9.0 Measuring Plan Progress & Success

It is essential to have a monitoring plan and evaluation component as part of any watershed plan to evaluate plan implementation progress and success over time. This watershed plan includes two monitoring/evaluation components:

1. The "**Water Quality Monitoring Plan**" includes methods and locations where monitoring should occur and a set of criteria (indicators & targets) used to determine whether impairment reduction targets and other watershed improvement objectives are being achieved over time.

2. "**Report Cards**" for each plan goal were developed that include interim, measurable milestones linked to evaluation criteria that can be evaluated by the planning committee over time.

9.1 Water Quality Monitoring Plan & Evaluation Criteria

Background Information
This subsection provides a monitoring plan that can be implemented to measure changes in watershed impairments related primarily to water quality. Water quality monitoring is performed by first collecting physical, chemical, biological, and/or social indicator data. This data is then compared to criteria (indicators & targets) related to established water quality objectives.

Water quality in the Wind Point watershed is currently monitored at six locations by volunteers with the WDNR Citizens Monitoring programs and The Prairie School, four of which correspond to sites previously monitored by the Racine Health Department (RHD) as part of the watershed restoration plan development. A summary of water quality data, collected in recent years, can be found in Section 4.0. Although they may meet the statutory criteria, tributaries within Wind Point watershed are not included among WDNR's Draft 2012 303(d) list due to ephemeral stream conditions and limited accessibility. As they have no official designation, all sites are assumed supportive of fish and aquatic life.

The water quality monitoring plan is designed to: 1) capture snapshots of water quality within Wind Point watershed through time; 2) assess changes in water quality following implementation of Management Measures, and 3) assess the public's social behavior related to water quality issues. It is crucial that representative water quality samples be carefully collected using method appropriate handling procedures. Unrepresentative samples or samples contaminated during collection or handling are often useless. It is also critically important that all future monitoring be completed using WDNR or other approved protocols and methods, as the EPA requires the WDNR to submit a Quality Assurance Project Plan (QAPP) for all programs and projects receiving EPA funds. Additional guidance on QAPP requirements can be found in EPA's publication entitled *EPA Requirements for Quality Assurance Project Plans* (USEPA, March 2001).

Physical, chemical, and biological water quality indicators in streams are typically measured during base flow and after significant (≥ 1.5 inches) storm events. Chemical parameters typically include nutrients (nitrogen and phosphorous) and total suspended solids. All samples should be analyzed by certified labs to ensure accurate results. Physical parameters, such as temperature, dissolved oxygen, pH, and water clarity (turbidity) should be collected in the field using properly maintained and calibrated field equipment. It is also important to obtain stream discharge calculations as a determination of potential pollutant loading. These calculations are easily obtained by measuring the stream width, average depth, and flow rate at the monitoring location. Biological (fish and macroinvertebrate) and habitat assessments may also be performed, site assessment criteria dependent.

Once implemented, monitoring related to individual Management Measures should ideally take place. Management Measure sampling locations should include points of water ingress and egress, e.g. the inflow and outflow appoints on a retrofitted detention basin. To achieve the best results with respect to performance, Management Measure monitoring should occur during or shortly after large rain events (≥ 1.5 inches). Biological and/or habitat assessments should also be included on any habitat improvement project, such as a stream restoration. Because funding for post implementation monitoring is typically limited, money should be built into the initial Management Measures project budget.

Future Water Quality Monitoring Plan Implementation (sampling locations & frequency)
Procedures by which physical, chemical, and biological monitoring data should be collected in the watershed, existing and recommended monitoring locations, monitoring entity, and monitoring frequency are outlined in Table 49 and Figure 75. Note: Monitoring locations related to individual Management Measures are not described and will be developed as these restoration activities are implemented.

Table 49. Recommended future water quality monitoring locations.

Recommended or Existing Monitoring Entity	Sampling Location (See Figure 75)	Sampling Frequency	Parameters Tested
Racine Health Department	19 Tributary Sites & 11 Outfalls (See Figure 75)	Weekly for one year	Physical, Chemical, Microbial (*E. coli*)
Racine Health Department	11 Tributary Sites (See Figure 75)	Spring and Fall for one year	Biological (macroinvertebrates)
RHD, Prairie School, WDNR Citizens Monitoring	19 Tributary Sites & 4 Outfalls near Beaches (See Figure 75)	Monthly	Physical, Chemical, Microbial (*E. coli*)
Local Health Departments	Informal Beaches and Bender Park Beach	Seasonal (May-Sept)	Physical, Chemical, Microbial (*E. coli*)

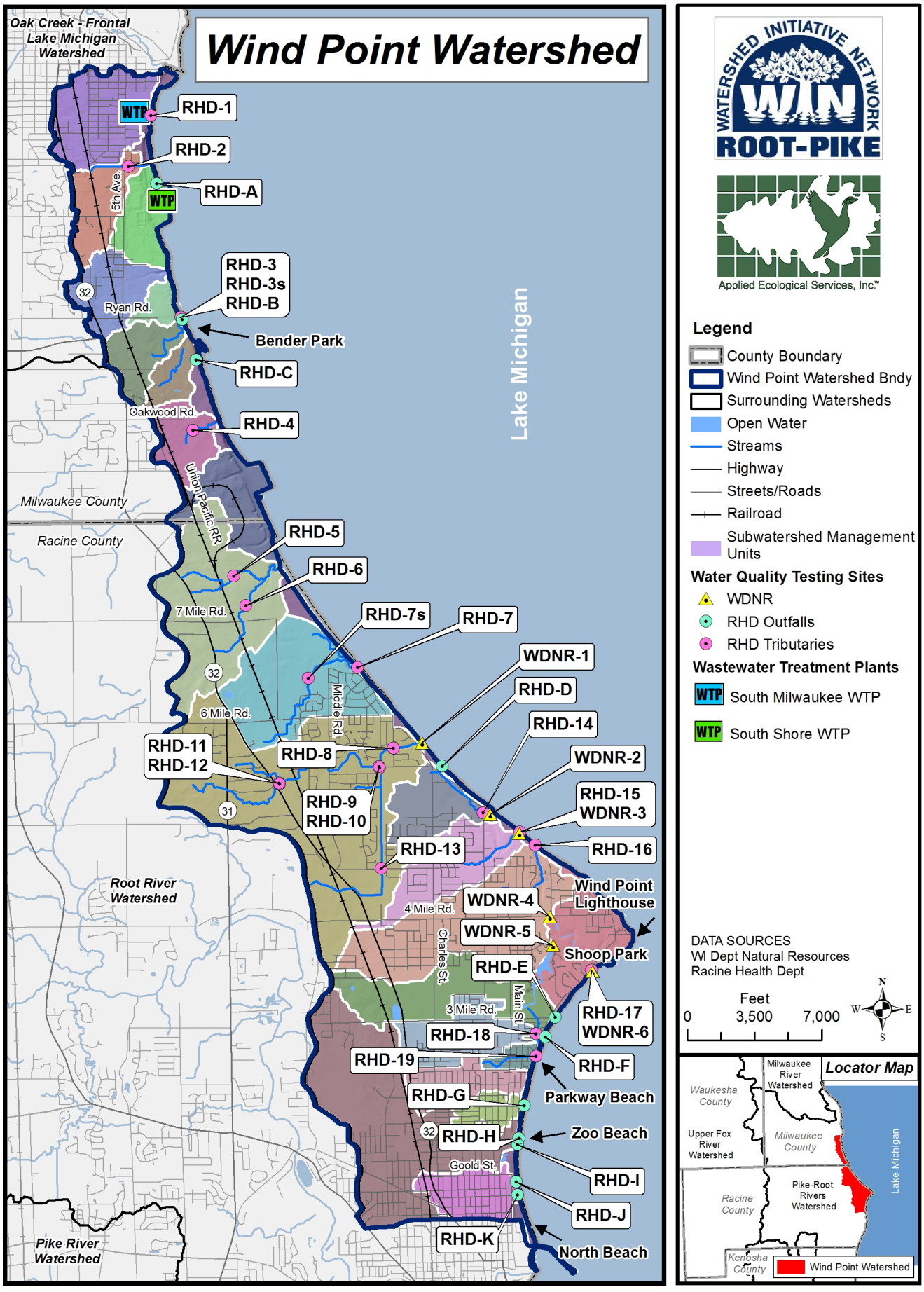

Fig. 75: Water Quality Monitoring Locations

In addition to continuing to participate in the WDNR's existing physical, chemical, and biological volunteer monitoring programs, monitoring of streams, stormwater outfalls, and coastal areas are recommended (Table 49 and Figure 75).

City of Racine Health Department (RHD)
The first recommendation is to reinstate the physical and chemical weekly assessments conducted by the Racine Health Department (RHD) for a period of one year. The initial one-year study, completed in 2013, included 19 permanent tributary sites and 11 stormwater outfall sites within Wind Point watershed. Since the initial assessments occurred in a relatively dry year, an additional year of monitoring at each tributary and outfall site is recommended in order to establish a more representative baseline of water quality and comprehensive understanding of inputs to Lake Michigan. For example, dry weather prevented regular sampling at tributary sites RHD-3 and RHD-19. Furthermore, low water levels were observed at other sites, including RHD-2, RHD-4, and RHD-18. An extension of the sampling program will provide not only more representative water quality data, but a better understanding of seasonal stream conditions. All tributary samples should be tested for the following parameters: air temperature, water temperature, dissolved oxygen, pH, conductivity, turbidity, *E. coli*, nutrients (phosphorus and nitrogen, bimonthly), chloride, and total suspended solids (once monthly).

Stormwater outfalls should be collected weekly, concurrent with sampling of surface water (tributary) sites. This will allow collection of samples at sites with low or no flow during the initial sampling period, including RHD-B and RHD-C. Additionally, sites RHD-E, RHD-F, and RHD-H through RHD-K should be monitored seasonally (May – September) with consideration to the collection of regulatory beach water samples to determine if a correlation exists between stormwater outfall discharge and water quality at Lake Michigan beaches; these outfalls are at or near established or informal beaches within Wind Point watershed. At a minimum, stormwater outfall samples should be assessed for water temperature, *E. coli*, pH, conductivity, turbidity, chlorine, and detergents. Furthermore, outfall RHD-I demonstrated a significant positive correlation between *E. coli* and detergent concentration during the initial study period. This may indicate sanitary sewage infiltration, and additional testing for the presence of *Bacteroides*, a human specific marker, may indicate an illicit discharge to the storm sewer system. Annual costs for weekly chemical and physical parameter assessments at the 19 tributary and 11 stormwater outfall sites, including monthly assessment of total suspended solids, and bimonthly analysis of phosphorus and nitrogen, would amount to approximately $100,000.

Existing biotic indexing data was collected on tributaries within Wind Point watershed by the Racine Health Department during the 2013 monitoring program. A Family Biotic Indexing (FBI) score was calculated at 11 tributary sites based on accessibility and flow conditions in fall 2013. Scores calculated during the initial assessment ranged from 7.5 to 8.0, corresponding to very poor water quality and likely severe organic pollution. Due to these scores and the limited number of sites, it is recommended that an FBI score be calculated at all available sites during the spring at a minimum, concurrent with the additional year of water quality monitoring. If funding allows, fall biotic indexing would increase the reliability of data collected.

The Prairie School and WDNR Citizens Monitoring
The second recommendation is to develop a joint monthly monitoring program between the RHD, The Prairie School, and WDNR Citizens Monitoring Programs (to extend beyond the 1-year period in Recommendation #1 above). A continuation of monthly monitoring efforts by volunteers with the WDNR Citizens Monitoring program and The Prairie School is recommended at a minimum of four tributary sites. This volunteer monitoring has been conducted at or near sites selected by the RHD during the one-year monitoring project, and include tributaries monitored at RHD-8, RHD-14, RHD-15, and RHD-17.

In addition to the continuation of WDNR Citizens Monitoring, it is recommended that the remaining sites among the 19 permanent tributary sampling sites, as well as the six stormwater outfalls in proximity to beaches (RHD-E, RHD-F, and RHD-H through RHD-K), be monitored on a monthly basis. All samples collected should be assessed for similar physical and chemical parameters as those for Recommendation #1. The data collected as a function of these three recommendations will provide a snapshot of the inputs from each tributary and stormwater outfall within Wind Point watershed to Lake Michigan. Monitoring these variables at these key locations will yield data over time that will indicate if pollutants in the watershed are being reduced to target levels, staying the same, or increasing. The resulting data will help to locate pollutant sources. Annual costs for monthly water quality monitoring would be approximately $60,000.

Local Health Departments
Sandy coastal areas on the shores of the Great Lakes are frequently utilized by the public for recreational swimming. However, they are not designated as public bathing beaches by the WI DNR, and as such are not monitored. In the Wind Point watershed, these informal beaches include the following areas: South of the South Milwaukee Wastewater Treatment Facility (south of RHD-1), North of the MMSD South Shore Reclamation Facility (east of RHD-A), the northern end of Bender

Park (north of RHD-3), the base of the bluffs on the eastern end of Cliffside Park (at the discharge point of RHD-7), north of the Siena Center (RHD-14 to RHD-15), and the former Michigan Boulevard Beach (north of RHD-H). Future monitoring of informal beaches should be a joint effort carried out by the respective local health departments (but could be supported by the RHD and/or volunteer groups). If volunteers are employed, they will be trained by RHD staff in correct sampling methods and on-site data collection, including air and water temperature, beach conditions, and wildlife presence. Following sample collection, laboratory analysis for chemical parameters, including *E. coli*, conductivity, and turbidity should be conducted by a certified laboratory or according to acceptable practices established for volunteers (e.g. WDNR WAV, Alliance for the Great Lakes Adopt-A-Beach, or others). Samples from informal beaches should be collected once weekly, if funding is available, or at minimum once monthly.

In addition to sampling the northern end of Bender Park, sampling should be expanded at Bender Park Beach, currently monitored twice-weekly during the summer beach season. Exceedances of regulatory advisory or closure thresholds have been observed at this location in more than 25% of samples for a single beach season (2005 and 2012), or more than 15% of samples across multiple beach seasons (three consecutive years, between 2003-2007 and 2010-2014). Additional sampling is also recommended at Shoop Park Beach, if it remains designated as a public bathing beach, where exceedances of the advisory or closure threshold occurred in more than 25% of samples in 2012, and in more than 15% of samples from 2010-2013. It is recommended that the additional samples be collected following significant rain events (≥1.5 inches) in order to determine sources of pollutant loading.

In summary, continued physical, chemical, and biological monitoring of Wind Point watershed over the next 25 plus years is paramount to the success of the plan. Only through continued monitoring and assessment will the effectiveness of restoration initiatives in improving watershed health be ascertained.

Recommended Methods

Physical and chemical monitoring of water can be time consuming and expensive depending on the complexity of the sampling program. Usually the budget and/or personnel available for monitoring limit the amount of data that can be collected. Therefore, the monitoring program should be developed to maximize the usable data given available funding and personnel. Monitoring programs should be flexible and subject to change to collect additional information or use newer equipment or technology when available.

Physical Parameters

Many different parameters can be included in physical monitoring of water quality in streams. Measurements of temperature, pH (typically not done in field by the volunteer monitoring programs or Racine Health Department), dissolved oxygen, and turbidity should be collected in the field for any future tributary monitoring done within Wind Point watershed. Where available, the use of properly maintained and calibrated portable instruments is recommended. Field measurements should be recorded directly on data sheets or, if using portable testing equipment with this feature, download data at the laboratory.

Chemical Parameters

There are a variety of chemical components that can be quantified in streams but it is recommended that testing only be completed for the parameters outlined in Table 50. Unlike physical monitoring, chemical monitoring requires grab samples analyzed at certified labs. Future monitoring of chemical components in Wind Point watershed should be done following significant precipitation (≥ 1.5 inches within the 24-hour period prior to sample collection) in order to capture storm event data, which can in turn be compared to baseline data and the target pollutant values summarized in Section 4.0. This same monitoring protocol can be used to determine pollutant removal efficiencies resulting from implementation of some Management Measures. In conjunction with chemical component assessment, it is also important to obtain stream discharge calculations so that pollutant loads can be calculated. Stream discharge is calculated by measuring the stream width, average depth, and flow rate (ft/sec) at the sample location. It is recommended that future nutrient samples (nitrogen and phosphorous) be sent to the University of Wisconsin – Oshkosh Environmental Research Innovation Center (ERIC).

Microbiological Parameters

The primary microbiological component recommended for assessment in future water quality monitoring is *E. coli*. Presence of this organism is determined with laboratory analysis of a water sample collected at the sampling site using proper protocols. Analysis for *Bacteroides*, a human specific marker, is also recommended on samples collected at RHD-I. Samples assessed for *Bacteroides* must be collected using the proper protocol, filtered, and analyzed using polymerase chain reaction (PCR) in the laboratory.

Table 50. Stream monitoring water quality parameters, collection, and handling procedures.

Parameter	Statistical, Numerical, or General Use Guideline	Container	Volume	Preservative	Max. Hold Time
Physical Parameters Measured in Field					
Dissolved Oxygen	>5.0 mg/l	These parameters are measured in the field			
Temperature	<90° F				
Chemical, Microbial, & Physical Parameters Analyzed in Lab					
Total Suspended Solids	<19 mg/l	Plastic or glass	32 oz	Cool 4° C	7 days
Nitrate-Nitrite Nitrogen	<1.798 mg/l (optional sampling with Oakton ionchromoroghapher)	Plastic or glass	4 oz	Cool 4°C 20% Sulfuric Acid	28 days
Total Phosphorus	<0.075 mg/l	Plastic or glass	4 oz	Cool 4° C 20% Sulfuric Acid	28 days
Chloride	<230 mg/l	Plastic or glass	32 oz	Cool 4° C	28 days
E. Coli	> 235 MPN is advisory > 1,000 MPN is beach closure	Plastic or glass	16 oz	Cool 4° C	24 hours
pH	>6.0 or <9.0	Plastic or glass	16 oz	Cool 4° C	immediately
Conductivity	<1,500 µmhos/cm	Plastic or glass	16 oz	Cool 4° C	24 hours
Turbidity	<14 NTU	Plastic or glass	16 oz	Cool 4° C	24 hours

Additional Recommendations

Expanded monitoring
If additional funding becomes available, the number of monitored tributary and stormwater outfall sites could be expanded. A more comprehensive understanding of water quality within Wind Point watershed can be achieved by not only sampling all sites included in the original monitoring project, but also upstream tributaries that have not previously been monitored. This would introduce at least three sites upstream of existing sampling locations on the Rifle Range Ravine (RHD-5), Cliffside Park Tributary (RHD-7), and RHD-15. Exceedances of the state standard for *E. coli* (at RHD-7 and RHD-15) and recommended guideline for turbidity (at RHD-5 and RHD-7), in at least 50% of samples collected at downstream sites, indicates additional upstream monitoring may prove beneficial for the identification of the pollutant sources.

Expanding Estimations of Sediment Loading
Additional monitoring should include either bed load testing or a stream cross section in order to monitor ongoing sediment loading on Wind Point tributaries. Bed load testing should be completed by USGS and/or an engineering consultant firm to measure flow-related sediment levels; unfortunately, this testing can often be a cost-prohibitive and time consuming program. Alternately, stream cross sections can possibly be used to assess sediment loads, as developed by the WDNR's technical services division.

Evaluation Criteria

Water Quality Evaluation Criteria
Water quality criteria (expressed as measurable indicators & targets) need to be developed so that water quality objectives can be evaluated over time. The criteria are designed to be compared against data gathered from the Water Quality Monitoring Plan as well as other data and analyzed to determine the success of the watershed plan in terms of protecting and improving water quality. These criteria also support an adaptive management approach by providing ways to reevaluate the implementation process if adequate progress is not being made toward achieving water quality objectives.

Section 2.0 of this plan includes a water quality goal (Goal 3) with seven objectives. Criteria are selected for each water quality objective to determine whether components of the water quality goal are being met (Table 51). Criteria are based on WDNR water quality criteria, data analysis, reference conditions, literature values, and/or expert examination. Criteria are also designed to address potential or known sources of water quality impairment identified in Section 5.0. Future evaluation of the criteria will allow the Wind Point Watershed Implementation Committee to gauge plan implementation success or determine if there is a need for adaptive management. Note: evaluation criteria are included for the water quality goal only; criteria for other plan goals are examined within the appropriate progress evaluation "Report Cards" in Section 9.2.

Table 51. Set of criteria related to water quality objectives.

GOAL 3: Improve surface water quality to meet applicable standards.	
Water Quality Objective	**Criteria: Indicators and Targets**
1) Stabilize 8,685 linear feet of highly eroded streambanks & ravines located along four "High Priority Critical Areas". This includes stabilizing four stream headcuts as identified along Tributaries B, E, and F.	• *# of Restored Stream & Ravine Reaches:* All "High Priority Critical Area" streams, ravines, and headcuts stabilized and/or restored. • *Chemical Water Quality Standards:* <19 mg/l TSS, <0.075 mg/l TP, <1.798 mg/l TN, and <235 MPN/100 ml mg/l *E. coli* • *Biotic Indexes:* Biological communities achieve at least "Fair" resource quality. • *Social Indicator:* >50% of surveyed residents know that bank erosion is a problem in the watershed and support bank stabilization efforts.
2) Stabilize 4,500 linear feet of highly eroded bluff located along on "High Priority Critical Area".	• *% Reduction in Bluff Erosion:* >95% reduction in erosion compared to existing conditions. • *Social Indicator:* >75% of surveyed residents know the importance of stabilizing eroded bluffs.
3) Restore 14,541 linear feet of riparian buffer along two "High Priority Critical Areas."	• *# of Riparian Area Restorations:* Two "High Priority Critical Area" riparian areas are restored. • *Chemical Water Quality Standards:* <19 mg/l TSS, <0.075 mg/l TP, <1.798 mg/l TN, and <235 MPN/100 ml mg/l *E. coli* • *Social Indicator:* >50% of surveyed residents know the importance of restoring riparian areas.
4) Restore 270 acres of wetland at nine "High Priority Critical Areas."	• *# of Wetland Restorations:* All nine "High Priority Critical Area" wetland restoration projects are implemented. • *Chemical Water Quality Standards:* <19 mg/l TSS, <0.075 mg/l TP, <1.798 mg/l TN, and <235 MPN/100 ml mg/l *E. coli* • *Social Indicator:* >50% of surveyed residents know the importance of restoring wetlands.
5) Retrofit eight "High Priority Critical Area" detention basins.	• *# of Detention Basin Retrofits:* All eight "High Priority Critical Area" detention basins are retrofitted. • *Chemical Water Quality Standards:* <19 mg/l TSS, <0.075 mg/l TP, <1.798 mg/l TN, and <235 MPN/100 ml mg/l *E. coli* • *Social Indicator:* >50% of surveyed stakeholders understand the water quality and habitat benefits created by retrofitting detention basins with native vegetation.
6) Implement agricultural best management practices on seven sites totaling 975 acres identified as "High Priority Critical Areas".	• *# of Sites in No Till:* Farmers at all seven "High Priority Critical Area" agricultural areas implement no till farming practices. • *Social Indicator:* >75% of surveyed farmers understand the water quality benefits created by implementing no till farming practices.
7) Continue water quality monitoring programs, specifically including Nitrogen, Phosphorus, Total Suspended Solids, and *E. coli.*	• *Monitoring Program:* Racine Health Department, Prairie School, WDNR, and local health departments implement the outlined water quality plan.

Biological Indicators of Water Quality

Biological data can be used alone or in conjunction with physical-chemical data to make an impairment assessment on a waterbody in Wisconsin. A Fish Index of Biotic Integrity (Fish IBI) is one method of assessing biological health and water quality through several attributes of fish communities found in streams. The WDNR uses biological data to determine water quality conditions of streams because fish and macroinvertebrates are relatively easy to sample/identify and reflect specific and predictable responses to human induced changes to the landscape, stream habitat, and water quality.

Indices have been developed that measure water quality using fish (fish Index of Biotic Integrity (fIBI)) and macroinvertebrates (Macroinvertebrate Index of Biological Integrity (M-IBI) and Family Biotic Indexing (FBI)). These indices are best applied prior to a project such as a stream restoration to obtain baseline data and again following restoration to measure the success of the project. Or, they can be conducted to simply assess resource quality in a stream reach.

Fish Indices of Biotic Integrity (fIBI)

The fIBI is designed to assess water quality and biological health directly through several attributes of fish communities in streams. After the fish have been collected using electrofishing equipment and identified, the data is used to evaluate 12 metrics and a rating is assigned to each metric based on whether it deviates strongly from, somewhat from, or closely approximates the expected values found in high quality reference stream reaches. The sum of these ratings gives a total IBI score for the site. The best possible IBI score is 100. The WDNR has determined that a score less than 30 indicates a stream is not fully supporting for *Warm Water Sport Fish*.

Macroinvertebrate Indices of Biological Integrity (M-IBI) and Family Biotic Indexing (FBI)

The M-IBI is designed to rate water quality using aquatic macroinvertebrate samples. An M-IBI score of 0-2.5 is considered grounds for 303(d) listing a stream.

The FBI is performed by collecting macroinvertebrates samples and sorting specimens by taxonomic order and family. The number of organisms within each Family and their respective tolerance to organic pollution is used to determine the FBI score. Higher scores are indicative of a higher degree of organic pollution and poor water quality.

Social Indicators of Water Quality

Quantifying social indicators of success in a watershed planning initiative is difficult. It is subjective to a large degree and complaints about poor conditions are often heard rather than compliments on improvements. The Great Lakes Regional Water Program (GLRWP), a leading organization that addresses water quality research, education, and outreach in Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin, defines social indicators as standards of comparison that describe the context, capacity, skills, knowledge, values, beliefs, and behaviors of individuals, households, organizations, and communities at various geographic scales. The GLRWP suggests that social indicators used in water quality management plans and outreach efforts are effective for several reasons including:

- Help watershed committee evaluate projects related to education and outreach;
- Help support improvement of water quality projects by identifying why certain groups install Management Measures while other groups do not;
- Measure changes that take place within grant and project timelines;
- Help watershed committee with information on policy, demographics, and other social factors that may impact water quality;
- Measure outcomes of water quality programs not currently examined.

GLRWP has developed a Social Indicators Data Management and Analysis Tool (SIDMA) to assist watershed stakeholders with consistent measures of social change by organizing, analyzing, and visualizing social indicators related to non-point source (NPS) management efforts. The SIDMA tool uses a seven step process to measure social indicators as shown in Figure 76. Detailed information about GLRWP's social indicator tool can be found at http://35.8.121.111/si/Home.aspx.

Several potential social indicators could be evaluated by the Wind Point Watershed Implementation Committee using different strategies to assess changes in water quality. For example, surveys, public meetings, and establishment of interest groups can give an indication of the public knowledge about the water quality in the watershed. It is important to involve the public in the water quality improvement process at an early stage through public meetings delineating the plans for improvement and how it is going to be monitored. Table 52 includes a list of potential social indicators and measures that can be used by the watershed committee to evaluate the social changes related to water quality issues.Then thank you letters should be sent to those that responded, while those that did not respond should be sent a second survey. The results of the survey can be used to develop appropriate media, citizen awareness, and watershed management activities to improve social behavior.

Figure 76. Steps to measure social indicators. Source: GLRWP.

Table 52. Social indicators related to understanding behavior toward water quality issues.

Social Indicator	Measure
1) Media Coverage	• # of radio broadcasts related to water quality protection • # of newspaper articles related to water quality protection
2) Citizen Awareness	• # of informational flyers distributed per given time period • % of citizens who are able to identify where pollution is originating from • % change in volunteer participation to protect water quality • % change in attendance at water quality workshops • # of requests to create public use areas with interpretive signage • % of stakeholders who are aware of watershed management information
3) Watershed Management Activities	• # of stream miles cleaned up per year • # of linear feet or miles of trails created or maintained each year • # of municipalities adopting watershed management plan • # of watershed groups implementing plan recommendations

9.2 Goal Milestones/ Implementation & Progress Evaluation "Report Cards"

Milestones are essential when determining if Management Measures are being implemented and how effective they are at achieving plan goals over given time periods. Tracking milestones allows for adaptive management whereby periodic plan updates and changes can be made if milestones are not being met.

Watersheds are complex systems with varying degrees of interaction and interconnection between physical, chemical, biological, hydrological, habitat, and social characteristics. Criteria that reflect these characteristics may be used as a measure of watershed health. Goals and objectives in the watershed plan determine which criteria should be monitored to evaluate the success of the watershed plan.

A successful watershed plan involves volunteer stakeholder participation to get projects completed, and must include a feedback mechanism to measure progress toward meeting goals. Watershed "Report Cards," developed specifically for each goal in this plan, provide this information.

Each Report Card provides:

- Summaries of current conditions for each goal to set the stage for what efforts are needed
- Most important performance criteria related to goal objectives (see Section 2.0)
- Milestones to be met for various time frames
- Monitoring needs and efforts required to evaluate milestones
- Remedial actions to take if milestones are not met
- Notes section

Report Cards were developed for each of the five plan goals and are located at the end of this section. The milestones are generally based on "Short Term" (1-10 years; 2015-2025), "Medium Term" (10-20 years; 2025-2035), and "Long Term" (20+ years; 2035+) objectives. Grades for each milestone term should be calculated using the following scale: 80%-100% of milestones met = A; 60%-79% of milestones met = B; 40%-59% of milestones met = C; and < 40% of milestones met = failed.

Report Cards should be used to identify and track plan implementation to ensure that progress is being made towards achieving the plan goals and to make corrections as necessary.

Lack of progress could be demonstrated in factors such as monitoring that shows no improvement, new environmental problems, lack of technical assistance, or lack of funds. In these cases the Report Card user should explain why other factors resulted in milestones not being met in the notes section of the Report Card.

Early on in the plan implementation process, the Watershed Planning Committee should fund a Watershed Implementation Coordinator such as Root-Pike WIN to update the committee on plan implementation progress by way of the Report Cards. If needed, adaptive management should be implemented accordingly by referencing the adaptive management recommendations on each Report Card then developing a strategy to either change the milestone(s) or decide how to implement projects or actions to achieve the milestone(s).

Report Cards can be evaluated at any time. However, it is recommended that they be evaluated every five years to determine if sufficient progress is being made toward achieving milestones or if adaptive management is needed.

Goal 1 Report Card

Manage cultural and ecological components of the Green Infrastructure Network.

Historic and Current Condition:

- The historic landscape was a mix mostly forested prior to European settlement in the 1830s.
- In 2012, residential areas were most common (3,927 acres; 33%) followed by vacant land (1,649 acres; 14%).
- The largest change of a land use/land cover is predicted to occur on agricultural land (-968 acres; -83%) in the next 30 years.
- A parcel level inventory found that open space comprises over 4,939 acres or nearly 41% of the watershed.
- Important Natural Areas comprise 2,188 acres in the watershed.
- Future development patters will likely continue to degrade watershed conditions if Green Infrastructure is not protected.

Criteria/Targets to Meet Goal Objectives:

- All six municipalities incorporate Green Infrastructure Plan into Comprehensive Plans and development review maps.
- Develop and adopt watershed-wide Conservation or Low Impact Design standards.
- 100% of developments on "Critical Green Infrastructure Protection Areas" use Conservation/Low Impact Design.
- All thirteen publically/privately owned Important Natural Areas have/implement management plans.
- Shoop Park Golf Course incorporates natural landscaping into rough areas.

Goal/Objective Milestones:		Grade
1-10 Yrs: (Short)	1. Green Infrastructure Network is incorporated into all 6 municipal Comp Plans & development reviews. 2. Watershed-wide Conservation/Low Impact Design standards developed. 3. 100% of developments on "Critical Green Infrastructure Protection Areas" follow plan recommendations. 4. Management plans developed/implemented at Bender Park, Cliffside Park, North Beach Park, & Tabor Woods, Oak Creek Power Plant Woods, and Power Plant Ravine Woods. 5. Native landscaping designs developed for rough areas at Shoop Park Golf Course.	
10-20 Yrs: (Medium)	1. 100% of developments on "Critical Green Infrastructure Protection Areas" follow plan recommendations. 2. Management plans are developed/implemented at MMSD Beach, Clay Ravine Woods, Oak Creek Bluffs & Beach, Neighborhood Central Walk, Dominican Ravine, Wind Point Ravine Woods, & North Bay Ravine. 3. 50% of rough areas at Shoop Park Golf Course are retrofitted with native vegetation.	
20+ Yrs: (Long)	1. 100% of developments on "Critical Green Infrastructure Protection Area" follow plan recommendations. 2. All thirteen Important Natural Area management plans are updated and implemented. 3. Remaining 50% of rough areas at Shoop Park Golf Course are retrofitted with native vegetation.	

Monitoring Needs/Efforts:

- Track number of communities that incorporate Green Infrastructure Network into Comp Plans and development reviews.
- Track developments on "Critical Green Infrastructure Protection Areas" that incorporate Conservation/Low Impact Design.
- Track number of management plans that are created & implemented on Important Natural Areas.
- Track number and type of natural landscaping incorporated at Shoop Golf Course.

Remedial Actions:

- Meet with municipalities that do not include the Green Infrastructure Network in Comp Plans and development reviews.
- Investigate via FOIA reasons/decisions that were made for developments that did not incorporate GI recommendations.
- Determine limits of funding where management plans are not developed/implemented on Important Natural Areas.
- Meet with golf course representatives to discuss possible low cost natural landscaping options.

Notes:

Grade Evaluation: 80%-100% met = A; 60%-79% met = B; 40%-59% met = C; and < 40% = failed.

Goal 2 Report Card

Implement watershed educational, stewardship, and recreational opportunities.

Current Condition:

Many of the stakeholders in Wind Point watershed have been active in the creation and leadership of the Root-Pike Watershed Initiative Network (Root-Pike WIN). The key stakeholders include the City of Racine, City of Oak Creek, City of South Milwaukee, Village of Caledonia, Village of Wind Point and the WDNR. The Root-Pike WIN is actively engaging the public in watershed activities such as: educational seminars, research grants, paddling outings, rain garden demonstration areas and plants, beach clean-up days and extensive public education programs and a media campaign. The watershed planning process for Wind Point watershed began in 2013 with educational sessions. The watershed planning process has allowed watershed partnerships to form that will help with implementing the watershed plan and initiating projects.

Criteria/Targets to Meet Goal Objectives:

- Number of land stewardship volunteers recruited.
- Number of public officials that support conservation development and ordinance language changes.
- Number of landowners adjacent to tributaries and lakeshore that are informed about healthy land management.
- Number of environmental interpretation signs posted throughout the watershed.
- Number of people attending public education events regarding fertilizer, road salt, and pet waste disposal.
- Number of people attending public education events regarding shallow aquifer water quality and quantity.

Goal/Objective Milestones:		Grade
1-10 Yrs: (Short)	1. Each municipality recruits at least one land stewardship volunteer. 2. At least one public official representing each municipality support conservation development. 3. At least 25% of landowners adjacent to tributaries and lakeshore are educated about healthy land management. 4. Watershed signage is installed on at least two major roads as they enter Wind Point watershed. 5. At least 30 people attend fertilizer, road salt, and pet waste disposal education campaigns. 6. At least 30 people attend shallow aquifer water quality and quantity education campaigns.	
10-20 Yrs: (Medium)	1. Each municipality recruits at least two land stewardship volunteers. 2. At least two public officials representing each municipality support conservation development. 3. At least 50% of landowners adjacent to tributaries and lakeshore are educated about healthy land management. 4. Watershed signage is installed on at least two additional major roads as they enter Wind Point watershed. 5. At least 30 people attend fertilizer, road salt, and pet waste disposal education campaigns 6. At least 30 people attend shallow aquifer water quality and quantity education campaigns.	
20+ Yrs: (Long)	1. Each municipality recruits at least three land stewardship volunteers. 2. At least three public officials representing each municipality support conservation development. 3. At least 75% of landowners adjacent to tributaries and lakeshore are educated about healthy land management. 4. At least 30 people attend fertilizer, road salt, and pet waste disposal education campaigns. 5. At least 30 people attend shallow aquifer water quality and quantity education campaigns.	

Monitoring Needs/Efforts:

- Track number of volunteers recruited by each municipality.
- Track number of public officials with each municipality that support conservation development.
- Track amount of information sent to landowners adjacent to tributaries and lakeshore.
- Track number of watershed signs that are installed along major roads in the watershed.
- Track number of people that attend education campaigns related to management of fertilizer, road salt use, and pet waste.
- Track number of people that attend education campaigns related to shallow aquifer water quality and quantity.

Remedial Actions:

- Meet with municipalities to help find avenues to recruit land stewardship volunteers.
- Meet with public officials to discuss the importance of conservation development and ordinance changes.
- Ask municipalities for funding related to creating and installing watershed signage.
- Actively recruit public to attend watershed education campaigns.

Notes:

Grade Evaluation: 80%-100% met = A; 60%-79% met = B; 40%-59% met = C; and < 40% = failed.

Goal 3 Report Card

Improve surface water quality to meet applicable standards.

Current Conditions:

- The findings of this report suggest moderate water quality impairment caused by channelization, streambank erosion, draining of wetlands, and high phosphorus and *E. coli* in agricultural and urban stormwater runoff.
- Biological data suggests that tributaries in the watershed are substantially affected by organic pollution.
- There are two wastewater treatment plants in the watershed: South Milwaukee Wastewater Treatment Facility & South Shore Wastewater Treatment Plant.
- 14 industrial WPDES Permit sites are located in the watershed.
- Zoo Beach and North Beach, located along Lake Michigan in the south portion of the watershed, are not impaired.

Criteria/Targets to Meet Goal Objectives:

- Four (TRB2, TRD2, TRE2, & TRF4 totaling 8,685 lf) "High Priority-Critical Area" stream/ravine reaches stabilized.
- One "High Priority-Critical Area" bluff erosion (B1: 4,500 linear feet) studied, designed, & stabilized if determined necessary.
- Two "High Priority-Critical Area" riparian areas (TRE1 & TRG5:14,541 linear feet) restored.
- Nine "High Priority-Critical Area" wetlands totaling 270 acres restored.
- Eight "High Priority-Critical Area" detention basins retrofitted.
- 975 acres at seven "High Priority-Critical Area" agricultural areas use conservation tillage (no till) farming.
- Implement future water quality monitoring program to measure success of completed water quality improvement projects.

Goal/Objective Milestones:		**Grade**
1-10 Yrs: (Short)	1. Designs developed to stabilize all four "High Priority-Critical Area" stream/ravine reaches. 2. Study and design (if determined necessary) plans to stabilize "High Priority-Critical Area" bluff erosion. 3. "High Priority-Critical Area" riparian areas along TRE1 & TRG5 are restored. 4. At least 2 of 9 "High Priority-Critical Area" wetlands are restored. 5. At least 2 of 8 "High Priority-Critical Area" detention basins are retrofitted. 6. At least 2 of 7 "High Priority-Critical Area" agricultural sites in no till farming unless land use changes. 7. Implement water quality monitoring program recommendations included in Section 9.1.	
10-20 Yrs: (Medium)	1. At least two of four "High Priority-Critical Area" stream/ravine reaches stabilized. 2. 4,500 lf of "High Priority-Critical Area" bluff erosion is stabilized if determined necessary. 3. At least 4 of 9 "High Priority-Critical Area" wetlands are restored. 4. At least 4 of 8 "High Priority-Critical Area" detention basins are retrofitted. 5. At least 4 of 7 "High Priority-Critical Area" agricultural areas in no till farming unless land use changes. 6. Implement water quality monitoring program recommendations included in Section 9.1.	
20+ Yrs: (Long)	1. All four "High Priority-Critical Area" stream/ravine reaches are stabilized. 2. All nine "High Priority-Critical Area" wetlands are restored. 3. All eight "High Priority-Critical Area" detention basins are retrofitted. 4. All seven "High Priority-Critical Area" agricultural areas in no till farming unless land use changes. 5. Implement water quality monitoring program recommendations included in Section 9.1.	

Monitoring Needs/Efforts:

- Track stream/ravine, riparian area, and bluff restoration & stabilization projects.
- Track wetland restoration project implementation and success.
- Track detention basin retrofit project implementation and success.
- Track acres of agricultural areas in no till farming.
- Monitor water quality per the "Monitoring Plan" in this report.

Remedial Actions:

- Locate USEPA 319 and other grants that are being submitted for recommended stream/ravine, riparian, buffer, wetland, and detention basin projects and determine success rate.
- NRCS contact farmers to determine why they are not implementing no till management practices.

Notes:

Grade Evaluation: 80%-100% met = A; 60%-79% met = B; 40%-59% met = C; and < 40% = failed.

Goal 4 Report Card

Increase communication and coordination among stakeholders

Current Condition:

- A limited number of watershed stakeholders are currently pursuing grant funds to implement watershed improvement projects. Root-Pike WIN is the leading entity pursing grant money and implementing watershed improvement projects.
- A number of practices and projects will require multi-jurisdictional and public-private participation/cooperation.
- Municipal decision-makers have not always worked collectively in the past to develop productive multijurisdictional partnerships related to funding, grant proposals, cost sharing ideas, and green infrastructure/open space protection.

Criteria/Targets to Meet Goal Objectives:

- All six municipalities in the watershed that adopt the Wind Point Watershed-Based Plan.
- Develop a "Watershed Planning Council" that meets quarterly.
- One workshop is held every ten years to teach municipal stakeholders how to use and implement the Plan at part of Phase III.
- Number of municipalities that amend current comp plans, codes, and ordinances to include watershed plan recommendations.
- Number of planning, funding, and implementation mechanisms implemented by multi-jurisdictional and/or public-private partnerships.

Goal Milestones:		**Grade**
1-10 Yrs: (Short)	1. All six municipalities adopt the Wind Point Watershed-Based Plan. 2. A "Watershed Planning Council" is developed and meets quarterly to implement Phase III. 3. One workshop is held to teach stakeholders how to use the watershed plan to implement projects. 4. Three of six municipalities amend comprehensive plans/codes/ordinances and implement projects that support the Plan. 5. At least three multi-jurisdictional and/or public-private projects are implemented.	
10-20 Yrs: (Medium)	1. The "Watershed Planning Council" continues to meet quarterly to implement Phase III. 2. One workshop is held to teach stakeholders how to use the watershed plan to implement projects. 3. All six municipalities amend comprehensive plans/codes/ordinances and implement projects that support the Plan. 4. At least three multi-jurisdictional and/or public-private projects are implemented.	
20+ Yrs: (Long)	1. The "Watershed Planning Council" continues to meet quarterly to implement Phase III. 2. One workshop is held to teach stakeholders how to use the watershed plan to implement projects. 3. At least three multi-jurisdictional and/or public-private projects are implemented.	

Monitoring Needs/Efforts:

- Track number of municipal and other governing bodies that adopt the Wind Point Watershed-Based Plan and implement recommendations.
- Track number of "Watershed Planning Council" meetings.
- Track number of multijurisdictional and/or public-private projects implemented during each milestone time period.

Remedial Actions:

- Watershed Council conduct meetings with government officials to adopt the watershed plan if it is not adopted in years 1-10.
- Track number of workshops related to Phase III plan implementation for municipal stakeholders.
- Watershed Council recommend multi-jurisdictional projects by bringing representatives to the table.

Notes:

Grade Evaluation: 80%-100% met = A; 60%-79% met = B; 40%-59% met = C; and < 40% = failed.

Goal 5 Report Card

Improve groundwater recharge to maintain shallow aquifers and reduce stormwater runoff.

Current Conditions:

- The upper aquifers found beneath Wind Point watershed consists of the sandstone and dolomite of the Ancell and Prairie du Chien Groups; the lower sandstone aquifer is made up of thick sedimentary sequences of the Cambrian sandstone.
- SEWRPC studies suggest that deep water aquifers are experiencing drawdowns in the area exceeding 400 feet.
- There are currently seven groundwater wells in the watershed; four are active.
- "Traditional" development over the past 20 years generally did not incorporate groundwater infiltration practices.

Criteria/Targets to Meet Goal Objectives:

- 10 rain gardens and 10 rain barrels installed at homes or businesses every 10 years.
- All six municipalities in the watershed implement groundwater recharge policies for development located in "High" and "Very High" groundwater recharge potential areas.
- Stormwater Treatment Train designs are used in all new and redevelopment.

Goal/Objective Milestones: **Grade**

1-10 Yrs: (Short)	1. At least 10 rain gardens and 10 rain barrels are installed as homes or businesses. 2. All six municipalities implement groundwater recharge policies. 3. Stormwater Treatment Train designs are used in all new and redevelopment.	
10-20 Yrs: (Medium)	1. At least 10 rain gardens and 10 rain barrels are installed as homes or businesses. 2. Stormwater Treatment Train designs are used in all new and redevelopment.	
20+ Yrs: (Long)	1. At least 10 rain gardens and 10 rain barrels are installed as homes or businesses. 2. Stormwater Treatment Train designs are used in all new and redevelopment.	

Monitoring Needs/Efforts:

- Track number of rain gardens and rain barrels installed each year.
- Track development that uses stormwater infiltration when located within sensitive groundwater recharge areas.
- Track number of municipalities that adopt policy requiring stormwater infiltration.

Remedial Actions:

- Municipalities develop funding sources for homeowners and businesses to install rain gardens and rain barrels.
- Conduct FOIA requests when developments in sensitive recharge areas do not incorporate stormwater infiltration practices.
- Meet with municipalities to review policy changes related to developments.

Notes:

Grade Evaluation: 80%-100% met = A; 60%-79% met = B; 40%-59% met = C; and < 40% = failed.