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.

2023 Report Year

DANE COUNTY LAND&WATER RESOURCES DEPARTMENT

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Executive Summary

The Dane County Land & Water Resources Department (Dane County) continued to assist the Yahara Watershed Improvement Network (WINS) on furthering adaptive management 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. 2023 marked the twelfth year of collaboration with continued success that will be outlined throughout this report.

Key 2023 Yahara Watershed Accomplishments

- Aided 237 landowners/producers with practice implementation, environmental compliance, and cost-share assistance.
- Conducted planning activities for the implementation of 116 conservation practices for 2023 and beyond.
- Tracked over 60,000 acres of nutrient management plans within the Yahara watershed.
- Entered into 32 cost-share agreements for conservation practices and systems.
- Established the Dane Demo Farms, a network of farmers that demonstrate and research leading edge conservation practices that improve water quality throughout Dane County. Two of the participating Demonstration Farms are in the Yahara Watershed.
- Completed 167 practice verification checks to ensure that conservation practices were functioning properly.
- Reduced and tracked a total (new + carryover) of 23,318 pounds of phosphorus from conservation practices implemented.
- Allocated over $600,000 in cost-share assistance within the Yahara watershed.
- Continued to invest resources in innovative conservation programs like the Continuous Cover Program and Legacy Sediment Removal.

Left: Cover Crops Right: Grassed waterway

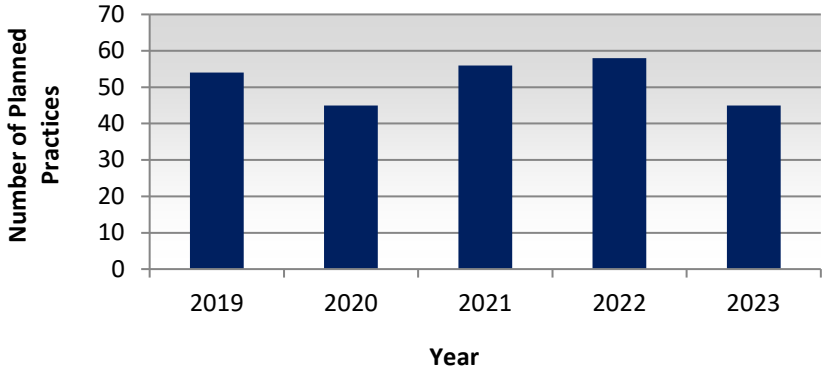
Planning Activities

In the beginning of 2023, Dane County staff had identified 45 conservation practices they would be providing planning assistance for. As the year progressed this number grew (see Practices Implemented). Many of these planned practices were voluntarily implemented by landowners this past year. Generally speaking, the drought throughout majority of the summer in 2023 led to less landowners contacting county staff as there weren't as many resource concerns identified, and therefore, less practices implemented.

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.



2023 Implementation Priorities

Conservation Practices

This past year proved to be another challenging year for conservation implementation. Majority of the summer had 'Severe Drought' conditions throughout the Yahara Watershed. Given that most of the resource concerns are driven by rainfall, such as soil erosion, not as many landowners worked with Dane County staff.

Even with the challenging weather; more than 115 conservation practices were implemented and tracked reducing the amount of phosphorus reaching nearby surface waters. This is a slight decrease from 2022 (Figure 2.) but similar to practices in 2021. Cover crops comprised the largest proportion of practices implemented with more than 4,000 acres verified utilizing the practice. Other practices include grazing systems, grassed waterways, and no-till management (Table 1 and Figure 3.).

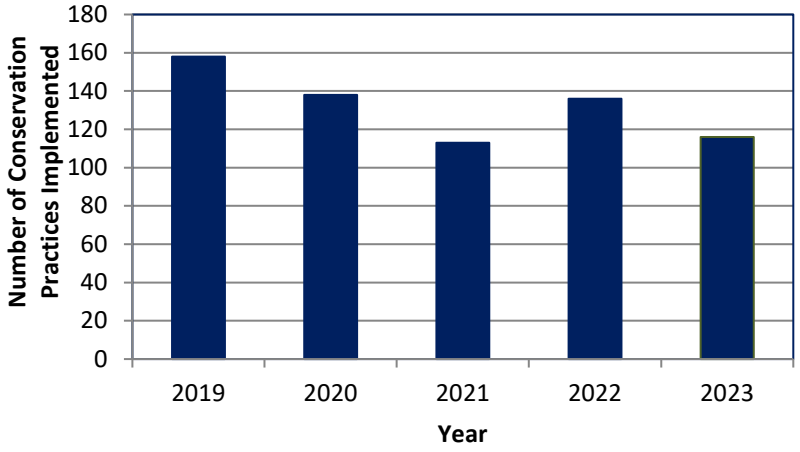


FIGURE 2.

Number of conservation practices implemented in the Yahara watershed since 2019.

TABLE 1.

Amount of conservation practices implemented in the Yahara watershed by TMDL Reach and year since 2019

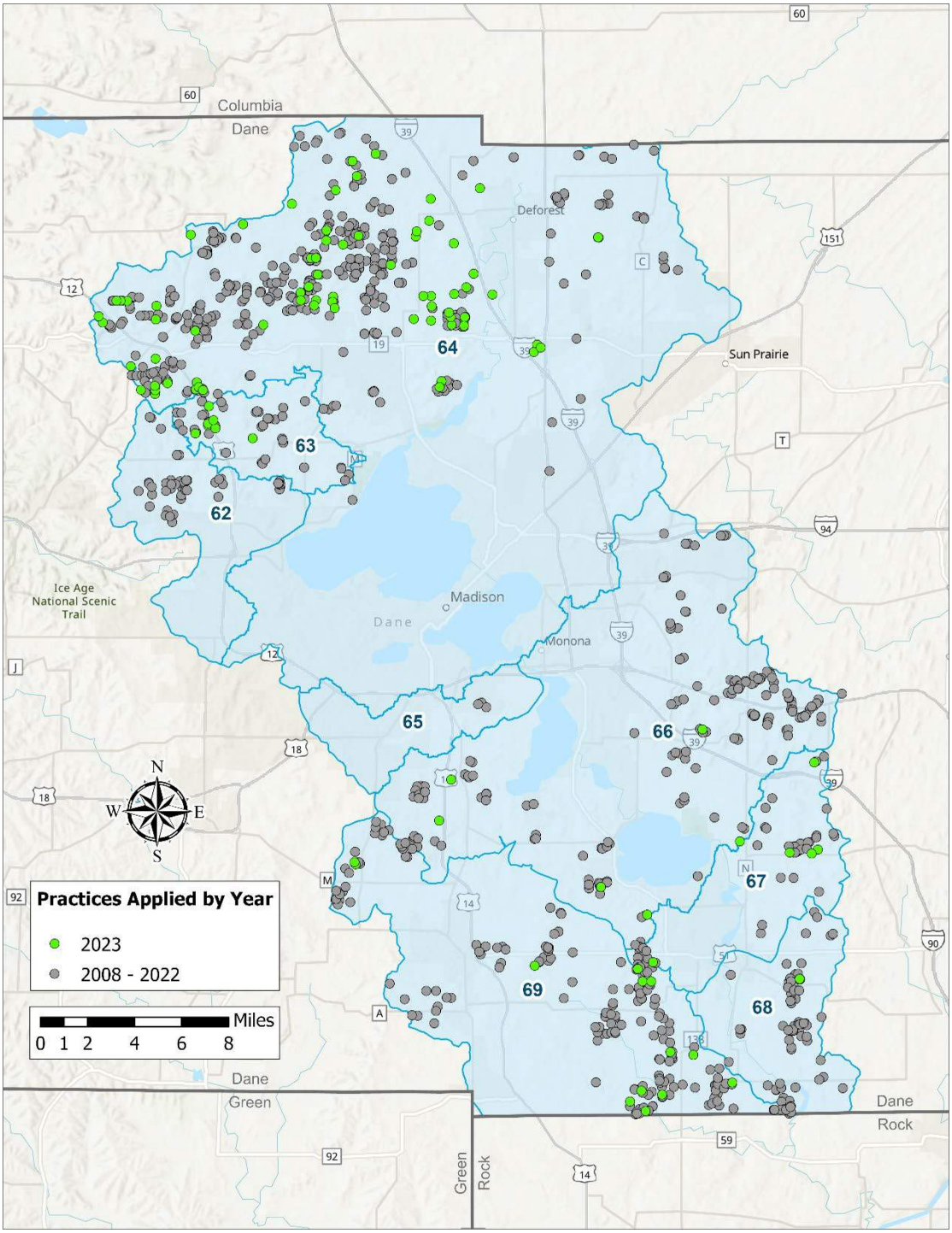
TMDL Reach	Practice	Units	2019	2020	2021	2022	2023	Total Amount Since 2008
62	Cover Crop	Ac	125.9	0	0	0	0	629.6
	Critical Area Planting	Ac	0	0.5	0	0	0	0.5
	Diversion	Ft	0	264	0	0	0	264
	Grade Stabilization Structure	No	0	0	0	0	0	1
	Grassed Waterway	Ac	0	0	2.6	0	0	6.3
	Lined Waterway	Ft	0	0	291.5	0	0	291.5
	Pasture and Hay Planting	Ac	0	0	0	0	0	5.5
	Roof Runoff Structure	No	0	0	0	0	0	1
	Waste Storage Facility	No	0	1	0	0	0	1
63	Closure of Waste Impound	No	0	0	0	0	0	2
	Cover Crop	Ac	0	0	0	136.6	135.5	545.4
	Dane County Perpetual Easement	Ac	0	0	0	0	0	3
	Filter Strip	Ac	0	0	0	0	0	9.6
	Grassed Waterway	Ac	0	0.3	3.1	0	0.05	8.25
	Heavy Use Area Protection	Ac	0	0	0	0	0	4.2
	Mulching	Ac				0	0.1	0.1
	No Till Drill	Ac	0	0	0	136.6	0	136.6
	Roof Runoff Structure	No	0	0	0	0	0	2
	Waste Facility Closure	No	0	0	0	1	0	1
	Waste Storage Facility	No	0	0	0	0	0	1
	Water and Sediment Control Structure	No	0	0	0	0	0	1
64	Access Control	Ac	0	0	0	0	0	2.9
	Animal Trails and Walkways	Ft	0	0	0	0	0	478
	Conservation Cover	Ac	0	12.7	1.4	0	0	16.1
	Cover Crop	Ac	1740.1	534	217.3	1216.2	1938.5	9674.85
	Critical Area Planting	Ac	0	0	0	0	1.5	9.6
	Diversion	Ft	0	0	3232	0	0	6022
	Fence	Ft	420	6400	720	0	9285	16825
	Filter Strip	Ac	0	0	0	0	0	18.46
	Grade Stabilization Structure	No	0	0	0	0	0	5
	Grassed Waterway	Ac	1	4.6	4	3.1	1.3	35.4
	Heavy Use Area Protection	Ac	0	0	0	0	0	3.3
	Lined Waterway or Outlet	Ft	0	589	0	0	0	1195
	Lot Relocation or Abandonment	No	0	1	0	0	0	1
	Manure Transfer	No	0	0	0	0	0	5
	Mulching	Ac				0	2.8	2.8
	No Till Drill	Ac	0	0	0	90.3	0	90.3
	No Till Drill (Equipment)	No				0	1	1
	Obstruction Removal	Ac	0	0	0	0	0	0.1
	Pasture and Hay Planting	Ac	0	0	0	0	0	67.9
	Prescribed Grazing	Ac	0	0	0	0	0	66.2
	Roof Runoff Structure	No	0	0	0	5	0	11

	Stream Crossing	No	0	1	0	0	1	3
	Streambank and Shoreline Stabilization	Ft	0	0	700	0	0	2225
	Subsurface Drain	Ft	0	1380	0	0	0	1380
	Underground Outlet	Ft	0	0	0	452	0	452
	Waste Facility Closure	No	0	1	1	1	4	7
	Waste Storage Facility	No	0	0	0	1	1	10
	Waste Transfer	No				0	1	
	Wastewater Treatment Strip	Ac	0	0	0	0	0	0.6
	Water and Sediment Control Structure	No	0	0	0	0	0	2
	Well Decommissioning	No	0	0	0	0	0	1
	Wetland Restoration	Ac	0	0	0	0	0	78
65	Grassed Waterway	Ac	0	0	0	0	0	3.3
66	Access Road	Ft	0	3826	0	392	0	5003
	Conservation Cover	Ac	0	99.7	35.4	29.2	0	182.8
	Cover Crop	Ac	42.4	76.7	219	23.1	140	518.6
	Critical Area Planting	Ac	0	0	6.5	0	0	6.5
	Diversion	Ft	0	700	0	0	0	4300
	Fence	Ft	0	17530	4800	2793	2430	27553
	Filter Strip	Ac	0	0	0	0	0	65.4
	Forage and Biomass Planting	Ac	0	70.7	24.8	0	0	95.5
	Forage Harvest Management	Ac	0	0	0	0	0	45.1
	Grade Stabilization Structure	No	0	2	0	0	0	2
	Grassed Waterway	Ac	0	3.3	0.4	0	0	36.93
	Heavy Use Area Protection	Ac	0	0.0005	0	0	0	0.10045914
	Lined Waterway or Outlet	Ft	0	0	0	0	0	249
	Livestock Pipeline	Ft				0	120	120
	No Till Drill (Equipment)	No				0	2	2
	Pasture and Hay Planting	Ac	0	0	0	0	0	33.8
	Livestock Pipeline	Ft	3070	980	0	0	0	6330
	Prescribed Grazing	Ac	0	24.6	36.1	11.3	0	72
	Roof Runoff Structure	No	0	0	0	0	0	1
	Sediment Basin	No	0	0	0	0	0	1
	Shallow Water Development	Ac	9.2	0	0	0	0	10.9
	Stream Crossing	No	0	2	0	0	0	4
	Terrace	Ft	0	0	0	0	0	558
	Tree/Shrub Establishment	Ac	0	0	0	0	0	18.8
	Underground Outlet	Ft	0	0	0	0	0	250
	Wastewater Treatment Strip	Ac	0	0	0	0	0	0.17
	Water and Sediment Control Structure	No	0	0	0	0	0	1
	Watering Facility	No	0	1	0	0	1	2
	Wetland Restoration	Ac	0	0	0	0	0	9.2
67	Cover Crop	Ac	196.8	196.7	356.1	53.3	0	802.9
	Fence	Ft	4261	0	0	0	8775	13036
	Filter Strip	Ac	0	0	0	0	0	34.3
	Forage and Biomass Planting	Ac	0	0	0	31.2	23.9	55.1
	Grassed Waterway	Ac	0	0	0	0	0.5	2.9
	Mulching	Ac				0	0.5	0.5
	No Till Drill	Ac	0	0	211	0	0	211
	Pasture and Hay Planting	Ac	0	0	0	0	0	4.2

	Livestock Pipeline	Ft	3070	0	0	700	0	3770
	Prescribed Grazing	Ac	17.5	39.7	0	31.2	23.9	112.3
	Tree/Shrub Establishment	Ac	0	0	0	0	0	4.7
68	Conservation Cover	Ac	0	0	0	5	0	5
	Cover Crop	Ac	321.67	352.3	473.9	144.9	77.2	1609.37
	Fence	Ft	8400	13700	5680	0	0	33024
	Filter Strip	Ac	6.7	0	0	0	0	14.7
	Forage and Biomass Planting	Ac	0	0	7.2	13	0	20.2
	Grade Stabilization Structure	No	0	0	0	0	0	1
	Grassed Waterway	Ac	0	0.6	0	0	0	5.3
	Heavy Use Area Protection	Ac	1	0	0	0	0	1
	No Till Drill	Ac	0	0	294.9	0	0	294.9
	Livestock Pipeline	Ft	0	4900	325	990	0	7165
	Prescribed Grazing	Ac	0	39.2	31.4	0	0	70.6
	Shallow Water Development	Ac	0	0	0	0	0	10
	Tree/Shrub Establishment	Ac	0	0	0	0	0	1
	Watering Facility	No	0	0	1	0	0	1
	Wetland Restoration	Ac	0	0	0	0	0	10
69	Conservation Cover	Ac	0	38.9	22	0	5.7	151.9
	Cover Crop	Ac	601.05	430.3	1239.5	1152	348.7	4654.72
	Critical Area Planting	Ac	0	25.6	0	0	0	25.6
	Fence	Ft	0	8050	17725	14299	3008	43082
	Filter Strip	Ac	9.3	0	0	0	0	56.51
	Forage and Biomass Planting	Ac	0	22	27	0	32.1	81.1
	Grade Stabilization Structure	No	0	0	0	1	0	1
	Grassed Waterway	Ac	0	0	0	0.3	0	10.1
	Livestock Pipeline	Ft	0	3000	0	1830	0	4830
	No Till Drill (Equipment)	No				0	5	5
	Prescribed Grazing	Ac	0	0	39	0	5.7	44.7
	Roof Runoff Structure	No	0	2	0	0	0	2
	Shallow Water Development	Ac	0	0	0	0	0	3.51
	Stream Crossing	No	0	0	0	1	0	1
	Waste Facility Closure	No	0	1	0	0	0	1
	Water and Sediment Control Structure	No	0	0	0	0	0	1
	Watering Facility	No	0	0	0	2	0	2
	Wetland Restoration	Ac	0	2	0	0	0	2
	Wetland Wildlife Habitat	Ac	0	0	0	0	0	9.6

FIGURE 3.

Conservation practices implemented in the Yahara watershed since 2008.



Dane Demo Farms

The Dane Demonstration Farm Network, known as Dane Demo Farms, kicked off at the beginning of 2023. Dane Demo Farms is a network of farmers that demonstrate and research leading edge conservation practices that improve water quality and soil health throughout Dane County. Their efforts help reduce nutrients and sediment from entering our waters and build healthy soil. Specific objectives of the Dane Demo Farms include testing the effectiveness of innovative conservation systems, share information learned in research trials by implementing an outreach strategy, and identify and address barriers to implementation of conservation practices. Two of the Demonstration Farms are located in the Yahara Watershed, and by being a Demonstration Farm, they participate in on-farm research and serve as a resource for other farms interested in adopting conservation practices. Events in 2023 focused on increasing awareness of the Dane Demo Farms, and future events will share information and research on conservation practices. The Dane Demo Farms was established in cooperation with USDA-Natural Resource Conservation Service.

Additionally, Dane Demo Farms will conduct on-farm research in partnership with UW-Madison. Research is focused on conservation practices that help protect local water quality and build soil health, with research projects that are designed to answer specific questions farmers have regarding crop management and economics. A number of the participating farms will also have edge-of field monitoring stations installed to help quantify the real world surface water quality impacts of the tested conservation practices. More information is available on-line at www.danedemos.danecounty.gov

Left: A Planter Clinic hosted at UW Arlington Agriculture Research Station; Right: County staff collecting soil samples as a part of on-farm research

Conservation Signage

In addition to Dane Demo Farms, county staff have increased awareness about conservation practices by developing signs for landowners to display for grazing, cover crops, and prairie restoration. While seeing conservation actively on the ground, other landowners can easily contact county staff to implement these practices.

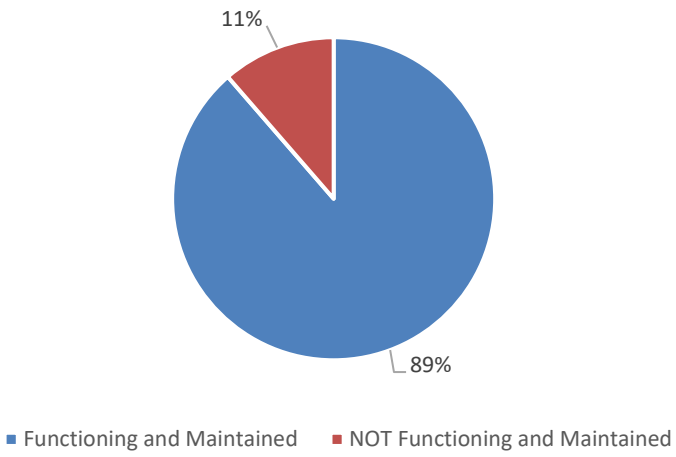
Above: Conservation signs placed throughout Dane County to showcase conservation practices

Verification Checks

Of the 167 conservation practices that were identified for verification this past year, Dane County staff inspected all of them. All inspected practices were located in TMDL reaches 62, 63, 64, 66, and 67. Of those checked 167 (89%) were found to be functioning and maintained while 19 (11%) were not (Figure 4.). Reasons for these practices no longer functioning and being maintained include conversion of land use from agriculture to residential or practices requiring repairs and maintenance.

FIGURE 4.

Field verification and review of conservation practices.

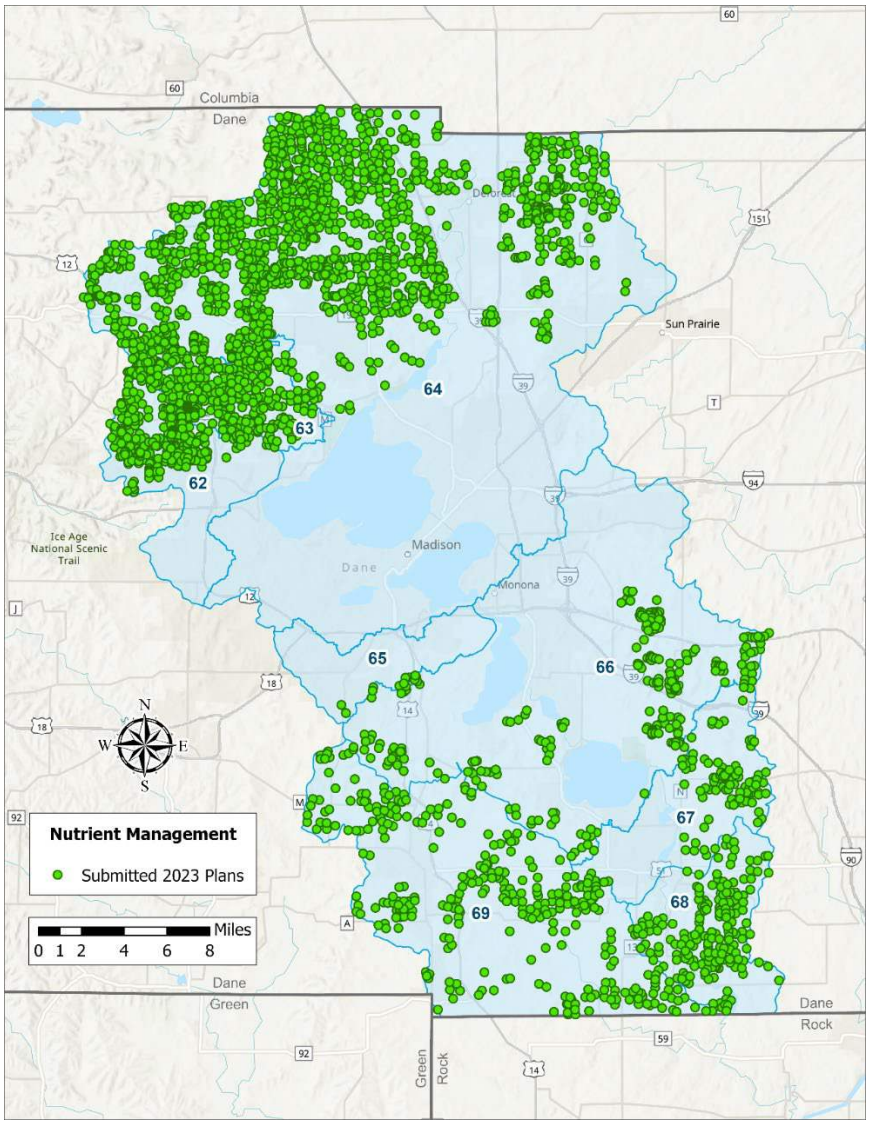


Nutrient Management

Nutrient management plans (NMP) continue to be received, reviewed and mapped by Dane County staff. In 2023, 60,919 total acres were mapped within the Yahara watershed. The general location of fields with NMP's are documented in Figure 5 and the total number of acres for each TMDL reach are recorded in Table 2.

Mapped NMP Acres

Figure 5.Map of the 2023 submitted nutrient management plans within the Yahara watershed.



Acres of NMP's

TABLE 2.

Acres of nutrient management plans mapped within the Yahara watershed since 2019.

TMDL Reach	2019	2020	2021	2022	2023
62	1,736	2,061	3,530	3,152	3,819
63	3,299	2,955	4,109	4,339	5,024
64	25,951	26,967	32,815	26,983	31,834
65	0	0	92	0	127
66	1,683	3,480	4,691	4,122	3,887
67	809	988	1,823	1,772	2,169
68	3,461	4,277	4,471	4,637	4,746
69	2,619	4,263	6,303	7,458	9,311
TOTAL	41,587	44,992	57,835	52,465	60,919

Innovative Conservation Practices

Dane County continues to explore and promote innovative conservation practices and systems in 2023. This included further development of the Continuous Cover Program and removal of legacy sediments. All of these practices and systems were implemented while considering both site specific conditions and landowner management goals. This maximizes the amount of phosphorus being reduced while ensuring future maintenance and practice function.

Continuous Cover Program

Dane County's Continuous Cover Program, launched in 2019, continues to be a popular program. This program provides cost-share assistance to landowners for the establishment and maintenance of a continuous living cover on lands that are traditionally row-cropped. Landowners can convert row cropped fields to cool season grasses, prairie and pollinator habitat, or forage for managed grazing. The option to incorporate trees into plantings, such as agroforestry or silvaculture, was added to the program in 2023. More information on the program can be found here: https://lcd-lwrd.countyofdane.com/Continuous-Cover-Program

Left: CCP Field being no-till planted to pasture Right: Newly established prairie

Legacy Sediment

Hydraulic dredge removing legacy sediments from Token Creek.

Since 2016, Dane County has been assessing and removing legacy sediments within stream tributaries of the Yahara Watershed. Dorn Creek, Sixmile Creek, Token Creek, Door Creek, Nine Springs Creek, and the Yahara River have all been sampled and assessed for both phosphorus concentrations and sediment volumes. Sediments have been removed from three sites; Dorn, Sixmile and Token Creeks.

In 2023, Dane County started planning and designing the removal of sediments in Door Creek. This project will also include the remaindering of the creek back to its original channel. The anticipated start date is summer of 2024.

More information regarding the Legacy Sediment Removal Project can be found here: https://lwrd.danecounty.gov/CurrentProjects/Detail/Legacy-Sediment-Removal

Cost-share

Dane County assisted with obligating 32 new cost-share agreements with landowners, utilizing federal, county and other funding sources (Figure 6.) within the Yahara. Total cost-share funding for the 32 agreements was over $600,000 (Figure 7.). Since 2013, Dane County has assisted with cost-share agreements totaling over $7 million for conservation practices that reduce phosphorus within the watershed. Dane County strives to utilize and leverage all funding sources available to landowners and producers including federal, county, and other sources (i.e. Yahara WINS, Clean Lakes Alliance grants, etc.). Available funds and conditions vary based on the source of funds. Similarly, the number of cost-share agreements executed annually varies, often limited by available annual funding and interest from landowners and producers.

Under the current Service Agreement, Yahara WINS provides Dane County with $540,000 for assisting with implementing conservation practices and the WINS Adaptive Management project. In 2023, $81,662.50 was used in providing cost share assistance, directly to landowners and individuals, to aid in implementing phosphorus reducing conservation practices. The remaining, approximately, $458,000 was used to partially fund staff and equipment required to plan, design, implement, document, verify, and map the conservation practices and nutrient management plans that were reported to Yahara WINS.

Funding Sources and Amounts

FIGURE 6.
Number of cost-share agreements annually by funding source within the Yahara watershed since 2013.

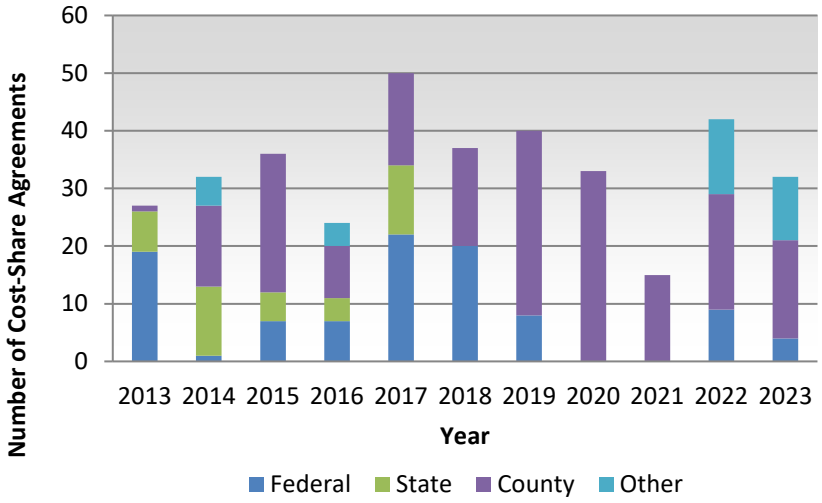
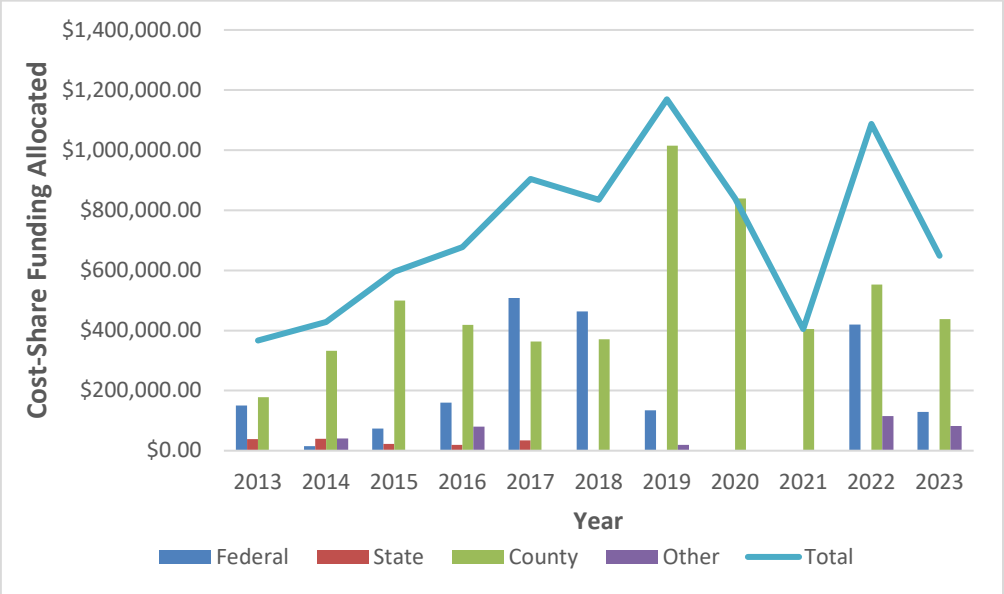


FIGURE 7.

Total cost-share dollars allocated by funding source annually within the Yahara watershed since 2013. The cumulative total from all funding sources is also presented.



Phosphorus Reductions

The pounds of phosphorus reduced in 2023 from new practices was 7,776. With 15,542 carryover pounds, the resulting combined total of 23,318 pounds of phosphorus reduced cap 2023. Carryover pounds are generated from conservation practices implemented from 2008 to 2022 that are still functioning and being maintained. New pounds are from practices implemented in the 2023 calendar year. Phosphorus reductions for the Yahara watershed and subsequent TMDL reaches over time are presented in figures below. Table 3 also shows both new and carryover pounds of phosphorus reduced over time.

Dane County was notified by Yahara WINS in 2023 that the methods used to calculate phosphorus reductions would be changing (Phosphorus Reduction Accounting: SnapPlus Modeling Guidance Yahara WINS, dated 2/27/2023). The two major changes in methods included the use of the P Trade report within the SNAP Plus model. The other change was an across the board 15% reduction in reported total pounds of phosphorus, for all partners, to account for internally drained areas. Historically, Dane County had been removing any practices located in these identified areas. Moving forward (2023 and beyond), the county will be reporting all phosphorus reductions from implemented practices within the project area. Yahara WINS will then apply the 15% reduction for their permit compliance reporting.

New and Carryover Phosphorus Reductions

TABLE 3.

New and carryover pounds of phosphorus reduced by TMDL reach annually.

	2019		2020		2021		2022		2023	
TMDL Reach	New	Carryover	New	Carryover	New	Carryover	New	Carryover	New	Carryover
62	299.5	652.8	203.6	342.4	442.3	167.7	307.4	186.1	381.9	186.1
63	329.9	2457.6	328.4	1529.4	464.9	1562.3	707.1	1616.3	541.0	1702.0
64	4325.7	5441	3033.7	4260.2	3300.6	4244.8	3819.6	4069.3	4504.2	4712
65	0	0	0.0	145.6	0.0	174.2	0.0	182.2	12.7	182.2
66	276.4	4561.3	1268.3	4587.6	900.1	5198.5	520.0	5411.6	416.7	5238.8
67	277.7	567	285.1	567.0	408.3	523.2	263.6	523.2	314.9	853.3
68	773.8	720.8	904.7	710.0	985.8	779.9	657.8	788.6	490.0	849.7
69	910.5	1642.7	737.3	1247.4	1352.0	1333.5	1582.8	1453.5	1114.3	1717.4
Total	**7,193.5**	**16,188.8**	**6,761.1**	**13,389.6**	**7,853.9**	**13,984.1**	**11,594.4**	**16,870.7**	**7,775.8**	**15,541.5**

Phosphorus Reductions by Reach

FIGURE 8.1.

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

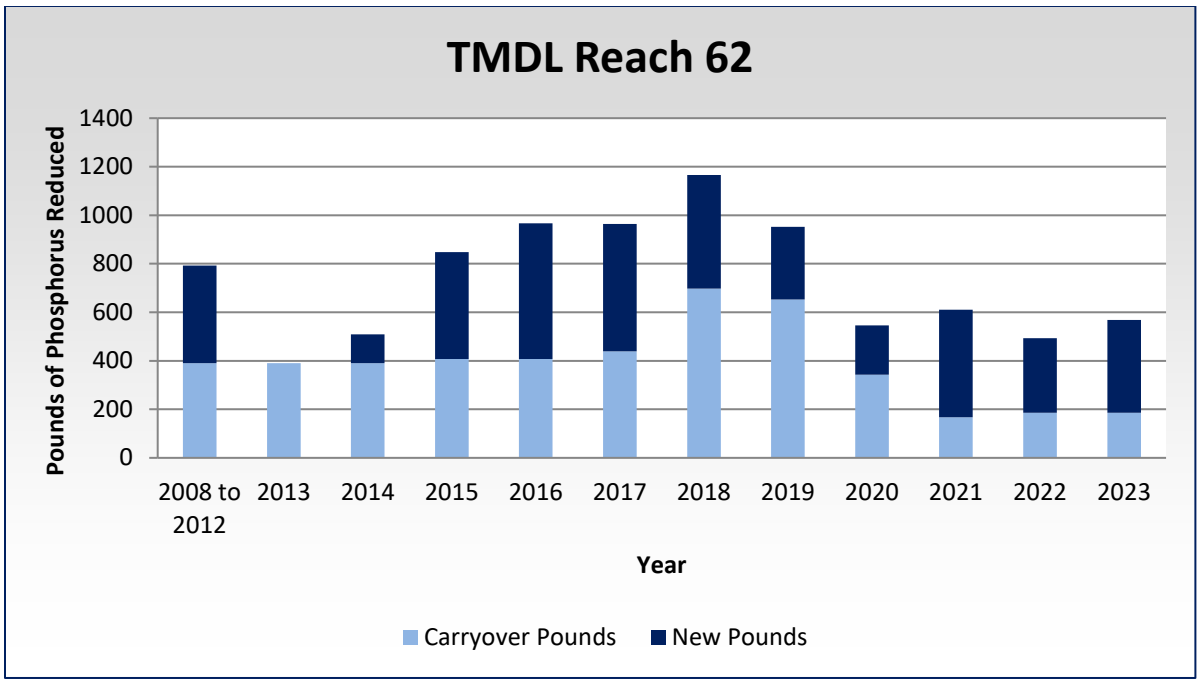


FIGURE 8.2.

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

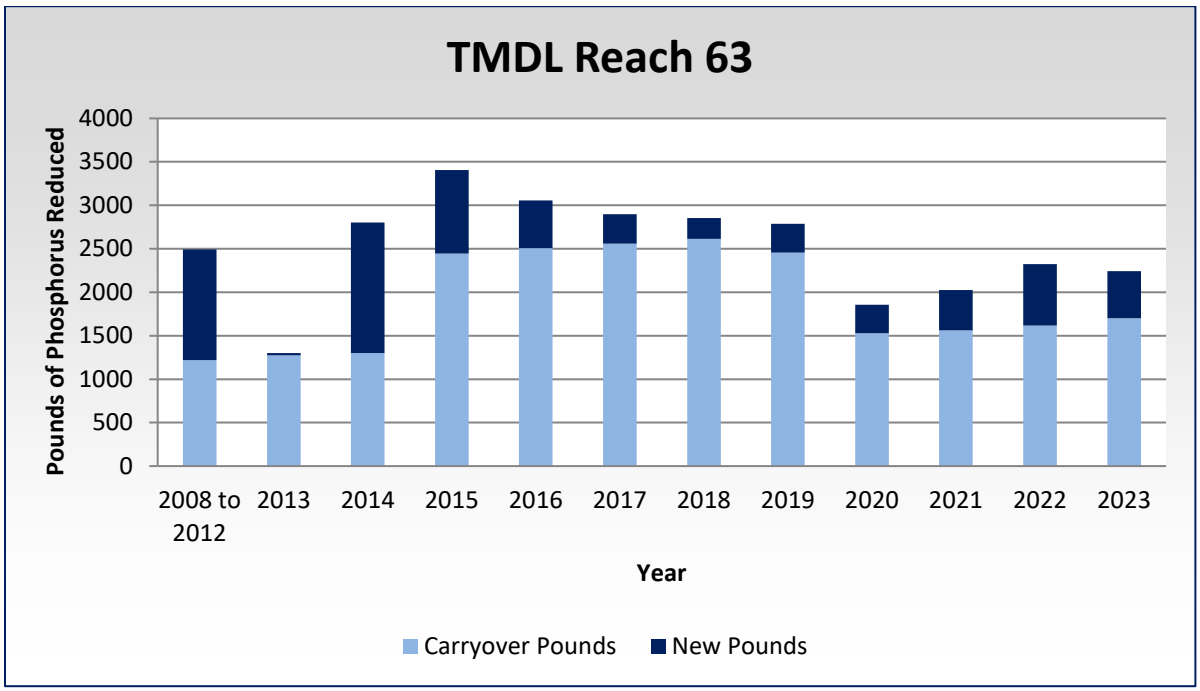


FIGURE 8.3.

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

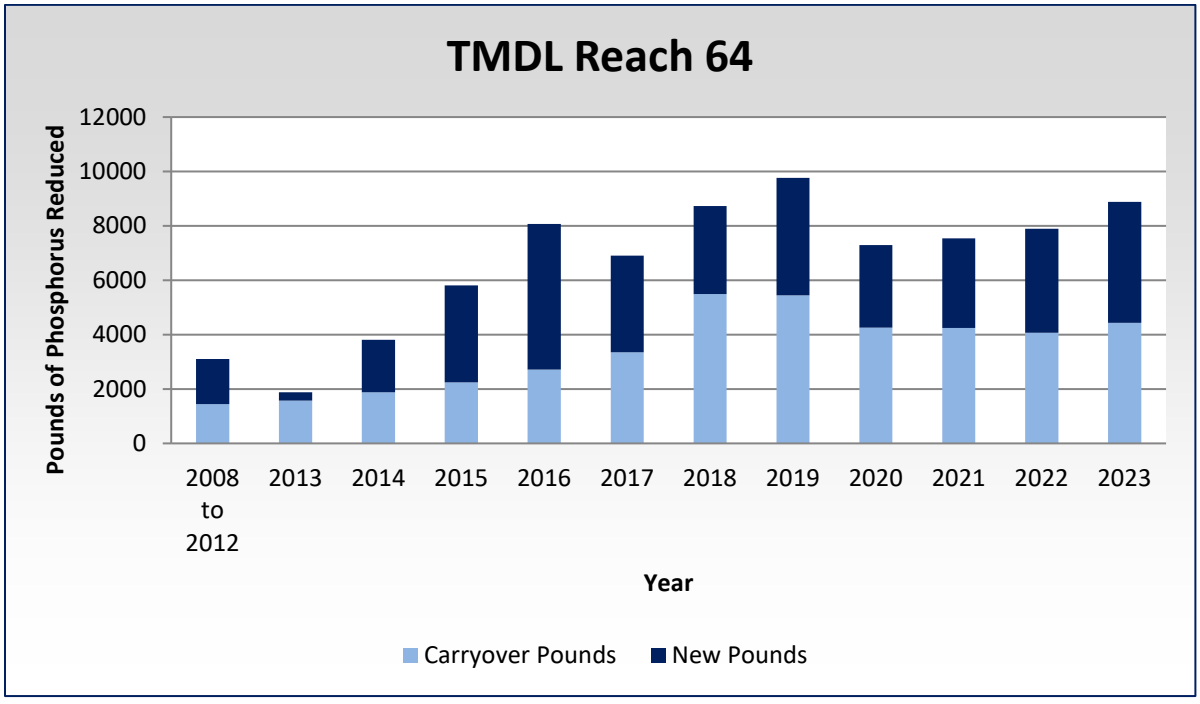


FIGURE 8.4.

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

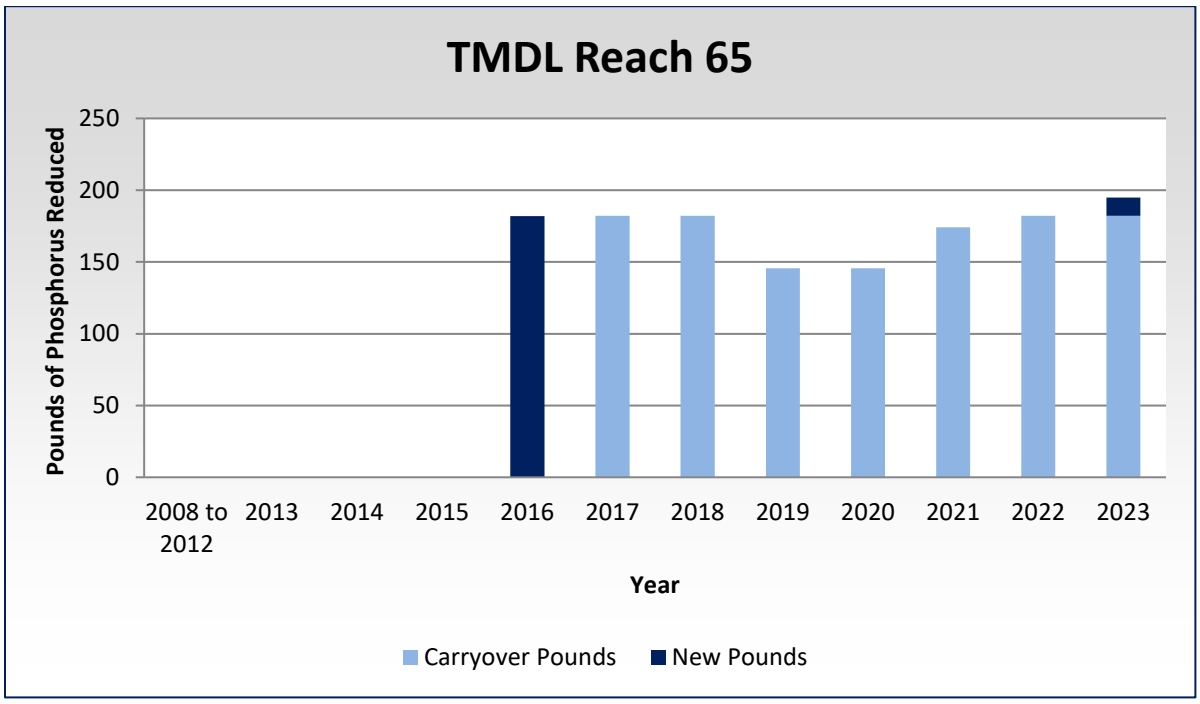


FIGURE 8.5.

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

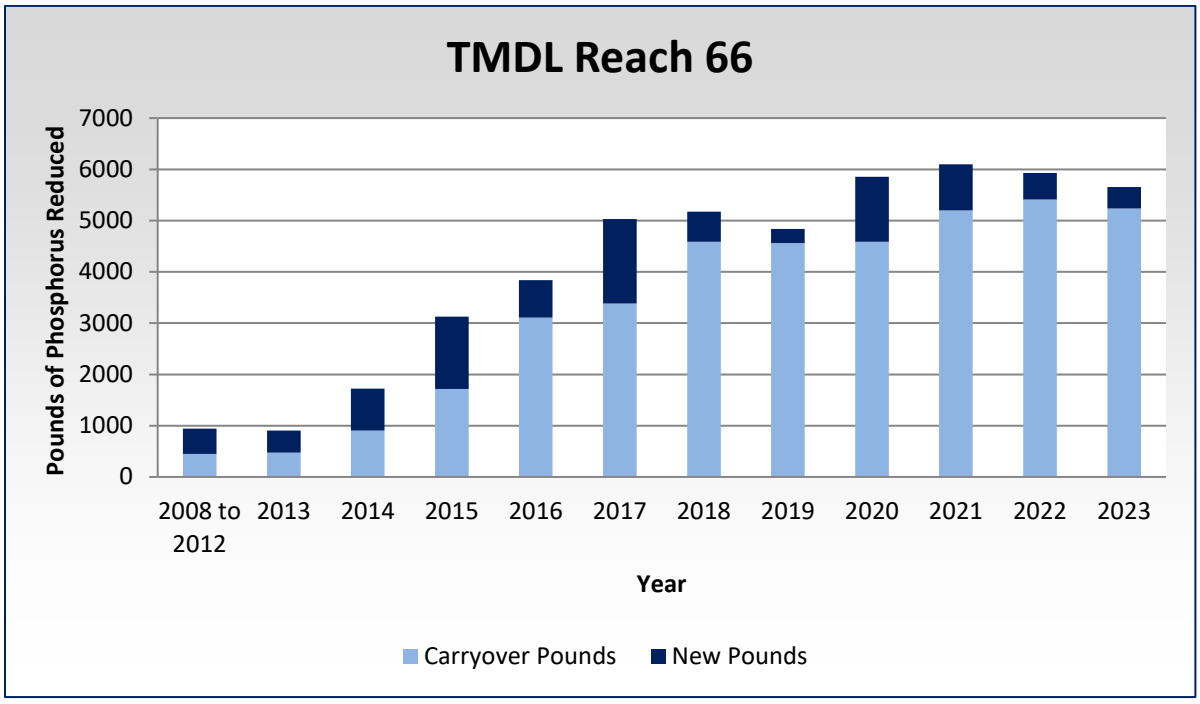


FIGURE 8.6.

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

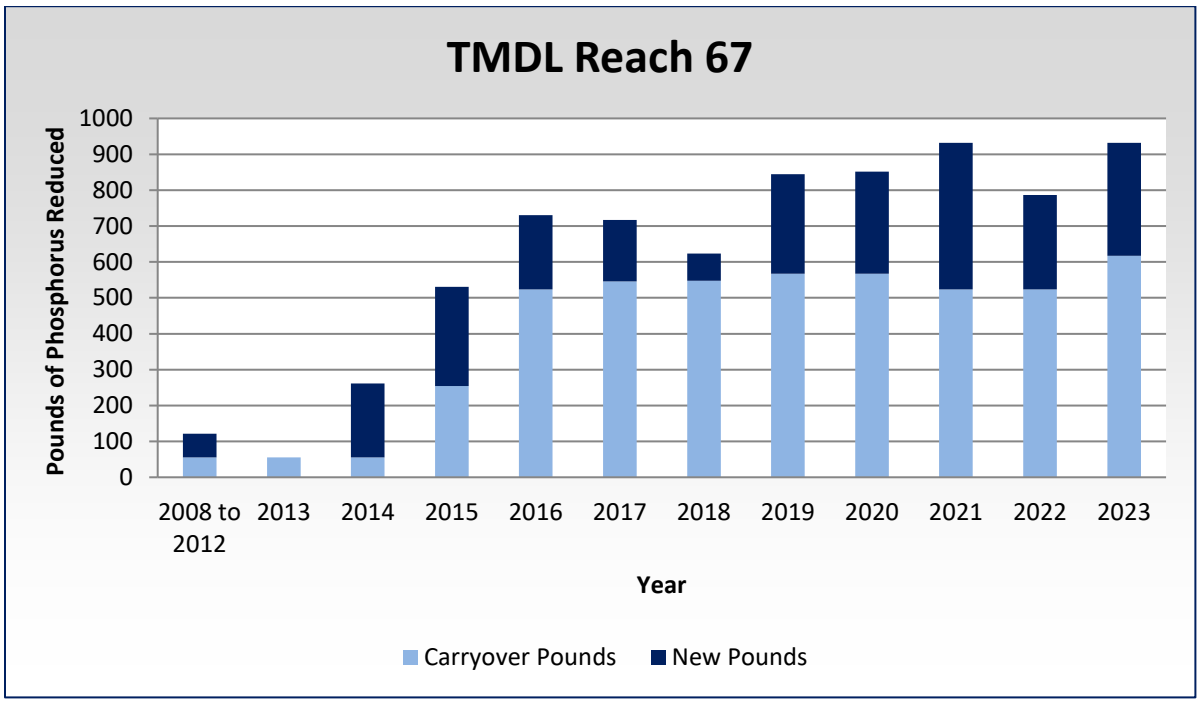


FIGURE 8.7.

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

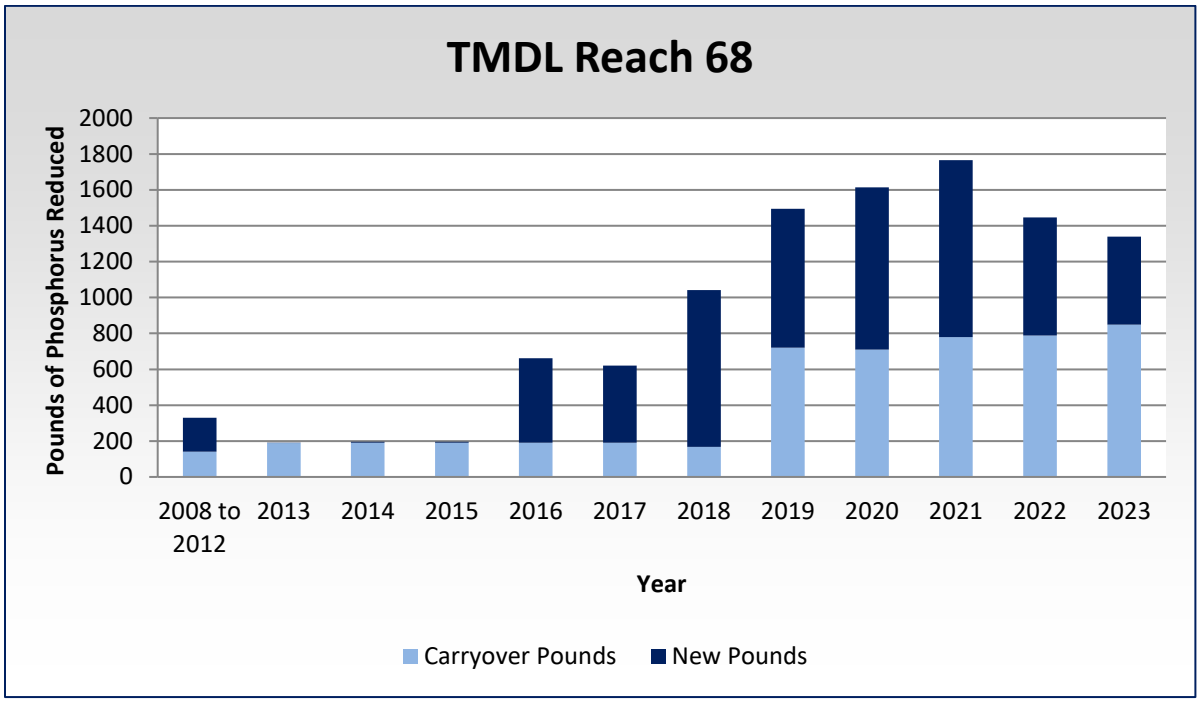
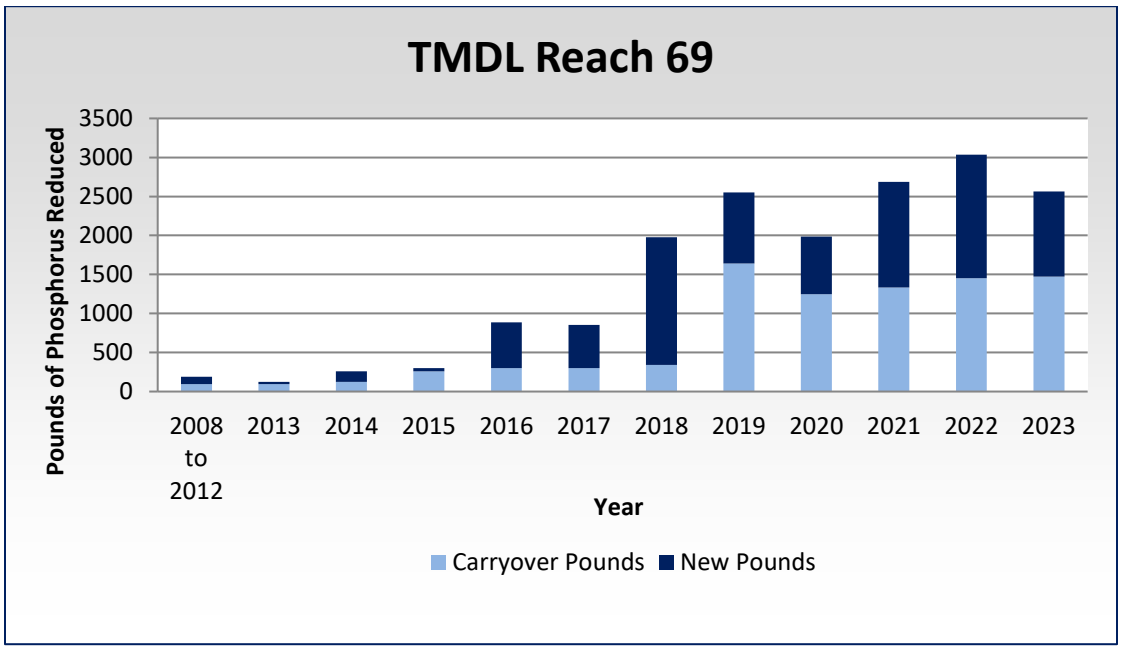


FIGURE 8.8.

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



Notable Accomplishments

Pheasant Branch Restoration Project

Dane County purchased a 160 acre property just north of the Pheasant Branch Conservancy in 2019. Since then, Dane County has implemented a four year restoration project that includes removing the barnyard, converted the cropped land to perennial vegetation, and constructing stormwater retention structures. Monitoring of runoff generation immediately before and after restoration by Dane County indicates that the restoration efforts have led to an order of magnitude decrease in runoff volume from the addition and its contributing watershed, bringing the empirical curve number down from 74 to 44. This decreased runoff volume is associated with an associated annual reduction in pollutant loading of approximately 5,400 pounds of sediment, 600 pounds of phosphorus, and 650 pounds of organic nitrogen.

Pheasant Branch property before restoration

More information and link to the Water Quality and Runoff Trends of Pheasant Branch Creek Tributary report can be found here: https://www.danecountyparks.com/documents/PDFs/projects/Pheasant-Branch/AckerWaterQualityReport-20230413.pdf

Left: Frost seeding prairie at Pheasant Branch Right: Sediment control basin constructed at Pheasant Branch

Permanently Protected Property

An additional 36 acres within the Yahara watershed were permanently protected with the assistance of Dane County and partners. Waakikižu Natural Resource Area (36 acres) is a property that includes 2,100 feet of Sixmile Creek shoreline and 13 acres of wetlands, providing opportunities for wetland enhancement and stormwater management

Six Mile Creek in the Waakikižu Natural Resource Area

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. Despite challenging weather conditions, more than 115 new practices were implemented and over 165 practices were verified to confirm that they were functioning. Yahara WINS continued to provide funding to aid Dane County in conservation implementation. This reduced the amount of phosphorus entering nearby surface waters by more than 7,000 pounds. Combining this with the more than 15,000 pounds of phosphorus reduced from previously implemented practices (carryover) resulted in a total reduction of 23,318 pounds of phosphorus in 2023.