Overview

The 187-square mile Aux Sable Creek Watershed is located in Kendall, Grundy and Will Counties, Illinois. The Aux Sable connects to the Illinois River, between Channahon and Morris. A majority of the watershed (78%) falls in southeastern Kendall County. Twenty-two percent falls in northeastern Grundy County. Less than one percent is on the western edge of Will County.

The Aux Sable Creek Watershed is home to 14,500 residents based on 2000 Census data. This is more than double the 1990 estimates of 5,600 people. The population in the Aux Sable Creek Watershed is expanding through development in Channahon, Joliet, Minooka, Morris, Oswego, Plainfield, Shorewood, and Yorkville as well as some unincorporated areas.

Photo courtesy of Paul Burd.

2006 marked the first time any stream in the Aux Sable Creek watershed was listed on the Illinois Environmental Protection Agency's 303(d) List of Impaired Waters. The 2006 Illinois Water Quality Report (305b) indicated primary contact uses (e.g., swimming) are not supported in a 20.48 mile stretch of the Aux Sable Creek (IL_DW-01). The potential cause: fecal coliform bacteria. The potential source: unknown.

Runoff from rain and snowmelt carries pollutants such as oils, salt, pesticides, and sediment into waterways. The Illinois Environmental Protection Agency (Illinois EPA) reports that nonpoint source pollution is the state's number one threat to water quality. This is called nonpoint source pollution. Numerous studies have shown that stream ecosystems and water quality degrade as a watershed is developed with streets, parking lots, rooftops, and other impervious surfaces. But with careful planning, we can implement practices that support the quality of our water – even as development continues. Watershed-scale plans strive to create an environmentally and economically healthy watershed for the benefit of everyone.

Changes in the watershed, along with new criteria for watershed plans, prompted the Aux Sable Creek Watershed Coalition and The Conservation Foundation to collaborate and request state funding to work with a group of local stakeholders updating the original watershed plan. Being a high quality stream, the hope is to utilize Illinois EPA funding to help stakeholders maintain water quality even as development continues. The project and long-term goal is to work cooperatively with units of local government, other organizations and stakeholders toward the mutual goal of protecting water quality in the Aux Sable Creek Watershed through the control of nonpoint source pollution. The premise: planning will result in efficient long-term use of taxpayer's money by preventing future impairments, avoiding costly remediation efforts that would be required if water quality is continued to be ignored. The grant covered the following scope of work: updating the Aux Sable Creek Watershed Management Plan to meet Illinois and US EPA criteria for watershed-based plans, as well as education and outreach about the watershed and practices that can protect and enhance water quality.

Healthy watersheds offer many benefits:

- reduced flooding
- safe drinking water
- a healthy river with good water quality
- sustainable economic development
- opportunities for recreation & outdoor education
- wildlife habitat

Implementation of the plan will vary. Chapter 6 provides a number of recommendations. Efforts will range from individual to local government (community-wide) actions. Regardless of the person or entity taking up a recommendation and working to implement it, all efforts are voluntary. That is, the Illinois EPA will not require recommendations to be completed, nor will The Conservation Foundation or Kendall or Grundy County Soil and Water Conservation Districts. These agencies and organizations are available as resources and wish to support efforts to protect the water quality of the creeks comprising Aux Sable Creek Watershed. Examples of voluntary individual actions that follow the recommendations include:

- **Keep it where it falls** - Nearly 60% of rainwater that falls on your lawn washes off. Native plants slow run off, allowing rainfall to soak into the soil. Rain barrels collect water for use later.
- **Let it grow** - Instead of mowing to the water's edge, use native plants to form a buffer along the banks of lakes, ponds, and streams to prevent erosion (and loss of property), stop pollutants from washing in and protect fish habitat.
- **Greener is better** - Runoff from impervious surfaces like driveways and patios contributes to flooding. Minimize its impacts by using porous materials.
- **Know your lawn's needs** - Excessive fertilizer washes off lawns and into waterways causing algae blooms and decreasing the stream health. Follow the application rate recommended by soil test results or on the fertilizer packaging. Consider environmentally friendly lawn care products.
- **Keep storm water clean** - Keep used motor oil, pesticides, and other toxic substances out of storm drains. Storm drains don't go to a treatment plant, but discharge to detention ponds and streams. Contact a local auto shop, Kendall County Environmental Health Services, Kendall or Grundy County Soil & Water Conservation District, or www.earth911.com to inquire about recycling used motor oil.

Examples of voluntary individual actions in the agricultural areas of the watershed that follow the recommendations include:

- **Continue good stewardship** - Grassed waterways, terraces, nutrient management, and comprehensive livestock management and other agricultural best management practices have supported water quality for generations.
- **Buffer the creek** - Planting riparian buffers/filter strips can reduce erosion by acting as sponges during times of high water, protecting cropland from flooding. The watershed plan identifies areas where this type of green infrastructure may be appropriate.

Examples of voluntary local government actions that follow some of the recommendations include:

- **Engage everyone** - Encourage everyone to treat water as a resource. Involve community members in activities such as stream clean-ups and storm drain stenciling to discourage dumping in sewers. Local conservation groups may have resources to assist.
- **Use conservation design** - This development approach requires working closely with a site's natural functions, avoiding floodplains, protecting high quality natural features, and utilizing stormwater Best Management Practices. The watershed plan identifies

Photo courtesy of Cindy Ayers.

areas where green infrastructure may be appropriate.

- **Keep soil in its place** - Erosion from construction sites contributes to stream sedimentation problems. Communities can organize contractor education and community awareness programs to minimize these impacts, as well as implement regulatory programs.

The 2009 Aux Sable Creek Watershed Management Plan is available a number of ways. Officially, it is available at the Kendall County Soil & Water Conservation District (KCSWCD). They are an independent, local unit of government created by state law for the purpose of promoting the protection and conservation of the county's soil, water and related natural resources. The KCSWCD, formed in 1947, provides technical assistance, educational opportunities and resource information regarding soil, water and related natural resources. The watershed plan is available on-line at www.auxsablecreekwatershed.org. A copy of the Management Plan has also been provided to the Oswego, Yorkville, Minooka, Channahon and Morris libraries. Local governments also have a copy including Grundy County, Kendall County, villages of Channahon, Minooka, Oswego, Plainfield and Shorewood, as well as the cities of Joliet, Morris and Yorkville. The Grundy and Kendall Farm Bureaus, Grundy and Kendall County Soil & Water Conservation Districts and The Conservation Foundation also have a copy of the 2009 Aux Sable Creek Watershed Management Plan.

If you are interested in getting involved in watershed efforts you may contact the Kendall or Grundy County Soil & Water Conservation District, the Aux Sable Creek Watershed Coalition or The Conservation Foundation. Any of these groups can tell you more about current efforts and ways to get involved. The Kendall County Soil & Water Conservation District was identified by the advisory committee as the agency that should officially hold the plan and be responsible to partner with organizations to hold an annual watershed review meeting. These annual meetings do not bind the Kendall County Soil & Water Conservation District or any other participating organization/individual to implement the plan. They are merely intended to be a forum to discuss Aux Sable Creek Watershed related activities, issues and opportunities.

If you have a concern, please use the matrix provided at the end of this Overview to identify the best agency to contact. Please note that availability of the plan at a local office does not imply that agency can address your concern.

Following is a summary of the Aux Sable Creek Watershed Management Plan completed in June 2009. It is provided to give interested persons an understanding of the key information included in the Plan. For complete information, interested persons should read the full Plan. The end of this Executive Summary discusses how the plan may be voluntarily implemented. It also includes some information about who to call with various types of concerns.

Chapter 1 – Introduction

The first chapter provides the context for the rest of the plan. In addition to explaining the location and size of the Aux Sable Creek Watershed, it details the history of watershed planning in the Watershed which dates back to right after major flooding in 1996, the reason for a watershed plan update and some of the first steps of the Advisory Committee.

The first steps of the watershed plan update included inviting a large range of Watershed stakeholders to the table. A complete list of those invited to be part of the Advisory Committee is included in the plan. Over 50 representatives were invited to participate on the committee, of which one-third are landowners in the watershed. Many of these representatives have been active in watershed activities in the past. Agencies represented include local government representatives (municipalities in or growing into the watershed and the

counties), the Kendall & Grundy County Farm Bureaus and the Kendall and Grundy Soil & Water Conservation Districts – each of these are organizations of area residents as well. The Conservation Foundation facilitated the process, with a technical consultant gathering data and writing the plan (Christopher B. Burke Engineering West, Ltd.). This collaborative effort focused on accomplishing the purpose of Illinois EPA's 319 program: to work cooperatively with units of local government and other organizations toward the mutual goal of protecting water quality in Illinois through the control of non-point source pollution. The Advisory Committee drafted and approved its own Vision Statement:

Vision Statement

We intend to maintain the Class A rating of the Aux Sable Creek and enhance the natural and economic health of the watershed using sound management practices, education and voluntary cooperation while respecting property owner rights.

The committee's goals focused on stream maintenance/quality, flooding, natural areas, wildlife biodiversity, development, education, property rights, water supply and farmland protection. If you would like to know who to call with questions about these types of issues, information is listed at the end of this document.

Chapter 2 – Existing Conditions

It is important to be aware of the Watershed's resources, to both gain a better understanding of the current state of the Watershed but also to know what aspects are important to consider when working to protect water quality. This chapter covers aspects such as climate and hydrologic conditions, natural conditions (geology, topography, soils, water bodies, biological assessments), cultural resources including population reports and current land uses. Also covered in this chapter are existing water quality protection programs such as National Pollutant Discharge Elimination System (NPDES) permits as well as local, state, and federal regulations.

Key sections a reader may want to focus on would include:

- ***Hydrologic conditions*** since this identifies drainage patterns and areas that may be more susceptible to erosion.
- ***Soils***, particularly hydric soils, since these are ones formed under conditions of saturation, flooding or ponding. These types of soils can be challenging because conditions can quickly become too wet for crops and are prone to flooding when developed.
- ***Existing regulations*** that are a starting point to understanding permitted and prohibited activities as well as where efforts could complement or enhance programs to protect the Watershed's water quality.

Chapter 3 – Watershed Impairments

The condition of watersheds has real consequences. Healthy watersheds can offer many benefits including:

- a healthy river through improved water quality
- enhanced opportunities for recreation, environmental education, and environmentally sustainable economic revitalization
- enhanced wildlife habitat
- reduced flooding problems

IEPA reports that non-point source pollution is the state's number one threat to water quality.

- and a safe drinking water supply.

The Illinois EPA periodically assesses the quality of streams in Illinois. In 1990 monitoring showed no use impairments in the Aux Sable Creek. However, in 2006 a stretch of the Aux Sable Creek was found to have an impairment; fecal coliform bacteria was identified as the source of this impairment.

Page 47 of the Plan includes a table of stream impairments in the Aux Sable Creek identified by the Advisory Committee.

Non point source pollution is a significant threat to water quality. It occurs when runoff from rain and snowmelt carries pollutants into waterways and even groundwater. The name "non-point source pollution" is derived from the concept that there is no single point from which the pollution comes; it comes from everyone and everywhere. Examples of sources of non-point source pollution in Illinois include runoff from construction sites, lawns and gardens, city streets and parking lots, farm fields, livestock facilities, surface coal mines, and forestry. The Center for Watershed Protection found that as impervious area (roof tops, driveways, roadways, parking lots, etc.) increases, water quality decreases. The connection is that rain water or sprinkler water running off our lawns, streets and parking lots flows into pipes through storm drains. This water then goes ***directly*** into our local lakes and streams; it is not "treated" like water from our bathrooms so it contains soil particles, oil from our cars, fertilizer from our yards, and other pollutants found in our communities. The potential for non point source pollution in the Watershed is high, given the urbanization occurring and expected in the Watershed, as noted on page 48 and earlier on page 33 (Figure 14 showing boundary agreements for communities in the Watershed).

Watershed planning seeks to protect water quality, in this case by identifying opportunities to prevent further impairment of the Aux Sable Creek.

Chapter 4 – Agricultural Management Practices & Programs

The current high quality condition of much of the Aux Sable Creek system is due in large part to quality agricultural practices and good stewardship. This chapter notes that while the change from agricultural to suburban land uses can result in negative impacts on a creek, areas that remain in agricultural use can implement a variety of voluntary conservation practices that can protect and enhance water quality. Examples of these conservation practices consist of filter strips, grassed waterways, terraces, nutrient management, conservation tillage, livestock management, and other activities. Many of these practices are already occurring throughout the Watershed. Landowners interested in implementing a conservation practice can apply to receive monetary assistance to offset the cost of installation through a variety of programs. Some programs currently available to landowners are Conservation Reserve Program, Conservation Reserve Enhancement Program, Environmental Quality Incentive Program, Wetland Reserve Program, and Partners for Conservation.

Chapter 5 – Urban Management Practices & Programs

Suburban and urban land uses (residential, commercial, industrial) are big contributors to non point source pollution. Therefore, they become an area of opportunity to improve practices and minimize pollutant contributions to our waterways. This chapter discusses opportunities to protect and improve water quality,

With urbanization, there is an increase in potential pollution from construction sites. The primary means to prevent construction site runoff is through the use of soil erosion and sediment controls. A Certified Professional in Erosion and Sediment Control (CPESC) is a recognized specialist in soil erosion and sediment control.

within the framework of the six minimum control measures of NPDES Phase II** (a regulation all communities in the watershed are required to comply with):

- public education and outreach on stormwater impacts
- public involvement and participation
- illicit discharge, detection, and elimination
- construction site runoff control
- post construction runoff controls
- pollution prevention/good housekeeping for municipal operations

*** For more information on NPDES Phase II visit www.epa.gov/npdes/pubs/fact2-0.pdf or the U.S. EPA Office of Wastewater Management at www.epa.gov/npdes/stormwater*

Chapter 6 – Recommendations & Action Plan

The recommendations are split into areas that apply to agricultural practices and then each of the areas pertaining to NPDES Phase II minimum control measures (outlined above). Best management practices (BMPs) for future developments or redevelopment within the Watershed are a key component of this chapter. The BMPs are separated by those that promote infiltration, manage stormwater or stabilize streambanks. Below is a listing of the BMPs identified in this section along with the cost of installation.

Best Management Practice (BMP)	Cost of installation ($=low <$100,000, $$$=high >$750,000)
Upland buffers	$
Elimination of curbs and gutters	$
Bioswales	$$
Rain gardens	$
Infiltration galleries/basins	$$
Permeable pavements	$$
Stormwater wetlands	$$$
Outlet detention wetlands	$
Open water detention basin	$$
Dry bottom detention basin	$$
Conservation design	$
Stormwater retention requirement	$$
Level spreader outlets	$
Stormwater separators	$
Deicing and anti-icing strategies	$
Stormwater ordinance development or amendments	$$$
Stream bank stabilization	$$-$$$
Revegetation	$
Erosion control blanket/turf reinforcement mat	$
Coir logs	$
A-jacks	$$
Stone toe	$
Stream barbs	$
Rip-rap/Stone armoring	$$
Soil bioengineering	$$

Pages 82-86 consist of a table listing recommended action in order of priority, as determined by the Advisory Committee. Below is a summary of these recommended actions, in said order, including capital and operational cost notes and the recommended timeframe for completion of each action.

Recommended Action	Capital Cost (installation)	Operational Cost (operation & maintenance)	Timeframe
Improve water quality	$-$$$	$	Continual
Riparian buffers/filter strips	$$	$	Continual
Post-construction runoff controls (BMPs in development)	$-$$$	$-$$	1-6 years
Improve aquatic habitat	$-$$$	$-$$	Continual
Enforcement of construction site runoff controls	$$	$	Continual
Development of illicit discharge, detection, and elimination program	$$$	$	2-5 years
Create Aux Sable Creek Watershed overlay district	$$$	$	3-6 years
Restoration of natural areas	$-$$	$	1-5 years
Post-construction runoff controls (Retrofit BMPs)	$-$$$	$-$$	2-4 years
Education/outreach (Coalition meetings)	$	$	Continual
Programmatic natural resource preservation	$-$$$	$-$$$	Continual
Stakeholder input survey	$	$	1-3 years
Aux Sable Creek Watershed website	$$	$	Continual
Community involvement programs	$	$	Continual
Water conservation program	$-$$	$	Continual

Chapter 7 – Potential Funding Sources

This chapter identifies a variety of potential state and federal funding sources that could provide financial assistance to implement the recommendations of this plan. No one source may fit each project, but identifying all of the potential sources provides a starting point from which to determine which grant is appropriate for a particular project as well as the possibility of leveraging these grants with each other or with local funding. The grants identified are through the following agencies: Illinois Department of Natural Resources, Illinois Environmental Protection Agency, United States Department of Agriculture – 2008 Farm Bill (through the United States Department of Agriculture), United States Environmental Protection Agency, Illinois Department of Agriculture and United States Fish and Wildlife Service.

Private grants may also be available through organizations such as the Environmental Grant Program through American Water, Field Foundation of Illinois, Gaylord and Dorothy Donnelley Foundation, Grand Victoria Foundation, Grundy County Community Foundation, Illinois Clean Energy Community Foundation and Waste Management Charitable Giving Program.

Chapter 8 – Monitoring Plan Successes

Evaluation is an important part of watershed planning. It can tell you whether or not your efforts are successful and provide a feedback loop for improving project implementation.

This Plan has a unique challenge when it comes to monitoring because the majority of the recommendations are for potential changes within the Watershed due to future development. Therefore the success of the watershed Plan would ultimately be determined by periodically evaluating the class rating of the stream as this would follow the Vision Statement. By maintaining the Class A rating, the Plan is successful.

Short-term (1-3 years) and long-term (3-10 years) milestones are identified that can assist to incrementally implement the Plan's recommendations. The milestone accomplishments are outlined for each Recommended Action identified in the table above.

The Plan further recommends an annual evaluation on the status of the milestones, which will serve to determine implementation over time as well as keep the Plan and its recommendations top of mind for all watershed stakeholders.

Clean Water Act Section 319 Incremental Funding: Required Component

In order to be eligible for Section 319 funding, a watershed plan must include a monitoring component to evaluate the effectiveness of your implementation efforts over time, measured against evaluation criteria established by your watershed planning group. Any combination of monitoring strategies identified above can satisfy this requirement, although you should take care to tailor your monitoring strategy to the needs and goals of your watershed.

An excerpt from Guidance for Developing Watershed Action Plans in Illinois by the Chicago Metropolitan Agency for Planning and IEPA.

When it comes to implementation, there is no single agency "on the hook" to make sure the plan is followed. Implementation will occur over time, as individuals and/or publica agencies are interested. Anyone can help keep the Aux Sable Creek clean. Beyond those mentioned at the beginning of this Overview, here are some ideas to get anyone started and being active in water quality aspects:

- **Get on a committee** working to support the watershed, such as the Aux Sable Creek Watershed Coalition. Contact Joan Soltwisch at (815) 467-2059 about the Coalition.
- **Install a rain garden** to soak in water where it falls.
- **Use a rain barrel** to collect and reuse rainwater.

Who Can Help You

This is not a chapter in the 2009 Aux Sable Creek Watershed Management Plan. However, the advisory committee recognized that water quality can be a tough issue to know how to start addressing. A variety of local governments have jurisdiction in the watershed, depending on where you're located. There are also other agencies that might be able to assist with common questions and concerns. The following is a brief outline of agencies and what aspects they might be able to assist with, as it relates to the focus of this plan: water quality. This list is not an exhaustive, but is intended to give individuals an idea of the appropriate contact for various issues so that no single agency is targeted.

Refer to	When the Questions Relate to	Additional Description
Kendall or Grundy County planning offices	• Construction site soil erosion and sediment control problems in (or caused by) unincorporated areas • Individual, neighborhood, watershed scale problems • Violation of local regulations	Have responsibility to inspect and respond to water quality complaints in unincorporated areas; can require remedial activity if in violation of applicable ordinances; can assist in determining approximate location of floodplain on properties.

	• Access to and navigation of federal floodplain maps • Drainage complaints	
Local municipalities (in the watershed that includes): • Channahon • Joliet • Lisbon • Minooka • Morris • Oswego • Plainfield • Plattville • Shorewood • Yorkville	• Lot/neighborhood level drainage concerns • Emergency response, sandbag distribution • Construction site soil erosion and sediment control problems in applicable incorporated area • Use of stormwater Best Management Practices in new or redevelopment activities • Violation of local regulations • Access to and navigation of federal floodplain maps. • Drainage complaints	Usually have staff or budget through planning or public works to handle common problems in addition to construction site problems; can assist in determining approximate location of floodplain on properties.
Kendall or Grundy County Soil & Water Conservation District	• Technical assistance on soil erosion issues. • Information related to soils and common issues with their performance. • Educational assistance in the form of workshops, presentations, brochures, pamphlets, handouts, etc. • Access to and navigation of federal floodplain maps. • Kendall only: inspect construction site for stormwater Best Management Practice construction/installation.	Agricultural, urban, and water body-related guidance; provides technical assistance, education and information on cost-share programs, field staff may make site visits to evaluate complex problems.
Township Highway Departments	• Drainage concerns within the right-of-way of a township road.	Sometimes staff is able to reduce local flooding problems by improvements along right-of-way, but is not common; policies vary from township to township; not able to assist in areas outside its own right-of-way
Kendall or Grundy Department of Transportation	• Bridges, culverts and ditches located within the right-of-way of county roads	Maintains all bridges, culverts and ditches with the right-of-way of county highways.
Kendall or Grundy Health Department	• Well and septic related problems	Primary concern for individual wells and septics, will assist if flooding problem results in failure of septic or contamination of well.

US Geological Survey – Urbana, IL	• Provides real-time, unofficial river/stream stage information, rain totals	Data available at http://il.water.usgs.gov

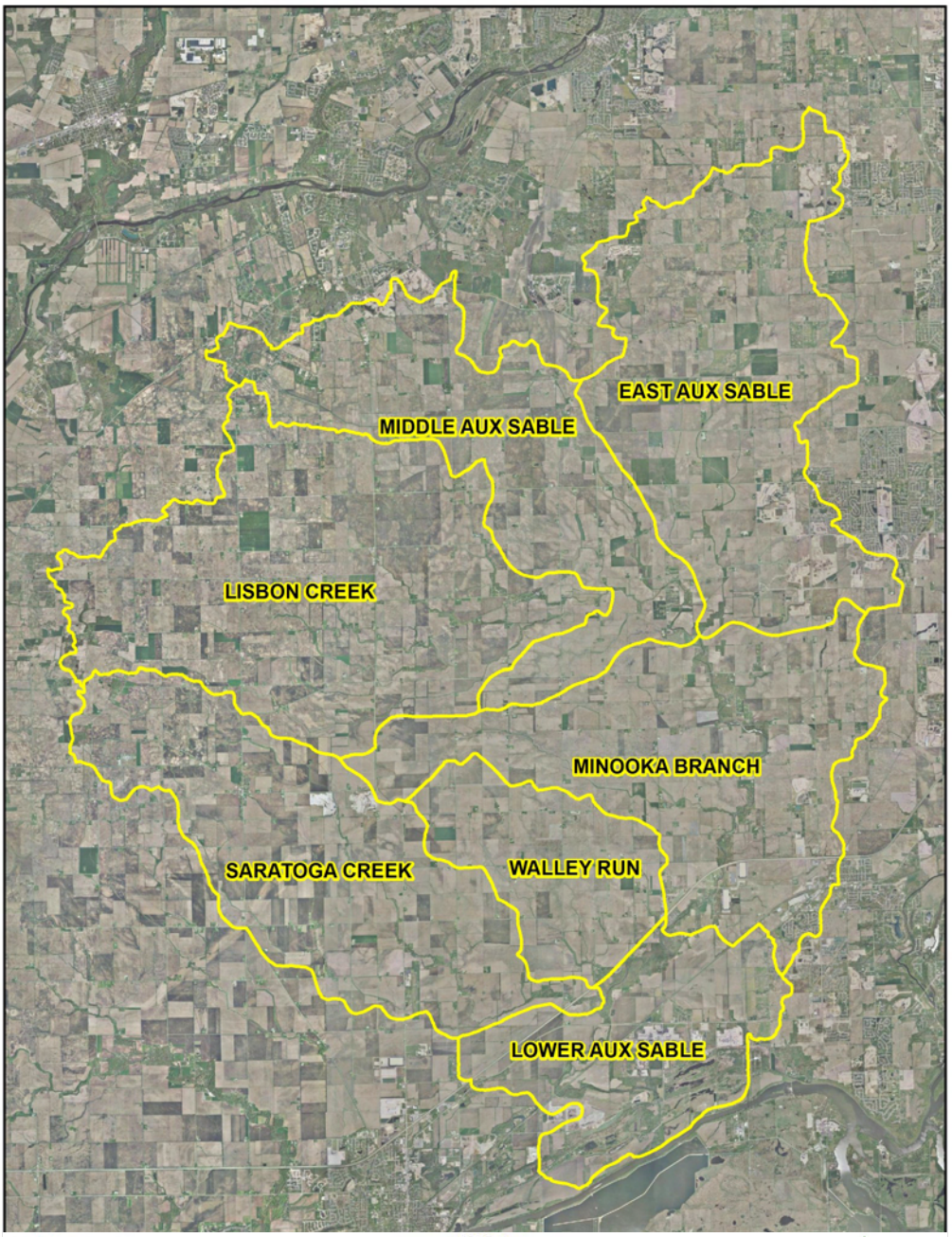
If you are interested in getting involved in the Aux Sable Creek watershed contact Joan Soltwisch at (815) 467-2059 about the Aux Sable Creek Watershed Coalition. The Conservation Foundation, a not-for-profit land and watershed protection organization serving northeastern Illinois, has also been involved in watershed activities and may be available to assist interested persons on water quality initiatives.

AUX SABLE CREEK WATERSHED PLAN

Completed June 1, 2009

This plan was prepared, in part, using U.S. EPA funds under Section 319 of the Clean Water Act distributed through Illinois EPA.

The findings and recommendations are not necessarily those of the funding agencies.



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CHAPTER 1: INTRODUCTION

WATERSHED OVERVIEW AND LOCATION

The Aux Sable Creek Watershed (referenced hereafter as the Watershed) is a sub-watershed of the Upper Illinois River Watershed in northeastern Illinois, comprised of approximately 297 miles of streams and channels. The Watershed (Figure 1) drains 119,911 acres (187 square miles) of gently rolling land in Kendall, Grundy, and Will Counties (Figure 2) before eventually outletting into the Illinois River at the south end of the Watershed, northeast of Morris. The Watershed has been divided into 7 sub-watersheds based upon natural drainage divides. This helps to separate the Watershed into more manageable units and to better identify specific impairments. These sub-watersheds are: East Aux Sable, Middle Aux Sable, Lisbon Creek, Minooka Branch, Saratoga Creek, Walley Run, and the Lower Aux Sable (Figures 3 and 4). The Watershed Hydrologic Unit Code (HUC) is 07120005101. The HUC is a code produced by the United States Geological Survey (USGS) to subdivide the United States into various levels of units based upon the local drainage basins. The Illinois Environmental Protection Agency (IEPA) water body identification numbers for the Watershed include both ILDW01 and ILDWD01. The Watershed is comprised of nine stream segments:

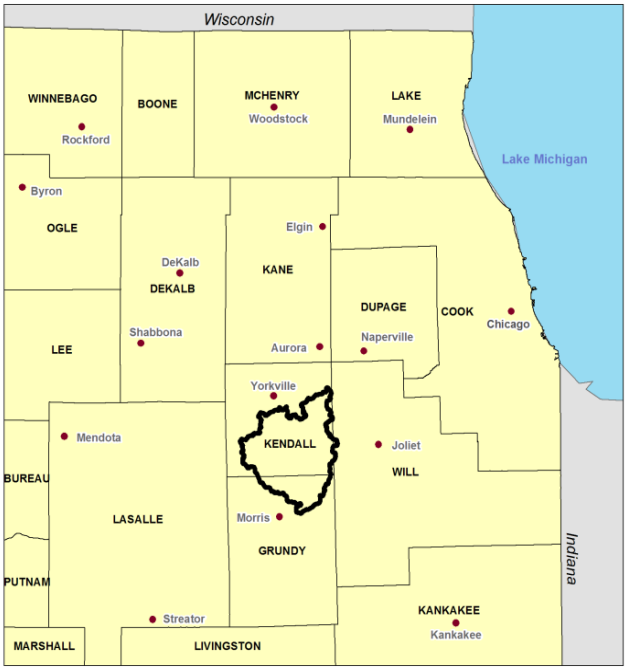

Figure 1 - Location of Aux Sable Creek Watershed

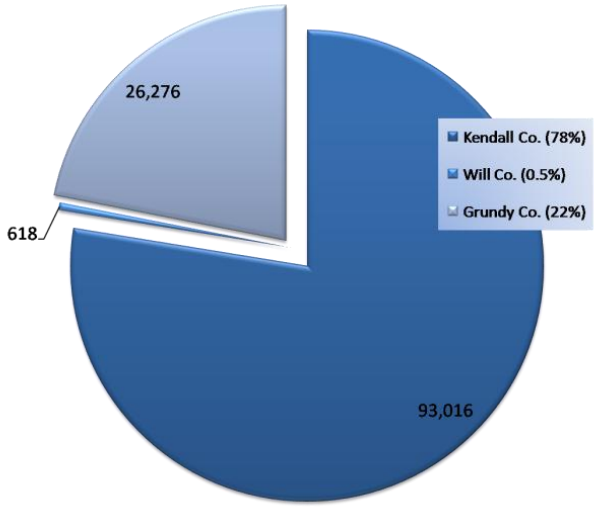

Figure 2 - Watershed Coverage by County (ac)

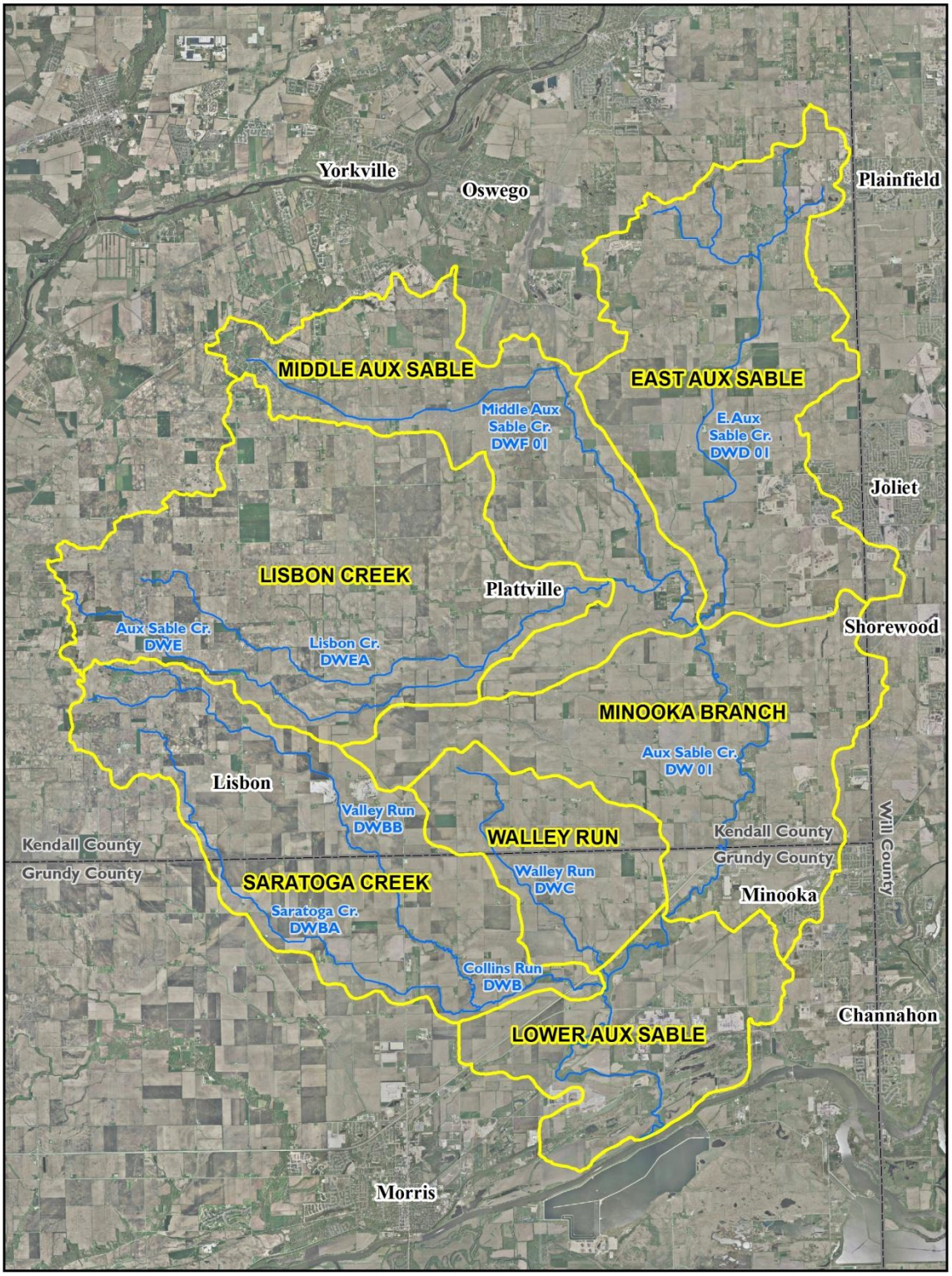

Figure 3 - Sub-Watershed Locations

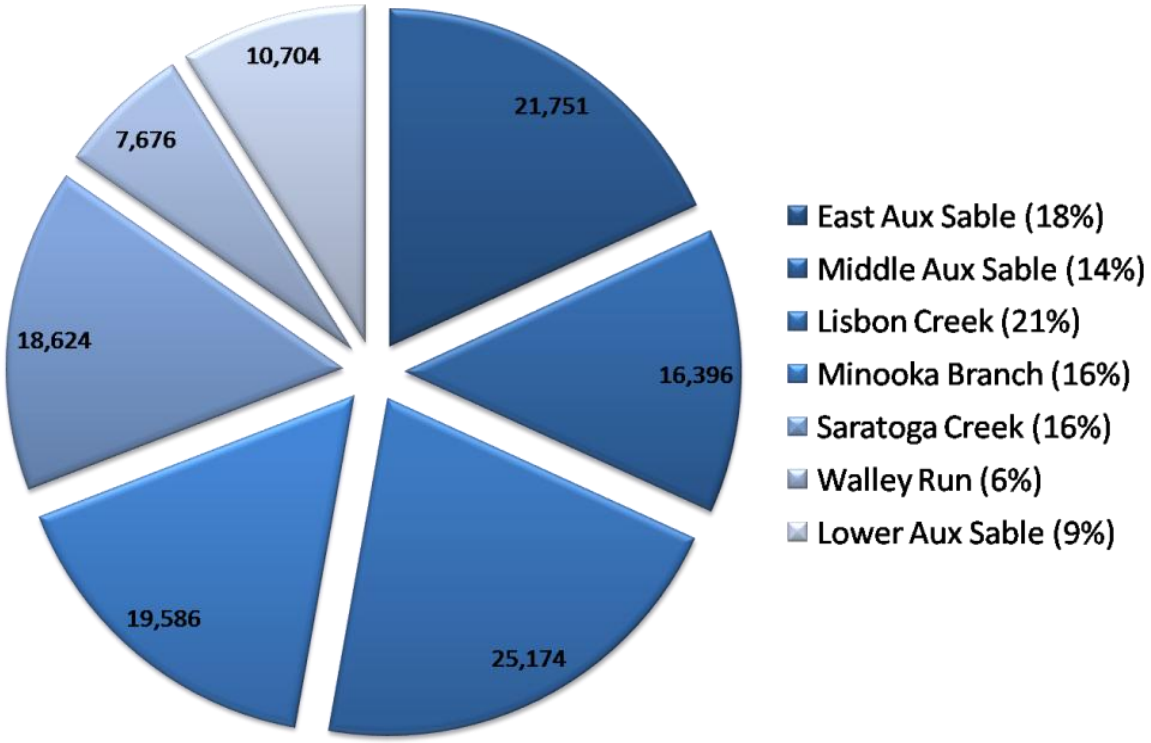

Figure 4 - Sub-Watershed Size (ac)

DW 01 (Aux Sable Creek), TD 64, DWB (Collins Run), DWBA (Saratoga Creek), DWBB (Valley Run), DWC (Walley Run), DWEA (Lisbon Creek), DWF 01 (Middle Aux Sable Creek), and DWD 01 (East Aux Sable Creek) (IEPA 2004). The land adjacent to a large majority of the creek is primarily in private ownership. The primary land use is agriculture (approximately 94%). About eighty percent of the agricultural land is a corn-soybean rotation with the remainder small grain and forage crops. In addition, a small amount of vegetables are being grown in the extreme eastern and northern sections of the Watershed. Numerous residential subdivisions have been developed or are proposed along the edges of many of the municipalities within the Watershed. Public land in the Watershed includes Baker Woods Forest Preserve, Illinois and Michigan Canal National Heritage Corridor, and the Aux Sable Railroad Prairie. The Aux Sable Creek Watershed has only one stream that has been noted as being impaired (Aux Sable Creek DW 01 – due to fecal coliform bacteria, IEPA 2004) and based upon numerous studies has generally good water quality (IDNR 1998, Huff and Huff 2006).

IMPORTANCE TO READER

One of the most crucial components of this watershed plan update is the voluntary participation of the stakeholders of the watershed who have an interest in the sustainable use of natural resources. Members of the general public, particularly the residents of the Aux Sable Creek Watershed, are concerned about and entitled to clean and safe water, a healthy natural environment that is an integral part of their community, access to high quality recreational resources, and protection of landowner rights. Such quality of life outcomes, however, can neither be assumed nor taken for granted. By improving voluntary cooperation among stakeholders within the Aux Sable Creek Watershed and by providing educational opportunities to local communities about their role in watershed protection, it is hoped that this initiative will encourage people to do their part to improve or protect the valuable natural resources in the Aux Sable Creek Watershed.

REASON FOR THE WATERSHED PLAN UPDATE

In the winter of 1997, a group of concerned citizens formed the Aux Sable Creek Watershed Planning Committee. The formation of the group was prompted by the flooding in 1996. This committee was comprised of local citizens and community leaders. The group began to identify resource concerns and soon realized that there were more issues to address than just flooding. Additional concerns included at that time were:

1) soil erosion,
2) loss of wetlands,
3) development,
4) degraded water quality,
5) loss of wildlife habitat.

When the natural resource inventory reports were presented to the committee, they discovered how rich the resources were within the Aux Sable Creek Watershed. For that reason, the committee felt that they should work together along with others in the Watershed to try to preserve the quality of the Watershed. The Planning Committee prepared a watershed plan and presented it in March 2001.

Since that time, the Aux Sable Creek Watershed Coalition, a grass roots committee of concerned watershed residents, has used the plan as a founding document for their work to promote the enhancement and protection of the identified resources of the Watershed. In 2007, The Conservation Foundation and the Aux Sable Creek Watershed Coalition obtained a Clean Water Act Section 319 Nonpoint Source

Pollution Grant from the Illinois Environmental Protection Agency (IEPA) to update the plan. They collaborated to form the Aux Sable Creek Watershed Plan Advisory Committee. The Advisory Committee is made up of a collection of stakeholders within the Watershed, charged with updating the existing plans to address the nine criteria which are required of all watershed plans by the IEPA. The original watershed plan did not address these criteria because, at the time, they were not required to be addressed. The IEPA requires that watershed plan address nine criteria in order to qualify for future funding through the 319 Nonpoint Source Pollution Control Program. The Aux Sable Creek Watershed Plan (published March 2001) prepared by the Planning Committee is being updated to meet those criteria, which include:

1. An identification of the causes and sources of Nonpoint Source pollution
2. An estimate of the pollutant load reductions expected following implementation
3. A description of measures to implement to achieve pollutant load reductions estimated
4. An estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources that can implement the plan
5. A public information/education component that is designed to change social behavior
6. An implementation schedule
7. A description of measurable milestones
8. A set of criteria to determine whether pollutant loading reductions are being achieved
9. A monitoring component

The members of the Advisory Committee are working to accomplish the purpose of IEPA's Section 319 Program: to work cooperatively with units of local government and other organizations toward the mutual goal of protecting water quality in Illinois through the control of nonpoint source pollution. To assist in updating the Watershed Plan, The Conservation Foundation secured a 319 Grant from the Illinois Environmental Protection Agency (IEPA). Wills Burke Kelsey Associates, Ltd (WBK) was contracted to provide technical assistance during the authoring process of the updated plan.

To assist in the identification of important resources in the Watershed, a watershed-wide open space/green infrastructure plan was created as an appendix item to the Watershed Plan update document. It will use the open space areas already identified in Kendall County (through the *Protect Kendall Now!* initiative in 2005-2007) and add the Watershed's Grundy County portion. The Kendall portion will not

be changed or revisited; work will focus on the Grundy County portion of the watershed with this project. The process will follow that used when the Kendall portion was mapped. Once completed, all of the open space information will be compiled into a watershed-wide open space/green infrastructure plan.

VISION STATEMENT

The vision statement was prepared by a sub-committee of the Aux Sable Creek Watershed Plan Advisory Committee. The Advisory Committee decided in March 2008 that it approximately summarizes the purpose of the plan as viewed by the stakeholders of the Watershed:

We intend to maintain the Class A rating of the Aux Sable Creek and enhance the natural and economic health of the Watershed using sound management practices, education, and voluntary cooperation while respecting property owner rights.

COMMITTEE GOALS

The Aux Sable Creek Watershed Plan Advisory Committee (Advisory Committee) discussed the goals from the previous plan and re-evaluated which ones were relevant. The process consisted of the Advisory Committee breaking into small, randomly divided groups. They discussed the existing goals and then identified additional goals and concerns which needed to be addressed in this plan. Below are the goals which were deemed the most critical by vote of the committee members (Table 1).

PLAN DEVELOPMENT PROCESS

This project is a collaborative effort to update the Aux Sable Creek Watershed Plan. An Advisory Committee has been formed of stakeholders within various areas of the Watershed, including landowners, municipal and county planning or engineering departments, the Kendall and Grundy County Soil & Water Conservation Districts, and other public interest groups. Over 50 representatives were invited by The Conservation Foundation to participate on the committee, of which one-third are landowners in the Watershed. Many of these representatives have been active in watershed activities in the past while others are just getting involved. Other agencies represented include the Kendall & Grundy County Farm Bureaus, which represents the large farming community in the watershed. Together, the committee is working to accomplish the purpose of IEPA's Section 319 Program: to work

cooperatively with units of local government and other organizations toward the mutual goal of protecting water quality in Illinois through the control of nonpoint source pollution. The advisory committee met monthly to assist in drafting an updated watershed plan that focused on control of nonpoint source pollution. The committee has discussed various topics and concerns regarding what should or should not be a part of the plan which Wills Burke Kelsey Associates, Ltd. authored. Once the draft was completed, a public informational meeting was held, to ensure the work of the advisory committee was appropriate to the challenges and opportunities of the Watershed.

LANDOWNER BILL OF RIGHTS

To reflect the commitment of the Aux Sable Creek Watershed Plan Advisory Committee to create a plan consistent with the vision statement, a Landowner Bill of Rights (Appendix 1) was drafted to outline basic rights. The Landowner Bill of Rights declares that Watershed landowner's basic rights to maintain their land would not be infringed upon during the implementation of this watershed plan, such that the plan did not contain or promote the regulation of land uses. The signatures at the end of the text indicate agreement to the terms of the document by individual landowners or the organizations as they are represented in the Advisory Committee. Committee members were free to sign or not sign the document, which does not impart legal authority to the plan or the committee members.

Table 1: Committee Goals Which Were Considered Significant by Committee Member Vote

Categories and Goals (categories listed in alphabetical order)	**High Priority** 3 points	**Med Priority** 2 points	**Low Priority** 1 point	**Total Points**
Stream Maintenance/ Quality				
Promote Best Management Practices (stormwater related)	7	2		**25**
Promote water quality	1	4		**11**
Create stream maintenance programs			2	**2**
Debris in creek		1	1	**3**
Flooding				
Flood control		2	1	**5**
Identify flooding areas and reason (use public input)	1			**3**
Natural Areas				
Encourage protection of natural areas	1			**3**
Educate about natural vegetation along detention ponds (and continued maintenance including costs to homeowners)		1		**2**

Categories and Goals (categories listed in alphabetical order)	**High Priority** 3 points	**Med Priority** 2 points	**Low Priority** 1 point	**Total Points**
Wildlife Biodiversity				
Protect current wildlife habitat	1			**3**
Protect and restore biodiversity		1		**2**
Development				
Inform development process of need to maintain drainage functions in agricultural areas	1		1	**4**
Education				
What is a watershed? (Target children especially)			3	**3**
Educate elected officials – BMPs in development			1	**1**
Property Rights				
Provide education on private property rights (re: recreation rights)	1			**3**
Recreation				
Promote recreational opportunities (but respect private property)		1	1	**3**
Water Supply				
Promote sustainable groundwater (water supply)			2	**2**
Farmland Protection				
Promote **voluntary** farmland protection (Including education opportunities to educate landowners about the variety of options available. Seek and advocate funding for individuals interested in such opportunities)			1	**1**

WATERSHED ROLES AND RESPONSIBILITIES

To enact this watershed plan, the roles and responsibilities for the different parts of the recommendations must be identified (Table 2).

Aux Sable Creek Watershed Coalition (Coalition)

The Aux Sable Creek Watershed Coalition is a grass roots committee of concerned watershed residents which help educate and advocate. The Coalition, along with The Conservation Foundation, is the catalyst behind the update of the Watershed Plan. The Coalition will be the primary agent for providing the educational component of the Watershed Plan.

Table 2: Aux Sable Creek Watershed Stakeholders

Stake Holder	Abbreviation
Aux Sable Creek Watershed Coalition	Coalition
Chicago Metropolitan Agency for Planning	CMAP
Corporate Landowners	Corp
County Dept. of Transportation/ Highway Department	CDOT
County Forest Preserve Districts	FPD
County Soil Water Conservation Districts	SWCD
Federal Emergency Management Agency	FEMA
Illinois Department of Agriculture	IDA
Illinois Department of Natural Resources	IDNR
Illinois Department of Transportation	IDOT
Illinois Emergency Management Agency	IEMA
Illinois Environmental Protection Agency	IEPA
Kendall, Grundy, and Will County	County
Local Farm Bureaus	FB
Municipalities	Municipality
Park Districts	Parks
Prairie Parklands Ecosystem Partnership	PPP
Residents/Landowners	Residents
The Conservation Foundation	TCF
Townships	TWP
US Army Corps of Engineers	USACE
US Environmental Protection Agency	EPA
US Fish and Wildlife Service	USFWS
USDA Natural Resource Conservation Service	NRCS

Chicago Metropolitan Agency for Planning (CMAP)

The Chicago Metropolitan Agency for Planning, formerly the Northern Illinois Planning Commission, has a series of model ordinances on stormwater management, soil erosion and sediment control, streams and wetlands, and floodplains for local governments to use in developing regulatory programs. CMAP can provide technical assistance and training opportunities related to watershed planning and management to local governments. CMAP also can assist local governments in applying for state and federal funding for watershed based projects.

Corporate Landowners (Corp)

Corporate Landowners, consisting of commercial and industrial landowners, have a small influence on the management of the Watershed. The industrial district in the southern portion of the Watershed has little affect on the water quality upstream, yet

their permits require that they be heavily involved in the management and protection of the Aux Sable Creek. Current commercial and industrial landowners can retrofit their existing stormwater facilities to reduce stormwater runoff and pollutants. As the potential for future development increases, so does the opportunity for commercial businesses. Future businesses can use portions of their land to apply BMPs and help preserve some of the natural features of the Watershed.

County Department of Transportation/ Highway Departments (CDOT)

The county departments of transportation and highway departments are responsible for all county roads, bridges, culverts, and drainage in the Right of Way. CDOT is responsible for all long range planning, maintenance, and coordination for maintenance transportation related projects.

County Forest Preserve Districts (FPD)

The local forest preserve districts, the Kendall County Forest Preserve District until a Grundy County Forest Preserve District is created, are responsible for acquiring and maintaining forests within their districts, along with providing educational programs. Future management within the Watershed can include assisting in providing educational opportunities that include volunteer activities.

County Soil and Water Conservation Districts (SWCD)

The local SWCD offices provide resources, technical assistance, and education opportunities in relation to promoting the protection and conservation of soil, water, and other natural resources. The Kendall County SWCD assists the IEPA (through an Inter-Governmental Agreement) with Soil Erosion and Sediment Control Inspections. The SWCD can also help in providing funding assistance to various projects that meet certain criteria.

Federal Emergency Management Agency (FEMA)

The Federal Emergency Management Agency (FEMA) is the federal agency in charge of reducing loss of life and protection from natural disasters, acts of terrorism, and other such devastating events. They are also in charge of administering the flood mapping and flood insurance program. FEMA's primary role in the watershed deals with mapping of the floodplains and floodways.

Illinois Department of Agriculture (IDA)

The Illinois Department of Agriculture is an advocate for Illinois' agricultural industry and provides the necessary regulatory functions to benefit consumers, agricultural industry, and natural resources. The agency strives to promote agri-business in Illinois and throughout the world.

Illinois Department of Natural Resources (IDNR)
The Illinois Department of Natural Resources is the state agency that is responsible for the protection, maintenance, and sustainability of all state owned natural and cultural resources. The IDNR offers a multitude of grants and technical assistance for projects that may take place in the Watershed. IDNR is also responsible for permitting any floodplain or floodway impacts due to development.

Illinois Department of Transportation (IDOT)
The Illinois Department of Transportation focuses primarily on the state's policies, goals, and objectives for Illinois' transportation system and provides an overview of the department's direction for the future.

Illinois Emergency Management Agency (IEMA)
IEMA is a state level agency which has a similar role to FEMA. Their primary objective is to protect the state of Illinois.

Illinois Environmental Protection Agency (IEPA)
The IEPA is an agency whose mission is to safeguard environmental quality, consistent with the social and economic needs of the State, so as to protect health, welfare, property, and the quality of life.

Kendall, Grundy, and Will County (County)
The Counties' involvement in the Watershed is typically concerned with overseeing the activities on land within the county that is not incorporated. They regulate the land in accordance with their ordinances. The Counties may have some cost share programs available or may be able to provide some technical assistance with projects initiated in the watershed.

Local Farm Bureaus (FB)
The local Farm Bureaus represent the large population of farmers in the watershed. The FB is an organization that provides public advocacy to its members within many levels of government while providing information regarding recent advancements in farming technologies.

Municipalities
The municipalities within and surrounding the Watershed are responsible for regulating and maintaining the land within its current boundaries, as well as, land which is annexed during various stages of development. The role of the municipality in terms of this Watershed report is primarily to advocate the Plan and its goals to its residents.

Park Districts (Parks)
The local park districts are typically responsible for maintaining public land and open space within its boundaries. They may be a source of maintenance in future projects or may be an outlet or source in future educational programs.

Prairie Parklands Ecosystem Partnership (PPP)
The Prairie Parklands is one of 41 Ecosystem Partnerships in Illinois that work in conjunction with the Illinois Department of Natural Resources. It is a coalition of public, private, and not-for-profit groups seeking to enhance and promote natural and cultural resource stewardship with compatible economic and recreational development in the Prairie Parklands region which includes the Watershed.

Residents/ Landowners (Residents)
The residents and landowners of the Watershed are the primary stakeholders due to the impact (both positive and negative) they have had and can have on the quality of the resources within the Watershed. Landowners or their tenants are primarily responsible for maintaining their property and the resources on their property. There are many projects or recommendations within this Plan which are structured for their participation.

The Conservation Foundation (TCF)
TCF is a not for profit organization which aims to preserve open space and natural lands, protect rivers and watersheds, and promote stewardship of our environment. Their role in the Plan is to administer the IEPA Section 319 grant and advocate the updated Watershed Plan.

Townships (TWP)
The local townships have the same purpose and role as the municipalities and the counties in that they maintain land within their boundaries.

United States Army Corp of Engineers (USACE)
United States Army Corps of Engineers (USACE) is a federal group of civilian and military engineers and scientists that provide services to the nation including planning, designing, building, and operating water resources and other Civil Works projects. These also include navigation, flood control, environmental protection, and disaster response. The local district, Rock Island, is the main permitting agency for any proposed projects which may impact any federally regulated wetlands or aquatic resources.

United States Environmental Protection Agency (EPA)

The EPA leads the nation's environmental science, research, education, and assessment efforts. The mission of the EPA is to protect human health and the environment. Since 1970, EPA has been working for a cleaner, healthier environment for the American people.

United States Fish and Wildlife Service (USFWS)

The USFWS works with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people. USFWS continues to be a leader and trusted partner in fish and wildlife conservation, known for its scientific excellence, stewardship of lands and natural resources, dedicated professionals, and commitment to public service.

United States Department of Agriculture - Natural Resource Conservation Service (NRCS)

The NRCS is a federal agency that works in partnership with the American people to conserve and sustain natural resources, soil, and water. Within the Watershed, the local NRCS office may be able to provide technical and monetary assistance with projects initiated to improve the quality of the Aux Sable Creek and its tributaries.

CHAPTER 2: EXISTING CONDITIONS

INTRODUCTION

In understanding the intent of the Aux Sable Watershed Plan and the recommendations, it is important to note the resources within the Watershed. This chapter outlines many of the known resources and conditions from various sources.

CLIMATIC AND HYDROLOGIC CONDITIONS

Climate

The climate of Northern Illinois can be described as temperate with cold winters and warm, humid summers. Lake Michigan has minimal effect on the climate of the Watershed, causing the occasional band of lake effect snowfall. The region is highly influenced by southward surges of polar air and northward surges of tropical air. These surges produce fluctuations in the seasonal temperatures, as well as daily temperatures. Winters are dominated by frequent storms called Alberta Clippers which travel from west to east along the Canadian border causing brief, light snowfall events with frigid temperatures behind them. Storms traveling from southwest to northeast are called Colorado Lows, and typically produce heavy snowfalls due to their warmer temperatures and higher amounts of moisture. These

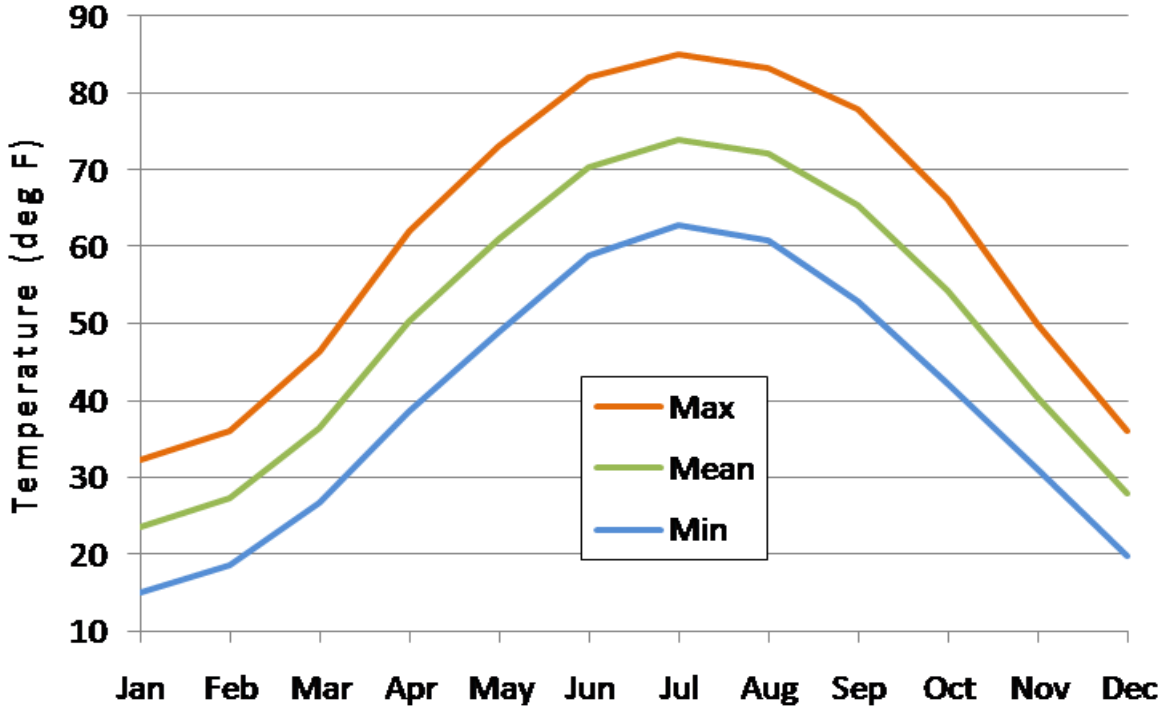

Figure 5 - Monthly Temperatures Recorded at Morris, IL (Midwest Regional Climate Center)

storms are known to traverse the area on a much less frequent basis. Prevailing winds are generally out of the west, but can vary depending on the current state of the atmosphere. In the winter, winds are typically out of the northwest after Alberta Clippers have passed. The summer winds are typically out of the southwest providing warm moist air. The average temperatures recorded at the Morris weather station are shown in Figure 5. The average high temperature reaches 85.1°F in July, the peak of the summer, and 32.2°F in January, the peak of the winter (NOAA Midwest Regional Climate Center). The average lows reach 62.2°F in July and 15°F in January. Typically, the last spring freeze occurs on April 30 and the first fall freeze occurs on October 11, based on the temperature record from the Joliet WB Airport Station (NOAA Midwest Regional Climate Center).

Precipication typically falls in the Watershed in a liquid form (Figure 6), with the greatest amount falling April through September. The highest monthly precipitation amounts usually occur during late summer when heavy thunderstorms are frequent. Rain is not as frequent during the winter months due to the cold temperatures. Snow fall has been variable over the last 55 seasons (October to May) of record at Chicago – Midway Airport (Figure 7). Different weather stations were used in reporting the various information due to inconsistancies and missing data. Data presented is from the most relieable or complete records available.

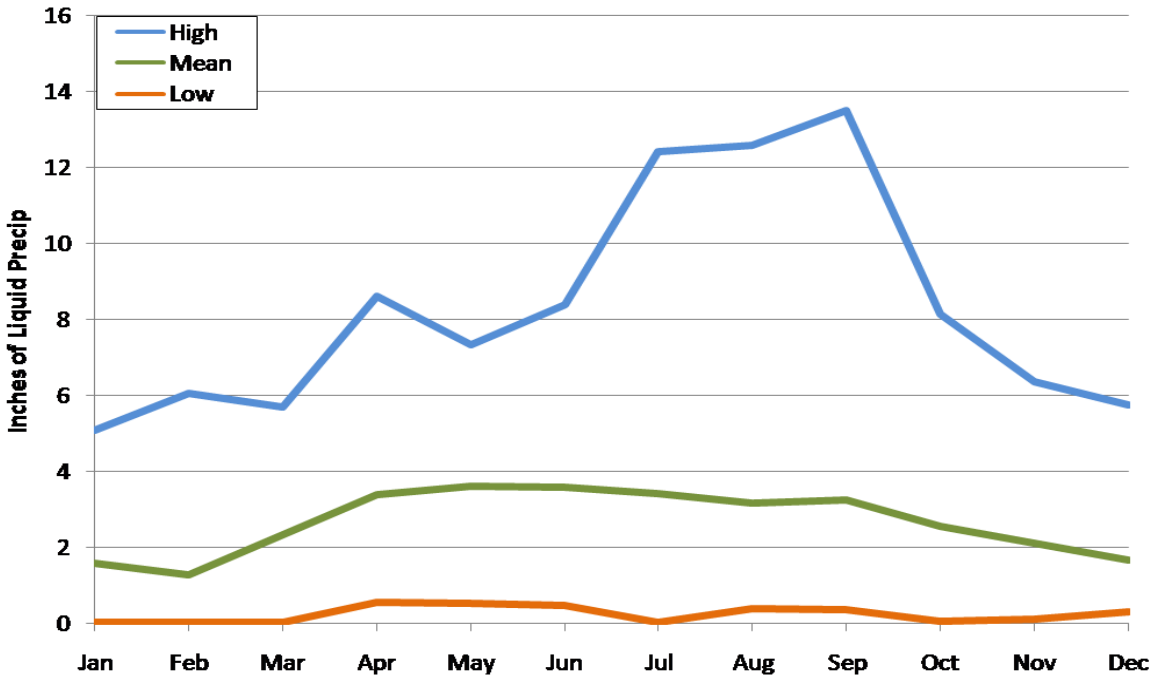

Figure 6 - Monthly Precipitation Recorded at Morris, IL (Midwest Regional Climate Center)

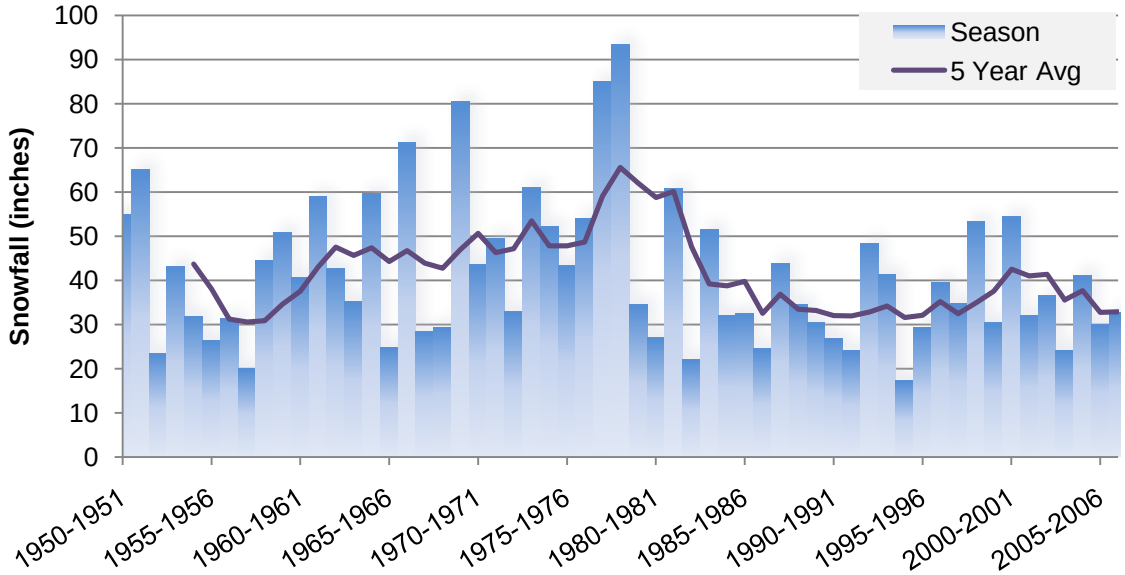

Figure 7 - Seasonal Snowfall Recorded at Chicago - Midway Airport (Midwest Regional Climate Center)

Hydrology

The mapping of hydrology is important in preparing the plan to identify drainage patterns and areas which may be more susceptible to erosion than others. Standard methodology to assess watershed hydrology utilizes the development of curve numbers to reflect the relationship between rainfall in a given event and the amount of runoff. As described in NRCS documentation (originally developed by the Soil Conservation Service (SCS) now the Natural Resource Conservation Service), curve numbers vary depending on the land cover, land use, and the antecedent moisture condition (AMC) and hydrologic soil group (HSG) of the soil. The hydrologic soil group (Figure 8) is determined based on the soil characteristics. A curve number for each of the various land uses and soil groups is determined. There are four hydrologic soil groups, referred to as A, B, C, and D. HSG A includes well-draining soils such as sands, while HSG D includes poor-draining soils such as undrained muck. Poor-draining soils combined with more intensive development result in larger curve numbers, and more runoff is generated during a rainfall event. The typical curve numbers for the major land uses in the Watershed are shown below (Table 3). Higher curve numbers indicate a large amount of runoff during storm events and are generally associated with impervious surfaces and poorly drained soils. Smaller curve numbers indicate high amounts of infiltration of stormwater and are generally associated with well drained soils and well vegetated land. The majority (94%) of the Watershed consists of agricultural row crops such as corn and soybean. The rest of the Watershed is divided between industrial/ commercial areas and residential lots. The industrial/commercial area is located in the southern

portion of the Watershed, just north of where the Aux Sable Creek discharges into the Illinois River. Currently, there are residential subdivisions located throughout the Watershed, with the majority near Joliet on the east side of the Watershed. To help determine a curve number for the Watershed, quarter-acre residential lots (typical lot sizes for new development in the area) were assumed. The use of the Hydologic Soil Groups can help identify the likely amount of runoff on a particular property based on the soil and how it may change based on proposed conditions.

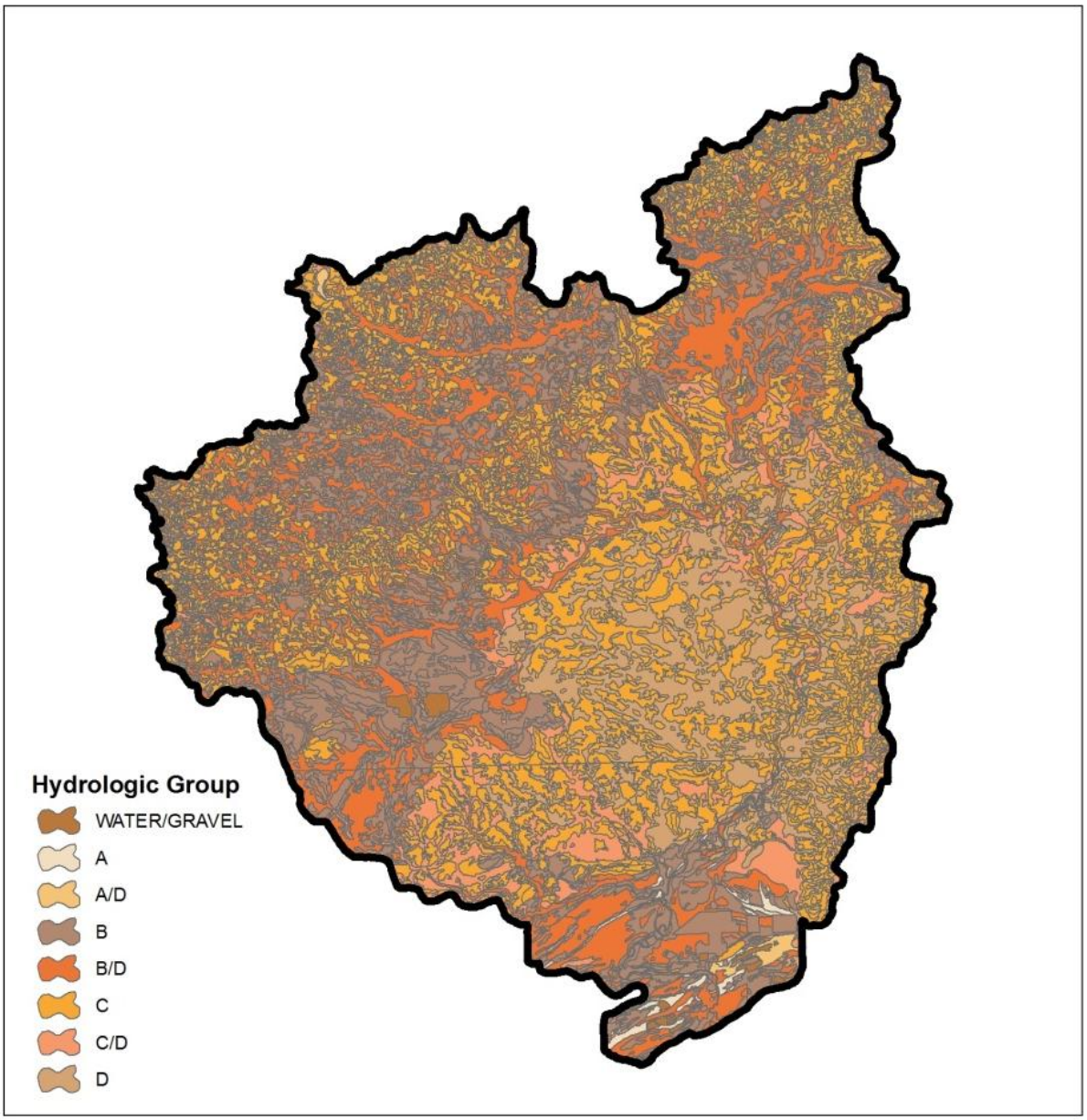

Figure 8 - Hydrologic Soil Groups (SSURGO)

Table 3: Curve Numbers based on Land Uses and Hydrologic Soil Groups (AMC = II)

Land Uses	A	B	C	D
Commercial/Business	89	92	94	95
Industrial	81	88	91	93
¼ acre Residential	61	75	83	87
Row Crop, Straight Row	67	78	85	89
Water	100	100	100	100

Hydrologic Modeling

Hydrologic modeling is used to determine the flow characteristics of the Watershed as well as determining the floodplain elevation. Portions of the Aux Sable Creek watershed have been studied in detail for preparation of the Grundy County and Kendall County Flood Insurance Studies (FIS). The current Grundy County study is dated December 15, 1994. It summarizes the detailed study of the Aux Sable Creek floodplain from approximately 1 mile northeast of the I-80/Brown Road interchange up to the Grundy/Kendall County line. The current Kendall County FIS is dated May 15, 2002. It summarizes the detailed study of the Aux Sable Creek and Middle Aux Sable Creek from Wildy Road upstream to Caton Farm Road. A revised Kendall County Preliminary FIS dated December 13, 2007 has been released for comment, but is not expected to become effective for approximately one year from that date.

The Preliminary FIS does not include any revised hydrologic or hydraulic modeling for the Aux Sable Creek. Per the Kendall County FIS, hydrologic modeling for the Creek was completed using the U.S. Army Corps of Engineers (USACE) HEC-1 hydrologic model with the SCS (curve number) option, to determine the flow of the stream based on the land use and climate. The HEC-1 and HEC-2 Models were developed by the Hydrologic Engineering Center for the USACE. Hydraulic modeling was completed using the USACE HEC-2 hydraulic model to determine the flow of the creek and the capacity of the channel, pipes, and culverts to handle that flow. According the Illinois State Water Survey (ISWS) the hydrologic data was last reviewed in January 2001 (Table 4). The HEC-2 model simulates the water profile of an open channel, taking into account the culverts and dimensions, slope, and roughness of the channel.

Based on the Grundy County FIS, at IL Route 6 the discharges for Aux Sable Creek into the Illinois River for the 10, 50, 100, and 500 year events are 5,724 cfs, 9,800 cfs, 11,224 cfs, and 14,932 cfs respectively. The drainage area at this spot is 172

square miles. The Flood Insurance Studies indicate that the Aux Sable Creek has a wide floodway, varying from 400 feet to 1,775 feet in width.

There is a United States Geological Survey (USGS) data station located in Aux Sable Creek at the Route 6 bridge (41.42°N, 88.35°W), in Grundy County. Akzo Nobel, a nearby chemical manufacturing plant has sponsored the station as part of their NPDES Permit conditions. The USGS station recently began keeping continuous stream flow data in March 2007. The station has experienced one flooding condition recorded in late August 2007, where the discharges were reported to have crested at 9,340 cubic feet per second. The data from this station is still provisional; there are still some problems with accuracy in recording low-flow conditions.

Table 4: Modeled Discharges for Aux Sable Creek into the Illinois River for Specific Storm Events (ISWS)

Storm Event (Years)	Discharge to Illinois River (cfs)
10	5,724
50	9,800
100	11,224
500	14,392

NATURAL CONDITIONS

Geology

Considering the geology of the Watershed assists in understanding the features that are present, how they developed, and how altering the land may be influenced by these conditions. The present landscape and soils within the Aux Sable Creek Watershed were greatly influenced by continental glaciation. The last major glaciation is called the Woodfordian substage of the Wisconsinan stage, which left this region about 12,000 to 15,000 years ago. These large sheets of ice carried boulders, cobbles, gravel, and soil as the ice sheets advanced and retreated over the previous land surface. When the ice melted it dropped much of its load of rock, sand, silt, and clay. This ice-deposited, unsorted material is called glacial till. Glacial till is a homogenous mixture of sand, silt, clay, pebbles, and boulders that have been somewhat compressed by the weight and pressure of the ice. Glacial till deposits in the Watershed are as thick as 100 feet or more. At times, the movement of the glaciers would stagnate. That is, they would grow and melt or advance and retreat at about the same rate. When this occurred, a terminal moraine, or ridge of

glacial till, would develop. The Marseilles Moraine consists of broad ground moraines and terminal moraines and it bounds the northern portion of the Aux Sable Creek Watershed. The Minooka Moraine is a well-defined terminal moraine and it occurs along the Watershed's eastern edge. These moraines are prominent ridges and are easily visible landforms. Ridge Road in Kendall County follows the Minooka Moraine.

As the ice melted, the melt waters carried some of the boulders, rocks, and soil and deposited this outwash material across the landscape. Outwash is a glacial deposit that has been sorted by the melt waters. It consists of stratified silts, sand, and gravel. In most places in the Watershed the outwash deposits are nearly level to gently sloping and overlie the glacial till. Glacial outwash is generally more permeable than glacial till since the outwash was deposited by the melt waters and was not compressed by the weight of the glaciers. The larger outwash deposits in the Watershed occur along the southern base of the Marseilles Moraine.

The moraines or other landforms sometimes trapped the water from the melting glaciers thus forming lakes. These lakebed sediments, known as lacustrine deposits, are usually higher in clay and fine silts than the other outwash deposits. Much of the Aux Sable Creek Watershed is within an area known as Glacial Lake Wauponsee. Lake Wauponsee covered about 75% of Grundy County and the southeastern portion of Kendall County when the melt waters filled the Illinois River valley and the lowlands to an elevation of about 650 feet. In Kendall County, a broad, nearly level landscape and a high water table characterize the area of this former lakebed.

After the ice retreated and the melt waters subsided, silts were deposited on the land surface by the prevailing winds from the west. These wind-blown silts, called loess, cover most of the land surface in the Watershed. The loess that overlies the glacial till and the glacial outwash vary from a few inches to about four feet.

Low broad moraines, prominent, sloping morainal ridges, nearly level outwash plains, and broad flat lacustrine deposits characterize the land surfaces that were created by the Woodfordian glaciers in the Aux Sable Creek watershed. The Watershed is in the Bloomington ridged plain and the Kankakee plain section of the Central Lowland Province. The Watershed is also in the Northern Illinois and Indiana Heavy Till Plain Major Land Resource Area (MLRA 110).

Topography/Relief

The relief of the Watershed is nearly level to gently sloping (0-5%), but steeper areas occur along Aux Sable Creek and on the moraines. The elevation is highest on the Marseilles Moraine at approximately 760 feet above sea level and lowest where the creek meets the Illinois River at approximately 490 feet above sea level. In general, the Watershed slopes from north to south, thus draining to the south, and ultimately to the Illinois River

Soils

Most of the soils in the Aux Sable Creek watershed are dark-colored soils that formed under native tallgrass prairie after the retreat of the Wisconsinan ice sheet. The various parent materials from which the soils formed are loess, glacial till, glacial outwash, lacustrine deposits, limestone bedrock, and alluvium.

Soils can be divided into two basic categories, hydric and non-hydric. Hydric soils are defined by the United States Department of Agriculture as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil (Federal Register, July 13, 1994). Due to the flat nature of the Watershed and the numerous drainage ways and streams, 39.4% of the Watershed consists of hydric soils (the areas in blue in Figure 9). A list of the hydric soils in Kendall and Grundy Counties is included in Appendix 2.

Bryce and Swygert soils are two hydric soils that are very extensive in the low, broad areas of the Aux Sable Creek Watershed. They formed in silty clay and clay lacustrine sediments. Bryce soils occur on broad flats, drainageways, and depressional areas. They are poorly drained, which means that they have a water table that is above or near the surface during the spring and much of the year. Bryce soils are typical of the wet prairies that existed in Illinois before European immigrants settled the area. The Swygert soils occur on nearly level areas that are slightly higher than the Bryce soils. They are somewhat poorly drained, which means that they have a water table (top of the ground water) near the surface during the spring. Because of their high clay content, both Bryce and Swygert soils are slowly permeable. Other soils in the Watershed that formed in the lacustrine sediments are the Martinton, Milford, and Nappanee soils, all of which are hydric.

Dark-colored soils that formed in loess and the underlying glacial outwash include the Barrington, Brenton, Drummer, Elburn, Mundelein, Plano, and Proctor soils.

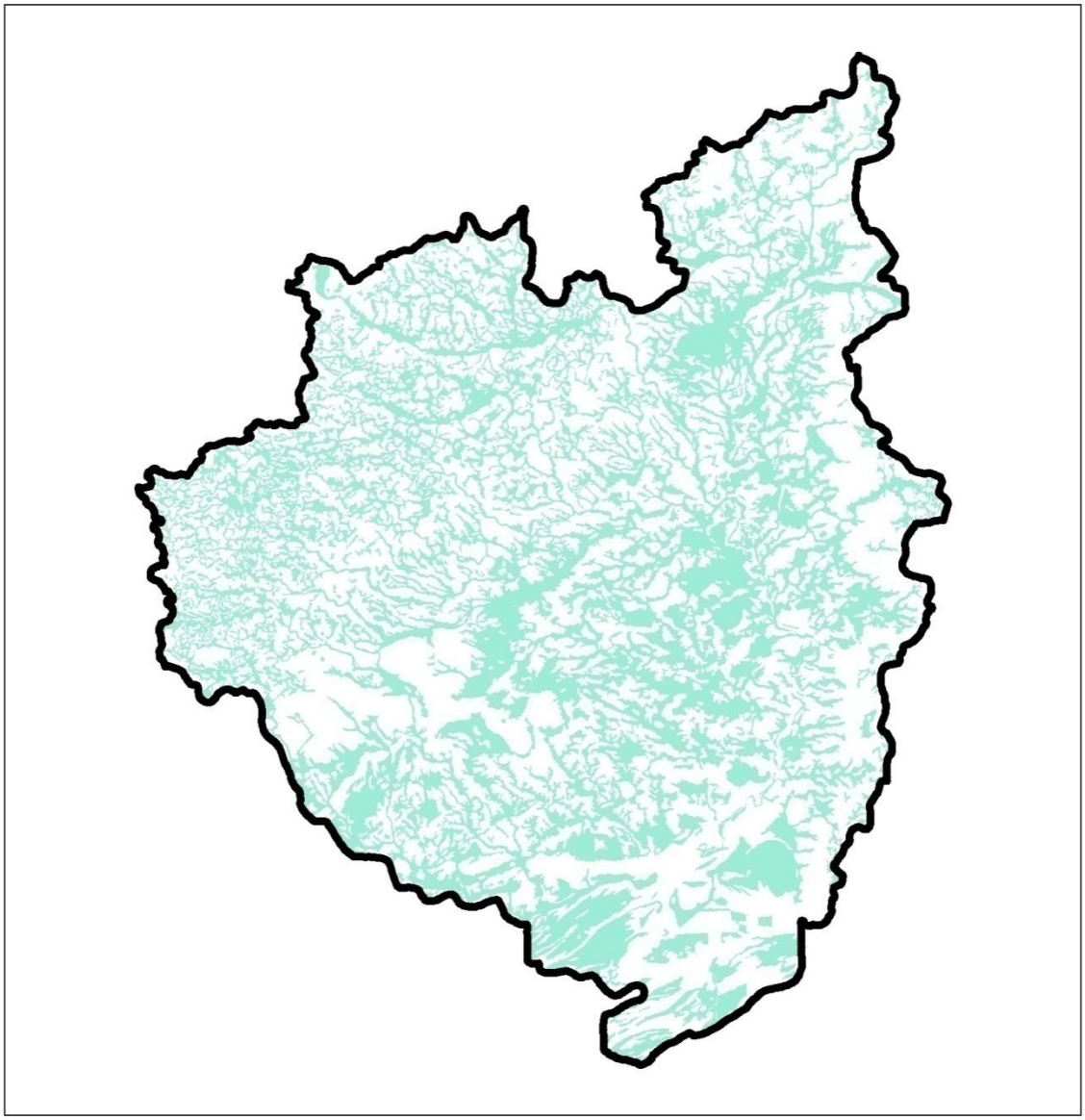

Figure 9 - Hydric Soils (NRCS)

Darroch, Jasper, and Selma soils are common in the southern part of the Watershed adjacent to Aux Sable Creek. These soils formed in loamy outwash deposits. The Starks and Martinsville soils formed under woodland vegetation and have a light-colored or thinner surface. The Starks soils formed in loess and underlying loamy outwash. The Martinsville soils formed entirely in outwash.

Dark-colored soils that formed in loess and the underlying glacial till include the Saybrook, La Rose, Lisbon, Elliott and Varna soils. These soils occur on the terminal and ground moraines. Generally, they are nearly level or gently sloping. The Elliott and Lisbon soils are somewhat poorly drained and have a seasonal high water table within a foot of the surface during the spring. The Saybrook, La Rose,

and Varna soils are slightly higher on the landscape, are moderately well drained or well drained, and have a potential to erode easily. The Dodge and Strawn soils formed mostly in glacial till. They are light colored and formed under woodland vegetation.

Glacial till deposits described above are not as thick in the western portion of the Watershed, near the town of Lisbon. In places the loess and outwash deposits are less than two feet thick. The well drained Ripon soils have limestone bedrock at depths of 20 to 40 inches. Plattville soils and bedrock phases of Brenton soils and Milford soils occur here also. These soils are underlain by limestone bedrock at a depth of 40 inches or more.

Lawson soils and Sawmill soils are common within the floodplain of Aux Sable Creek. Lawson soils are somewhat poorly drained and have a water table near the surface in the spring. Sawmill soils are hydric soils, are poorly drained, and have a water table at or above the surface for much of the year. Both the Lawson and Sawmill soils formed in alluvium and are subject to frequent flooding.

The different soils described above are done so to help illustrate the conditions of the ground and the characteristics which may be evident. The presence of hydric soils is an indication of potential flooding. Due to the large area of poorly drained soils, much of the land was drained with underground drain tiles to utilize the land for agriculture.

Water Bodies

Lakes and Ponds

There are no impoundments of significant size, as identified by the IDNR National Wetlands Identification program located in the Aux Sable Creek Watershed (Figure 10 and Figure 11). There are several ponds located at the southern end of the Watershed north and south of the I&M Canal. One of the ponds (4.61 acres) serves as a treatment facility for stormwater from the Equistar Chemicals Plant at Tabler Road and Route 6. Another pond, southeast of South Tabler Road, treats stormwater from the ditches along Route 6 and South Tabler Road. Most of the lakes in this area (southeast of South Tabler Road and north of the I&M Canal) appear to be connected or part of a large wetland complex. There are numerous privately owned ponds created for various uses such as recreation, irrigation, and stormwater detention. No such program has been developed (at the time of this report) to map or identify the quality of these small ponds, as well as, identifying any potential affect they may have on the Aux Sable Creek or its tributaries.

Streams

Aux Sable Creek and its tributaries drain approximately 187 square miles (Healy 1979) in Kendall and Grundy Counties with 297 miles of streams (Figure 10).

The Aux Sable Creek originates south and southwest of Oswego and flows approximately 34 miles generally south to its confluence with the Illinois River, approximately 5 miles upstream of Morris (Figure 10). There are several named and unnamed tributaries to the Aux Sable Creek including Walley Run, Valley Run,

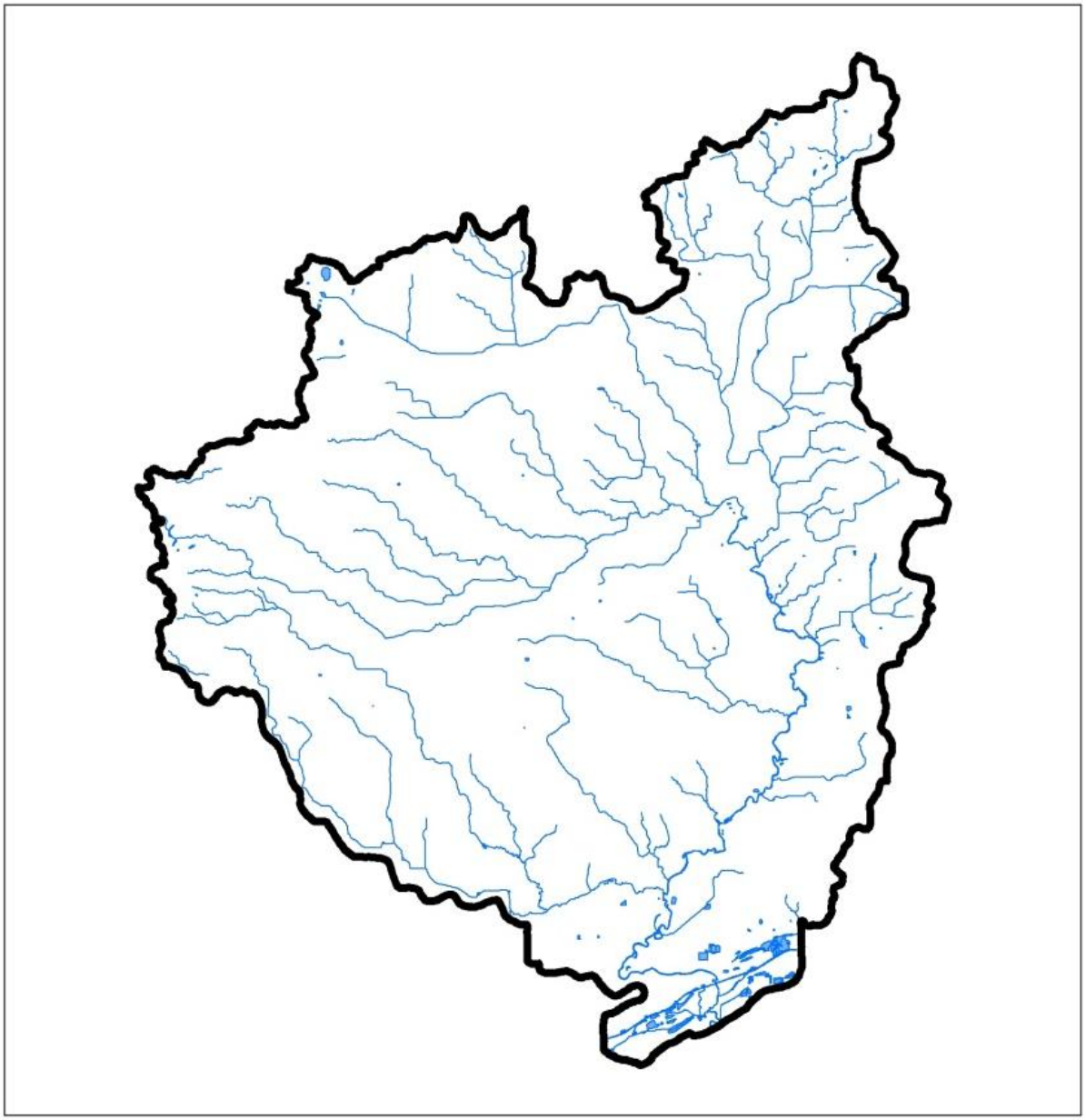

Figure 10 – Water bodies Within the Watershed (National Hydrography Dataset)

Saratoga Creek, Lisbon Creek, and the East, Middle, and West Aux Sable Creeks. Many portions of the creek have been channelized during the establishment of the agricultural fields to assist with drainage, irrigation, and maximization of farmable land.

As part of its Ambient Water Quality Monitoring Network, the Illinois Environmental Protection Agency (IEPA) routinely collects water quality data on the Aux Sable Creek at Route 6 in Grundy County. The Aux Sable was routinely sampled from 1979 to 1997 at this location. Review of water quality results for this station from October 1990 to June 1998 indicated generally good water quality conditions. Sixty-nine individual and separate sampling dates were reviewed and no violations of general use water quality standards were found. Forty-three fecal coliform bacteria samples were collected during this same period (10/90 through 6/98). General Use Water Quality Standards require the geometric mean of a minimum of 5 samples taken over a period of thirty (30) days not to exceed 200 colonies per 100 mL. This standard applies May through October, during months when contact with stream water could be expected. Although the IEPA sampling routine does not satisfy the requirements of the standard, several bacteria results did exceed the (non-geometric mean) 200 colony count limit.

The health of a stream can be determined by viewing the health of the biotic population as well as observing water quality. The use of macroinvertebrates to determine the health of a stream is a well-established practice. Pre-adult macroinvertebrates are relatively immobile; therefore, can indicate stream conditions in the weeks and even months prior to sampling. IEPA biologists collect macroinvertebrate samples in order to determine the condition of a stream. After the macroinvertebrates within the sample are identified, tolerance ratings for each taxon (species) are applied and a Macroinvertebrate Biotic Index (MBI) value is determined. MBI values range from 1 to 11, with lower values indicating better water quality and/or aquatic conditions. The most recent macroinvertebrate collection of July 2006 resulted in an MBI of 4.8 and a total taxa richness of 10 (very good) just north of Route 6 (Huff and Huff 2006). An MBI of less than 5 is generally considered to indicate high water quality conditions. Samples from two sites were studied in July 2006 at the Dellos Road crossing and about a half mile north of the Dellos Road crossing. The MBI was 6.1 and 6.2 respectively indicating fair water quality (Huff and Huff 2006).

The July 2006 assessment of portions of the south end of the Aux Sable Creek by Huff and Huff for the Akzo Nobel Antidegradation Analysis studied the biological and water qualities of the stream. Four sites were sampled along the stream, two north

of Route 6 and two north of Dellos Road. The two northern sites exhibited characteristics of a Class B stream, the site immediately south of Akzo Nobel varied, but is likely a Class C segment of stream and the site near Dellos Road is likely a Class B stream although it exhibits some characteristics of a Class C stream (for more information regarding Stream Class Ratings: http://www.dnr.state.il.us/orc/BioStrmRatings/). In 2008, the IDNR revised the stream rating system to include more recent data and to allow inclusion of several different indicator scores. Based on the revised rating systems, several reaches of streams within the Aux Sable Creek Watershed appear to be of moderate to significant quality for integrity (a systems wholeness and its ability to support organisms comparable to natural habitat of the region) and moderate quality for diversity (the variety of taxa within the stream segment). Maps illustrating the ratings and segments are included in Appendix 3.

Wetlands

Wetlands, areas typically saturated for a portion of the growing season that contain hydrophytic vegetation and hydric soils, are important resources which provide numerous functions relating to water quality and wildlife habitat. Wetlands are regulated both locally and federally in relation to protection from development.

National Wetlands Inventory for Aux Sable Creek Watershed Map (Figure 11) was produced using a data set published and digitized by the IDNR Illinois Natural History Survey from National Wetlands Inventory (NWI) 1:24,000 quad maps. The United States Fish and Wildlife Service (USFWS) produced the original quad maps and NRCS re-projected the data into UTM zone 16. In this coverage, wetlands and deepwater habitats are identified from 1980-1987 photography and based on USFWS definitions. Wetlands as small as .01 acres were digitized, however many farmed wetlands were not included. This data is not accurate enough to be a determination of size, shape, or position. This map shows the distribution and the types of wetlands that can be found in the Aux Sable Creek watershed. Table 5 lists all of the various wetland types that were identified in the Watershed the "Code" column is the symbols for each of the wetland types and the "Count" column provides the quantity of each wetland type. The deepwater habitats are identified by codes starting with L1 and R2. There were 513 wetlands identified totaling 2,116 acres. Other wetland information can be found on wetland maps at the local Soil and Water Conservation District and Natural Resources Conservation Service offices. These maps have an aerial photography base with wetlands and farmed wetlands indicated on agricultural land. The above mentioned sources are only guides and indicators where wetlands might be located. For the exact location and size of

wetlands, a delineation by a private qualified consultant or the agency with jurisdiction should be completed. An Advanced Identification (ADID) study for both Grundy and Kendall Counties would be a useful instrument in locating wetlands within the two counties, not just the Watershed. An ADID study is a United States EPA program designed to provide improved awareness of the locations, functions, and values of wetlands and other waters of the U.S. More specifically, it is intended to inform landowners, developers, and local governments that it may not be appropriate to fill or drain certain high quality wetland sites. ADID projects also can

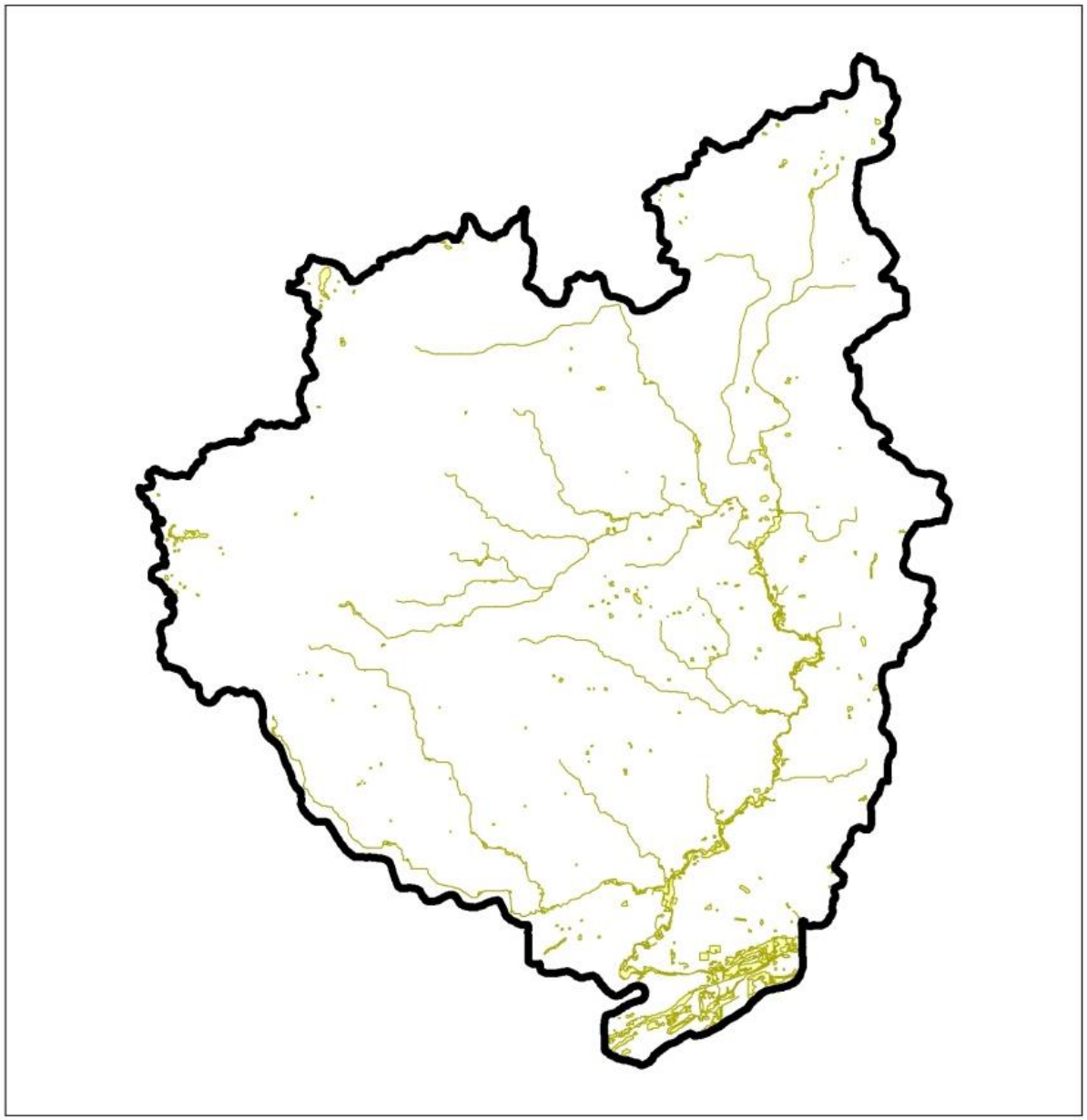

Figure 11 - NWI Wetlands (IDNR)

provide guidance on strategies for long-term protection and management of aquatic resources in an area. As part of the study, the value, importance, and function of wetlands would be emphasized. Other benefits of this study are that wetlands could be better protected with set back and buffer requirements or acquired and kept as open space by public agencies or municipalities.

Table 5: National Wetland Inventory Summary (USWFS)

General Category Description	Codes Included in Category	Count	Acres
Deep Water Lake	L1UBHH, L1UBHX	3	35
Shallow Water Lake	L2UBF	1	36
Forested / Emergent Deep Marsh	PEM/FO1F	1	<1
Shallow Marsh/ Wet Meadow	PEM/SS1, PEMA, PEMADF, PEMAF, PEMC, PEMCD, PEMCF, PEMCX	178	528
Deep Marsh	PEM1F/SS1F, PEM1F, PEMF, PEMFX	39	204
Broad-Leaved Deciduous Bottomland Forest	PFO1A, PFO1AH, PFO1C, PFO1CH	124	795
Swamp	PFO1F	1	4
Scrub-Shrub Wetland	PSS1A, PSS1C, PSS1F	21	76
Open Water Wetlands	PUBF, PUBFH, PUBFX, PUBG, PUBGH, PUBGX	127	291
Perennial Deepwater River	R2UBH, R2UBHX	18	147
Total Wetlands		**513**	**2,116**

Public Open Space

Significant areas of publicly owned land in the Watershed include the Baker Woods Forest Preserve (25 acres), the Illinois and Michigan Canal National Heritage Corridor, and the Aux Sable Railroad Prairie. The Kendall County Forest Preserve has recently acquired over 200 additional acres within the Watershed.

Biological Assessments

The Aux Sable Creek Watershed contains a wide variety of State and Federally listed threatened and endangered species and their required habitat. The Watershed contains many protected natural areas which enhance wildlife habitat

and populations in the Aux Sable Creek and adjacent areas. Three biological assessments have been performed along the Aux Sable Creek (Rung and Pescitelli 1998, Pescitelli and Rung 2004, and Huff and Huff 2006). While the 2004 study incorporated an area larger than just the Aux Sable Creek Watershed, the survey in the Watershed was completed at three sampling stations along the Aux Sable Creek. The northern station is located at the Route 52 Bridge downstream from where the three branches of the Aux Sable Creek converge (Figure 3). The second station is at the Route 6 Bridge near the USGS Gage Station. The southernmost station is located at the Cemetery Road and I&M Canal crossings of the creek, just upstream from the creek's confluence with the Illinois River.

Multiple fish, mussel, and invertebrate samplings were completed during the course of the studies. Of the areas included in the study and in the Watershed, there are 17 native mussel species, 48 species of fish, and 21 species of invertebrates in the Aux Sable Creek. Aux Sable Creek is home to seven species of fish considered Species in Special Need of Conservation by the Illinois DNR. The Greater Redhorse (*Moxostoma valenciennesi*), a State-listed endangered species, was inventoried at the Route 6 Bridge. Large-scale stonerollers (*Campostoma oligolepis*), previously identified as a relatively rare minnow species (Pescitelli and Rung 2004), was inventoried at the southern sampling station. Fourteen species of the sucker family (catostomid) were found in the Upper Illinois River Basin stations in the Mazon River, Aux Sable Creek, Nettle Creek, and Waupecon Creek.

Overall, the 2004 study concluded that the two downstream sampling stations had had an increase in the Index of Biotic Integrity (IBI), which indicates basic stream conditions on a 60 point scale (Table 6). Higher IBI scores generally indicate higher quality streams at the sampling points. The 2004 study had noted no perceptible habitat or water quality changes since the previous report so it is possible that the change in IBI from the previous studies could indicate that there is a natural variation in species diversity or conditions have changed elsewhere to have caused a change in the distribution of large river migrants. The IBI decreased at the northern sampling station and was lower than the other two stations during previous studies as well. This decrease could be for a variety of different reasons. The sampling station is located a great distance from the Illinois River and there is at least one dam which inhibits the ability of upstream migration to this sampling location. The stream in this area has a very small gradient which can allow siltation during low flow events. Both IDNR biological Surveys are included in Appendices 4 and 5 for future reference.

Table 6: Sample Locations for IDNR Biological Studies (Rung and Pescitelli 1998, Pescitelli and Rung 2004)

IDNR Station Code	Location	IBI		
		1998	1999	2004
DW-99	I and M Canal	N/A	46	53
DW-01	Route 6	52	49	59
DW-07	Route 52	42	N/A	36

The 2006 Study was completed along the southern stretch of the Aux Sable Creek to determine any possible negative effects of an increased Chloride load in effluent discharge into the creek from the Akzo Nobel chemical facility's land application system. Samples were taken from four sites, A-1 was located north of Route 6 and south of the Aux Sable Cemetery, A-2 was located just south of Minooka Road, C-1 was located immediately downstream of the Akzo Nobel outfall (south of the facility), and C-2 was taken at the Dellos Road and I&M Canal crossings of the creek. Based on the biological assessments, the study concluded that the biological diversity of the stream was dependent upon suitable habitat in the stream (Appendix 6). The study produced results similar to the 1999 IDNR study (Table 7) indicating that the stream is a good quality resource, but may not be as high quality as the IDNR 2004 study indicated, or the stream has a cyclical pattern in biological diversity.

The US Fish and Wildlife Service (USFWS), Illinois Department of Natural Resources (IDNR), and the Illinois Natural Heritage Database have all been consulted regarding the presence of threatened and endangered species and or natural areas in the Watershed. According to a preliminary EcoCAT consultation, the IDNR's web-based consulting tool, completed in December 2007 there are 30 natural areas and 59 endangered or threatened species (Appendix 7). The Aux Sable Creek is considered an Illinois Natural Areas Inventory (INAI) Site in the EcoCAT assessment.

According to the list of "Illinois Threatened and Endangered Species by County", prepared by the Illinois Natural Heritage Database (September 10, 2007), there are 10 endangered species and 9 threatened species in Kendall County, which consists of the majority of the project area. In Grundy County there are 12 endangered species and 13 threatened species located in the county. Exact locations of the last observations of the species are not included in this report to protect the individuals and their habitat. Will County was excluded from the search due to the small portion

of the county in the Watershed and the lack of habitat conditions which would support threatened or endangered species.

Table 7: Station Location and Index of Biotic Integrity for 2006 Akzo Nobel Antidegradation Analysis (Huff and Huff 2006)

Station	IDNR Equivalent Station	IBI		
		IDNR 1999	IDNR 2004	Huff & Huff 2006
A-1	DW-01	49	59	50
A-2	None	-	-	50
C-1	None	-	-	46
C-2	DW-99	46	53	46

The "Illinois list of Federally Endangered, Threatened, Proposed, and Candidate Species – by County" prepared by the United States Fish and Wildlife Service (USFWS) lists three species which may occur in Kendall County. These include Indiana Bat (*Myotis sodalis*), Eastern Prairie Fringed Orchid (*Platanthera leucophaea*), and Prairie Bush Clover (*Lespedeza leptostachya*). There are five species listed which may occur in Grundy County; including the three listed for Kendall County, there are also two species which are listed as candidate species or those that are in the process of being proposed as endangered or threatened species. These species are the Sheepnose mussel (*Plethobasus cyphyus*) and the Spectaclecase mussel (*Cumberlandia monodonta*).

There are no known occurrences of the Indiana Bat in either county, but their habitat consists of caves and mines, well developed riparian woods along small stream corridors, and large upland woodlots with many trees with sloughing bark. The Eastern Prairie Fringed Orchid is known to occur in Grundy County, but not Kendall. This plant can be found in wet to mesic prairies. The Prairie Bush Clover is not known to occur within the Watershed, but is typically found in dry to mesic prairies with gravelly soils. The two mussel species are typically found in large rivers with sand and gravel bottoms. The Sheepnose mussel prefers shallow waters with constant flow, while the Spectaclecase mussel prefers locations sheltered from the main current of rivers.

The Illinois Natural Areas Inventory (INAI) lists only one site in the Aux Sable Creek Watershed, the Aux Sable Railroad Prairie. A figure illustrating the location of this resource has not been included to protect any sensitive species which may inhabit the site. The Aux Sable Creek drains into the southern end of the INAI identified

stretch of the Illinois River. The Aux Sable Creek Watershed encompasses 187 square miles and 297 miles of tributary stream channels.

Woodlands

Based upon the Illinois Gap Analysis Project (IL-GAP), a remote sensing based project to map the vegetative cover of Illinois sponsored in part by the Illinois Natural History Survey, there are approximately 3,484 acres of woodlands within the watershed (INHS 2003). There are 1,558 acres of upland forests and 1,926 acres of floodplain forests. These numbers have not been ground confirmed or cataloged. IL-GAP does not map woodlands based on quality, but focuses more on plant community and land use on a fairly large resolution (30 meter^2).

CULTURAL RESOURCES

Population

The most recent United States Census (2000) indicates that 54,544 people reside in Kendall County and 37,535 people reside in Grundy County. Based on the percent coverage of the Watershed in the two counties (Table 8) and the assumption that each county's population is evenly distributed, there are 42,310 people residing in the Kendall County portion of the Watershed, and 8,224 people residing in the Grundy County portion. Based upon an aerial photo view of the Watershed boundaries and the limits of Will County, it is estimated that there are 20 people who reside in the Will County portion of the Watershed. The approximate population of the Watershed is 50,544 people. This number appears to grossly overestimate the population of the Watershed since a majority of the populated areas (Plainfield, Joliet, Yorkville, Oswego, Channahon, Morris, Minooka, and Shorewood) are located outside of the Watershed and most of the Watershed is in agriculture.

Table 8: Population and Projections of Various Municipal Corporations

Community	County	1990 Pop.	2000 Pop.	Current Pop.	2030 Pop. Projection
Newark	Kendall	840	887	-	-
Oswego	Kendall	3,949	13,326	-	-
Plano	Kendall	5,104	5,633	-	-

Community	County	1990 Pop.	2000 Pop.	Current Pop.	2030 Pop. Projection
Yorkville	Kendall	3,894	6,189	11,204[1]	-
Morris	Grundy	10,274	11,928	-	-
Minooka	Grundy / Will	2,561	1,388 (Will Only)	7,695[1]	5,372 (Will Only)
Channahon	Will	4,266	7,344	12,683[3]	22,231
Joliet	Will / Grundy	77,217	105,597 (Will Only)	-	140,824 (Will Only)
Shorewood	Will	6,264	7,686	13,822[2]	38,398
Plainfield	Will	4,557	13,038 (Will Only)	37,300[3]	110,439 (Will Only)

1-2005 Local Special Census
2-2006 Local Special Census
3-2007 Local Special Census

Using the 2000 US Census blocks (Figure 12) and an aerial photo, blocks covering only a small portion of the Watershed were omitted based upon their population contribution to the Watershed. The two northern census blocks (170938901003, 170938901004) inflate the overall watershed population because they include populations of Yorkville and Oswego from outside the Watershed. Removing them from the Watershed population count may adversely affect the total watershed population. On the eastern edge of the Watershed, the census blocks containing Plainfield, Joliet, Shorewood, Minooka, and Channahon were removed to eliminate extra population counts. Since a large majority of block 170630001002 lies within the Watershed boundaries and still includes a portion of Channahon outside of the Watershed, it was included. The Watershed population based upon the census blocks shown in Figure 12 for 2000 is 14,574 (Table 9).

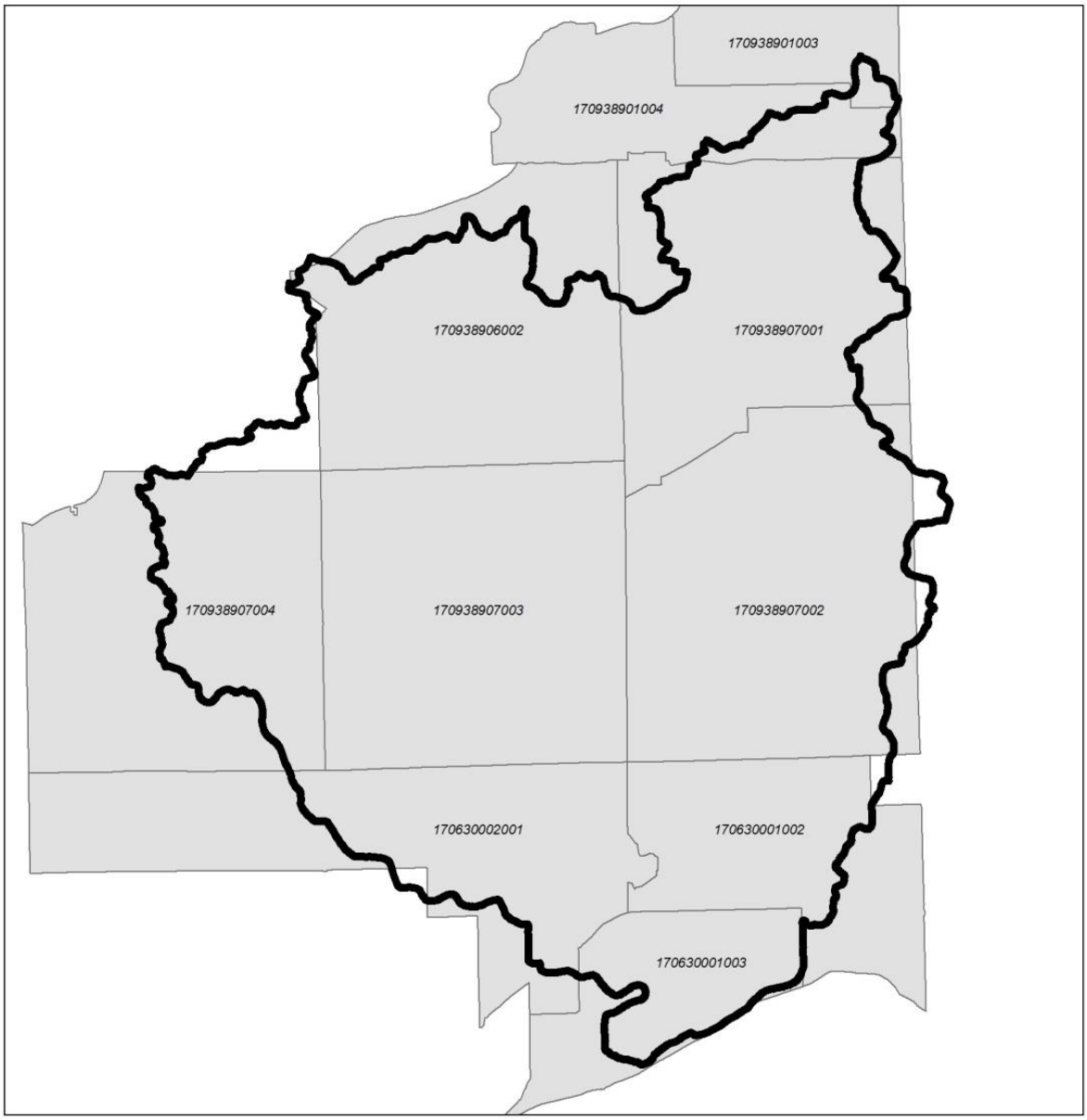

Figure 12 - US Census Blocks Included in Population Calculation for the Aux Sable Creek Watershed (US Census 2000)

Table 9: US Census Block Information (2000 US Census)

Block ID Num	2000 Pop.	2005 Pop.	Pop./mi^2 2000 Census	Pop./mi^2 2005 Pop.	Block Area (mi^2)
170630001002	2318	2929	115.4	145.8	20.09
170630001003	645	675	47.6	49.8	13.56
170630002001	1073	1218	33.0	37.4	32.55
170938901003	802	1065	74.1	98.4	10.82
170938901004	3982	5940	258.1	385.0	15.43
170938906002	1435	1831	43.4	55.4	33.03
170938907001	1195	1714	38.2	54.8	31.27
170938907002	1464	2292	38.4	60.1	38.12
170938907003	851	1094	23.3	29.9	36.60
170938907004	809	1005	23.4	29.1	34.59
Watershed Wide	**14,574**	**19,763**	**55**	**74**	**266**

Between the 1990 Census and the 2000 Census, there was a large increase in population in both counties (Figure 13). Based on projections from the Illinois Department of Commerce and Economic Opportunity, there is likely to be a 56% increase in Kendall County's population by 2030 and a 34% increase in Grundy County's population in the same time frame. Many of the communities around and partially included in the Watershed have completed special censuses since the 2000 US Census to verify their populations for a variety of reasons. These updated population counts are included in Table 9.

Oswego, Yorkville, Minooka, Channahon, Shorewood, and Plainfield have all doubled in population since the 1990 census. Plainfield, which has grown eight times larger in the last 17 years, had the largest population change.

Development Trends

With 94% of the Watershed currently in agriculture and many communities surrounding the Watershed, there is an opportunity for a great deal of development. Many communities are experiencing large increases in population and are projected to continue expanding. Joliet, Yorkville, and Plainfield have multiple large developments under construction. There are also three current development projects along Grove Road, north of Route 52, indicating a potential increase in population or residential center. Due to the recent downturn in the housing market, many developers have begun to scale back their residential developments. It is believed that the recent drop in the housing market will be temporary and the long term trend will be one of an increase in development.

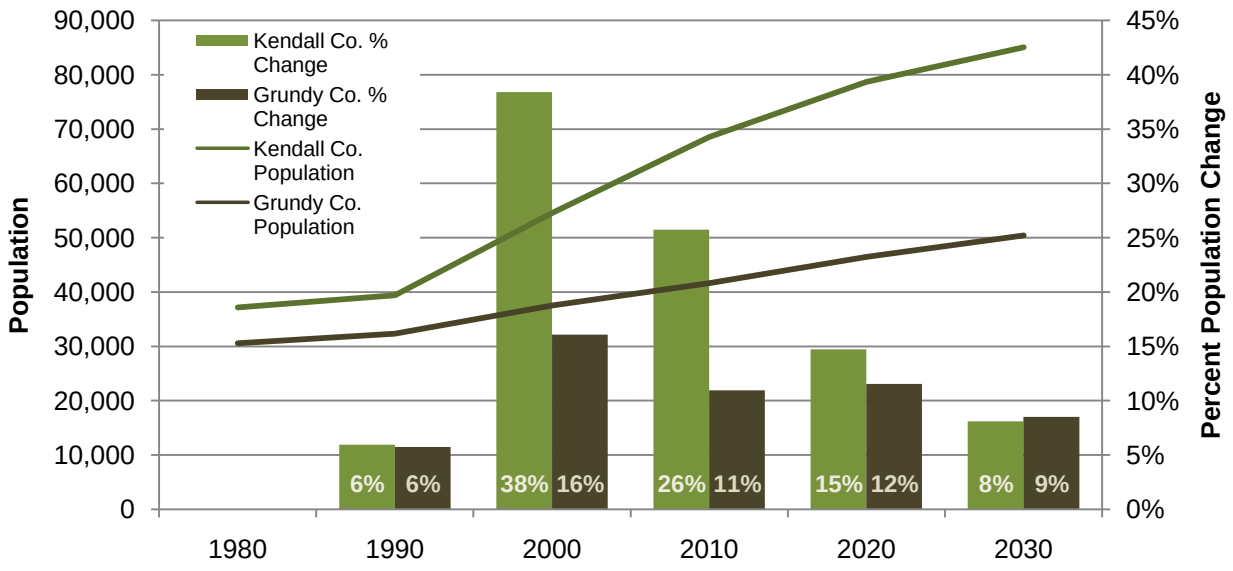

Figure 13 - Population Trends in Kendall and Grundy Counties
[1] Recorded Population- 1980, 1990, 2000 U.S. Census of Population and Housing
[2] Projected Population– IL Department of Commerce and Economic Opportunity

Impervious Cover

A major area (~2 square miles) of impervious cover is located in the southeast corner of the East Aux Sable Creek sub-watershed where multiple residential developments are currently under construction within the City of Joliet. Another major area is in the Lower Aux Sable Creek sub-watershed where multiple chemical manufacturing plants are located south of Interstate 80 and north of the Illinois River. The western portion of Minooka is the third largest source of impervious cover, located in the southeastern corner of the Minooka Branch sub-watershed. Other sources of impervious cover include the miles of roads within the Watershed as well as the individual homes and farm buildings.

Political Jurisdictions

The Aux Sable Creek Watershed has a relatively low number of residential developments. Located on the fringe of the Chicago Metropolitan area, urban sprawl has begun to creep into the eastern edge of the Watershed. Boundary agreements between Yorkville, Oswego, Plainfield, Joliet, Shorewood, Minooka, and Channahon have been provided (Figure 14) which indicates the extent to which the cities have agreed to allow expansion. The expansions of Shorewood and Minooka extend to approximately Grove Road. The smaller towns on the western side of the

Watershed, such as Lisbon and Plattville, have not yet prepared comprehensive plans or boundary agreements.

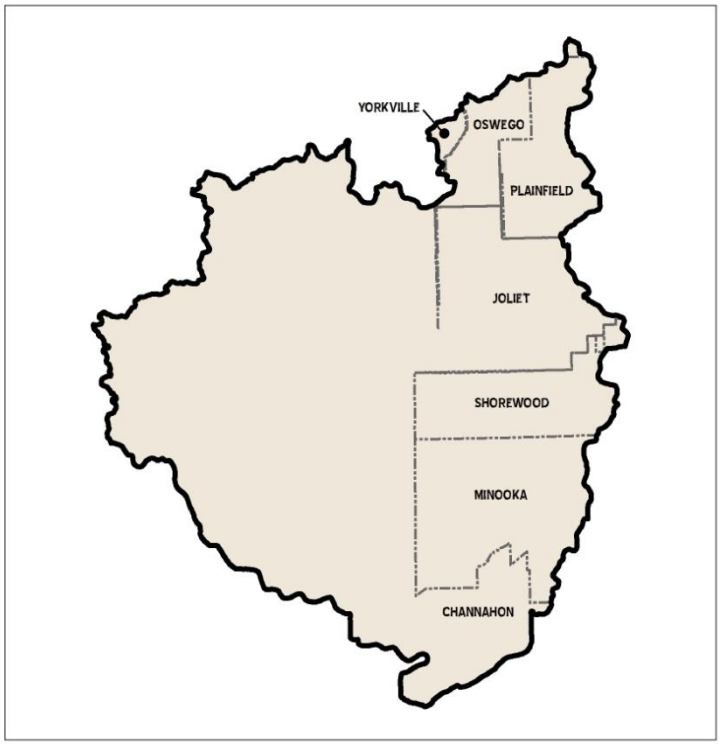

Figure 14 - Boundary Agreement Borders

CURRENT LAND USES

Agricultural

The land use in the Watershed is primarily agricultural. While the number of farms has decreased between 1997 and 2002, the average size of the farms has increased (Table 10). The primary livestock production within the Watershed is small cow/calf and confinement operations. About eighty percent of the agricultural land is a corn-soybean rotation with the remainder including small grain and hay. In addition, a small amount of vegetables are being grown in the extreme east and north of the Watershed. On agricultural land, conservation practices such as conservation tillage, crop residue management, grass waterways, terraces, water and sediment control basins, contour farming, buffer strips, and streambank stabilization are being used to reduce soil loss due to erosion. Both the local Natural Resource Conservation Service (NRCS) and the Soil and Water Conservation District (SWCD) offices provide assistance in planning and implementing conservation practices on agricultural lands.

There are no large scale tile investigations compiled for the Watershed. There are several farms which have noted that they have tiles on their property which outlet to some of the streams within the Watershed. There is evidence based on aerial photographs of the Watershed that channelization of many streams has occurred, but there are no published documents which outline modifications such as the creation of levees, tilling of fields, or channelization of the streams.

Table 10: Agricultural Statistics for Kendall and Grundy Counties (1997 and 2002 Census of Agriculture – USDA, National Agricultural Service)

	Kendall County	Grundy County
Land Area (sq. mi)	321	420
Population Density (P/sq. mi) (2002)	170	89
Population Density (P/sq. mi) (1997)	123	77
Number of Farms (2002)	412	407
Number of Farms (1997)	441	463
Difference (2002 – 1997)	-29	-56
Ave. Size of Farms (ac) (2002)	408	524
Ave. Size of Farms (ac) (1997)	380	435
Difference (2002 – 1997)	28	89
Total Farmed Land (2002) (ac)	168,082	213,467
Estimated Market Value of Land (2002) ($/ac)	4,206	3,096

Residential

The current residential density for the Watershed is low due to the high percentage of agricultural land use. There are few currently built out residential subdivisions along the eastern edge of the Watershed near the expanding cities of Plainfield, Joliet, and Minooka. Joliet and Shorewood have a large number of subdivisions planned and approved which will increase the population in the Watershed. There are two towns located wholly within the Watershed, Lisbon and Plattville. With the exception of new and recently completed developments, there are believed to be no public stormwater, water service, or sanitary sewers within the watershed.

Schools

There are two schools located within the Watershed, the Lisbon Grade School and Plainfield South High Schools. It is anticipated that newer large developments will also include schools to accommodate the increased population

Industrial

The major industrial area in the Watershed is along the south side of Route 6 east of Aux Sable Creek, north of the CSX Railway, and west of Channahon. This area was previously designated as one of three major heavy industrial corridors in Grundy County (Grundy County Comprehensive Plan). The companies occupying the corridor include Akzo Nobel Surfactants producing a variety of industrial chemicals, Equistar Chemicals (a Lyondell Company) producing petrochemicals, Sapa Extrusions producing aluminum products, Kinder Morgan storing and transferring a variety of Natural Gas products, Nova Stone selling and distributing architectural landscape materials, A&R Transportation providing over-the-road and rail service transport services and storage, and Aux Sable Liquid Products' (ASLP) NGL Facility processing a variety of natural gas based products (ethane, propane, butane, iso-butane and natural gasoline). ASLP has three pipelines which connect their facility to the surrounding chemical manufacturers as well as the nearby Kinder Morgan transfer facility and petroleum refineries (out of the Watershed). These companies transport their products via rail car on the CSX tracks which also connect to and are partially operated by the Elgin Joliet & Eastern Railway.

Mining

There are three mines currently operating in the Aux Sable Creek Watershed. The Avery Quarry, previously operated by Valley Run Stone, now under the ownership of Vulcan Materials, is located on the south side of Joliet Road immediately west of Valley Run. The Central Limestone Co. Quarry is located on the southwest corner of Joliet Road and Route 47. The Northfield Block Company, an Old Castle Company, operates a quarry in Morris along East Bungalow Road. All three mines are currently producing crushed aggregate for construction and building materials.

There are two applications for mining operations permits within the Watershed. One is a mine to be operated by Vulcan Materials immediately north of Central Limestone Co. Quarry. The other proposed mine is the Weitendorf Quarry to be operated by Prairie Materials. Both quarries are proposed to mine crushed aggregate materials for construction and building materials.

In the southern end of the Watershed, along the existing CSX railroad tracks, there are several abandoned coal mines which have been abandoned as recently as 1954 (ISGS 2007). These mines were harvesting coal from the northern limits of the Colchester Coal seam in the Pennsylvanian Extent.

Transportation

The primary means of transportation through the Watershed is along the 346 miles of roads. Interstate 80 crosses from the northeast to southwest along the bottom portion of the Watershed. This is the only limited access roadway in the Watershed. There are plans by the Illinois Department of Transportation to complete the Prairie Parkway, a north-south limited access roadway which will connect Interstate 88 (north of the Watershed) to Interstate 80.

To assist in the transport of industrial products, there is a length of railroad operated by CSX in the southern portion of the Watershed. There are no public railroad stations, airports, or other means of public transportation within the Watershed.

EXISTING WATER PROTECTION PROGRAMS

National Pollutant Discharge Elimination System

The main form of water quality protection in the Watershed lies within the auspices of the National Pollutant Discharge Elimination System (NPDES) which has its origin in the Federal Clean Water Act Amendments of 1987. The Act called for implementation of the program in two phases. Phase 1, addressing the most significant sources of pollution in stormwater runoff was completed in March 2001. Phase 2 addresses the other sources of pollution in stormwater runoff, mostly from construction sites and municipal storm sewers. Summary of the Storm Water Phase II Rules as published in the December 8, 1999 Federal Register:

- Municipalities located in urban areas as defined by the Census Bureau are required to obtain NPDES permit coverage for discharges from their municipal separate storm sewer systems (MS4s). Municipalities located outside of urbanized areas may need to comply within 180 days notice or as determined by the NPDES Permitting Authority.
- Beginning on March 10, 2003, construction sites that disturb one acre or more are required to have coverage under the NPDES general permit for storm water discharges from construction site activities.

- Municipalities under a population of 100,000 will no longer be exempt from the construction site storm water requirements and the industrial storm water requirements effective March 10, 2003. (WWTPs 1.0 mgd or more will need a General Storm Water Permit for Industrial Activities)
- Definition of industrial storm water has been revised to expand the "no-exposure" exemption to all industrial categories except construction.

Currently there are 23 NPDES permits issued within the Watershed (Table 11). Of these, 11 are general permits (ILR40) issued to MS4s which are located wholly or partially in the Watershed. Three of the permits are general permits (ILR10) issued to construction sites. The remaining permits have been issued for industrial or mining activities.

Table 11: NPDES Permits Issued Within the Aux Sable Creek Watershed (IEPA)

Permit No./ Permit Type	Facility Name	Address	Receiving Waters	Permit Issued	Permit Expires
ILR10H801 Construction	47 Asphalt Company	10425 Joliet Road Newark, IL 60541	Valley Run Creek	May 30, 2007	May 31, 2008
IL0026069 Industrial	Akzo Nobel Surface Chemistry	8005 N. Tabler Road Morris, IL 60450	Aux Sable Creek	March 22, 2007	April 30, 2012
IL0034631 Industrial	Alcoa Extrusions Inc.	555 E. Highway 6 Morris, IL 60450	Trib. Of Aux Sable Creek	August 31, 2007	September 30, 2012
IL0026662 Industrial	Aux Sable Liquid Products, LP	6155 E. Route 6 Morris, IL 60450	Illinois River	June 2, 2000	May 31, 2005
ILG840133 Mining	Central Limestone CO-Morris	16805 Quarry Road Morris, IL 60450	Valley Run Creek	July 13, 2007	November 30, 2011
IL0002917 Industrial	Equistar Chemicals, LP	8805 N. Tabler Road Morris, IL 60450	Illinois River; Aux Sable Creek	February 17, 1998	February 28, 2003
ILR10H347 Construction	Distribution Center	International Blvd Minooka, IL 60447	Trib. Of Aux Sable Creek	March 19, 2007	May 31, 2008
ILR002156 Industrial	John O'Brien Trucking	211 W. Joliet Road Newark, IL 60541	Not Provided	June 1, 2003	June 1, 2008
ILR400261 MS4	County of Kendall	111 W. Fox Street Yorkville, IL 60560	Fox River	September 23, 2004	February 29, 2008
ILR400584 MS4	Township of Kendall	9513 Walker Road Yorkville, IL 60560	Not Provided	March 21, 2005	February 29, 2008
ILR10H833 Construction	Lisbon Quarry Asphalt Plant	Near Route 47 and Joliet Road Lisbon, IL 60541	Valley Run Creek	June 13, 2007	May 31, 2008
ILR400104 MS4	Township of Oswego	162 N. Madison St Oswego, IL 60543	Not Provided	March 21, 2005	February 29, 2008
IL0045951 Industrial	Shady Oaks MHP-Minooka	Oak Street & Shady Oak Road Minooka, IL 60447	Aux Sable Creek	January 12, 2005	February 28, 2010
ILR006427 Industrial	Utility Concrete Products	2495 W. Bungalow Road Morris, IL 60450	Not Provided	Not Provided	Not Provided
ILR400638 MS4	Village of Minooka	121 E. Mcevilly Road Minooka, IL 60447	DuPage River	September 27, 2004	February 29, 2008

Permit No./ Permit Type	Facility Name	Address	Receiving Waters	Permit Issued	Permit Expires
ILR400415 MS4	Village of Oswego	113 Main Street Oswego, IL 60543	Fox River	October 4, 2004	February 29, 2008
ILR400426 MS4	Village of Plainfield	835 W 143rd St Plainfield, IL 60544	Not Provided	December 20, 2002	February 29, 2008
ILR400445 MS4	Village of Shorewood	Not Provided	DuPage River; Hammel Creek; Unnamed Trib. To DuPage River	October 6, 2004	February 28, 2008
ILR400554 MS4	City of Yorkville	800 Game Farm Road Yorkville, IL 60560	Fox River	October 12, 2004	February 29, 2008
ILG840129 Mining	Vulcan Construction-Lisbon Quarry	10425 Joliet Road Lisbon, IL 60541	Valley Run Creek	July 11, 2007	November 30, 2011
ILR400361 MS4	City of Joliet	150 W Jefferson Street	Des Plaines River, DuPage River, Thorne Creek, Sugar Run Creek, Spring Creek, Hickory Creek, Cedar Creek, Aux Sable Creek, Rock Run Creek	September 23, 2004	Renewed Annually
ILR400623 MS4	Village of Channahon	24555 S Navajo Drive Channahon, IL 60410	Any surface water of the state	September 20, 2004	February 29, 2008

Local Ordinances

To protect areas from flooding and to control the amount of water displaced during development, many areas have enacted stormwater management ordinances (Table 12). These ordinances often have provisions for the amount of stormwater which needs to be detained on a site and the rate at which it can be released. There are also provisions for types of stormwater facilities which are allowed on sites. There are other types of ordinances, like the Will County Stream and Wetland Protection Ordinance, which prohibit development in certain types of natural resources that provide a variety of functions and are worthy of protection. These ordinances provide information on types of resources that are to be protected, means of which to protect them, and means for mitigating impacts to them during development. At the time of this report, there is little coverage of water quality requirements in the present ordinances.

Table 12: Ordinances Which Regulate Stormwater, Wetlands, or Protected Resources

Municipality/ Township/ County	Name of Ordinance	Date Adopted	Most Recent Amendment
Oswego	Village Code of the Village of Oswego	October 7, 1974	March 22, 2004
Plainfield	Code of Ordinances Village of Plainfield	July 18, 1988	February 25, 2002
Yorkville	Wetland Protection Regulation Ordinance	January 1, 2008	
Yorkville	Subdivision Control Regulations	September 2004	
Yorkville	Standard Specifications for Improvements	September 2004	
Yorkville	Soil Erosion and Sediment Control Ordinance	March 2003	
Channahon	Stormwater Detention Regulations	November 1, 1995	September 21, 2004
Channahon	Comprehensive Plan	May 7, 1973	March 18, 1996
Channahon	Flood Hazard Prevention	October 2, 1989	November 4, 1996
Channahon	Subdivision Development	March 6, 1978	May 20, 2002
Channahon	Soil Erosion Regulations	November 20, 1995	
Joliet	Code of Ordinances City of Joliet	March 3, 1970	December 1, 1993
Joliet	Aux Sable Creek Protection Area	March 24, 2003	
Joliet	Subdivision Regulations of the City of Joliet	October 16, 1979	
Minooka	The Village Code of Minooka	1997	
Shorewood	The Village Code of Shorewood	August 11, 1992	November 25, 2003
Oswego Township	Kendall County Land Resource Management Plan 2006	March 1994	
Fox Township	Kendall County Land Resource Management Plan 2006	March 1994	2005
Kendall Township	Kendall County Land Resource Management Plan 2006	March 1994	2005

Municipality/ Township/ County	Name of Ordinance	Date Adopted	Most Recent Amendment
Na-Au-Say Township	Kendall County Land Resource Management Plan 2006	March 1994	2003
Big Grove Township	Kendall County Land Resource Management Plan 2006	March 1994	2002
Lisbon Township	Kendall County Land Resource Management Plan 2006	March 1994	2005
Seward Township	Kendall County Land Resource Management Plan 2006	March 1994	2005
Kendall County	County of Kendall Stormwater Management Ordinance	September 2002	
Kendall County	County of Kendall Floodplain Ordinance	September 2002	
Kendall County	County of Kendall Soil Erosion and Sediment Control Ordinance	July 2006	
Will County	Flood Damage Prevention Ordinance	February 19, 1998	May 20, 1999
Will County	Soil Erosion and Sedimentation Control Ordinance	February 19, 1998	May 20, 1999
Will County	Stormwater Drainage and Detention Ordinance	February 19, 1998	October 15, 1998
Will County	Stream and Wetland Protection Ordinance	March 19, 1998	
Will County	Will County Stormwater Management Ordinance	October 17, 2002	March 18, 2004
Grundy County	Grundy County 2020 Comprehensive Plan	September 27, 2004	
Grundy County	Grundy County Zoning Ordinance	January 14, 1997	
Grundy County	Grundy County Subdivision Regulations	2004	

Federal Regulations

Under Section 404 of the Clean Water Act, the United States Army Corps of Engineers (USACE) regulates the discharge of dredged or fill material into jurisdictional waters of the US, including wetlands which are hydrologically

connected to waters of the US. Generally, the applicant must satisfy the USACE that the plans submitted completely meet the following before federal authorization by the USACE is issued:

(1) Avoid Wetlands and Waters of the US to the maximum extent possible;
(2) Minimize fill of Wetland and Waters of the US; and
(3) Provide compensatory mitigation for impacts that cannot be avoided.

The Rock Island District, which regulates a large portion of northern Illinois including the Aux Sable Creek Watershed, issues two kinds of permits for impacts to jurisdictional waters of the US/wetlands: Nationwide Permits (NWP) and individual permits (IP). NWP's are usually issued for projects which contain similar circumstances (i.e. residential developments, recreational developments, utilities, etc.) that have minimal impacts (currently greater than 0.10-acres and less than 1.5-acres). IP's are usually issued for projects that involve wetland impacts greater than 1.5-acres, unusual circumstances, etc. Permit type is at the discretion of the USACE.

The US Environmental Protection Agency (USEPA) along with the IEPA regulates pollutant discharges with the NPDES program discussed in earlier in this Chapter.

The Mitigation Directorate, a component of the Federal Emergency Management Agency (FEMA), manages the National Flood Insurance Program (NFIP). The three components of the NFIP are:

- Flood Insurance
- Floodplain Management
- Flood Hazard Mapping

Nearly 20,000 communities across the United States and its territories participate in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in these communities. Community participation in the NFIP is voluntary and a list of the active floodplain management ordinances in the Watershed is listed in Table12.

Flood insurance is designed to provide an alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods. In addition to providing flood insurance and reducing flood damages through floodplain management regulations, the NFIP identifies and maps

the nation's floodplains. Mapping flood hazards create broad-based awareness of the flood hazards and provides the data needed for floodplain management programs and to actuarially rate new construction for flood insurance.

State Regulations

In relevance to the Watershed, the IDNR - Office of Water Resources (OWR) regulates construction in the floodways of rivers and streams; regulates construction of appropriate uses in designated floodways in northeastern Illinois; protects public bodies of water from private encroachment; regulates dam safety; coordinates National Flood Insurance Program; plans the conservation of water resources; plans and constructs projects to assist units of local government urban flood damage reduction including acquisition of flood-prone properties; represents Illinois in three river basin commissions and national organizations of water resources, floodplain management, urban flood control and dam safety officials; is lead state agency for federal urban flood control and navigation projects, state water planning, and state water laws and policies.

The OWR consists of five divisions: Water Resource Planning, Project Implementation, Water Resource Management, Program Development, and Administrative Services. The Division of Water Resource Management (DWRM) issues permits to demonstrate compliance with its regulatory programs. The Division issues permits for work in and along the rivers lakes and streams of the state for activities in and along the public waters, and for the construction and maintenance of dams. Prior to 1995, DWRM was part of the Illinois Department of Transportation. All permits for work in water issued by the Department of Transportation are now administered by DWRM. Generally, the division issues an individual formal permit to the applicant to demonstrate compliance with the rules. In some cases, the Division has issued statewide, regional, and general permits to reduce paperwork for the applicant. The statewide and regional permits describe a general project type and set limits on the scope of the work.

The permits which OWR grants are for the following areas as authorized by the Rivers, Lakes, and Streams Act [615 ILCS]:

- Construction in Floodways of Rivers, Lakes, and Streams
- Construction and Maintenance of Dams
- Regulation of Public Waters
- Regulation of Construction within Floodplains

The IEPA, in cooperation with the USEPA, administers the NPDES program discussed earlier in this Chapter.

Illinois Water Quality Standards

Subpart B: General Use Water Quality Standards of 35 Ill. Adm. Code 302 (Environmental Protection – Water Quality Standards) apply to the section of the Aux Sable Creek (ILDW01) which is currently listed as impaired on the IEPA 303(d) list (IEPA 2004). The remaining segments of streams within the watershed are bound to the water quality standards of Subpart D: Secondary Contact and Indigenous Aquatic Life Standards. Currently, the Dissolved Oxygen Standard (35 Ill. Adm. Code 302.206) is under review by the Illinois Pollution Control Board to better reflect the natural variations.

CHAPTER 3: IMPAIRMENTS IN THE WATERSHED

TYPES OF IMPAIRMENTS / CAUSATIVE AGENTS

On an annual basis, the IEPA reports the quality of the surface water and ground water resources to the United States Environmental Protection Agency (USEPA) as required in Sections 305(b), 303(d), and 314 of the Clean Water Act. Reports were previously compiled separately for each of the Sections, 305(b) for surface water quality and uses, 303(d) for a list of quality-impaired waters, and 314 for publicly owned lakes. As of 2006, the reports are compiled into one "Integrated Report" which contains all the required information. The "Integrated Report" includes analysis of the resources of Illinois including the designated use(s), the levels of support of the designated use(s), a list of identified impairments of non-supporting resources, and a list of potential sources of the identified impairments.

Illinois waters are designated for various uses including aquatic life, agricultural use, primary contact (swimming), fish consumption, industrial use, and several others (IEPA 2004). These designated uses are also considered beneficial uses, or the most likely use of the water resource. To determine whether the quality of the resources are supporting or impairing the designated use, the Illinois Pollution Control Board (IPCB) is responsible for determining the water quality standards that apply for each use. The IEPA is responsible for proposing scientifically based water quality standards to the IPCB for adoption into the state standards. Based on whether or not the water quality standards are being met, basic categories or "Degrees of Support" are identified for each stream segment and its designated uses. These levels are listed as Fully Supporting (Good), meeting the applicable standards and generally good quality, Not Supporting (Fair), exceeds standard on rare occasion or within safe levels and generally fair condition, and Not Supporting (Poor), exceeds standards and generally poor quality. If the resource achieves a Not Supporting designation, the potential pollutant(s) are identified which may be causing the impairment (IEPA 2008). The Not Supporting (Fair) has replaced the Partially Supporting Designation (IEPA 2008, IEPA 2004).

Due to time constraints, budget, and means of recording/processing data, not every resource is surveyed and analyzed each year. All of the resources are resurveyed or analyzed over a five year period. The Aux Sable Creek Watershed was part of the subset of Illinois River Watershed which was in the analysis cycle in 2004. In general, there is a two year lag in presenting data for the reports (IEPA 2004).

For inventory purposes, the IEPA has identified the streams in the Aux Sable Creek Watershed and evaluated them to verify that they are meeting the requirements of their respective designated uses (Table 13, Table 14). General Use Water Quality Standards, as identified by the Illinois Pollution Control Board (IEPA 2004, 2008), apply to Aux Sable Creek and its tributaries. "Primary Contact" is identified as "…any recreational or other water use in which there is prolonged and intimate contact with the water involving considerable risk of ingesting water in quantities sufficient to pose a significant health hazard, such as swimming and waterskiing" (35 Ill. Adm. Code 301.355). In preparing assessments of "Primary Contact" streams, the primary pollutant examined is Fecal Coliform.

Table 13: IEPA Stream Segments, Designated Use, and Support Status (IEPA 2004)

Segment Name	IEPA ID	Designated Use	Use Support Status	Identified Impairment
Aux Sable Cr.	DW 01	Aquatic Life	Full	n/a
Aux Sable Cr.	DW 01	Fish Consumption	Full	n/a
Aux Sable Cr.	DW 01	Primary Contact (Swimming)	Partial	Fecal Coliform Bacteria
Collins Run	DWB	Aquatic Life	Not Evaluated	n/a
Saratoga Cr.	DWBA	Aquatic Life	Not Evaluated	n/a
Valley Run	DWBB	Aquatic Life	Not Evaluated	n/a
Walley Run	DWC	Aquatic Life	Not Evaluated	n/a
E. Aux Sable Cr.	DWD 01	Aquatic Life	Not Evaluated	n/a
Aux Sable Cr.	DWE	Aquatic Life	Not Evaluated	n/a
Lisbon Cr.	DWEA	Aquatic Life	Not Evaluated	n/a
Middle Aux Sable Cr.	DWF 01	Aquatic Life	Not Evaluated	n/a

Table 14: IEPA 303(d) Aux Sable Creek Watershed Stream Segments, Designated Use, and Impairments (IEPA 2008).

Segment Name	HUC ID#	IEPA ID	Designated Use	Miles/Acres	Identified Impairment
Aux Sable Cr.	0712000501	DW 01	Primary Contact (Recreational)	20.54	Fecal Coliform Bacteria

The streams in the Aux Sable Creek Watershed sustain aquatic life and can be assessed in terms of whether or not impairments exist (IEPA 2004). Assessments for support of Aquatic Life are based on available biological information, physiochemical data, and physical habitat data from the Intensive Basin Survey, Ambient Water Quality Monitoring Network, or Facility-Related Stream Survey programs (IEPA 2008). In the Aux Sable Creek Watershed, The Illinois EcoWatch Network of citizen scientists has been and continues to gather data in the Watershed which can also be used to assist in determining if the designated uses are being supported. Levels of attainment of support are based upon the quality of aquatic life present in the stream, the amount of available habitat, and the frequency of exceedance of specific water quality standards. The smaller streams were evaluated but not monitored by the IEPA in 2004. This means that data used to analyze the streams was not necessarily as accurate as the data from the Aux Sable Creek, which was monitored. The types of data likely used for these streams were data more than 5 years old or volunteer data which has not gone through the IEPA quality control process.

Other impairments not specifically identified by the IEPA have been identified by members of the Aux Sable Creek Watershed Steering Committee. These impairments are addressed elsewhere in this chapter. Means to preventing or eliminating these impairments are addressed in Chapters 4 and 5.

SOURCES OF IMPAIRMENTS

In assessing levels of support for Primary Contact use streams, Fecal Coliform is the only impairment reviewed by the IEPA. Fecal Coliform is a series of bacteria which typically indicate the presence of feces from humans and/or animals in the water. Contaminated water may enter the stream from stormwater runoff which has encountered residual fecal matter along the banks or adjacent fields. Human septic systems discharging directly into the stream or failing at the surface with effluent being carried in stormwater runoff can also contribute to increased levels of high Fecal Coliform. The bacteria may also enter the stream through direct discharge of fecal matter from birds or animals. Within the Watershed, the presence of aquatic fowl and cattle in the streams can contribute greatly to levels of Fecal Coliform measured.

Aquatic Life support assessments are based on available biological assessments. Habitat and physio-chemical data are used to assist in the support attainment assessment when only one biological collection is available (IEPA 2008). Sources of impairments can include dams or other structures that limit the movement of

aquatic species, disturbance in the creek creating high amounts of sediment deposition, lack of available habitat, and increased amounts chemical impairments. A summary of the previous assessments of the Aux Sable Creek indicates that there are no impairments which hamper the supporting of the Aquatic Life use as detailed by the IEPA (Huff and Huff 2006, IEPA 2008).

Impairments associated with flooding may not necessarily contribute to not supporting the designated IEPA defined uses. Flooding along the streams may be caused by the installation of undersized culverts, debris blocking the stream, drain tiles which may have been crushed, plugged, or disconnected, and structures in the creek which may restrict flow.

EXISTING IMPAIRMENTS

The 2004 IEPA Water Quality Report indicated that one section of the Aux Sable Creek (DW01) had higher than allowed quantities of Fecal Coliform Bacteria from an unknown source. Unverified sources of Fecal Coliform Bacteria include livestock and waterfowl defecating or tracking defecated materials into the stream. Open water ponds with mowed turf grass at the edge are prime habitat for various types of waterfowl.

Verbal reports have indicated several areas where livestock are allowed access to the stream. Visual observations of grazed pastures along the banks of the Aux Sable Creek as well as hoof prints in the banks indicate the ingress and egress of livestock into and out of the stream. As of the printing of this report, no pictures have been presented recording instances of livestock in the stream. Another source of Fecal Coliform can be attributed to untreated stormwater runoff from pastures which contain livestock waste which flows directly into the creek or its tributaries.

An additional source of fecal coliform bacteria could be from poorly functioning or failing septic systems which may leach fecal matter into stormwater runoff which can drain into the creek. Currently, there are no published maps of septic systems in the Watershed, but most residences built prior to 2000 are not on a public sewage system.

The following list of impairments (Table 15) was identified by the members of the Aux Sable Creek Watershed Steering Committee as potential or existing sources of impairments within the Watershed. “Existing” impairments are those that are known to occur. “Potential” impairments have been identified as impairments which may occur based on, local information, currently available permits, or local

comprehensive plans. Impairments listed as "Unlikely" are those which have not been identified as occurring in the sub-watersheds or are not identified to occur based on the local comprehensive plans. The listed impairments are not tied to specific designated uses of the streams or specific locations.

Table 15: Stream Impairments and Causes Identified By the Aux Sable Creek Watershed Steering Committee Listed By Sub-Watershed as Either Unlikely Impairment, Existing Impairment, or Potential Impairment.

Impairment	East Aux Sable	Middle Aux Sable	Lisbon Creek	Saratoga Creek	Walley Run	Minooka Branch
Fecal Coliform	Potential	Potential	Potential	Potential	Potential	Potential
Residential Development	Existing/ Potential	Existing/ Potential	Existing/ Potential	Existing/ Potential	Existing/ Potential	Existing/ Potential
Commercial Development	Existing/ Potential	Existing/ Potential	Existing/ Potential	Existing/ Potential	Existing/ Potential	Existing/ Potential
Industrial Development	Unlikely	Unlikely	Unlikely	Existing/ Potential	Existing/ Potential	Existing/ Potential
Mining/Quarries	Unlikely	Unlikely	Existing/ Potential	Existing/ Potential	Unlikely	Unlikely
Nutrient Loading/ Fertilizer Use	Existing/ Potential	Existing/ Potential	Existing/ Potential	Existing/ Potential	Existing/ Potential	Existing/ Potential
Undersized Culverts	Existing	Existing	Existing	Existing	Existing	Existing
Discontinuous Drainage	Existing	Existing	Existing	Existing	Existing	Existing
Erosion of Stream Banks	Existing	Existing	Existing	Existing	Existing	Existing
Fallen Trees/Debris in Creek	Existing	Existing	Existing	Existing	Existing	Existing
Sewage or Septic Failures	Existing	Existing	Existing	Existing	Existing	Existing
Improperly Constructed Bridges/Structures	Existing	Existing	Existing	Existing	Existing	Existing
Crushed/Undersized Drainage Tiles	Existing	Existing	Existing	Existing	Existing	Existing

Impairment	East Aux Sable	Middle Aux Sable	Lisbon Creek	Saratoga Creek	Walley Run	Minooka Branch
Buried/ Submerged Outfalls	Existing	Existing	Existing	Existing	Existing	Existing
Prairie Parkway and Associated Traffic	Potential	Potential	Potential	Potential	Potential	Potential

POTENTIAL FUTURE IMPAIRMENTS

The most noted concern and one of the reasons for initiating the update of the Watershed plan, is to address the concern of potential rapid urbanization that has started to occur in the predominantly agricultural watershed. Urbanization, if improperly managed or designed, can cause a variety of impairments. Increased traffic and traffic related pollutants can be deposited throughout the Watershed which can be transported into the streams through stormwater runoff. The change in surface characteristics can alter the natural drainage patterns by either increasing or decreasing the amount of stormwater runoff reaching certain areas of the Watershed. In general, the impoundment and release of stormwater with the use of storm sewer and stormwater detention basins can increase the initial amount of water discharging to the streams and cause more erosion to the channels.

In addition to the change in surface characteristic altering the amount of runoff reaching the streams, the temperature change of the runoff can also be considered an impairment. An increase in temperature can cause a decrease in available nutrients to aquatic species or increase the concentration of naturally occurring compounds which may be toxic in large quantities to some animals. Some species are physically sensitive to changes in temperature and an increase by only a few degrees can be fatal. Urbanization typically increases the temperature of streams by removing the shade trees and vegetation and increasing the amount of dark colored surfaces which absorb heat.

Rapid urbanization can also include the development of commercial and industrial areas as well. Without proper precautions and design, commercial and industrial areas can contribute pollutants and impairments to the Watershed. Increased levels of chemicals can be discharged into the Watershed as waste products or as chemical spills. Pollutant discharges may also come from exhaust through the air, noise from traffic and machinery, and permitted discharges of waste water.

Another potential impairment concern addressed within the committee is excess nutrients reaching the water from untreated stormwater runoff from the improper fertilization and herbiciding of residential lawns and agricultural fields. In recent years, the use of chemicals has become more controlled due to governmental mandating (Department of Agriculture) training and licensing of proper pesticide/herbicide application which needs to be renewed every three years. Residential fertilization is far less controlled due to the ability of individual landowners being able to purchase and apply less restrictive chemicals. Fertilizers used in lawns may be washed away during storm events and degrade water quality if not properly treated before reaching the streams. The increased regulation of nutrient application has not prevented additional chemicals from being introduced to waterways. Residents may dump used household chemicals into storm sewers instead of properly disposing of them.

An additional potential impairment identified by the committee is associated with further development of mining within the Watershed. Several quarries are located in the Lisbon Creek, Saratoga Creek, and Lower Aux Sable Creek sub-watersheds. There are several quarries proposed adjacent to existing mines near Lisbon. Mines can cause impairments to the Watershed due to increased traffic hauling materials out of the quarries. Improper drainage controls and stormwater treatment within the property can cause dust and fine particulates to be washed into the streams increasing turbidity. Increased turbidity, the amount of suspended sediment causing cloudiness, can negatively affect the health and habitat of aquatic wildlife.

CHAPTER 4: AGRICULTURAL MANAGEMENT PRACTICES AND PROGRAMS

INTRODUCTION

The current high quality condition of much of the Aux Sable Creek system is due, in large part, to quality agricultural practices and good stewardship. The agricultural community within the Aux Sable Creek Watershed includes grain producers, grain producers with livestock operations, and livestock operations only.

A spectrum of best management practices is available for agricultural lands. As the Watershed changes, and as agricultural lands become a smaller portion of each sub-watershed, the transition from rural to urban-rural to urban will require more focus on the importance of good land management. These pressures are currently being felt in the eastern and south eastern sub-watersheds of the Aux Sable Basin. Included below are practices that are appropriate for maintaining or improving the condition of streams in the Aux Sable Creek Watershed, as related to agribusiness activities. We have divided the practices into three categories:

- Programmatic practices associated with State and Federal agricultural programs,
- Structural practices,
- Non-structural practices.

PROGRAMMATIC PRACTICES

A variety of State and Federal programs exists for the purpose of conserving both uplands and wetlands (streams, wetlands, water bodies) within watersheds that are largely agricultural. These programs typically target open space protection, wetland protection, or stream side protection. We have listed current programs below. Programs should be verified with the current Federal and State agencies as programs are often created, suspended, terminated, or revised. Funding information for these and other programs are discussed further in Chapter 7.

Conservation Reserve Enhancement Program:

The Conservation Reserve Enhancement Program is a voluntary land retirement program. It helps agricultural land owners protect sensitive environment sites, reduce erosion, restore wildlife habitat, and protect ground and surface waters in watersheds. The program is a partnership between the State and Federal governments and is administered by the United States Department of Agriculture's

Farm Service Agency. This program is often used in concert with the Conservation Reserve Program, which is a temporary set-aside program that will be discussed below. The community based Conservation Reserve Enhancement Program addresses high priority conservation issues at the local level, but of those that are of National Significance. These include impacts to habitat for threatened and endangered wildlife species or species of special concern, reduction of accelerated erosion, reduced habitat for fish populations, and impacts to local water supplies. Specific information on enrollment in the Conservation Reserve Enhancement Program can be received by contacting the appropriate Farm Service Agency office.

Conservation Reserve Program:

The Conservation Reserve Program (CRP) is a voluntary program for agricultural landowners. The program provides annual rent payments and cost-share assistance to establish long-term resource conserving vegetation on farmland. Payments are made to producers through the Commodity Credit Corporation, as rental payments for agricultural land that is set aside for up to 50% of the participant's cost in establishing conservation practices. These rental payments are separate from conservation practice funds. Landowners enroll in Conservation Reserve Program contracts for periods of 10 to 15 years. The program is administered by the Farm Service Agency, but technical support functions are also provided by the USDA-NRCS, the State Cooperative Extension Service, State Forestry Agencies, and local Soil and Water Conservation Districts. For more information, on CRP, contact the local Farm Service Agency.

Farmable Wetlands Reserve Program:

A Farmable Wetlands Reserve Program is a voluntary program to restore up to a half million acres of farmable wetlands and associated buffers by improving agricultural land hydrology and vegetation. Eligible producers can enroll in the Farmable Wetlands Reserve Program through the Conservation Reserve Program at their local Farm Service Agency office. In order to be eligible for the Farmable Wetlands Program, the producer must have acreages that include both farmed and prior converted wetlands that have been impacted by farming activities. The maximum acreage for enrollment is 40 acres per tract of land. A producer may enroll multiple wetlands and buffers on a single tract of land provided that the total acreage does not exceed 40 acres. In order to be eligible for the Farmable Wetlands Reserve Program, the following criteria must be met.

- The land must be cropland planted in an agricultural commodity in three of the most recent crop years.
- It must be physically capable of being planted in a normal manner to an agricultural commodity.
- The wetland must be 10 acres or less, and only the first 5 acres may receive payment.
- A buffer may not exceed 3 times the size of the wetland, and participants must agree to restore hydrology to the wetland to the maximum extent practicable.

As with the Conservation Reserve Program, contracts are typically 10 to 15 years, and are compensated through annual rent payments, incentive payments, and cost-share for installation of the necessary practices to install the buffers or restore the hydrology.

Illinois Department of Agriculture Programs - T by 2000:

The Illinois Erosion and Sediment Control laws, commonly referred to as the T by 2000 Program was first implemented in 1980. The law is designed to preserve long-term productivity of Illinois soil and to protect water quality. The program continued into the 21 Century, and provides conservation and natural resource information that has economic and environmental benefits for agricultural producers. The program recognizes agricultural producers as stewards of the land and sets programmatic goals for erosion and sediment control on agricultural lands, focusing primarily on crop residue management strategies for a variety of crops. The program is administered jointly by the Illinois Department of Agriculture and the local Soil and Water Conservation District (SWCD). Each local SWCD receives funds from the Illinois Department of Agriculture, as well as other sources, to help develop and implement conservation plans designed to meet the Illinois Erosion and Sediment Control laws. Landowners interested in crop residue management programs, or other erosion control measures for their properties, should contact the appropriate SWCD in the watershed.

Illinois Department of Agricultural Livestock Management Facilities Program:

The Illinois Department of Agriculture manages the Livestock Management Facilities Act to protect citizens' rights to a safe and clean environment, as well as the rights of livestock producers to earn a living. The program fosters the relationship between the importance of animal agriculture and Illinois' economy, while recognizing the responsibility that the agribusiness community has to be good neighbors. Because

of global economic pressures, the agribusiness communities are increasingly called upon to expand their operations to maintain profitability. This trend towards expanded farms has created a need to safe guard and protect the communities and watersheds as related to livestock management facilities. The Livestock Management Facilities Program is a public input process for the siting of new livestock facilities and changes to the operations of existing livestock management facilities.

The importance in watershed planning is the need to manage and treat livestock waste and prevent its release into local streams without treatment. The Illinois Department of Agriculture has an extensive process for siting animal facilities in residential areas and setbacks from aquatic resources. For additional information, contact the Illinois Department of Agriculture.

Nutrient Management Planning:

The University of Illinois Extension, as part of a program with Illinois Department of Agriculture and the Illinois Environmental Protection Agency, oversees Nutrient Management Planning for nitrogen and phosphorous best management practices. The following summarizes the expectations for best management practices for Nutrient Management Planning in Illinois (University of Illinois Extension 2002).

Nitrogen Best Management Practices

1. Apply nitrogen fertilizers at the proper rate. Optimal rates vary from year to year depending on field use and crop rotation.
2. Take credit for in-situ or home-grown nitrogen. Legumes, animal, human, and industrial waste all contribute nitrogen to the following year's crop.
3. Take credit for incidental nitrogen. Nitrogen is often an incidental fertilizer in other fertilizer treatments. As an example, phosphorous is often applied as ammoniated phosphate. Be certain to include the nitrogen values in the nutrient management plan as part of your phosphorous considerations.
4. Be certain to apply nitrogen at the proper time for the specific crop planned for that year. The closer in time nitrogen is applied to the crop, the more available nitrogen will be and the less potential for loss of nitrogen from the field.
5. Consider the use of nitrification inhibitors to reduce the conversion rate from ammonium to nitrate. This is crucial in the application of anhydrous ammonia.

Phosphorous Best Management Practices

1. Do not maintain high levels of phosphorous in the soil. The soil should not be a depository for phosphorous.
2. Establish and maintain buffer strips where water leaves the field. Consider grass water ways and vegetative buffers anywhere water is concentrated.
3. Minimize field erosion. Phosphorous moves with soil particles.
4. Match the nutrient needs to the specific crop.
5. Where possible, grow high-yielding, high-phosphorous removing crops in fields that have high phosphorous soil tests. This will reduce phosphorous levels and reduce the potential for phosphorous to contaminate water ways.
6. Incorporate or inject phosphorous fertilizers or manures where ever possible. This should be done without destruction or damage to crop residues.

NON-STRUCTURAL BEST MANAGEMENT PRACTICES

Conservation tillage systems are the most common non-structural best management practices for agricultural systems. Conservation tillage systems include no-till, strip-till, ridge-till, and mulch-till systems. Each of these tillage types are appropriate for specific crops and soil and moisture conditions within the tract being farmed. Conservation tillage practices should be an integral part of the conservation plan for the farm. The use of conservation tillage is encouraged as part of the Federal Farm Program, the Illinois Department of Agriculture programs and local programs developed by the Soil and Water Conservation District. Additional non-structural BMPs should include crop rotations and contour farming.

STRUCTURAL BEST MANAGEMENT PRACTICES

Structural best management practices are physical alterations typically to the water conveyance system in an agricultural system that reduces the peak flow in fields. This reduces rill and gully erosion and conserves soil, reducing the amount of nutrients that reaches streams, thereby reducing algal blooms. These systems include grassed waterways under drained with tile systems, field inlets connected to tile systems, terracing, terracing with drop inlet structures, and animal barrier systems along streams. Structural practices require specific design elements. They should be implemented as part of a complete farm conservation plan.

Additional structural BMPs which can be implemented in agricultural situations, such as stream bank stabilization and riparian buffer strips, are discussed in Chapter 6.

CHAPTER 5: URBAN MANAGEMENT PRACTICES AND PROGRAMS

INTRODUCTION

The Aux Sable Creek Watershed is a unique watershed because it is primarily agricultural with the potential for rapid urbanization. There is great concern regarding how future landowners will protect the Watershed. This is important because current urbanization occurs at the headwaters of many of the streams. Pollutants and/or impairments occurring at the headwaters can continue to flow or effect the entire watershed.

There are six minimum control measures which are required by the NPDES Phase II guidelines. The management practices and programs provided below are grouped by their applicability to these six minimum control measures.

PUBLIC EDUCATION AND OUTREACH ON STORMWATER IMPACTS

Public education is mainly focused toward individual residential landowners, whose typical behaviors have the potential to generate pollutants and impairments in the Watershed. These behaviors include inappropriately or not disposing of pet waste, over application or improperly applying lawn chemicals, washing cars on driveways, vehicle maintenance on impervious driveways, and emptying chemicals into the storm sewers. Education focused on preventing these behaviors or providing alternative behaviors can greatly reduce the amount of pollutants entering the storm sewers and waterways.

Additional education will focus on fostering the understanding of the function and maintenance of stormwater facilities. Existing facilities are not always maintained to ensure that they function properly. With the potential for rapid increases in population, maintenance of the facilities will be key in maintaining the quality of water within the Watershed.

There are many resources available for preparing a public education or outreach program through the US Environmental Protection Agency. Specific programs can include developing municipal outreach programs, promoting the stormwater message by providing classroom education, pamphlets for commercial businesses, as well as media that can be placed in public areas or on public access television. Education specific for individual homeowners can include pamphlets or educational materials aimed at using alternatives to toxic substances, landscaping and lawn

care, pest control, pet waste management, water conservation practices, and proper disposal of household wastes which can have a negative impact on the flora and fauna of the watershed.

PUBLIC INVOLVEMENT AND PARTICIPATION

The residents and stakeholders of the Watershed are a key resource for continually protecting the Watershed. One municipal agency will not be as effective at preventing or controlling stormwater pollution as the residents of that municipality due to the sheer numbers of participants. Public involvement can also be integrated with public education to get residents involved in the Watershed, as well as learning about stormwater runoff and stormwater management facilities. There are many activities that the public can be involved in around the Watershed. These activities include cleaning up the stream by removing debris and garbage at various locations, either as an organized group or as individuals. Another activity for newer residential subdivisions can include storm drain marking, where residents use stencils or stickers specifically designed for this activity, to indicate that the storm sewers drain to the rivers, can affect aquatic habitats, and are not for dumping wastes into.

There are multiple volunteer programs such as the Eco-Watch River Watch which monitor aquatic habitat and stream conditions at various locations. Short training seminars are required to ensure accuracy and quality of data gathering. This data can be collected, analyzed, and used in future updates to this watershed plan. Other activities which can enhance portions of the Watershed include reforestation programs and wetland or riparian planting programs, where individuals or groups of individuals can supplement and restore the Watershed with planting specific wetland riparian or woody plants. Gathering public opinion through stakeholder meetings, informal surveys, or organizations such as the Aux Sable Creek Watershed Coalition, can be used to determine what programs can be used or have been used successfully to improve the Watershed. These opinions can also be used whether or not the goals of the Watershed plan are being met.

ILLICIT DISCHARGE, DETECTION, AND ELIMINATION

An illicit discharge is a discharge that enters a storm sewer or other stormwater facility that is not entirely composed of stormwater runoff, including, but not limited to, used motor oil, chemicals, pool water, etc. Exceptions to an illicit discharge are those from firefighting or emergency activities or discharges already approved under an NPDES permit. Discharges regulated by NPDES permits usually contain specific water quality standards that must be strictly adhered to.

With the increase of urbanization around the headwaters of the Watershed, detecting illicit discharges is an important task. Illicit discharges are generally a problem because they are difficult to detect, but also they are not generally treated before entering stormwater. Many small scale illicit discharges are discreet events, such as dumping a quart of used motor oil into a storm drain. Large scale illicit discharges include chemical spills from train derailments or pipe failures at chemical manufacturing plants. By using a treatment train for treating stormwater before it enters the creeks, most of the harmful pollutants will be filtered out. A treatment train involves the use of several or multiple stormwater Best Management Practices (BMPs) in a consecutive manner to treat stormwater runoff.

Continual education of the public and public policing are ways that stakeholders can be involved in trying to reduce the number of illicit discharges in the Watershed. Programs to eliminate illicit discharges are heavily relied upon by municipalities. Besides public education, municipalities can offer programs as alternatives to behaviors, such as dumping used motor oil or other hazardous chemicals into storm sewers. These programs include developing used oil recycling programs, trash and debris management, as well as monitoring or collecting sewage from various recreational facilities. Municipalities can also help prevent illicit discharges by mapping their storm sewers, screening discharges for inappropriate materials, and monitoring sewage lines and septic systems for failures.

As part of the general NPDES permit conditions for individual municipalities, annual reports must be submitted to the IEPA demonstrating the status of their NPDES BMPs. Kendall County (jointly with Kendall, Na-Au-Say, Bristol, and Oswego Townships), Plainfield, and Joliet have initiated programs to eliminate illicit discharges through dry weather inspections of stormwater facilities, comprehensive mapping of existing storm sewers creating a means of tracing illicit discharges, and creating ordinances and enforceable codes specifically related to illicit discharges. Currently there are no published maps of storm sewer systems within the Watershed.

CONSTRUCTION SITE RUNOFF CONTROL

As rapid urbanization occurs in the Watershed, there is an increase in the amount of construction sites and potential pollution from those sites. The primary means of preventing pollution from construction sites entering the creeks within the Watershed is the use of Stormwater Pollution Prevention Plans and soil erosion and sediment controls (SESC). A variety of different controls are available in multiple categories,

such as municipal regulations, erosion controls, sediment controls, design, and waste management. Through municipal regulations, the municipalities as well as the local Soil Water Conservation District (SWCD) can review plans to ensure that sediment will not leave the construction sites and that stormwater will be treated before leaving the site. The contractor is required by the NPDES Permit to be responsible for inspecting the sites at various times during construction to determine if the installed SESC measures are properly functioning and to provide any necessary remediation.

Erosion controls are practices intended to prevent the movement of unconsolidated, unstabilized surface materials. These measures include the use of dust control or water erosion blankets to be laid out over bare or planted slopes, temporary and/or permanent seeding to reduce water velocities, and placing mulch or straw on the surface to prevent erosion. Sediment controls are those used to prevent sediments in stormwater from leaving the site. These measures include a construction entrance made of rough gravel or riprap, silt fabric barriers or fences, inlet protection or barrier fabric within stormwater inlets, and sediment traps or silt dikes, which allow sediment to settle out of water before it travels over the measures. Rock check dams can also be used to help filter sediment and slow water down as it moves through channels.

Proper construction planning and sequencing is generally reviewed by the county's or municipality's review engineer before authorization to proceed is provided. A proper sequence of construction typically requires SESC measures be installed before clearing or disturbing can occur. After the installation of measures and the completion of construction, all disturbed areas must be permanently stabilized before the site is released from any construction permit requirements. Means of managing waste on construction sites include providing a concrete washout to allow cement trucks to rinse out their mixers before leaving the site, providing contained storage locations for hazardous material storage, such as fuel or cleaning chemicals, as well as providing bins throughout the site for construction site waste. All of these measures are generally provided on a Stormwater Pollution Prevention Plan (SWPPP) as part of the engineering and construction plan set. The SWPPP is required for all construction sites which disturb more than one acre at a time and may be reviewed by the various permitting agencies before construction can begin.

POST CONSTRUCTION RUNOFF CONTROLS

After construction has been completed, the potential for pollution discharges into the Watershed are not absent. Post construction runoff controls consist of measures or

practices to treat, store, and infiltrate runoff before it leaves the site. Many new designs are being developed and used on a regular basis to promote infiltration and filtration of stormwater runoff. Many of these runoff controls have been thought out and planned long before construction begins.

Municipalities, park districts, and forest preserves tend to be the long term owners of public open space and are generally required to routinely inspect and maintain stormwater treatment facilities. Designs, which minimize the need for routine maintenance, are typically preferred by municipalities because they tend to decrease the amount of potential additional workload for its employees. In smaller towns with a small staff, a rapid increase in workload can compromise the integrity of the facilities.

Many post construction runoff controls are developed as part of the initial design for urbanization projects. Best Management Practices (BMPs) consist of using pervious concrete, permeable pavers, conservation easements, green roofs, riparian forested buffers, low impact development, and urban forestry. Specific BMPs which can be used to promote infiltration include bioswales, rain gardens, and infiltration structures, such as basins and trenches, planned reduction in pavement or impervious surfaces, and porous pavement. BMPs which promote filtration of pollutants out of stormwater include rain gardens, catch basins inserts, vegetated filter strips, and sand and organic filters. Other stormwater BMPs which may be beneficial to the Watershed include the use of stormwater basins with wetland bottoms. The key to successful runoff control after construction lies within the long term maintenance of these measures. Future recommendations regarding which BMPs should be incorporated into future developments in the Watershed are discussed in Chapter 6.

POLLUTION PREVENTION/GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

Daily activities that occur in a variety of locations throughout the Watershed can pose a threat to water quality, but are not generally considered bad water quality behaviors. Good housekeeping is not just appropriate behaviors but also the use of practices and procedures by homeowners, industrial users, businesses, and municipal operations to prevent pollutants from entering storm sewers and eventually the creeks. These activities include winter de-icing operations, road and infrastructure repairs, automobile or vehicle fleet maintenance, landscaping installation and maintenance, and building repairs.

Proper training of municipal, commercial, and industrial employees can prevent pollution by providing proper procedures during these activities that will eliminate any sort of pollutants from entering the storm sewer. These procedures can include the use of alternative methods for washing and maintaining vehicles and equipment, the use of specific containment structures and storage facilities to prevent the leakage or contamination of stormwater, and the use of new or improved products which are less or non-hazardous to stormwater. The initiation of a spill response program into training and procedures for municipal and other users will not prevent the initial spill from entering waterways, but can reduce the quantity of contamination through rapid detection, response, and remediation.

CHAPTER 6: RECOMMENDATIONS AND PRIORITIZED ACTION PLAN

INTRODUCTION

To provide guidance as to future work within the Aux Sable Creek Watershed, recommendations and a prioritized action plan have been developed. These recommendations are based upon guidance from the Committee via their goals and vision statement, the IEPA 319 Nonpoint Source Control Program "9 Criteria", input from committee members, and current trends in development and regulations from areas outside of the Watershed. The top four goals that were used in providing recommendations were (in order of priority, high to not as high): Promote stormwater Best Management Practices, Promote Water Quality, Flood Control, and Inform development process of need to maintain drainage functions in agricultural areas. Since there is a concern that future development will impact the watershed more than current agricultural practices, the focus of this section tends toward addressing the urbanization of the Watershed. Funding sources for these recommendations will be addressed in Chapter 7.

AGRICULTURAL RECOMMENDATIONS

Based on the high quality of the Aux Sable Creek and its tributaries and the fact that approximately 94% of the Watershed is in agriculture of some sort, the main recommendation in the agricultural areas is to continue using sound agricultural practices and good stewardship. To further assist in the attainment of the committee's goals, the following recommendations are provided.

Continued Good Stewardship

Many practices currently being used within the Watershed are working well to prevent degradation of the streams. The SWCD, NRCS, and the University of Illinois Extension can further assist those who require further assistance in the use of:

- Crop Residue Management
- Grassed Waterways
- Field Borders
- Terraces
- Windbreaks
- Nutrient Management
- Prescribed Grazing
- Fencing along streams
- Grade Stabilization Structures
- Stream Bank Stabilization

Riparian Buffers/ Filter Strips/ Livestock Exclusion

Filter Strips, a minimum of 50 feet wide (from the edge of the bank), should be created along stretches of streams in the Watershed that are currently unprotected. During new development of land, the United States Army Corps of Engineers typically requires upland buffers of at least 50 feet on all streams and wetlands under their jurisdiction which are to be preserved. These buffers are especially important along pastures where livestock are grazing streambanks. If filter strips are being or have already been created, the addition of permanent fencing along the stream banks can help to eliminate livestock in the streams. Buffers are also important between tilled fields and streams to prevent sedimentation of the stream from fields during times when they are not vegetated.

Figure 15: Grassed waterway through an agricultural field.

Natural Resource Preservation

Natural resources such as wetlands, woodlands, and grasslands, should be preserved or continued to be preserved using the variety of programs available from the SWCD, NRCS, FSA, and IDNR. Some of these programs provide technical assistance and/or funding. The programs discussed in Chapters 4 and 7 can be utilized with the assistance of the various agencies.

URBAN MANAGEMENT RECOMMENDATIONS

While there is very little of the Watershed which contains residential subdivisions, these recommendations focus on coordinating future developments, the committee's goals, and addressing water quality impairments.

Public Education and Outreach

Aux Sable Creek Watershed Coalition Meetings

Various groups, agencies, and companies can be brought in to give presentations and lead informative discussions pertaining to a variety of topics relating to the Watershed. The meetings are open to those interested in the Watershed and are publicized.

Aux Sable Creek Watershed Website

As part of the updated watershed plan, a website has been developed (www.aux sablecreekwatershed.org). The website was intended to host a variety of information about the Watershed which can also include a section on homeowner education. The section can provide links and information regarding alternatives to toxic substances which can be used in the home, landscaping and lawn care methods, pest control and pesticides, pet waste management, proper disposal of hazardous wastes, and water conservation practices. A page can also be dedicated to existing and future programs occurring within the Watershed such as used oil recycling pick-ups, educational seminars, and community events.

Kendall and Grundy County Soil Water Conservation Districts

The two SWCD offices within the Watershed provide websites (www.kendallswcd.org and www.grundycountyswcd.org) which contain a wealth of information regarding their cost share programs, various educational opportunities, and the services they offer. The SWCDs also offer a soil test kit for homeowners to test their soil to find out the current pH and nutrient load. The analysis will also return a fertilizer recommendation to reduce the possibility of over applying chemicals.

Classroom Education

General education regarding watersheds can benefit the residents within the Aux Sable Creek Watershed. Grade specific programs based on Illinois curriculum standards can be utilized at a variety of levels and lengths to introduce the concepts of watersheds and stormwater. Related projects which can be implemented at different durations can include precipitation monitoring, runoff tracing, stream monitoring and analysis, and habitat assessments. These programs could be developed by the schools or by some of the various groups such as the SWCDs,

University of Illinois Extension offices, Farm Bureaus, Forest Preserve, TCF, or the Coalition.

The local SWCDs currently offer a couple of programs related to agriculture ("Agriculture in the Classroom" Kendall and Grundy County SWCDs) and conservation ("Conservation in the Classroom" – Kendall County SWCD). The states of California and Florida, the University of Wisconsin, the University of Central Florida, and various others across the United States have created curriculum and education tool kits which can assist in preparing the classroom activities. These kits are available on the USEPA website:
http://cfpub.epa.gov/npdes/stormwater/menuofbmps

Public Involvement

Eco-Watch RiverWatch

The RiverWatch has been recording data throughout the Watershed. It is recommended that volunteers continue to participate to assist in the data collection which may be used in future IEPA reports to help demonstrate what improvements are being made in the Watershed to remove the Aux Sable Creek from the 303(d) List of Impaired Waters. It is also recommended that additional sites be monitored on each of the tributaries to Aux Sable Creek to ensure that there is no degradation. Information regarding RiverWatch activities are available on the IDNR website: (website not available at time of printing), the link could be posted on the website.

Adopt-A-Stream

An Adopt-A Stream program could be set up by the counties or municipalities or a combination thereof. The Aux Sable Creek Watershed Coalition can also sponsor the program since it involves basic record keeping. The sponsor can create as few reaches or as many reaches as they are willing to keep track of for groups to maintain. Reaches should include public stretches of stream as long as there is also public access. Any areas of privately owned streams would require an agreement for access for these activities. Each group would receive a packet from the sponsor indicating their reach, reporting/ observation instructions, basic history on the stream, trash collection materials (gloves, bags, etc.), and basic instructions for the activity as well as instructions in case hazardous materials (syringes, waste, etc.). Advertisements can be posted on the Aux Sable Creek Watershed website, in various locations throughout the Watershed, and in various announcements and postings.

Stakeholder Input Surveys

The Aux Sable Creek Watershed Coalition or other advocacy group could prepare surveys to send out to watershed stakeholders. These surveys will gather input regarding their opinions of the Watershed and other pertinent items which may be used for future updates to the Watershed plan. The periodic updates should highlight future activities residents and stakeholders may want to participate in or see carried out.

Volunteer Coordination

Based upon individual restoration projects throughout the Watershed, solicitation for volunteers can be posted on the Watershed website. Volunteers can be contacted to assist in the planting associated with projects whether they are sponsored by municipalities, local park districts, the forest preserve districts, or individual landowners.

Illicit Discharge, Detection, and Elimination

Communities (local, township, and county levels) who have not yet developed specific programs in association with the NPDES permit conditions regarding Illicit Discharge Detection and Elimination can adopt programs similar to Kendall County, Joliet, Plainfield (who currently have established NPDES programs). Consistency throughout the Watershed will allow collaboration as to whether or not programs have worked, are working, or could be improved.

Failing septic systems or sewage discharges from small collective systems (septic systems for single family homes) have been identified as existing impairments by the Aux Sable Creek Watershed Advisory Committee. To help prevent untreated sewage from entering the streams, it is recommended that the Will, Kendall, and Grundy County Health Departments collaborate on preparing a unified system of monitoring septic systems. Mechanical systems should require annual monitoring reports to ensure proper functioning. A method for periodic inspection of residential septic systems should be set up to ensure that individual systems are properly treating effluent before it enters the groundwater system.

Construction Site Runoff Controls

Construction plans should be reviewed by the SWCD, County, or Municipality prior to construction for appropriateness of Soil Erosion and Sediment Controls to

minimize the potential for sediment to be carried off-site, into the waterways of the Watershed. Currently the IEPA requires that a Stormwater Pollution Prevention Plan (SWPPP) is prepared in advance of any earthwork. All work sites should incorporate soil erosion and sediment controls even if permitting is not required. Minimum measures should include the use of silt fence and inlet protection to prevent sediment from leaving the site, mulch or erosion control blanket on slopes to prevent erosion, and temporary or permanent seeding in "flat" areas (< 2% slope) to provide protection from erosion from rainfall and stormwater runoff.

Recommended Construction Staging Requirement

Construction should be staged or sequenced to allow no more than 40 acres of open construction at one time. Twenty (20) acres may be under current construction with a maximum of an additional 20 acres used to balance cut and fill. The 40 acre maximum can be applied to "rolling operations" where grading occurs and is stabilized immediately so that additional area may be graded. Temporary stabilization can be applied cheaply and effectively to stabilize the soil until it is time to build or finish grading the site. Areas excluded from the 40 acre requirement include stormwater basins, utility corridors, and areas which have been permanently stabilized.

The 40 acre recommendation is based upon regulations in other areas around the region to prevent large tracts of land with open soil which is susceptible to wind and water erosion. The reduction in erodible land will minimize the amount of sediment deposited in the Watershed.

Recommended Soil Erosion Control Techniques

The following list represents some of the Soil Erosion Control techniques which should be considered in all construction sites in the Watershed. There are a variety of products available to achieve the desired effect of preventing sediment from leaving the site when installed correctly.

- Minimizing disturbed areas will reduce the area susceptible to erosion. Consideration should be given to retain as much existing natural vegetation as possible.
- Stormwater from off-site which may enter the site should be temporarily diverted with diversion channels or berms to prevent extra runoff from eroding the disturbed areas of the site.
- Lined channels are permanent waterways which divert stormwater. Lining may consist of concrete, flag stones, or rip-rap on top of a bedding of sand

and geotextile fabric. Permanent lined waterways are typically discouraged by regulators due to a lack of water quality benefits.

- Vegetated channels are either a temporary or permanent diversion channel which is planted with grasses and covered with mulch or erosion control blanket to protect from erosion while vegetation is establishing.
- Combination diversion is used on slopes across the flow path of water. Combination diversion consists of excavating a channel and creating a berm on the down slope side of the channel to stop flow from passing over the channel and diverting the flow from the slope.
- Ridge diversion consists of creating a berm at the top of a hill to prevent water from flowing down slope and eroding the soil.
- Straw bales should not be used for erosion or sediment control due to the frequent improper installation and lack of maintenance. Other materials, such as silt fence, triangular silt dikes, or stone should be considered instead.
- Flocculent, environmentally safe chemicals which help sediment stick together and quickly drop out of suspension, may be used in sediment traps and diversion channels to assist in the removal of sediment in stormwater before it discharges off-site.
- Polyacrylamides are chemicals which act as soil stabilizers and can create, when applied correctly, a pervious, but less erodible soil surface. There are a variety of means of applying Polyacrylamides based upon the given project.
- Lined aprons are areas of coarse stone which are placed at the end of outlet pipes. Their primary function is to reduce the velocity of water as it comes out of the pipe, thus reducing the potential for erosion.

Recommended Stabilization Techniques

All areas which are not actively being worked should be temporarily stabilized. There are several types of temporary and permanent stabilization which can be used:

- Temporary seeding can be applied on areas which need to be left dormant for a period of time longer than 14 days and consists of annual grasses and grains.
- Permanent seeding is used for final stabilization after construction and consists of specific suites of vegetation which is suitable for specific moisture contents.
- Sodding can be used in vegetated channels or swales which are to remain after construction, such as road side ditches. Sodding can also be used to stabilize lawns after building construction has been completed.

- Mulch, hydromulch (a combination of a mulch material and water applied by truck mounted sprayers), and erosion control blankets can be applied over areas which have been seeded to protect the soil and seed from erosion.
- Aggregate cover is stone which has been applied to cover the surface, but is typically only used for haul roads. The rip-rap prevents erosion of the surface, but also helps reduce the amount of material transported by truck tires.
- Paving is considered a means of permanent stabilizing the surface and is used where roads, sidewalks, and/or trails are planned. Paving can occur early in the construction sequence, but a final surface will likely need to be applied at the end of construction.

Recommended Sediment Control Techniques

The following list represents Sediment Control techniques which should be considered in all construction sites in the Watershed. There are a variety of products and techniques which can be used to achieve the same effect of these listed. It is up to the contractor, designer, engineer, or reviewer to determine the most appropriate measures to be installed for a given project site.

- Stabilized construction entrance should be used at the entrance to a site from the roadway to prevent the tracking of mud and debris from the site onto the road.
- Sediment traps should be installed where stormwater runoff may discharge into storm sewers or streams. Traps will hold water long enough to allow sediment to settle out of the water prior to discharge. Care should be taken to properly size traps to ensure drainage area is not too large.
- Silt fence or filter barriers should be installed along any areas where sediment may leave the site, except for areas of concentrated flow. Silt fence does not function properly in cases where large amounts of water flow through it.
- Geotextile barrier fabric, or silt fence, should be used in and around storm sewer inlets to prevent sediment from entering the sewers. Clogged sewers can cause flooding and are expensive to replace or clean out after development is completed. There are a variety of different products that can be used in place of barrier fabric or silt fence; straw bales are not one of them.
- Dust control should be considered during mass grading in dry conditions where wind can transport material off-site (wind erosion). The construction site should have a tanker truck full of water which can be applied as necessary to reduce the possibility of excess blowing dust.

Post Construction Runoff Controls

Post Construction Runoff Controls consist of a variety of Best Management Practices (BMPs) which should be included or incorporated in the site design prior to and during construction. These BMPs will function after construction to reduce the amount of sediment reaching the important aquatic resources in the Aux Sable Creek Watershed. The list of BMPs includes some which may not be recommended in the Watershed, but may be presented by developers at some point in time.

Suggested Best Management Practices for the Watershed

The following list of BMPs should be considered for use in the Watershed as either recommended in future developments or utilized in the retrofitting of existing stormwater management facilities. Included by each BMP is a general scale of relative installation cost ($=low <$100,000, $$$=high >$500,000).

Upland Buffers - $

Upland buffers are also known as Riparian Buffers near streams. These buffers are established from the edge of water bodies or wetlands from 50 to 100 feet into the floodplain or upland area depending on the quality of the aquatic resource and regulatory requirements during development. Native, deep-rooted vegetation is seeded with either temporary seeding, mulch, or erosion control blanket to prevent erosion of the stream banks and to filter out sediment and contaminants in stormwater runoff before it enter the streams. Buffers can be used along any stream, drainage ditch, or wetland in the Watershed as a restoration activity or can be established as part of new development projects. Upland buffers should be established along all of the streams in the Watershed in areas indicated as Open Space Opportunities or Additional Open Space Opportunities shown on the Open Space Plan (included in the Appendices) to prevent sediment deposition and improve wildlife habitat. While it may not be feasible for every landowner to provide buffers on their land for streams and wetlands, there are restoration grants available through the SWCD and NRCS as well as through the IEPA 319 grant program.

Infiltration BMPs

Elimination of or Retrofitting Curbs and Gutters - $

Curbs and gutters were designed to help eliminate standing water on roads to reduce the potential for accidents. Curbs and gutters funnel stormwater into storm drains and storm sewers. Without treating the water before entering the storm

sewers, any contaminants washed from the roadway are then transported into the sewers and eventually the creeks. By using grassed swales along the roadway (Figure 16), contaminants can be filtered out of the water as the water moves more slowly through the grass. Grassed swales are widely present in the Watershed in areas which have not yet been developed. Newer developments with large lots or near streams should incorporate this method of stormwater diversion for its water quality benefits.

Figure 16: Grassed swale along a roadside.

Bioswales - $$

Bioswales are broad, shallow ditches planted with a specific mix of native vegetation which will promote infiltration and survive in a wide range of moisture conditions. Bioswales are designed with a specific mixture of soil above a drain tile or storm sewer. Strategically placed, Bioswales can be used to transport stormwater runoff to stormwater drains or detention basins while promoting infiltration by reducing water velocities and reducing compaction. Bioswales work well in parking lot islands, around buildings, and road dividers.

Rain Gardens - $

Rain gardens (Figure 17) are small depressions planted with a variety of plants in a specially designed soil mixture which will flourish in different moisture conditions and are able to survive being flooded for short periods of time. Rain gardens do not transport stormwater runoff, but holds the water to allow infiltration and use by the plants. Rain gardens have become increasingly popular due to their aesthetically pleasing nature and ease to construct. Rain gardens should be installed in depressional areas that are currently maintained as mowed turf grass that have a

tendency to flood on a regular basis. Rain gardens can also be installed at the end of downspouts which drain stormwater runoff from the roof.

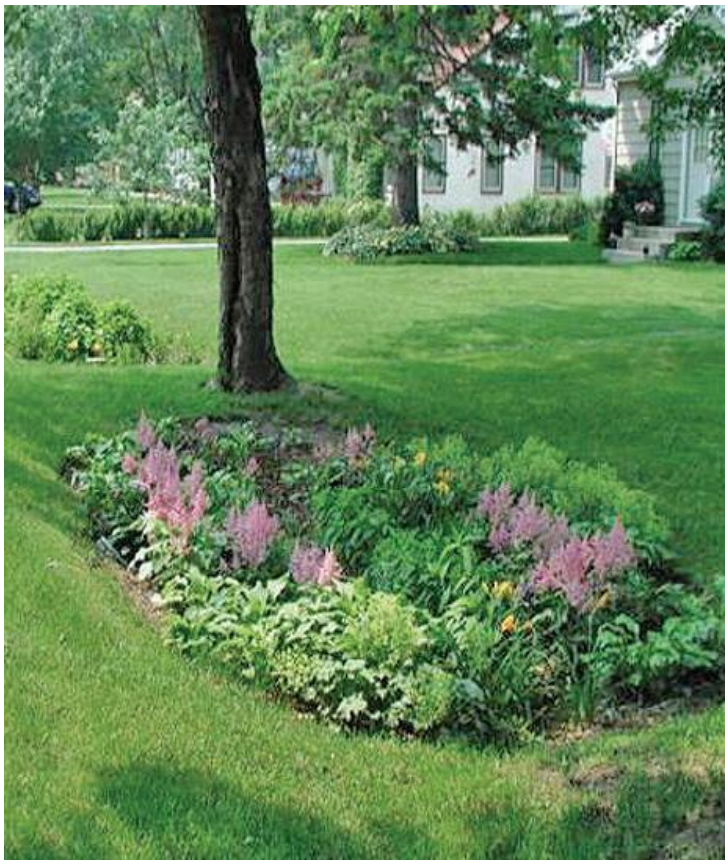

Figure 17: A rain garden created at the base of an embankment of a roadway.

Infiltration Galleries/Basins - $$

Infiltration galleries are trenches excavated out of the existing coarse textured soil, then filled with clean stone of approximately 1.5 to 2.5 inches in diameter. The trench is placed at the downhill end of a grassed filter strip at least 20 feet wide. Geotextile fabric is used to line the trench to prevent soil from being washed into the stone and prevent proper functioning. Infiltration trenches should not be used in areas where ground water contamination is a concern such as in areas near heavy applications of fertilizer or pesticides or be placed near potable drinking wells because the primary function of the infiltration trench is storing stormwater while promoting infiltration. Any filtering of the stormwater is done prior to entering the trench. The placement of infiltration galleries in the Watershed may not be utilized as much as other means of infiltration due to the use of ground water wells and fertilizer application. These may be more useful in newer developments which are located along the fringe of the Watershed and are included in a public water system.

Permeable Pavements - $$

Permeable pavements (Figure 18) are hard materials such as porous concrete or permeable pavers which are used for parking lots, roads, trails, or common areas and allow infiltration of stormwater to the ground below. Pavers, or sculpted bricks, are placed in geometric patterns which create small spaces which are filled with very fine gravel. Porous concrete is placed the same way normal concrete is, but allows water to slowly permeate through to the ground below. While the initial cost of placing these types of surfaces is higher than traditional pavements, their use can potentially reduce the amount of stormwater detention that will be required by local regulations, thus allowing more lots to be created within a subdivision. Most current ordinances in the Watershed and the Region do not yet offer reduction in stormwater detention required, but can be used as an incentive. This incentive may allow developers to reduce the amount of stormwater detention basins created and increase the buildable land in the development.

Figure 18: Permeable paver parking lot with bioswales.

With proper maintenance the use of these surfaces can decrease the amount of water entering the storm sewers and eventually the streams during storm events. The reduction of stormwater will not hydrologically affect the streams, but will decrease the potential for pollutants being washed into the streams. Permeable pavements should be used within the Watershed in new or rebuilt parking lots and storage areas. Requirements for appropriate maintenance should be included in future developments which proposed the use of permeable pavements.

Stormwater Management BMPs

Stormwater Wetlands - $$$

Stormwater wetlands, or constructed wetlands, are stormwater retention basins which incorporate wetland plants into the design (Figure 19). Instead of creating an open water pond or open grassed (dry bottom) basin, the wetland based pond will allow water to be filtered and create habitats which will promote more diverse wildlife. Concerns have been raised that having standing water will increase the amount of mosquitoes and the risk for West Nile Virus, but by providing more habitat than an open water pond, more species of amphibians which feed on mosquito larvae will be present. This type of basin provides many water quality and wildlife benefits. Additional information regarding the West Nile Virus can be obtained from the USACE at www.nae.usace.army.mil/reg/mosquitoes.pdf.

Figure 19: Wetland bottom detention pond with some patches of open water.

Outlet Detention Wetlands - $

Outlet detention wetlands are small wetlands placed in ditches and at culvert end sections to slow the flow of water during small storm events and allow the “first flush” to be “captured”. Although the wetlands’ usefulness beyond the “first flush” is limited, most pollutants are carried in the “first flush”. Therefore, they are a viable option especially where there are few other options for implementing water quality BMPs. Outlet Detention Basin may not be suitable in culverts or ditches which receive very rapid flows which could damage the vegetation.

Open Water Detention Basin - $$

Open water detention basins are typical ponds built in residential and commercial subdivisions in which stormwater is routed into the basin before it leaves the property. Some basins are maintained with turf grass to the edge of the water while most basins are now required to have a native vegetation buffer around the edge. Except for extreme drought conditions, this type of detention basin will have standing water at all times; the water level is determined by rainfall events until the pond reaches its normal conditions. The normal conditions are designed by engineers by creating outlets for the pond to maintain a specific water level. The ponds outlet into streams, storm sewers, or additional ponds. Open water ponds can be stocked with fish for recreational fishing. This type of basin is preferred over Dry Bottom Basins, but should be proposed as an alternative to Wetland Detention Basins.

Dry Bottom Detention Basin - $$

Dry bottom detention basins are open areas typically vegetated with turf grass, which holds water during and immediately after rainfall events, but eventually drain into streams or storm sewers or the water infiltrates. Dry detention basins can be used as open field recreational areas by residents. Of the three types of basins, this basin provides the least amount of water quality benefit because of the shortened detention time of the water and the bottom of the basin typically gets too compacted with active recreational uses to allow stormwater to infiltrate.

Conservation Design - $

Conservation design, also known as Low Impact Development Design, is a general method of designing new developments to reduce the overall hydrologic impact. Concepts utilized during the design process involve laying out the subdivisions to minimize mass grading of the site, placing roads at level elevations instead of up and down slopes, and incorporating natural features and green infrastructure. These concepts help reduce the potential for high amounts of stormwater runoff and promote infiltration. By incorporating natural features along with other stormwater BMPs, the amount of impervious area will decrease, the amount of infiltration will increase, and the amount of storm sewers required will decrease.

Stormwater Retention Requirement - $$

Typical development alters the surface by creating areas that are impervious. By requiring developments to retain stormwater on site, the amount of water that would have been absorbed by the pervious ground before development can be held until it infiltrates in a basin or other stormwater BMPs. Stormwater from the development should be routed to the basin or BMPs and held so that it infiltrates. The amount of water that should be retained is equal to 0.75 inches over the entire impervious area.

This volume of water is roughly equal to what has been previously determined to normally infiltrate the ground in typical agricultural row-crop before it reaches saturation. Some developments are able to achieve retaining all stormwater on site and not discharging any stormwater off site. This may be desirable in areas that do not naturally contribute stormwater to the streams in the Watershed.

Level Spreader Outlets - $

Level spreaders (Figure 20) are a device which can be attached to the end of a stormwater outlet to disperse water without causing erosion. This is accomplished by slowing down the flow of water. The level spreader is installed underground, perpendicular to the pipe it is attached to, with a thin outlet at the surface. As water fills the device, it slowly overflows out of the outlet and creates sheet flow. These devises are normally used to discharge outlets into and out from stormwater basins towards streams. Level spreaders are also used in combination with buffers to prevent concentrated water from eroding the vegetation and soil. Level spreaders are placed up-slope from the buffer so that the water flows through the buffer. The use of level spreaders is recommended in the Watershed, especially in cases where buffers are being established along the streams and in places where agricultural field tiles drain through the buffers. Level spreaders are also recommended in new developments where stormwater basin may be designed to discharge into a stream.

Figure 20: Level spreader outlet used in a recently restored riparian buffer.

Stormwater Separators - $

Stormwater separators remove debris, sediment and/or greases and oils from runoff prior to being discharged into detention facilities or streams. These units are particularly useful in areas where Right Of Way (ROW) widths are limited and additional ROW cannot be obtained because of economic, environmental, or other

physical constraints. There are a variety of designs commercially available including gravity, centrifugal, and coalescing separators. Most separators handle relatively small flows of less than 30 cubic feet per second (cfs) and these units are typically placed off-line in the stormwater conveyance system or multiple units are used on-line adjacent to inlets that produce maximum flows below 50 cfs. The appropriate type of separator should be chosen based upon the given situation.

Deicing and Anti-Icing Strategies - $

Public safety is the first and foremost concern when considering winter roadway safety. Snow and ice removal programs must weigh the environmental effects of deicing against the need to deliver a safe roadway to the public and the perception that the roadways are safe to travel. Alternate deicers reduce the impacts that chlorides have on wetlands, woody plants, roadways, and bridge structures. The long-term view of acetate-based deicers shows them to be cost effective. Nevertheless, their high cost is an annual operational budget issue that cannot readily be absorbed into the annual budgets.

It is recommended that the municipal and county departments of transportation or highway departments, along with IDOT review their current deicing salt usage and available products that will reduce the amount of salt applied, as well as, salt alternatives.

<u>Stormwater Ordinance Development or Amendments - $$$</u>

Currently, there are 28 different ordinances which relate to stormwater, wetlands, soil erosion and sediment controls, and natural resource protection active in the Watershed (see Table 12 in Chapter 2). The ordinances vary in strength of protection and amount of requirements. As of printing, both Kendall and Grundy County are in the beginning process of reviewing and revising their county wide stormwater plan.

It is recommended that the ordinances be re-reviewed to provide more consistent protection throughout the Watershed. It is not recommended to require certain BMPs in future developments, but it is recommended that the use of a suite of BMPs be requested so that long term protection of the Watershed is the ultimate goal. The use of an overlay district similar to the Will County or Joliet's Aux Sable Protection Overlays could be applied to the Watershed to create a unified ordinance to protect the Watershed using the recommendations contained in this Watershed Plan.

Stream Bank Stabilization

Stream bank stabilization (Figure 21) can occur in a variety of means to prevent further erosion of stream banks. Poorly stabilized stream banks can degrade water quality and reduce aquatic life in the streams. There are a multitude of different techniques which can be used; the following list identifies stream stabilization options which may be appropriate for the Aux Sable Creek Watershed:

Revegetation with Minor Regrading- $

Revegetation can be used in conjunction with minor regrading of the banks to produce a gentler slope (10-25%) than the existing steep slopes (50+%). This technique is commonly used in situations where there is five to fifteen feet from the edge of the bank to re-sculpt the land. The bank is pulled back and revegetated with deep-rooted native vegetation which transition from plants that favor wet environments to those found in upland areas. Revegetating the bank is the easiest of the recommended techniques, can be done relatively inexpensively, and can be tied to upland buffers.

Figure 21: Stabilized stream channel adjacent to a stormwater basin in Joliet, IL

Erosion Control Blanket/Turf Reinforcement Mat - $

Erosion control blankets and turf mats are temporary or permanent mats (respectively) or weaved plastic material which allows vegetation to grow through it, but also protect the soil from being eroded (Figure 22). This technique is used along the banks of streams or basins and in the channel in areas where the stream bottom is silty and vegetation cannot establish due to high water velocity. Erosion control blankets are a highly effective method of helping establish vegetation in areas where water is not always present, but may flow rapidly, such as tile or culvert outlets. This method is fairly inexpensive, but care must be taken to properly install the blankets or mats. Erosion control blankets can also be used in recently graded areas to assist in the establishment of vegetative cover.

Figure 22: Erosion control blanket used after seeding a newly constructed stormwater detention basin.

Coir Logs - $

Coir logs (Figure 23) are sausage shaped rolls of coconut fibers held together with heavy jute netting, sometimes containing seed. The logs are placed against the bank near the normal water level and soil is packed behind it. The logs are staked in place to prevent movement and to hold them tight against the banks. This technique can be used in areas where grading the banks is not an option due to proximity of lot lines, fences, trees, or other blockages. Coir logs will last two to ten years and function as a plant growing medium if they are manufactured with seed or are used to hold live vegetation stakes.

Figure 23: Coir logs installed at a stormwater outlet (flared end section at the end of the treatment train) along with rip-rap to prevent sediment from leaving the site at the edge of the property.

A-jacks - $$

A-jacks are concrete jacks, 12-24 inches across, which can be installed in the stream bank to prevent erosion and to anchor soil and vegetation. The banks are excavated and the A-jacks are stacked or weaved together to prevent undermining. Soil is backfilled behind the A-jacks and then stabilized with native vegetation. A-jacks are an effective means of stabilizing the banks, but should only be used in areas with high flow velocities.

Stone Toe - $

A stone toe is a means of stabilizing a portion of a channel at the toe of the slope. The toe is the transition from the slope to the bottom of the channel. This area is commonly stabilized with various types of stone because the toe is typically unvegetated and is prone to frequent eroding. The stone prevents the erosion of the channel from the normal flow of water through the channel.

Stream Barbs - $

Stream barbs are small stone berms placed in a channel, a short distance, to direct flows away from areas currently being eroded. The small berms are installed so they do not stick out of the water vertically, but cause a change in the direction of flow as the water flows over it. Stream barbs do not cross the entire stream.

Rip-Rap/ Stone Armoring - $-$$

Rip-rap or stone armoring consists of lining the bank from the toe slope to the high water line with rip-rap stone. This method works well in areas of constant flow with periodic high flows after storm events. Armoring works well at protecting the banks from erosion as long as the stone is sized appropriately to not be carried away during high flow events. While armoring the stream banks with rip-rap is highly effective, it should be used as a last resort because it is not visually appealing and does not provide a habitat or water quality benefit aside from reducing stream bank erosion. This method is not usually favored by regulators unless the conditions warrant its use.

Soil Bioengineering - $$

Bioengineered soils are a combination of grading of the banks, placement of soil for planting, and the addition of a variety of materials to create vegetated banks and a diverse assortment of natural habitats. Examples of materials incorporated into bioengineered banks include:

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- Root wads which are anchored to the bank to slow water down, create fish habitat, and redirect flow. Root wads consist of dried root balls from trees which have been removed from off-site.
- Live stakes or cuttings (typically of Willows or Dogwood) can be placed in the soil to create vegetated areas which will be less prone to erosion.
- Soil lifts are “pillows” of soil wrapped in a geotextile fabric to allow vegetation to establish without the fear of the soil eroding away.
- Crenulated banks are small back water areas created by placing stone in the water and planting emergent vegetation to prevent the stone from being washed away.

Pollution Prevention / Good Housekeeping for Municipal Operations

For municipalities and county operations within the Aux Sable Creek Watershed, specific plans should be developed to prevent inadvertent pollutant release into the Watershed. These plans should include maintenance operations on fleet vehicles (repair and cleaning), deicing operations, road maintenance, debris removal, and nutrient or fertilizer storage or disposal, and spill response.

PRIORITIZED ACTION PLAN

The following Prioritized Action Plan (Table 16) provides a list of activities which should be completed following the approval of the overall Watershed Plan. This plan includes the recommended actions, approximate capital and operational costs ($=low (<$100,000), $$$=high (>$500,000)), approximate time frame for which they should be implemented (from adoption of the Watershed plan), and the category of goals in which they apply. The plan also includes a committee priority column which is based upon votes (1=high priority, 3=lower priority) from committee members. Votes were requested from all of the committee members (52 members total), but a total of 12 responses were collected. A rating and the average score are included with each action item. The action item priority ratings were based on the following scale:

1.00 - 1.50 = High Priority
1.50 - 1.75 = Medium-High Priority
1.75 – 2.25 = Medium Priority
2.25 – 2.75 = Medium-Low Priority

Table 16: Prioritized Action Plan

Recommended Action	Priority (Ave.)	Capital Cost	Opp. Cost	Time Frame	Applicable Goal Category	Applicable Goals
Improve Water Quality	High (1.40)	$-$$$	$	Continual	Education, Natural Areas, Stream Maintenance/ Quality, Wildlife Biodiversity	What is a watershed?; Educate elected officials - BMPs in Development; Encourage protection of natural areas; Educate about natural vegetation along detention ponds; Promote Best Management Practices; Promote water quality; Debris in creek; Create stream maintenance programs; Protect current wildlife habitat; Protect and restore biodiversity
Riparian Buffers/ Filter Strips	Medium-High (1.55)	$$	$	Continual	Flooding, Natural Areas, Property Rights, Stream Maintenance/ Quality, Water Supply, Wildlife Biodiversity	Flood Control; Encourage protection of natural areas; Provide education on private property rights; Promote Best Management Programs; Promote water quality; Debris in creek; Promote sustainable groundwater; Protect and restore wildlife biodiversity
Post-Construction Runoff Controls (BMPs) – Development	Medium -High (1.58)	$-$$$	$-$$	1-6 Years	Development, Education, Farmland Protection, Flooding, Natural Areas, Stream Maintenance/ Quality, Water Supply, Wildlife Biodiversity	Inform development process of need to maintain drainage functions in agricultural areas; Educate elected officials - BMPs in Development; Promote **voluntary** farmland protection; Provide education on private property rights; Encourage protection of natural areas; Educate about natural vegetation along detention ponds; Promote Best Management Practices; Promote water quality; Debris in creek; Create stream maintenance programs;

Table 16: Prioritized Action Plan

Recommended Action	Priority (Ave.)	Capital Cost	Opp. Cost	Time Frame	Applicable Goal Category	Applicable Goals
						Promote sustainable groundwater; Protect current wildlife habitat; Protect and restore biodiversity
Improve Aquatic Habitat	Medium-High (1.60)	$-$$$	$-$$	Continual	Education, Natural Areas, Stream Maintenance/ Quality, Wildlife Biodiversity	What is a watershed?; Educate elected officials - BMPs in Development; Encourage protection of natural areas; Educate about natural vegetation along detention ponds; Promote Best Management Practices; Promote water quality; Debris in creek; Create stream maintenance programs; Protect current wildlife habitat; Protect and restore biodiversity
Enforcement of Construction Site Runoff Controls	Medium -High (1.64)	$$	$	Continual	Development, Education, Farmland Protection, Flooding, Natural Areas, Property Rights, Stream Maintenance/ Quality	Inform development process of need to maintain drainage functions in agricultural areas; Educate elected officials - BMPs in Development; Promote **voluntary** farmland protection; Provide education on private property rights; Encourage protection of natural areas; Educate about natural vegetation along detention ponds; Promote Best Management Practices; Promote water quality; Debris in creek
Development of Illicit Discharge, Detection, and Elimination Program	Medium -High (1.75)	$$$	$	2-5 Years	Stream Maintenance/ Quality	Promote Best Management Practices; Promote water quality
Create Aux Sable Creek Watershed	Medium (1.92)	$$$	$	3-6 Years	Development, Education, Farmland	Inform development process of need to maintain drainage functions in

Table 16: Prioritized Action Plan

Recommended Action	Priority (Ave.)	Capital Cost	Opp. Cost	Time Frame	Applicable Goal Category	Applicable Goals
Overlay District					Protection, Flooding, Natural Areas, Stream Maintenance/ Quality, Water Supply, Wildlife Biodiversity	agricultural areas; What is a watershed?; Educate elected officials - BMPs in Development; Promote **voluntary** farmland protection; Provide education on private property rights; Encourage protection of natural areas; Educate about natural vegetation along detention ponds; Promote Best Management Practices; Promote water quality; Debris in creek; Create stream maintenance programs; Promote sustainable groundwater; Protect current wildlife habitat; Protect and restore biodiversity
Restoration of Natural Areas	Medium (2.00)	$-$$	$	1-5 Years	Education, Farmland Protection, Natural Areas, Property Rights, Recreation, Stream Maintenance/ Quality, Water Supply, Wildlife Biodiversity	What is a watershed?; Educate elected officials - BMPs in Development; Promote **voluntary** farmland protection; Provide education on private property rights; Encourage protection of natural areas; Educate about natural vegetation along detention ponds; Promote Best Management Practices; Promote water quality; Debris in creek; Create stream maintenance programs; Promote sustainable groundwater; Protect current wildlife habitat; Protect and restore biodiversity

Table 16: Prioritized Action Plan

Recommended Action	Priority (Ave.)	Capital Cost	Opp. Cost	Time Frame	Applicable Goal Category	Applicable Goals
Post-Construction Runoff Controls (BMPs) – Retrofit	Medium (2.00)	$-$$$	$-$$	2-4 Years	Education, Farmland Protection, Flooding, Natural Areas, Stream Maintenance/ Quality, Water Supply, Wildlife Biodiversity	What is a watershed?; Educate elected officials - BMPs in Development; Promote **voluntary** farmland protection; Provide education on private property rights; Encourage protection of natural areas; Educate about natural vegetation along detention ponds; Promote Best Management Practices; Promote water quality; Debris in creek; Create stream maintenance programs; Promote sustainable groundwater; Protect current wildlife habitat; Protect and restore biodiversity
Education/ Outreach-Coalition Meetings	Medium (2.00)	$	$	Continual	Development, Education, Farmland Protection, Natural Areas, Property Rights, Recreation, Stream Maintenance/ Quality, Wildlife Diversity	Inform development process of need to maintain drainage functions in agricultural areas; What is a watershed?; Educate elected officials - BMPs in Development; Promote **voluntary** farmland protection; Provide education on private property rights; Encourage protection of natural areas; Educate about natural vegetation along detention ponds; Promote recreational opportunities; Promote Best Management Practices; promote water quality; create stream maintenance programs; Debris in creek; Protect current wildlife habitat; Protect and restore biodiversity

Table 16: Prioritized Action Plan

Recommended Action	Priority (Ave.)	Capital Cost	Opp. Cost	Time Frame	Applicable Goal Category	Applicable Goals
Programmatic Natural Resource Preservation	Medium (2.08)	$-$$$	$-$$$	Continual	Farmland Protection, Flooding, Natural Areas, Property Rights, Recreation, Stream Maintenance/Quality, Water Supply, Wildlife Biodiversity	Promote **voluntary** farmland protection; Flood control; Encourage protection of natural areas; Provide education on private property rights; Promote recreational opportunities; Promote water quality; Promote sustainable groundwater; Protect current wildlife habitat; Protect and restore biodiversity
Stakeholder Input Survey	Medium (2.08)	$	$	1-3 Years	Education, Flooding, Natural Areas, Property Rights, Recreation, Stream Maintenance/ Quality, Wildlife Biodiversity	Educate elected officials - BMPs in Development; Flood control; Identify flooding areas and reason; Encourage protection of natural areas; Educate about natural vegetation along detention ponds; Provide education on private property rights; Promote Best Management Practices; Promote water quality; Debris in creek; Create stream maintenance programs; Protect current wildlife habitat

Table 16: Prioritized Action Plan

Recommended Action	Priority (Ave.)	Capital Cost	Opp. Cost	Time Frame	Applicable Goal Category	Applicable Goals
Aux Sable Creek Watershed Website	Medium (2.17)	$$	$	Continual	Education, Farmland Protection, Property Rights, Natural Areas, Recreation, Stream Maintenance/ Quality, Water Supply, Wildlife Biodiversity	What is a watershed?; Educate elected officials - BMPs in Development; Promote **voluntary** farmland protection; Provide education on private property rights; Encourage protection of natural areas; Educate about natural vegetation along detention ponds;Promote recreational opportunities; Promote Best Management Practices; Promote water quality;Debris in creek; Create stream maintenance programs;Promote sustainable groundwater; Protect current wildlife habitat; Protect and restore biodiversity
Community Involvement Programs	Medium (2.17)	$	$	Continual	Education, Natural Areas, Stream Maintenance/ Quality	What is a watershed?; Encourage protection of natural areas; Promote water quality; Debris in creek; Create stream maintenance programs
Classroom Education	Medium -Low (2.38)	$$	$	Continual	Education, Natural Areas	What is a watershed?; Encourage protection of natural areas
Water Conservation Programs	Medium -Low (2.33)	$-$$	$	Continual	Education, Stream Maintenance/ Quality, Water Supply	What is a watershed?; Promote water quality; Debris in creek; Create stream maintenance programs; Promote sustainable groundwater;

CHAPTER 7: POTENTIAL FUNDING SOURCES

Funding for various projects within the Aux Sable Creek Watershed to obtain the goals identified by the Committee is available from a variety of locations. It is important to realize that there is no one well of money that can be tapped for each project, but a cornucopia of opportunities exist for those willing to locate it. There are two basic types of money available for projects within the Watershed: grant money and alternative money. Grant money is money that can be obtained from various agencies or sources (public and private) for project specific purposes. Alternative money is money that is gained through creative applications which encourage the exploration of partnerships with groups that may have similar objectives which may not be the direct purpose of the project. An example of using alternative money would be to request a partnership with an organization such as Ducks Unlimited to utilize one of their programs for wetland enhancement to help assist a resident along the creek in protecting a wetland. While the resident's desire to enhance a wetland may not have included the idea of helping in waterfowl conservation, the partnership with Ducks Unlimited help fund the enhancement project to achieve both goals.

Due to the large number of funding programs available, no one source may fit each project. Some sources are a cost share (such as the 319 Grant) where there has to be some other source paying for a part of the project in conjunction with the grant. Most sources allow the applicant to search for multiple sources of funding for a single project to help lower the cost for the landowner(s).

In coordination with the grant applications, another importance consideration is the inclusion of surrounding landowners and the effect of the project on them. The effect of the landowners on the project should also be considered. Depending on the project, some surrounding landowners may wish to join in on the project. It should be noted that rights of access may be included in the grant applications indicating that if there is land outside of the project under separate ownership, access can be granted through that property.

The following represents a list of potential state and federal technical resources and funding sources that has been developed from a variety of sources. There are a variety of private sources of funding which can be applied for such as the Grand Victoria Foundation. The list is not complete, but represents a good starting point. Due to changes in the state of the various levels of government and the economy, not all programs may exist past the printing of this plan. Before starting a project, check with the various agencies to determine what programs are currently available.

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Partners for Conservation Program (formerly the Conservation 2000-Ecosystems Program (C-2000))

- The goal of the program is to provide funding for larger projects ($$-$$$) whose goal is to maintain and enhance ecological and economic conditions of the region. Funding for projects are awarded on a competitive basis to applicants from designated Ecosystem Partnership Areas (resource economics, habitat, outreach, research, or capital).
- The C-2000 program provides financial and technical support to Ecosystem Partnerships.
- Applications are due in February.
- Applications should be completed through the Watershed Coalition or other local partnerships.
- Applicable to larger scale restoration projects within the Watershed.

Office of Water Resources Small Projects Fund

- Assists rural and smaller urban communities to reduce stormwater related damages by alleviating local significant drainage and flood problems.
- The OWR does the initial surveys of conditions and provides recommendations for flood control and acquisition projects for local flood problem areas. If the project is deemed warranted, IDNR coordinates planning, design, and funding.
- Contributions can reach $75,000 on small projects.
- Contact IDNR-OWR at 217-782-4637 for further information.
- This type of funding may be applicable to a variety of smaller flood issues throughout the Watershed.

Forestry Development Act Program

- Administers the Forestry Development Cost-Share Program, which provides funding for landowners that manage forests for environmental, social, and economic benefits.
- Forests must be at least 100 feet wide and be located on 5 acres of contiguous land within the state.
- Application must include a Forest Management Plan prepared by someone other than the applicant who is qualified and submitted to and approved by the District Forester.
- A maximum of 75% cost share is provided for tree planting, site preparation, vegetation control, fencing, thinning, fire breaks, and pruning.
- This grant can be combined with federal FDA programs.

- This program may be suitable for a private landowner that has a woodlot that requires maintenance or restoration.

Open Space Lands Acquisition and Development Program (OSLAD)

- Eligible projects include money for acquisition and development of public parks and open space.
- Application deadline is July 1 annually.
- Funding consists of 50% of project costs with a maximum of $750,000 for acquisition projects and $400,000 for development and renovation projects.
- OSLAD funding would be appropriate for projects in the Watershed that will be used for open space or public recreation.

Land and Water Conservation Fund (LWCF)

- The LWCF is a state funded program that provides funding assistance to local government agencies for acquisition and/or development of land for public parks and open space.
- This program is similar to OSLAD.
- Funding from this source is recommended for municipalities looking to create public open space.

Open Land Trust Fund Grant (OLT)

- Grants are available to local governments to acquire land from willing sellers for open space and resource based outdoor recreation.
- OLT funding should be applied for use with projects similar to those described above.

Illinois Nature Preserves Commission Programs (INPC)

- The INPC is a program for landowners who wish to protect high quality natural resources, threatened or endangered species, and habitat in perpetuity through voluntary dedication or registration of such lands into the Illinois Nature Preserves System. The INPC promotes the preservation of these significant lands and provides leadership in their stewardship, management, and protection.
- The INPC program is recommended for landowners who have had suspected high quality resources identified and recorded and wish to preserve those resources.

EcoWatch Network

- Through programs such as the RiverWatch, ForestWatch, PrairieWatch, WetlandWatch, and UrbanWatch, adult volunteers, high school science

teachers, and students monitor the various resources as part of an educational tool to learn more about their surroundings.

Illinois Migratory Waterfowl Stamp Fund

- Provides for the acquisition of public lands and/or the development of habitat to attract and support waterfowl. Eligible projects must directly or indirectly benefit waterfowl hunting in Illinois. Projects involving education or research are not eligible.
- Application deadline is December 31.

Private Land Wildlife Habitat Management Fund

- A technical assistance program for private landowners that provide plans, field equipment, plant materials, and labor to develop, implement, and maintain wildlife habitat management practices that require specialized training, equipment or resources which would otherwise be unavailable to landowners.
- To be eligible, the privately owned land must be at least 1.0 acres in size in a rural area, or 0.25 acres in an urban area.

Private Waters Program

- This program provides free field inspections and technical advice on fish habitat, fish population management, water quality, vegetation control, streambank stabilization, and habitat restoration in impounded waters or streams.

Trees, Shrubs, and Seedlings at No Cost Program

- The goal of the program is to encourage the reforestation of land by private landowners to increase wildlife habitat and erosion control function.
- The program provides seedlings at no cost to landowners who have an IDNR approved management plan.

Recreation Trails Program

- Provides financial assistance to federal, state and local government agencies and not-for-profit organizations for the acquisition, development, rehabilitation, and maintenance of public motorized and non-motorized recreation trails.
- There must be a minimum of a non-federal match of 20%.
- This grant may be used in conjunction with federal programs to create access to public land through private land.

Snowmobile Grants

- Financial assistance for the acquisition and development or rehabilitation of public snowmobile areas, trails, and facilities.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

Nonpoint Source Management Program (Section 319 Grants)

- The 319 program has funds available for projects which include controlling or elimination nonpoint source pollution sources. A wide variety of projects are included.
- Grants are awarded annually with the amount available varying based on number of applications.
- These funds are not available to complete actions required by state or federal law.
- Requires 40% non-federal matching funds or in-kind services.

Water Revolving Fund: Wastewater and Drinking Water

- These two programs provide low interest loans to local units of government for the construction of wastewater or community water supply facilities.

ILLINOIS DEPARTMENT OF AGRICULTURE

Partners for Conservation Program

- Program provides funding for the SWCDs for various cost-sharing programs such as well sealing, stream bank stabilization, nutrient management, upland BMPs, and special projects.

UNITED STATES DEPARTMENT OF AGRICULTURE – 2008 FARM BILL
Through the Natural Resource Conservation Service (NRCS)

Conservation Reserve Program (CRP)

- The CRP removes marginal croplands from production and encourages environmental enhancement on those lands.

Conservation Reserve Enhancement Program (CREP)

- The Conservation Reserve Enhancement Program (CREP) is a voluntary land retirement program that helps agricultural producers protect environmentally sensitive land, decrease erosion, restore wildlife habitat, and safeguard ground and surface water.

- The program is a partnership among producers; tribal, state, and federal governments; and, in some cases, private groups. CREP is an offshoot of the country's largest private-lands environmental improvement program - the Conservation Reserve Program (CRP).

Wetlands Reserve Program (WRP)

- The WRP is a voluntary, non-regulatory, incentive-based program that helps private based landowners, farmers, and ranchers protect and restore wetlands on their property.

Environmental Quality Incentives Program (EQIP)

- EQIP offers financial and technical help to assist farmers and ranchers install or implement conservation practices on eligible agricultural land to protect water, air, and soil quality as well as wildlife habitat.
- Also includes the Agricultural Water Enhancement Program to help producers achieve water quality goals and address water quantity concerns.

Conservation Stewardship Program (CSP)

- The CSP pays farmers who are implementing conservation practices on their working lands. It provides annual payments and increasing financial incentives to encourage the continuation of farming practices that benefit soil, water, and air resources.

Farm Protection Program (FPP)

- The FPP provides matching funds up to 50% of the fair market assessment value to help State, tribal, or local governments and non-governmental organizations purchase the development rights to keep productive farm and ranchland in agricultural uses.

Grassland Reserve Program (GRP)

- GRP helps landowners restore and protect grassland, rangeland, pastureland, shrubland, and certain other types of lands as well as provides assistance for rehabilitation or enhancement of those lands.

Open Fields Program (OFP)

- The OFP provides incentives to State governments and Indian Tribes to provide public access to private land for hunting and fishing.

Wildlife Habitat Incentives Program (WHIP)

- WHIP helps landowners develop and improve wildlife habitat primarily on private lands.

Small Watershed Rehabilitation Program

- This program provides technical assistance and financial assistance for the rehabilitation of existing small watershed projects that may include upgrading or removing dams.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Environmental Education Grants

- Eligible projects include environmental education activities such as curricula design or development, design and demonstration of education field methods, training educators, or fostering international cooperation.
- Typically the grant requires a non-federal match of 25%.

Five-Star Restoration Challenge Grant Program

- Grant funding is available for community based wetland and riparian area restoration projects in a variety of locations. The program combines environmental enhancement activities with employment opportunities for economically disadvantaged youth.
- Partnerships between public and private entities are encouraged to promote the collaboration of services and goods.
- Multiple entities may apply for the grant with average awards about $10,000/ project.

UNITED STATES FISH AND WILDLIFE SERVICE

North American Wetlands Conservation Act

- The act provides financial assistance for on-the-ground projects which include acquisition, restoration, creation, or enhancement of wetlands and wetland associated uplands. Partnerships are encouraged and conservation easements are required to protect the land from future development.
- The deadline for application various.
- The grant requires an equal match of non-federal funds to a maximum amount of $50,000.

Northeastern Illinois Wetlands Conservation Account

- Projects which are eligible for this grant include restoration, enhancement, and/or replacement of wetland values and functions which have been degraded or destroyed as a result of activities conducted in violation of the Clean Water Act. Other eligible projects include those that promote understanding, appreciation, and stewardship of wetlands. Permanent land protection along with federal/state mitigation plans is required on all projects.
- Matching funds are preferred with this grant as either in-kind or cash, but not required.

Flexible Funds

- This program provides relatively small amounts of funding from up to five separate programs to good projects on private lands to restore fish and/or wildlife habitat.
- An equal match is preferred with this type of grant.

Partners for Fish and Wildlife

- Provides financial assistance for the restoration of degraded wetlands and other important fish and wildlife habitats such as grasslands, streams, and riparian habitats. Technical assistance is also provided for the design of the restoration plans.
- This grant can provide 100% funding for up to 10 years on private lands and are often paired with the MRCD Wetland Reserve Program.

Waterfowl Production Areas

- This program provides 100% of the fair market value for the acquisition of land greater than 100 acres in size to preserve or restore wetlands open to hunting, fishing, and trapping. This program does not guarantee the receipt of local permits required to restore the wetlands.

CHAPTER 8: MONITORING PLAN SUCCESSES

INTRODUCTION

The Aux Sable Creek Watershed Plan presents a unique challenge for monitoring because the majority of the recommendations are for potential changes within the Watershed due to future development. To attain the goals of the plan while following the Vision Statement (Chapter 1), the success of the Watershed plan would ultimately be determined by reevaluating the class rating of the stream. By removing Fecal Coliform bacteria from the streams and maintaining the Class A rating of the Aux Sable Creek, the plan is successful.

To assist in ensuring the broad action items of the Prioritized Action Plan (Chapter 6) are being addressed, smaller, more detailed milestones must be attained. The milestones presented below can be applied to more than one recommended action item, and therefore may be repeated. To best evaluate the status of the milestones on an annual basis; they have been presented based on the recommended action items in which they will help to attain. The short-term milestones are tasks that should be completed in the near future (1-3 years) to set up or initiate the long-term milestones which may require several steps before completion.

IMPROVE WATER QUALITY

To improve water quality within the watershed, including removing Fecal Coliform bacteria, water quality must continually be monitored so that remedial measures can be taken as necessary. To achieve this action, a monitoring plan needs to be implemented and carried out.

Short-term Milestones (1-3 years)

- Develop a Quality Assurance Project Plan (QAPP). The QAPP is a detailed description of the monitoring methods/components along with reasoning behind the procedure. The QAPP is required for any projects with a monitoring component seeking Section 319 grant funding and helps ensure to the IEPA that the data that is being collected is to strict standards of credibility. The monitoring described in the held QAPP consists of any stream assessments and water quality measurements that may be collected. This also helps ensure that the data collected within the Watershed can be used in future IEPA Integrated Reports.
- Create a Watershed Resource Inventory with more detailed information built off this plan. The Inventory should be made available on the website including a method to submit additional information. Caution should be made with making

specific locations of sensitive resources available to protect them from harm. The Inventory could include information for specific resources such as vegetation communities, observed wildlife, owner(s), recreational facilities present, etc.

- Provide an educational workshop hosted by the local governmental agencies, SWCD, and/or Coalition to discuss the current ordinances and how they affect the landowners. This workshop would also be a time to gather local input for possible revisions to the ordinances.
- The Watershed Website should continue to be maintained to update information regarding maintaining natural vegetation around detention basins and along streams and proper maintenance techniques that can reduce water fowl usage (which can act as a source of Fecal Coliform bacteria).

Long-term Milestones (4-10 years)

- Create a brochure for homeowners regarding the purpose, use, and maintenance of streams and detention basins. Brochure should contain similar materials as the website and include a mention of the website.
- Coalition (or other suitable host) will maintain the Watershed Website as a means of distributing information and providing a connection to Watershed Stakeholders. The website should contain the progress of the plan implementation and any relevant reports, as well as, participation opportunities.
- The measured counts of Fecal Coliform are below the Illinois Water Quality Standards. This goal can be achieved through the implementation of various measures or the attainment of several of the goals outlined in this chapter.
- Ensure that each community with an NPDES ILR40 permit has developed an Illicit Discharge Detection and Elimination program to meet the requirements of their permit.
- Provide an educational program with the Watershed Plan to elected officials to provide the necessary information regarding the plan and Best Management Practices to apply in their communities. The program can be used and modified accordingly as the Watershed Plan is updated.

RIPARIAN BUFFERS/FILTER STRIPS

The purpose of the buffers and filter strips has been previously discussed. They should be placed along the creek in areas identified as Open Space Opportunities or Additional Open Space Opportunities in the Open Space Plan (found in the Appendices).

Short-Term Milestones (1-3 years)

- Provide educational workshops and seminars hosted by the SWCDs, NRCS, Coalition, or other interested resources. These educational workshops should include:

  - How to find available grants and how to apply for them;
  - Creating buffers and filter strips along streams;
  - Creating open space with guidance from the Open Space Plans;
  - Conservation easements and preservation of land;
  - Current regulations that are in place in the Watershed.
- Buffers should be installed in identified areas within public property at a rate of approximately 5,000 feet per year.
- Create a Watershed Resource Inventory with more detailed information built off this plan. The Inventory should be made available on the website including a method to submit additional information. Caution should be made with making specific locations of sensitive resources available to protect them from harm. The Inventory could include information for specific resources such as vegetation communities, observed wildlife, owner(s), recreational facilities present, etc.
- Buffers should be installed in identified areas within private property at a cumulative rate of 2,500 feet per year.

Long-term Milestones (4-10 years)

- In addition to updating the Watershed Plan, the Open Space plans should be updated to reflect current conditions in relation to the creation of riparian buffers and filter strips.

POST CONSTRUCTION RUNOFF CONTROLS (BMPS) – DEVELOPMENT

Post construction runoff controls are measures which are designed prior to construction, but implemented to control stormwater runoff in residential or commercial developments. The use of these controls is required in the NPDES Phase II permit which covers most projects within the Watershed, although which measures to be used are not specified.

Short-term Milestones (1-3 years)

- The Watershed Website should continue to be maintained to contain information for developers regarding maintaining drainage features in relation to agricultural tiles and maintaining natural vegetation around detention basins and proper maintenance techniques that can reduce water fowl usage (which can act as a source of Fecal Coliform bacteria).
- The Watershed Website should continue to be maintained with operation and maintenance techniques along with new BMPs which may be implemented in new projects or retrofitted into existing areas.
- Continued maintenance should occur of all culverts, swales, and drainage ways on public property by the local department of transportation or highway department.

- Create a brochure for homeowners regarding the purpose, use, and maintenance of detention basins. Brochure should contain similar materials as the website and include a mention of the website.

Long-term Milestones (4-10 years)

- Address the necessary flooding concerns cooperatively with landowners and municipalities as they may be remedied by measures implemented by neighboring developments. SWCD/NRCS can provide technical assistance and potentially assist with funding opportunities.
- Coalition (or other suitable host) will maintain the Watershed Website as a means of distributing information and providing a connection to Watershed Stakeholders. The website should contain the progress of the plan implementation and any relevant reports, as well as, participation opportunities.
- Develop an Aux Sable Overlay District (or expand on the City of Joliet's version) which recommends a variety of BMPs along with documentation that the drainage will be maintained. The overlay district can function similar to an ordinance to enforce protection
- Provide an educational program with the Watershed Plan to elected officials to provide the necessary information regarding the plan and Best Management Practices to apply in their communities. The program can be used and modified accordingly as the Watershed Plan is updated.
- Implementation of Watershed Open Space Plan as found in the Appendices.

IMPROVE AQUATIC HABITAT

To improve aquatic habitat in the Watershed, both small and large projects can initiated. The increase in wildlife and plant diversity will be the ultimate indicator of success.

Short-term Milestones (1-3 years)

- The Watershed Website should continue to be maintained to contain information regarding maintaining natural vegetation around detention basins which can improve aquatic habitat.
- Provide educational workshops and seminars hosted by the SWCDs, NRCS, Coalition, or other interested resources. These educational workshops should include:
    - Proper techniques for water quality monitoring;
    - Small scale projects for individual homes that would enhance the Watershed;
        - Stream Barbs
        - Aquatic Habitat Creation
        - Bird Boxes
        - Bird and Animal Feeders

        - Native Plantings
        - Rain Gardens
    - Conservation easements and preservation of land;
    - Current regulations that are in place in the Watershed.
    - How to find available grants and how to apply for them;
- Create an Adopt-A-Stream program where groups can remove trash and debris from the streams on a volunteer basis. All of the public reaches of the stream should be cleaned about every two years. Private reaches should be periodically attended to by landowners. If permission is granted by the landowners, sections adjacent to public reaches could be attended to by the various groups. Permission could be granted by private landowners willing to have their reach cleaned regardless of location to public reaches.
- Create a Watershed Resource Inventory with more detailed information built off this plan. The Inventory should be made available on the website including a method to submit additional information. Caution should be made with making specific locations of sensitive resources available to protect them from harm. The Inventory could include information for specific resources such as vegetation communities, observed wildlife, owner(s), recreational facilities present, etc.
- Individual landowners along the streams can initiate small scale (based on relative cost and typical size in single private ownership) projects on their land to promote the increase of wildlife diversity.

Long-term Milestones (4-10 years)

- Coalition (or other suitable host) will maintain the Watershed Website as a means of distributing information and providing a connection to Watershed Stakeholders. The website should contain the progress of the plan implementation and any relevant reports, as well as, participation opportunities.
- Ensure that each community with an NPDES ILR40 permit has developed an Illicit Discharge Detection and Elimination program to meet the requirements of their permit.
- Provide an educational program with the Watershed Plan to elected officials to provide the necessary information regarding the plan and Best Management Practices to apply in their communities. The program can be used and modified accordingly as the Watershed Plan is updated.

ENFORCEMENT OF CONSTRUCTION SITE RUNOFF CONTROLS

With the concern of the increasing amount of development within the Watershed, careful attention must be paid to the effects of construction to the local water bodies. The milestones presented are those which can help achieve the requirements of the NPDES Phase II permit and thus protect the Watershed from sediment which could degrade the water quality.

Short-term Milestones (1-3 years)

- The Watershed Website should continue to be maintained to contain information for developers regarding maintaining drainage features in relation to agricultural tiles.
- Survey the Watershed for evidence of flooding and determine causes, especially if related to construction projects. Rank cases of flooding based on severity and extent of damage to prioritize the need for fixing issues. Surveys can be recorded by municipalities and counties.
- Continued maintenance should occur of all culverts, swales, and drainage ways on public property by the local department of transportation or highway department.

Long-term Milestones (4-10 years)

- Address the necessary flooding concerns cooperatively with landowners and municipalities that may have occurred from sediment transport from a nearby construction site. SWCD/NRCS can provide technical assistance and potentially assist with funding opportunities.
- Coalition (or other suitable host) will maintain the Watershed Website as a means of distributing information and providing a connection to Watershed Stakeholders. The website should contain the progress of the plan implementation and any relevant reports, as well as, participation opportunities.
- Provide an educational program with the Watershed Plan to elected officials to provide the necessary information regarding the plan and Best Management Practices to apply in their communities. The program can be used and modified accordingly as the Watershed Plan is updated.
- Develop an Aux Sable Overlay District (or expand on the City of Joliet's version) which recommends a variety of BMPs along with documentation that the drainage will be maintained. The overlay district can function similar to an ordinance to enforce protection

DEVELOPMENT OF ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM

As part of the NPDES Phase II requirements, all municipalities covered by the permit must develop a program to detect and eliminate illicit discharges such as discharges into storm sewers containing used motor oil or paint from individual land owners.

Short-term Milestones (1-3 years)

- Create a brochure for homeowners regarding the purpose, use, and maintenance of stormwater facilities and functions such as storm sewers and detention basins. Brochure should contain similar materials as the website and include a mention of the website.

- Create a Watershed Resource Inventory with more detailed information built off this plan. The Inventory should be made available on the website including a method to submit additional information. Caution should be made with making specific locations of sensitive resources available to protect them from harm. The Inventory could include information for specific resources such as vegetation communities, observed wildlife, owner(s), recreational facilities present, etc.
- Create an education brochure or newsletter which highlights proper disposal of used household chemicals, local programs for disposal and collection, and means of protecting stormwater facilities or other local water resources. Special attention can be made to programs offered by the local SWCDs.

Long-Term Goals (4-10 years)

- Coalition (or other suitable host) will maintain the Watershed Website as a means of distributing information and providing a connection to Watershed Stakeholders. The website should contain the progress of the plan implementation and any relevant reports, as well as, participation opportunities.

CREATE AUX SABLE CREEK WATERSHED OVERLAY DISTRICT

An overlay district is an area that may overlap several municipalities and act as an ordinance to provide structure or requirements over an area. The overlay district can be used to require developments to protect the watershed through the implementation of the Watershed Plan. The overlay district can also provide a frame work for regulating development in the Watershed.

Short-term Milestones (1-3 years)

- The Watershed Website should continue to be maintained to contain information for developers regarding the Watershed Plan and how they can protect the Watershed during and after construction.
- Create a Watershed Resource Inventory with more detailed information built off this plan. The Inventory should be made available on the website including a method to submit additional information. Caution should be made with making specific locations of sensitive resources available to protect them from harm. The Inventory could include information for specific resources such as vegetation communities, observed wildlife, owner(s), recreational facilities present, etc.

Long-term Milestones (4-10 years)

- Develop an Aux Sable Overlay District (or expand on the City of Joliet's version) which recommends a variety of BMPs along with documentation that the drainage will be maintained. The following steps can assist in preparing the overlay district.
    - Create a sub-committee of the Coalition to prepare the overlay district. This sub-committee should vary in membership so that equal representation of the Watershed is achieved.

  - Define the limits of the overlay district, in terms of geographical boundary and regulatory pressure. Thorough research should be conducted to establish who oversees the implementation and enforcement of the overlay district, the depth of detail of the requirements (whether it requires a general review of the plan or implementation of specific pieces of the plan.
  - The committee should draft the language of the overlay and have it reviewed and approved by all of the municipalities included in the boundaries of the district.
  - The approved overlay district should be published and posted as necessary to make available to the appropriate people.
- Coalition (or other suitable host) will maintain the Watershed Website as a means of distributing information and providing a connection to Watershed Stakeholders. The website should contain the progress of the plan implementation and any relevant reports, as well as, participation opportunities.
- Provide an educational program with the Watershed Plan to elected officials to provide the necessary information regarding the plan and Best Management Practices to apply in their communities. The program can be used and modified accordingly as the Watershed Plan is updated.

RESTORATION OF NATURAL AREAS

Natural areas which currently exist in a degraded state (riparian buffers, public areas not managed by a Forest Preserve District or other municipal agency, or private land not under a management program unless done in a partnership with those entities) should be restored to higher quality with more opportunity for wildlife habitat.

Short-term Milestones (1-3 years)

- Create an educational brochure available at various locations to provide information regarding property rights in relation to recreation opportunities in the Watershed. Topics to be covered should include:
  - Requesting access to private property;
  - Identification of private versus public property;
  - Trespassing laws;
  - Private landowner rights.
- Create a program where private landowners can purchase “Private Property” signs for restored areas at a reduced cost or share the cost. Signs can include means of appropriately contacting the landowner to request permission to access the land.
- Create a Watershed Resource Inventory with more detailed information built off this plan. The Inventory should be made available on the website including a method to submit additional information. Caution should be made with making

specific locations of sensitive resources available to protect them from harm. The Inventory could include information for specific resources such as vegetation communities, observed wildlife, owner(s), recreational facilities present, etc.

- Provide educational workshops and seminars hosted by the SWCDs, NRCS, Coalition, or other interested resources. These educational workshops should include (at least):
  - How to find available grants and how to apply for them;
  - Farm Bill 2008 Programs for restoration of land;
  - Small scale projects for individual homes that would enhance the Watershed;
    - Bird Boxes
    - Bird and Animal Feeders
    - Native Plantings
    - Rain Gardens
  - Conservation easements and preservation of land;
  - Restoration techniques to increase vegetation and habitat quality;
  - Current regulations that are in place in the Watershed.

  These seminars can be a launching point for landowners to take part in various programs.

Long-term Milestones (4-10 years)

- Create open space (prairies and wetlands) which are open to the public and have opportunities for recreation such as trails for walking and biking. These trails could contain educational signage about the landscape and specific restoration measures.
- Coalition (or other suitable host) will maintain the Watershed Website as a means of distributing information and providing a connection to Watershed Stakeholders. The website should contain the progress of the plan implementation and any relevant reports, as well as, participation opportunities.
- Based on public opinion, land can be set aside, either publicly or privately, for specific recreation opportunities (hunting, off-road biking, etc.). A group can be created to oversee the set-up and maintenance.

POST CONSTRUCTION RUNOFF CONTROLS (BMPS) – RETROFIT

Existing developments in the Watershed may have a need for replacing or improving existing runoff controls. The retrofitting of existing controls can consist of creating a wetland bottom basin from a dry bottom basin, creating rain gardens at the end of stormwater outlets or in yards at the ends of drainage ways or downspouts, and installing grit separators into catch basins.

Short-term Milestones (1-3 years)

- Survey the Watershed for evidence of flooding or water quality issues and determine causes. Rank cases of flooding based on severity and extent of

damage to prioritize the need for fixing issues. Surveys can be recorded by municipalities and counties. The outcome of the surveys can include analysis with a consultant or municipality to use stormwater BMPs to alleviate the flooding problem.

- Create a Watershed Resource Inventory with more detailed information built off this plan. The Inventory should be made available on the website including a method to submit additional information. Caution should be made with making specific locations of sensitive resources available to protect them from harm. The Inventory could include information for specific resources such as vegetation communities, observed wildlife, owner(s), recreational facilities present, etc.
- The Watershed Website should continue to be maintained to contain information regarding maintaining natural vegetation around detention basins and proper maintenance techniques that can reduce water fowl usage (which can act as a source of Fecal Coliform bacteria).
- Continued maintenance should occur of all culverts, swales, and drainage ways on public property by the local department of transportation or highway department. During maintenance, condition reports of the various structures could be recorded to assist in the planning of potential locations to apply stormwater BMPs.

Long-term Milestones (4-10 years)

- Provide an educational program with the Watershed Plan to elected officials to provide the necessary information regarding the plan and Best Management Practices to apply in their communities. The program can be used and modified accordingly as the Watershed Plan is updated.
- Create a brochure for homeowners regarding the purpose, use, and maintenance of detention basins. Brochure should contain similar materials as the website and include a mention of the website.
- Coalition (or other suitable host) will maintain the Watershed Website as a means of distributing information and providing a connection to Watershed Stakeholders. The website should contain the progress of the plan implementation and any relevant reports, as well as, participation opportunities.
- Address the necessary flooding concerns cooperatively with landowners and municipalities. SWCD/NRCS can provide technical assistance and potentially assist with funding opportunities.

EDUCATION/ OUTREACH – COALITION MEETINGS

Education and Outreach is part of the general 319 Grant procured by the Coalition and the Conservation Foundation. This specific goal is focused at presenting material to the public through the Coalition's regular meetings.

Short-term Milestones (1-3 years)

- Provide educational workshops and seminars hosted by the Coalition with presentations by the SWCDs, NRCS or other resources. These educational workshops should include:
  - Proper techniques for water quality monitoring;
  - How to find available grants and how to apply for them;
  - Conservation of water in the home;
  - Conservation easements and preservation of land;
  - Farm Bill 2008 Programs;
  - Small scale projects for individual homes that would enhance the Watershed;
    - Bird Boxes
    - Bird and Animal Feeders
    - Native Plantings
    - Rain Gardens
  - Current regulations that are in place in the Watershed.

  These seminars can be a launching point for landowners to take part in various programs. A system of recommending programs or seminars should be implemented so that coalition members and the public can provide ideas for future meeting topics.
- Prepare educational brochures which highlight the topics of the meetings. Each brochure can be made available at future meetings or on the Watershed Website for future reference for the public.
- Additional advertising should be prepared to promote the ideals of the Coalition to garner more attention and positive publicity to attract additional members to the Coalition.
- The Watershed Website should continue to be maintained to contain information from the meetings and be used to advertise for the Coalition.

Long-term Milestones (4-10 years)

- Coalition (or other suitable host) will maintain the Watershed Website as a means of distributing information and providing a connection to Watershed Stakeholders. The website should contain the progress of the plan implementation and any relevant reports, as well as, participation opportunities.

PROGRAMMATIC NATURAL RESOURCE PRESERVATION

Preservation of natural resources can be done through a variety of programs, based upon whether land is public or private at the time of protection.

Short-term Milestones (1-3 years)

- Provide educational workshops and seminars hosted by the SWCDs, NRCS, Coalition, or other interested resources. These educational workshops should include (at least):
  - How to find available grants and how to apply for them;
  - Farm Bill 2008 Programs relating to natural area preservation;
  - Conservation easements and preservation of land;
  - Current regulations that are in place in the Watershed.

  These seminars can be a launching point for landowners to take part in various programs.
- Create an educational brochure available at various locations to provide information regarding property rights in relation to recreation opportunities in the Watershed. Topics to be covered should include:
  - Requesting access to private property;
  - Identification of private versus public property;
  - Trespassing laws;
  - Private landowner rights.
- Create a Watershed Resource Inventory with more detailed information built off this plan. The Inventory should be made available on the website including a method to submit additional information. Caution should be made with making specific locations of sensitive resources available to protect them from harm. The Inventory could include information for specific resources such as vegetation communities, observed wildlife, owner(s), recreational facilities present, etc.
- Create a program where private landowners can purchase "Private Property" signs at a reduced cost or share the cost. Signs can include means of safely contacting the landowner to request permission to access the land.

Long-term Milestones (4-10 years)

- Establish a local program where private landowners can donate their land that may be adjacent to existing publicly preserved land. Educational materials can be distributed with the details of the program.
- Create open space (prairies and wetlands) which are open to the public, but also contain opportunities for recreation, such as trails for walking and biking. These trails should contain educational signage.
- Based on public opinion, land can be set aside, either publicly or privately, for hunting. A group can be created to oversee the set-up and maintenance.
- Coalition (or other suitable host) will maintain the Watershed Website as a means of distributing information and providing a connection to Watershed Stakeholders. The website should contain the progress of the plan implementation and any relevant reports, as well as, participation opportunities.

STAKEHOLDER INPUT SURVEY

The purpose of the Stakeholder Input Survey is to gather information about continuing concerns within the Watershed. Information collected can be used to update the objectives of the Watershed Plan and to verify that previous concerns have been met. The survey can also include report of the existing status of BMPs in the Watershed which have a limited life span.

Short-Term Milestones (1-3 years)

- Create a draft version of the survey and present at Coalition meeting for approval. Survey should include an area for stakeholders to provide concerns with locations, as well as, a means of ranking concerns previously identified in terms of relative significance.
- Create a means of recording, tallying, and reporting survey results without identification of specific parties to protect their privacy (unless specifically requested).

Long-term Milestones (4-10 years)

- Address the necessary flooding or water quality concerns cooperatively with landowners and municipalities. SWCD/NRCS can provide technical assistance and potentially assist with funding opportunities.
- Based on public opinion, land can be set aside, either publicly or privately, for hunting. A group can be created to oversee the set-up and maintenance.

AUX SABLE CREEK WATERSHED WEBSITE

The Watershed Website was created as part of the Watershed Plan update to be a means of distributing information to the stakeholders in the Watershed. The use of the website creates a large potential for hosting a wide variety information relevant to all the potential users. The key is making sure that the website is maintained long-term.

Short-term Milestones (1-3 years)

- Establish a webmaster or long term host of the website and a means of regularly updating the website with necessary information.
- Upload the updated and approved version of the Watershed Plan.
- Create a Watershed Resource Inventory with more detailed information built off this plan. The Inventory should be made available on the website including a method to submit additional information. Caution should be made with making specific locations of sensitive resources available to protect them from harm. The Inventory could include information for specific resources such as vegetation communities, observed wildlife, owner(s), recreational facilities present, etc.

- Prepare existing information for use on the website (may include scanning various documents or obtaining original electronic copies from the source).

Long-term Milestones (4-10 years)

- Regularly update the website with the progress of the implementation of the Watershed Plan. Status of individual goals or achievements should be highlighted along with future meetings to update the plan itself.
- Continue to maintain the website with the information that has been listed in the other goals.

COMMUNITY INVOLVEMENT

The Watershed Plan will not provide any protection of the watershed without the involvement of the stakeholders both in implementing and updating the plan. Attention needs to be drawn to what individuals and groups can accomplish together in various locations.

Short-term Milestones (1-3 years)

- Provide educational workshops and seminars hosted by the SWCDs, NRCS, Coalition, or other interested resources. These educational workshops should include (at least):
    - How to find available grants and how to apply for them;
    - Proper techniques for water quality monitoring;
    - Farm Bill 2008 Programs;
    - Small scale projects for individual homes that would enhance the Watershed;
        - Bird Boxes
        - Bird and Animal Feeders
        - Native Plantings
        - Rain Gardens
    - Conservation easements and preservation of land;
    - Current regulations that are in place in the Watershed.

  These seminars can be a launching point for landowners to take part in various programs.
- Create a Watershed Resource Inventory with more detailed information built off this plan. The Inventory should be made available on the website including a method to submit additional information. Caution should be made with making specific locations of sensitive resources available to protect them from harm. The Inventory could include information for specific resources such as vegetation communities, observed wildlife, owner(s), recreational facilities present, etc.
- The Watershed Website should continue to be maintained to contain information regarding the Watershed Plan, Coalition meetings, educational materials/resources, and local news and projects.

Long-term Milestones (4-10 years)

- Coalition (or other suitable host) will maintain the Watershed Website as a means of distributing information and providing a connection to Watershed Stakeholders. The website should contain the progress of the plan implementation and any relevant reports, as well as, participation opportunities.

CLASSROOM EDUCATION

Although there are no schools in the Watershed at the time of this report, classroom education can help implement some of the monitoring goals of this plan by providing modular classroom curriculum with fieldtrips to enhance the experience. Students get a hands on learning experience, as well as, an opportunity to get family involved with projects they have learned about.

Short-term Milestones (1-3 years)

- Define, in one location, the current or past stream monitoring locations. Use the information to determine if there is a need to implement or modify the monitoring network to adequately cover the Watershed. The use of monitoring the stream can be added to the classroom experience.

Long-Term Milestones (4-10 years)

- Create an educational program presented in classrooms which incorporates lectures, laboratory experiments, and field work to illustrate the appropriate level of knowledge about natural resources, the environment, and the interactions within the various levels of the environment. Educational programs should be tailored for a specific age range. Materials to support the program can be found from a variety of sources.

WATER CONSERVATION PROGRAMS

It was indicated that conservation of the supply of ground water was important to some stakeholders and is a growing concern on a larger scale. Milestones to achieve this goal are focused more to individual homeowners.

Short-term Milestones (1-3 years)

- Provide educational workshops and seminars hosted by the SWCDs, NRCS, Coalition, or other interested resources. These educational workshops should include:
    - How to find available grants and how to apply for them;
    - Small scale projects for individual homes that would enhance the Watershed;
    - Water conservation in and around the home;
    - Current regulations that are in place in the Watershed.
- Create a Watershed Resource Inventory with more detailed information built off this plan. The Inventory should be made available on the website including a

method to submit additional information. Caution should be made with making specific locations of sensitive resources available to protect them from harm. The Inventory could include information for specific resources such as vegetation communities, observed wildlife, owner(s), recreational facilities present, etc.

- Prepare an educational brochure which highlights means of saving water for homeowners. Items which can be highlighted should include:
  - Rain Gardens
  - Rain Barrels
  - Reducing Water Usage
  - Benefits Of Reusing Grey Water

Long-Term Milestones (4-10 years)

- Coalition (or other suitable host) will maintain the Watershed Website as a means of distributing information and providing a connection to Watershed Stakeholders. The website should contain the information presented in the seminars along with supportive documents/ resources.

GOOD AGRICULTURAL STEWARDSHIP

Based upon the current status of the Watershed, agriculture does not appear to have a negative effect on the quality of the streams. Instead, the goal is to continue and promote good agricultural stewardship to those that may not use these practices or those that may want to do more.

Short-term Milestones (1-3 years)

- Provide educational workshops and seminars hosted by the SWCDs, NRCS, University of Illinois Extension, Coalition, or other interested resources. These educational workshops should include (at least):
  - Available Grants and Grant Writing/Applying;
  - Farm Bill 2008 Programs;
  - Agricultural BMPs;
  - Advancements in agricultural techniques;
  - Current regulations that are in place in the Watershed.

  These seminars can be a launching point for landowners to take part in various programs.
- Create an educational brochure available at various locations to provide information regarding property rights in relation to recreation opportunities in the Watershed. Topics to be covered should include:
  - Requesting access to private property;
  - Identification of private versus public property;
  - Trespassing laws;
  - Private landowner rights.

- Landowners should inspect their drain tiles, drainage ways, and culverts with special attention at areas where water may leave their property. Necessary maintenance should include cleaning or repairing tiles and culverts and replacing culverts with appropriate sized structures to eliminate the potential for flooding.
- Create a Watershed Resource Inventory with more detailed information built off this plan. The Inventory should be made available on the website including a method to submit additional information. Caution should be made with making specific locations of sensitive resources available to protect them from harm. The Inventory could include information for specific resources such as vegetation communities, observed wildlife, owner(s), recreational facilities present, etc.
- Create a program where private landowners can purchase "Private Property" signs at a reduced cost or share the cost. Signs can include means of safely contacting the landowner to request permission to access the land.
- Continued maintenance should occur of all culverts, swales, and drainage ways on public property by the local department of transportation or highway department.

Long-term Milestones (4-10 years)

- Coalition (or other suitable host) will maintain the Watershed Website as a means of distributing information and providing a connection to Watershed Stakeholders. The website should contain the progress of the plan implementation and any relevant reports, as well as, participation opportunities.
- The measured counts of Fecal Coliform are below the Illinois Water Quality Standards. This goal can be achieved through the implementation of various measures or the attainment of several of the goals outlined in this chapter.
- Address the necessary flooding concerns cooperatively with landowners and municipalities. SWCD/NRCS can provide technical assistance and potentially assist with funding opportunities.

GLOSSARY

303(d): The Federal Clean Water Act requires states to submit a list of impaired waters to the USEPA for review and approval using water quality assessment data from the Section 305(b) Water Quality Report. States are then required to develop total maximum daily load analyses (TMDLs) for water bodies on the 303(d) list.

305(b): The Illinois 305(b) report is a water quality assessment of the state's surface and groundwater resources that is compiled by the IEPA as a report to the USEPA as required under Section 305(b) of the Clean Water Act.

319 Nonpoint Source Pollution Control Program: Congress enacted Section 319 of the Clean Water Act in 1987 as a way of encouraging and supporting the states' efforts to develop management programs to control the complex problem of nonpoint source water pollution. Nonpoint source pollution is caused by rainfall or snowmelt moving over and through the ground and carrying natural and human-made pollutants into lakes, rivers, streams, wetlands, estuaries, other coastal waters, and groundwater. Atmospheric deposition and hydrologic modification are also sources of nonpoint pollution.

Advanced Identification (ADID): An EPA program designed to provide improved awareness of the locations, functions, and values of wetlands and other waters of the U.S. More specifically, it is intended to inform landowners, developers, and local governments that it may not be appropriate to fill or drain certain high quality wetland sites. ADID projects also can provide guidance on strategies for long-term protection and management of aquatic resources in an area.

Antecedent Moisture Condition (AMC): The soil moisture before a precipitation event that affects runoff.

Aquatic habitat: Structures such as stream substrate, woody debris, aquatic vegetation, and overhanging vegetation that is important to the survival of fish and macroinvertebrates.

Aux Sable Creek Watershed Coalition: The organization comprised of a committee of concerned watershed residents that continue to educate and advocate in the Aux Sable Creek Watershed.

Aux Sable Creek Watershed Plan Advisory Committee: A group of stakeholders within the Watershed formed to begin the process of updating the existing plan to address the nine criteria which are required of watershed plans by the Illinois Environmental Protection Agency (IEPA).

Aux Sable Creek Watershed Planning Committee: A group of local citizens and community leaders that identify resource concerns and address issues like flooding, soil erosion, loss of wetlands, development, degraded water quality, and loss of wildlife habitat. The group tries to presence the quality of the Watershed and prepared a watershed plan and presented it in March 2001.

Best Management Practices (BMPs): Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMPs also include treatment requirements, operating procedures, and practice to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Biological Oxygen Demand (BOD): The amount of dissolved oxygen that is required by microscopic organism (e.g. bacteria) to decompose organic matter in waterbodies.

Clean Water Act (CWA): The CWA is the basic framework for federal water pollution control and has been amended in subsequent years to focus on controlling toxics and improving water quality in areas where compliance with nationwide minimum discharge standards is insufficient to meet the CWA's water quality goals.

Conservation easement: The transfer of land use rights without the transfer of landownership. Conservation easements can be attractive to property owners who do not want to sell their land now, but would support perpetual protection from further development. Conservation easements can be donated or purchased.

Discharge (stream flow): The volume of water passing through a channel during a given time, usually measured in cubic feet per second (cfs).

Drain tile: A perforated, corrugated plastic pipe laid at the bottom of the foundation wall and used to drain excess water away from the foundation. It prevents ground water from seeping through the foundation wall.

Drainage basin: Land surface region drained by a length of stream channel; usually 1,000 to 10,000 square miles in size.

Dredged material: Bottom sediments which are removed by dredging.

Erosion: Displacement of soil particles on the land surface due to water or wind action.

Farmed wetland: Wetlands that were manipulated and used to produce an agricultural commodity prior to December 23, 1985, but had not been completely converted prior to that date and therefore are not prior converted cropland. These areas still meet the wetland criteria and include areas that are seasonally ponded or flooded for an extended period of time.

Fecal coliform bacteria: A group of organisms common to the intestinal tracts of humans and animals. The presence of fecal coliform bacteria in water, wastewater, or biosolids is an indicator of pollution and possible contamination by pathogens.

Federal Emergency Management Association (FEMA): Made to reduce the loss of life and property and protect the Nation from all hazards, including natural disasters, acts of

terrorism, and other man-made disasters, by leading and supporting the Nation in a risk-based, emergency management system of preparedness, protection, response, recovery, and mitigation.

Fill material: The materials—rock, soil, asphalt, concrete, construction debris, etc.—natural or man-made, deposited during filling.

First flush: The delivery of a highly concentrated pollutant loading during the early stages of a storm due to the washing effect of runoff on pollutants that have accumulated on the land.

Flocculent: A treatment that causes suspended organics to clump, which then will sink to the bottom of the pond.

Flood hazard mapping: A basic tool for flood preparedness and mitigation activities, including flood insurance programs.

Flood insurance: Insurance that covers against losses that are a direct result of flood damage. Flood insurance is required by lenders if a property is located in a flood zone

Flood Insurance Study (FIS): Studies conducted by the Federal Emergency Agency (FEMA) to determine the areas that have the highest probability for flooding.

Floodplain: Land adjoining the channel of a river, stream, watercourse, lake or wetland that has been or may be inundated by floodwater during periods of high water that exceed normal bank-full elevations.

Floodway: The floodway is the portion of the stream or river channel that includes the adjacent land areas to that must be reserved to discharge the 100-year flood without increasing the water surface.

Floodway Fringe: The Floodway Fringe is typically the area outside of the Floodway, but within the 100—year Floodplain.

Grading (earthmoving): The moving of dirt and other materials on the Earth's surface to achieve desired characteristics for building, vegetating, or other activities.

Grading (materials): The degree of mixing of particle size classes in sediment. Well-graded sediments are those with a more or less uniform distribution of sizes; poorly graded implies uniformity in size or lack of a continuous distribution.

Gully erosion: Severe erosion in which trenches are cut to a depth greater than 30 centimeters (a foot). Gully erosion forms when several rills combine or are cut deeper and wider. Generally, ditches deep enough to cross with farm equipment are considered gullies.

Headwaters: Upper reaches of tributaries in a drainage basin.

Hydric soil: Soil units that are wet frequently enough to periodically produce anaerobic conditions, thereby influencing the species composition or growth, or both, of plants on those soils.

Hydrologic Soil Group (HSG): Soils are classified by the Natural Resource Conservation Service into four Hydrologic Soil Groups based on the soil's runoff potential. The four Hydrologic Soil Groups are A, B, C and D. A's generally have the smallest runoff potential and D's the greatest.

Hydrologic Unit Code (HUC): A hierarchical classification of drainage basins. An 8 digit HUC indicates region (leftmost 2 digits), sub-region (next two digits), accounting unit (next 2 digits), and cataloging unit (rightmost 2 digits).

Hydrology: The scientific study of the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere.

Illicit discharge: All nonurban runoff discharges to urban runoff drainage systems that could cause or contribute to a violation of State water quality, sediment quality, or ground-water quality standards, including but not limited to sanitary sewer connections, industrial process water, interior floor drains, car washing, and grey water systems

Impervious cover: An area covered with solid material or that is compacted to the point where water cannot infiltrate underlying soils (e.g. parking lots, roads, houses, patios, swimming pools, tennis courts, etc.). Stormwater runoff velocity and volume can increase in areas covered by impervious surfaces.

Index of Biotic Integrity (IBI): The IBI is based on fish surveys with the rating dependent on the abundance and composition of the fish species in a stream. Fish communities are useful for assessing stream quality because fish represent the upper level of the aquatic food chain and therefore reflect conditions in the lower levels of the food chain. Fish population characteristics are dependent on the physical habitat, hydrologic and chemical conditions of the stream, and are considered good indicators of overall stream quality because they reflect stress from both chemical pollution and habitat perturbations. For example, the presence of fish species that are intolerant of pollution are an indicator that water quality is good. The IBI is calculated on a scale of 12 to 60, the higher the score the better the stream quality.

Individual Permits (IP): Permits usually issued for projects that involve wetland impacts greater than 1.5 acres.

Infiltration: That portion of rainfall or surface runoff that moves downward into the subsurface soil.

Macroinvertebrates: Invertebrates that can be seen by the unaided eye (macro). Most benthic invertebrates in flowing water are aquatic insects or the aquatic stage of insects, such as stonefly nymphs, mayfly nymphs, caddisfly larvae, dragonfly nymphs and midge larvae.

They also include such things as clams and worms. The presence of benthic macroinvertebrates that are intolerant of pollutants is a good indicator of good water quality.

Macroinvertebrate Biotic Index (MBI): The MBI is very similar to the IBI except it is based on sampling macroinvertebrates (insects, worms etc.) that live in the stream rather than fish. The MBI scale is from 1 to 10, with 1 being the highest stream quality indicator and 10 being the worst. A MBI less than 6 indicates a good macroinvertebrate population. As with fish, the presence of pollution intolerant macroinvertebrate species is an indicator of good water quality. Since macroinvertebrates are less mobile than fish, the MBI is a good index to evaluate upstream/downstream impacts of point source discharges.

Mitigation: Measures taken to eliminate or minimize damage from development activities, such as construction in wetlands or Regulatory Floodplain filling, by replacement of the resource.

National Flood Insurance Program (NFIP): Managed by the Mitigation Division within the Federal Emergency Management Agency (FEMA), participants in the NFIP adopt and enforce floodplain management ordinances to reduce future flood damage and in exchange are eligible to receive federally funded flood insurance.

National Pollutant Discharge Elimination System (NPDES): Clean Water Act law requiring smaller communities and public entities that own and operate in MS4 to apply and obtain an NPDES permit for stormwater discharges. Permittees at a minimum must develop, implement, and enforce a stormwater program designed to reduce the discharge of pollutants from the MS4 to the maximum extent practicable. The stormwater management program must include these six minimum control measures:

1. Public education and outreach on stormwater impacts
2. Public involvement/participation
3. Illicit discharge detection and elimination
4. Construction site stormwater runoff control
5. Post-construction stormwater management in new development and redevelopment
6. Pollution prevention/good housekeeping for municipal operations

National Wetlands Inventory (NWI): U.S. Fish and Wildlife Service study that provides information on the characteristics, extent, and status of U.S. wetlands and deepwater habitats and other wildlife habitats.

Nationwide Permits (NWP): Permits usually issued for projects which contain similar circumstances (i.e. residential developments, recreational developments, utilities, etc.) that have minimal impacts (currently greater than 0.10-acres and less than 1.5-acres).

Nonpoint Source Pollution (NPS or NPSP): Refers to pollutants that accumulate in waterbodies from a variety of sources including runoff from the land, impervious surfaces, the drainage system and deposition of air pollutants.

Nutrients: Substances needed for the growth of aquatic plants and animals such as phosphorous and nitrogen. The addition of too many nutrients (such as from sewage dumping and over fertilization) will cause problems in the aquatic ecosystem through excess algae growth and other nuisance vegetation and may cause adverse impacts to aquatic species.

Pollutant load: The amount of any pollutant deposited into waterbodies from point source discharges, combined sewer overflows, and/or stormwater runoff.

Polyacrylamide: A polymer ($-CH_2CHCONH_2-$) formed from acrylamide subunits that can also be readily cross-linked. Used in sediment control to coagulate sediment particles which are in suspension. The newly formed, larger sediment particles can no longer be supported by the water and fall out of suspension, thus, no longer being carried by the water.

Quality Assurance Project Plan (QAPP): A detailed description of the monitoring methods/components along with reasoning behind the procedure. The QAPP is required for any projects seeking Section 319 grant funding and helps ensure to the IEPA that the data that is being collected is to strict standards to be credible.

Rill erosion: The removal of soil by concentrated water running through little streamlets, or headcuts. Detachment in a rill occurs if the sediment in the flow is below the amount the load can transport and if the flow exceeds the soil's resistance to detachment. As detachment continues or flow increases, rills will become wider and deeper.

Rip-rap: Rock or other material used to armor shorelines and streambeds against water and sometimes ice erosion. It is normally made from hard rock, commonly granite, and is used to protect coastlines from erosion and other coastal processes caused by the sea. It is also used inland, on lakes to protect the banks from erosion.

Soil Bioengineering: Techniques for stabilizing eroding or slumping stream banks that rely on the use of plants and plant materials such as live willow posts, brush layering, coconut logs and other “greener” or “softer” techniques. This is in contrast to techniques that rely on creating “hard” edges with riprap, concrete and sheet piling (metal and plastic).

Stormwater: A term used to describe water that originates during precipitation events. It may also be used to apply to water that originates with snowmelt or runoff water from overwatering that enters the stormwater system.

Stormwater management: A set of actions taken to control stormwater runoff with the objectives of providing controlled surface drainage, flood control and pollutant reduction in runoff.

Stormwater Pollution Prevention Plan (SWPPP): Required for all construction sites which disturb more than one acre at a time and are reviewed by the SWCD and various permitting agencies before construction can begin.

Stormwater Retention Requirement: Requiring developments to store stormwater onsite to allow the water a pervious on- site area to sit before entering a basin. Often required in subdivision codes.

Stormwater Runoff: Stormwater that does not soak into the ground and either flows into surface waterways or is channeled into storm sewers.

Sub-watershed: A smaller basin within a larger drainage area that all drains to a central point of the larger watershed.

Threatened and Endangered Species (T&Es): An "endangered" species is one that is in danger of extinction throughout all or a significant portion of its range. A "threatened" species is one that is likely to become endangered in the foreseeable future.

Treatment train: Several BMPs used together to improve water quality, infiltration and reduce sedimentation.

Turbidity: Refers to the clarity of the water, which is a function of how much material including sediment is suspended in the water.

Water table: The water table is the level at which the ground water pressure is equal to atmospheric pressure. It may be conveniently visualized as the 'surface' of the ground water in given vicinity.

Watershed: An area confined by topographic divides that drains to a given stream or river. The land area above a given point on a waterbody (river, stream, lake, or wetland) that contributes runoff to that point is considered the Watershed.

Wetland: A wetland is considered a subset of the definition of the Waters of the United States. Wetlands are land that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, under normal conditions, do support a prevalence of vegetation adapted for life in saturated soil conditions (known as hydrophytic vegetation). A wetland is identified based upon the three attributes: 1) hydrology, 2) hydric soils, and 3) hydrophytic vegetation.

ABBREVIATIONS

Abbreviation	Definition
ADID	Advanced Identification
ASLP	Aux Sable Liquid Products
BMPs	Best Management Practices
BOD	Biological Oxygen Demand
CDOT	County Dept. of Transportation/ Highway Department
cfs	Cubic Feet per Second
CMAP	Chicago Metropolitan Agency for Planning
Coalition	Aux Sable Creek Watershed Coalition
County	Kendall, Grundy, and Will County
CRP	Conservation Reserve Program
DWRM	Division of Water Resource Management
EPA	United States Environmental Protection Agency
FB	Local Farm Bureaus
FEMA	Federal Emergency Management Agency
FPD	County Forest Preserve Districts
HSG	Hydrologic Soil Group
HUC	Hydrologic Unit Code
IBI	Index of Biotic Integrity
IDNR	Illinois Department of Natural Resources
IDOT	Illinois Department of Transportation
IEMA	Illinois Emergency Management Agency
IEPA	Illinois Environmental Protection Agency
INAI	Illinois Natural Area Inventory
IP	Individual Permit Program
ISWS	Illinois State Water Survey
MBI	Macroinvertebrate Biotic Index
MS4s	Municipal Separate Storm Sewer System

Abbreviation	Definition
NFIP	Nation Flood Insurance Program
NGL	Natural Gas Laboratory
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	USDA Natural Resource Conservation Service
NWI	National Wetland Inventory
OWR	Office of Water Resources
Parks	Park Districts
PPP	Prairie Parklands Ecosystem Partnership
QAPP	Quality Assurance Project Plan
ROW	Right of Way
SESC	Soil Erosion and Sediment Control
SWCD	County Soil Water Conservation Districts
TCF	The Conservation Foundation
TWP	Townships
USACE	US Army Corps of Engineers
USFWS	US Fish and Wildlife Service
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
WBK	Wills Burke Kelsey Associates, Ltd.

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