

Annual Dane County Yahara WINS Adaptive Management Report



Annual report on Dane County Land & Water Resources Department efforts assisting with the implementation of conservation practices that reduce phosphorus runoff for the Yahara WINS Adaptive Management project.

2018 Report Year



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Executive Summary

The Dane County Land & Water Resources Department (Dane County) continued to assist the Yahara Watershed Improvement Network (WINS) on furthering the adaptive management effort within the Yahara watershed. This included helping rural landowners and producers with the voluntary implementation of conservation practices along with calculating and reporting associated phosphorus reductions. 2018 marked the seventh year of collaboration with many notable accomplishments.

Key 2018 Yahara Watershed Accomplishments

- Aided 225 landowners/producers with practice implementation, environmental compliance, and cost-share assistance.
- Conducted planning activities for the implementation of more than 52 conservation practices for 2018 and beyond.
- Implemented and tracked over 630 conservation practices and systems that reduce phosphorus delivery to nearby surface waters.
- Tracked over 36,800 acres of nutrient management plans within the Yahara watershed.
- Entered into 37 cost-share agreements for conservation practices and systems within the Yahara watershed.
- Continued promotion of the Regional Conservation Partnership Program (RCPP) - Yahara Watershed Grant and Soil Health Initiative through the Natural Resource Conservation Service (NRCS).
- Reduced and tracked a total (new + carryover) of 21,570 pounds of phosphorus from conservation practices implemented.
- Allocated over \$835,000 in cost-share assistance within the Yahara watershed.



Temporary fencing installed in a managed grazing system (top photo). Landowners discussing solutions for managed grazing systems (bottom photo).

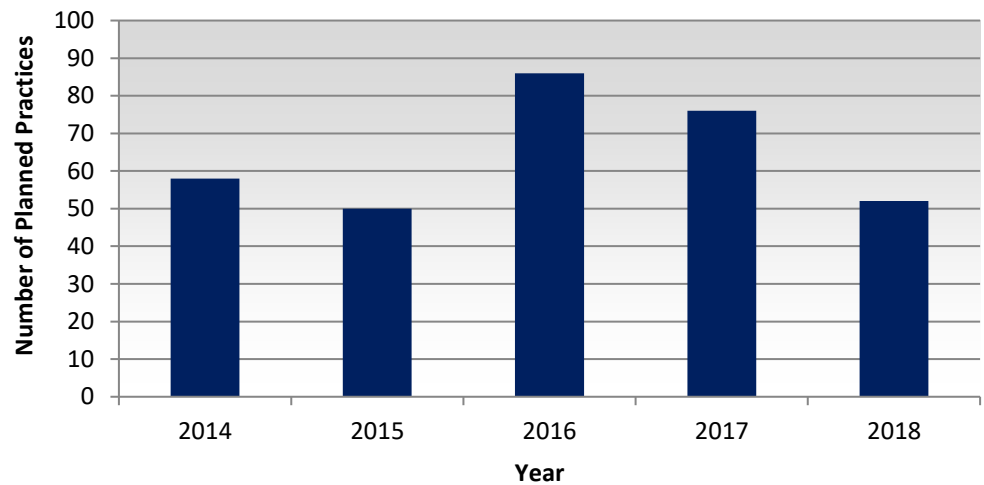
Planning Activities

More than 50 conservation practices in the Yahara watershed received planning assistance from Dane County in 2018 (Figure 1). Many of these planned practices were successfully implemented this past year (see [Practices Implemented](#)). Practices that were not completed continue to receive planning assistance with the intention of being implemented in 2019 and beyond. The implementation of conservation practices by a landowner or producer is voluntary and the number of planned practices versus implemented practices varies each year.

Number of Planned Practices

FIGURE 1.

Number of planned conservation practices within the Yahara watershed identified in the Dane County annual work plans submitted to Yahara WINS.



Contacted Landowners and Producers

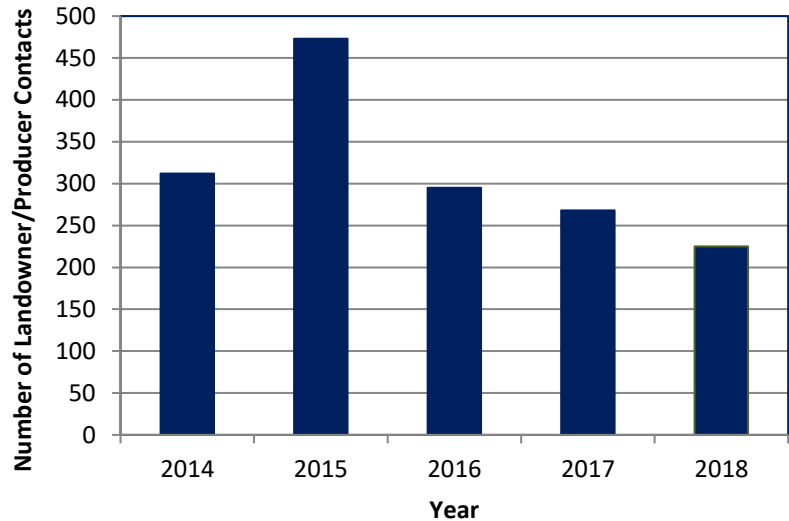
In 2018, Dane County contacted 225 landowners and producers within the Yahara watershed (Figure 2). Services provided include but are not limited to; identifying resource concerns, providing technical and financial assistance for conservation implementation, and verifying compliance with program participation, rules, and ordinances. These contacts are critical for practice implementation as they are often the first steps in establishing productive relationships between the landowner or producer and county staff.



Staff discussing cover crops with a group of producers.

FIGURE 2.

Number of annual landowner/producer contacts since 2014.



2018 Implementation Priorities

Conservation Practices

2018 was a challenging year for conservation practice implementation. Large amounts of rain and flooding in August reduced the amount of time for practice implementation. However, even with the unfavorable weather conditions staff were able to assist landowners and producers in completing 40 different projects resulting in 189 individual conservation practices being implemented (Figure 3.). This is a 40% increase from 2017. Conservation practices implemented by landowners and producers this past year included cover crops, conservation cover, waste storage structures, grassed waterways, sediment basins, and harvestable buffers (Table 1). Since 2008, staff have assisted with implementation and tracking more than 630 conservation practices within the Yahara watershed (Figure 4.).



Installation of a waste transfer system (top photo) and grassed waterway (left photo).

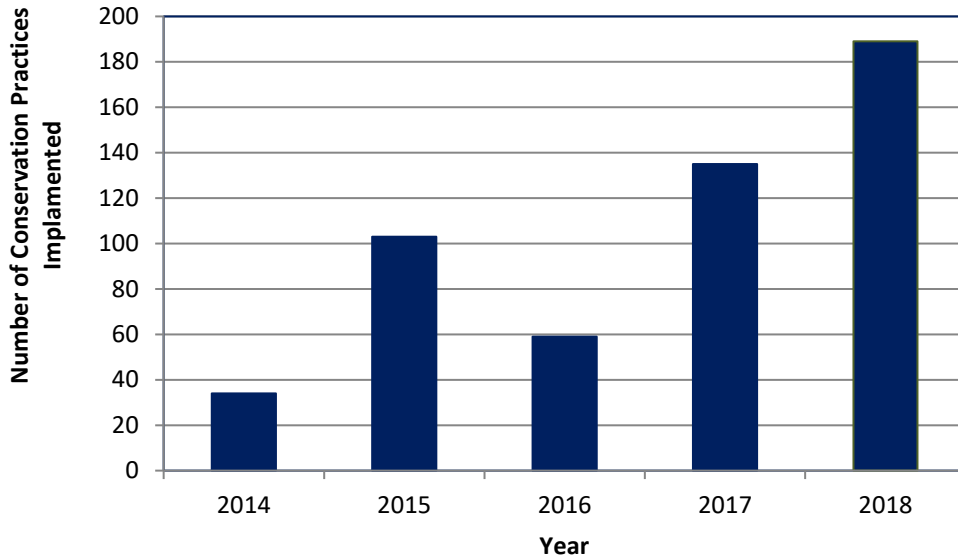


FIGURE 3.
Number of conservation practices implemented in the Yahara watershed since 2014.

TABLE 1.

Amount of conservation practices implemented in the Yahara watershed by TMDL Reach and year since 2014.

TMDL Reach	Practice	Unit	2014	2015	2016	2017	2018	Total Amount Since 2008
62	Cover Crop	Ac	0	25	0	277.7	201	503.7
	Grade Stabilization Structure	No	0	0	0	0	0	1
	Grassed Waterway	Ac	0	0	0	1.0	0	3.7
	Pasture and Hay Planting	Ac	0	0	0	0	0	5.5
	Roof Runoff Structure	No	1	0	0	0	0	1
63	Waste Storage Facility	No	0	0	0	0	0	1
	Cover Crop	Ac	0	146.8	126.5	0	0	273.3
	Closure of Waste Impound	No	2	0	0	0	0	2
	Filter Strip	Ac	7.3	0	0	2.3	0	9.6
	Grassed Waterway	Ac	0	1	0	0	0	4.8
	Roof Runoff Structure	No	0	0	0	0	0	2
	Heavy Use Area Protection	Ac	0	0	0	0	0	4.2
	Water and Sediment Control Structure	No	1	0	0	0	0	1
	Dane County Perpetual Easement	Ac	0	0	0	0	0	3
64	Waste Storage Facility	No	0	2	2	0	1	8
	Conservation Cover	Ac	0	0	2	0	0	2
	Cover Crop	Ac	0	256.2	167.9	1672.0	1932.7	4028.8

TMDL Reach	Practice	Unit	2014	2015	2016	2017	2018	Total Amount Since 2008
	Critical Area Planting	Ac	4.5	0	0.5	0	0	8.1
	Diversion	Ft	0	1350	290	0	0	2790
	Filter Strip	Ac	3.46	7.3	6.2	0	0	18.5
	Grade Stabilization Structure	No	1	1	0	0	0	5
	Grassed Waterway	Ac	1.6	4.05	0.25	0.5	0	21.4
	Lined Waterway or Outlet	Ft	0	0	606	0	0	606
	Access Control	Ac	0	0	2.9	0	0	2.9
	Pasture and Hay Planting	Ac	0	0	0	0	33.4	67.9
	Prescribed Grazing	Ac	0	0	0	0	33.4	66.2
	Roof Runoff Structure	No	0	1	0	2	0	6
	Heavy Use Area Protection	Ac	0	0.1	0	0	0	3.3
	Animal Trails and Walkways	Ft	0	0	331	0	0	478
	Stream Crossing	No	0	0	1	0	0	1
	Streambank and Shoreline	Ft	0	0	0	215	0	1525
	Manure Transfer	No	0	0	0	0	1	5
	Wastewater Treatment Strip	Ac	0	0	0	0	0	0.6
	Water and Sediment Control Structure	No	0	1	0	0	0	2
	Wetland Restoration	Ac	0	0	0	0	0	78
	Well Decommissioning	No	0	0	0	1	0	1
	Obstruction Removal	Ac	0	0	0	0.1	0	0.1
65	Grassed Waterway	Ac	0	0	3.3	0	0	3.3
66	Conservation Cover	Ac	3.6	1	0	7.6	0	18.5
	Cover Crop	Ac	0	0	0	0	17.4	17.4
	Sediment Basin	No	0	0	0	1	0	1
	Diversion	Ft	0	300	0	1250	0	3600
	Filter Strip	Ac	0	41.2	11.3	7.4	1.4	65.4
	Grassed Waterway	Ac	2.98	4.95	0	6.3	0.7	33.23
	Lined Waterway or Outlet	Ft	0	0	0	249	0	249
	Forage Harvest Management	Ac	0	0	0	0	0	45.1
	Pasture and Hay Planting	Ac	0	0	0	25	0	33.8
	Roof Runoff Structure	No	0	0	0	1	0	1
	Access Road	Ft	0	0	0	785	0	785
	Heavy Use Area Protection	Ac	0	0	0	0.1	0	0.1
	Stream Crossing	No	0	0	0	2	0	2
	Terrace	Ft	0	0	0	558	0	558
	Underground Outlet	Ft	0	0	0	250	0	250
	Wastewater Treatment Strip	Ac	0	0	0	0.17	0	0.17
	Tree/Shrub Establishment	Ac	8.2	10.6	0	0	0	18.8
	Water and Sediment Control Structure	No	0	0	0	0	0	1
	Shallow Water Development	Ac	1.7	0	0	0	0	1.7
	Wetland Restoration	Ac	0	6	0	0	0	9.2
	Pipeline	Ft	0	0	0	0	2280	2280

TMDL Reach	Practice	Unit	2014	2015	2016	2017	2018	Total Amount Since 2008
67	Filter Strip	Ac	0	23.2	3.7	2.2	0	34.3
	Grassed Waterway	Ac	0.8	0	0	0	0.6	2.4
	Pasture and Hay Planting	Ac	0	0	0	0	0	4.2
	Tree/Shrub Establishment	Ac	4.7	0	0	0	0	4.7
68	Cover Crop	Ac	0	0	0	0	239.4	239.4
	Grade Stabilization Structure	No	0	0	0	0	0	1
	Grassed Waterway	Ac	0	0	0	0	0.9	4.7
	Tree/Shrub Establishment	Ac	0	0	0	0	0	1
	Wetland Restoration	Ac	0	0	0	0	0	10
	Fence	Ft	0	0	0	0	5244	5244
	Filter Strip	Ac	0	0	0	0	4.2	4.2
	Pipeline	Ft	0	0	0	0	950	950
	Shallow Water Development	Ac	0	0	0	0	10	10
	69	Conservation Cover	Ac	0	0	24.8	0	0
Cover Crop		Ac	0	0	0	0	883.17	883.17
Filter Strip		Ac	4.4	0	0	2.2	24.8	47.21
Grassed Waterway		Ac	0.4	1.4	1.2	0	1	9.8
Water and Sediment Control Structure		No	0	1	0	0	0	1
Wetland Wildlife Habitat		Ac	0	0	0	0	0	9.6
Shallow Water Development		Ac	0	0	3.51	0	0	3.51

Cover Crops and Soil Health

Cover crops continue to be an important conservation practice in helping reduce the amount of phosphorus entering nearby surface waters. In 2018, more than 3,200 acres were planted in the Yahara watershed with staff assistance. This was a 68% increase in acres from 2017. Staff helped landowners and producers sign up and enroll roughly 2,220 acres under the NRCS-EQIP Soil Health Initiative to receive cost-share assistance to plant cover crops for three years. This initiative provided roughly \$387,000 in cost-share assistance and was additional federal funding on top of the already existing Regional Conservation Partnership Program (RCPP).

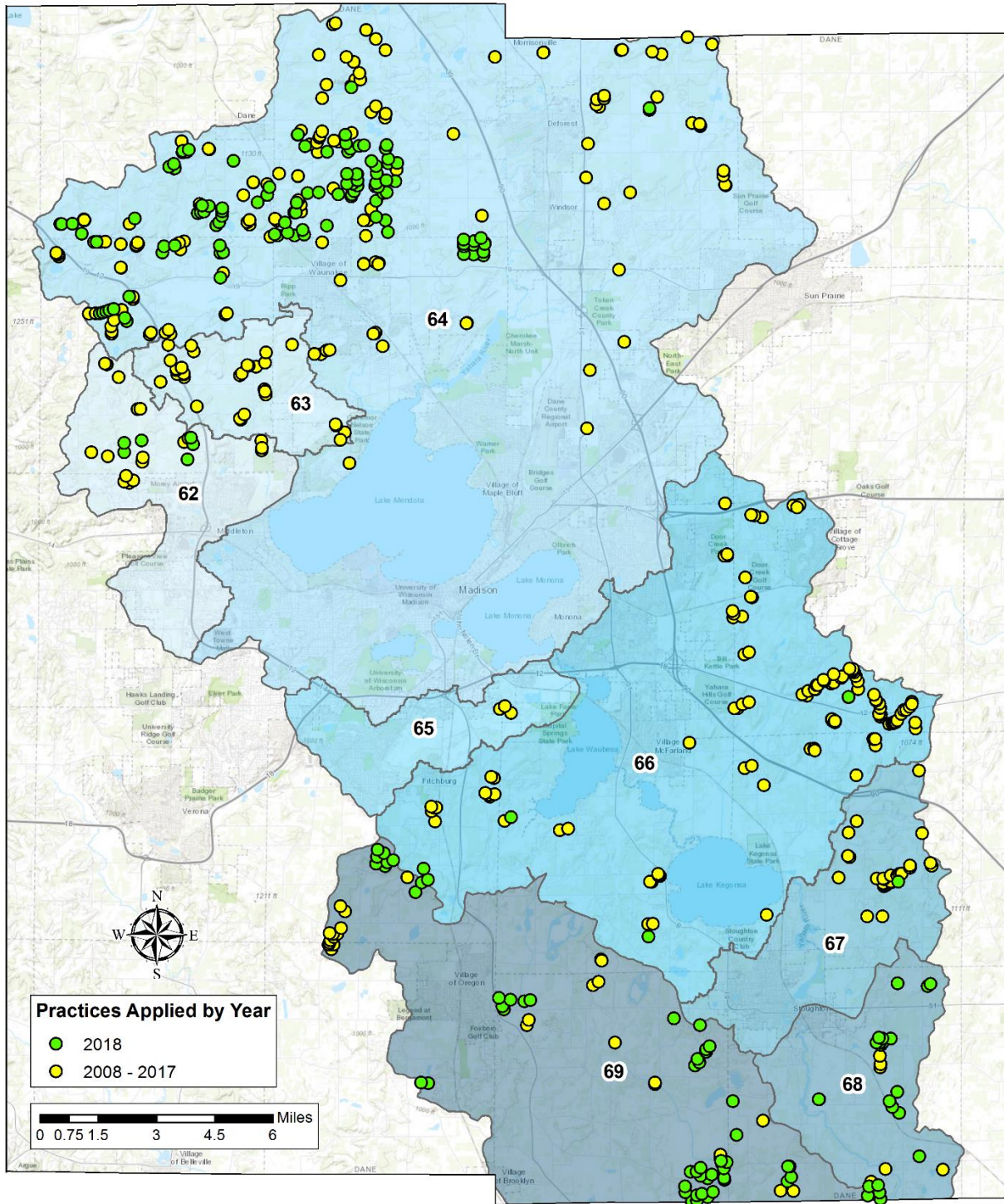
Healthy Farms Healthy Lakes Task Force

In 2017, the Dane County Board of Supervisors created the Healthy Farms Healthy Lakes Task Force. This Task Force consisted of a variety of stakeholders including representatives from agriculture, community groups, and state and local agencies with the task of developing goals and recommendations for improving water quality in the Yahara watershed. In August of 2018 the group finalized the below recommendations. The full report can be accessed here:

<https://board.countyofdane.com/Healthy-Farms-Healthy-Lakes-Task-Force>.

1. Increase support and encourage conservation efforts by farmer-led groups and watershed organizations to improve nutrient management and reduce nonpoint source runoff from farms,
 2. Enforce reasonable management regulations at the local level by adopting state agricultural performance standards into county ordinance as a complement to the state agricultural prohibitions already in county ordinance,
 3. Improve the use of manure nutrient and prevent nutrient losses through improved manure management,
 4. Improve soil and water quality through the expansion, adoption and implementation of nutrient management plans along with the development and maintenance of a tracking database,
 5. Continue to support, implement and evaluate the Yahara CLEAN strategic Action Plan and other Yahara watershed water quality efforts,
 6. Develop and implement programs that aid in the preservation of agricultural land,
 7. Expand implementation of conservation practices through streamlined cost-share program administration, new program development and improved promotion of opportunities,
 8. Develop large scale watershed analysis to identify and prioritize high risk areas for phosphorus runoff and water quality degradation.
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FIGURE 4.
 General location of conservation practices implemented in the Yahara watershed since 2008.

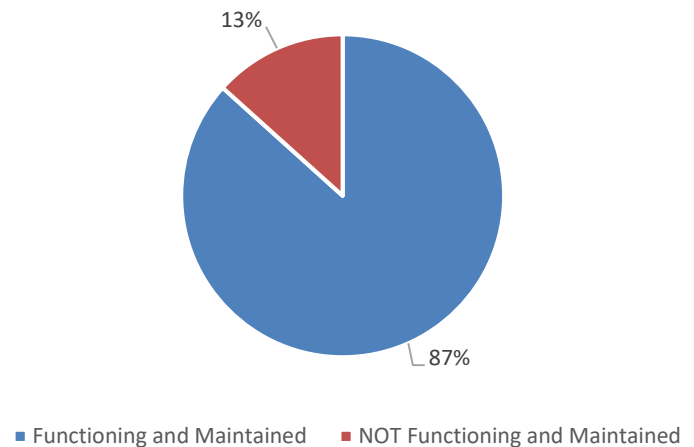


Verification Checks

In total, 15 previously implemented conservation practices were checked in 2018 to verify their continued function, maintenance, and associated phosphorus reductions. Practices in TMDL reaches 62, 64, 65, 66, and 68 were selected as part of a larger, countywide, practice and compliance review process outlined in *Madison Metropolitan Sewerage District Adaptive Management Plan* under Agricultural Implementation Strategy. All remaining practices will be included in this review process within the next two years, and continue through the life of the project on a four year rotation. Of the 15 conservation practices checked, 12 were found to be functioning and maintained, three were identified as not functioning and maintained (Figure 5).

FIGURE 5.

Field verification and review of conservation practices.



Nutrient Management

Nutrient Management Plans continue to be received, reviewed and mapped by county staff. Plans are submitted by landowners and operators for a variety of reasons including; a condition of receiving cost-share, participation in the Farmland Preservation Program, a condition of a permit, or voluntarily. In 2018, 36,861 total acres were mapped within the Yahara watershed. Of these, 33,046 acres were located in areas that are not internally drained (Figure 6.). Internally drained areas are those areas within the Yahara watershed that are not hydrologically connected to the outlet of the Yahara watershed (Figure 8.) 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 general location of fields with NMP's are documented in Figure 7 and the total number of acres for each TMDL reach are recorded in Table 2.

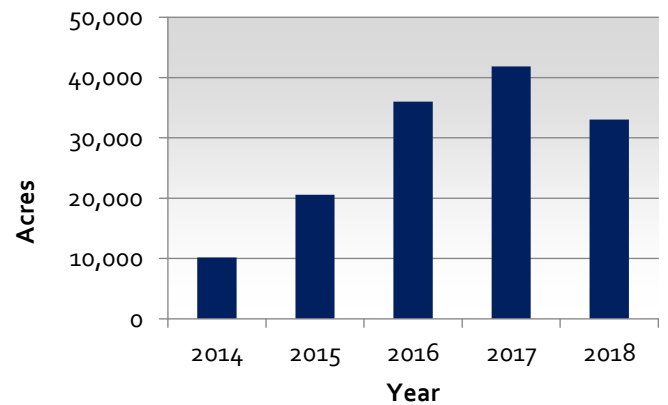


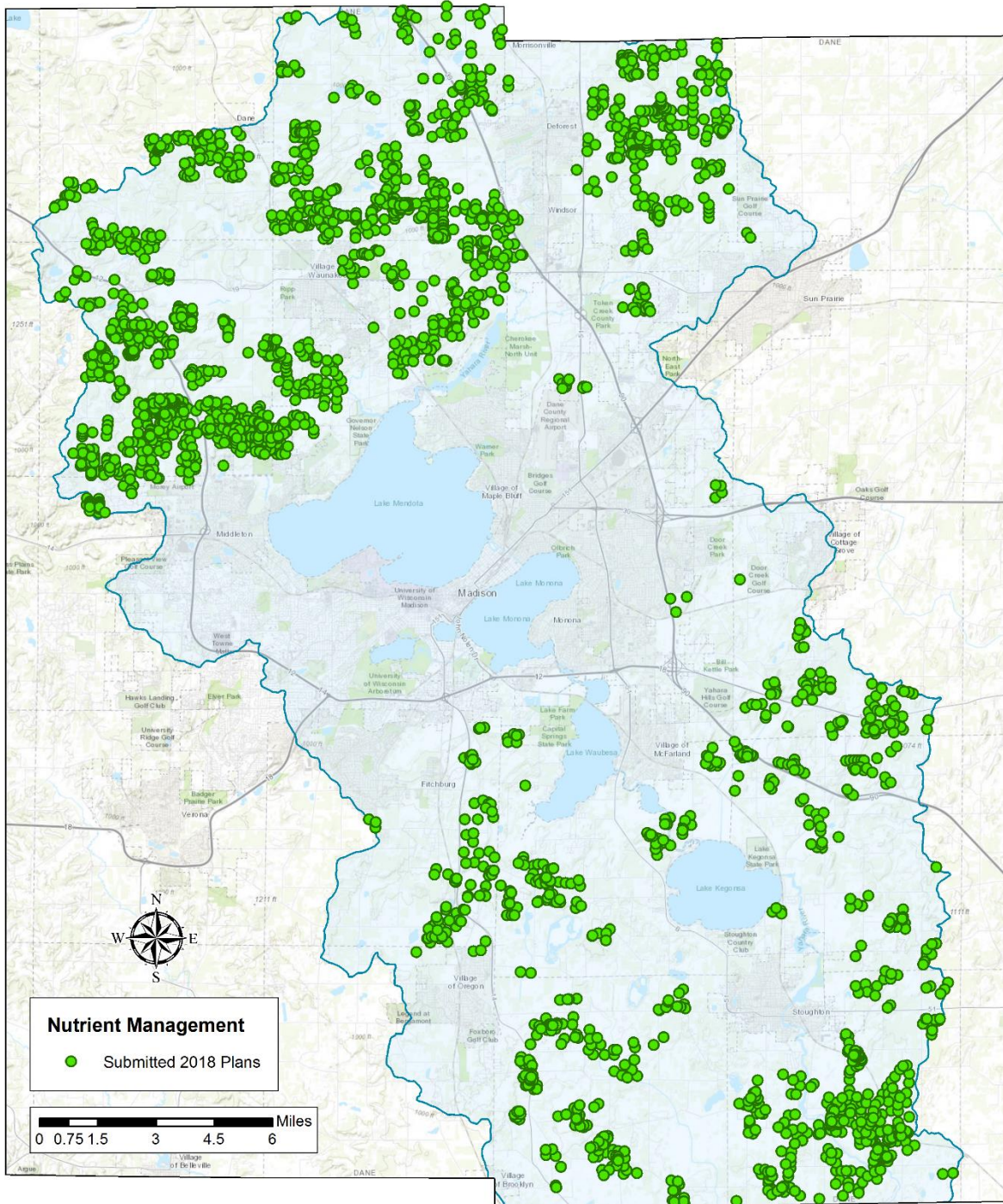
FIGURE 6.

Total acres of nutrient management plans mapped within the Yahara watershed since 2014. Internally drained areas have been removed.

Mapped NMP Acres

FIGURE 7.

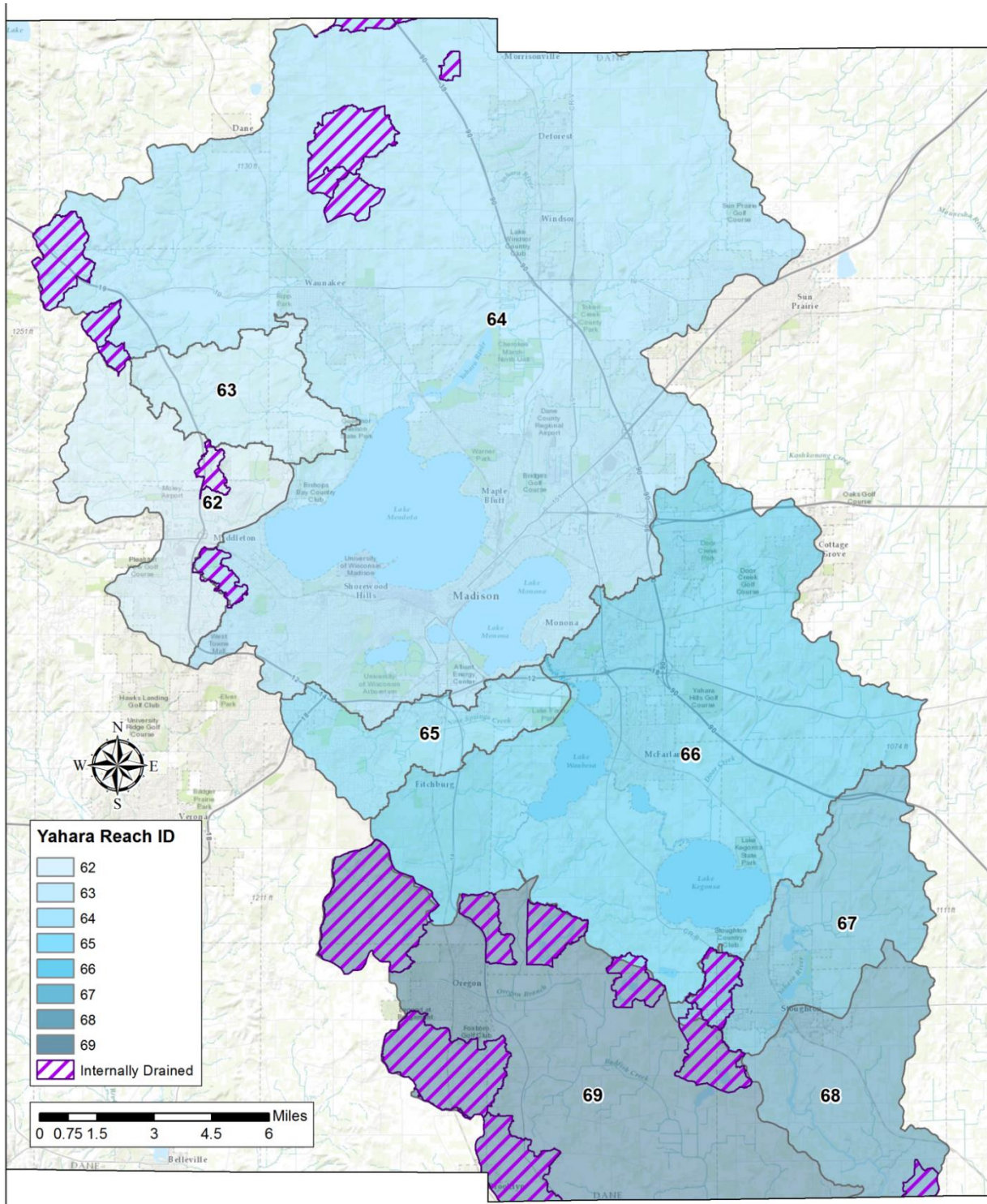
Map of the 2018 submitted nutrient management plans within the Yahara watershed. Fields located in internally drained areas are removed.



Internally Drained Areas

FIGURE 8.

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



Acres of NMP's

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	2017	2018
62	505	2,077	2,794	2,355	2,663
63	1,779	3,757	2,112	2,855	2,401
64	7,833	14,574	23,015	20,696	16,556
65	0	0	0	203	67
66	0	104	2,213	4,453	4,263
67	37	37	915	1,699	564
68	26	26	2,348	4,299	3,198
69	0	0	2,606	5,278	3,335
TOTAL	10,180	20,574	36,003	41,838	33,046

Innovative Conservation Practices

Dane County and its partners continued to explore and promote innovative conservation practices and systems in 2018. This included the promotion and implementation of harvestable buffers, the removal of legacy sediments, and the integration of livestock grazing into established cover crops. All of these practices and systems are custom designed and implemented accounting for site specific conditions and landowner management strategies. This insures that the practices will function properly and continue to reduce phosphorus over its design life expectancy. Even though each practice and system is unique; all have the same common environmental goal of reducing phosphorus and sediment to improve water quality.

Legacy Sediment



Photo of the hydraulic dredge removing legacy sediments from Dorn Creek.

Dane County has been studying the impacts that instream legacy sediments have on water quality since November of 2014. The research has shown that phosphorus concentrations in these sediments range from hundreds to thousands of parts per million in many of the stream reaches within the Yahara watershed. In addition, these sediments were evaluated and determined to be a “source” releasing phosphorus into the water flowing above them. This research led to the adoption of a 2018 county budget initiative allocating 12 million dollars over four years for further investigation and removal of legacy sediments within the Yahara.

This past year was the first year in which a “full scale” removal project was implemented. Approximately 11,000 tons of phosphorus laden sediment was hydraulically removed from a 2.7 mile stretch of Dorn Creek. Additional sediment samples were also collected, analyzed, and evaluated to determine the feasibility of removing sediments from other stream reaches within the Yahara watershed. As a result, Token Creek was selected as the second site with plans to be begin sediment removal in July of 2019. More information regarding the Legacy Sediment Removal Project can be found here: <https://lwr.dane.countyofdane.com/Legacy-Sediment-Project>.

Harvestable Buffers

Harvestable buffers continued to be a popular conservation practice. These buffers typically consist of a combination of cool season grasses and legumes and are established along perennial streams with a minimum width of 30 feet. The purpose of the buffer is to filter and trap phosphorus and sediment laden runoff before it enters the stream. More than 31 additional acres were established bringing the total acres implemented since 2014 to more than 132 (Table 3). This equates to approximately 24 miles of buffered streams.



Photo of an established harvestable buffer.



Aerial photos of Little Door Creek before (top) and after (bottom) the implementation of harvestable buffers.

TABLE 3.

Annual amount of harvestable buffers implemented within the Yahara watershed by TMDL Reach since 2014.

TMDL REACH	PRACTICE	UNIT	2014	2015	2016	2017	2018	TOTAL AMOUNT
63	HARVESTABLE BUFFER	AC	7.3	0	0	2.3	0	9.6
64	HARVESTABLE BUFFER	AC	3.5	0	6.2	0	0	9.7
66	HARVESTABLE BUFFER	AC	0	28.9	11.3	7.4	1.4	49.0
67	HARVESTABLE BUFFER	AC	0	23.2	1.9	2.2	0	27.3
68	HARVESTABLE BUFFER	AC	0	0	0	0	8	8.0
69	HARVESTABLE BUFFER	AC	4.4	0	0	2.2	22.2	28.8
TOTAL	HARVESTABLE BUFFER	AC	15.2	52.1	19.4	14.1	31.6	132.4

Grazing Cover Crops

An innovative approach of using cover crops for grazing livestock was also implemented by producers within the Yahara watershed this past year. Producers worked with staff to identify cover crop types that not only protect the ground from soil erosion and phosphorus runoff during the most critical time periods during the year (winter and spring), but that also provide a quality food source for grazing livestock adding financial value to their operations. Seeds were planted and vegetation was established in September of 2018. As temperatures rose and the snow melted the cover crops continued growing providing not only continued ground cover but also a quality food source for grazing livestock early on in the growing season.



Photo of livestock grazing cover crops.

Cost-share

Cost-share is provided to producers using a number of different funding sources including federal, state, county, and other sources (i.e. Yahara WINS, Clean Lakes Alliance grants, 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 varies and is often limited by available annual funding and interest from landowners and producers. In 2018, there were 37 new cost share agreements with landowners that

utilized federal, state, and county, funding sources (Figure 8) within the Yahara. Other funding sources were not available nor utilized in 2018. The total cost-share funding allocated in 2018 was over \$835,000 (Figure 9).

Funding Sources and Amounts

FIGURE 9.

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

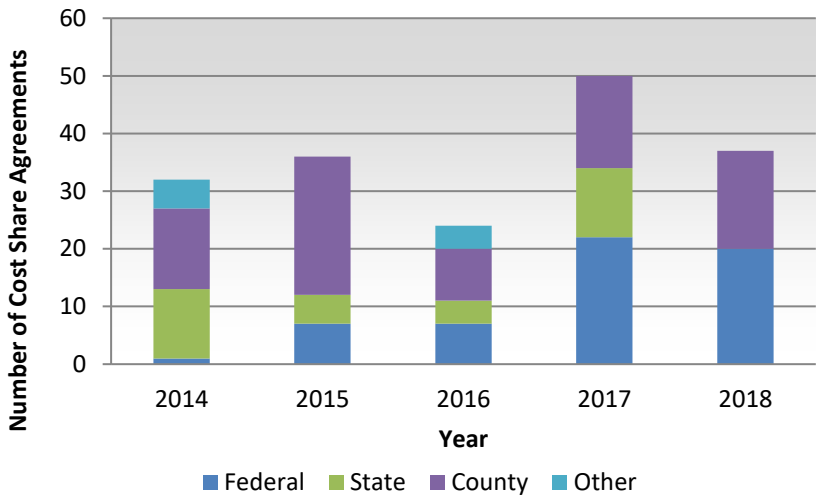
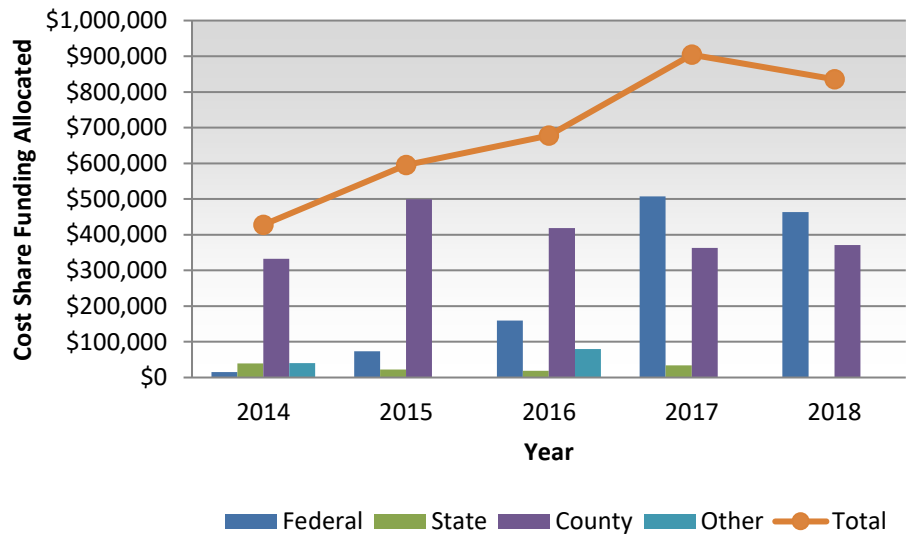


FIGURE 10.

Total cost-share dollars allocated by funding source each year within the Yahara watershed since 2014. The cumulative total from all funding sources is also presented.



Phosphorus Reductions

The pounds of phosphorus reduced in 2018 from new practices implemented was 7,123. This combined with the 14,447 carryover pounds resulted in a combined total of 21,570 pounds of phosphorus reduced. Carryover pounds are generated from conservation practices implemented from 2008 to 2017 that are still functioning and reducing phosphorus. New pounds are from practices implemented in the 2018 calendar year. Phosphorus reductions for the Yahara watershed and subsequent TMDL reaches over time are presented in figures below. Table 4 also shows both new and carryover pounds of phosphorus reduced over time.

New and Carryover Phosphorus Reductions

TABLE 4.

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

TMDL Reach	2014		2015		2016		2017		2018	
	New	Carryover	New	Carryover	New	Carryover	New	Carryover	New	Carryover
62	118.7	390.2	440.4	407.9	558.8	407.9	525.5	438.5	467.3	697.9
63	1503	1299.4	957.7	2446.6	548.9	2506.1	341.2	2558.6	240.1	2614.3
64	1934.2	1875.8	3568	2243.4	5355.4	2712.9	3559.5	3348.0	3234.0	5492.7
65	0	0	0	0	182.2	0	20.3	0	6.7	0
66	812.7	906.9	1408.7	1719	733.5	3106.9	1650.5	3381.7	589.7	4586.9
67	205.5	55.8	277.1	253.9	206.9	523.6	171.2	546.2	75.9	547.5
68	5.2	191.4	5.2	191.4	469.6	191.4	429.9	191.4	872.2	168.4
69	136.1	124.3	41.1	260.4	586.3	301.5	551.7	300.8	1636.7	339.5

Phosphorus Reductions by Reach

FIGURE 11.1.

TMDL Reach 62 new and carryover pounds of phosphorus reductions by year.

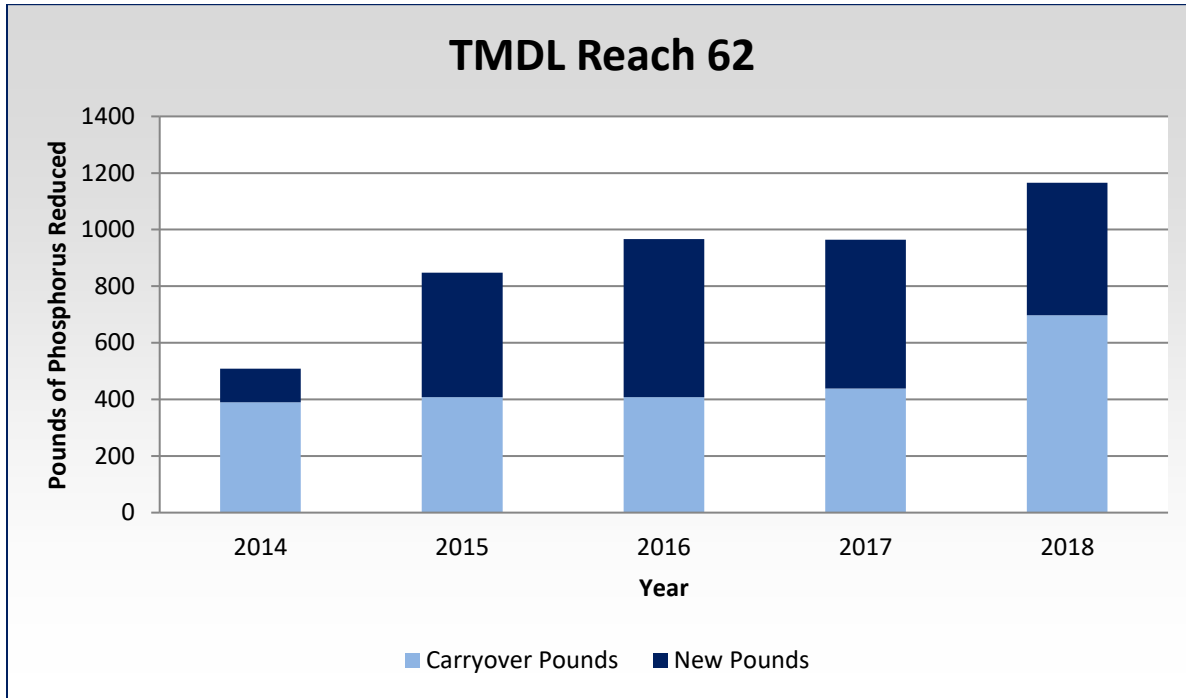


FIGURE 11.2.

TMDL Reach 63 new and carryover pounds of phosphorus reductions by year.

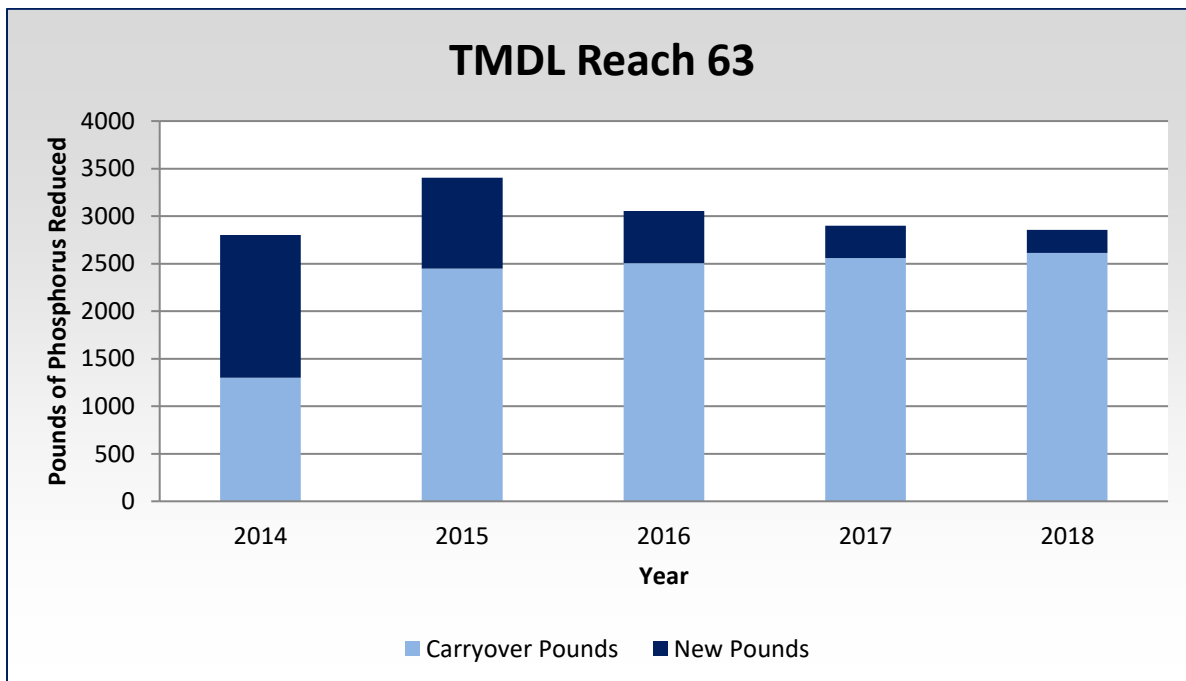


FIGURE 11.3.

TMDL Reach 64 new and carryover pounds of phosphorus reductions by year.

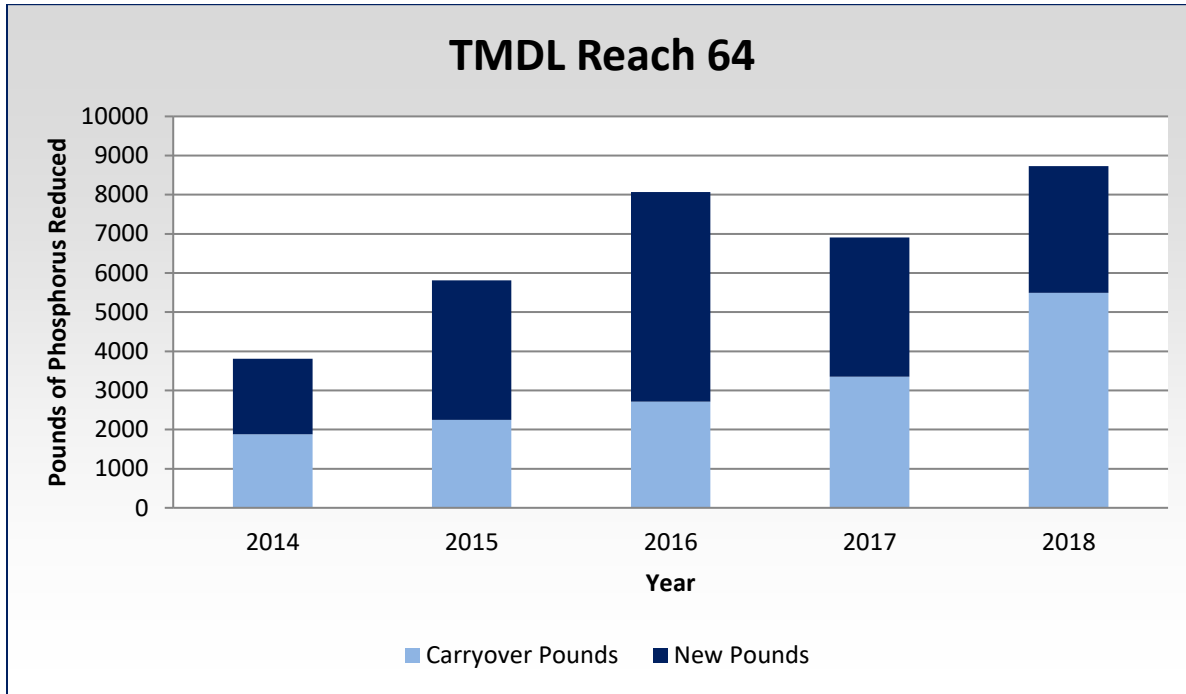


FIGURE 11.4.

TMDL Reach 65 new and carryover pounds of phosphorus reductions by year.

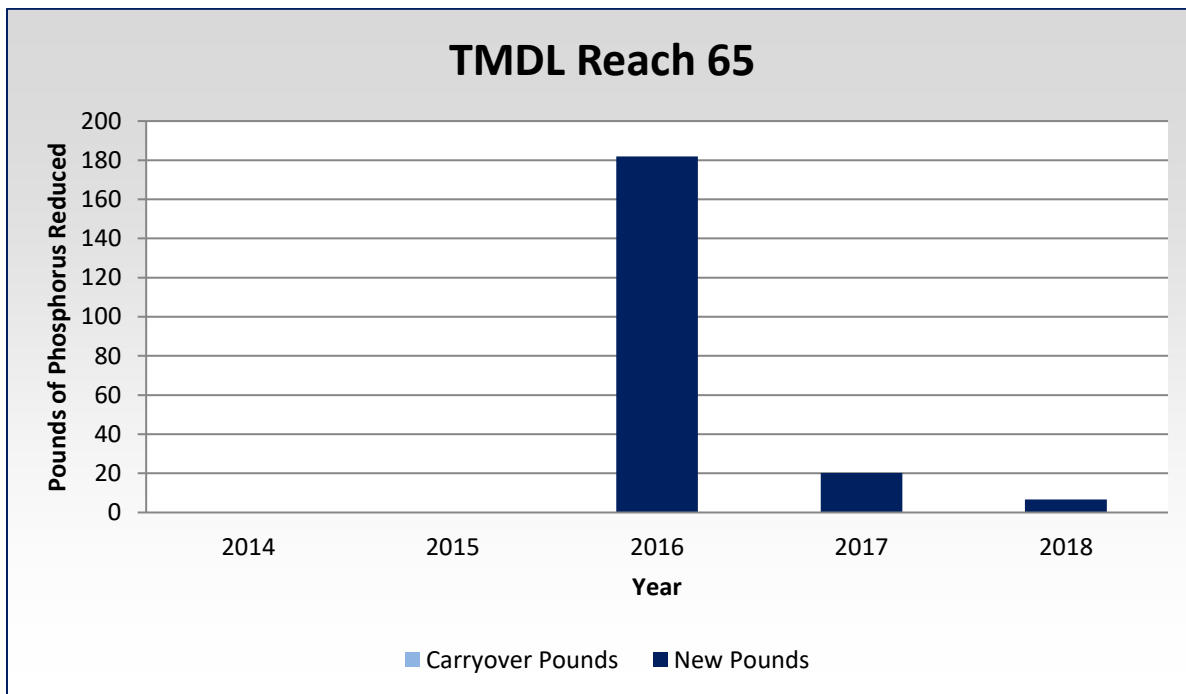


FIGURE 11.5.

TMDL Reach 66 new and carryover pounds of phosphorus reductions by year.

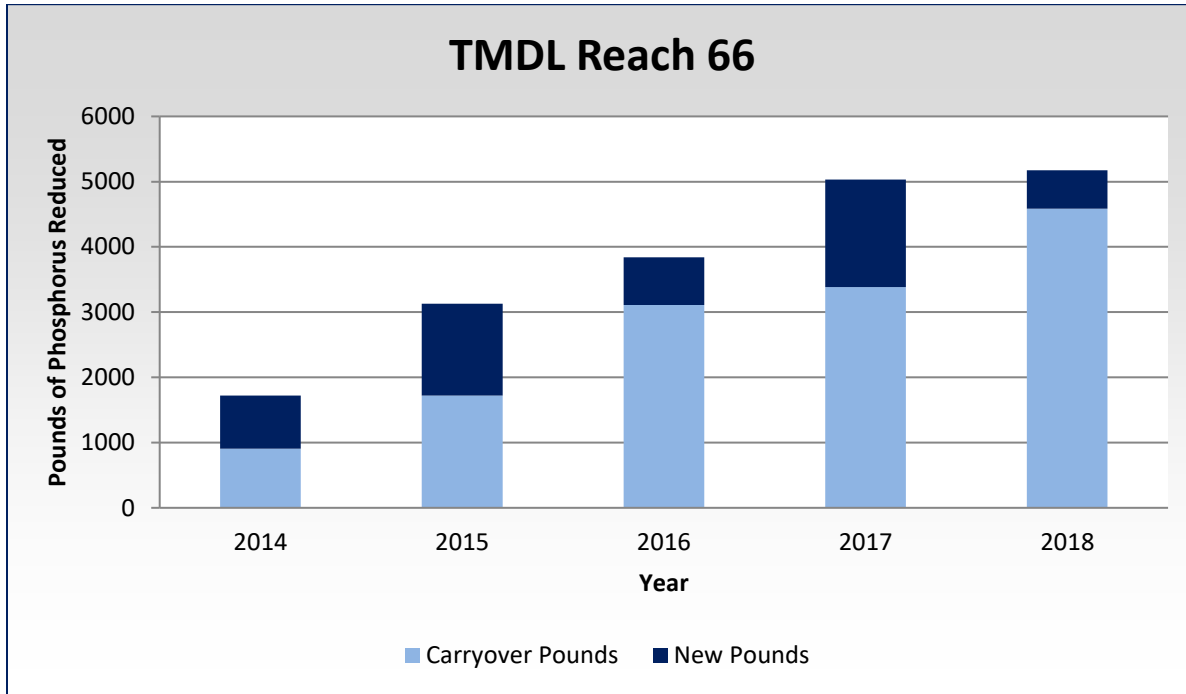


FIGURE 11.6.

TMDL Reach 67 new and carryover pounds of phosphorus reductions by year.

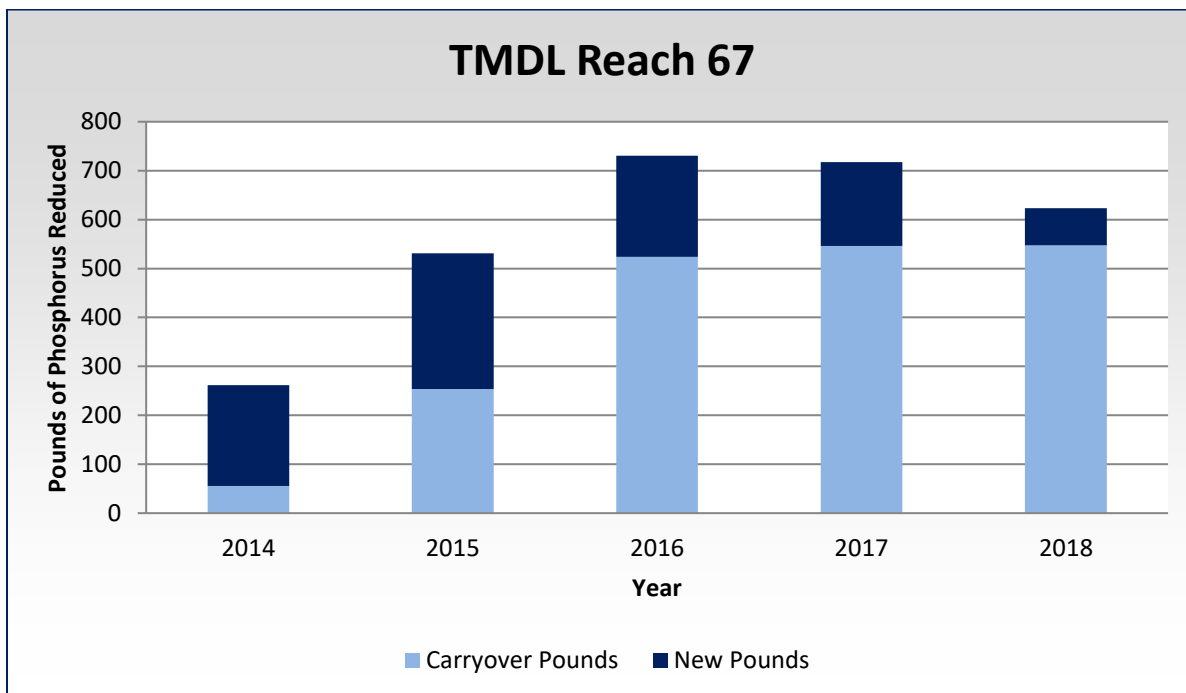


FIGURE 11.7.

TMDL Reach 68 new and carryover pounds of phosphorus reductions by year.

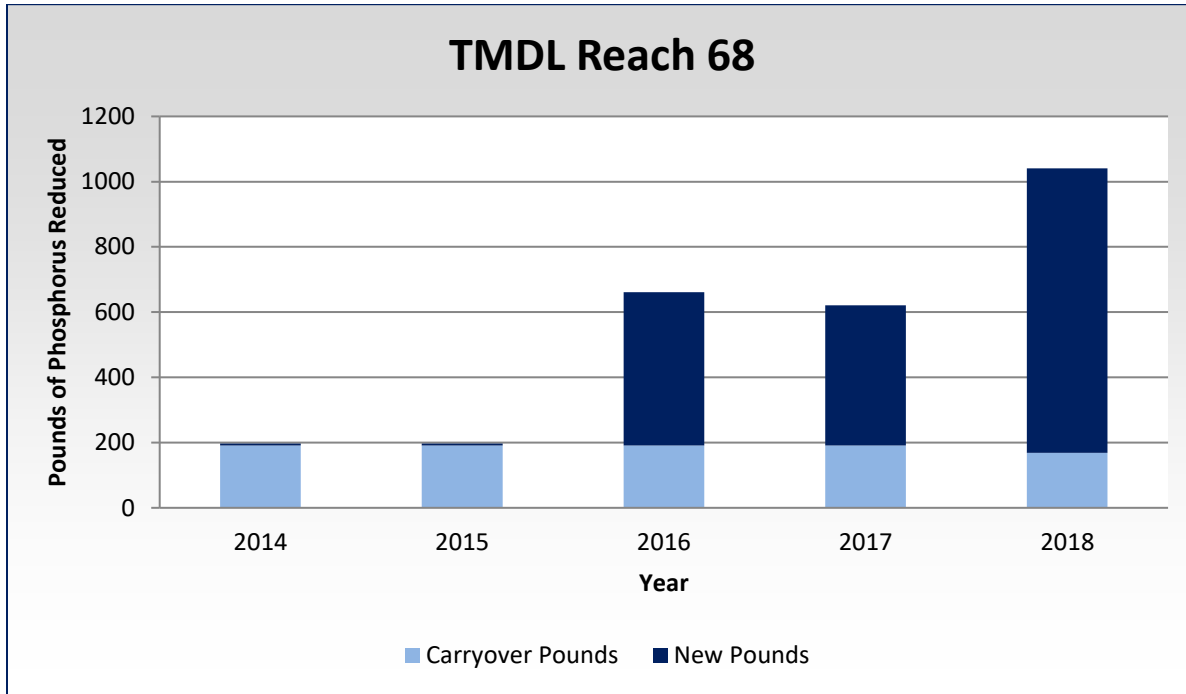
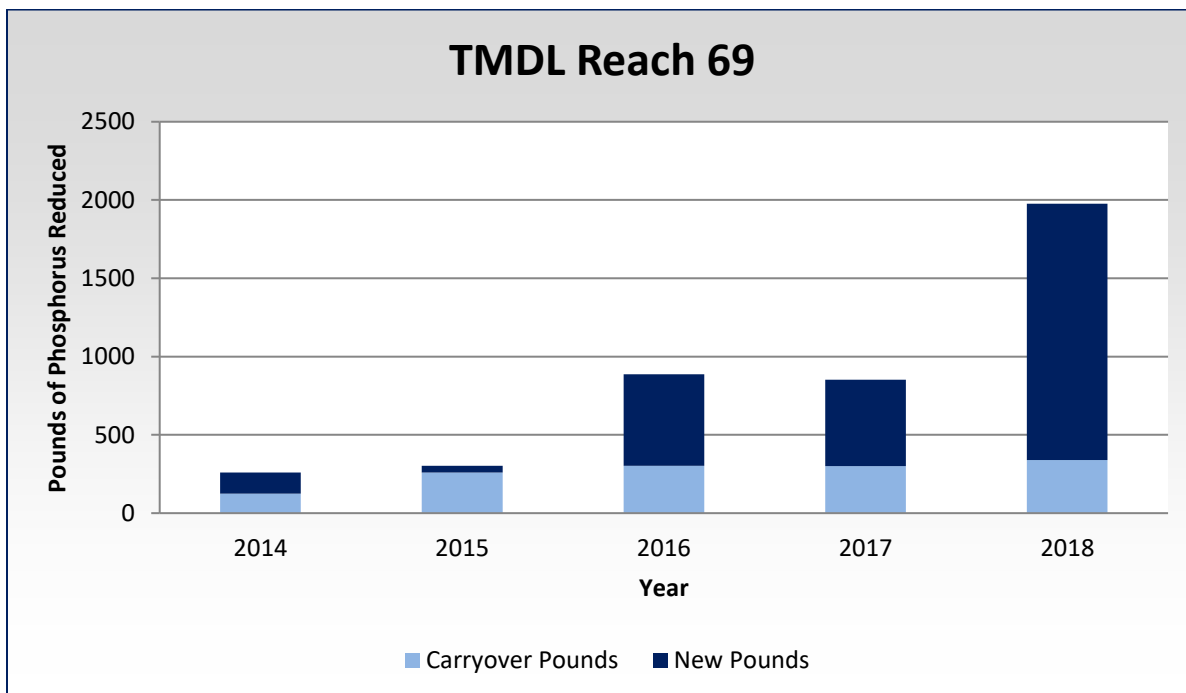


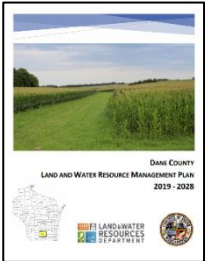
FIGURE 11.8.

TMDL Reach 69 new and carryover pounds of phosphorus reductions by year.



Notable Accomplishments

Land and Water Resource Management Plan Update



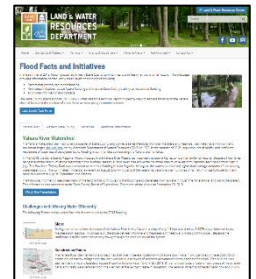
The Dane County Land and Water Resource Management Plan was updated in 2018. This plan provides a holistic approach to land and water resource management and was developed over the course of the year by staff working with a local advisory committee made up of citizens and resource professionals. The plan includes and assessment of resource conditions along with identifying needs to provide a holistic approach to land and water resources management. The final plan was approved by the Wisconsin Land and Water Conservation Board in December <https://lcd-lwrp.countyofdane.com/Resources/LWRM-Plan>.

Urban Initiatives

In conjunction with the rural initiatives stated above, the county also provided resources and support for a number of urban initiatives. This included providing funding through the Urban Water Quality Grant Program for projects that will prevent 440 pounds of phosphorus and 165,000 pounds of sediment from reaching surface waters. Street leaves are also a major sources of phosphorus within the watershed. As part of the Leaf-free Streets Program more than 400 residents received alerts reminding them to remove their leaves from the street prior to rain events. Staff also implemented the county's Erosion Control and Stormwater Management ordinance issuing permits and performing more than 4,000 inspections to help prevent erosion and phosphorus runoff from construction sites.

Yahara Flood Response

The summer of 2018 produced large rain events causing extensive flooding throughout the Yahara watershed and Dane County. As a result the County Board proposed and passed a resolution (2018 RES-227) calling for a technical report to identify ways to address flooding in the Yahara chain of lakes and the creation of a task force to make policy recommendations. Along with RES-227 the county also adopted the 2019 Budget that contained many new funding areas aimed at addressing flooding. More information regarding flooding in the Yahara can be found here: <https://lwrp.countyofdane.com/flood-facts-and-initiatives>.



Conclusion

The continued partnership between Dane County and Yahara WINS resulted in another successful year of conservation implementation to improve water quality in the Yahara watershed. Yahara WINS provided staff funding to aid county resources in assisting landowners and producers with the planning, design and implementation of over 180 conservation practices. This reduced the amount of phosphorus entering nearby surface waters by more than 7,000 pounds. Combining this with the more than 14,400 pounds of phosphorus reduced from previously implemented practices (carryover) resulted in a total reduction of 21,570 pounds of phosphorus in 2018.