara WINS entered into a five year agreement for services associated with implementing the Yahara Watershed Adaptive Management Plan. The County services provided in relation to this agreement include:

- Identifying resource concerns as they relate to water quality.
- Assisting landowners and producers with implementing conservation practices that reduce nutrient and sediment runoff and address resource concerns.
- Providing and managing cost share agreements for conservation practice implementation.
- Calculating phosphorus reductions as a result of conservation practice implementation.
- Verifying conservation practice implementation and continued maintenance.
- Reporting on accomplishments and progress.
- Providing technical support for developing a full scale adaptive management plan consistent with Department of Natural Resources guidance.

By providing these services to Yahara WINS, the County receives \$300,000 annually to be used for staff dedicated to supporting conservation activities in the Yahara watershed. In addition to the \$300,000 for staffing, the County can also receive an annual incentive payment, not to exceed \$240,000, if the annual phosphorus reduction goals (Table 5) are met by the County. These goals will be achieved through assisting agricultural producers with conservation practice implementation.

Table 5. Dane County Land and Water Resources Department annual phosphorus reduction goals per the Yahara WINS Service Agreement.

Year	Annual Phosphorus Reduction Goals
2017	2,900
2018	3,900
2019	4,900
2020	5,900
2021	6,900