DRAFT 8/7/2015

# Door Creek Watershed Management Action Plan

A Nine Key Element Watershed Based Plan

DANE COUNTY
LAND & WATER RESOURCES
DEPARTMENT

## ACKNOWLEDGEMENTS

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Credit LWRD staff team and reviewers, external reviewers.

Cover photo by Steve Falter, Capitol Water Trails.

## 1.0 INTRODUCTION

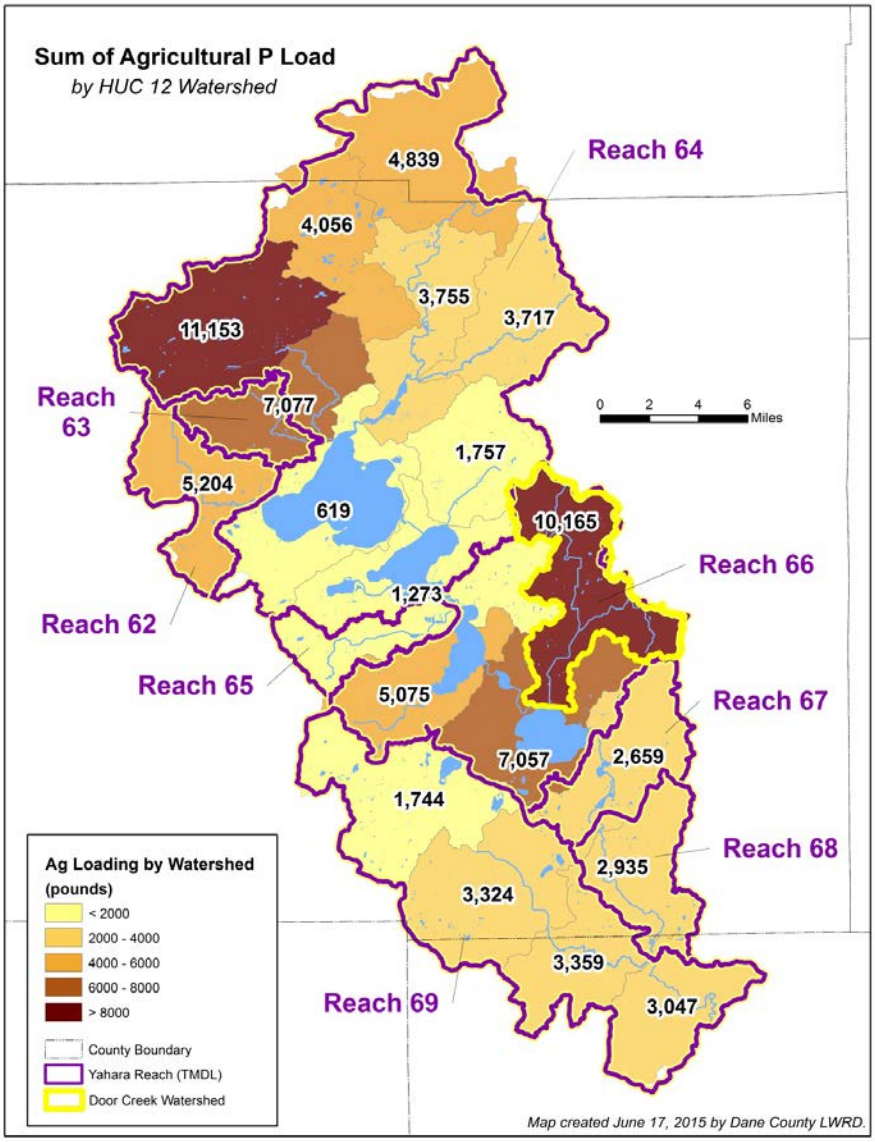
For decades, Dane County, Wisconsin has been engaged in watershed planning and conservation practice implementation to reduce pollutants from entering lakes and streams. As part of these planning and implementation efforts extensive modeling and evaluations of watersheds within the county have been conducted to provide insights into enhanced prioritization and efficiencies to improve water quality. One of the more substantial efforts has been the completion and approval of the *Total Maximum Daily Loads (TMDL) for Total Phosphorus and Total Suspended Solids in the Rock River Basin* by both the Wisconsin Department of Natural Resources (WDNR) and U.S. Environmental Protection Agency (EPA) (The Cadmus Group, Inc, 2011). This document serves as a guide in identifying specific load reductions for both total phosphorus and total suspended solids for point and non-point sources within the Rock River Basin.

The Rock River Basin is extremely large (approximately 3,750 square miles) of which 746 square miles are located within Dane County. These 746 square miles are broken down into 16 TMDL reaches with each reach having its own designated load reductions. These 16 reaches vary significantly in size when compared to one another making it difficult to determine which areas should be prioritized . In order to make more informed decisions, the Dane County Land and Water Resources Department (LWRD) conducted a refined evaluation on 8 of the 16 TMDL reaches. The 8 reaches were selected given limited resources and their direct impact on the Yahara Chain of Lakes (Mendota, Monona, Waubesa, and Kegonsa). These lakes are particularly important for the recreational opportunities they provide for hundreds of thousands of Dane County residents as well as the millions of dollars that are associated with the lakes economic impacts.

This refined evaluation also used the Soil and Water Assessment Tool to evaluate both non-point and point source phosphorus and sediment loadings within the Yahara and Badfish Creek Watersheds (Figure 1). However, the analysis was conducted at the Natural Resource Conservation Service Hydrologic Unit Code – 12 (HUC-12) watershed scale in order to standardize the loadings for comparison across all evaluated watersheds. Corresponding results enabled the LWRD to select priority areas with which to conduct further planning and practice implementation.

Door Creek has been identified as contributing the second highest annual phosphorus loading among the 19 HUC-12 watersheds of the larger Yahara River and Badfish Creek watersheds (Figure 1). The highest phosphorus loads to the Yahara watershed originate from the Waunakee Marsh watershed located northwest of Lake Mendota. With extensive conservation practices already completed in Waunakee Marsh, LWRD selected the Door Creek HUC-12 watershed for development of this “Nine Key Element” watershed plan.

Figure 1. Agricultural phosphorus loading rates (pounds/acre) for Hydrologic Unit Code – 12 (HUC – 12) watersheds located within the Yahara and Badfish Creek Watersheds. Results were generated by Dane County Land and Water Resources Department using data from *Yahara WINs Extended SWAT Model to Estimate Baseline Phosphorus Loading to the Yahara Watershed* (Montgomery Associates Resource Solutions, LLC, 2014).



## *1.1 NINE KEY ELEMENT PLANNING*

This plan is being prepared to address U.S. Environmental Protection Agency's (EPA) nine key element planning process. LWRD's intention is to include all the elements necessary for successful plan implementation in order to remove impairments, meet established phosphorus water quality criteria, and restore Door Creek's designated use.

**Figure 2. Summary of EPA's nine key elements and a reference for each elements location in this Door Creek Watershed Management Action Plan.**

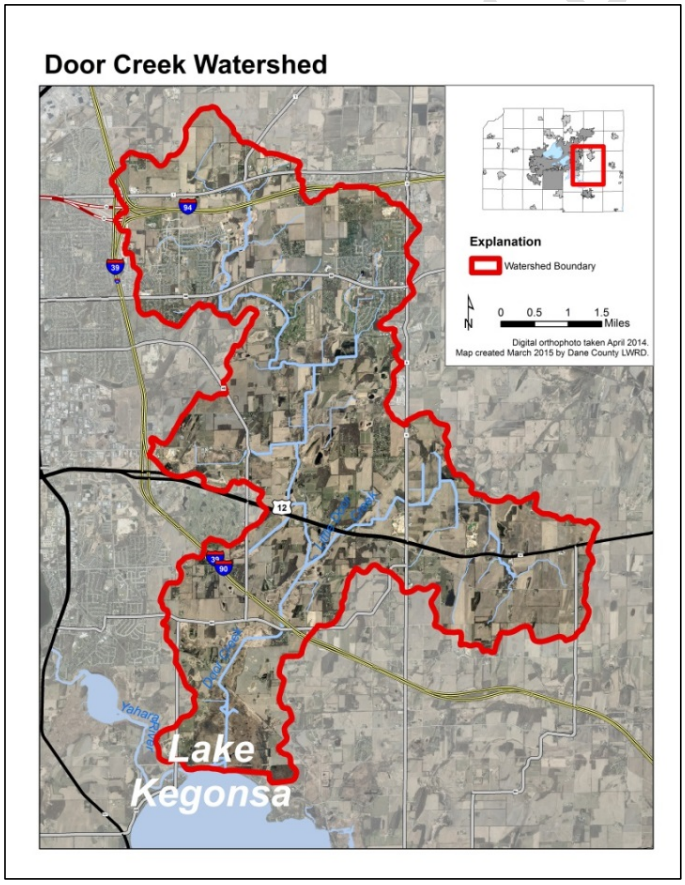
| | |
|---|---|
| Element 1 Pollutant Sources | •Identification of causes of impairment and pollutant sources that need to be controlled to achieve needed pollutant load reductions and any other goals identified in the watershed plan<br>•Element 1 is addressed in Section 3.0 of this document |
| Element 2 Pollutant Reductions | •An estimate of the load reductions expected from any recommended management measures<br>•Element 2 is addressed in Section 5.0 of this document |
| Element 3 Management Measures | •A description of the nonpoint source management measures that will need to be implemented to achieve load reductions identified in Element 2, locations where those practices are needed, and measures to address other pollution reduction goals.<br>•Element 3 is addressed in Section 7.0 of this document |
| Element 4 Technical & Financial Assistance | •Estimates of the amounts of technical and financial assistance needed, costs, and/or the sources and authorities that will be relied upon to implement the plan.<br>•Element 4 is addressed in Sections 10.0 and 11.0 of this document |
| Element 5 Information & Education | •An information and education component that will be used to enhance public understanding of the project and encourage the public's early and continued participation in selecting, designing, and implementing the appropriate nonpoint source management measures.<br>•Element 5 is addressed in Section 8.0 of this document. |
| Element 6 Implementation Schedule | •A timely schedule for implementing the nonpoint source management measures identified in the plan.<br>•Element 6 is addressed in Sections 8.2 and 9.1 of this document. |
| Element 7 Implementation Milestones | •A description of the interim measurable milestones for determining whether nonpoint source management measures or other control actions are being implemented.<br>•Element 7 is addressed in Section 12.1 of this document. |
| Element 8 Implementation Success Criteria | •A set of criteria that can be used to determine whether pollutant load reductions are being achieved over time and how the plan will be reevaluated<br>•Element 8 is addressed in Section 12.0 of this document |
| Element 9 Effectiveness & Evaluation | •A monitoring component to evaluate the effectiveness of the implementation efforts over time<br>•Element 9 is addressed in Sections 7.4 and 9.1 of this document |

## 2.0 DOOR CREEK BACKGROUND INFORMATION

### *2.1 SETTING AND LOCATION*

Door Creek, a tributary to the Yahara River entering at Lake Kegonsa, begins as a small stream in the southeast corner of the Town of Burke, and flows south 12.7 miles to Lake Kegonsa, the most southern of the Yahara River Chain of Lakes. The Yahara River Chain of Lakes is located within the Rock River Basin in South Central Wisconsin. Little Door Creek begins in the south central portion of the Town of Cottage Grove and joins the main stem of Door Creek just south of U.S. Highway 12/18. Door Creek and its tributaries drain 29.5 square miles of rolling agricultural land in the drumlin-marsh area of eastern Dane County. It has a gradient of 2.4 feet/mile and surface area of 12.3 acres. Base discharge is 9.4 cubic feet per second. The watershed is oriented in a north-south direction and drains portions of five towns, two villages and a small segment of the City of Madison.

Figure 3. General map of the Door Creek Watershed.



Much of Door Creek has been straightened and ditched to facilitate drainage and provide more agricultural land. Drainage projects date back to 1919 when the Door Creek Drainage District was organized.

The Door Creek Wetland, adjacent to the north shore of Lake Kegonsa, is an extensive low-lying marsh that covers approximately one square mile. Door Creek and the Door Creek wetland exhibit very low elevation gradients due to the region's glacial history (WDNR, 2001). Their average water level is approximately 843 feet above sea level and reflects hydrological conditions in downstream Lake Kegonsa.

## *2.2 TOPOGRAPHY, HYDROLOGY AND GEOLOGY*

Door Creek generally flows from the higher drumlin area in the north to the lower marshy area in the south before discharging into northern Lake Kegonsa. The Door Creek stream network consists of the main stem of Door Creek, its tributary Little Door Creek, and a network of human-made drainage ditches.

Door Creek and Little Door Creek are divided by a ridge that runs through the northern half of the watershed. It extends in a northeasterly direction from the confluence of the two creeks toward the Village of Cottage Grove and reaches a maximum elevation of just over 1,000 feet above sea level. The highest elevation in the Door Creek watershed is 1,075 feet, on a drumlin north of Rinden Road. The lowest elevation is 841 feet, at the mouth of Door Creek flowing into Lake Kegonsa.

Door Creek is in the Southeastern Wisconsin Savannah and Till Plain ecoregion. The region's unique landscape was formed approximately 15,000 years ago during the last glaciation period. This dramatically affected the water resources and flow patterns of the region and formed the Yahara Chain of Lakes. Upland areas in the northern and eastern portions of the Door Creek watershed include many small drumlin hills (long narrow glacial features) interspersed with shallow glacial deposits, which created an extensive system of interconnected wetlands with poorly defined drainage. Much of the watershed is several feet of glacial till and meltwater stream sediment, over bedrock of sandstone, siltstone, dolomite and shale.

## *2.3 LAND COVER AND USE*

Regional land cover and land use practices have implications for land and water resources quality and function. The predominant land use within the watershed is agriculture accounting for more than 47% of the total watershed area (Table 1). The dominant agricultural practice is cash grain farming consisting of corn and soybean rotations. However, some livestock operations are present in the watershed having cropping rotations of corn, soybeans, hay, and wheat.

Figure 4. No-till soybeans following corn.

The second largest land cover/use within the watershed is the WDNR Wetlands. Wetlands occupy more than 2,700 acres (13%) of the total area. The wetlands have four distinct plant community types; shallow marsh, sedge meadow, wet prairie, and shrub-carr. Shallow marsh and sedge meadow are the most dominant.

Table 1. Table identifying land cover and use within the Door Creek Watershed.

| Land Cover and Use | Acres |
|---|---|
| **AGRICULTURE** | 9,768 |
| **COMMERCIAL** | 146 |
| **WDNR WETLAND** | 2,741 |
| **INDUSTRIAL** | 9 |
| **INSTITUTIONAL/GOVERNMENTAL** | 165 |
| **MANUFACTURING** | 20 |
| **MINERAL EXTRACTION** | 172 |
| **OPEN LAND** | 1,623 |
| **RECREATION** | 584 |
| **RESIDENTIAL** | 2,062 |
| **TRANSPORTATION, COMMUNICATIONS AND UTILITIES** | 1,724 |
| **UNDER CONSTRUCTION** | 3 |
| **VACANT SUBDIVIDED LAND** | 302 |
| **WATER** | 101 |
| **WHOLESALE AND RETAIL TRADE** | 1 |
| **WOODLANDS** | 1,082 |
| | |
| **TOTAL** | 20,503 |

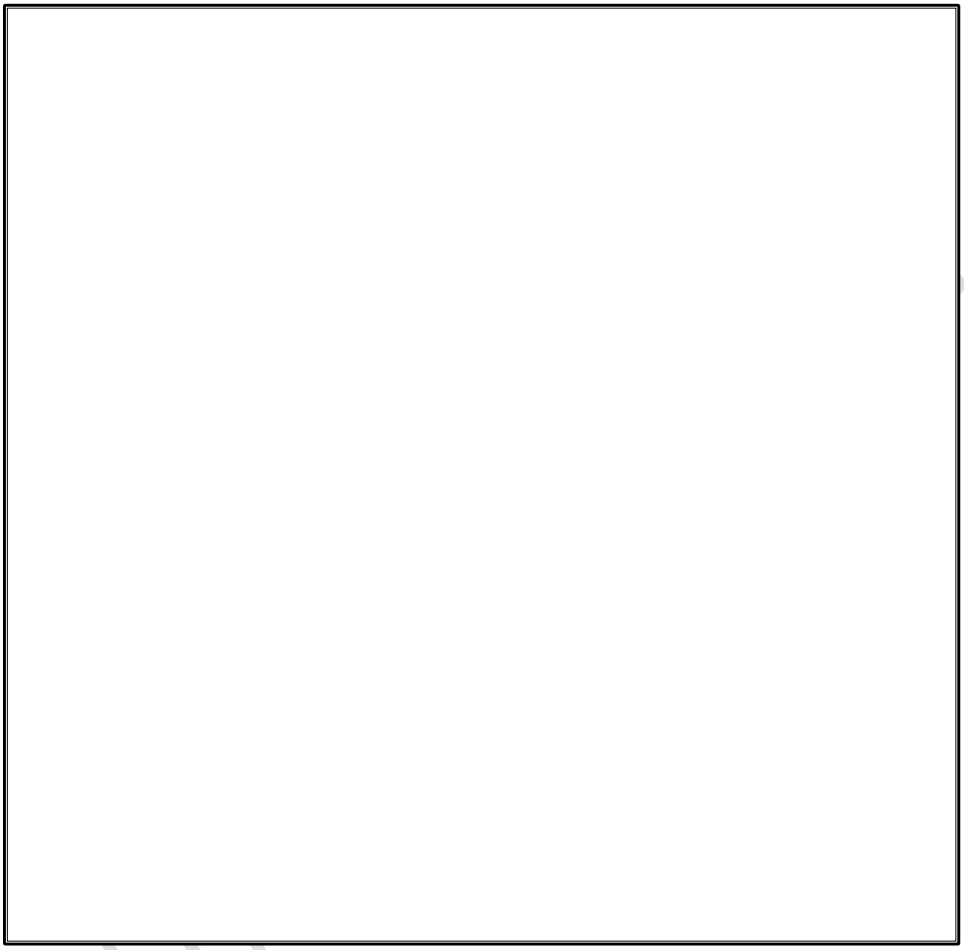
## *2.4 SOIL CHARACTERISTICS*

The watershed is comprised primarily of three soil groupings: McHenry-Kidder, Ringwood-Plano-Griswold, and Rodman-Fox-Casco (Table 2). These Door Creek watershed soil groupings are all well-drained, meaning that water moves through the soil readily, but not rapidly. In addition, there are extensive acreages along Door Creek of Houghton muck, a hydric soil (meaning that it formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part). Houghton muck is a very deep, very poorly drained soil formed in herbaceous organic materials more than 51 inches thick in depressions on lake plains, outwash plains, ground moraines, end moraines, and floodplains. Slope ranges from 0 to 2 percent.

**Table 2. Dominant soil groupings in the Door Creek Watershed.**

| Soil Grouping | Total Acres | Drainage Class |
|---|---|---|
| McHenry-Kidder | 8078 | Well drained |
| Ringwood-Plano-Griswold | 3629 | Well drained |
| Rodman-Fox-Casco | 8798 | Well drained |

Figure 5. Soil series in the three Door Creek Watershed soil groupings.



## *2.5 CLIMATE AND PRECIPITATION*

The Door Creek watershed has a humid, continental climate. The average annual temperature is 46 degrees Fahrenheit (°F), with a high monthly average of 72 degrees in July and a low monthly average of 17 degrees in January. The average precipitation is 33 inches per year, and the average yearly snowfall is 50 inches.

Future projections of temperature and precipitation patterns by University of Wisconsin-Madison climate scientists indicate that Wisconsin's warming trend will increase considerably in the decades ahead. Wisconsin will also likely continue its trend toward more precipitation overall, with the most probable increases in winter, spring and fall. Large storm events are also

likely to increase in frequency during spring and fall. Statewide, the amount of precipitation that falls as rain rather than snow during the winter is also projected to increase significantly, with freezing rain more likely to occur.

The climate contributes to the region's hydrology by producing high volumes of runoff during both the spring and summer seasons. Spring runoff is produced by the melting of snow as temperatures rise, and summer runoff is produced by intense convective storms. Given current weather pattern trends, runoff events will likely be more frequent and/or more intense in the future.

## *2.6 JURISDICTIONS AND POPULATION*

The Door Creek watershed drains portions of six towns, two villages and a small segment of the city of Madison. Half of the watershed falls within the Town of Cottage Grove.

Table 3. Municipalities and associated acres within the Door Creek Watershed.

| Municipality | Acres in Door Creek |
|---|---|
| City of Madison | 2,664 |
| Village of Cottage Grove | 1,214 |
| Village of McFarland | 4 |
| Town of Blooming Grove | 1,636 |
| Town of Burke | 306 |
| Town of Cottage Grove | 10,240 |
| Town of Dunn | 1,696 |
| Town of Pleasant Springs | 2,429 |
| Town of Sun Prairie | 314 |
| TOTAL: | 20,503 |

The watershed also includes portions of three active Drainage Districts, Number 20, Blooming Grove, and Door Creek districts, local governmental districts which are organized to drain lands for agricultural or other purposes. The three active districts are all organized under Chapter 88, Wisconsin Statutes, and are governed by the Dane County Drainage Board. With 5,459 acres included, the Door Creek Drainage District is the largest of the three within this watershed.

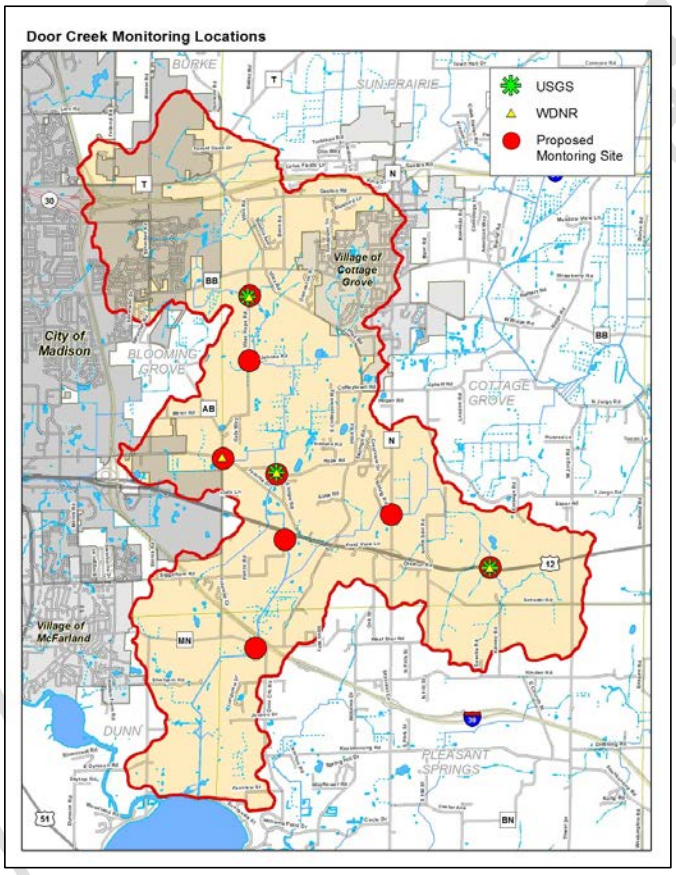
The human population in the Door Creek watershed was estimated to be 14,516 in 2010, and projected as 15,386 in 2013.

## *2.7 WATER QUALITY AND HABITAT CONDITIONS*

Door Creek is a relatively sluggish stream subject to high temperatures and low flow. Water quality in the stream is poor and some stretches have four to six feet of silt with less than two feet of water. Historical water quality monitoring data is limited and includes information from USGS gauging stations and baseline monitoring conducted by WDNR. County staff identified up

to eight sites within the watershed with associated historical monitoring: six sites on Door Creek and two sites on Little Door Creek. LWRD staff and the WDNR Rock River Water Quality Biologist reviewed the data for applicability. The lack and inconsistency of data is directly related to stream conditions, as many areas of the system have large volumes of soft sediment making it difficult to monitor (Sorge & Riedel, 2015).

**Figure 6. Map of historic and proposed water quality monitoring within the Door Creek Watershed.**




Soil loss in the watershed from cropland erosion has been high, resulting in a stream bottom covered with silt. This sedimentation decreases the amount of aquatic habitat, increases the turbidity of the water, and affects the creek's overall temperature.

The Door Creek Wetlands near the mouth of Door Creek are a shallow marsh with stands of cattail, which sits on a major peat deposit of the Yahara River Valley. The north end of the peat deposit is drier than the southern area, with sedge meadow and shrubs. This high quality

wetland complex provides excellent habitat for northern pike spawning and sandhill crane nesting; the cranes are expanding their range into the area. Waterfowl and upland game birds also use the area.

Biological indicators can also be used to support water chemistry findings. The Hilsenhoff Biotic Index (HBI) and Index of Biotic Integrity (IBI) are two metrics used to capture these indicators. The HBI measures species richness as related to organic pollution. The HBI score is strongly correlated to the overall average pollution tolerance value of the macroinvertebrates in the stream. However, limited habitat can also influence HBI scores. Sampling locations lacking riffle areas can reflect higher (poor) HBI scores since they do not have suitable habitat for invertebrates. The HBI scores and degree of organic pollution for various sampling sites is provided in Table 4 below.

**Table 4. Results of historic Habitat of Biological Integrity (HBI) sampling in the Door Creek watershed. See Figure for a map of sampling locations.**

| Location | Date | HBI Score | Degree of Organic Pollution |
|---|---|---|---|
| Vilas Hope Rd. | 10/18/2001 | 4.4 | Very Good |
| Vilas Hope Rd. | 11/5/2001 | 6.1 | Fair |
| Tributary to Door Creek at Femrite Rd. | 9/24/2012 | 7.8 | Poor |
| Little Door Creek near Cottage Grove | 10/18/2001 | 5.5 | Good |
| Little Door Creek near Cottage Grove | 9/24/2012 | 2.2 | Excellent |
| Hope Rd. | 11/5/2008 | 8.0 | Poor |

The IBI uses information on the structure, composition, and functional organization of fish assemblages to assess the health of aquatic ecosystems (Lyons & Wang, 1996). With the exception of the Jahnke Road site, fish IBIs were fair to poor (Table 5). It should also be noted that stream reaches vary based on locations within the watershed. Headwater areas are typically cool/cold at the source from spring discharge.

**Table 5. Results of historic Index of Biological Integrity (IBI) scores for the Door Creek Watershed. See 5 for sampling locations.**

| Station Name | Survey Year | Cool Cold IBI Score | Cool Cold IBI Score | Cool Warm IBI Score | Cool Warm IBI Score |
|---|---|---|---|---|---|
| Door Creek – Door Creek at Jahnke Road | 1998 | Excellent | 70 | | |
| Door Creek – Door Creek at Hope Road | 2008 | | | Fair | 40 |
| Door Creek at Vilas Hope Rd, near Cottage Grove, WI | 2001 | | | Poor | 0 |
| Door Creek at Vilas Hope Rd, near Cottage Grove, WI | 2008 | | | Poor | 20 |

## 3.0 POLLUTANT SOURCES

### *3.1 SOURCES IDENTIFIED IN ROCK RIVER TOTAL MAXIMUM DAILY LOAD (TMDL)*

The Rock River TMDL identified major sources of phosphorus and sediment water pollution within the Rock River basin and assigned corresponding load allocations and reductions. Major sources include both point sources (wastewater treatment facilities and regulated urban areas) and non-point sources (agricultural land, non-regulated urban areas, and natural areas). The TMDL used two models to calculate loads. The Soil and Water Assessment Tool (SWAT) was used to calculate loads from rural, agricultural, and natural areas and the Source Loading and Management Model (SLAMM) was used to calculate loads from urban areas.

The Door Creek watershed is located in the western portion of the Rock River basin within TMDL Reach 66 and encompasses 20,503 acres (33%) of the entire TMDL reach area. Currently there are no Wastewater Treatment Facilities (WWTF) or Concentrated Animal Feeding Operations (CAFOs) within the watershed. Primary sources identified within the Rock River TMDL include non-point (agriculture, non-permitted urban, and natural areas) and point sources (Urban Municipal Separate Storm Sewer System (MS4)).

### *3.2 OTHER POLLUTANT SOURCES*

Although the TMDL does identify some broad non-point and point sources of phosphorus and sediment pollution within Door Creek, a more detailed evaluation of the watershed has revealed other potential sources. These sources include Privately Owned Wastewater Treatment Systems (POWTS) and sewage treatment plant biosolids applications.

Privately owned wastewater treatment systems (POWTS) serve many developed properties within the watershed. Currently, there are 1,405 active systems in the watershed according to the POWTS inventory maintained by Public Health Madison and Dane County (PHMDC). More than 40% of these systems were installed prior to 2000 when the current POWTS codes were enacted. One of the responsibilities of PHMDC is to ensure that these systems are receiving regular inspection and maintenance. This allows for failing systems to be found and replaced. A failing system is one that is discharging untreated wastewater to the groundwater or bedrock, the land surface, or backing up into the house (University of Wisconsin - Madison Nelson Institute for Environmental Studies Water Resources Management Workshop, 2009).

In addition to runoff from agricultural activities, one other land use that may contribute excess nutrients to rural areas in the Door Creek watershed are biosolids applications from municipalities and private septic haulers. The largest biosolids source within the watershed is the Madison Metropolitan Sewage District (MMSD) Metrogro Program, a voluntary program wherein agricultural landowners allow MMSD Metrogro to inject liquid biosolids on their land. Figures obtained from the *University of Wisconsin – Madison Nelson Institute for Environmental Studies Water Resources Management Workshop (2009)* indicate MMSD had injected municipal biosolids into 1219 (10%) of the 13,272 acres of agricultural fields. The workshop also

concluded that the Metrogro biosolids program was not likely to be a primary contributing sources of nutrient pollution to the Door Creek watershed. However this study did recommend avoiding Metrogro applications on fields with high erosivity, to reduce runoff contributions downstream.

## 4.0 GOALS

There are three primary goals that this watershed plan for Door Creek is striving to achieve, they are as follows:

1. ***Remove Door Creek's Impairments***
2. ***Meet Door Creek's Phosphorus Water Quality Criterion***
3. ***Restore Door Creek's Designated Use***

### *4.1 REMOVING DOOR CREEK'S IMPAIRMENTS*

The WDNR added Door Creek to its impaired waters list (the "303(d) list" submitted every two years to EPA) in 2012 (Wisconsin Department of Natural Resources, 2014). "Impaired" means that the levels of one or more pollutants is affecting the water body's ability to meet its designated use. The impaired waters list states the type of water quality impairment and the pollutants responsible for the impairment. WNDR currently lists Door Creek's impairment as "unknown," with the pollutant of concern being phosphorus.

### *4.2 MEETING DOOR CREEK'S PHOSPHORUS WATER QUALITY CRITERION*

Wisconsin Water Quality Standards for phosphorus (NR 102.06) establishes the maximum concentration of phosphorus allowed in various types of water bodies. For Door Creek this water quality criterion is 0.075 mg/L (Wisconsin State Legislature, 2010). The purpose of this standard is to protect the general public's health and welfare as well as present and prospective uses.

### *4.3 RESTORING DOOR CREEK'S DESIGNATED USE*

Door Creek's "designated use" is specified based on what the creek could be used for if it was restored and naturally functioning. Wisconsin's waters are assigned designated uses in state water quality standards (Chapter NR 102, Wisconsin Administrative Code). The official designated use for Door Creek is Fish and Aquatic Life (FAL). Within the FAL designation, WDNR further identifies Door Creek as a Warmwater Forage Fishery (WWFF), with the potential to meet its designated use of Warmwater Sport Fishery (WWSF) following restoration (Wisconsin Department of Natural Resources, 2015). A WWFF is comprised of small fish which are preyed on by larger predators for food. Examples of forage fish that are currently found in Door Creek are common and spotfin shiner, mud and bluntnose minnows, creek chub, white sucker, brook stickleback, and Johnny darter. The WDNR's designation of Door Creek's potential use as a WWSF implies that game fish that grow best in temperatures between 80-95 º F), such as large and smallmouth bass, crappie, and bluegill, could be found there after restoration (Sorge & Riedel, 2015).

DNR is also currently evaluating streams and rivers for placement in a revised aquatic life use classification system called Natural Communities (Wisconsin Department of Natural Resources, 2015). The natural community model incorporates model predicted flow and temperature along with supporting biological and chemical data. The existing data-set for Door Creek is somewhat limited. While the model reliably shows predicted values correct in 70-75% of test segments, most monitored data for Door Creek is greater than 10 years old. The monitoring plan identified in 7.4 is designed to meet assessment needs and support any future Natural Community model runs.

As part of the overall evaluation and desire to meet the designated use, these natural community model runs are critical in determining overall success. However, implementation efforts may not always have direct measureable impacts and predicted model results may vary. In such cases, professional judgement will assist in final determinations.

### *4.4 DISCUSSION ON MEETING PLAN GOALS*

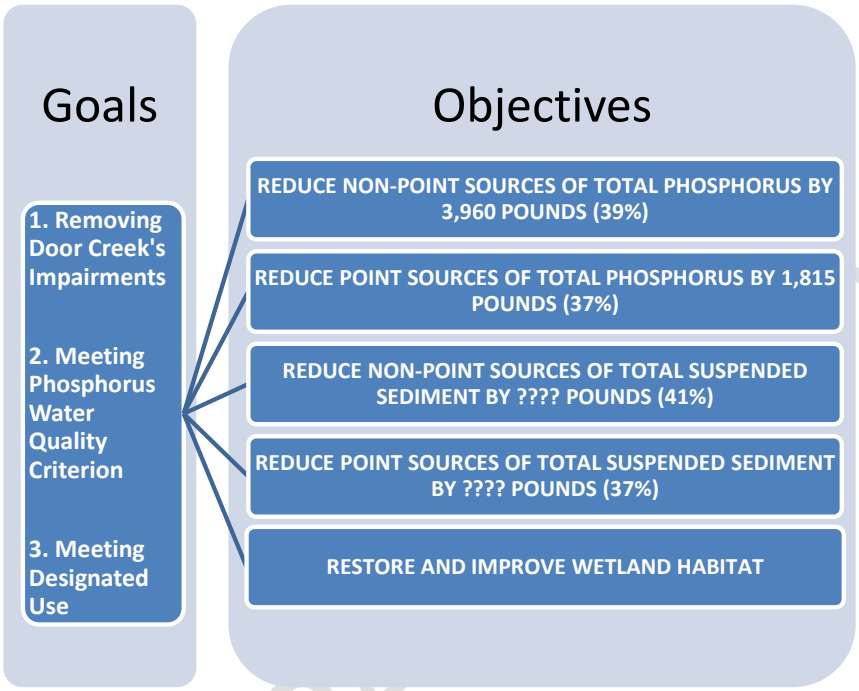
The relationship between ***impairment, pollutant, numeric standards***, and ***designated use*** in Door Creek is unclear. Typically, if local resource managers are successful in removing the impairment, then the designated use should be achieved for that particular water body. In this situation, where the impairment is "unknown," Dane County intends to focus on addressing the pollutant of concern, phosphorus. Staff have communicated with WDNR scientists, who do not believe that reducing phosphorus runoff will help Dane County achieve the designated use for Door Creek, which is to move it from Warmwater Forage Fishery (WWFF) to Warmwater Sport Fishery (WWSF). Habitat improvements would have more of a direct benefit in changing the designated use. It is also unclear what degree of habitat improvement, for example relocating the channel back into its original location, would be required to attain WWSF function (Sorge & Riedel, 2015).

Indirect impacts on improving habitat to meet Door Creek's designated use will occur given the direct relationship between phosphorus and sediment and subsequently sediment and habitat. Research has shown that a large proportion of the total phosphorus within stream systems is in the particulate form attached to sediments (Randall, et al., 2002). By focusing on reducing total phosphorus within the system subsequent sediment reductions are also likely to occur. Studies have also found positive correlations between increased sedimentation and degraded habitat (Castro & Reckendorf, 1995). By setting objectives and actions focusing on phosphorus all three of the previously stated goals will be positively impacted.

## 5.0 OBJECTIVES

Objectives to meet all three watershed plan goals are summarized graphically below, followed by a discussion of how specific objectives, linked to each goal, were developed. Each of the following objectives also have specific actions associated with them that are described in Section 7.0 IMPLEMENTATION AND MEASURING PROGRESS of this plan.

Figure 7. Objectives to meet watershed plan goals.




## *5.1 SETTING OBJECTIVES RELATED TO GOALS OF REMOVING DOOR CREEK'S IMPAIRMENTS AND MEETING PHOSPHORUS WATER QUALITY CRITERION*

In 2014, an updated analysis using the Soil and Water Assessment Tool (SWAT) was conducted by Montgomery Associates: Resource Solutions, (MARS) LLC to provide baseline loading estimates, at the sub-HUC12 watershed scale, for Door Creek and the larger Yahara River Watershed (Montgomery Associates Resource Solutions, LLC, 2014). This analysis included many of the same approaches used in the Rock River TMDL with the exception of incorporating updated information and conducting the analysis at a much finer spatial scale. The primary contributing point (wastewater treatment facilities and permitted urban areas) and non-point (agriculture, non-permitted urban, and natural areas) sources that were identified by the MARS analysis for Door Creek were the same as those identified in the TMDL. The sub-HUC12 areas were then summed by source to determine the total baseline phosphorus and sediment loadings within HUC-12 watersheds including Door Creek (Table 6).

Table 6. Annual total phosphorus and total suspended sediment loadings in pounds by source category for the Door Creek watershed based on results generated by Dane County Land and Water Resources Department using data from *Yahara WINs Extended SWAT Model to Estimate Baseline Phosphorus Loading to the Yahara Watershed* (Montgomery Associates Resource Solutions, LLC, 2014).

| Category | Source | Annual Total Phosphorus Loading (pounds) | Annual Total Suspended Sediment Loading (pounds) |
|---|---|---|---|
| Non-point | Agriculture, Non-Permitted Urban, and Natural Areas | 10,150 | ??? |
| Point | Permitted Urban - Municipal Separate Storm Sewer Systems (MS4) | 4,900 | ?? |
| Point | Wastewater Treatment Facilities | 0 | 0 |
| | Total | 15,050 | ??? |

These baseline loading estimates were then combined with corresponding pollutant percent reductions for Reach 66 of the TMDL (Table 7). The TMDL percent reductions were developed to provide a guide in restoring each reach to its specified designated use. Should the percent reductions for each reach be achieved the resulting water body is predicted to meet both the designated use and numeric water quality criterion goals previously mentioned. By combining both the TMDL percent reductions and MARS baseline loading values specific load reductions were generated and incorporated into the overall watershed plan objectives.

Table 7. Summarized data from Appendix H and I of the Rock River Total Maximum Daily Load identifying required percent reductions of total phosphorus and total suspended sediments from annual baseline loadings for TMDL Reach 66. The Door Creek watershed is located within Reach 66.

| TMDL Reach | Required Average Percent Reductions of Total Phosphorus from Baseline Loading | | | Required Average Percent Reductions of Total Suspended Sediment from Baseline Loading | | |
|---|---|---|---|---|---|---|
| | Nonpoint Source | MS4 | WWTF | Nonpoint Source | MS4 | WWTF |
| 66 | 39% | 37% | - | 41% | 37% | - |

## *5.2 SETTING OBJECTIVES RELATED TO THE GOAL OF RESTORING DOOR CREEK'S DESIGNATED USE*

As stated in section *4.4* DISCUSSION ON MEETING PLAN GOALS, phosphorus and suspended sediment reductions may have indirect benefits in improving degraded habitat in the watershed. The WDNR believes that habitat improvements would have more of a direct benefit in moving Door Creek's designated use from WWFF to WWSF, especially south of U.S. Highway 12 (Sorge & Riedel, 2015). Restoring wetlands within Door Creek potentially poses the greatest opportunity for habitat improvement and has been identified as an objective for this watershed plan. However, wetland systems are complex and actions related to restoring wetlands and

their overall benefits have not yet been identified. As more information becomes available and corresponding actions are identified they will be incorporated into this plan.

Wetland restoration will also play a role in removing impairments and meeting phosphorus water quality criterion, although efforts are still underway in quantifying the nutrient reduction benefits of restoring wetlands within the watershed. The 2009 Water Resources Management (WRM) practicum reviewed the scientific literature on wetland ecosystem services and the role of wetlands in improving water quality, as well as their own data collected from the Door Creek watershed.

The process for prioritizing wetland restorations for nutrient reduction benefit is described in the "actions" section (Section 7.3).

## 6.0 PRIOR STUDIES

The Door Creek watershed is referenced in several prior studies and projects, and in comprehensive plans and other plans adopted by area municipalities. Known studies, projects and plans are listed in Appendix A.

## 7.0 IMPLEMENTATION AND MEASURING PROGRESS

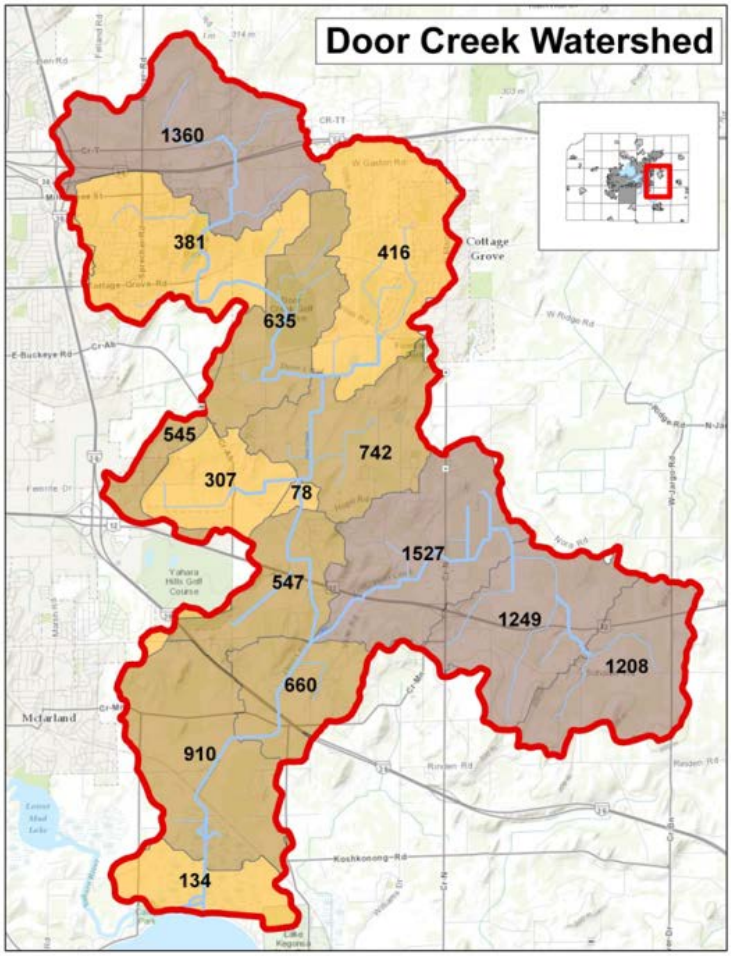
### *7.1 NON-POINT SOURCE ACTIONS TO ACHIEVE PHOSPHORUS AND SUSPENDED SEDIMENT OBJECTIVES*

The Door Creek Watershed Management Action Plan recommends the following actions be completed over the next 10 years in order to achieve the objectives of reducing 3,960 pounds of phosphorus and ???? tons of sediment from non-point sources. Each non-point action is broken down into three main categories; Management, Structural, and Innovative and are outlined below in Table 8. Implementation will be focused on those actions located within high phosphorus contributing areas first followed by medium, and low (Figure ). Those actions categorized as high will be implemented in the first 4 years followed by medium in years 4 to 7 and low in years 7 to 10. Priority areas were determined based on the MARS baseline phosphorus loadings. Areas contributing more than 1,000 pounds of phosphorus per year were classified as high priority. Those areas contributing between 500 and 1,000 pounds were classified as medium. Those with less than 500 pounds were determined to be low priority. A detailed work plan with specific timelines and costs for the implementation of the non-point actions can be found in Section 9.0.

Table 8. Actions, corresponding units, and estimated load reductions to achieve overall total phosphorus reduction objectives.

| *Action* | *Indicators (unit of measure)* | *Total Number of Units* | *Estimated pounds of Phosphorus Reduced per Unit* | *Total Phosphorus Reduced* |
|---|---|---|---|---|
| **Management** | | | | |
| Conservation-Nutrient Management Plan Development/Review | number | 90 | 0 | 0 |
| Conservation-Nutrient Management Plan Implementation/Follow Up | number | 45 | 30 | 1,350 |
| Harvestable Buffers | feet | 50,375 | 0.017 | 856 |
| **Structural** | | | | |
| Diversion | feet | 3,950 | 0.14 | 553 |
| Terrace | feet | 1,800 | 0.02 | 36 |
| Grassed Waterway | acres | 23.8 | 30 | 714 |
| Barnyard System | number | 5 | 30 | 150 |
| **Innovative** | | | | |
| Legacy Sediment Removal | feet | 3,000 | 0.2 | 600 |
| | | | | |
| **Total Phosphorus Reduction** | | | | 4,259 |

Figure 8. Map of baseline phosphorus loadings based on results generated by Dane County Land and Water Resources Department using data from *Yahara WINs Extended SWAT Model to Estimate Baseline Phosphorus Loading to the Yahara Watershed* (Montgomery Associates Resource Solutions, LLC, 2014).




Comment [KM1]: Update map with high medium and low priority areas

Progress towards meeting the 3,960 pound phosphorus reduction will be measured based upon actual modeled phosphorus reductions observed from site specific conservation practices that are implemented. The most appropriate model to calculate phosphorous losses by conservation practice will be used to quantify reductions (Table 9). These reductions will then be compared to estimated phosphorus reductions for each practice as well as the total estimated reduction based on planned actions and activities (Table 8).

Table 9. Model to calculate phosphorus reductions during plan implementation.

| *Action* | *Model* |
|---|---|
| **Management** | |
| Conservation-Nutrient Management Plan Development/Review | SNAP + |
| Conservation-Nutrient Management Plan Implementation/Follow Up | SNAP + |
| Harvestable Buffers | SNAP + |
| **Structural** | |
| Diversion | SL x PC |
| Terrace | SL x PC |
| Grassed Waterway | SL x PC |
| Barnyard System | BARNY |
| **Innovative** | |
| Legacy Sediment Removal | TBD |

SNAP+ – Soil and Nutrient Application Planner Software Program
SL x PC – Soil Loss multiplied by the Soil Test Phosphorus Concentration
BARNY – BARNY barnyard runoff model
TBD – Calculation is To Be Determined



Efforts are still underway in evaluating tools that can be used to determine reductions in sediment losses as a result of implementing specific actions listed above. As stated earlier, the positive relationship between total phosphorus and suspended sediments will result in reductions in suspended sediment loads as phosphorus loads are reduced. This plan will be updated as new tools and methods are selected for calculating suspended sediment reductions. In efforts to promote conservation systems (meaning combinations of practices and whole farm planning and implementation); actions related to conservation-nutrient management plan implementation/follow up will be emphasized throughout the 10-year Door Creek Watershed Management Action Plan implementation lifespan. The purpose for this is to not only recognize those landowners who are currently meeting local, state, and federal performance standards but to also encourage and promote continuous conservation improvement (meaning conservation improvements focused on meeting water quality goals). By highlighting and acknowledging those individuals who are pursuing continuous conservation improvement, the rate at which additional land owners adopt continuous conservation improvement, above and beyond performance standard compliance, will increase. This shift to continuous conservation improvement will provide increased assurance in achieving the overall Door Creek Watershed Management Action Plan goals of reducing 3,960 pounds of phosphorus.

There are approximately 230 acres of Dane County-owned agricultural land within the watershed. These lands are leased to agricultural producers and currently remain in crop productivity. Specific resource concerns and corresponding actions have been identified on these lands and are included in the list of actions above including grassed waterways and diversions. Current cropping rotations and tillage practices vary with each crop lease. All tillage practices on county-owned land within this watershed will be transitioned to no-till by 2020.

## *7.2 POINT SOURCE ACTIONS TO ACHIEVE PHOSPHORUS AND SUSPENDED SEDIMENT OBJECTIVES*

Although both total phosphorus and total suspended sediment point source load reductions have been established corresponding actions related to achieving those objectives have not yet been identified. Many of the municipalities within the watershed are in the process of reviewing their point source (MS4) discharge permits and are identifying actions and associated load reductions that they intend to implement. These actions and load reductions are anticipated to be available within the next year and will be incorporated into this plan during the next update.

## *7.3 ACTIONS TO ACHIEVE WETLAND AND HABITAT OBJECTIVES*

Initial Wetland Actions

In order to strategically identify specific wetland restoration priority actions in the Door Creek watershed, Dane County plans to design and hold a wetlands summit in the watershed. Desired summit participants would be property owners in the Door Creek watershed, and the purpose of the summit would be to share information about wetlands and their benefits in this area, tools that we have available to identify and assess wetlands, any wetland restorations that have happened on public lands including wetlands. By sharing map overlays of potentially restorable wetlands available in the WDNR Surface Water Data Viewer, with high priority phosphorus reduction areas identified through SWAT modeling, organizers would facilitate a discussion of wetland restoration priority and feasibility. Potentially restorable wetlands are areas where historic wetlands have been drained but not yet developed. The resulting discussion could be focused on where to restore wetlands to solve natural resources problems such as excess phosphorus, or to help with water management problems. These conversations would assist in developing a plan for strategic restoration, including a sense of where landowners would support restorations to help them and their neighbors.

LWRD will continue to work with the Wisconsin Wetlands Association to plan and hold this summit and incorporate specific wetland restoration and management actions into updates to this plan.

Initial Habitat Actions

The Lower Yahara River Trail is being planned to cross the Door Creek wetland just north of where Door Creek flows into Lake Kegonsa. As LWRD completes its plans for this area, staff will also work with WDNR on which specific habitat improvement actions on public lands should be implemented to move Door Creek's designated use closer to WWSF.

## *7.4 WATER QUALITY MONITORING*

A robust water quality and biological monitoring program will also be implemented during plan implementation in order to measure progress towards meeting the overall watershed plan goals. Chemical and biological monitoring will occur in years 1, 5 and 10 with a description of

each specific sampling activity listed in Table 10. This proposed monitoring includes the collection of water chemistry lab samples, flow, field chemical analysis, macroinvertebrate Hilsenhoff Biotic Index (HBI) sample collections, field notes on habitat, and fish Index of Biological Integrity (IBI) electroshocking surveys. Eight sampling locations (Figure ) have been selected based on historical sites listed in the WDNR's Surface Water Integrated Monitoring System (SWIMS) database. Not all sampling sites may be practical locations based on accessibility and the availability of funds. LWRD staff will finalize all sampling locations prior to year one.

**Table 10. Planned water quality sampling activates and time periods for monitoring during Door Creek Watershed Management Action Plan implementation. Figure identifies proposed sampling locations.**

| Activity | Sampling Frequency | Schedule for Years 1, 5,and 10 | Description |
|---|---|---|---|
| Spring water recon | 1 | March - April | Assess sampling locations to ensure access to the sites. |
| Macroinvertebrate collections | 1 sample at 4 of the 8 sites | April | Collection of macroinvertebrates at four of the eight sampling locations. Samples will be processed by the UW-Stevens Point Water Science Lab. |
| Baseflow water sample collections | 4 samples at each of the 8 sites | April, June, July, August | Collection of baseflow water samples to be analyzed by Madison-Dane County Public Health Lab and/or State Lab of Hygiene. Analyzed constituents include total phosphorus, total kjeldahl nitrogen, ammonia, nitrate, and total suspended sediment. |
| Stormflow water sample collections* TP, TKN, NH3, NO3, SS (1-2 x 8 sites)* | 1 to 2 storm event samples at each of the 8 sites | April - August | Collection of stormflow water samples to be analyzed by Madison-Dane County Public Health Lab and/or State Lab of Hygiene. Analyzed constituents include total phosphorus, total kjeldahl nitrogen, ammonia, nitrate, and total suspended sediment. |
| Fish electroshocking surveys 4 sites | 1 sample at 4 of the 8 sites | July - August | Electroshock stream reaches and collect data on fish populations, species richness, etc. |



## 8.0 INFORMATION AND EDUCATION

*A Citizen's Guide to Watershed Planning in Wisconsin* states "Another important and necessary element of your watershed plan is a detailed strategy for getting the people who live and work in the watershed to become involved in the process of making decisions about how land is

managed in the watershed. The process of protecting or restoring a water body will not happen unless those who manage the land that drains to it understand their role in water quality and are empowered and willing to make changes."

The information and education components of this plan incorporate several elements of civic governance (a means of working together to make a difference in the civil life of our communities) to influence adoption of urban and rural actions necessary to meet the water quality goals and objectives of this plan.

Several partners within the Yahara Basin are involved in a broader regional planning and implementation strategy known as adaptive management. Collaborative efforts, such as the Yahara Watershed Improvement Network (WINs), present an ideal opportunity to explore citizen roles in improving water quality throughout the county. History shows that motivating voluntary action to improve nonpoint pollution is a significant challenge.

## *8.1 INFORMATION AND EDUCATION GOALS AND OBJECTIVES*

**Figure 9. Goals and objectives for informing and engaging citizens during plan implementation.**

**GOAL 1: Door Creek residents understand and appreciate the value of natural resources in Door Creek**

- Working collaboratively with watershed residents, share information, knowledge and experiences related to Door Creek watershed streams and wetlands. Include the importance and value of streams and wetlands to the watershed community, and the vision residents have for their long-term restoration and protection, thereby increasing watershed literacy.

**GOAL 2: Door Creek residents are aware of and support the Door Creek Watershed Management Action Plan, and support implementation.**

- Consult with watershed stakeholders on plan content, and on actions to improve water quality and habitat.
- Collaborate on development and implementation of a citizen action plan for watershed residents, to include work days, volunteer projects, citizen volunteer monitoring and local leadership enhancement.
- Provide annual watershed plan implementation accomplishment summary to the public, including reports on milestone achievements for each section of the plan (practice implementation, acres of wetlands restored, monitoring, citizen engagement etc.)

**GOAL 3: A culture of mutual contribution exists among all watershed stakeholders who need to make reductions in phosphorus and sediment**

- Focus attention first on individuals willing to model good civic behaviors and best practices and are willing to organize other interested citizens in implementing best practices.
- Encourage greater citizen participation in watershed cost-share assistance programs by bringing farmers to the table
- Develop productive stakeholder partnerships among government agencies, agriculture commodity groups, and NGOs by seeking to break down organizational silos and restructure existing resources in a way that is most effective and accountable.
- Facilitate establishment of meaningful roles for watershed stakeholders: residents, local officials, businesses, and the agricultural community in addressing complex water quality challenges.

## *8.2 INFORMATION AND EDUCATION WORK PLAN*

Developing civic capacity is not without its own challenges. Over the next ten years, LWRD will lead a new approach that identifies all watershed residents as collaborators in achieving desired pollutant reductions and habitat improvement. Table 11below provides an overview of urban and rural actions that may be taken in an effort to reach water quality improvement in Door Creek.

Under this model, LWRD's civic strategy is to support collaborative, stakeholder-driven planning by engaging producers, local residents, elected officials, community organizations and nongovernmental organizations throughout implementation. Through this process, community capacity will be enhanced and meaningful citizen roles developed. "Replacing the traditional top-down model of decision-making with one that is more participatory will require citizens to shift their role as well – from one that is more passive to one that seeks a greater role in policymaking for the common good (LimnoTech Central Regional Office, 2013)." The LWRD staff and partners will facilitate public meetings intended to help identify pathways for citizen participation in the watershed plan.

Linkages between suggested involvement activities and water-related outcomes exist within Table 11. However, working together to develop mutually reinforcing activities, including roles and responsibilities, is part of the public dialogue. Therefore, many of the suggested actions may need to be integrated into a larger public discussion of collaboration and civic problem-solving. The objectives represent a grassroots strategy for empowering those who work and live within the watershed to take an active role in managing the resource. Incorporating local friends groups and farmer-led councils into the monitoring plan, restoration workdays and public discussions are just a few examples of how LWRD plans to advance elements of civic governance in the Door Creek Watershed.

**Table 11. Civic engagement and implementation work plan for the Door Creek Watershed.**

| Civic Strategies | Target Audience | Recommended Actions | Projected Timeline | *Desired Outcome (*short-term, intermediate and long-term*) | Cost | **Implementation and Partners | Aligns with Door Creek Civic Engagement Goals (see section 8.1 ) |
|---|---|---|---|---|---|---|---|
| Develop trusting relationships with watershed residents – (first priority/action). | Urban and rural residents in the Door Creek Watershed. | Identify key stakeholders.<br>Meet with each 1-1 to identify emerging leaders.<br>Bring leaders and other interests together in a community conversation that helps to set watershed priorities. | 1 year | A list of interested local leaders willing to help organize a base of other citizens.<br>*(short-term)*<br><br>Willingness to organize together and bring additional watershed residents to the table.<br>*(intermediate)* | 1 FTE to implement civic engagement for all sub-watershed plans in Yahara Watershed | LWRD<br><br>Watershed residents that are in alignment with the higher purposes of the plan. | This builds a base of local residents willing to help LWRD work to achieve desired reductions.<br><br>Developing trusting relationships is vital and aligns with Door Creek civic engagement goals 1, 2 & 3. |
| Assess producers' interests in formalizing participation in an agricultural watershed council/farmer led network focused on improving manure and nutrient management, cropping and tillage practices. | Producers in the Door Creek Watershed | Contact each farmer in person (100 percent landowner contact in the watershed). Ask if they are interested in being part of a farmer-led council potentially affiliated with YPF.<br><br>Foster community connections among producers in the watershed<br>Distribute a newsletter detailing watershed updates and information on new practices and programs.<br>Farmers coordinate local demonstrations on farms that have implemented conservation practices. | 0-2 years | All headwaters are buffered.<br>*(long-term)*<br><br>Producers understand how they can improve water quality nearby and downstream while also benefiting their own operation.<br>*(short-term)*<br><br>Reduction in nutrient loading (especially cropland soil erosion and barnyard runoff) to surface waters<br>*(intermediate)*<br><br>Exhibits at the County Fair, summer field day and farm tours/demonstrations of BMPs that have been implemented<br>*(short-term)* | $220 for printing | YPF , OLW, LCD | 2 & 3 |
| Hold Cover Crop and Soil Health Learning Days (and other forums focused on agricultural | Producers in the Door Creek Watershed | Ask agricultural leaders in the watershed to host the meetings.<br>Strategically publicize activities | 0-10 years<br><br>Annual workshop | Education leads to better land management in the watershed<br>*(intermediate)* | $200 to cover costs for printing | UWEX, LCD, WWA, NRCS, FSA, YPF, Farm Bureau | 2 |

| Civic Strategies | Target Audience | Recommended Actions | Projected Timeline | *Desired Outcome (*short-term, intermediate and long-term*) | Cost | **Implementation and Partners | Aligns with Door Creek Civic Engagement Goals (see section 8.1 ) |
|---|---|---|---|---|---|---|---|
| practice implementation) | | and organize events that bring together adjacent landowners in "neighborhood meetings" with groups of 5-6 people (plus 1-3 staff)<br>Develop as needed, and distribute educational materials on riparian buffers, bank stabilization techniques, fencing of livestock, wetland restoration and proper stream crossings.<br>Materials that include cost-share program information.<br>(These documents would be used in a variety of meetings and in support of other objectives). | | Increased interest and participation in the harvestable buffer program<br>*(short-term)*<br>Increased interest and participation in all other cost-share and technical assistance programs<br>*(short-term)*<br><br>Increased interest in restoring degraded streambanks and riparian habitat.<br>*(short-term)*<br><br>Increased interest and participation in wetland restoration<br>*(short-term)*<br><br>Rural landowners that we currently do not work implement at least one conservation practice<br>*(intermediate)* | | (There are existing extension workshops – Focus some offerings in this watershed). | |
| Hold community discussions at town halls that provide information about the Door Creek Watershed Management Action Plan.<br>At these public meetings, provide residents with a select number of choices/water quality recommendations (including pros and cons of each) that are consistent with plan implementation. | Agricultural landowners, Elected officials, urban and rural residents, City of Madison, Town of Blooming Grove, Town of Dunn, Town of Pleasant Springs, Village of Cottage Grove, Village of McFarland, | Hold one meeting in each township focusing on PSB and linked with MAMSWaP<br>Present plan and generate public support for LWRD implementation<br>Encourage municipalities to amend any planning documents, codes and ordinances necessary to implement the plan<br>Develop factsheets that address each recommendation thoroughly to share in this and other forums.<br>Distribute materials ahead of | 0-1 years | Local officials are educated about goals and objectives during implementation.<br>*(short-term)*<br>Door Creek becomes a community asset<br>*(long-term)* | LWRD staff time<br><br>$300 for refreshments and snacks<br><br>$425 to cover printing for multi-page I&E hand-outs | LWRD, MMSD, Yahara WINs, planning and resource experts, local municipalities Drainage District, MAMSWaP,<br><br>Agriculture, Natural and Cultural Resource work group | 1& 2 |

| Civic Strategies | Target Audience | Recommended Actions | Projected Timeline | *Desired Outcome (*short-term, intermediate and long-term*) | Cost | **Implementation and Partners | Aligns with Door Creek Civic Engagement Goals (see section 8.1 ) |
|---|---|---|---|---|---|---|---|
| | Hydrate Chemical Company, R.G. Huston Company, Door Creek Golf Course, Yahara Hills Golf Course | each community conversation (allowing participants to read and think over the recommendations beforehand). | | | | | |
| Improve public understanding of leaf management and yard maintenance, construction site erosion and chloride concerns. | Non-producer land owners and urban residents, contractors, municipalities. | Design educational materials and displays around the effects of transportation and reduction of sediment, chlorides, and other pollutants. Focus MAMSWaP outreach on leaf management in the Door Creek watershed (special emphasis) | 0-10 years | Increased participation in the urban water quality grant program *(short-term)* | LWRD staff time | MAMSWaP, Yahara WINs, MMSD, OLW | 2 |
| LWRD develops its civic capacity by modeling the use of good governing processes and policies that enable and encourage all interested watershed residents to participate in planning for and administering plans for their watershed.<br>Support residents interested in organizing a citizen group to advocate on behalf of Door Creek and the Door Creek wetland complex.<br>Provide a governing structure that will support an emerging group work effectively together.<br>Focus attention on influential individuals | All Dane County residents | If there is interest, provide guidance to citizens on establishing an effective governing structure in collaboration with interested residents.<br><br>Provide civic leadership training to create strong and sustainable watershed leadership into the future. | 0-3 years | Staff educate and engage youth and coordinate water festivals, poster and photos contests in partnership with local schools and surrounding communities *(intermediate)*<br>Earned media coverage highlighting LWRD and collaborative governance/ participatory planning in the watershed *(short-term)* | LWRD staff time | LWRD, UWEX, FFA, 4H, youth groups and clubs, local school districts. | 1, 2 & 3 |

| Civic Strategies | Target Audience | Recommended Actions | Projected Timeline | *Desired Outcome (*short-term, intermediate and long-term*) | Cost | **Implementation and Partners | Aligns with Door Creek Civic Engagement Goals (see section 8.1 ) |
|---|---|---|---|---|---|---|---|
| that can influence those who need to implement actions. | | | | | | | |
| Focus LWRD marketing, outreach and community engagement priorities in Door Creek<br><br>LWRD helps facilitate the use of volunteers in watershed projects by partnering with citizens and providing support | All citizens in the watershed who share an interest in participating (including producers, government, business, congregation, students, etc). | Marketing and Outreach Coordinator and Strategic Engagement Coordinator collaboratively develop a department communication strategy for Door Creek (use this strategy in future LWRD watershed plans).<br>Staff publicize press releases, newsletters, newspaper articles and videos that outline progress throughout implementation<br>Coordinate a series of restoration & vegetation management volunteer workdays (work with local landowners interested in wetland restoration)<br>Coordinate a series of volunteer workdays (in partnership with Capitol Water Trails) that improve navigation and recreational use of the waterway<br><br>Offer a water quality monitoring training for watershed residents interested in citizen science<br><br>Incorporate local citizen monitors into the Door Creek monitoring plan.<br><br>Host watershed tours in partnership with local municipalities. (canoes and | 0-10 years | Creation of an engaged citizen group<br>*(intermediate)*<br><br>Improved access, interest and recreational value throughout Door Creek and surrounding wetlands<br>*(long-term)*<br><br>Citizen share collective ownership in tracking water quality improvement over time.<br>*(long-term)*<br><br>Streambank stabilization<br>*(long-term)*<br><br>Increased public support for implementing future projects<br>*(short-term)*<br><br>Citizens develop a fundraising campaign for restoration projects<br>*(intermediate)*<br><br>Funding and public support for stream bank restoration is realized<br>*(intermediate)*<br><br>Earned media coverage highlighting the Yahara WINs adaptive management program | $5,000 to cover costs for Level 1 volunteer training, supply costs and data collection/coordination with LWRD<br><br>LWRD staff to support restoration workdays (majority of projects reliant upon external funding) | LWRD, FOLKS, CWT, Wingra Boats, Yahara Fishing Club, WWA, local DU chapter, YPF, RRC, Yahara WINs, NHLT, LWRD, Inter-Fluve, Applied Ecological Services, TNC, CLA, watershed experts, Drainage District | 1, 2 & 3 |

| Civic Strategies | Target Audience | Recommended Actions | Projected Timeline | *Desired Outcome (*short-term, intermediate and long-term*) | Cost | **Implementation and Partners | Aligns with Door Creek Civic Engagement Goals (see section 8.1 ) |
|---|---|---|---|---|---|---|---|
| | | kayaks provided by Wingra Boats).<br>Install interpretative signage & watershed boundary markers<br>Clear shorelines and remove trash<br>Remove invasive species and restore natural habitat in wetlands<br>Streambed and sediment analysis<br>Wetland restoration in inter-drumlin areas<br>Explore the potential for hydrologic restoration/stream realignment in areas with significant flood plain issues (FOLKS and Lathrop interest) | | *(long-term)*<br><br>Earned media coverage highlighting conservation practices and landowners that participate in Yahara River Watershed Cost-share assistance programs<br>*(long-term)*<br><br>Public support and approval for LWRD grows<br>*(intermediate)* | | | |
| Develop a baseline survey and annual measurement tool allowing LWRD to track public participation, practice implementation, civic capacity and overall progress during the planning and implementation phases of the project. | Work with local planning/leader ship team to identify target audience and key parameters to measure. | Assess public perception, interest and knowledge of LWRD's civic watershed processes.<br>Assess the value of local programs intended to encourage civic participation.<br>Assess ability of local programs and agencies to share existing resources and work across sectors to get work done.<br>Track participation in conservation programs currently being offered.<br>Assess the understanding of existing water quality and resource concerns (i.e. current perception of where pollution comes from)<br>Assess where landowners get their information and why they have (or have not) gotten involved in the public outreach | Annually 0-5 years | Evaluate progress and make program and civic engagement adjustments to our services throughout implementation<br>*(intermediate)*<br><br>Continuous improvement<br>*(long-term)*<br><br>More robust future planning efforts that incorporate citizen input and participation.<br>*(long-term)* | LWRD staff time<br>$5000 for a baseline knowledge and behavior survey<br>$5000 for a post-plan evaluation | OLW, UWEX, FOLKS, local leaders | 2 & 3 |

| Civic Strategies | Target Audience | Recommended Actions | Projected Timeline | *Desired Outcome (*short-term, intermediate and long-term*) | Cost | **Implementation and Partners | Aligns with Door Creek Civic Engagement Goals (see section 8.1 ) |
|---|---|---|---|---|---|---|---|
| | | effort<br>Assess willingness to participate in conservation programs<br>Assess what could be improved with existing nutrient management plans and whether or not they are working<br>Assess preferred method of communication | | | | | |
| Strategically identify wetland restoration priority actions | Watershed landowners in high P priority areas | Design and hold a wetlands summit to focus on potentially restorable wetlands | 0-2 years | Focus wetland restoration in areas where it could help solve P and other problems | $750 | WWA | 2, 3 |

* Short-term outcomes are those that can be achieved in less than three months. Intermediate-term outcomes usually take three to six months—but can take up to 12 months—to achieve. Long-term outcomes may take more than a year to become fully realized.

** Lead implementers are listed first for each corresponding civic engagement objective. See list of implementers below for interpretation of acronyms.

## Acronyms of Implementation Partners Noted in Table11.

| | |
|---|---|
| 4-H | Head, Heart, Hands, and Health. (Youth Development) |
| CLA | Clean Lakes Alliance |
| CWT | Capitol Water Trails |
| DU | Ducks Unlimited |
| FFA | Future Farmers of America |
| FOLKS | Friends of Lake Kegonsa Society |
| FSA | USDA Farm Service Agency |
| LCD | Land Conservation Division |
| LWRD | Dane County Land and Water Resources Department |
| MAMSWaP | Madison Area Municipal Stormwater Partnership |
| MMSD | Madison Metropolitan Sewerage District |
| NHLT | Natural Heritage Land Trust |
| OLW | Office of Lakes and Watersheds |
| RRC | Rock River Coalition |
| TNC | The Nature Conservancy |
| UWEX | Dane County UW-Extension |
| WWA | Wisconsin Wetlands Association |
| Yahara WINs | Yahara Watershed Improvement Network |
| YPF | Yahara Pride Farms |

| Year | Goal | Objective | Action | Units | Amount | Total Cost | Total Hours |
|---|---|---|---|---|---|---|---|
| | **Door Creek's Impairments** | OF TOTAL PHOSPHORUS BY 3,960 POUNDS (39%) | Conservation-Nutrient Management Plan Development/Review | Number | 30.0 | $90,000.00 | 1,500 |
| 4-7 | | • REDUCE POINT SOURCES OF TOTAL PHOSPHORUS BY 1,821 POUNDS (37%) | Conservation-Nutrient Management Plan Implementation/Follow Up | Number | 15.0 | $30,000.00 | 250 |
| | ▪ **Meeting Phosphorus Water Quality Criterion** | | Harvestable Buffers | Feet | 9,250.0 | $65,675.00 | 1,100 |
| | | | Diversion | Feet | 400.0 | $6,600.00 | 80 |
| | | • REDUCE NON-POINT SOURCES OF TOTAL SUSPENDED SEDIMENT BY (41%) | Terrace | Feet | 800.0 | $8,280.00 | 60 |
| | | | Grassed Waterway | Acres | 5.9 | $54,132.50 | 475 |
| | | | Barnyard System | Number | 2.0 | $56,000.00 | 275 |
| | | | Legacy Sediment Removal | Feet | 1,000.0 | $23,150.00 | 100 |
| 4-7 | ▪ **Meeting Designated Use** | • REDUCE POINT SOURCES OF TOTAL SUSPENDED SEDIMENT BY POUNDS (39%) | **Monitoring** | | | | |
| | | | Spring water recon | Number | 1.0 | $1,000.00 | 15 |
| | | | Macroinvertebrate collections @ 8 sites | Number | 1.0 | $2,200.00 | 40 |
| | | | Water sample collections @ 8 sites | Number | 4.0 | $5,500.00 | 20 |
| | | | Storm event sample collections @ 8 sites | Number | 2.0 | $3,300.00 | 10 |
| | | | Fish electroshocking surveys @ 4 sites | Number | 1.0 | $1,000.00 | 15 |
| | | | Water quality and biological data analysis and reporting | Number | 1.0 | $5,000.00 | 40 |
| | | | **Planning** | | | | |
| | | | Plan update (every two years) | Number | 1.0 | $2,500.00 | 25 |
| | | | | | | | |
| | ▪ **Removing Door Creek's Impairments** | • REDUCE NON-POINT SOURCES OF TOTAL PHOSPHOURS BY 3,960 POUNDS (39%) | **Practices** | | | | |
| | | | Conservation-Nutrient Management Plan Development/Review | Number | 30.0 | $90,000.00 | 1,500 |
| | ▪ **Meeting Phosphorus Water Quality Criterion** | • REDUCE POINT SOURCES OF TOTAL PHOSPHORUS BY 1,821 POUNDS (37%) | Conservation-Nutrient Management Plan Implementation/Follow Up | Number | 15.0 | $30,000.00 | 250 |
| | | | Harvestable Buffers | Feet | 3,050.0 | $21,655.00 | 60 |
| | | | Diversion | Feet | 400.0 | $6,600.00 | 80 |
| | | | Terrace | Feet | 500.0 | $5,175.00 | 40 |
| | | • REDUCE NON-POINT SOURCES OF TOTAL SUSPENDED | Grassed Waterway | Acres | 3.1 | $28,442.50 | 250 |
| 7-10 | | | Barnyard System | Number | 0.0 | $0.00 | 0 |

| Year | Goal | Objective | Action | Units | Amount | Total Cost | Total Hours |
|---|---|---|---|---|---|---|---|
| 7-10 | ▪ **Meeting Designated Use** | SEDIMENT BY ??? POUNDS (41%)<br>• REDUCE POINT SOURCES OF TOTAL SUSPENDED SEDIMENT BY ??? POUNDS (39%) | Legacy Sediment Removal | Feet | 1,000.0 | $23,150.00 | 110 |
| | | | **Monitoring** | | | | |
| | | | Spring water recon | Number | 1.0 | $1,000.00 | 15 |
| | | | Macroinvertebrate collections @ 8 sites | Number | 1.0 | $2,200.00 | 40 |
| | | | Water sample collections @ 8 sites | Number | 4.0 | $5,500.00 | 20 |
| | | | Storm event sample collections @ 8 sites | Number | 2.0 | $3,300.00 | 10 |
| | | | Fish electroshocking surveys @ 4 sites | Number | 1.0 | $1,000.00 | 15 |
| | | | Water quality and biological data analysis and reporting | Number | 1.0 | $5,000.00 | 40 |
| | | | **Planning** | | | | |
| | | | Plan update (every two years) | Number | 2.0 | $5,000.00 | 50 |

## 10.0 PLAN IMPLEMENTATION COSTS

Financial assistance costs for conservation practice actions were determined using a combination of current federal and state cost-share rates, average Dane County costs obtained from past paid receipts, and incentive payments for increased landowner participation. Technical assistance costs were calculated based on the average amount of time it takes LWRD conservation staff to work with landowners to identify resource concerns, plan conservation practice alternatives, design, implement, and verify selected practices according to standers and specifications, and administer cost-share programs. Total costs for implementing the watershed plan including water quality monitoring and information and education are below. Successful implementation of this plan requires the resources below as well as a commitment from Dane County to provide the necessary staff time and oversight necessary. For a detailed breakdown of costs see Sections 8.2 and 9 containing the work plans and Table 13 below.

| | |
|---|---|
| Financial Assistance: | $629,412 |
| Technical Assistance: | $599,442 |
| Water Quality Monitoring: | $54,000 |
| Information and Education: | $655,605 |
| Plan Updating: | $12,500 |
| Total: | $1,938,459 |

**Table 13. Detailed breakdown of the information and education costs for implementing the Door Creek watershed plan.**

| | COST | TOTAL OVER LIFE OF PLAN IMPLEMENTATION |
|---|---|---|
| 1 FTE to implement information and education plan elements for this and all other watershed plans prepared by LWRD | $64,000 salary and benefits, for 10 years Door Creek Watershed Management Action Plan implementation | $640,000 |
| Workstation furniture for 1 FTE | $2,510 | $2,510 |
| Workstation computer and network setup for 1 FTE | $1,000 | $1,000 |
| Plan implementation costs summarized from Table 11 (printing, workshop refreshments, volunteer monitoring, baseline and evaluation surveys) | $11,345 | $12,095 |
| | **Grand Total** | $655,605 |

## 11.0 FUNDING SOURCES

LWRD intends to use a variety of federal, state, and local funding sources in implementing the Door Creek Watershed Management Action Plan. Typically funding sources are limited in the types of actions they can support. By leveraging multiple sources, LWRD will greatly increase both the rate of implementation and overall likelihood of project success.

Current funding sources available through the LWRD for implementation of this watershed plan include the USDA Natural Resources Conservation Service - Regional Conservation Partnership Program, Land and Water Resources Management funding, Dane County Yahara CLEAN Implementation funding, Yahara WINs funding, and Madison Metropolitan Sewage District funding. All of these funding sources are currently limited in only providing funding for those actions associated with practice implementation. It may be possible in the future to use funding from Yahara WINs and MMSD to cover activities associated with water quality monitoring and information/education activities. These current funding sources are also not exclusively allocated to activities within the Door Creek Watershed. Door Creek is one of 19 watersheds that can receive funding from the previously mentioned sources. Estimated available funding from those sources is $5 million with an ending date for all funds to be allocated by 2019.

**Table 14. Possible funding sources to support plan implementation.**

| Funding Source | Description | Type | Actions Funded |
|---|---|---|---|
| RCPP | Regional Conservation Partnership Program | Federal | FA, TA |
| EQIP | Environmental Quality Incentive Program | Federal | FA |
| LWRM | Land and Water Resources Management | State | FA |
| Dane County | Dane County Yahara CLEAN Implementation | Local Government | FA, TA |
| Dane County | Urban Water Quality Grant Program | Local Government | FA, TA, WQ, IE |
| Yahara WINs | Yahara Watershed Improvement Network | | FA, TA, WQ, IE |
| MMSD | Madison Metropolitan Sewage District | Point Source | FA, TA,WQ,IE |
| SCF | Sand County Foundation | Non-Government Organization | TA, WQ |
| WDNR | *Citizen-based Monitoring Partnership Program* (expand monitoring to build robust pre/post eval.) http://dnr.wi.gov/Aid/CBM.html | State | IE, WQ |
| WDNR | *County Conservation Aids* http://dnr.wi.gov/Aid/CountyConservation.html (ideally spawning area development for northern | State | TA |

| | | | |
|---|---|---|---|
| | pike or stream improvement devices including bank repair and vegetation control) | | |
| WDNR | *Urban Rivers (Stewardship)* (could be used to increase citizen participation and access to Door Creek- consistent with long term goals- Sara and Chris are familiar with this grant program. http://dnr.wi.gov/topic/stewardship/grants/applyLUG.html | State | IE |
| WDNR | *A Watershed Approach to Wetland Conservation Planning* (a great opportunity for multi-partner effort to improve wetland restoration and increase civic engagement in the process). Would likely need to be submitted by a 501 (c)3) http://dnr.wi.gov/Aid/wetland.html | State | FA, IE |
| WDNR | Surface Water Grants – River and Lake Planning (could be used for monitoring, surveys, and outreach) http://dnr.wi.gov/Aid/SurfaceWater.html | State | WQ, IE |
| WDNR | Surface Water Grants – River Protection (could be used for practice implementation) http://dnr.wi.gov/Aid/SurfaceWater.html | State | TA, FA |
| WDNR | Lake Protection and Classification Grants http://dnr.wi.gov/Aid/SurfaceWater.html | State | TA, FA |
| EPA | *EPA Urban Waters Federal Partnership* http://www.urbanwaters.gov/?_ga=1.174171682.1667224689.1426611874 | Federal | TA, IE |
| | *McKnight Foundation- Mississippi River Program* https://www.mcknight.org/grant-programs/mississippi-river/ | Private - national | IE |
| | *RBC Blue Water Project* http://www.rbcwm-usa.com/community/cid-276800.html | Private - national | IE |
| | *NFWF Conservation Partners Program* http://www.nfwf.org/conservationpartners/Pages/home.aspx#.VWiO19zF-So | Private - national | IE |
| | http://midwestglaciallakes.org/ http://www.fishersandfarmers.org/ | Private | IE |

FA – Financial Assistance
TA – Technical Assistance
WQ – Water Quality Monitoring
IE – Information and Education

# 12.0 MEASURING PROGRESS AND MAKING ADJUSTMENTS

Measuring plan progress and implementation is critical to ensure that advancement is being made in achieving identified water quality goals. This will be tracked by capturing water quality changes (chemical and biological), the level of practice implementation, and the overall awareness and participation of watershed stakeholders.

## *12.1 TRACKING INTERIM PROGRESS*

Interim progress will be measured based upon achieving the established actions and unit amounts specified in the conservation practice, water quality monitoring, and information and education work plans provided in Sections 8.2 and 9. LWRD staff will also be tracking and reporting on the below components as well.

1. Total number of landowners/operators in the watershed plan area.
2. Total number of eligible landowners/operators in the watershed plan area.
3. Number of landowners/operators contacted.
4. Number of cost-share agreements signed.
5. Number of one on one contacts made with landowners in the watershed.
6. Comments or suggestions for future activities.
7. Planned and completed conservation practices
8. Pollutant load reductions and percent of goal planned and achieved.
9. Cost-share funding source of planned and installed BMP's.
10. Numbers of verification checks to make sure management plans (nutrient management, grazing management) are being followed by landowners.
11. Number of verification checks to make sure practices are being operated and maintained properly.
12. Status of grants relating to project.
13. Status of nutrient management planning, and easement acquisition and development.
14. Total amount of money on cost-share agreements.
15. Total amount of landowner reimbursements made.
16. Trust and understanding of the plan are established.
17. Urban and rural citizen leaders organize to bring additional watershed residents, including producers, to the table.
18. Governing structure for civic engagement in Door Creek is established in collaboration with interested residents
19. Earned media coverage highlighting LWRD, collaborative governance/participatory planning, and conservation practices and landowners who have made reductions as a result of participating in financial and technical assistance programs.
20. Greater farmer interest in joining a local or existing famer-led council

21. Rural landowners that LWRD currently does not work with implement at least one conservation practice
22. Increased participation in the urban water quality grant program
23. Increased interest and participation in the harvestable buffer program and other cost-share and technical assistance programs.
24. Increased interest and participation in wetland restoration
25. An engaged citizen group emerges advocating on behalf of Door Creek and the Door Creek wetland complex.
26. Stream bank stabilization is completed in high priority areas

## *12.0 WATERSHED PLAN EVALUATION CRITERIA*

Achieving the overall objectives of the watershed plan will be evaluated based upon calculated phosphorus and sediment reductions and lower total phosphorus and total suspended sediment measurements in water quality samples. As conservation practices are implemented phosphorus and sediment reductions will be calculated as specified in Section 7 and compared to the overall plan objectives. These calculated reductions will then be further supported by capturing measured changes in both phosphorus and suspended sediment results from water quality samples. As wetland and habitat objectives are developed so will a set of criteria be developed to evaluate achievement of the objectives.

This plan will also be reevaluated and updated every two years to ensure that lessons learned and successful approaches are correctly incorporated into the plan.

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## APPENDIX A

## *A.1 PRIOR STUDIES AND PROJECTS – ROCK RIVER BASIN OR COUNTY-WIDE*

Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Rock River Basin (2011)

This TMDL report, prepared by The Cadmus Group for Wisconsin DNR and U.S. EPA, is available here http://dnr.wi.gov/topic/TMDLs/RockRiver/FinalRockRiverTMDLReportWithTables.pdf and was prepared to support restoration of the Rock River to meet applicable water quality standards.

A Total Maximum Daily Load (TMDL) considers all sources of pollution to an impaired waterbody (one designated under Section 303(d) of the Clean Water Act as not meeting designated uses or water quality criteria). TMDLs identify the amount of pollutant that the waterbody can assimilate and not exceed water quality standards, and these pollutant loads are determined in consideration of in-water targets that must be met for the waterbody to respond favorably.

The Rock River TMDL has been approved by the U.S. Environmental Protection Agency, and implementation activities are summarized on the Rock River Recovery website (http://dnr.wi.gov/topic/tmdls/rockriver/ ).

Dane County Land and Water Resource Management Plan
The Land and Water Resource Management Plan addresses soil and water quality concerns using local, state and federal programs. It is a 10-year (from 2008 through 2018) action and implementation plan that emphasizes cooperation with conservation partners in Dane County.

The plan is available at: https://www.countyofdane.com/lwrd/landconservation/lwrm.aspx

## *A.2 PRIOR STUDIES AND PROJECTS – YAHARA RIVER WATERSHED*

A Clean Future for the Yahara Lakes: Solutions for Tomorrow, Starting Today (September 2010)

This report by Yahara CLEAN (Capital Lakes Environmental Assessment and Needs), initiated with a Memorandum of Understanding in 2008, identified 70 specific options for action that will reduce phosphorus, sediment loadings, and beach bacteria to the Yahara River chain of lakes, many of which addressed more than one of the main targets. The report identified a

50% reduction in average annual phosphorus (P) load to Lake Mendota as the primary objective of the Yahara CLEAN Project in order to produce measurable water quality benefits in Mendota and a significant P load reduction to Lake Monona from Mendota's outlet. The report is available at:
http://www.yaharaportal.org/sites/default/files/CLEAN_Report_090910.pdf

Yahara CLEAN Strategic Action Plan for Phosphorus Reduction (November 2012)

The plan, based on an engineering report prepared by Strand Associates for Clean Lakes Alliance and Yahara watershed partners, outlines the 14 most important, achievable and cost-effective lake-improvement steps that can be taken by urban and rural stakeholders in the coming years to achieve the 50% P reduction goal. The plan is available at:
http://www.cleanlakesalliance.com/wp-content/uploads/2012/11/Strategic-Action-Plan-11092012.pdf

Yahara WINs Extended SWAT Model to Estimate Baseline Phosphorus Loading to the Yahara Watershed (revised June 2014)

The purpose of this project, completed by Montgomery & Associates under contract to the Dane County Land and Water Resources Department, was to update the baseline phosphorus loading to reaches of the Yahara River Watershed using the detailed Soil and Water Analysis Tool (SWAT) model developed for the Yahara CLEAN project in 2010. This baseline phosphorus loading update was conducted to support the adaptive management project being conducted by the Yahara Watershed Improvement Network (Yahara WINs). The project results are available at:
http://www.madsewer.org/Portals/0/ProgramInitiatives/YaharaWINs/Resources/Yahara%20WINs%20SWAT%20Model%20Final%20Report%20Revised%20June%202014.pdf

Phosphorus Loading and Lake Response Analyses for the Yahara Lakes (2011, unpublished)

Prepared for the Yahara CLEAN project, this analysis prepared by Dr. Richard Lathrop and Dr. Stephen Carpenter looked at long-term P loading and lake response data that would allow us to recommend specific P loading reduction targets that would produce measureable water quality objectives for the four Yahara lakes. A key recommendation of this analysis, confirmed their preliminary recommendation included in the 2010 CLEAN report, was that the average annual phosphorus (P) load to Lake Mendota should be reduced by 50% as the primary objective of the Yahara CLEAN Project in order to produce measurable water quality benefits in Mendota and a significant P load reduction to Lake Monona from Mendota's outlet.

This work was expanded and ultimately published as "Water quality implications from three decades of phosphorus loads and trophic dynamics in the Yahara chain of lakes" by Richard C. Lathrop and Stephen R. Carpenter, in *Inland Waters* during 2013.

Yahara WINs (Watershed Improvement Network)

The Madison Metropolitan Sewerage District (MMSD), in collaboration with over 30 partners, is pioneering a new regulatory approach to address phosphorus called Watershed Adaptive Management. Excessive levels of phosphorus can impact the quality of rivers, streams and lakes. In watershed adaptive management, all sources of phosphorus work together to implement cost effective phosphorus reduction practices.

This collaborative effort, Yahara WINs, is the first project in the State of Wisconsin, and nationally, to pilot test the adaptive management concept. Background on the pilot and impending full-scale project is available at: http://www.madsewer.org/Programs-Initiatives/Yahara-WINs

## *A.3 PRIOR STUDIES AND PROJECTS – SUBBASIN WATERSHED PLANS*

Yahara Kegonsa Focus Watershed Report PUBL-WT-711 (2001)

This comprehensive plan for the Yahara Kegonsa watershed includes background material on the Door Creek watershed. This report is available at http://dnr.wi.gov/water/basin/lowerrock/imp/yaharakegonsa.pdf .

## *A.4 PRIOR STUDIES AND PROJECTS - DOOR CREEK*

Door Creek Watershed Assessment: A Sub-Watershed Approach to Nutrient Management for the Yahara Lakes (2009)
This report was prepared by the University of Wisconsin-Madison Nelson Institute for Environmental Studies Water Resources Management Workshop. The publication describes current water quality conditions, assesses nutrient sources, identifies management opportunities, and presented recommendations for agricultural producers and Dane County.

The publication is available at: http://www.nelson.wisc.edu/docs/door_creek_2009.pdf

Door Creek Wetlands Resource Protection Plan (April 2000)
Prepared by the Capital Area Regional Planning Commission, this plan evaluated the Door Creek wetlands and developed a comprehensive framework for protecting and restoring the significant natural resources associated with the Door Creek wetlands and Lake Kegonsa. The plan placed special emphasis on restoring and enhancing wetland functions and promoting water quality improvements in Lake Kegonsa. The plan is available from the Capital Area Regional Planning Commission.

## *A.5 COMPREHENSIVE PLANS*

(Source: Dane County Planning and Development Department) Adopted plans related to water quality, natural and recreational resources in the Door Creek Watershed. Here are the communities in the watershed and links to relevant portions of each community's adopted plans.
Chapter 5 of the Dane County Comprehensive Plan deals with Agricultural, Natural and Cultural Resources (adopted in 2007)
This plan is available at:
http://danedocs.countyofdane.com/webdocs/PDF/PlanDev/ComprehensivePlan/CH5_Agriculture.pdf The Dane County Planning and Development Department has also been working on some proposed amendments to county Resource Protection Corridors. This work is described here: http://www.daneplan.org/Resource_Protection.aspx

### Town Plans

The following towns are all under county zoning and the Dane County Comprehensive Plan. Town plans are adopted as part of the Dane County Comprehensive Plan.

- Town of Cottage Grove:
  - Full plan text: http://danedocs.countyofdane.com/webdocs/PDF/plandev/CottageGrove_LandUseElement_050211.pdf
  - Excerpt (p. 28) "Eliminate the area's contribution to encroachment upon nature including land, water, wildlife, soil and ecosystems."
  - "Preserving open space and habitat"
- Town of Dunn
  - Full plan text: http://danedocs.countyofdane.com/webdocs/PDF/plandev/DunnWholePlan.pdf
  - Excerpt (p.43) "**Action 2-2a:** Work with other organizations and government agencies to identify disturbed or degraded lakeshore and wetland areas that are important to water quality and support efforts to restore and improve such areas."
  - **"Action 2-2b:** Require strategies to address the potential impacts of development on water quality and quantity in Dunn's streams, rivers, lakes, wetlands and groundwater aquifers. Such strategies could include buffers, setbacks and/or best management practices for erosion control and stormwater management."
- Town of Pleasant Springs
  - Full plan text: http://danedocs.countyofdane.com/webdocs/PDF/plandev/pleasantSpringsPlan.pdf
  - P. 136 includes relevant language regarding stream corridors, wetlands and floodplains.
- Town of Sun Prairie:

- Full Plan text: http://danedocs.countyofdane.com/webdocs/PDF/plandev/sunPrairiePlan.pdf
- Excerpt (p.34) "5. Conservancy Areas. The Town recognizes its natural environment and its historical and natural heritage as an irreplaceable resource and desires to proceed as follows: a. Identify and protect the unique natural resources, including but not limited to wetlands, woodlands, groundwater, native prairies, and mineral deposits. b. Ensure that floodplain areas are protected from development or filling in order to maintain their natural flood accommodation capacity."

### Towns That Will be Annexed

The following towns are under an intergovernmental agreement with the City of Madison that will result in their annexation to the City over the next several years. They're covered under the Madison Peripheral Plan, part of the City Comprehensive Plan. Most of the peripheral area neighborhood plans are accessible here: http://www.cityofmadison.com/planning/ndp/index.html

- City of Madison
- Town of Burke
- Town of Blooming Grove

### Village Comprehensive Plans

The Villages will have their own comprehensive plans.

- Village of Cottage Grove: http://www.vi.cottagegrove.wi.gov/section.asp?linkid=2153&locid=190
- Village of McFarland: http://www.mcfarland.wi.us/index.asp?SEC=69B9255A-DE11-462D-8FFA-CEE325C6B843&DE=7A9A59D0-9A62-4AB9-A55F-BFE1853670CB&Type=B_BASIC

## *A.6 URBAN SERVICE AREA PLANS*

The Capital Area Regional Planning Commission (CARPC) has approved Urban Service Area (USA) plans for the cities and villages in this watershed.

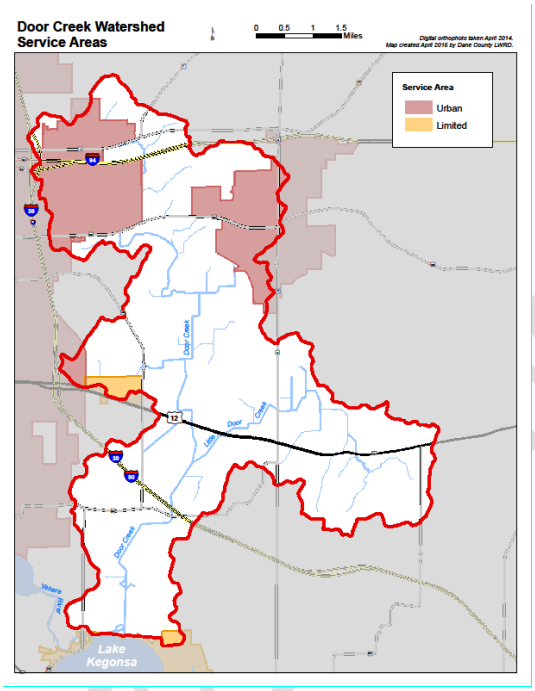
Urban service areas are those areas in and around existing communities which are most suitable for urban development and capable of being provided with a full range of urban services. The urban service area boundaries represent the outer limits of planned urban growth over a long-term planning period.

CARPC and WDNR approve sewer extensions and sewage treatment facilities based on USA boundaries, and USAs are included in area-wide plans so that local, regional and state agency decisions can be coordinated, consistent, and capable of achieving desired growth and development patterns.

Regional plans also provide for Limited Service Areas; areas where only one or a few limited urban services, such as sanitary sewer service, is intended to be provided to special or unique areas, or areas of existing development experiencing sewage disposal problems.

(Source: CARPC website - http://www.capitalarearpc.org/USA_overview.html , accessed 5/20/15 at 11:35 a.m.)

**Figure A1. 14. Adopted urban and limited service areas in the Door Creek Watershed.**




## *A.7 PARK AND OPEN SPACE PLANS*

Existing and planned park and open space areas within the Door Creek watershed may be described in the current park and open space plans for the municipalities within the watershed. If the park and open space plan for a community is available online, it is indicated below.

Dane County
http://pdf.countyofdane.com/lwrd/parks/SE_QuadrantPPT.pdf

City of Madison
https://www.cityofmadison.com/parks/about/parksopenspaceplan.cfm

Village of Cottage Grove
http://www.vi.cottagegrove.wi.gov/docview.asp?docid=12462&locid=190

Village of McFarland
http://www.mcfarland.wi.us/index.asp?SEC=22C9747D-F0EF-4F27-A265-CFC5CF68E829&DE=F4D660BB-61AD-4D71-A725-AB40610CA260&Type=B_BASIC

Town of Dunn
http://town.dunn.wi.us/resources/parksandopenspaceplan2014.pdf

If plans exist for the following towns, they are not available online:

- Town of Blooming Grove
- Town of Burke
- Town of Cottage Grove
- Town of Pleasant Springs
- Town of Sun Prairie