

# Chapter 1

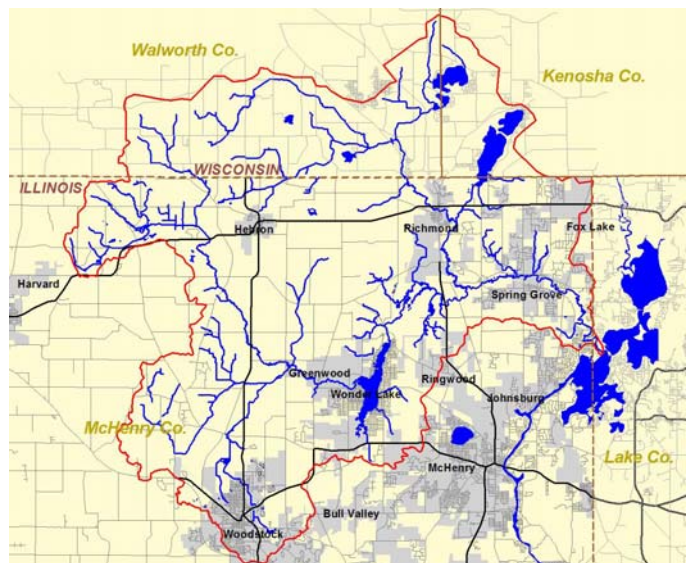
## Introduction

### 1.1 Watershed Overview

Nippersink Creek is the largest tributary of the Fox River in the state of Illinois. The Nippersink Creek Watershed encompasses about 202 square miles, of which roughly 50 square miles are located within the State of Wisconsin. The western edge of the Nippersink Creek watershed is formed by the Marengo Ridge moraine, which forms a major watershed divide between the Fox River / Illinois River system and the Kishwaukee River / Rock River system. From its headwaters in northwest Alden Township of McHenry County, Nippersink Creek flows generally to the southeast to Wonder Lake, and then east towards the Fox River / Chain O' Lakes. Nippersink Creek joins the Chain O'Lakes near US Route 12, roughly at the point where Nippersink Lake connects with Pistakee Lake. The North Branch of Nippersink Creek drains areas of Walworth County and Kenosha County in Wisconsin before joining the main channel between Richmond and Spring Grove.

Figure 1.1 Watershed Location Map

The southeastern half of the watershed, being closest to the Chicago metropolitan area, has the longest history of urban and suburban development, and includes the communities of Woodstock, Wonder Lake, Spring Grove, Richmond, Greenwood, and Ringwood. The only municipalities in the northwest half of the watershed are the Village of Hebron in Illinois, and Genoa City in Wisconsin.



*Nippersink Creek Countryside*



The balance of the Nippersink watershed is still largely dominated by agricultural uses, with residential uses comprised of agricultural farmsteads and low-density (>5 acres or more) rural parcels. However, rural areas of the Nippersink watershed are beginning to urbanize. According to current municipal comprehensive land use plans, there is a potential for significant development growth over the next twenty years.

Based upon projected growth, the watershed governmental stakeholders that will have the most impact on the future of the Nippersink Creek watershed are McHenry County (in unincorporated areas), the City of Woodstock, the Village of Spring Grove, the Village of Wonder Lake, and the Village of Richmond.

It should be emphasized that while the Nippersink Creek Watershed also extends into the State of Wisconsin, significant analysis or discussion of the Wisconsin portion of the watershed was not included in this report. However, future interaction and cooperation with the stakeholders in the Wisconsin portion of the watershed is imperative, as their land use decisions will have a direct impact on the downstream portions of the watershed located in Illinois.

## **1.2 Stream and Water Quality Ratings**

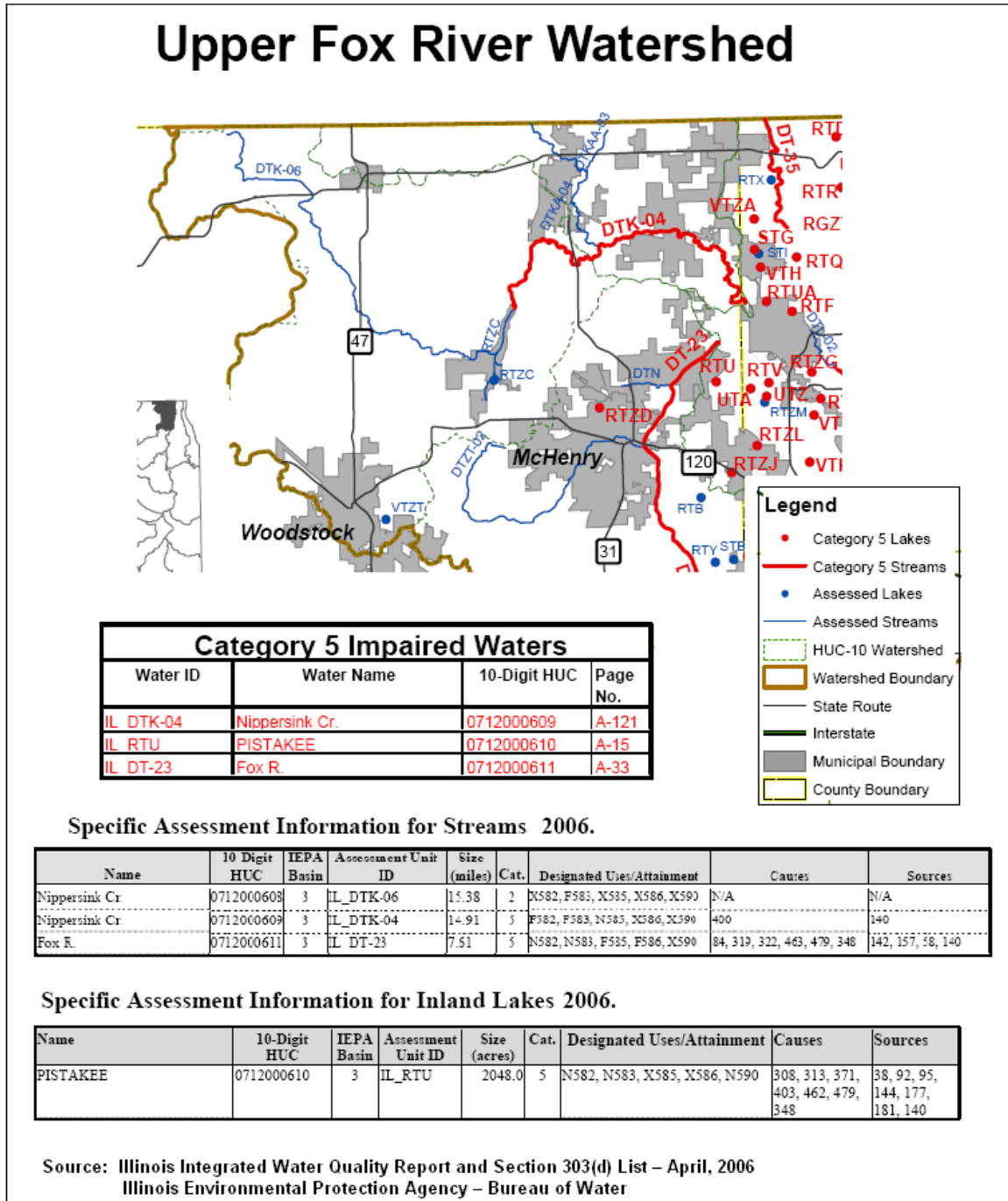
The Illinois Environmental Protection Agency (IEPA) is tasked with assessing the quality of the surface water resources of Illinois. The IEPA has determined Nippersink Creek's designated uses are:

- Aquatic Life
- Fish Consumption
- Primary Contact
- Secondary Contact
- Aesthetic Quality

As discussed more extensively in Chapter 2.4, the IEPA periodically produces a [303\(d\) list](#), which identifies waterways that are not achieving targeted designated uses. The most recent IEPA 303(d) list was produced in 2006. As shown in Figure 1.2, below Wonder Lake, Nippersink Creek (Reach DTK-04) is identified as being in Full Support of its Aquatic Life and Fish Consumption Designated Uses. Above Wonder Lake, Nippersink Creek (Reach DTK-06) is identified as being in Full Support of its Aquatic Life Designated Use. These Full Support designations are notable for a stream in northeastern Illinois.

However, below Wonder Lake, Nippersink Creek (Reach DTK-04) was also determined to be Non-supporting of its Primary Contact Designated Use, due to excessive levels of fecal coliform. This pollutant, associated with human and animal waste, was listed as coming from unknown sources. The IEPA also identified secondary contact and aesthetic quality as designated uses for Nippersink Creek, although the ratings for these uses were classified as "not assessed".

Figure 1.2 IEPA 303 (d) List Impaired Waters Map (2006)



Of equal importance is the fact that Nippersink Creek discharges into the Fox River, one of the most important natural resources in McHenry County (along with its groundwater supply). The Fox River is the primary source of drinking water for more than 236,600 residents of Aurora and Elgin (2000 US Census) in the Kane County portion of the watershed. The potential for McHenry County to someday have to rely on the Fox River as a drinking water source cannot be ignored.

The Fox River is also a heavily used resource that is subjected to a number of inputs of pollution, including point sources (storm sewers) and non-point sources (runoff from the landscape, rooftops, and roadways), as well as pollution that enters the Fox River's many tributaries, such as Nippersink Creek. For these reasons, downstream of Nippersink Creek, Nippersink Lake, and the Fox River are also listed on the IEPA 303(d) List.

As the sustainability of our local groundwater resources is increasingly questionable given the rapid rates of urban growth, and the certain unavailability of Lake Michigan water, the protection and enhancement of Fox River water quality should be a top priority of every unit of government in the entire Fox River Watershed.

### 1.3 Existing and Future Watershed Protection Challenges

Overall, the health of Nippersink Creek today is very good. Previous water quality and biological data collection studies over the last eight years confirm that Nippersink Creek has the water quality and biological characteristics to qualify it as a highly valued resource. McHenry County is fortunate to have in place an Advanced Identification (ADID) Wetland Study, as well as a McHenry County Natural Areas Inventory (MCNAI), that identify the remaining high quality natural areas that need to be protected to preserve environmental quality and diversity.

Not surprisingly, the highest quality reaches of Nippersink Creek are in the rural portions of the watershed, or within the large tracts of riparian lands where the McHenry County Conservation District, the Land Conservancy of McHenry County, other agencies, or concerned landowners have been implementing stream corridor restoration or protection activities.

*Nippersink Creek Stream Corridor*



*Nippersink Creek Stream Corridor*



The fact that these high quality stream reaches are found in predominately agricultural areas demonstrates the fact that agriculture and protection of the environment are not incompatible. Properly managed row crop agricultural or pasture areas, where sediment, chemical and nutrient delivery to streams and wetlands are minimized by the implementation of Best Management Practices (BMP's), can have significant open space benefits, serve as groundwater recharge areas, and provide flood storage capacity.

Modern farming practices, and the costs associated with it, dictate that farmers run a tightly managed business. As a result, they typically only apply the minimum amount of agricultural chemicals need to grow crops, and conduct appropriate tillage operations. A farmer who excessively tills their field or over-applies agricultural chemicals will not be in business long, as the diesel fuel and fertilizer bills will bankrupt them. Farmland has a long history in the Nippersink Creek watershed, and should have a long future if steps are taken towards funding and implementing a farmland preservation program.

However, situated on the edge of the Chicago metropolitan area, changes are rapidly occurring in the Nippersink Creek watershed. Many of the municipalities in the Nippersink Creek watershed have already begun significant residential and commercial development, or are anticipating it in the near future.

As all of McHenry County is dependent on groundwater, extracted from both shallow and deep aquifer wells, as its sole source of drinking water, protection of surface water resources and groundwater recharge areas must occur in order to ensure a safe, sustainable, and adequate supply of drinking water into the future.

To protect our water resources, they must be protected from both direct and indirect impacts. Existing wetland, floodplain, stormwater and development related ordinances, if properly enforced, provide some measure of protection from direct development impacts to riparian or wetland areas. However, they are currently inadequate to address the more intangible impacts of development, such as groundwater quality degradation, loss of groundwater recharge areas, changes in flow regimes, fragmentation of wildlife habitat, and the loss of native plant communities.

As an example, the transition from undeveloped to developed land results in an increase of impervious surfaces, increasing stormwater runoff volumes as well as the speed at which it runs off. While stormwater ordinances require developers to intercept, detain, and slowly release this runoff, the net result is that over time, there is still a larger volume of water entering the stream system. The increases in total runoff and small storm peak flow frequency, which adversely impact stream stability, will have a profound impact on the remaining high quality natural areas downstream.

Development also creates additional pollutant loading into the stream system, especially nutrients such as phosphorus and nitrogen, which can fuel the growth of algae and aquatic vegetation to nuisance levels. The excessive growth of this biomass can impair water quality and recreational usage, as well as diminish the aesthetic appeal of the water.

Wastewater treatment has been, and will continue to be, a concern in the watershed. On-site wastewater septic systems, if not properly maintained, can pose a threat to both surface and groundwater resources. As the Nippersink Creek watershed continues to develop, it is likely that increasing areas will be served by municipal wastewater treatment plants (WWTP).



Significant advancements in Best Management Practice technology have occurred that can allow these WWTP to further “polish” their treated effluent to a higher standard, minimizing potential impairments to the receiving waterway. However, the inability of current WWTP technology to remove pharmaceuticals, hormone disruptors, and other household medications from their treated effluent, and prevent them from being released into the environment, is becoming an increasingly significant concern.

Another threat is the rapid spread of non-native species of vegetation into the remaining natural areas, such as wetlands, woodlands, and stream corridors. Unless properly managed, nearly every wetland, woodland, prairie, or other natural open space is being overrun with invasive, non-native herbaceous species, including Reed Canary Grass, Common Reed, and Garlic Mustard. In addition, the watershed is faced with a proliferation of weedy, low quality trees and brush, such as Box Elder, Common Buckthorn, Autumn Olive, and Honeysuckle, which chokes the stream corridor with a thick, shady canopy that exacerbates streambank erosion and sediment delivery into the stream system.

In order to address these issues, as well as other ones that will arise in the future, it is necessary to properly devise and implement appropriate land use planning concepts; revise or enact regulations that protect the environment while allowing economic vitality; and preserve and enhance the quality of life found in the Nippersink Creek Watershed.

Fortunately, earlier watershed planning and outreach efforts helped set the stage for many stakeholders becoming aware of the significant value of Nippersink Creek, and the need to protect it.

#### **1.4 Impetus for Updated Watershed Plan**

A watershed plan for Nippersink Creek was completed in 1996 by the Nippersink Creek Watershed Planning Committee. That plan provided a summary of watershed history, physical, chemical and biological characteristics of the watershed at that time, and an outline for general watershed protection guidelines, and recommendations for restoration and protection of natural resources throughout the watershed.

While a valuable document that still provides a wealth of background information, the 1996 plan has become outdated, as it:

- only provides a general “road map” to protect the natural resources of the watershed.
- only identified perceived needs in the watershed at the time (1990s – primarily agricultural issues).
- did not address the growth pressures that are present today.
- does not identify specific projects, prioritization, or the cost to implement them.
- does not clearly define responsibility for implementation or sources of funding.

**Result: The 1996 Nippersink Creek watershed plan does not meet all the current requirements set by the United States Environmental Protection Agency for funding watershed projects.**

## 1.5 Watershed Planning – A USEPA Perspective

The U.S. Environmental Protection Agency (USEPA) plans and implements non-point source management programs, under authorization granted by Section 319 of the Federal Clean Water Act. A Watershed Plan that meets USEPA guidelines are eligible to apply for Section 319 grant funds (administered through the Illinois EPA) to assist watershed stakeholders in implementing activities to help mitigate non-point source pollution in the watershed. If approved, Section 319 funding provides a 60% federal project cost share from USEPA. Other (non-federal) sources of funding must be secured by the 319 grant applicant to provide the required local 40% project cost-share match. In many circumstances, other non-federal funding sources can be tapped to provide the 40% local cost-share match.

Since the 1996 Nippersink Creek Watershed plan was published, the USEPA has updated the criteria it requires to ensure that watershed plans meet the goals and objectives of the Section 319 program. This 2008 Nippersink Creek Watershed Plan was prepared to address the following nine required components set forth by the EPA, as listed below:

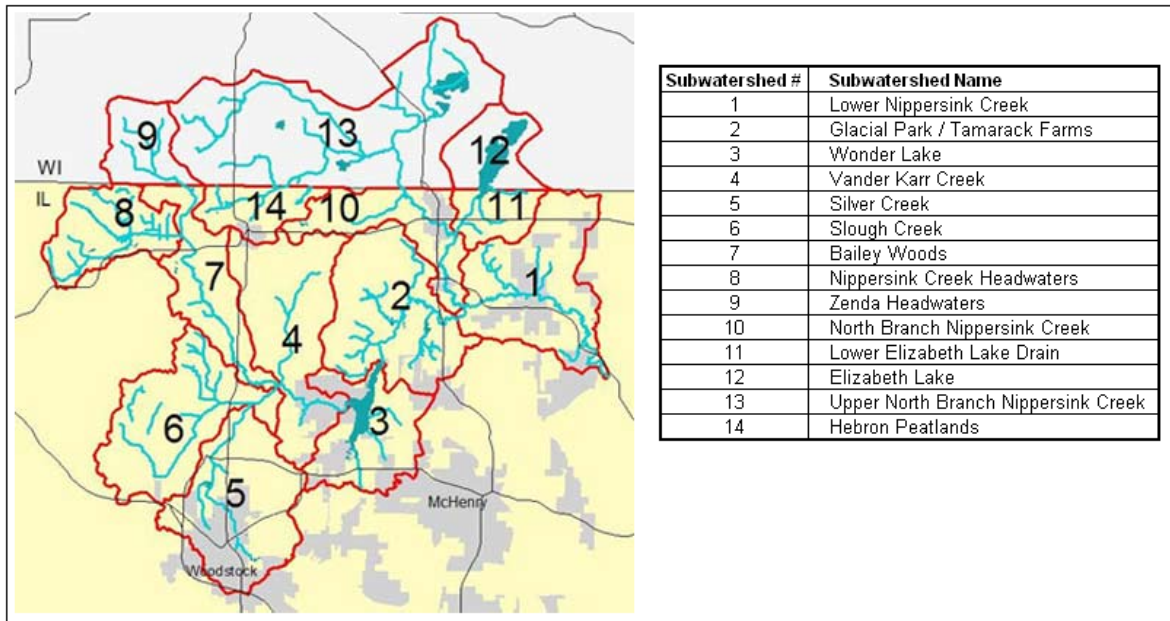
1. An identification of the causes and sources or groups of similar sources of pollution that will need to be controlled to achieve the pollutant load reductions estimated in this watershed-based plan.
2. An estimate of the pollutant load reductions expected following the implementation of the management measures described under #3 below.
3. A description of the non-point source (NPS) management measures that will need to be implemented to achieve the load reductions estimated under #2 above and an identification (using map or a description) of the critical areas in which those measures will be needed to implement this plan.
4. An estimate of the amounts of technical and financial assistance needed, associated costs, potential funding sources, and parties / governmental agencies that will be relied upon to implement this plan.
5. A public information/education component that is designed to change social behavior.
6. A plan implementation schedule.
7. A description of interim, measurable milestones.
8. A set of criteria that can be used to determine whether pollutant loading reductions are being achieved over time.
9. A monitoring component to evaluate the effectiveness of the implementation efforts over time.

## 1.6 Nippersink Creek Watershed Plan Organization

The hope is that this plan will serve as the reference document that watershed stakeholders will use to plan projects and measure how successful their efforts are in protecting the environmental integrity of the Nippersink Creek Watershed. More importantly, it is hoped that the Nippersink Creek Watershed Plan will be a “living” document, periodically updated to keep it current and relevant, and made available to all interested parties on the watershed website [www.nippersink.org](http://www.nippersink.org).

To facilitate easier dissemination of the findings and recommendations within the Nippersink Creek Watershed Plan (NCWP), the Nippersink Creek Watershed was divided into fourteen subwatersheds, as illustrated in Figure 1.3.

**Figure 1.3 Subwatershed Location Map**



The remainder of this watershed plan document is divided into the following chapters.

**Chapter 2** provides a summary of watershed characteristics, natural resources, water quality, population, land use, existing watershed impairments, and potential future watershed impairments.

**Chapter 3** details the Pollutant Loading Analysis component of this plan, as well as recommended Best Management Practices.

**Chapter 4** presents the goals and objectives of the plan; recommendations to protect watershed resources; a discussion of watershed-wide recommendations; and an overview of the types of recommendations specified for each of the subwatershed units.



**Chapter 5** presents a summary of features, impairments, and recommendations for the Lower Nippersink Creek Subwatershed.

**Chapter 6** presents a summary of features, impairments, and recommendations for the Glacial Park / Tamarack Farms Subwatershed.

**Chapter 7** presents a summary of features, impairments, and recommendations for the Wonder Lake Subwatershed.

**Chapter 8** presents a summary of features, impairments, and recommendations for the Vander Karr Creek Subwatershed.

**Chapter 9** presents a summary of features, impairments, and recommendations for the Silver Creek Subwatershed.

**Chapter 10** presents a summary of features, impairments, and recommendations for the Slough Creek Subwatershed.

**Chapter 11** presents a summary of features, impairments, and recommendations for the Bailey Woods Subwatershed.

**Chapter 12** presents a summary of features, impairments, and recommendations for the Nippersink Headwaters Subwatershed.

**Chapter 13** presents a summary of features, impairments, and recommendations for the North Branch Nippersink Creek Subwatershed.

**Chapter 14** presents a summary of features, impairments, and recommendations for the Lower Elizabeth Lake Drain Subwatershed.

**Chapter 15** presents a summary of features, impairments, and recommendations for the Hebron Peatlands Subwatershed.

**Chapter 16** presents a brief summary of the three Wisconsin Subwatersheds, which include Zenda Headwaters, Upper North Branch Nippersink Creek, and Elizabeth Lake.

**Chapter 17** details the components and implementation strategy for the proposed Green Infrastructure Plan.

**Chapter 18** provides information on existing Public Education & Outreach Programs, as well as provides guidance for how these programs can be strengthened and utilized to effect change in watershed awareness by the local stakeholders.

**Chapter 19** outlines milestones and a framework for measuring how successful the stakeholders are in implementing the actions of the Watershed Plan.

**Chapter 20** lists the references used to create this document, contact information for organizations and stakeholders in the Nippersink Creek Watershed, and other publications in print and on-line that offer reference information on Best Management Practices and planning strategies that are applicable to the watershed.

**Chapter 21** consists of appendices where technical information used to make this document can be found.

*Nippersink Creek Prairie*



*Nippersink Creek Farmstead*

