

Pike River Watershed-Based Plan

A Guide to Protecting and Restoring Watershed Health

Prepared for
Root-Pike Watershed Initiative Network
By Applied Ecological Services, Inc.
August 2013



Executive Summary



Source: A. Thompson



Applied Ecological Services, Inc.

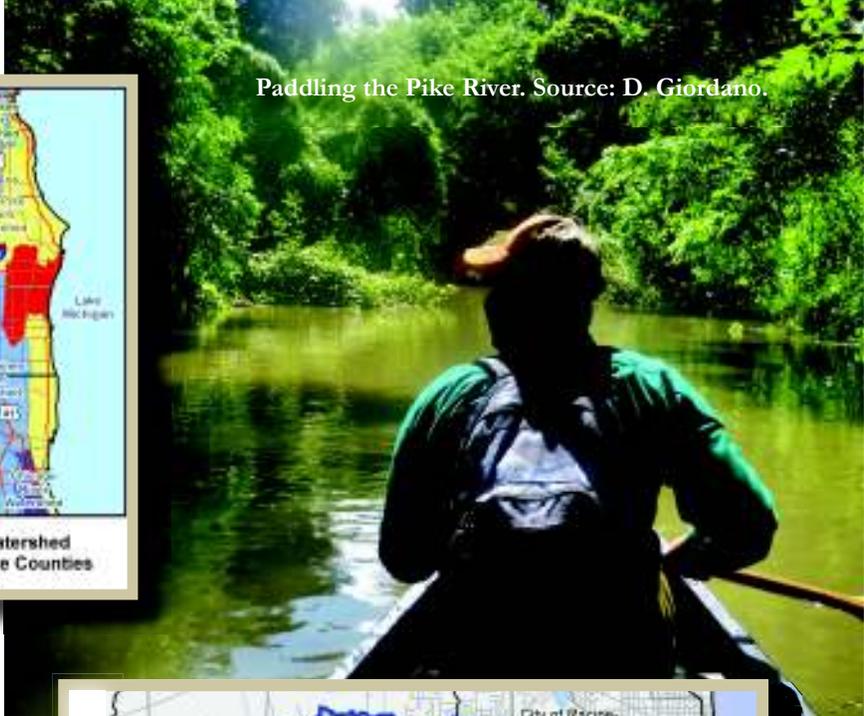
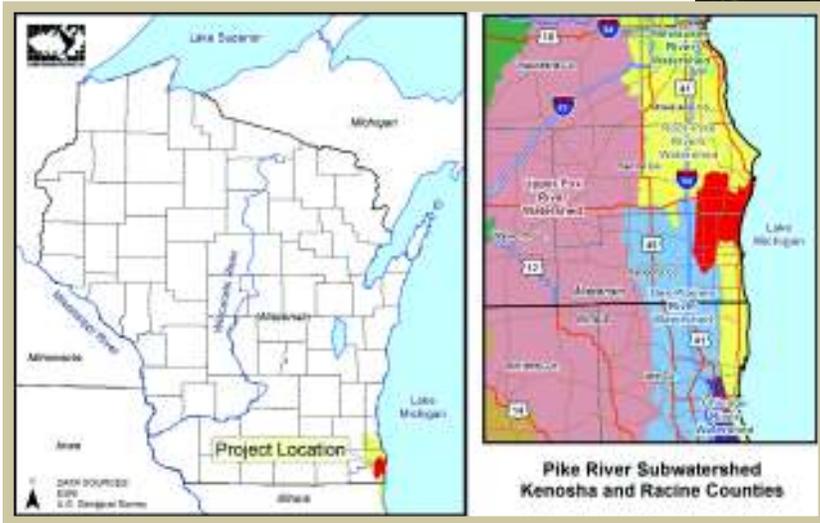


Source: NRCS



Source: Crispell-Snyder

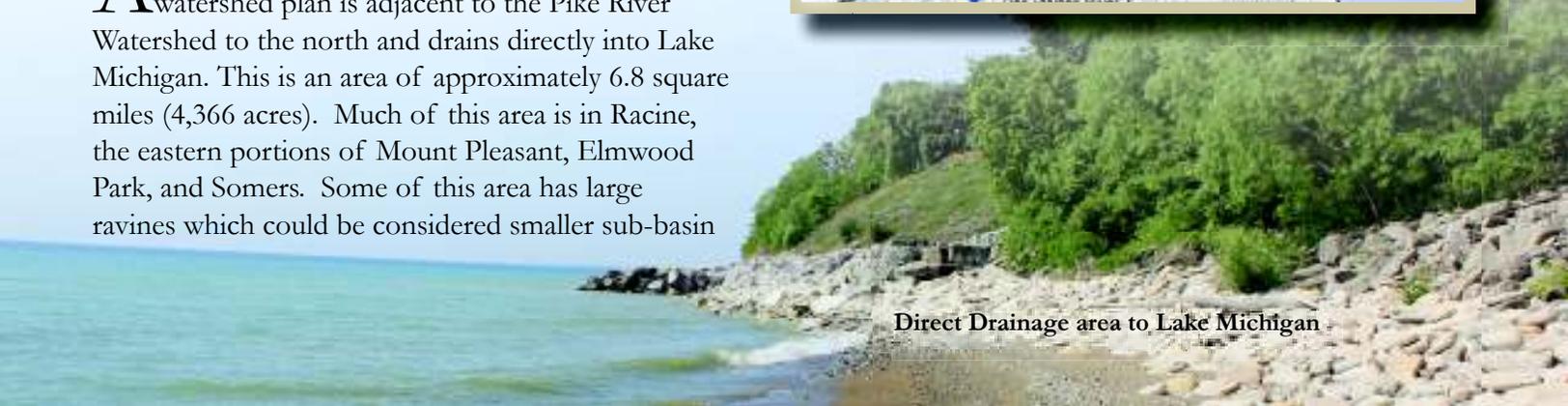
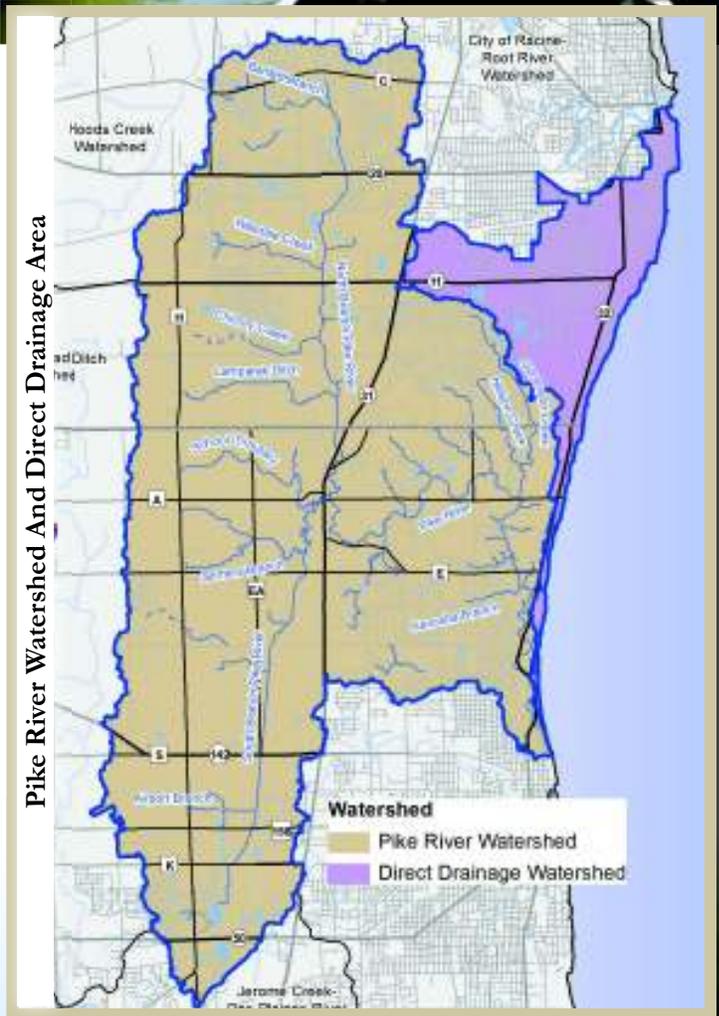




Each of us lives in a watershed. According to the Environmental Protection Agency, the definition of a watershed is “the area of land where all of the water that is under it or drains off of it goes into the same place.” A healthy watershed depends on the complex interactions between soil, water, plants, climate, people, and animals. Other elements such as nutrient rich agricultural and urban stormwater runoff, impervious surfaces, altered stormwater flows, erosion, and sedimentation are detrimental to the health of those watersheds experiencing increasing human development.

The Pike River Watershed is located in southeast Wisconsin in portions of Racine and Kenosha Counties. Pike River and its numerous small tributaries drain approximately 50.7 square miles (32,498 acres) of land surface. The watershed drains areas of southeast Racine County and northeast Kenosha County including portions of the Cities of Kenosha and Racine, the town of Somers, and the Villages of Pleasant Prairie, Mt. Pleasant, Sturtevant and Elmwood Park. The Pike River empties directly into Lake Michigan in the City of Kenosha.

Another land area that is addressed in this watershed plan is adjacent to the Pike River Watershed to the north and drains directly into Lake Michigan. This is an area of approximately 6.8 square miles (4,366 acres). Much of this area is in Racine, the eastern portions of Mount Pleasant, Elmwood Park, and Somers. Some of this area has large ravines which could be considered smaller sub-basin



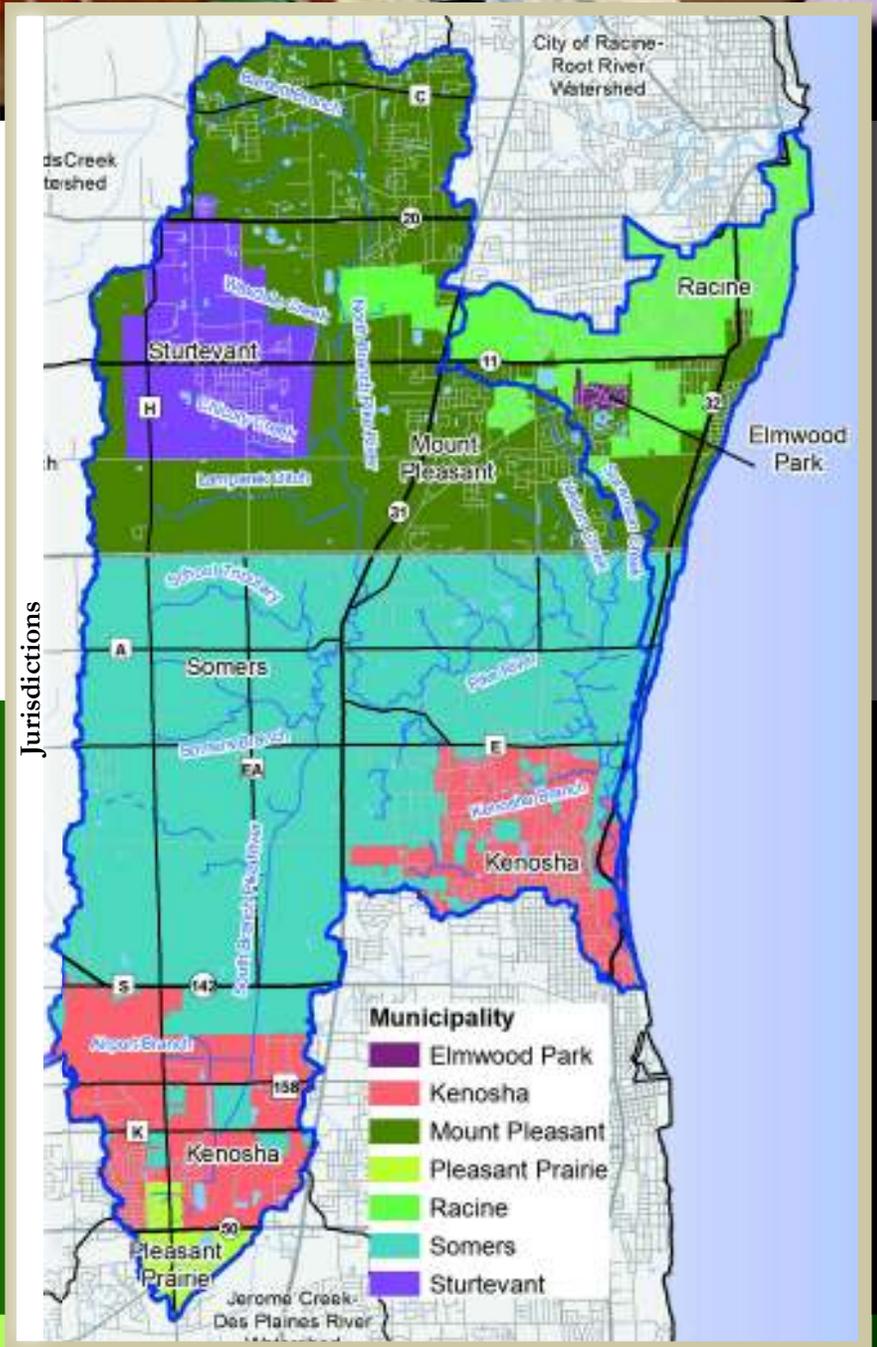


Left: Fishing at the mouth of the Pike River.
Source: Lake Michigan Angler.
Right: Pike River Summit visioning meeting.



drainages whereas most of the urban area has storm sewers that feed directly into Lake Michigan. Throughout the plan, this area is referred to as the Direct Drainage area.

Somers and Mount Pleasant represent the largest portions of the watershed with 39% and 30%, respectively, of the total land area. Kenosha makes up approximately 13%, Racine another 9%, and Sturtevant covers 7% of the watershed. Pleasant Prairie and Elmwood Park combined take up the remaining 2%.



MISSION

Pike River Future's mission is to realize a long-term vision for a healthy watershed, provide stewardship, and educate citizens. The group's primary goal is to educate while building partnerships for projects to improve water quality, reduce flooding, and enhancing ecosystem benefits by preserving and restoring wetlands, prairies, and other natural features for future generations.

GOALS

- Goal A:** Foster engagement and provide opportunities for stewardship of our watershed.
- Goal B:** Improve surface water quality and groundwater resources to achieve DNR/EPA water quality standards.
- Goal C:** Identify, enhance and protect important natural areas and provide open space for appropriate recreational benefits.
- Goal D:** Reduce existing structural flood damage and ameliorate potential flooding where flooding threatens structures and infrastructure.
- Goal E:** Improve aquatic and terrestrial habitat to encourage diverse, resilient ecosystems.
- Goal F:** Increase communication and coordination among municipal decision-makers, business and agricultural communities and other stakeholders within the watershed.

THE PAST

The terrain of the Midwestern United States formed during a recent geological period when continental glaciers advanced and retreated - a period known as the Pleistocene Era or "Ice Age". Some of the glacial lobes were a mile or more thick. The area of southeastern Wisconsin where the Pike River Watershed now lies was covered by the most recent glacial event known as the Late Wisconsin Glaciation that began approximately 30,000 years ago and ended around 9,500 years ago. As the earth's temperature warmed and the massive ice sheets receded, they scoured out what has become the Great Lakes and the nearby Kettle Moraine was revealed.

The ecological communities present in the Pike River watershed prior to European settlement exhibited a bountiful diversity of plants and wildlife. The mosaic of maple – basswood forests, oak savanna, prairie, and wetlands were largely maintained and shaped by frequent fires ignited by both lightning and the Native Americans that inhabited the area. Herds of large mammals including elk and perhaps bison helped maintain the landscape mosaic by grazing. Fires ultimately removed dead plant material, exposing the soils to early spring sun, and returning nutrients to the soil. During these times most of the water that fell as precipitation was absorbed in upland prairie and forest communities or within the extensive wetlands that existed along stream corridors; any additional water slowly seeped into the Pike River and its tributaries. Infiltration and absorption of water was so great that many of the defined stream channels seen today were likely sedge and grass-dominated swales exhibiting excellent water quality.

Highlights from:

"In Memory of the Once Big Trees of Pike Woods," written by Ben Bones, one of the earliest settlers, and published in the *Racine Journal* in 1904:

"A half a mile southeast of Petrified Springs, there was a timber hewed from a swamp burr oak 2 ft. square and 64 ft. long. I think this is the largest stick ever taken out of Pike Woods. A white oak, three-quarters of a mile west of my farm, was cut down. I made a butcher block, 42 posts, and 17-1/2 cords of wood. A hickory felled on the Jackson farm made 7-1/2 cords of wood. One half mile west of Berryville, and exactly where John Gehring's house now stands, was a fallen black walnut tree, 7-1/3 ft. in diameter. Black walnut trees 4 ft. in diameter were plenty, also butternut trees on the flats; also elms of that caliber and now and then a basswood tree, white and black ash 3-1/2 ft. were not scarce. There was probably no forest more beautiful on earth fifty years ago."



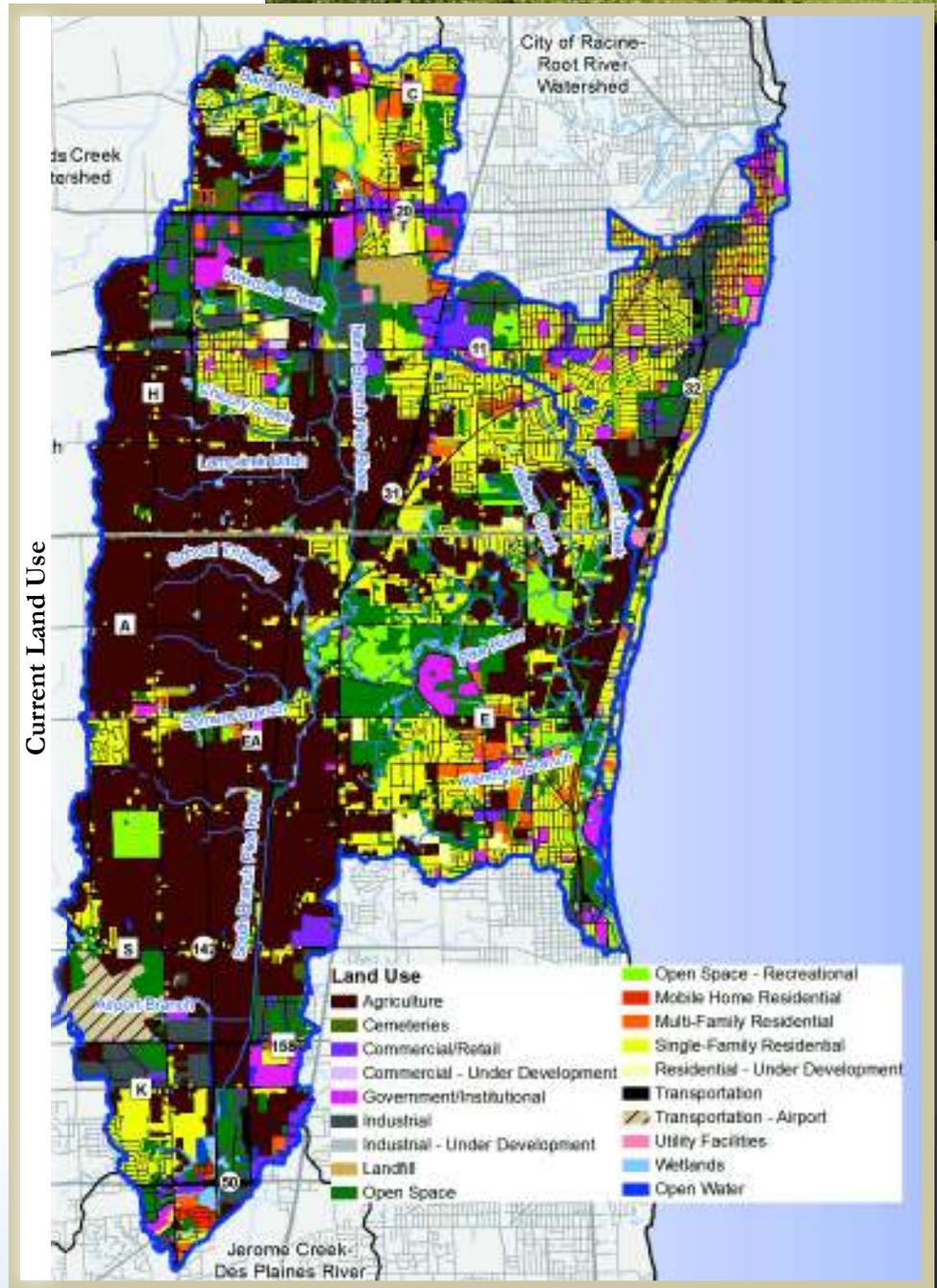
Pre-existing settlement community

THE PRESENT

European settlement began in 1835 and resulted in dramatic changes to the ecological communities. The old growth forests, once known as Pike Woods, were cleared by settlers who used the wood for fuel, to build their homes, sold it to sawmills, and farmed what land was left between the stumps. Fires rarely occurred. Prairies were tilled for farming and cut for hay or developed. Wetlands were drained. The majority of streams were dammed, channelized, and ditched and in most cases the land was cleared to the streambank, leaving little to no natural riparian cover. Today, a few isolated remnants of once healthy ecological communities exist in the Pike River watershed. Most remnants are degraded. Some savanna remnants retain an oak canopy, but their understories are turf grass, especially in residential areas.

Today, much of the land has undergone or is in the process of development. Agriculture is by far the dominant land use, comprising 39% of the watershed. Residential use captures another 19% while open space amounts to 11%, and transportation makes up nearly another 10%. Most agriculture occurs in the western half and central portions of the watershed while single-family homes occupy much of the eastern half and northern portions of the watershed. According to future land use predictions, roughly 75% of existing agricultural land is predicted to be converted to residential uses by 2035.

Agricultural land in Pike River watershed



Typical development pattern in Pike River watershed



SPECIAL NATURAL FEATURES

SANDER'S PARK HARDWOODS State Scientific Area was designated as a State Natural Area in 1967 for both the quality of its southern dry-mesic forest and the extent of wildflowers and ferns. The 20-acre park is in the Village of Mount Pleasant, northeast of Petrifying Springs Park and owned by Racine County. The site lies on an ancient terrace of Lake Michigan and contains basswood, white oak, black walnut, red oak, sugar maple, shagbark hickory and white ash trees; state-designated species of special concern goldenseal; uncommon ferns such as ostrich, rattlesnake, rusty woodsia, and ebony spleenwort; as well as showy orchis, yellow lady's-slipper, false mermaid, false Solomon's seal, Trillium, sharp-lobed hepatica, spring-beauty, wild geranium, and blue cohosh.

PETRIFYING SPRINGS PARK is a 358-acre public park owned by Kenosha County and harboring portions of the Pike River. The park was first opened in April of 1928 and boasts a golf course, hiking trails, dog park, and many other recreational amenities. It lies along the ridge of an ancient glacial moraine and also boasts contact, or hillside, springs and an artesian well drilled into the bedrock which brings water to the surface via hydrostatic pressure. Within this park lies a 65-acre woodland referred to as Petrifying Springs Hardwoods. The woodland contains a mixture of red and white oaks as well as sugar maples, ash, and basswood over an undulating topography. It is considered one of the better quality woodland areas remaining in the southeastern Wisconsin region.

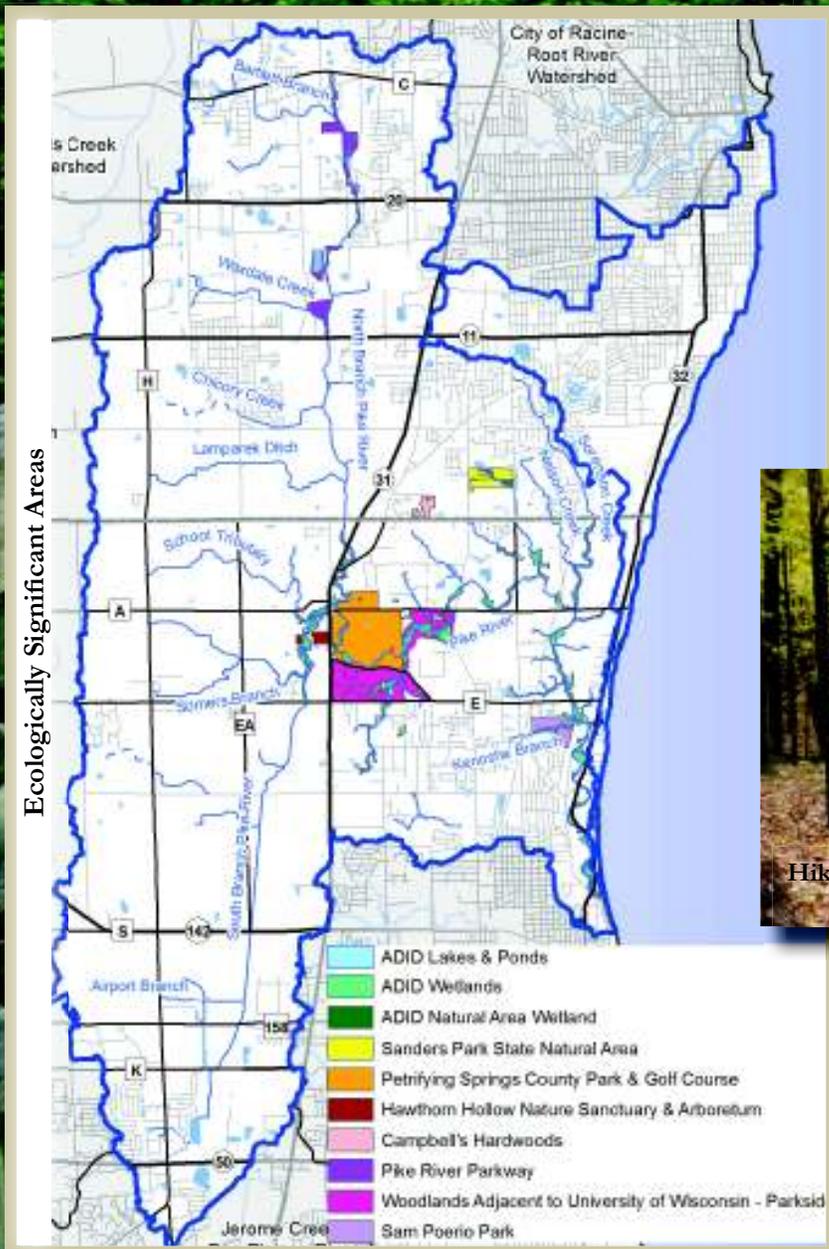


Trillium recurvatum

HAWTHORN HOLLOW Nature Sanctuary & Arboretum is a 40-acre site located in the Town of Somers immediately southwest of Petrifying Springs Park. It was deeded to the Hyslop Foundation. In addition to being an excellent recreational attraction, Hawthorn Hollow includes a good quality mesic forest bordering the Pike, a 12-acre arboretum originally designed by Clarence Godshalk, and an ecologically valuable 10 acre remnant prairie.



Hiking in Hawthorn Hollow Nature Sanctuary & Arboretum.
Source: Lori Artomsky

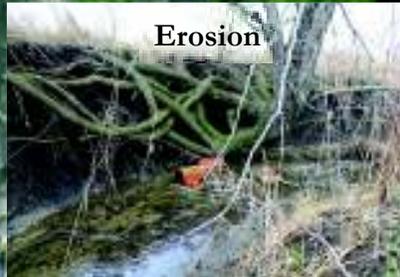
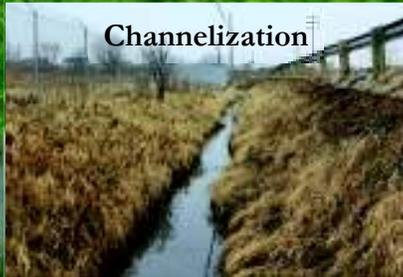


CAMPBELL'S HARDWOODS is a privately owned 38-acre parcel located in the Village of Mount Pleasant just north of Petrifying Springs Park. The site contains an upland hardwood forest of predominantly red oak and shagbark hickory trees and harbors hop-like sedge, a state-designated endangered species.

CHALLENGES & THREATS

PIKE RIVER & TRIBUTARIES

- 80% of stream and tributary length in the watershed is moderately to highly channelized.
- 59% of stream and tributary length in the watershed is moderately to highly eroded causing total suspended solids and total phosphorus loading downstream.
- 50% of stream and tributary riparian corridors in the watershed are in poor condition.



Source: mapawatt

RAVINES

Urban development and increases in impermeable surfaces have exacerbated the erosion process in several ravines in the watershed.

BROWNFIELDS

Several former industrial or commercial sites, which could provide valuable green space in urbanized areas, lie vacant and under-utilized.

DETENTION BASINS

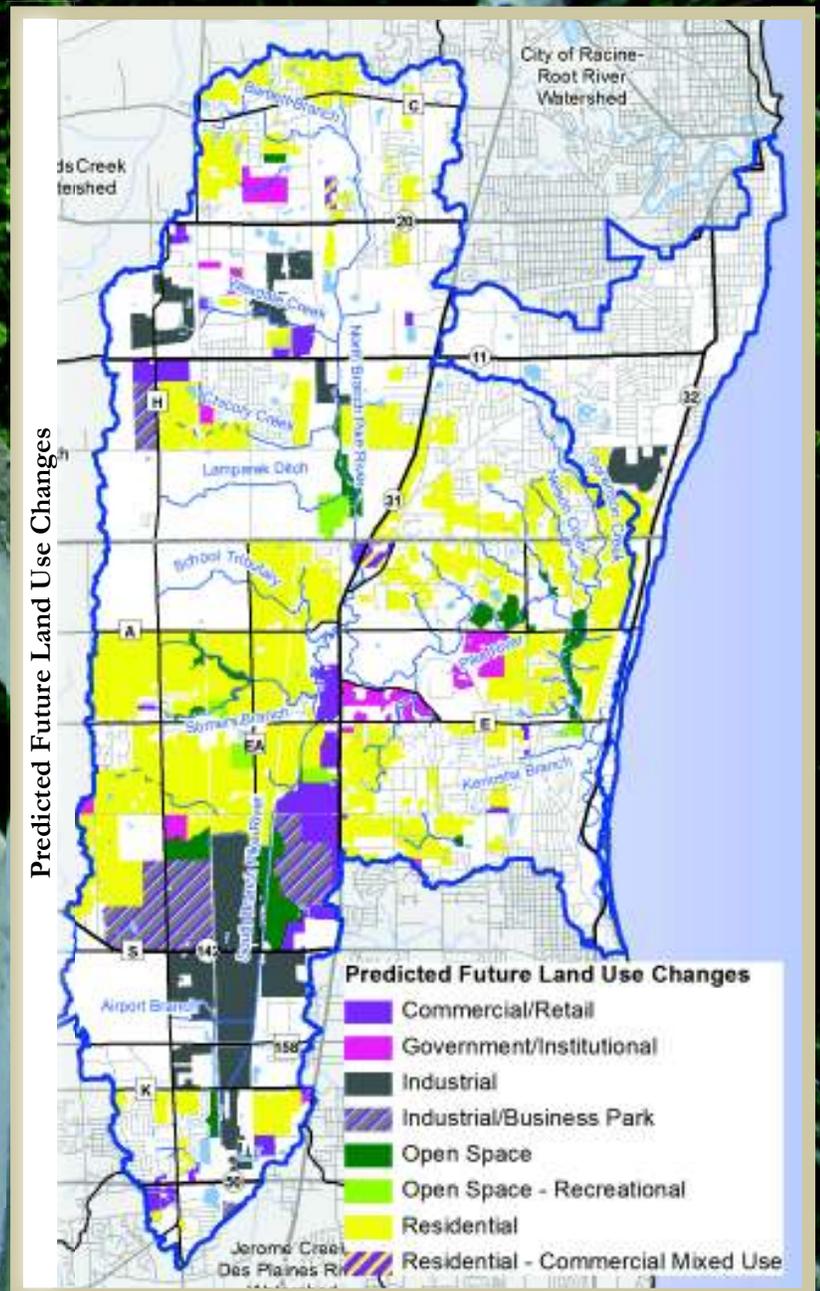
Many detention basins could be retrofitted with native vegetation to improve water quality.

LOSS OF WETLANDS

Only 21% of pre-settlement wetlands remain. Wetlands are vital to improving water quality and increasing habitat.

LAND USE & MANAGEMENT

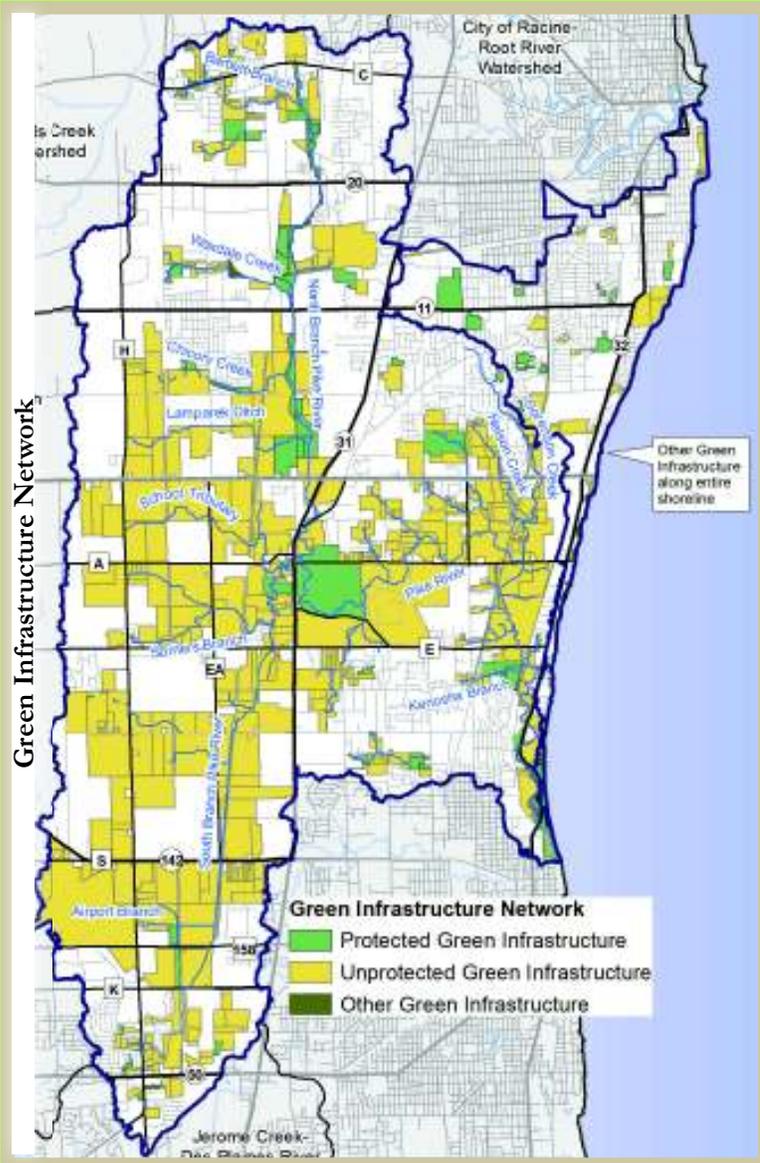
- Agricultural uses comprise nearly 40% of the watershed.
- Widespread implementation of agricultural best management practices would benefit water quality.
- According to future land use predictions, 75% of existing farmland is expected to be converted to residential uses.



GREEN INFRASTRUCTURE

Green infrastructure is the natural or open space links within and surrounding the built environment and typically has multiple functions. A “green infrastructure network” is best defined as an interconnected 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 people and wildlife (Benedict, 2006). Natural features such as stream corridors, wetlands, floodplain, woodlands, and grassland are the primary components of green infrastructure.

The green infrastructure network for Pike River watershed consists of over 13,000 acres of interconnected open space, but only 10% of the network is protected. The majority of the unprotected open space is currently in agricultural production.



WATERSHED IMPROVEMENT PROJECTS

Rain garden at Town of Somers Village Hall created through the Root-Pike WIN Rain Garden Initiative program.
Source: Root-Pike WIN.



Planting work for North Branch Pike River Restoration. Source: Alice Thompson.



Ongoing water quality monitoring program conducted by City of Racine Health Department for the City of Kenosha. Source: Stacie Havron.



Restoration of a prairie remnant in Hawthorn Hollow Nature Sanctuary and Arboretum in the Town of Somers. Source: Lori Artiomow.



Naturalized detention basins at Hiawatha Crossing in the Village of Sturtevant. Source: Crispell-Snyder.



Controlled burn along North Branch Pike River in Village of Mount Pleasant. Source: Alice Thompson.



Student water quality monitoring program hosted by Carthage College for Wilson Elementary School. Source: Dr. Prisca Moore.



Restored stream channel along North Branch Pike River Restoration site. Source: Alice Thompson.



ACTION RECOMMENDATIONS

Students hiking along South Branch Pike River at Hawthorn Hollow Nature Sanctuary. Source: Lori Artiomow.

The Pike River Watershed Plan includes an “Action Plan” developed to provide stakeholders with recommendations to address plan goals. The Action Plan includes both programmatic recommendations 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

This section of the Action Plan provides stakeholders with general structural and non-structural, educational, policy, and project coordination/planning recommendations. The following are highlights of the recommendations found in the full plan.

Policy

- Partners adopt the plan and incorporate into existing comprehensive plans.
- Partners include Conservation Design as part of their comprehensive plans, allowing for additional protection of open space by allowing clustered development where appropriate.

Surface & Groundwater Quality

- Implement the water quality monitoring program outlined in the plan.
- Retrofit existing stormwater systems to improve water quality.
- Use best management practices when applying salt for snow and ice removal.

Green Infrastructure

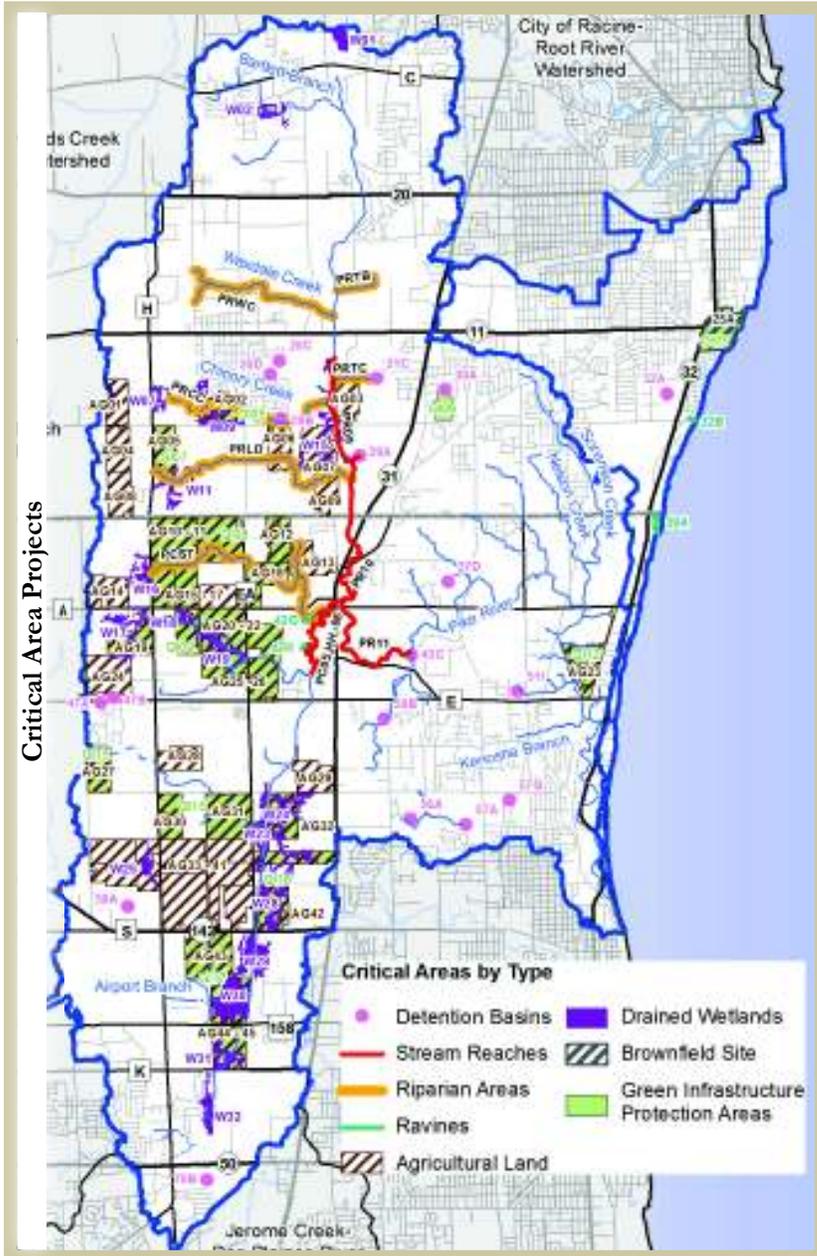
- Municipalities incorporate the green infrastructure network (GIN) into comprehensive plans and development review maps.
- Prepare Management Plans for all protected natural area parcels within the GIN.

Habitat

- Maintain naturalized detention basins per plan recommendations.
- Control existing invasive populations and prevent the spread of non-native/invasive plant species within natural areas.

Agriculture

- Provide additional monetary incentives for agricultural parcels over 35 acres to meet



conservation practices established by Natural Resources Conservation Service (NRCS).

- Work with farmers & NRCS to ensure compliance to standards outlined within NR151 and ATCP50.

Education & Recreation

- Implement programs to educate stakeholders about the plan, watershed issues, and projects.
- Implement the information & education plan.

SITE SPECIFIC PROJECT RECOMMENDATIONS

This portion of the Action Plan includes over 200 site specific project recommendations designed to improve watershed health. As part of the planning process, “Critical Areas” were identified where implementation of projects could result in pollutants being reduced to target levels. These projects fall under several categories, as detailed below.

Streambank & Channel Restoration

Streambanks along critical reaches are highly eroded and channelized and are a major contributor of sediment and phosphorus. Water quality and habitat can be improved by restoring these areas using bioengineering - stabilization that relies on plants and plant material.

Detention Basin Retrofits & Maintenance

Many detention basins can be retrofitted by naturalizing with native vegetation. Naturalized basins improve water quality coming from developed areas, improve habitat, and require less maintenance.



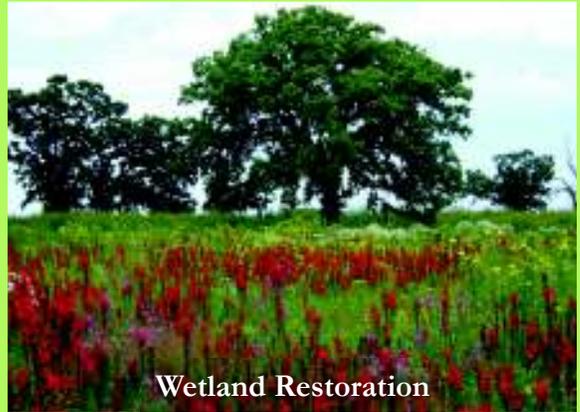
Naturalized Detention Basin

Ravine & Brownfield Restoration & Maintenance

Ravine restorations generally involve bank stabilization and reducing nutrient and sediment loading to receiving waters. Brownfield restorations are a great opportunity to not only reduce impervious cover, but to increase habitat and reduce pollutants by naturalizing larger pieces of land that were once reserved for industrial use.

Wetland Restoration

39 potential wetland restoration sites, totaling almost 1,800 acres, were identified throughout the watershed. Wetland Restoration projects improve water quality and wildlife habitat while acting as sponges to reduce stormwater runoff.



Wetland Restoration

Riparian Area Restoration & Maintenance

Critical riparian areas are select natural areas adjacent to stream reaches that are in poor ecological condition but have excellent ecological restoration and remediation potential to improve water quality and habitat conditions.

Agricultural Retrofits & Management

Widespread adoption of agricultural land management practices such as no-till farming and filter strips is crucial to improving the water quality of Pike River. These practices improve the soil's ability to hold water and reduce overall erosion to adjacent waterbodies.



No-Till Farming

Green Infrastructure Protection

17 Green Infrastructure Priority Protection Areas totaling 3,343 acres were identified in the watershed. These sites are situated in environmentally sensitive or important green infrastructure areas where acquiring, protecting, and restoring or developing in keeping with Conservation Design standards that protect natural areas would be most beneficial for enhancing water quality.

MAKE A DIFFERENCE!

Watershed planning and implementation is a voluntary effort. Active watershed stakeholders are needed to put this watershed plan into action. The Pike River Education & Public Outreach Committee (PREPOC) or Pike River Advisory Group is in place to support plan implementation and future planning efforts. Contact the Root-Pike Watershed Initiative Network to learn how you can help.

How can *you* help the Pike River?

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.
- Install rain gardens and use rain barrels to reduce stormwater runoff.
- Attend Root-Pike WIN sponsored environmental education events.
- Become a volunteer or steward for the Pike River watershed.

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, increase habitat, and reduce flooding damages.

Municipalities & Park Districts

- Inform the public that a plan has been developed for the Pike River watershed.
- Adopt the Pike River Watershed-Based Plan.
- Incorporate watershed plan goals and recommended actions into local comprehensive plans, zoning overlays, codes, and ordinances.
- Build “demonstration projects,” or large-scale water quality & public education projects, near public facilities.
- Restore and manage publically owned green infrastructure network natural areas.
- Prepare annual budgets for restoring & managing green infrastructure and providing education.
- Increase recreational opportunities throughout the green infrastructure network.

Pike River Education & Public Outreach Committee (PREPOC) or Pike River Advisory Group

- Identify “champions” to participate at future PREPOC meetings, pursue projects, and to discuss and evaluate watershed plan implementation progress.
- Build partnerships to leverage funding for implementing plan recommendations.

Watershed Coordinator:

Root-Pike Watershed Initiative Network

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Applied Ecological Services, Inc.

All photos by AES unless otherwise noted.



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