DRAFT

Lake Superior Watershed Rural Property Guide

Example Cook County, Minnesota

LAKE SUPERIOR BINATIONAL FORUM

SUPERIOR WATERSHED PARTNERSHIP

Lake Superior Watershed Rural Property Guide

Example
Cook County, Minnesota

Participating Organizations:

Michigan
counties
Michigan Department of Environmental Quality
Michigan Sea Grant
Superior Watershed Partnership

Minnesota
Carlton County
Cook County
Lake County
Minnesota Pollution Control Agency
Minnesota Sea Grant
St. Louis County

Wisconsin
counties
University of Wisconsin Extension Service
Wisconsin Department of Natural Resources
Wisconsin Sea Grant

Ontario
EcoSuperior
Ministry of Environment

Environment Canada
Ontario Region

U.S. Environmental Protection Agency
Great Lakes National Program Office

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What is in This Guide?

Owning and managing rural properties is challenging as well as rewarding. A dream to create that perfect home, hunting land or secluded retreat in the country requires careful planning and maintenance. A rural landowner has responsibilities to protect their environment in ways that city dwellers are unaccustomed to, including coping with land, water and air quality.

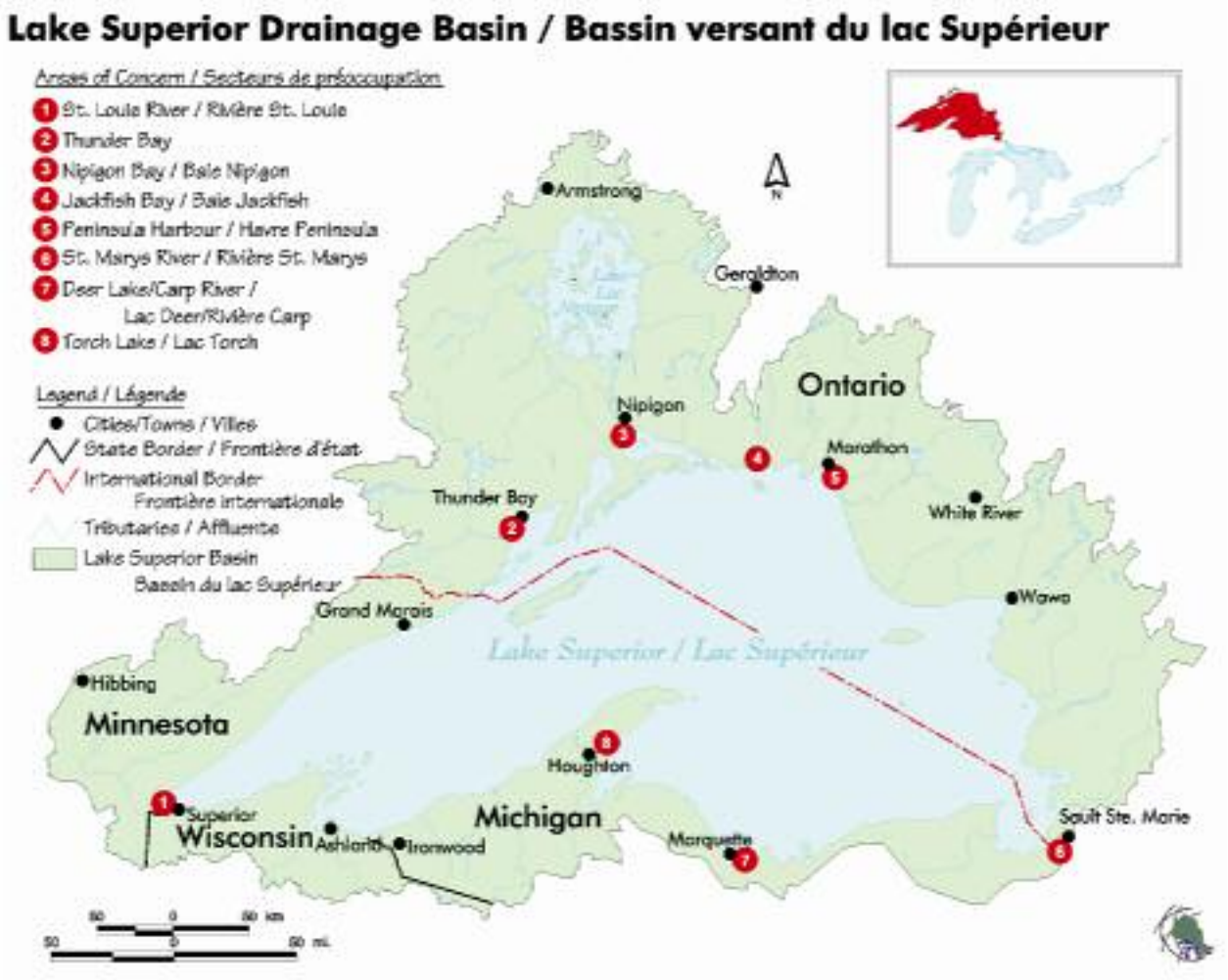
This guide answers some of the most common questions asked by rural landowners and helps you find the information needed to plan and care for your property in ways that comply with applicable environmental regulations and best management practices.

The following questions are designed to help you navigate some of the programs that are important to rural property owners. Good luck on your journey and enjoy your property for years to come!

- My family uses a well for drinking water. How do I know it's safe and what can I do to protect it? —see **Wells**
- What happens when I flush the toilet or drain the sinks? How do I keep things working efficiently? —see **Septic Systems**
- How do I deal with solid and hazardous wastes now that I live in the country? —see **Waste Disposal**
- There are wet or swampy areas on my property. How do I find out what I can and can't do with them? How can I protect and manage wetlands on my property? —see **Wetlands**
- My property includes lakeshore or stream banks. How can I find out what I can and can't do in these areas? What environmentally friendly practices are recommended on and around the dock, boathouse, and boat launches? —see **Shorelines**
- My property has habitat such as forests and grasslands. What advice is available for managing such habitats in this region? —see **Habitat**
- I don't want the soil on my property to erode or the runoff to pollute water. Where do I get information to manage this? —see **Stormwater**
- I want to know more about the plants and animals on my property. What can I do to attract and protect plants and animals on my property? —see **Landscaping**
- I'm looking for more advice on rural property and managing an environmentally responsible household. —see **Other**

"Breathtaking rocky cliffs towering over shimmering aquamarine waters; hidden mysterious coves protecting an astonishing array of habitat for fish and wildlife; deep, crystal clear, frigid waters silently guarding the final resting place for more than 350 shipwrecked vessels... These are some of the images evoked by the "greatest" of the Great Lakes: Lake Superior, or as the Ojibwe people named it, "gichigami."

Or: *"Straddling two countries, with a crown of iron and a foot of copper, Lake Superior merits her title as queen of the inland seas. She is loved and feared, admired and respected. Sometimes she's serene and peaceful, at other times turbulent and tempestuous. Her wooded shores, the pristine streams that feed her, and the rugged cliffs that pay homage to her are dwarfed by Queen Superior herself, greatest of the Great Lakes." Craig Charles, Exploring Superior Country, 1992*



Note: if your property lies in the green area above, then water from your property will drain to Lake Superior.

Introduction to the Lake Superior Watershed

The Lake Superior watershed is one of the most special places in the world. The lake's pristine beauty and frigid waters inspire and awe residents and visitors alike. Equally special is the watershed, where forests, wetlands, placid lakes and bedrock cover the landscape and lively trout streams tumble towards the lake. With a total area of 96,000 sq kilometers (37,000 square miles), the lake contains one-tenth of the world's supply of freshwater and one-fourth of all the water in the Great Lakes.

Despite its immense size, Lake Superior is surprisingly fragile. The year-round cold temperatures of Lake Superior and small amount of nutrients entering the lake result in a simple food chain that ends with top predator fish such as lake trout and salmon. Because Lake Superior is nourished by forests and watered by streams, changes on the land become changes in the lake. We find algae blooms in bays, contaminated sediment in harbors, invasive species on the land and in the water and toxic contaminants building up in the food chain.

What is being done to protect the Lake Superior watershed?

In Canada and the United States, several binational and domestic initiatives have been developed to protect, restore, and maintain Lake Superior and the other four lakes that make up the Great Lakes ecosystem. A special Lake Superior Binational Program was initiated in 1991 by the governments surrounding Lake Superior. Governments, municipalities, and community groups are making progress but they cannot do it alone. They need help from people like you in order to get the job done.

What can I do to help?

Every action counts! As a property owner or realtor, there are many things that you can do to help restore and protect the Lake Superior basin. This binder was designed to make it easier for you to help restore and protect Lake Superior. Please look over this binder when you move in and keep handy for future reference.

For questions about a specific topic or issue on your property, please consult the relevant section of the binder. For questions about the Lake Superior Binational Program or additional copies of this binder, please contact:

Canada:
Pamela Finlayson
Environment Canada
Phone: (416) 739-5996
pamela.finlayson@ec.gc.ca

United States:
E. Marie Wines
United States Environmental Protection Agency
Phone: (312) 886-6034
wines.e-marie@epa.gov

Welcome to your new home in the watershed of the Greatest Lake!

Wells

Cross References
Improperly designed, installed or maintained septic systems have the potential to contaminate wells. - see **Septic Systems**

Groundwater accumulates from precipitation and is stored beneath the surface of the earth. It fills cracks, pores and crevices of underground materials. Many rural homes and businesses rely completely on groundwater for their source of potable water.

As a water supply, groundwater is actually preferable to surface water from rivers, lakes or streams. Groundwater requires minimum treatment and quality and temperature is usually uniform. When properly managed, groundwater is a dependable source of supply that is accessed by drilling wells.

Well Basics

There are three main types of well:

- drilled
- dug or bored
- sand point

Each type of well has its advantages and disadvantages. Drilled wells can reach deeper aquifers and can be drilled through bedrock. These wells are also less susceptible to contamination. Some deep, drilled wells do have a tendency to produce poor water quality however, due to salt, sulphur and other minerals.

Dug wells are usually shallow, typically in the 6 to 9 metre (20 to 30) foot range. They are easy and inexpensive to construct. On the other hand, water shortages are possible with these shallow wells during dry periods and they are quite vulnerable to contamination from debris or bacteria found in surface water (as opposed to groundwater) which may infiltrate these wells.

Sand point wells are generally simple and inexpensive to install but they are limited to installation in permeable materials like sand, have limited yield, are susceptible to shortages in dry periods and are quite vulnerable to contamination from surface water and materials.

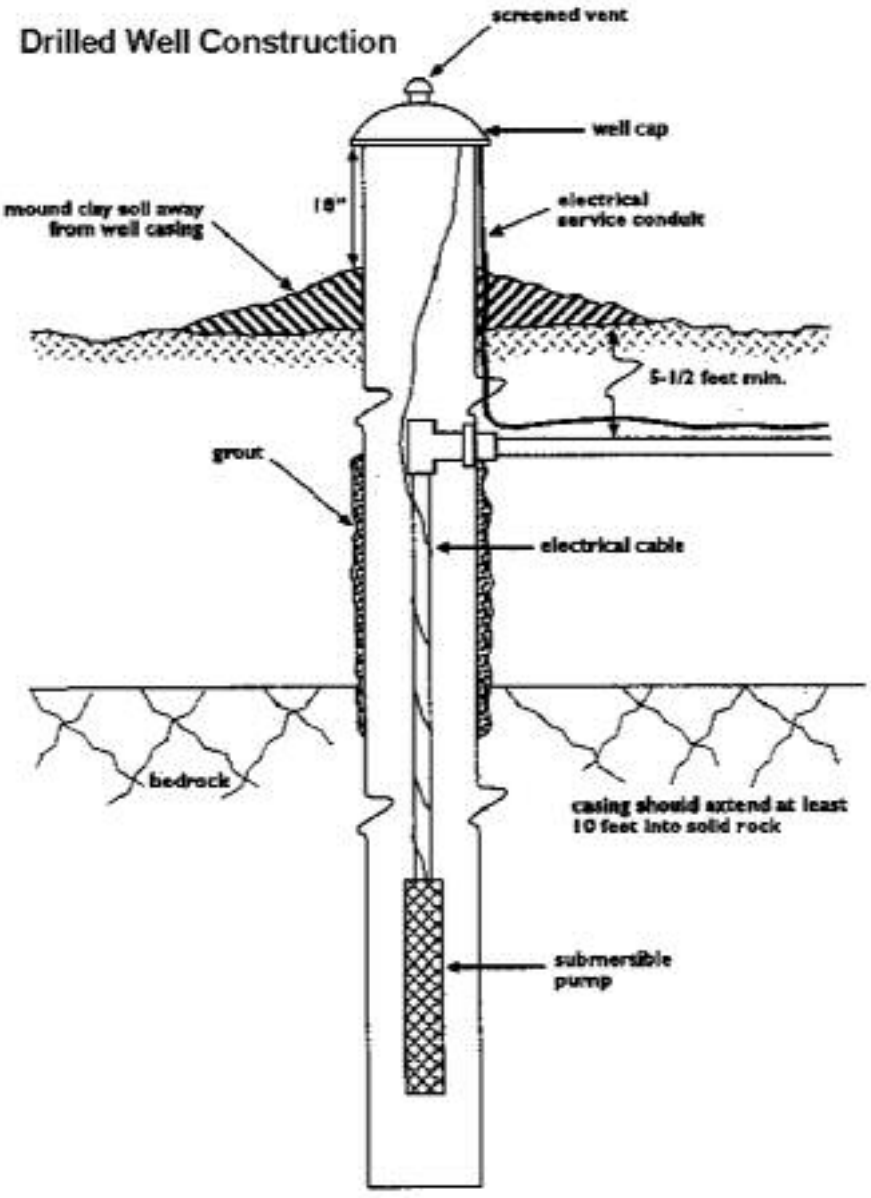
Best Management Practices

Wells need to be properly constructed and managed in order to provide a safe, reliable source of water. Best management practices are not limited to the well alone but are inextricably related to how a property as a whole is managed. An action on one part of the property can affect the well which is located on another part of the property.

A well should be properly located in order to minimize the risk of contamination. Separation distance from potential sources of contamination is dictated by local, provincial or state regulations. Keep in mind that these are minimum distances. Greater separation adds to the safety of your water supply.

Wells must also have watertight casings to a minimum depth. If they do not have

Wells


Drilled Well Construction
screened vent
well cap
mound clay soil away from well casing
18"
electrical service conduit
5-1/2 feet min.
grout
electrical cable
bedrock
casing should extend at least 10 feet into solid rock
submersible pump

Wells continued

watertight casings to this depth, wells must have increased separation distance to potential sources of contamination. Potential sources of contamination include animal pens and barns, homes, buildings and downspouts (which can flush large quantities of debris locked up in surface water into a well which is not properly sealed), septic fields, etc.

Wells must also be properly maintained. This includes the following actions:

– Regular testing for bacteria and other contaminants,

– inspection for cracks and leaks which admit surface water,

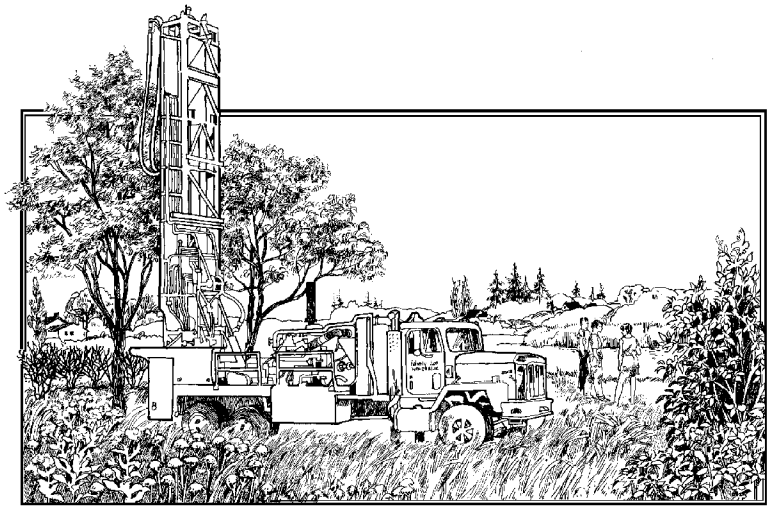
– inspection for staining on the well interior which may indicate that, over time, surface water is seeping into the well,

– removal of debris which may be floating in the well,

– ensuring ground directly around the well is mounded up to promote drainage away from the well and

– maintenance of a buffer around the well.

Note: the above text was adapted from materials developed by the Green Communities Canada program.



Well Resources

[Minnesota]

[Cook County]

The Cook County Property Owners Resource guide covers wells on page 11. See Appendix B of this binder or http://www.co.cook.mn.us/sw/cook_pog.pdf

[Lake County]

The Lake County Property Owners Resource guide covers wells on page 7. See Appendix B of this binder or http://www.lakecounty.govoffice2.com/vertical/Sites/{A88D6CA0-192C-4EBE-8698-70C44B114E79}/uploads/{A7E37FD1-32BA-4B74-918D-B706CA38F915}.PDF

Septic Systems

Cross References
Improperly designed, installed or maintained septic systems have the potential to contaminate wells. - see **Wells**

If you have a sewer bill or part of your property tax covers wastewater treatment, then what is flushed down your toilet or drains into your sink is going to a wastewater treatment plant and you don't have to worry about a septic system. If you aren't hooked up to a wastewater treatment plant, then you have a septic system (also called an "on-site" treatment system) and this information will be helpful.

What Do Septic Systems Do?

Septic systems protect human health and the environment by safely recycling wastewater back into the natural environment. Septic systems treat wastewater as well as, or better than, municipal treatment systems at a reasonable cost when properly designed, installed, operated, and maintained. Federal, state, and local regulation of on-site systems focuses on proper treatment of sewage to protect citizens, communities, and the environment.

How Does a Septic System Work?

In typical on-site treatment systems, all wastewater is co-mingled, treated, and dispersed by one system. There are a few separation systems in which toilet wastes are treated separately from other wastewater. Common septic systems all have three basic components: plumbing, septic tank, and a soil treatment area. Individual systems may have variations of each of these.

Septic Systems Require Care

Regularly clean/pump and inspect the septic tank

- The septic tank must be cleaned or pumped regularly to remove all solids. Never go into the septic tank. It lacks oxygen and contains dangerous gases.
- Always clean the tank through the manhole.
- Always use a licensed professional.
- Be sure all solids are removed (flush and back-flush).
- Inspect the baffles to be sure they are in place and functioning properly.

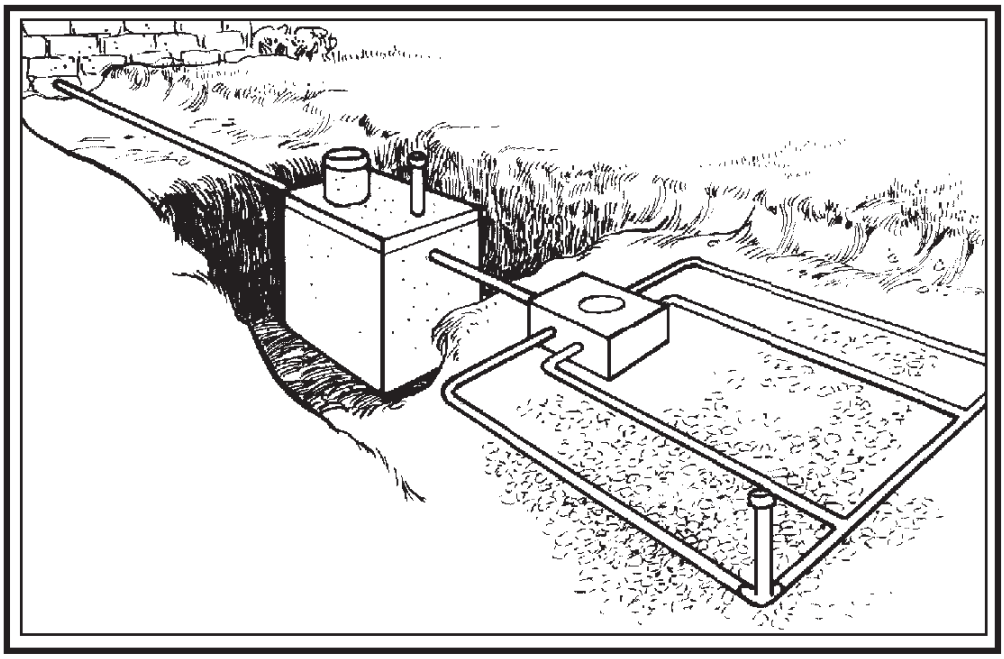
Maintain pumps and filters properly

- All pumps and motors should be routinely checked for proper operation.
- Replace weak or faulty pumps and motors.
- Install and clean lint filters on laundry equipment.
- Clean or replace effluent filters regularly.
- Attend to alarms on pumps and filters immediately.

Protect the soil treatment area

- Mow but do not fertilize or water turf grasses.
- Keep heavy vehicles (cars, tractors, snowmobiles, etc.) off soil treatment area.
- Do not place gardens, swing sets, or sand boxes over this area.
- Do not plant trees and shrubs on or close to this area.
- Maintain stands of appropriate plants on constructed wetland sites.

Note: the above text was adapted from materials developed by the Minnesota Extension Service.



Septic System Resources

[Minnesota]

Buying a Cabin With a Septic System:
http://septic.umn.edu/homeowner/factsheets/buyingacabin.html

Septic System Owners Guide:
http://shop.extension.umn.edu/PublicationDetail.aspx?ID=941

Understanding Your Septic System:
http://septic.umn.edu/homeowner/factsheets/understanding.html

Minnesota's Individual Sewage Treatment Systems Program (ISTS):
http://www.pca.state.mn.us/programs/ists/

[Cook County]

The Cook County Property Owners Resource guide covers septic systems on pages 12 and 13. See Appendix B of this binder or http://www.co.cook.mn.us/sw/cook_pog.pdf

[Lake County]

The Lake County Property Owners Resource guide covers septic systems on pages 8 and 9. See Appendix B of this binder or http://www.lakecounty.govoffice2.com/vertical/Sites/{A88D6CA0-192C-4EBE-8698-70C44B114E79}/uploads/{A7E37FD1-32BA-4B74-918D-B706CA38F915}.PDF

[St. Louis County]

St. Louis County Environmental Health Department:
Individual Septic System Program:
http://www.co.st-louis.mn.us/publichealth/Environmental/envir_pro_septic.htm

Waste Disposal

Cross References
Improper disposal of wastes can contaminate wells - see **Wells**

Waste generation statistics show that just one person produces about 360 kilograms (800 pounds) of garbage every year[1]. How we deal with our garbage can have a big impact on our health and our environment.

Reduce

Source reduction prevents waste from being created. It reduces the amount or toxicity of waste at the source. Because source reduction actually prevents the generation of waste in the first place, it is the most preferable method of waste management. Source reduction includes purchasing durable, long-lasting goods and making them last longer by repairing them when necessary, reusing products and packaging, and reducing the amount of packaging that is discarded. It is also seeking products and packaging that are as free of toxics as possible.

Reuse

Reusing items by repairing them, donating them to charity and community groups or selling them also reduces waste. Reusing, when possible, is preferable to recycling because the item does not need to be reprocessed before it can be used again.

Recycle

Recycling uses waste to make new products. Common recyclable materials are glass, paper, aluminum and steel. New technologies are making it possible to recycle other materials as well. Recycling has become a standard practice among many residents of the Lake Superior watershed. However, buying products that are recyclable and actually recycling them is only part of the recycling process. We must also buy products made from recycled materials.

Don't Burn

Backyard burning of garbage is unnecessary, dangerous and often illegal in many places in the Lake Superior watershed. Even rural households have alternatives to burning trash. In addition, burning garbage may be a liability since open burning can start fires (for example, 40% of Minnesota wildfires are from careless debris burning). Backyard burning is also a source of toxic chemicals because trash burning creates toxic pollution. Trash burned in a burn barrel creates two thousand times more dioxin (a highly toxic known carcinogen) than if that same trash was burned at a modern municipal incinerator. For some people, pollutants created by garbage burning can cause respiratory and other health problems and it's an un-neighborly practice since the unpleasant odor wafts into other properties.

Compost

Home composting is a way for you to speed up the natural process of

decomposition and return organic materials to the soil. Yard trimmings and food scraps make up nearly 1/6 of what the average household throws into the garbage..

Your local government will have more information on the options in your area for waste collection, transfer stations, landfill locations and hours, recycling and hazardous waste collections.

Note: Most of the above text was adapted from materials from Minnesota's Consumer Handbook to Reducing Waste and other Minnesota Pollution Control Agency materials.

[1] From Netta Benazon's 2006 Emissions Inventory 2005 for Canadian Portion of Lake Superior Basin. Lake Superior LaMP 2005. Does not include per capita waste from industrial and commercial sources.

Waste Disposal Resources

[Minnesota]

Minnesota's Consumer Handbook to Reducing Waste
http://www.moea.state.mn.us/reduce/handbook.cfm

Minnesota Office of Environmental Assistance Reduce website
http://www.reduce.org/index.html

Don't Burn Your Garbage http://www.moea.state.mn.us/reduce/burnbarrel.cfm

Household Hazardous Waste Guide
http://www.wlssd.com/publications/HHW%20guide.htm

If You're Burning Garbage, You're Making Poison
http://www.wlssd.com/Open_Burning/Backyard_Garbage_Burning.htm

How to Compost Your Organic Waste http://www.reduce.org/compost/index.html

[St. Louis County]

St. Louis County Solid Waste Department (click on Departments then Solid Waste for information on solid waste disposal facilities and fees, recycling, hazardous waste and composting) http://www.co.st-louis.mn.us/slcportal

St. Louis County Solid Waste Department
307 First Street South, Suite 115, Virginia, MN 55792
1-800-450-9278 or 218-749-9703
FAX: 218-749-0650

[WLSSD Service Area]

WLSSD Materials Recovery Center
http://www.wlssd.com/ENVPROG_files/materials_recovery_center.htm

Township recycling sheds for rural residents
http://www.wlssd.com/ENVPROG_files/recycling_sheds.htm

Energy Conservation

Conserving energy helps you save money while helping electric utilities offset their peak loads and avoids the need to construct new power plants or transmission facilities. It also helps alleviate smog, acid rain, and global climate change because fewer fossil fuels such as coal and oil are burned. Conserving energy thus preserves our planet's rich natural resources and promotes a healthy environment, in addition to cleaning the air we breathe.

But conservation isn't about doing without, it's about making informed choices. It's about knowing how much electricity you use, when you use it, and finding more energy-efficient ways to maintain your comfort and lifestyle.

Below is a list of simple actions to help reduce energy consumption.

1. First, understand how much energy is used in your household. Your bills from power companies, heating oils, natural gas and fuel provide this information.
2. In the winter, turn your thermostats down to 20 degrees Celsius (68 degrees Fahrenheit) or below. Reduce the setting again before going to sleep or when leaving for the day.
3. In the summer, adjust your thermostat up a few degrees. Your house will still feel cool without as much air conditioning. Remember that some thermostats can be programmed so they can shift the temperature automatically. That way, you won't be heating or cooling your home when you're not around.
4. Close shades and blinds at night to reduce the amount of heat lost through windows. During the day, closing your drapes will block the sun and keep your house cooler.
5. Buy Energy Star appliances, products and lights to save between 30-50% of energy and maintenance costs compared to a comparable non-qualified product.
6. Avoid running large appliances such as washers, dryers, and electric ovens during peak energy demand hours from 5:00 a.m. to 9:00 a.m. and 4:00 p.m. to 7:00 p.m.
7. Let your clothes dry naturally outdoors on a clothesline or inside on a rack.
8. Turn off non-essential lights and appliances. The electricity generated by fossil fuels for a single home puts more carbon dioxide into the air than two average cars!
9. Have your home tested for energy efficiency. A number of excellent programs are available to choose from. While most of these programs come at a cost to the homeowner, their intent is to save you money over the longer term by providing information about cost-effective, energy-efficient upgrades.

10. Once you've reduced the energy demand from your household, see the "Other" section in this binder to learn about some renewable energy options.

There are also many other areas of the home where further energy conservation measures can be implemented, saving you more money in utility bills. These include:

- well maintained heating, cooling and duct systems
- proper insulation of the basement and exterior walls
- effective weather-stripping of the home
- a water heating system which is not set at a temperature which is too high for general use
- windows suitable for a cold weather climate but which include shades for hot summer days
- energy efficient lighting including the use of compact fluorescent bulbs
- landscaping to provide windbreak and shade

Note: the above text was adapted from materials developed by Ontario Power Generation

Energy Conservation Resources

[Minnesota]

Energy Star is a joint program between the Environmental Protection Agency and the US Department of Energy. The purpose of the program is to allow consumers to save money through energy efficient appliances. Energy Star produces a variety of products, from common household appliances such as dishwashers, washers and dryers, to home electronics, lighting and office equipment. The site also offers guidelines to making a home more energy efficient with tips on insulation, windows and heating and cooling. The benefits of having an Energy Star home are lower cost, environmental protection and increased market value. The site has a guidebook to determine if a house if energy efficient. http://www.energystar.gov/

Millennium Star: Minnesota Power's Model Energy-Saving Home
Minnesota Power built the Millennium Star with the goal being to create an energy efficient house and to provide information to future homeowners or current homeowners looking to remodel with energy efficiency advice. The advice is geared towards people with middle class budgets, and has energy saving information ranging from the construction of the house, starting at the foundation, to having energy efficient appliances. http://www.mnpower.com/energyhome/project/

Energy Info Center This site offers 19 different guides with suggestions and instructions to energy related issues involved in owning a home. These guides tell how to make a home more energy efficient, from simple tasks to owning certain appliances. http://www.state.mn.us/portal/mn/jsp/content.do?action=doc_contentlist&subchannel=-536881511&programid=536885406&id=-536881350&agency=Commerce&sp2=y

[Cook County]

The Cook County Property Owners Resource guide covers energy conservation on page 10. See Appendix B of this binder or http://www.co.cook.mn.us/sw/cook_pog.pdf

Arrowhead Electric Cooperative, Inc. This site offers energy efficient appliances from washers and dryers to electric boilers designed to cut down on the amount of energy used. http://www.aecimn.com/Services.html

Wetlands

Cross References
- Wetlands near shorelines may have additional requirements - see **Shorelines**
- Wetlands can enhance the variety of plants and animals on your property - see **Habitat**

Wetlands are land areas that are submerged or permeated by water - either permanently or temporarily. They are characterized by plants adapted to wet soil conditions. Wetlands in the Lake Superior Basin include marshes, wooded swamps, bogs, seasonally flooded forest, sloughs and shorelands. Essentially they are any land area that can keep water long enough to let wetland plants and soils develop.

Wetlands often form the link between the mainland and Lake Superior. Coastal wetlands make up 10% of the Lake Superior shore, mostly associated with protected bays, estuaries and barrier beach lagoons. Inland lakes and rivers in the Basin include wetland environments that support living organisms that need both environments to survive. In the past, wetlands were considered wasteland, and many of the Lake Superior Basin wetlands have been adversely affected by land use practices that have destroyed or impaired the ecological services of wetlands. The Lake Superior Binational Program promotes the value of wetlands and efforts to protect them. However, wetlands are still disappearing under the pressure of human activity, and are being threatened by air and water pollution and climate change.

Wetlands serve people's basic needs and sustain their livelihoods.

Wetlands are the only ecosystem designated for conservation by international convention. They have been recognized as particularly useful areas for ecological services society needs because:

- they absorb the impact of large waves or floods and protect shoreline areas from erosion;
- they filter sediments and toxic substances (dirty water in, cleaner water out);
- they supply food and essential habitat for many species of fish, shellfish, shorebirds, waterfowl, and furbearing mammals people enjoy or depend upon;
- they also provide products for food (wild rice, cranberries, fish, wildfowl), energy (peat, wood, charcoal), and building material (lumber);
- they are valuable recreational areas for activities such as hunting, fishing, and bird and dragonfly watching.

Wetlands provide excellent fish and wildlife viewing opportunities

Wetlands are important to many living organisms. Every drop of water contains microscopic zooplankton, which are a vital component of the food chain. The water's surface and the wetland bottom are covered with insect eggs, larvae, and nymphs. Members of the fish, amphibian, and reptile groups are all dependent on the habitat provided by wetlands. Numerous bird and mammal species make extensive use of the water and its adjacent shores. These species can be important to humans economically or as indicators of environmental health.

How do living organisms use wetlands?

Food and shelter are the primary requirements of life including ours. Wetlands provide these functions for many species that either live permanently within the wetland or visit periodically. Almost every part of a wetland, from the bottom up, is important in some way. Frogs bury themselves in the muddy substrate to survive the winter, and some insects use bottom debris to form a protective covering. Fish swim and feed in wetlands, often eating the eggs of insects that have been deposited in the water. Wetland vegetation provides nesting materials and support structures to several bird species and is a major source of food to mammals, even those as large as moose. Small mammals use the lush vegetation at the edge of wetlands for cover and as a source of food, and they themselves are a food source for birds of prey. Each species has adapted to and depends on the wetland and its surrounding area in a particular way.

The Future for Wetlands

As a frontier-type ecosystem, wetlands are particularly vulnerable to climatic variation and extreme events. Many wetlands, are unstable to start with, and are easily or frequently changed by erosion and flooding. As Lake Superior experiences low water levels some coastal wetland perimeters dry out and plant communities begin to change as do the insects, fish and wildlife. When the high water cycle returns the area floods and returns to wetland. These cycles can be of short or very long duration (decades). Human development in these areas is environmentally detrimental and a risky investment.

Periods of drought and the possibility of hotter, drier summers and the increased use of water for irrigation in the Lake Superior Basin could reduce the supply of water for wetlands, either directly or indirectly (through the effect on the water table), or both. A lower volume of water would increase the concentrations of the pollutants that tend to settle in wetlands (agricultural chemicals, naturally occurring salts, atmospheric pollutants).

Small changes in temperature or water supply could have significant effects on wetland biota. A rise in temperature could allow an undesirable plant species (purple loosestrife, for example) to expand northward. High temperatures and low concentrations of oxygen favour the growth of the botulism bacterium. A change in the seasonality of precipitation could harm plants or animals whose life cycles require certain amounts of water at specific times of the year. Such a change could cause a decline in a plant on which waterfowl depend or interrupt the life cycle of wetland spawning fish.

Wetlands like wells are vulnerable to surface pollutants leaching into the water table

Wetlands often have very close connections with the groundwater system. Some wetlands, in higher ground, may serve as important groundwater recharge areas. Others, especially those in low-lying areas, may be the receptors for significant amounts of groundwater discharge. Therefore, if the underlying groundwater is contaminated, detrimental consequences will be felt by the wildlife and all other resources users dependent on that wetland. (see Wells)

Note: the above text was adapted from materials developed by Environment Canada.

(www.ec.gc.ca/water/en/nature/wetlan/e_wet.htm and www.on.ec.gc.ca/wildlife/factsheets/fs_wetlands-e.html#5)

Wetland Resources

[Ontario]

To understand more about the function and economic value of wetlands visit the Environment Canada web site at http://www.on.ec.gc.ca/wildlife/factsheets/fs_wetlands-e.html#5 . There is an entire branch of economics emerging that is devoted to the assessment of ecological services and their value.

[Minnesota]

[Cook County]

The Cook County Property Owners Resource guide covers wetlands on pages 14 and 15. See Appendix B of this binder or http://www.co.cook.mn.us/sw/cook_pog.pdf

[Lake County]

The Lake County Property Owners Resource guide covers wetlands on pages 10 and 11. See Appendix B of this binder or http://www.co.cook.mn.us/sw/cook_pog.pdf

Shorelines

Cross References
- Wetlands near shorelines may have additional requirements - see **Wetlands**
- Landscaping along shorelines can help or harm water quality - see **Landscaping** and **Storm Water**

Living by a lake or stream is a dream that many people share and for people who are lucky enough to live in the Northern Great Lakes region, that dream is often easier to achieve. The Great Lakes region is blessed with thousands of lakes and streams but building on a lakeshore or next to a river or stream comes with responsibilities not only to protect your own investment but to protect our shared waters and resources

Many cities, townships and counties in the Great Lakes region are enacting laws, zoning ordinances and rules designed to protect our water resources. What kinds of hazards and issues come with shoreline property?

- **Erosion of Soil due to wind and water** - Most cities, townships and counties now have mandatory setbacks from the edge of water bodies in order to avoid the affects of flooding and to prevent erosion of soil into the water. Erosion happens when the natural vegetation, rocks or logs which hold the soil in place are removed during construction or structures are built too close to the edge of the lake or stream. Soil erosion can affect not only the property where the construction has taken place but can lead to burial of fish spawning habitat and affect other properties far away from the site.
- **Sand Dunes** - Many communities are starting to realize the importance of protecting sand dunes. Sand Dunes along the Great Lakes took thousands of years to form and are constantly changing with the wind and forces of weather. In addition, unique ecosystems have developed in areas with sand dunes. Your local ordinances may forbid building on lakeshore sand dunes or require a setback from the crest of the dune closest to the lake.
- **Flooding** - Areas near rivers streams or lakes are often prone to flooding and not all of these areas are obvious just by looking. Flood maps are useful tools to determine if your property lies in a flood plain.
- **Habitat Loss** - Unique ecosystems have developed along lake shores and stream watersheds. Removing trees and native vegetation can disrupt these ecosystems and enables invasive species to become established. Using the resources in this book can help you decide which areas to leave alone and how to landscape in harmony with the surrounding ecosystem.
- **Damage caused by Ice** - The power and destructive potential of ice should be considered when building next to a lake or stream. With the right conditions, wind can cause ice to pile up on the shoreline and do serious damage to structures built too close to the shoreline. Learn how to spot the signs of past ice damage.

Note: the above text was prepared by the Lake Superior Lakewide Management Plan Habitat Committee.

Shoreline Resources

[Michigan]

North American Lake Management Society (NALMS) - NALMS was created by lake scientists from Canada, Mexico and the United States to promote education of lakes and watersheds to professional lake managers, politicians, policy makers, regulators, volunteer monitors, lake users, and anyone interested in lakes. The website has a wide variety of information on lake management and research.
www.nalms.org

Michigan Lake and Stream Associations: This is a good source for Michigan specific information for shoreline property owners. The MLSA was established in 1961 and is made up of organizations, corporations, associations and individuals who share an interest in the use and maintenance of Michigan's WATER resources. MLSA has also produced educational material that is very useful to land owners.
www.mlswa.org

Michigan Department of Environmental Quality - The state agency in charge of protecting Michigan's water resources is a great source of information on shoreline issues.
www.michigan.gov/deq

Central Lake Superior Land Conservancy - The mission of the Central Lake Superior Land Conservancy is to promote the protection of natural, agricultural, recreational, historic, and scenic lands through the use of conservation easements, land donations, and education. Click on newsletter archives for useful information on protecting the ecosystem of your land.
www.clslc.org/

Superior Watershed Partnership - The mission of the Superior Watershed Partnership is to protect and improve the natural resources of the Upper Peninsula of Michigan on a watershed basis; by promoting responsible individual and community actions that ensure a sustainable environment, encourage a sustainable economy and help improve quality of life. The partnership has produced many useful educational materials regarding shoreline management.
www.clswp.org

[Minnesota]

A Guide for Buying and Managing Shoreland: This MDNR guide provides information not only on managing shoreland property, but also on buying it. People interested in property that has some kind of water feature should check this out before they make their purchase. If you already have shoreland property, this guide provides basic information to keep your property in compliance with the law and the steps you can take to improve the property's natural values.
http://www.dnr.state.mn.us/shorelandmgmt/guide/evaluating.html

It is also available as a hard copy from the MDNR Information Center:
DNR Information Center
500 Lafayette Road
St. Paul, MN 55155-4040
Telephone: (651) 296-6157 or (888) 646-6367
TTY: (651) 296-5484 or (800) 657-3929

DNR Central Office hours: 8:00 a.m. - 4:30 p.m., Monday - Friday. Closed holidays.

If you are requesting materials, please include a mailing address and a daytime phone number.
E-mails are answered only during business hours.

Restore Your Shore: This CD-ROM will enable you to:
- Develop a deeper understanding of shoreland ecosystems and natural shoreland management.
- Discover how lakeshore problems similar to your own have been resolved through innovative approaches. Follow four different shoreland owners' experiences as they share their shoreland transformation projects.
- Create your own plant list from an extensive interactive database of over 400 native plant species (photos included!). Select native plant species suitable for planting in your area. Find out what to plant and what *not* to plant.
- Use worksheets and forms that will guide you step by step through the design and implementation process. Watch your project unfold and enjoy the transformation that takes place.

The CD-ROM can be purchased for $29.95 plus shipping and, in Minnesota, sales tax from Minnesota's Bookstore. If buying in bulk quantities, be sure to ask about discounted rates.

Minnesota's Bookstore
660 Olive Street
St. Paul, MN 55155
tel. (651) 297-3000 Twin Cities metro or nationwide toll free (800) 657-3757
TTY: (651) 282-5077 or (800) 657-3706
fax. (651) 215-5733
www.minnesotasbookstore.com

[Cook County]

The Cook County Property Owners Resource guide covers shorelines on page 16. See Appendix B of this binder or http://www.co.cook.mn.us/sw/cook_pog.pdf

[Lake County]

The Lake County Property Owners Resource guide covers shorelines on page 12. See Appendix B of this binder or http://www.co.cook.mn.us/sw/cook_pog.pdf

Habitat

Cross References
- Wetlands are important habitats - see **Wetlands**
- Shorelines are important habitats - see **Shorelines**

If you have areas of upland, including fields or forests on your property, you might be wondering what they contribute to the Lake Superior basin. . .

Your land is part of an ecosystem comprised of living things (animals and plants) that interact with their nonliving environment (soil, water and geology). Ecosystems can be large - the Lake Superior basin is an ecosystem in which prevailing winds and water temperatures affect the amount of snow fall, which in turn affects the distribution of deer. Ecosystems can also be small - a small area near a fallen tree is an ecosystem where microorganisms help the tree decompose and nourish the soil. Humans and nature influence and change these ecosystems in a variety of ways. In this section, you will find information about upland ecosystems - they play important roles in providing habitat (food and shelter) for a variety of species, from invertebrates that live in the soil to birds and large mammals like deer. How you manage your property will affect these species and the ecosystems in which they live.

With regard to the Lake Superior basin as a whole, it is mostly forested (about 88%), including conifer, hardwood and mixed forests. The character of these forests changes from the southern to the northern part of the basin. On the US side of the basin, the forest is in transition between boreal and deciduous forest types, with deciduous forest tending to occur in richer soils and conifer forest in poorer soils. As one moves north, the proportion of conifer species increases until one reaches the boreal forest ecosystem, where species like black spruce, jack pine, aspen and white birch predominate.

Some areas within the Basin are not forested. Most of these areas are small and are open because of weather patterns or because of fire. The areas maintained by fire are called Pine Barrens, and their area has declined dramatically since European settlement. They provide habitat for grassland birds and other open habitat species. This habitat type is rated as globally rare.

There are other sections of this guide that will help you understand the importance of shorelines, wetlands, and landscaping for wildlife on your property.

What Kind of Forest Do I have?

The kinds of trees that will grow in a particular area vary depending on the climate, soil type, amount of water available, topography, and other factors. Certain plants and animals are adapted to live in different types of forests. The trees in one forest may be mostly birch and aspen, in another area spruce and fir trees may predominate. Different forest types are often identified by the tree species found there.

What threats exist to forest ecosystems?

There are a number of threats to forest ecosystems including land use and land conversion practices, forest fragmentation, invasive species and poor timber harvesting practices. There are many resources available to help you manage forests on your property and avoid negative ecosystem impacts. Some of these resources are listed on the next page.

Invasive species such as the emerald ash borer threaten black, white and green ash trees across the basin and, once attacked, the trees almost always die. The potential for spreading these insects is one reason never to move firewood long distances, eg from your home in the city to your cabin in the Lake Superior basin.

Logging equipment can cause soil compaction. Poor harvesting practices can allow soil to erode into local streams and lakes, and eliminate tree cover causing increased water temperatures in waterways.

What about open upland areas like cropland or grasslands/fields?

These areas provide important habitat for species like Northern harriers, sharp-tailed grouse, red winged blackbirds and several species of sparrow. These areas can be managed in a number of different ways - from allowing them to revert to forest ecosystems, to maintenance by fire, to conventional crop production. A number of resources are available to help you assess and manage your open upland ecosystems.

Note: the above text was adapted from materials developed by the Michigan Department of Natural Resources and Minnesota Department of Natural Resources

(http://www.michigandnr.com/publications/pdfs/huntingwildlifehabitat/Landowners_Guide/Introduction/Ecosystems.htm
and
http://files.dnr.state.mn.us/forestry/citizens_guide/citizensguide_chapter2.pdf)

Habitat Resources

Backyard Woods: Arbor Day This site explains how to build a small woodland in your backyard of about one to ten acres of land. It helps make a plan of action. Topics include proper use of a chainsaw, protecting against wildfire, and identifying and taking care of hazardous defects. It helps explain how to keep the woodland healthy, along how to attract wildlife. http://www.arborday.org/backyardwoods/

[Minnesota]
The Minnesota DNR has a program to help landowners develop Forest Stewardship Plans by providing technical advice and long range planning to interested landowners. http://www.dnr.state.mn.us/grants/forestmgmt/stewardship.html

The Minnesota DNR Private Lands Program assists landowners in developing and maintaining wildlife habitat on their land.
http://www.dnr.state.mn.us/privatelandsprogram/index.html

The Minnesota DNR's invasive species website has links to information about terrestrial animal and plant species as well as links to Minnesota's invasive species regulations and other useful information. Go to http://www.dnr.state.mn.us/invasives/index.html

Sustaining Minnesota Forest Resources This guide was created for landowners, loggers and resource managers. It goes through components of a forest such as resources, soil, wetlands and wildlife. The guidebook has different sections to forest management specific to each type of person. It offers resource needs, landowner objectives, site capabilities, existing regulations and economics of forest management.
http://www.frc.state.mn.us/FMgdline/2005guidelinesbook/Complete%20FMG%20Book.pdf

Backyard Tree Care This site offers advice on planting and maintaining trees. It explains how certain trees should be planted certain ways in specific spot that will help the tree live longer with less maintenance. Health advice is also given, from protecting trees from tent caterpillars, beetles, and gypsy moths to disease diagnostics.
http://www.dnr.state.mn.us/treecare/index.html

Tree Care Handbook This handbook offers tips for before and after planting of trees and the shelter they may need to survive. It goes through specialized planting for trees with specific uses, such as wood production, windbreakers, Christmas trees and energy conservation tips. Tree care is also given about animal depredation, insect and pest management, disease, pruning and thinning, and weed control around the trees.
http://www.co.cook.mn.us/sw/tree_care_handbook.pdf

[Wisconsin]
The Wisconsin DNR has a program that reduces property taxes on forest land enrolled in the Managed Forest Law Property Tax Program. To learn more, go to
http://dnr.wi.gov/org/land/forestry/ftax/mflfactsheet.pdf

Wisconsin DNR has a comprehensive website on invasive species at http://dnr.wi.gov/invasives/ and a specific site devoted to forest pests. See http://dnr.wi.gov/org/land/forestry/fh/

[Michigan]
Michigan provides a web site called "Caring for Private Forest Lands in Michigan" that details many of the tax incentive and other forest management programs available in Michigan. Go to http://www.michigan.gov/dnr/0,1607,7-153-30301_30505-159665--,00.html

The Michigan DNR provides a guide to managing wildlife on your property. Link to it through http://www.michigan.gov/dnr/0,1607,7-153-10370_12148---,00.html
This comprehensive guide discusses forestland, cropland, wetland, grassland and back-yard management.

Stormwater

Cross References

- Improper management of stormwater can contaminate wells - see **Wells**
- Landscaping is an important aspect of managing stormwater - see **Landscaping**

What Is Stormwater?

Stormwater runoff is rain or snowmelt that runs off the land rather than soaking into the soil. When water picks up soil and pollutants or repeatedly runs off the land so quickly that it damages stream habitat, we need to look at stormwater best management practices to protect our waterways. In the 1990s, we learned that stormwater is a significant source of nutrients and sediments to Lake Superior.

Many communities in the Lake Superior Basin are working on stormwater issues. But stormwater is not just an urban issue. Property owners in rural and urban areas can use best management practices to keep stormwater clean, and protect the waters of the Lake Superior basin.

Stormwater Runoff: Slow it Down, Keep it Clean

Changes we make to the land affect the volume and velocity of storm water runoff, and influence the pollutants picked up by that water. For example, forest cover, wetlands, and natural drainage patterns in a watershed help to slow water runoff from the land, which protects streams and rivers.

Stream habitat is damaged by the power of high volumes of water runoff hitting the stream, causing rapid fluctuations in flow, and subsequent erosion and sedimentation. Slowing the flow of water runoff is a particular concern in areas of the Lake Superior basin with clay soils, where the soils and geology make the streams susceptible to damage from rapid runoff. Studies show that peak floods in this area are larger today than before European settlement, making it all the more important to slow stormwater runoff.

When water runs off the land, it picks up more pollutants from developed land than from land covered by natural vegetation. Impervious surfaces, such as rooftops, parking lots, gravel and paved roads do not absorb water, and rainfall runs off very quickly, picking up pollutants. Pollutants common in stormwater include sediment, nutrients from yard waste and fertilizer, pathogens from pet waste, detergents, pesticides, oil and grease, and road salt. As the amount of impervious surfaces in a watershed increases, the quality of the water usually decreases unless best management practices and stormwater controls are used.

Best management practices and stormwater controls are aimed at keeping pollutants out of stormwater, holding the water for filtration, or encouraging the water to infiltrate into the ground. It is very important to maintain these controls and minimize erosion during and after construction. More than one dump truck load of soil can wash away from a one acre construction site unless erosion controls are in place and maintained. It is also important to plan how to handle stormwater after construction is completed, to keep stormwater clean. In some jurisdictions, permits are required.

What Can You Do?

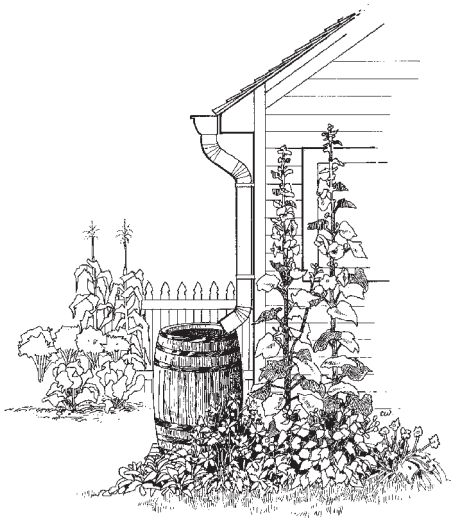
If Your Home is in town or in the country:

- Keep streets, gutters, and storm drains clean - never use them for dumping.
- Compost yard waste.
- Wash vehicles at the car wash or on your lawn.
- Clean up after pets.
- Keep your car in good condition - fix leaks.
- Garden for water quality: use rain barrels, plant rain gardens, minimize fertilizers and pesticides.
- Direct downspouts away from paved areas.
- If you live on the shoreline, plant a buffer of native vegetation.
- Consider keeping as much natural vegetation as possible on your property.

New construction:

- Contact appropriate authorities to determine if permits or approvals are needed.
- Develop a plan to control erosion during construction and make sure the practices work. For example, install silt fence properly. Consider staging work to minimize the amount of exposed bare soil.
- Be sure that the erosion control measures are inspected and repaired frequently during the construction period.
- Develop a plan to manage stormwater on your site when construction is finished. Stormwater best management practices may include rain gardens and other infiltration systems, detention ponds, grass swales, constructed wetlands, and other methods that protect surface and ground water. Choose approaches appropriate to your site, whether it is a single home or a larger development.
- Minimize soil compaction by limiting where trucks and other heavy equipment will be driven on your property.
- Consider conservation development designs to maintain green space.
- Do not fill wetlands. Protect existing wetlands by maintaining a buffer area of native vegetation around them. Wetlands store water on the land and provide important habitat to many plants and animals.

Note: the above text was prepared by the University of Wisconsin Extension Service.



Stormwater Resources

"Building Superior Coastal Communities" 2006. J. Schomerg, C. Hagley, D. Desotelle - University of Minnesota Sea Grant and S. O'Halloran - University of Wisconsin Extension. University of Minnesota Sea Grant Product Number: WQ 4 2006. 27 pgs.

"Stormwater is not just rain! Easy ways you can prevent water pollution." Brochure by Regional Stormwater Protection Team (Minnesota and Wisconsin). No date.

"Construction Site Erosion Control. Things you should know if you are planning a construction site." Brochure by Wisconsin Department of Natural Resources, Northern Region. No date.

"Stormwater Management on Lake Superior Clays. A Best Management Practice Guidance and Information Source." August 2006. 11 pgs. Prepared by Sandra Schultz-Naas for Ashland Bayfield Douglas Iron County Land Conservation Departments (Wisconsin). Available at http://basineducation.uwex.edu/lakesuperior/stormwater.htm

"A Guide to Understanding the Hydrologic Condition of Wisconsin's Lake Superior Watersheds." November 2007. Prepared by Sandra Schultz-Naas for Wisconsin Lake Superior Basin Partner Team. 35 pgs. Available at http://basineducation.uwex.edu/lakesuperior/watershedmgmt.htm

http://runoffinfo.uwex.edu/

http://www.lakesuperiorstreams.org/

Landscaping for Wildlife

Cross References

- Landscaping has the potential to improve or harm wetlands, shorelines and habitat - see **Wetlands, Shorelines** and **Habitat**

Do you enjoy watching wildlife? If so, you are not alone, and may wish to increase your opportunities to attract and observe wildlife on your property.

What would you like to attract to your property?

Are you interested in butterflies, hummingbirds, songbirds, bats, frogs ....all of the above or something different? One of the joys of landscaping for wildlife is that you can plan your yard to attract what you want and learn about the ecology of those species at the same time.

What does wildlife need?

There are four essential survival needs for wildlife that you need to keep in mind while creating your landscape plan. These are critical to all life stages of an animal and it is important to meet all of these needs as some species use different habitat types for their different life stages. For example, frogs lay eggs in the water, which hatch into tadpoles and develop into adult stages which are semi-terrestrial, and turtles which are primarily aquatic lay their eggs in the ground away from the water.

Food - needs vary by species, and change from season to season. Using native species of food plants is most beneficial as the species in your area have adapted to them.

Water - as important as food & critical for survival, a bird bath or pond is a good start.

Cover - for example shrubs and trees provide protection from weather and predators, as well as provide nesting and resting areas. Bird and bat houses are also a nice addition. Using native species of cover vegetation is the best as this is what the wildlife species have adapted to.

Space - the area required for a species to meet their needs for food, water & cover and raise their young. Many species establish and defend territories (e.g. bluebirds) while others do not (e.g. purple martin).

Some tips for success

Limit the amount of lawn
Increase vertical layering of plants, shrubs, trees
Provide water
Plant native vegetation
Remove invasive exotic plants
Provide bird/bat houses and bird feeders
Manage your pets
Reduce or eliminate use of pesticides

How do I get started?

There are many resources available in print and on-line to help you in your landscaping efforts. A selection is listed in the Resources section of this note.

To begin you should ask yourself a few questions:

What do I want to attract to my yard?

How big is my yard?

What elements of habitat do I already have in my yard?

These questions will help you begin the development of your landscape plan and the design and placement of new plants, water features and feeders/shelters on your property.

With a little research and planning you can be well on your way to creating a healthy wildlife landscape on your property.

Note: the above text was prepared by the Ontario Ministry of Natural Resources.

Landscaping for Wildlife Resources

National Wildlife Federation Backyard Wildlife Habitat This site goes through the four basic elements wildlife needs to survive in your own backyard. These are food, water, cover for places to raise young, and sustainable gardening. It mentions the benefits of having a wildlife habitat. It explains the types of trees that are natural to each state that supply food to the wildlife, as well as how to create a pond. http://www.nwf.org/gardenforwildlife/

[Minnesota]

Landscaping for Wildlife and Water Quality by Minnesota Department of Natural Resources

Woodworking for Wildlife by Minnesota Department of Natural Resources

Keeping your family safe from mercury

Mercury is dangerous because it's a neurotoxin, a poisonous substance that at high enough concentrations damages or destroys nerve tissue. Young children, developing fetuses and breast-fed babies are at most risk, because small amounts of mercury can damage a brain that is just starting to form or grow. Too much mercury may affect a child's behavior and lead to learning problems later in life. The first symptoms of adult mercury poisoning include incoordination and burning or tingling sensation in the fingers and toes. As mercury levels increase, your ability to walk, talk, see, and hear may all be affected in subtle ways.

Although all forms of mercury are toxic when taken into the body, they are not equally likely to be absorbed. For example, while liquid metallic mercury does not penetrate the skin rapidly, the lungs readily absorb mercury vapor. If, on the other hand, metallic mercury is swallowed, the digestive system rejects it.

Once in a lake, mercury is converted to methylmercury by bacteria. Fish absorb methylmercury from their food. Mercury is tightly bound to proteins in all fish tissue, including muscle. There is no method of cooking or cleaning fish that will reduce the amount of mercury in a meal. If you follow the fish consumption advisories, the amount of methylmercury you take into your body is safely eliminated between meals.

What You Can Do

Properly dispose of mercury containing products. Take mercury-containing products and devices that you find in your home to a household hazardous waste collection site so the mercury can be recycled.

Buy mercury free. Here are some alternatives to common mercury containing products:

- alcohol (red bulb) and digital thermometers;
- electronic thermostats;
- digital barometers, blood pressure cuffs, or other gauges; and
- mercury-free fishing gear (such as tip-ups).

Conserve energy. Using less energy at home will not only save you money, it will also help reduce mercury pollution. That is because coal contains trace amounts of mercury and when electrical power plants burn coal, mercury is released to the atmosphere.

Keeping Your Family Safe From Mercury Resources

Other

Other Resources

[Minnesota]

Firewise This site addresses the risk of homes to wildfire, both in urban and rural areas. It explains which homes are at higher risk and how to measure the fire hazard. Tips to protect a home are given, as well as tips for landscapers to reduce the risk of wildfires. http://www.dnr.state.mn.us/firewise/index.html

Indoor Air Quality AirSmart offers an interactive computer program the focuses on residential indoor air quality. It identifies major indoor air pollutants and the health effects of each one, and what actions can be done to protect against them. http://www.extension.umn.edu/distribution/housingandclothing/DK6695.html

4-H Info and Newsletters This site has all past publications released by 4-H available, along with a listing of events. They also have workshops that are educational about natural resources and other environmental issues. http://www.extension.umn.edu/county/template/index.aspx?pID=1&countyID=16

[Cook County]

Cook County Maps This site has detailed maps of roads, rivers and lakes. Other features of this site include contact information of getting a hold of Cook County officials. http://www.co.cook.mn.us/maps/maps.html

The Cook County Property Owners Resource guide covers zoning districts on page 4; purchasing property on page 6; fire safety on page 17; and emergency vehicle access on page 17. See Appendix B of this binder or http://www.co.cook.mn.us/sw/cook_pog.pdf

[Lake County]

The Lake County Property Owners Resource guide covers zoning districts and permits on page 4; purchasing property on page 5; fire safety on page 13; and emergency vehicle access on page 13. See Appendix B of this binder or http://www.co.cook.mn.us/sw/cook_pog.pdf

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Appendix A

Example: Cook County Property Owners Guide

[Appendix A will differ depending on which jurisdiction the binder is printed for]