

Wind Point Watershed-Based Plan

A Guide to Protecting and Restoring Watershed Health

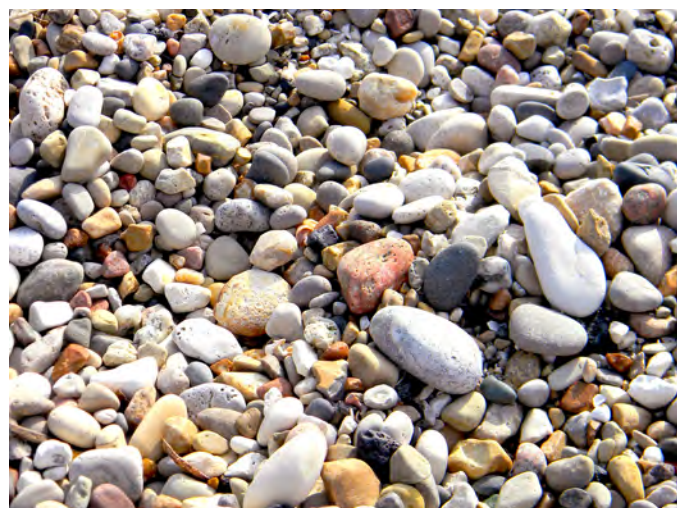
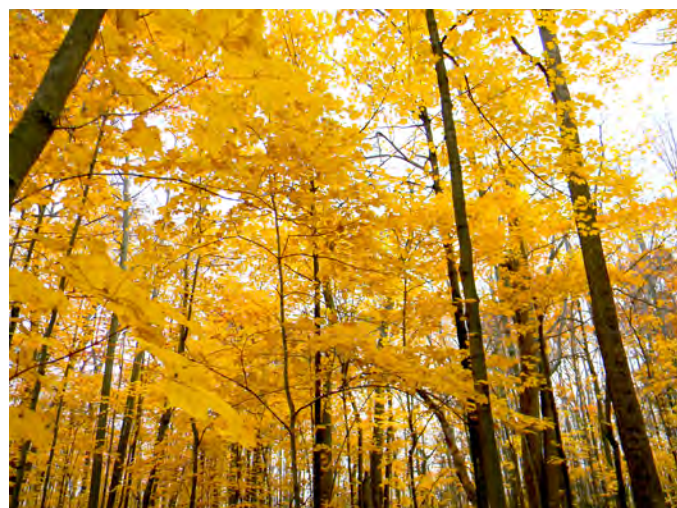
Prepared for
Root-Pike Watershed Initiative Network
By Applied Ecological Services, Inc.
May 2015



Applied Ecological Services, Inc.™

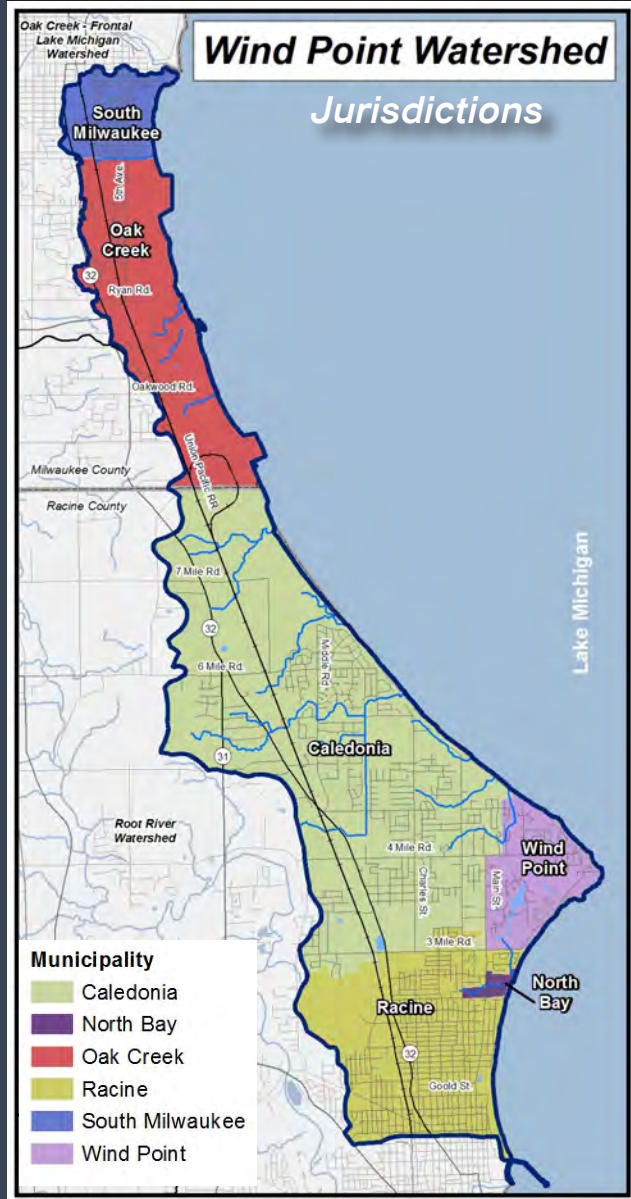
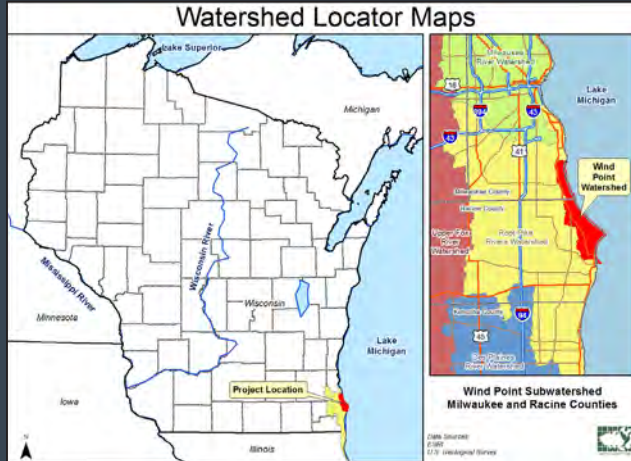


EXECUTIVE SUMMARY



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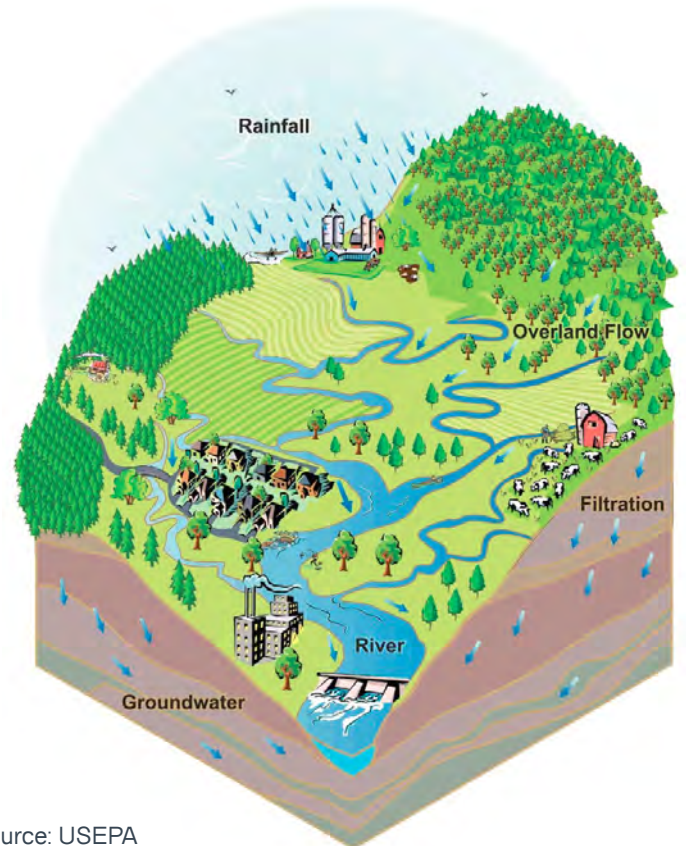


INTRODUCTION

People live, work, and recreate in areas of land known as watersheds. A watershed is best described as an area of land where surface water drains to a common location such as a stream, river, or lake (see image, below). The source of groundwater recharge to aquifers, streams, and lakes is also considered part of a watershed. Watersheds are complex systems because there is interaction between natural elements such as climate, surface water, groundwater, vegetation, and human elements. Human influences can produce polluted stormwater runoff, increase impervious surfaces, alter stormwater flows, and degrade or fragment natural areas.

Wind Point watershed (12 Digit HUC# 040400020101) is located in southeast Wisconsin in Milwaukee and Racine Counties (see map, left). It is named for the conspicuous "Point" that extends out into Lake Michigan in the southeast portion of the watershed. The watershed is relatively narrow with a north-south orientation along Lake Michigan. Many small tributary streams and stormsewer networks in the watershed drain approximately 18.7 square miles (11,996 acres) of land surface east to Lake Michigan.

The watershed falls within the borders of six municipalities including Racine, Caledonia, North Bay, Wind Point, Oak Creek, and South Milwaukee (see map, lower left). Of the six municipalities in the watershed, the Village of Caledonia is the largest (6,234 acres; 52%) followed by the City of Racine (2,334 acres; 20%) and City of Oak Creek (1,961; 16%). The Villages of North Bay and Wind Point and City of South Milwaukee account for the remaining 1,462 acres or 12% of the watershed.



Source: USEPA

PURPOSE

The Root-Pike Watershed Initiative Network (Root-Pike WIN) is a grassroots organization that awards grants to projects that will preserve, promote, and protect watershed health. Root-Pike WIN received grant funding from the Fund for Lake Michigan and SC Johnson Fund to undergo a watershed planning effort and produce a comprehensive “Watershed-Based Plan” for Wind Point watershed that meets requirements as defined by the United States Environmental Protection Agency (USEPA). Improvement projects identified within the watershed plan are eligible for state and federal grants.

MISSION

The Wind Point Watershed Planning Committee (WPWPC) is comprised of watershed stakeholders dedicated to the preservation, protection, and improvement of Wind Point watershed.

“The Wind Point Watershed Planning Committee’s mission is to realize a healthy watershed and lakefront for future generations by implementing a long term plan to protect, restore, and manage the cultural and ecological aspects of green infrastructure within Wind Point watershed through watershed plan implementation, education, and stewardship.”

GOALS

Goal 1: *Manage cultural and ecological components of the Green Infrastructure Network.*

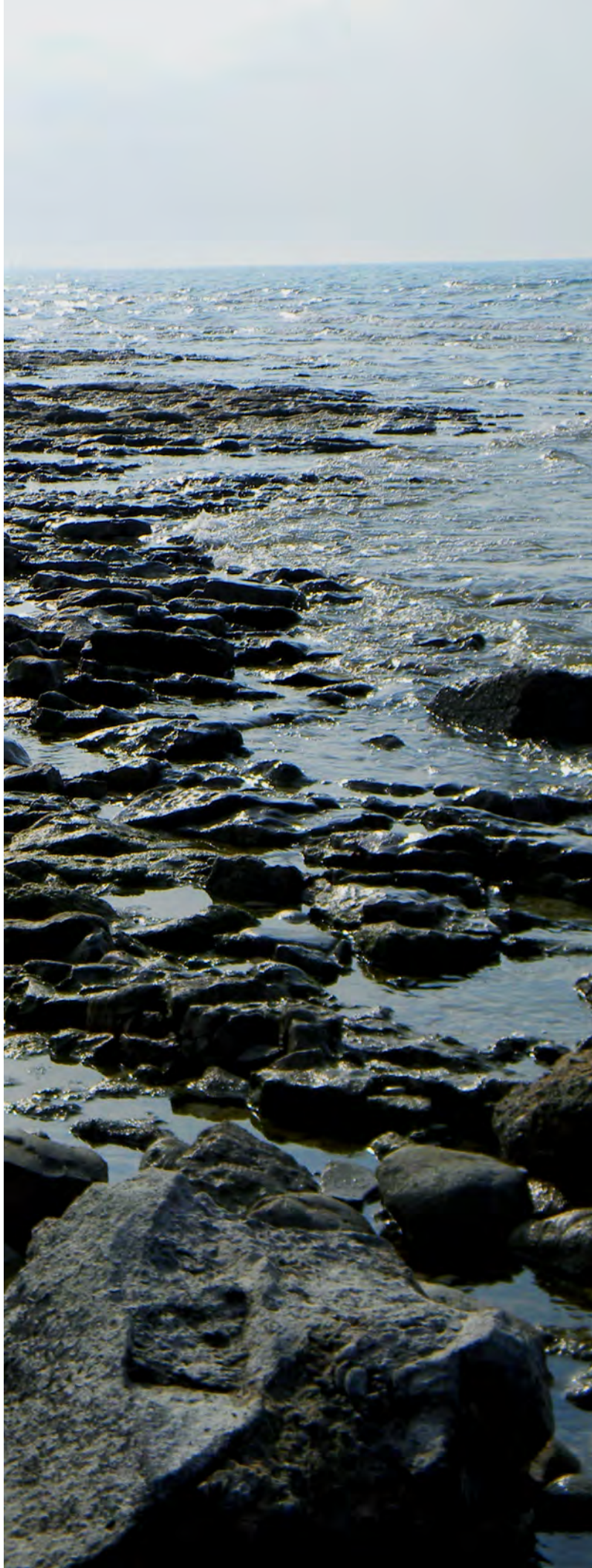
Goal 2: *Implement watershed educational, stewardship, and recreational opportunities.*

Goal 3: *Improve surface water quality to meet applicable standards.*

Goal 4: *Increase communication and coordination among stakeholders.*

Goal 5: *Improve groundwater recharge to maintain shallow aquifers and reduce stormwater runoff.*

Wind Point Watershed Planning Committee meeting overlooking Lake Michigan and at We Energies (above, inset).



THE PAST

The area of southeastern Wisconsin where Wind Point watershed now lies was covered by the most recent glacial event known as the Late Wisconsin Glaciation that ended around 9,500 years ago. During this period the earth's temperature warmed and the ice slowly retreated leaving behind moraines, ridges, and other glacial features. The receding glaciers also scoured out what have become the Great Lakes. The warming climate led to a tundra-like environment covered by spruce forest after glaciers retreated. As temperatures continued to rise, cool moist deciduous forests developed along Lake Michigan coastal areas and oak-hickory forests, oak savannas, marshes, and prairies developed more inland.

The last Native American Indian tribe to call the area home was the Potawatomie. These people lived in harmony with the environment until a treaty in 1833 resulted in their removal from the land by the U.S. Government. This treaty paved the way for European settlement in the area that began with government surveys of the land. The surveyors described about 85% of Wind Point watershed as being forested by southern mesic forest dominated by maple, basswood, and beech trees and southern dry-mesic forest, dominated by a variety of oak and hickory species. Southern lowland forest was common on the relatively flat plateau west of Wind Point. These wet areas contained black ash and alder. There were also beach and dune communities along Lake Michigan that were sculpted by waves and shifting sand.

THE PRESENT

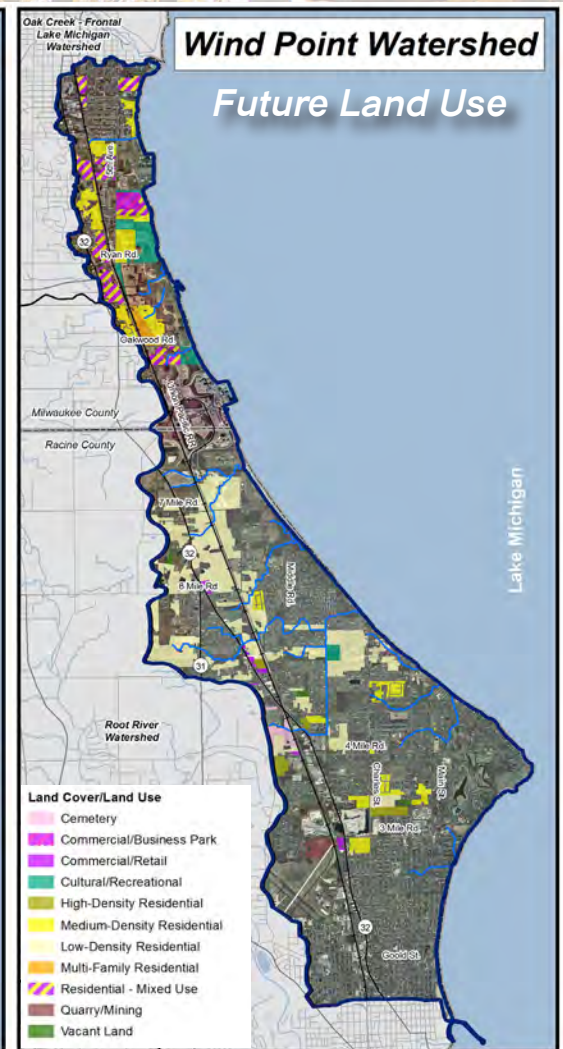
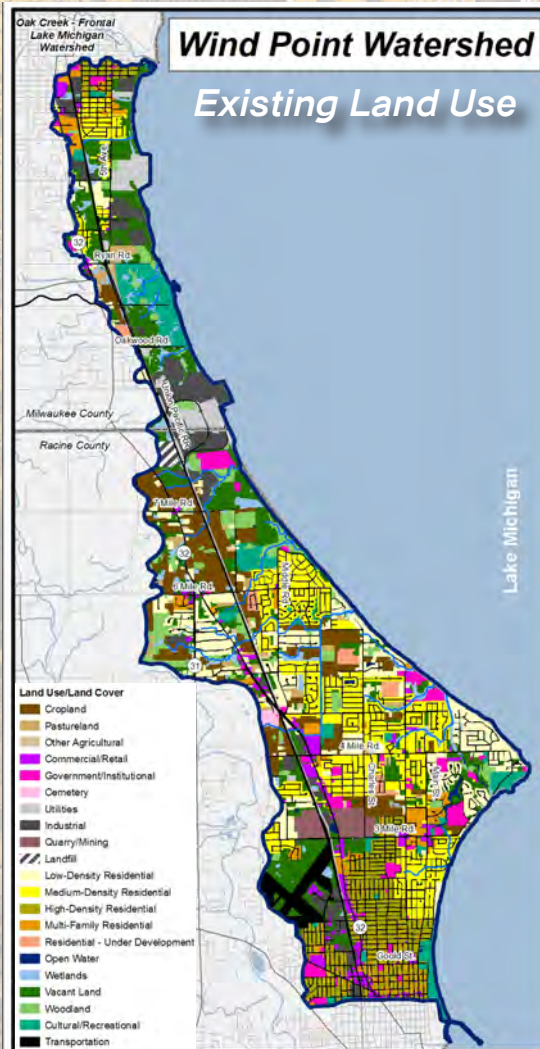
European settlement beginning in the mid 1800s resulted in drastic changes to the fragile ecological landscape. Most of the old growth forests were cleared by settlers who used the wood for fuel, to build their homes, sold it to sawmills, and farmed the cleared land. The large wetland areas west of Wind Point were also cleared and drained for farmland. The majority of streams were channelized and ditched to further drain water off the land.

Residential, commercial, and industrial development followed which led to additional alteration of the natural landscape as landowners

converted property to meet individual needs and roads were constructed adding to landscape fragmentation. By 2012, residential communities comprised 39% of the watershed (see map, below left). Unfortunately, most of this development used "traditional" practices that altered stormwater runoff and fragmented many natural areas.

THE FUTURE

Predicted land use (see map, below right) reveals that the most change is expected to occur on agricultural land where approximately 968 acres of the existing 1,111 acres (83% decrease) is expected to be converted to mostly single family residential and commercial/retail within the municipalities of Caledonia and Oak Creek. A significant loss of vacant land is also expected as 989 acres of the existing 1,649 acres (40% decrease) is predicted to become mostly residential. The remaining 500 acres of woodland is expected to decrease by at least 25% due to residential development. Future development provides one of the best opportunities for local communities to require "conservation" development that preserves green infrastructure, thereby improving water quality, wildlife habitat, groundwater recharge, and quality of life for people.



CHALLENGES & THREATS

Surface Water

- Surface water is impacted by phosphorus, sediment, and *E. coli*.
- Modeling suggests that streambank erosion contributes the most to sediment loading, cropland is the highest contributor of nitrogen, and residential areas contribute the most phosphorus.
- 66% of tributary reaches are moderately to highly channelized.
- 14% of tributary reaches are moderately to highly eroded as a result of headcutting.
- 74% of detention basins are not designed for water quality benefits.

Groundwater

- “Traditional” development trends over the past 30 years generally did not incorporate groundwater infiltration practices.
- Southeastern Wisconsin Regional Planning Commission (SEWRPC) modeling suggests that deep water aquifers are experiencing excessive drawdown.

Land

- Nearly 85% of the watershed was forested historically; only 4% remains.
- There were 2,945 acres of wetlands prior to European settlement; 577 acres or 20% remain.
- 45% of tributary buffers are in poor ecological condition.
- Bluffs along sections of Lake Michigan are experiencing accelerated erosion.
- Development policy among the communities does not adequately protect green infrastructure.
- Over 2,000 acres of open space is predicted to be developed in the future.
- 16 of 24 subwatersheds are or will likely be highly impacted by impervious cover.

Socioeconomics

- A 2010 SEWRPC study estimates a 9,239 (18%) population increase by 2035.
- 14% of the population in Racine is below poverty level.
- 42 “Critical Areas” were identified that could cost over 10 million dollars to address.



Stream Channelization



Bluff Erosion



Detention Basin Design

IMPORTANT NATURAL AND CULTURAL AREAS

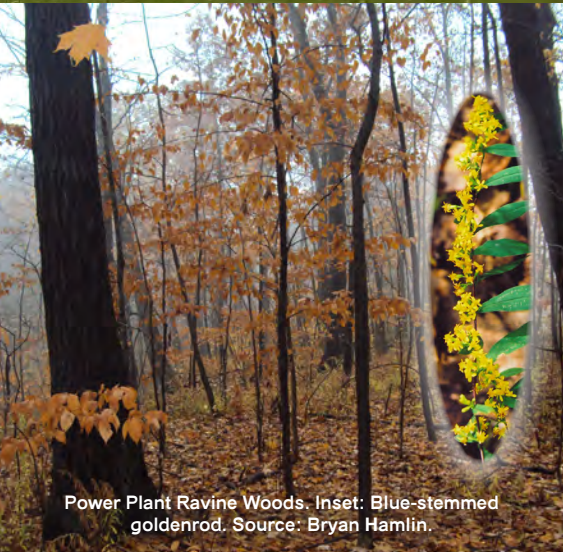


Cliffside Park



Source: Jonathan Nightingale

Cliffside Park consists of over 220 acres of natural and recreational areas and is owned by Racine County (see map, lower left). The park harbors second growth mesic woodland, clay seepage bluffs, and old field communities that contain critical species habitat for uncommon bird species such as Cooper's hawk, wood thrush, bobolink, upland sandpiper (inset, left), and grasshopper sparrow. Uncommon plant species found within the park include buffaloberry, yellowish gentian, stiff gentian, balsam poplar, and blue-stemmed goldenrod. In addition, the park may be the best place to see the Lake Border moraines as they tower above the waters of Lake Michigan.



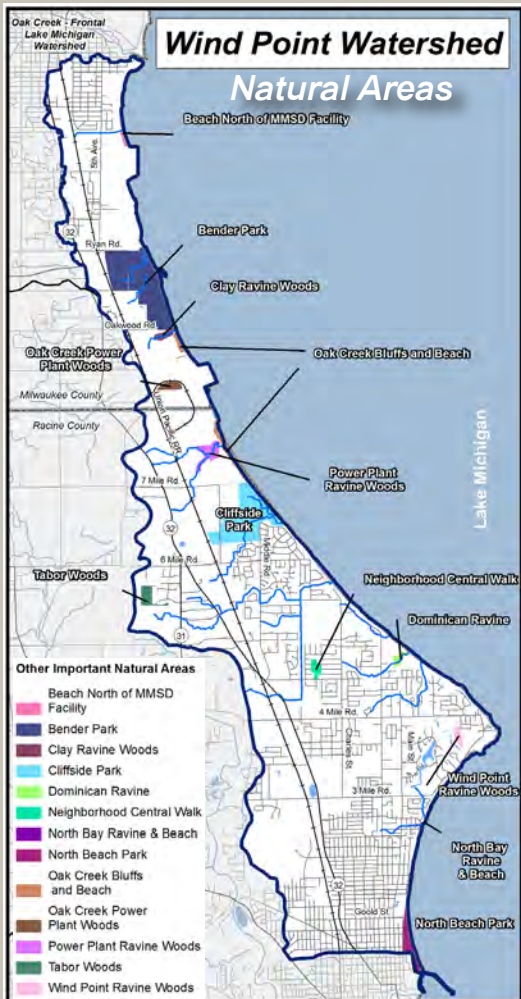
Power Plant Ravine Woods. Inset: Blue-stemmed goldenrod. Source: Bryan Hamlin.

Tabor Woods

Tabor Woods, a locally significant natural area, is found in the west-central portion of the watershed and consists of 38 acres owned by the Caledonia Land Conservancy (see map, lower left). These holdings were named for the Czechoslovakian community that first settled the area. Tabor Woods includes high quality mesic, dry-mesic, and wet-mesic woodland areas harboring beech, hickory, oak, maple, and walnut trees with an abundance of spring wildflowers. Walking and horseback riding trails traverse the property.

Power Plant Ravine, Oak Creek Power Plant Woods, & Clay Ravine Woods

We Energies owns the 32-acre Power Plant Ravine Woods, 12-acre Clay Ravine Woods, and 18-acre Oak Creek Power Plant Woods (see map, lower left). These areas are made up of mesic and dry-mesic woodland and deep ravines that open onto clay banks at Lake Michigan. Oak Creek Power Plant Woods contains mostly mesic woodland that harbors a number of uncommon species such as the endangered blue-stemmed goldenrod. We Energies sites are not open to the public.



Bender Park

Bender Park is 303 acres and owned by Milwaukee County (see map, left). The natural landscape of the park varies with areas of upland and lowland hardwood forests, old orchards, beech forest, shrub-carr, cattail marsh, sedge meadow, and prairie. Hiking trails, overlooks, beach access, and a boat launch are among the recreational amenities offered at the park.

The natural communities at Bender Park harbor a number of uncommon, threatened, and endangered plant and animal species such as Henslow's sparrow, bank swallow, alder flycatcher, American redstart, chestnut-side warbler, eastern kingbird, orchard oriole, and clay-colored sparrow. Uncommon and endangered plants such as blue-stemmed goldenrod, variegated horsetail, slender bog arrow-grass, and red trillium are also found at the park.

Oak Creek Bluffs & Beach, North Bay Ravine & Beach, & Beach North of MMSD

Other beach, foredune, and bluff natural areas in Wind Point watershed include Oak Creek Bluffs & Beach, Clay Ravine Woods, North Bay Ravine & Beach, and Beach North of MMSD (see map, left). All these sites potentially provide habitat for rare sea rocket and species of special concern Ohio goldenrod and false asphodel.

Dominican Ravine, Wind Point Ravine Woods, & Neighborhood Central Walk

Dominican Ravine is roughly 18 acres of woodland that was upgraded to a natural area of local significance due to species diversity and containing endangered blue-stemmed goldenrod. Wind Point Ravine Woods is a small ravine woodland harboring red trillium. Neighborhood Central Walk is a 15-acre parcel owned by the Caledonia Land Conservancy and contains a second growth woodland and neighborhood trails.



North Bay Beach foredune



Wind Point Lighthouse was constructed in 1880 by the U.S. Lighthouse Service which later merged with the Coast Guard. It is a 108-foot-tall building built of brick with a stone foundation. The lighthouse is one of tallest and oldest in active service on the Great Lakes. In 1999 a “Friends” group formed to preserve the lighthouse and in 2006, the Fog Horn House was converted to a maritime museum.

The original beacon was powered by a 3-wicked mineral oil lamp that was converted to electric in 1923. The beacon was fully automated when the last resident keeper left in 1964 and the Village of Wind Point began to maintain the property. The grounds also harbor the keepers’ quarters, several fog signal buildings, and the oil house.

In 1984, Wind Point Lighthouse was recognized as a National Historic Landmark and the National Park Service officially awarded ownership to the Village of Wind Point in 1997. The Village uses the keepers’ quarters as a village hall, police headquarters, and caretakers residence. In addition, the lighthouse still acts as an aid in navigation by the Coast Guard.



WISCONSIN HISTORICAL SOCIETY

THE WIND POINT LIGHTHOUSE

To assist navigation around the point into Racine harbor, the Wind Point Lighthouse began functioning in 1880 with a kerosene lamp, focused and magnified by a third order Fresnel lens. Its light could be seen for 19 miles.

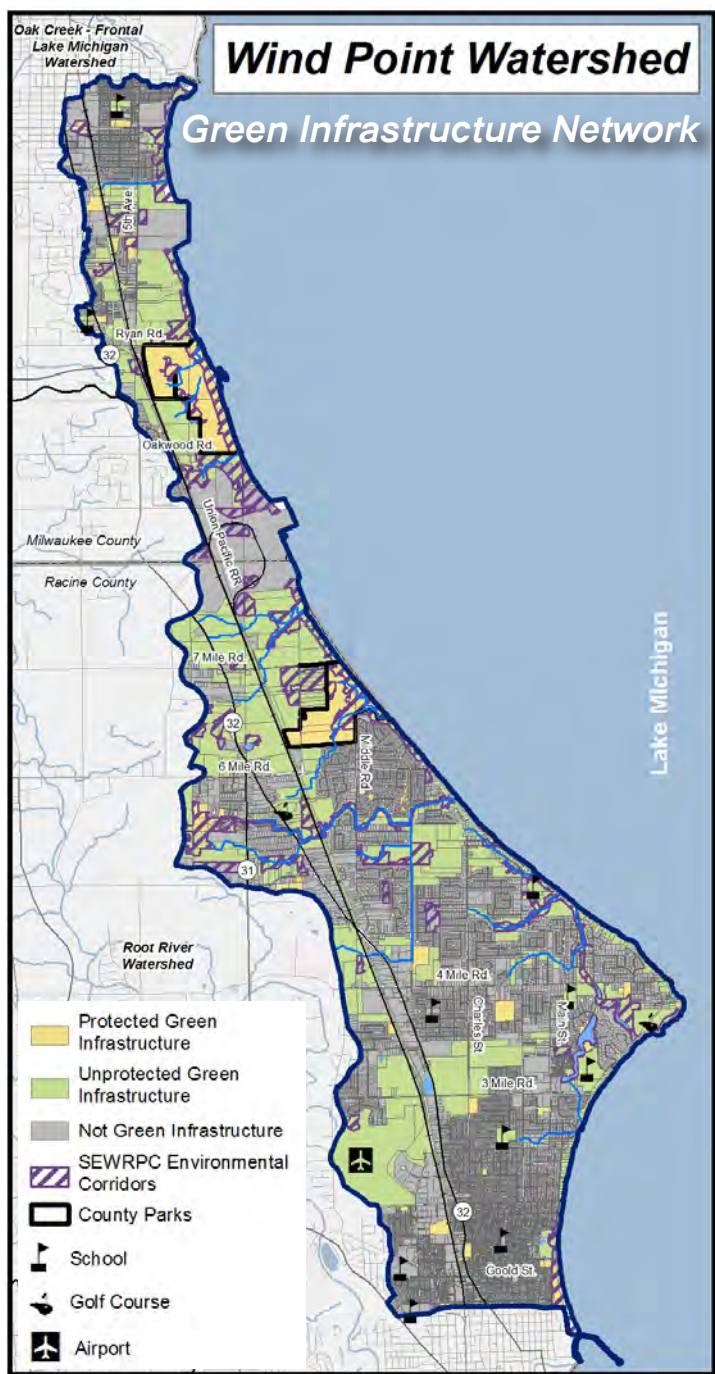
At 108 feet, it is one of the tallest and oldest lighthouses still serving navigation on the Great Lakes. Its fog horns, which last sounded in 1964, could be heard for 10 miles.

In recognition of the key role this lighthouse has played in the maritime history of Racine County, it was placed on the National Register of Historic Places in 1984.

In 1997, the National Park Service awarded ownership of the property to the Village of Wind Point. The Coast Guard still maintains the light as a public navigation aid.

Erected in 2002 by Friends of the Wind Point Lighthouse in memory of Judge Richard G. Harvey, Jr.

GREEN INFRASTRUCTURE



A Green Infrastructure Network is a connected system of natural areas and other open space that conserves natural ecosystem values and functions, sustains clean air and water, and provides a wide array of benefits to wildlife and people (see map, left). The network is made up of *Hubs* and linking *Corridors* (image, lower left). Hubs generally consist of the largest and least fragmented areas such as Bender Park and Cliffside Park within Wind Point watershed. Corridors are generally formed by smaller private/unprotected parcels along tributaries and Lake Michigan coast and are important because they provide biological conduits between hubs.

A major component of watershed planning includes an examination of open space to determine how it best fits into a Green Infrastructure Network. Natural features such as stream corridors, wetlands, floodplain, woodlands, and grassland are the primary components of green infrastructure. Working lands such as farms, parks/ball fields, golf courses, school grounds, detention basins, and large residential parcels can also be considered green infrastructure components.

SEWRPC Environmental Corridors

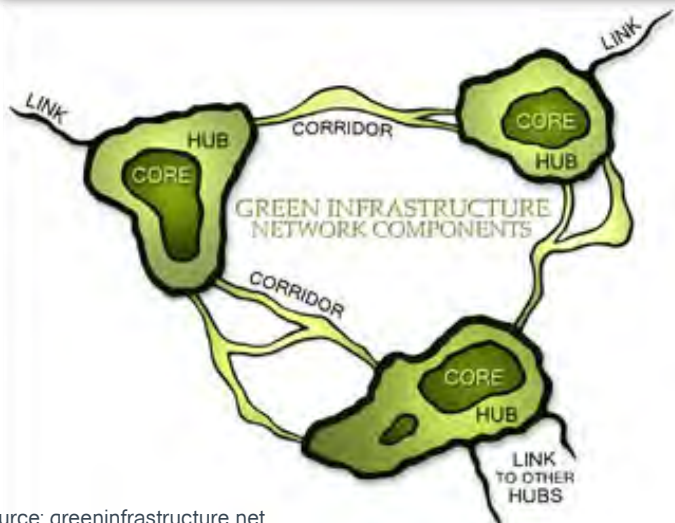
Southeastern Wisconsin Regional Planning Commission (SEWRPC) identified primary and secondary environmental corridors within southeastern Wisconsin (see map, left) to protect important natural resources in the area. Approximately 801 acres are considered Primary Environmental Corridors. An additional 66 acres and 426 acres, respectively, fall within Secondary Environmental Corridors and Isolated Natural Resource Areas. The majority of these Environmental Corridors extend along Lake Michigan and over some of the ravines and tributaries within Bender Park and Cliffside Park. The Environmental Corridors in Wind Point watershed form the backbone of the Green Infrastructure Network.

ADID Wetlands, Lakes, and Ponds

The United States Environmental Protection Agency (USEPA) uses the advanced identification of disposal areas (ADID) process to identify wetlands and other waters that are unsuitable for the discharge of dredged and fill materials. For Wind Point watershed, 130 acres of these ADID identifications were made by the USEPA in conjunction with the United States Army Corps of Engineers (USACOE) and Wisconsin Department of Natural Resources (WDNR). SEWRPC provided technical assistance in producing these maps by combining this data with their Primary Environmental Corridors (see map, upper left).

Green Infrastructure Highlights

- Nearly 5,000 acres or 57% of the watershed is open space.
- Public open space comprises about 18% of the watershed.
- 17% of public open space is protected.
- Over 2,000 acres of open space will likely be developed in the next 30 years.



Perhaps the most important aspect of green infrastructure planning is that it helps communities identify and prioritize conservation opportunities and plan development in ways that optimize the use of land to meet the needs of people and nature. As additional development occurs within Wind Point watershed, it will be extremely important to consider alternatives that use conservation or low impact development designs. These types of developments facilitate density needs while preserving the most valuable natural features and ecological functions of a site.

Conservation Design & Low Impact Development



Conservation design and low impact developments are not only environmentally sound choices, but economical ones for both developers and municipalities. Conservation design can produce some of its biggest cost savings in infrastructure such as site preparation, stormwater management, site paving, and sidewalks. Studies have also shown that the average savings created by choosing conservation development over more traditional footprints is as high as 24%. In addition, lots within a development with protected open space have been shown to have a 2.6% higher annual appreciation rate over lots within traditional developments.



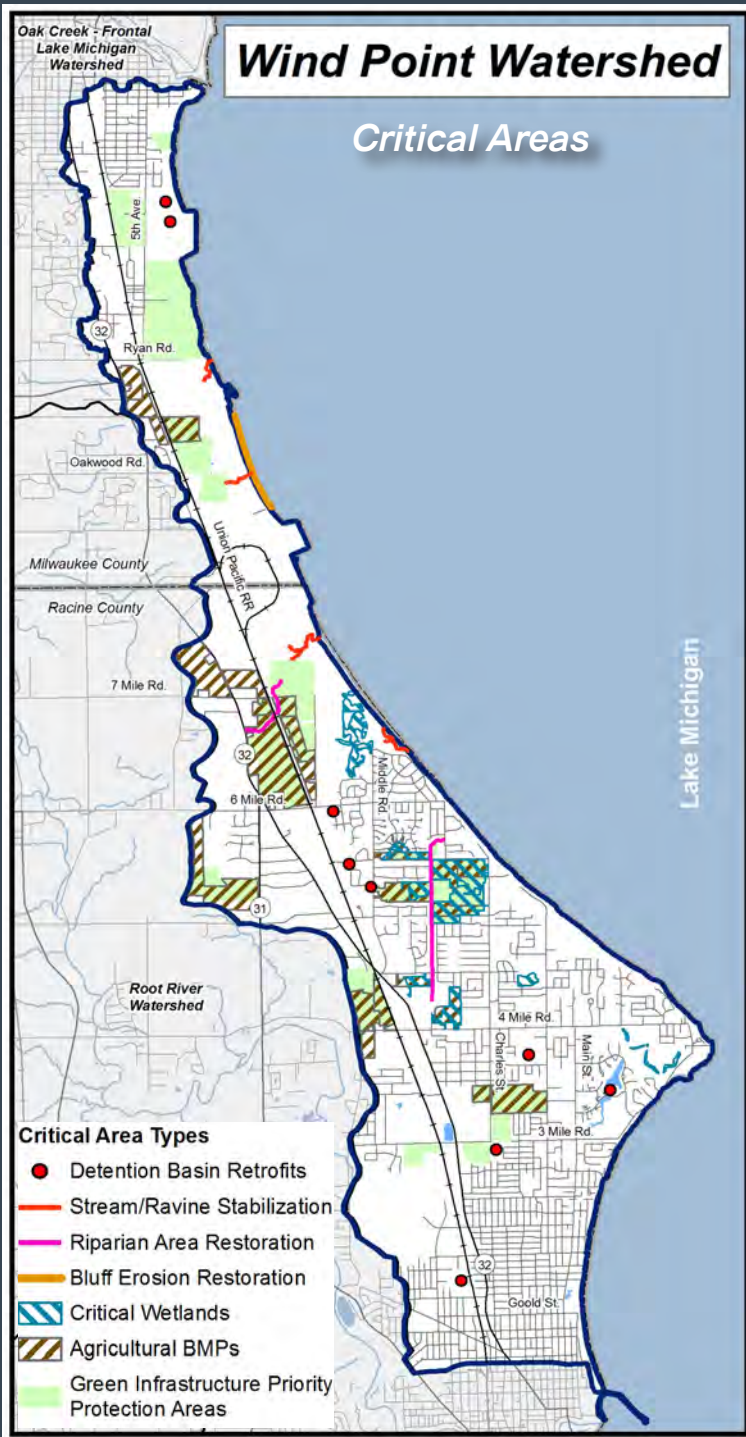
PHOTOS: Conservation/low impact development design (upper) and example of conservation subdivision at Carrington Reserve in West Dundee, IL (lower).

Green infrastructure at North Beach (upper photo) and along Lake Michigan coast (lower photo).



ACTION RECOMMENDATIONS

The Wind Point watershed plan includes an “Action Plan” developed to provide stakeholders with recommendations to address plan goals. The Action Plan includes programmatic and site specific recommendations. Programmatic recommendations are general watershed-wide remedial, preventative, and regulatory actions. Site specific recommendations include actual locations where projects can be implemented to improve surface and groundwater quality, green infrastructure, and aquatic and terrestrial habitats.



Programmatic Recommendations

Policy

- Stakeholders adopt the watershed plan to leverage green infrastructure, groundwater, stormwater management, and native landscaping/natural area restoration policy recommendations.

Surface & Groundwater Quality

- Retrofit existing detention basins with native vegetation and properly design future basins.
- Use vegetated swales, pervious pavement, and porous asphalt in future developments.
- Incorporate riparian buffers into future developments.
- Incorporate wetland restoration into future conservation developments.
- Municipalities implement minimum bi-weekly street sweeping programs.
- Implement stream and ravine restoration projects.
- Septic system owners become compliant with treatment and disposal ordinances.
- Use recommendations in the plan to identify potential water quality trading opportunities.

Habitat

- Install native landscaping on small lots and implement natural area restoration on larger lots.
- Control existing invasive species populations and prevent the spread of invasives.
- Implement dune swale restoration projects along the Lake Michigan coast.

Agricultural

- Farmers enroll in Farm Bill and NRCS incentive and assistance programs.
- Farmers implement conservation tillage (no-till) farming as a standard practice.

Education

- Educate residents and businesses about the beneficial uses of rain gardens.
- Educate residents and businesses about the beneficial uses of rain barrels and cisterns.
- Implement the Wind Point watershed Information & Education Plan.

Green Infrastructure

- Municipalities incorporate the green infrastructure network into development review maps.
- Use conservation and/or low impact development designs on future developments.
- Convert brownfields into natural areas, conservation developments, or parks.

High Priority Critical Area Site Specific Recommendations (see map, opposite page)

Detention Basin Retrofits

Traditional detention basins can be retrofitted by naturalizing with native vegetation. Naturalized basins improve water quality from developed areas, improve habitat, and require little maintenance. There are 8 critical detention basin retrofit opportunities in the watershed.

Wetland Restoration

Wetland restoration sites are generally associated with large areas that were historically wetland prior to European settlement in the 1830s but were drained for agricultural purposes. Many of these historic wetlands can be restored to improve water quality, reduce flooding, and improve wildlife habitat. There are 9 critical wetland restoration sites totaling 270 acres.

Stream and Ravine Stabilization

Stream and ravine reaches with highly eroded banks are a major source of total suspended solids (sediment). Bank stabilization using bioengineering and installation of artificial riffles would greatly reduce sediment and nutrient transport downstream while improving habitat and increasing oxygen levels. Four critical area stream and/or ravine reaches totaling 8,685 linear feet were identified.

Riparian Area Restoration

Critical riparian areas are select locations adjacent to tributary reaches that are in poor ecological condition or areas lacking a buffer but with excellent ecological restoration and remediation potential to improve water quality and habitat conditions. Two critical riparian areas totaling 14,541 linear feet were identified.

Green Infrastructure Protection Areas

The watershed plan identifies 11 critical green infrastructure protection areas totaling 1,403 acres. Most of these areas are existing agricultural land or brownfields where future development is planned. These areas should be protecting and restoring or developing using conservation or low impact development designs.

Agricultural Management Practices

Agricultural measures such as conservation tillage (no-till) would reduce pollutant loading in the watershed. Seven critical agricultural areas totaling 975 acres were identified based on their size and/or location in the watershed.

Bluff Stabilization

There is significant bluff erosion along 4,500 linear feet of the Lake Michigan coast from Fitzsimmons Rd. (within Bender Park) south to Elm Rd. (We Energies owned land). The watershed plan recommends completing a feasibility study to determine the need for and cost of stabilizing the eroded bluff.



Naturalized Detention Basin



Wetland Restoration



Stream Restoration

MAKE A DIFFERENCE!

Watershed planning and implementation is a voluntary effort. Active watershed stakeholders are needed to put the Wind Point Watershed-Based Plan into action. The Wind Point Watershed Implementation Committee is in place to support plan implementation and future planning efforts. Contact the Root-Pike Watershed Initiative Network to learn how you can help. The Wind Point Watershed-Based Plan can be downloaded at www.rootpikewin.org.

How can you help the Wind Point Watershed?

Residents & Businesses

- Reduce fertilizer use on lawns and consider using organic products.
- Use less salt on driveways, parking lots, and sidewalks during winter months.
- Use native landscaping to decrease watering needs and maintenance.
- Manage your backyard as part of the green infrastructure network.
- Attend meetings with decision makers to express concerns about the watershed.
- Install rain gardens and use rain barrels to reduce stormwater runoff.
- Attend Root-Pike WIN sponsored environmental education events.
- Become a natural area volunteer or steward.

Agricultural Community

- Consult your local Natural Resources Conservation Service (NRCS) office regarding enrollment in conservation programs to help reduce soil erosion, enhance water supplies, improve water quality, improve wildlife habitat, and reduce flood damages.

Municipalities & Park Districts

- Inform the public that a plan has been developed for Wind Point watershed.
- Adopt the Wind Point Watershed-Based Plan.
- Incorporate watershed plan goals and recommended actions into local comprehensive plans, zoning overlays, codes, and ordinances.
- Build “demonstration projects” near public facilities.
- Prepare annual budgets for restoring & managing green infrastructure and providing education.
- Increase recreational opportunities throughout the green infrastructure network.

Wind Point Watershed Implementation Committee

- Identify “Champions” to participate at future meetings, pursue projects, and discuss and evaluate watershed plan implementation progress.
- Fund a Watershed Implementation Coordinator to follow through on plan implementation.
- Build partnerships to leverage funding for implementing plan recommendations.



Applied Ecological Services, Inc.™

This plan was prepared using grant funding from the Fund for Lake Michigan, SC Johnson Fund, and We Energies Foundation. The findings and recommendations herein are not necessarily those of the funding entities.

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