

Executive Summary

The Madigan Creek Watershed

The Madigan Creek watershed is located in the south-central Winnebago County in northern Illinois (Figure 1). The watershed drains approximately 6.21 square miles (3,973 acres) of land into the Kishwaukee River (Figure 2). From the confluence with Madigan Creek, the Kishwaukee River flows westward through Rockford before joining the Rock River. The Rock River flows southwesterly before joining the Mississippi River at Rock Island, Illinois.

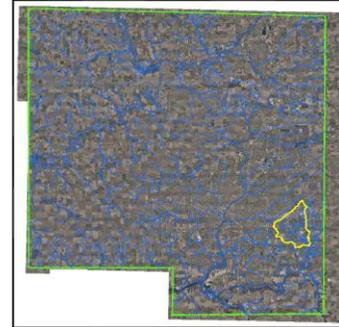


Figure 1: Madigan Creek watershed within the context of Winnebago County

In addition to the mainstem of Madigan Creek, three unnamed tributaries make up the Madigan Creek system. Collectively, there are 20.31 stream miles in the Madigan Creek watershed of which 4.42 miles are the mainstem of Madigan Creek. Available data indicates that 25.65 acres of wetlands are located within the Madigan Creek watershed. With the exception of the Cherry Valley regional storm water detention facilities near the mouth of Madigan Creek, there are no major impoundments on Madigan Creek or its tributaries.

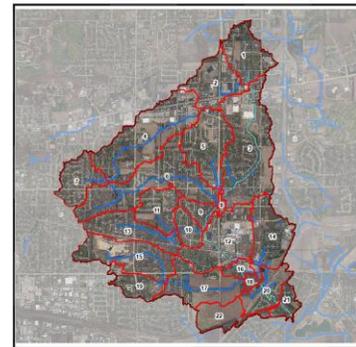


Figure 2: Madigan Creek watershed

Approximately 76-percent (4.72 square miles) of the watershed was incorporated as of 2012 in two different municipalities: City of Rockford (50.81%) and Village of Cherry Valley (25.2%). The remaining 24% of the watershed is unincorporated Winnebago County. The Madigan Creek watershed is approximately 88% developed with the majority of the development occurring in the north and central portions of the watershed. Though primarily residential, land use in the watershed also includes commercial/industrial developments, agricultural lands, and a rock quarry.

The Watershed Over Time

Prior to development, in the early 1800s, the landscape of the watershed included prairies, wetlands, and widely scattered oaks and hickories. In the 1800s, due to the fertile soils and openness of the oaks and hickories, farmers began converting the land including the draining of wetlands for agricultural uses. Very quickly by the mid-1800s, the City of Rockford and Village of Cherry Valley were incorporated and urbanization of the watershed began. This development continued with the suburbanization following World War II and the watershed has now been converted to a mix of residential, commercial, and industrial land uses.

The Impact of Watershed Development

Under natural and undisturbed conditions, precipitation that falls onto the land surface is allowed to soak into the soil and become groundwater in a process referred to as infiltration or evaporated into the air by plants or from soil or surface waters in a process known as evapotranspiration. Typically, 75-90% of the rainfall either soaks into the ground or evaporates. Precipitation that is not infiltrated or evapotranspired is called runoff. Urban development in the watershed is reducing the amount of

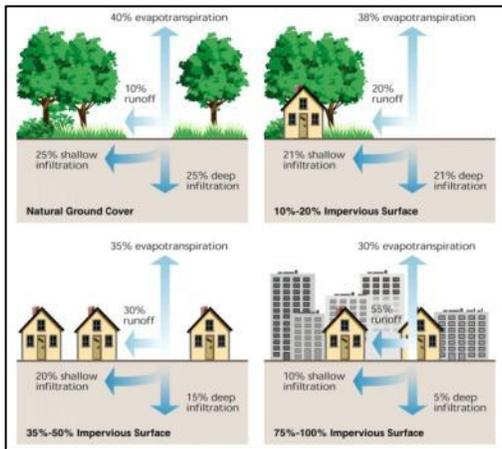


Figure 3: Impacts of increase urbanization on stormwater runoff (FISRWG)

land available for the natural infiltration of rainfall into the ground (Figure 3). Instead of precipitation falling on vegetation where it can be infiltrated, it falls on parking lots, rooftops, and roads. The surfaces that prevent infiltration are known as impervious surfaces. From these impervious surfaces, the runoff is quickly conveyed into stream and creeks via a constructed drainage system comprised of drainage ditches, swales, and storm sewers. As a result, streams receive large pulses of water in shorter periods of time, resulting in erosion and destabilization of the stream channel and streambanks. As physical modification of the stream occurs, adjacent property can be damaged.

Additionally, when the landscape or stormwater system is insufficient to contain these pulses of water, flooding can occur.

In addition to the change of the volume and rate of runoff, pollutants such as oil and grease, road salt, eroding soil and sediment, metals, bacteria from pet wastes, and excess nutrients (nitrogen and phosphorus) from fertilizers are washed from streets, parking lots, construction sites, lawns, roofs, and golf courses into streams. This type of pollution is called nonpoint source pollution. Additional pollutants include increased water temperature, altered pH, and low dissolved oxygen levels, all of which can make the streams unhealthy for fish and other aquatic species.

Thus, the health of the Madigan Creek watershed is directly related to land use activities throughout the watershed. These activities not only impact the residents of the watershed but all of those of the communities, both human and natural, living downstream on the Kishwaukee River. Fortunately, there are proven measures and practices for addressing these impacts that watershed stakeholders can utilize to take positive action towards improving the watershed. One of the first steps in the process is to understand watershed problems and make a plan for moving forward – a watershed-based plan.

Watershed Planning

Watershed planning is a collaborative approach to addressing a variety of related water resource issues including water quality protection. This approach allows stakeholders to share information, better target limited financial resources, and address common water-related challenges. These challenges can include improving stream and lake water quality, preserving and protecting groundwater resources, managing stormwater, reducing soil erosion and flood damage, conserving open space, protecting wildlife habitat, providing safe recreational opportunities, supporting opportunities for economic development, and other issues of concern.

The following general steps were used in developing this watershed plan:

1. Conduct periodic meetings of the Winnebago County Watershed Improvement Plan Steering Committee (WCWIPSC) with watershed stakeholders.
2. Solicit public input on watershed problems and opportunities to develop watershed goals and objectives.

3. Review and analyze existing studies, watershed conditions, and available watershed data to identify watershed problems and opportunities.
4. Identify best management practices (BMPs) and polices to improve water resources.
5. Develop a detailed watershed action plan and implementation plan.

Watershed Issues and Goals

Early in the planning process, WCWIPSC members, using input obtained from stakeholders during a public meeting, developed a list of watershed issues and concerns. Watershed concerns included:

- Stormwater
 - Too much runoff and not enough infiltration and/or detention leading to flooding
 - Non-point source pollution
 - Hydromodification leading to erosion and sedimentation
- Need for recreational, greenway, and open space
- Lack of education for landowners along the creek, need to encourage riparian best management practices to prevent illicit dumping and bad-housekeeping
- Groundwater contamination/impacts
- Water quality impacts from the Sand and Gravel Quarry
- The ecological condition of the stream channels including lack of fish and wildlife habitat

Figure 4 included photos of problem areas identified in the watershed. Goals were drafted directly from the concerns expressed by the stakeholders. The final goals were adopted on November 2, 2011 and capture the desired outcomes and vision for the Madigan Creek watershed. Objectives assigned to each goal are intended to be measurable so that the WCWIPSC can assess future progress made towards each goal. The goals are not listed by order of importance.

- A. Protect and enhance overall surface and groundwater quality in the Madigan Creek watershed.
- B. Reduce existing flood damage in the watershed and prevent flooding from worsening.
- C. Improve aquatic and wildlife habitat in the Madigan Creek watershed.
- D. Develop open space in the Madigan Creek watershed and provide recreational opportunities.
- E. Increase coordination between decision makers and other stakeholders in the watershed.



Figure 4: Photos of watershed concerns

Watershed Inventory and Assessment

Chapter 3 of this watershed-based plan is an assessment watershed conditions based on available data, studies, and stakeholder input. The assessment includes information on stream corridor conditions, stormwater infrastructure, flooding, water quality, land use, wetlands, and other relevant information. This information not only provides a snapshot of current conditions but also serves as baseline data for comparing future watershed assessments. Four important conclusions based on this watershed assessment are summarized here.

1. The Madigan Creek watershed exhibits rapid increase and decrease in water flow and velocity. These frequent changes are causing significant water quality degradation, reductions in the quality of stream habitat, and destabilizing the stream channel leading to erosion and damage to infrastructure.
2. Water quality is impacted by low dissolved oxygen levels and high phosphorus concentrations. Large impervious surface areas are significant contributors to water runoff and pollution.
3. Hydromodification including streambank erosion and channelization is prevalent through the watershed. These conditions have lead to severely degraded instream and streamside habitat.
4. Municipalities, residents, business, landowners, and other watershed stakeholders lack the coordination and communication necessary to improve watershed resources.

Watershed Best Management Practices (BMPs) and Solutions Toolbox

Chapter 4 of the watershed-based plan includes a description of BMPs and solutions that when properly applied can reduce stormwater impacts and improve water quality and stream habitat. The toolbox contains BMPs that can be implemented by all levels of watershed stakeholders from residents and landowners to municipalities. BMPs and solutions in the toolbox include:

- Stabilizing and restoring streambanks using bioengineering techniques.
- Installing rain gardens and bioinfiltration practices to help slow, infiltrate, cool, and cleanse stormwater runoff before being discharged to stream.
- Constructing new and retrofitting existing detention basins to help reduce volume and rate of stormwater released during storm events into streams.
- Reducing the area of impervious surfaces and using permeable pavements that allow water to infiltrate into the ground instead running off as stormwater runoff.
- Restoring and maintaining native riparian buffers along stream and detention basins.

Prioritized Action Plan

The effectiveness of the Madigan Creek Watershed-Based Plan will be largely dependent of the successful implementation of the Prioritized Action Plan by watershed stakeholders. The action plans serves as a roadmap for watershed improvement and provides the “who, what, where, and when” for making watershed improvements. The Prioritized Action Plan includes programmatic, policy, and site-specific recommendations. Programmatic Actions is focused on watershed-wide action items that are not site specific while the Site Specific Action Plan identifies specific and actual

locations where water quality, hydrological modification, and/or flood reduction/prevention projects can be implemented. The eight most important general recommendations include:

1. A stormwater management plan feasibility study for the Madigan Creek watershed should be completed to obtain a better understanding of how stormwater runoff can be better managed within the watershed.
2. Remediate existing flood problems and protect future flooding by reducing stormwater runoff and preserving and restoring areas for surface water storage such as depressional areas, floodplains, and wetlands. These areas also provide water quality improvement benefits.
3. Construct new and retrofit and maintain the existing stormwater management system including detention basins and storm sewer outfall culverts to reduce runoff volume and rate and improve water quality in streams.
4. Reduce impervious areas by incorporating permeable pavements and bioinfiltration practices such as depressed islands and rain gardens in parking lots and streets throughout the watershed.
5. Stabilize streambanks to reduce erosion, protect property and infrastructure, and improve water quality and habitat.
6. Remove the concrete channel and replace with a more naturalized channel using bioengineering techniques in order to improve water quality and habitat.
7. Provide public education and outreach to all watershed stakeholders as means of enhancing the understanding of watershed resources and provide opportunities for stakeholders to become involved in plan implementation.
8. Monitor and evaluate watershed plan implementation and changes in watershed conditions to gauge progress on reaching watershed goals.



Figure 5: Examples of BMPs that could be implemented in the watershed

Monitoring and Evaluation Plan

The final chapter of the watershed plan (Chapter 6) includes the Monitoring and Evaluation Plan. The Monitoring and Evaluation Plan was designed to provide a straightforward means of measuring progress towards watershed goals and plan implementation. Stakeholders should utilize this plan to monitor watershed resources and track whether meaningful progress is being made towards reaching the watershed-based plan's goals. The monitoring plan includes a series of Report Cards developed for each of the goals. The Report Cards are intended to provide a brief description of current conditions, suggest performance indicators that should be evaluated and monitored, milestone to be met, and remedial actions if milestones are not being met.

Where Do We Go From Here?

Urbanization has played a significant role in the degradation of water resources in the Madigan Creek watershed. Fortunately, there are actions outlined in this plan can be taken to mitigate existing issues and prevent additional future problems. The future health of the watershed is largely dependent on how stormwater is managed. The business-as-usual approach using conventional development practices, stormwater management techniques and landscape management practices will result in a continued decline of the watershed resources and water quality. A new approach that includes proven and environmentally-sensitive practices and approaches to stormwater management can reverse this trend and begin to improve water quality and stream health in the watershed.

There is no single fix for the water quality and flooding problems in the Madigan Creek watershed. These problems are the cumulative result of decisions made since urbanization accelerated in the mid-1900s. It will take the decisions and actions of every stakeholder living in the watershed to work together to improve the health of the watershed. Likewise, actions will need to be taken on every scale from the individual lot to the neighborhood to the municipalities to positively impact watershed resources.

This watershed-based plan is the first step in helping watershed residents and stakeholders understand what can be done to restore the valuable resources of the Madigan Creek watershed.