

- Sustainable Development Guide For Kishwaukee Watershed Municipalities

---

### ***Introduction***

***The Friends of the Kishwaukee River are proud to present your community with this resource book on the Kishwaukee River watershed.*** The Kishwaukee River or one of its tributaries has been a part of your town's history since its establishment. Sawmills and gristmills were powered by Kishwaukee waters. Picnickers and fishermen have enjoyed the solitude of Kishwaukee hideaways. Today as in days gone by, people enjoy and respect the surrounding lands and waters of the Kishwaukee River.

The Kishwaukee is one of three highest quality stream systems in Illinois. It is home to numerous endangered and threatened species including: the Iowa darter, white heelsplitter mussel, Sandhill crane, least bittern, prairie bush clover, and even the river otter.

Communities in the Kishwaukee watershed are experiencing immense growth, therefore you are challenged with the task of encouraging economic growth without sacrifice to your greatest natural resource asset -- the Kishwaukee River or its tributary.

This book is designed to aid civic leaders in meeting these challenges. Use each section as a guide to develop and implement sustainable development plans for your municipality.

It is our pleasure to present each of your municipal leaders with this ***Sustainable Development Guide for Municipalities.***



*a project of the  
McHenry County Defenders  
in partnership with the  
Kishwaukee River Ecosystem Partnership*

**For more information contact:**  
***Friends of the Kishwaukee River***  
c/o McHenry County Defenders  
124 Cass St. Suite 3  
Woodstock, IL 60098  
815.338.0393  
email [mcdcf@owc.net](mailto:mcdcf@owc.net)  
Visit our website: [www.mcdcf.org](http://www.mcdcf.org)

funded by  
**Illinois**  
Department of  
**Natural Resources**  
C-2000 Ecosystems Program



## ***What is Sustainable Development?***

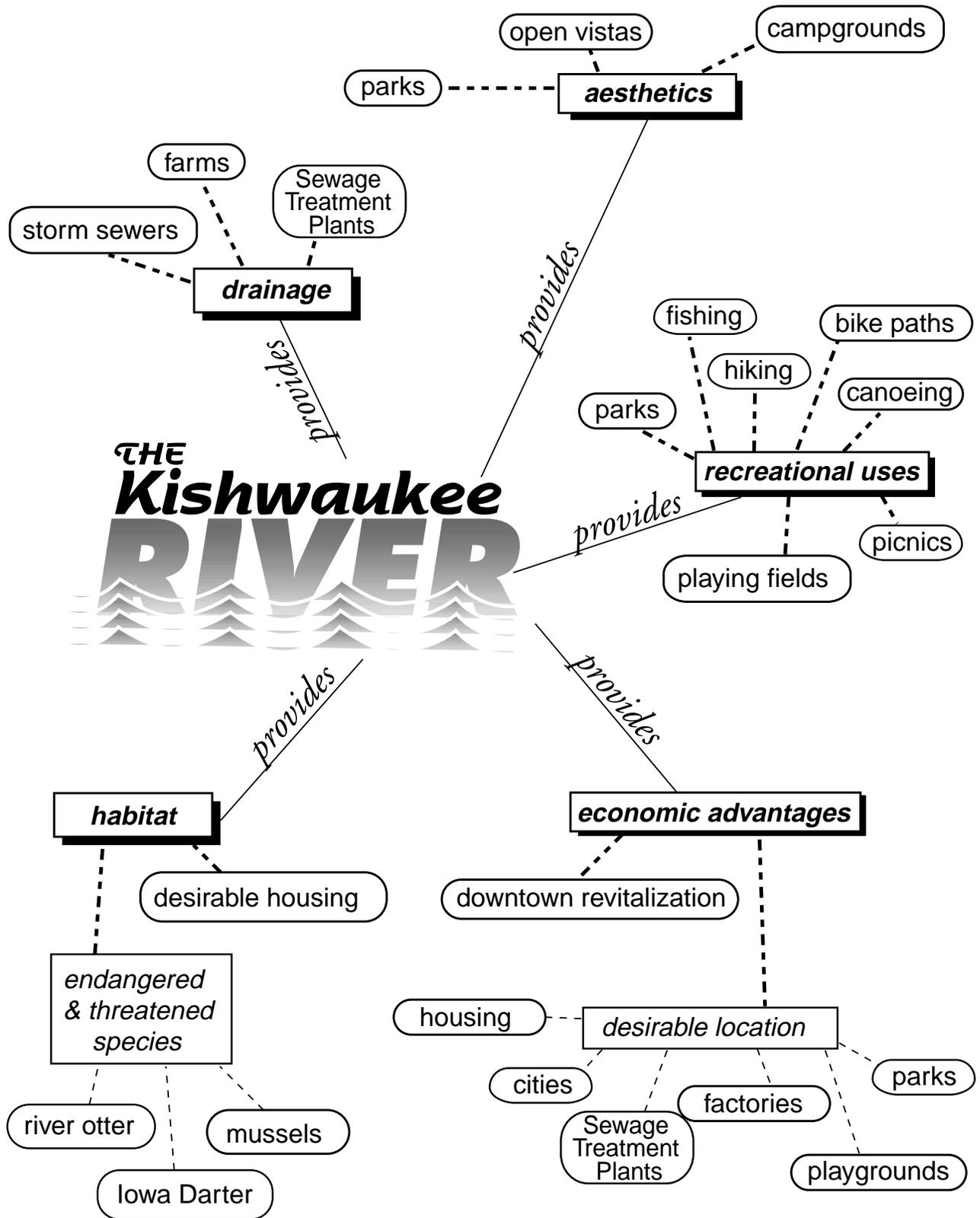
By definition - "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." --- Our Common Future, by World Commission on Environment and Development (WCED)

Sustainable Development creates a balance between society, economy and the environment. On the local level, this means providing the needs of society without harming the environment, all the while encouraging the economic development of your community. It is about taking action, by changing policy and practices at all levels.

This guide is specific to the local level, with examples of how to protect the Kishwaukee Watershed for the benefit of society, often times with economic benefit. ***For example, the preservation of open space and wetlands offers recreational opportunities to the community, while also preventing costly flooding.***

Sustainable Development practices will, in the long term, protect your community's valuable natural resources, increase the economy, and create a better society. (See section 4 for examples of Sustainable Development practices already taking place in the watershed!)

# Uses of the Kishwaukee River



## ● TABLE OF CONTENTS

---



### **Section 1:**

#### ***Water—clear water—everywhere***

See how the Kishwaukee River water system replenishes itself. Learn about the Kish – your river of “clear waters,” your municipality’s greatest natural resource asset.



### **Section 2:**

#### ***Protect your wetland assets***

What’s a wetland? What’s protected by federal/state law? What’s not? What are the benefits of local wetland protection? What can local communities do? Also includes a personalized wetland map of your municipality.



### **Section 3:**

#### ***Implement Best Management Practices to protect the Kishwaukee watershed***

Ideas for municipal planning departments to implement non-traditional, alternative stormwater management techniques for economic and environmental advantage.



### **Section 4:**

#### ***4a—Kishwaukee Municipalities plan for sustainable development***

Details Kishwaukee watershed cities’ plans for economic growth with environmental sensitivity. Local examples of downtown economic revitalization strategies, innovative collaborative landuse planning and a sewage treatment plant expansion—all planned for longterm livability of people and the Kishwaukee River.

#### ***4b—Greenways***

See how other Kishwaukee watershed municipalities have linked ribbons of land to form recreational and natural resource areas along the Kishwaukee River.



### **Section 5:**

#### ***Use local, state, and federal resources in your community***

Connect with information to help solve the unique challenges of your area of the Kishwaukee River watershed. Includes bibliography of print materials and websites to help Kishwaukee municipal leaders plan for sustainable development.

## ● WATER—CLEAN WATER—EVERYWHERE

---



*Winnebago County view of the Kishwaukee River*

*“Since precipitation falls everywhere, our relationship with water must be developed everywhere. Every form of land use, whether urban, suburban, rural, or otherwise must be based upon a clear understanding of the relationships of water within the physical characteristics unique to each place. Whatever the context of human inhabitancy or nature’s hydrology, the way water is incorporated into the design, development and management of the land should be such that water does not act as a depleter of resources.”*

***The Ecology and Culture of Water, Patchett and Wilhelm***

### ***Additional resources for this section:***

- EPA Environmental Quality and Community Growth  
How to avoid flooding, traffic congestion and higher taxes in your community  
(see binder pockets)
- The Kishwaukee River Basin  
An Inventory of the Regions’ Resources  
(see binder pockets)

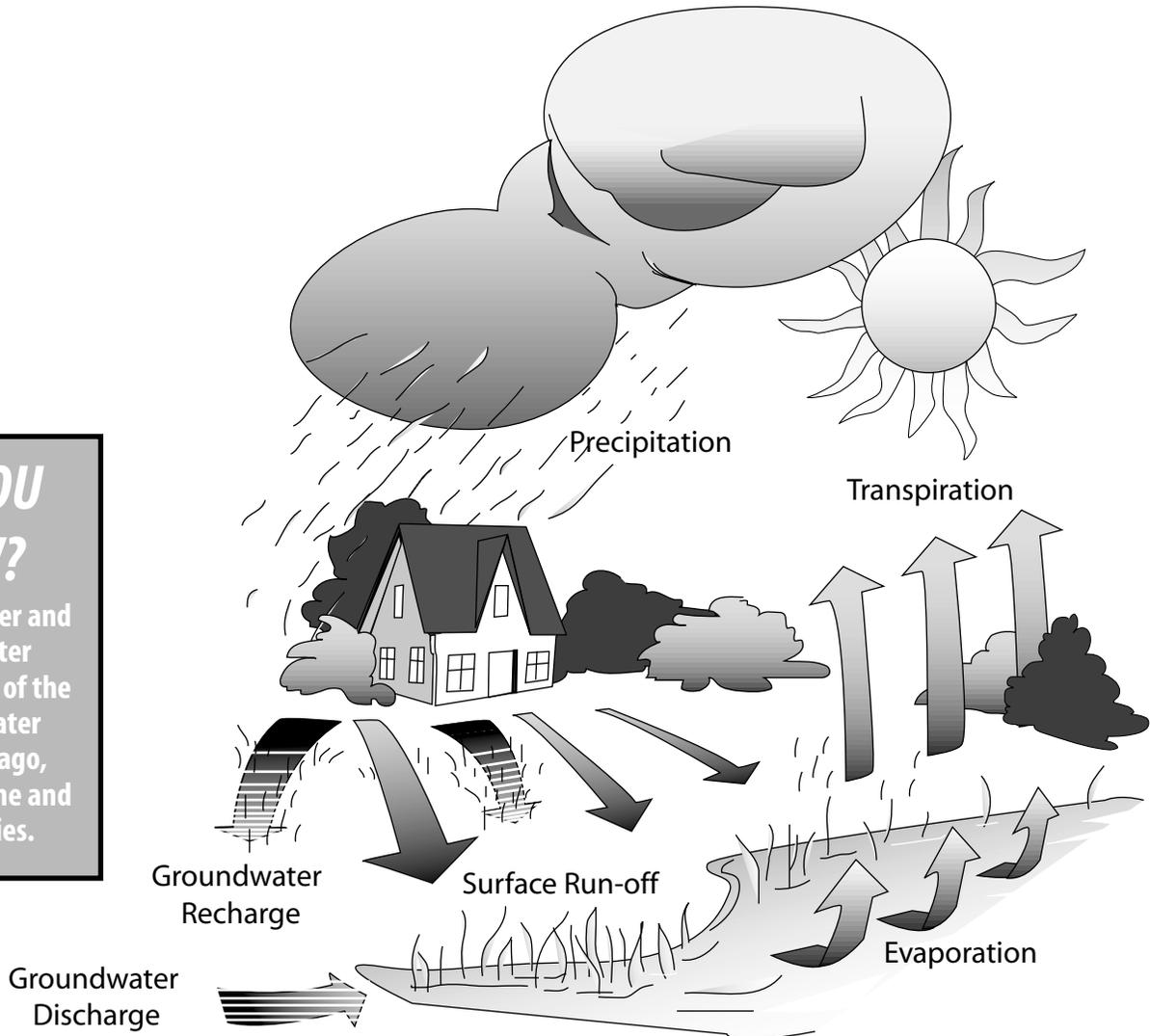
The waters of the Kishwaukee and its tributaries have lived up to its Potowatomie origins and remained “clear waters.” An understanding of the natural water cycle and the effects of development upon Kishwaukee waters will help municipal officials better understand their role in guiding sustainable development. Planning for development within the Kishwaukee watershed, fully aware of impacts upon the Kishwaukee, is a wise investment of time and manhours. The following section will discuss: the dynamics of the natural water cycle; upland development impacts; and streamside development issues affecting the Kishwaukee.



### Dynamics of the Natural Water Cycle

*The natural water cycle is self-replenishing and dynamic. Rainfall flows into streams, lakes, ponds and wetlands. Groundwater is replenished by rainfall that seeps into the soils. Plants and soils release this water (evapotranspiration) back into the air, creating more rainfall. The cycle repeats itself.*

**DID YOU KNOW?**  
Groundwater and Surface Water supplies all of the drinking water for Winnebago, DeKalb, Kane and Ogle Counties.

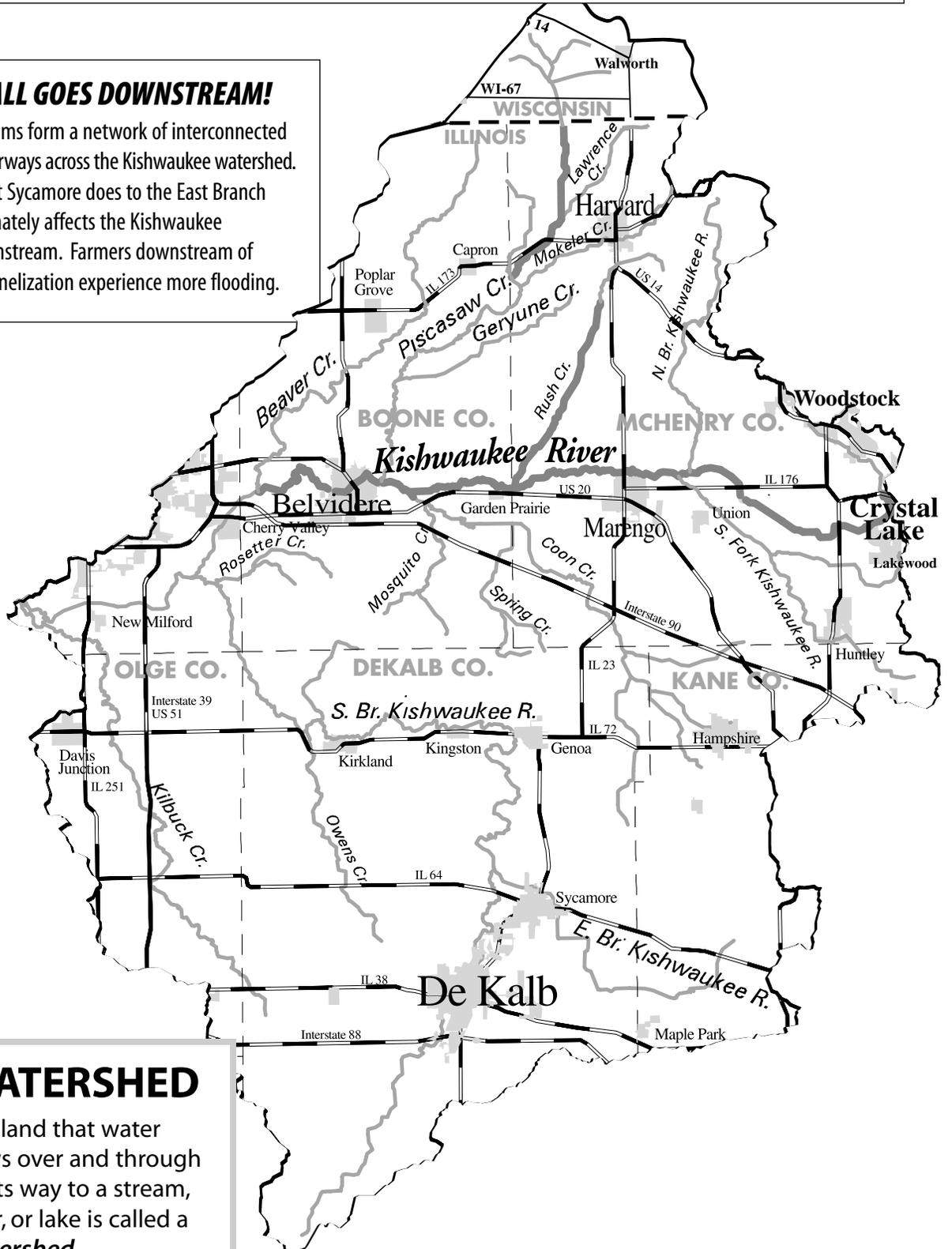


“Precipitation in the Chicago area amounts to about 37 inches, or about **one million gallons of non-compressible fluid per acre per year**. When it falls, two things can happen. It can infiltrate the soil and become an asset to local life, or it can run off and become a liability to life downstream.”

Patchett & Wilhelm, *The Ecology and Culture of Water*

**IT ALL GOES DOWNSTREAM!**

Streams form a network of interconnected waterways across the Kishwaukee watershed. What Sycamore does to the East Branch ultimately affects the Kishwaukee downstream. Farmers downstream of channelization experience more flooding.



**WATERSHED**

The land that water flows over and through on its way to a stream, river, or lake is called a **watershed**.

# 1 *The Watershed at Work ... Naturally*

---



## **Historically, the Kishwaukee River was characterized as a prairie stream.**

Deep-rooted native plant species populated Kishwaukee uplands. Rain and snowmelt soaked into upland prairies, trickled through soils, and seeped into wetlands prior to joining waters in the meandering riverbeds.

Slow-moving water splashed through riffles and pools on its meandering path toward the Rock River.

During summer drought native prairie plants still thrived in dry conditions. Streams received a steady supply of water from streamside wetlands.

This system worked. Flooding and river dry-up were minimized because throughout the year rain and snow soaked into the ground.



## **Fast-forward to today's Kishwaukee River.**

Today, housing developments, towns, roads and farms cover a large proportion of the land in the watershed. Very few native plant species populate the upland areas. Upland areas can't soak up as much rain and snowmelt. More water with accompanying silt and pollutants flows directly to wetlands and streams. Many wetlands have been dried up with underground tiles which also drain directly into streams.

Riverbeds have been straightened. These channelized streams move water more quickly downstream. Swifter currents chop off chunks of soil from streambanks. More water all at once causes flooding downstream.



## **Plan to work with the river.**

*See the following sections for information:*

**Section 2** for information about protecting wetlands

**Section 3** for Best Management Practices your town should implement

**Section 4** for tips on how your municipality can plan for sustainable development

**Section 5** for resources to help you protect the Kishwaukee and its tributaries

# The Watershed at Work... On Land



## Upland Development Impacts the Natural Water Cycle

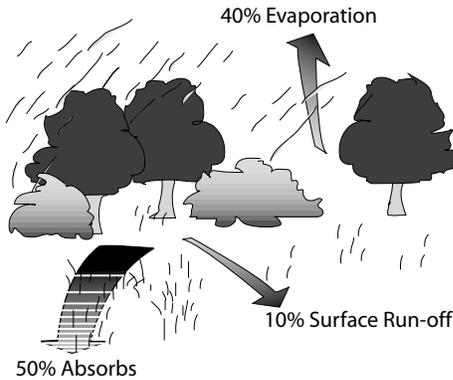
*What we do on the land affects the Kishwaukee and its tributaries*

The following illustrations depict changes in the natural water cycle when upland development occurs in a watershed.



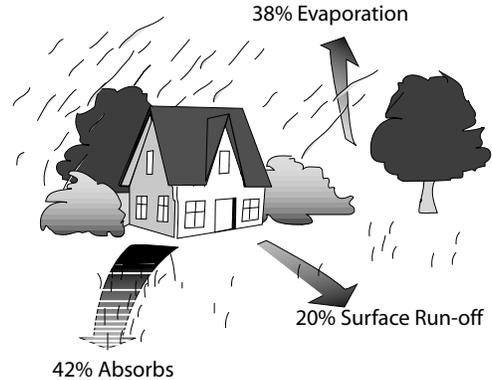
### Impervious Surface Area

The footprint of a single house adds roof, driveway, sidewalk and other areas which will not allow rainfall to seep into the ground. This footprint is called the **impervious surface area**.



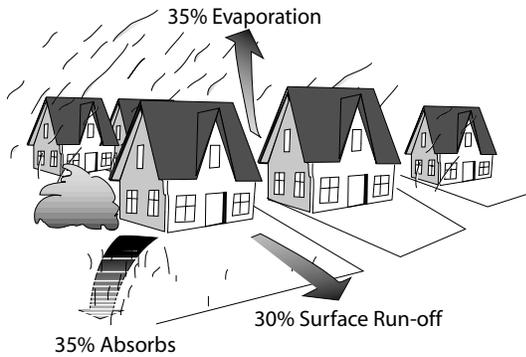
### NATURAL GROUNDCOVER

Most of the rainfall to a watershed infiltrates the ground with little surface runoff. Streams, lakes, and wetlands are fed by groundwater that is replenished by rainfall that seeps into the ground.

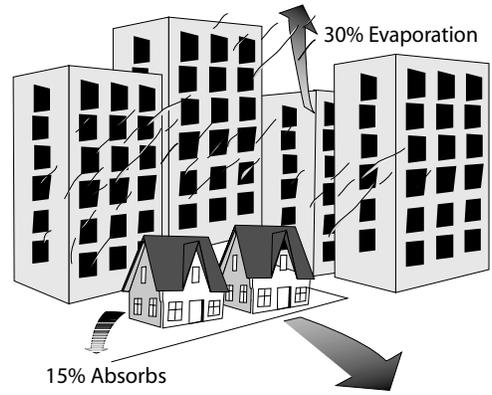


### 10-20% IMPERVIOUS SURFACE

The introduction of impervious surface area greatly increases the amount of surface runoff. Here, the addition of only 10-20% impervious surface area actually doubles the amount of surface runoff as compared to runoff from an area with natural ground cover.



### 35-50% IMPERVIOUS SURFACE



### 75-100% IMPERVIOUS SURFACE

Roofs, parking lots, driveways, and streets are types of impervious surfaces. Oils, dirt, and other pollutants accumulate on these surfaces. Rains wash streets, roofs, parking lots and driveways clean. The runoff quickly delivers accumulated oils, dirt, and pollutants directly to the Kishwaukee and its tributaries.

*Data provided by Tom Price, Northeastern Illinois Planning Commission.*

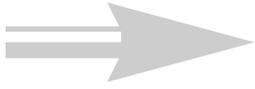


### SUSTAINABLE DEVELOPMENT

Planned development that fosters economic growth without sacrificing the natural resource assets of your community. Plan development to reduce impervious surface. **See Section 3 for ways to do this.**

*“Imperviousness represents the imprint of land development on the landscape. It is composed of two primary components — the rooftops under which we live, work and shop and the transport system (roads, driveways, and parking lots) that we use to get from one roof to another. As it happens, the transport component now often exceeds the rooftop component, in terms of total impervious area created. For example, transport-related imperviousness comprised 63%-70% of total impervious cover at the site in 11 residential, multifamily and commercial areas where it had actually been measured.”*

**Tom Schueler, The Importance of Imperviousness. 1994.**



## Economic/environmental impacts of imperviousness

*As more land is covered with impervious surface areas, the natural absorbing powers of the land are lost. Rainfall will rush across these surfaces causing a series of events:*



### **IMPERVIOUS SURFACE AREA**

Streets, parking lots, sidewalks, roofs—all those development features which increase water runoff and decrease the amount of water seeping into the soil.

- ☹️ Overflowing Kishwaukee stream channels will flood nearby businesses and homes. Manhours and repair dollars will be spent repairing flood damage.
- ☹️ Eroding stream banks will result in personal property losses, resulting in lost municipal tax revenues.
- ☹️ Uprooted trees and shrubs in waterways will obstruct flood waters, increasing flood damages and requiring manhours to remove blockages.
- ☹️ Manhours and equipment will be needed to remove debris from canoe and boating routes.
- ☹️ Increased water flow and velocity will cause large chunks of Kishwaukee streambank to drop into streambeds. Severed banks will disintegrate spreading sediment to downstream waters. Navigable channels will fill with sediment. The clear waters of the Kish will be muddy. Even fishermen will find their favorite fishing spots, the pools and riffles, sediment-covered.
- ☹️ Rainwaters and snowmelts rushing over roads, roofs, parking lots, homes will wash off all accumulated motor oils, antifreeze, road salts, or other pollutants. These waters then flow into the Kish and its tributaries. It all ends up in the river!



## Groundcover influence on stormwater runoff

### **Native plant species, natural land cover**

- ☺️ saves municipal and private dollars; no mowing costs in terms of manhours and equipment
- ☺️ protects lower areas from flooding and drought by absorbing rainfall and slowly releasing stored water to streams, lakes and wetlands
- ☺️ provides beautiful natural areas attracting birdwatchers, hikers, and wildlife
- ☺️ protects the Kishwaukee River from stormwater pollutants

### **Mowed turfgrass**

- ☹️ requires constant supply of municipal and private dollars in terms of fertilizer, manhours, equipment
- ☹️ requires replacement in flooded areas costing municipality money in manhours, equipment, and supplies
- ☹️ absorbs less stormwater and in some cases releases pesticides and fertilizer-enriched stormwater runoff
- ☹️ attracts Canada Geese (resulting in fouling of parklands with geese feces)

## The Watershed at Work ... Streamside



### Reducing negative impacts of streamside development

*Waterfront areas along the Kishwaukee and its tributaries present planning challenges. By understanding the dynamic nature of the waterway, planning for sustainable development, and enforcing planning initiatives your municipality will save money, time and a first class natural resource asset — the Kishwaukee River and its tributaries.*

- ➔ Restrict shoreline development. Save your municipality money and time in reparations from flood damages along swollen Kishwaukee streams and tributaries.
- ➔ Think of the stream and its shoreline buffer area as a whole.
  1. In populated areas, a riverfront “greenway” provides flood storage and conveyance, a recreational area for fishermen, boaters, hikers, bikers, and picnickers, habitat protection and water quality enhancement.
  2. In farmed areas, a buffer strip provides flood storage and protection, filtration of pollutants and sediments, and habitat protection.
- ➔ Understand the unique soils and lands adjacent to the Kishwaukee River. Local Natural Resources Conservation Service (NRCS) and Soil and Water Conservation District (SWCD) officials can supply maps and aerial photos of riverside floodplains.
- ➔ Go wild for the Kishwaukee.
  1. Selecting the right landscape materials for common lands, open space and streamside parks reduce flooding impacts and invasive gatherings of Canada geese which prefer mowed grass.
  2. Deep-rooted prairie plants provide water retention and filtering capabilities, aesthetic beauty and a link to our natural history heritage of the plains.
- ➔ Initiate shoreline stabilization projects. Check with NRCS, SWCD, and the Kishwaukee River Ecosystem Partnership (KREP) for available grants. Projects to improve deteriorating streambanks will keep the Kishwaukee clear and clean, saving more public land for recreational uses.

***“There is no such thing as a free lunch.”***

*Time spent in careful community watershed planning today will provide a legacy of clear waters for our children's children.*

*“...stream degradation occurs at relatively low levels of imperviousness (10 - 20%). Most importantly, imperviousness is one of the few variables that can be explicitly quantified, managed and controlled at each stage of land development.”*

***Tom Schueler, The Importance of Imperviousness. 1994.***



***“THEY AREN'T MAKING ANY MORE LAND TODAY.”  
Hang on to what you have!***

*Don't forever lose the opportunity to provide public places for your residents. Stream corridors are good places for scenic bike paths, greenways and parks... places that become the heart of your community.*

***See Section 4b for Greenway information.***

# 1 The Watershed at Work ... In the Water

All streams are not created equal. Take a look under water ...

HISTORICAL		TODAY	
PRACTICE	CONSEQUENCES	PRACTICE	CONSEQUENCES
Channelization	<ul style="list-style-type: none"> <li>• Loss of riffles and pools</li> <li>• moves water faster downstream                             <ul style="list-style-type: none"> <li>▶ flooding</li> </ul> </li> <li>• streambanks cave in                             <ul style="list-style-type: none"> <li>▶ sedimentation</li> </ul> </li> <li>• Loss of plant and animal habitat</li> </ul>	Give the Kish elbow room	<ul style="list-style-type: none"> <li>• slow-moving water</li> <li>• scenic views</li> <li>• plant &amp; animal habitat</li> </ul>
Channel Armoring i.e. seawalls	<ul style="list-style-type: none"> <li>• moves water faster downstream                             <ul style="list-style-type: none"> <li>▶ bank erosion</li> </ul> </li> <li>• increases downstream flooding</li> </ul>	Native Plantings	<ul style="list-style-type: none"> <li>• streambank stabilization</li> <li>• wildlife habitat</li> <li>• looks better</li> </ul>
Impoundments i.e. dams	<ul style="list-style-type: none"> <li>• sediment builds up behind dam</li> <li>• fish won't be able to migrate</li> </ul>	Free-flowing	<ul style="list-style-type: none"> <li>• fish can reach headwater spawning areas</li> <li>• no sediment buildup</li> </ul>
Floodplain Filling	<ul style="list-style-type: none"> <li>• floodplain shrinks                             <ul style="list-style-type: none"> <li>▶ more flooding</li> </ul> </li> <li>• river buffer gone                             <ul style="list-style-type: none"> <li>▶ more sediment goes into the water</li> </ul> </li> </ul>	Natural Floodplain	<ul style="list-style-type: none"> <li>• prevents flooding</li> <li>• keeps sediments and pollutants out of stream</li> </ul>
Sewage Treatment Plants	<ul style="list-style-type: none"> <li>• nutrient-rich wastewater is a pollutant to the stream</li> </ul>	Land Treatment of Wastewater	<ul style="list-style-type: none"> <li>• nutrient-rich wastewater is a fertilizer for land</li> </ul>



**See Your Town Packet:**  
NIPC: Restoring and Managing Stream Greenways