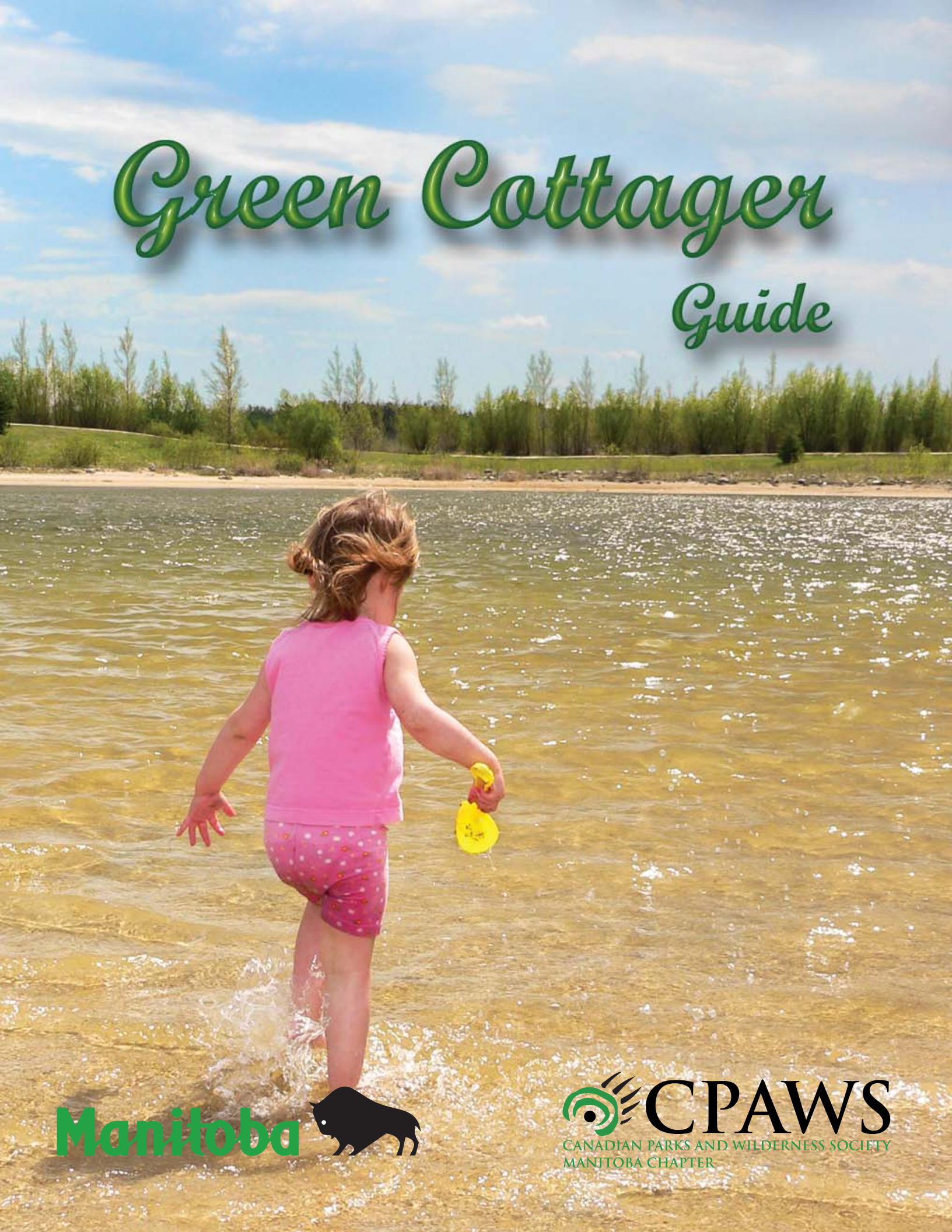
Green Cottager Guide



Manitoba

CPAWS
CANADIAN PARKS AND WILDERNESS SOCIETY
MANITOBA CHAPTER

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Canadian Parks and Wilderness Society

CPAWS is Canada's pre-eminent, non-profit wilderness protection organization.

With a network of 13 chapters, 20,000 members, over 50 staff and hundreds of committed volunteers, since 1963 CPAWS has helped to conserve over 400,000 square kilometres of Canada's most treasured wild places in parks and other protected areas- an area nearly seven times the size of Nova Scotia!

Our mission

CPAWS envisages a healthy ecosphere where people experience and respect natural ecosystems. We will achieve this by:

- protecting Canada's wild ecosystems in parks, wilderness, and similar natural areas, preserving the full diversity of habitats and their species;
- promoting awareness and understanding of ecological principles and the inherent values of wilderness through education, appreciation and experience;
- encouraging individual action to accomplish these goals;
- working co-operatively with government, First Nations, business, other organizations and individuals in a consensus-seeking manner, wherever possible.

CPAWS believes that by ensuring the health of the parts, we ensure the health of the whole, which is our health too.

Our 10-year vision

Canada, home to one-quarter of the world's remaining wilderness forests, stands out as a beacon of hope for conservation in a time of enormous change. The next 10 years are a critical time for us to act, before industrial development forecloses the chance to protect some of the last great forests and fresh water and marine ecosystems on earth. We have the amazing opportunity to protect at least 50% or more of our remaining wilderness, including our Boreal Forest region.

CPAWS' vision is that Canada will lead by example through conserving large landscapes and waterscapes within our own borders and oceans. Our vision is that Canada will maintain pristine lakes, vast caribou herds and abundant wild salmon; that we will share the land with magnificent predators like grizzly bears and wolves; that we will nourish the land ethic of Canadian cultures; and that we will continue to enjoy the beauty of nearby natural landscapes in our daily lives.

mission

Forward

Manitoba's spectacular wild places offer abundant opportunities for relaxing, recreating, and connecting with nature. Natural lands and waters provide inspiration to the many people who have chosen to purchase or build a cottage in wilderness country.

Few people have a better opportunity to observe the effects of human activities and pollution on the wilderness than cottagers, many of whom return each year to the same location and whose knowledge of the local area may have been passed down by previous generations. With over half a million cottages across Canada, cottagers, as a group, can have quite a positive or negative impact on the environment.

For cottagers to continue fully enjoying their homes away from home, it's essential they take measures to ensure their environmental footprint is as small as possible. Collectively, taking positive steps based on informed choices will help keep our treasured sanctuaries clean and healthy for future generations of wildlife and people.

The Green Cottager Guide is intended for use by individual cottagers, cottage associations, non-governmental environmental organizations, and all other citizens with an interest in preserving the natural beauty and functions of the ecosystems where they live, work and enjoy outdoor activities.

The guide is a comprehensive compilation that includes valuable information as well as useful tips on how you can become a green cottager. Download this handbook for reference, or print it to keep at the cottage, and share it with friends and neighbours. Consider printing the "Quick Tips Reference Guide," a condensed version of the handbook, to post on your cottage fridge.

We hope the Green Cottager Guide finds a useful place in your cottage and helps you do your part in keeping Manitoba's wilderness beautiful and well for all.

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Dear Friends,

On behalf of CPAWS Manitoba, I would like to share our pleasure in presenting you the Green Cottager Guide. This project is part of fulfilling our mission to inspire responsible stewardship of our wilderness and natural areas.

CPAWS Manitoba's primary role is working to establish large protected areas in Manitoba's boreal forest. We focus exclusively on boreal forest conservation as it is our province's greatest opportunity for large-scale ecosystem protection.

Draping across the northern shoulders of the globe, the boreal is the world's largest source of fresh water, the northern lungs of the planet, and as Earth's largest terrestrial storehouse of carbon, it helps slow the accelerator pedal on climate change. Every Canadian relies on the boreal for either food, a job, supplies, medicines, or recreation. Canada's boreal also provides a home to a vast array of wildlife as well as over 600 First Nation communities who rely on it for traditional activities and sustainable economic opportunities such as eco/cultural tourism.

Unlike many places in the world, Manitoba is still rich with an abundance of intact ecosystems and healthy wildlife populations. While we can take great pride in our robust natural treasures, it's important to note that our remaining boreal lands and waters are threatened by the northward push of industry and associated road networks. Large-scale developments, such as logging, mining, and hydro, that fail to sufficiently consider long-term environmental and cultural impacts continue to be the status quo.

In the next decade, many land-use decisions will be made in Manitoba that will map out the future of much of Manitoba's wilderness. This is a critical time in our province's history, a time when we must ensure that we plan for conservation and communities before allowing expansion of landscape-altering mega-projects. That is why CPAWS has a bold vision to work with all involved to permanently protect at least 50% of Canada's remaining wild lands and waters.

Everyone can contribute to keeping our natural regions wild. We encourage you to get active with CPAWS' conservation efforts by volunteering, voicing your views about wilderness protection to political leaders, or donating to one of our campaigns. Your investment will help build a Manitoba where future generations will enjoy the call of the loon, the eerie howls of wolves, and the sound of trembling aspens in the wind. Please visit ***www.cpawsmb.org*** *to learn more our conservation initiatives and how you can get involved.*

All the best,

Ron Thiessen
Executive Director
CPAWS Manitoba

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Did you know?

- Manitoba has 900 trillion litres of surface water which covers approximately 16 per cent of the province.
- Three of Canada's 15 largest lakes are found in Manitoba - Lake Winnipeg, Lake Manitoba and Lake Winnipegosis.
- At 115 metres, West Hawk Lake is the deepest lake in Manitoba.
- About 12,000 years ago, glacial Lake Agassiz covered five-sixths of Manitoba. It drained 7,500 years ago.
- Manitoba is the only province in Canada where all water in the rivers eventually flow north.
- More than 70 per cent of the flow in our streams originates outside of Manitoba.
- Lake Winnipeg - the largest lake in Manitoba and the tenth largest in the world - covers 24,389 square kilometres.
- The Nelson, Churchill, Seal and Hayes rivers carry more than 99 per cent of the water flowing from Manitoba into Hudson Bay. The Nelson River alone carries over 60 per cent of this flow.
- Global warming is expected to influence Manitoba's water resources. For example, warmer air temperatures are likely to increase water temperatures and reduce the length of time of ice-covered conditions.

Water

Our vast, virtually untouched reaches of water - an intrinsic part of our daily lives – are admired by people all over the world. A lakeside cottage epitomizes the dream vacation or ideal retirement home for many of us. However, it is essential that we preserve pristine aquatic areas in the province for their ecological and intrinsic value. Surface water quality varies in the province. It is generally poorest in the more densely populated south and improves to pristine conditions in the less populated north.

Manitoba: Land of 100,000 Lakes

Lakes, Bogs and Streams

Surface water is present in a variety of forms - lakes, ponds, bogs, sloughs, marshes, streams and rivers. Flow is the primary feature that distinguishes still waters such as lakes, ponds and sloughs, from flowing waters such as rivers, creeks and streams.

Large permanent bodies of still water are called lakes; smaller bodies that dry up occasionally are called ponds or sloughs. Marshes and bogs are semi-permanent and shallow but quite extensive in surface area. They have deep layers of partially decomposed vegetation that act like a sponge - soaking up water in times of abundance and slowly releasing it during drier conditions.

Still waters act as sinks, allowing pollutants to settle to the bottom. They also act as production factories where algae and other organisms convert nutrients and raw substances to biological material.

Rivers as Report Cards

Flowing waters transport water and nutrients across the landscape. Rivers are distinguished from creeks by their flow volume and channel width. Rivers have been called the "report cards of communities" because the quality of water in our rivers reflects our land management practices.

Water Use

Manitoba has an abundance of water and it plays an important role in our daily lives. Water uses include drinking water, recreation, irrigation, industrial operations and aquatic life and wildlife habitat.

Household Water Use

Water conservation should be practiced at home and at the cottage. Every day, the average Manitoban uses about 227 litres of water in their home. A recent study from the Rural Municipality of St.Andrews suggests that in households, 33 per cent of the water is used to flush toilets, 16 per cent for baths and showers, 23 percent for laundry and 28 per cent for drinking, cooking, dishes, water softener regeneration and lawn and garden watering.

Did you know?

- Like most of the rivers in southern Manitoba, the Red River carries three quarters of its annual runoff between April and June.
- As of 2006, Manitoba had four of Canada's 40 designated or nominated heritage rivers under the Canadian Heritage River System – the Seal River, the Bloodvein River, the Hayes River and the Red River (nominated).

Using Water Wisely

Water is wasted in many ways and can be used more wisely by reducing, repairing and retrofitting. You can reduce your water use by making a conscious effort to use less whenever possible. Repairing leaks in taps, toilet tanks and pipes can save water and money. Replacing older and inefficient toilets with efficient six litre per flush or dual flush toilets could reduce the water you use indoors by up to 25 per cent. If you are replacing your appliances, consider purchasing water and energy efficient washing machines and dishwashers.

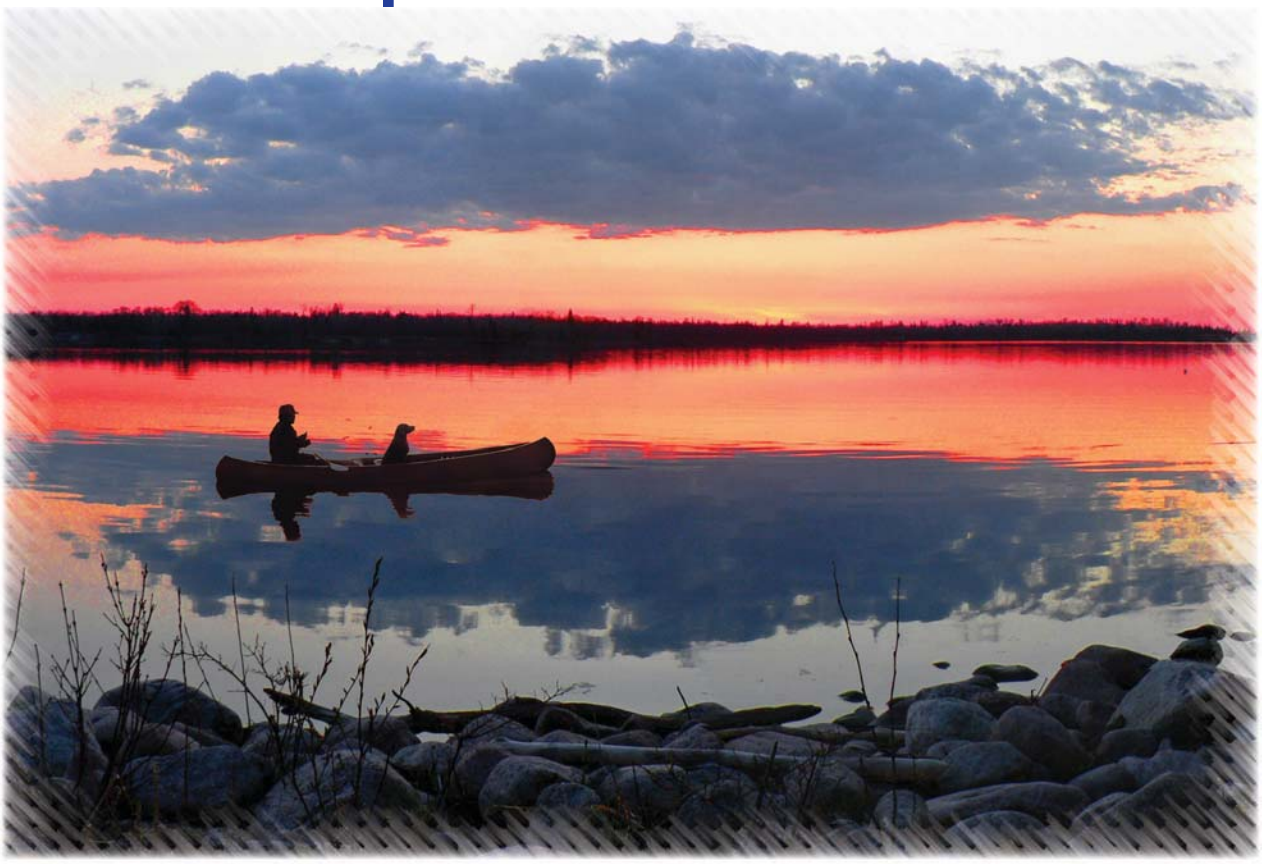

Photo by Ron Thiessen

Did you know?

- When sewage systems become overloaded with excess water, poorly treated or untreated water enters and contaminates Manitoba's lakes, rivers, streams and aquifers.
- One drip per second wastes 10,000 litres of water per year – enough to fill 200 bathtubs per year.
- A leaking toilet can waste up to 200,000 litres of water per year - enough to fill 4,000 bathtubs per year.

What You Can Do

In General

- Turn taps off tightly so they do not drip.
- Repair tap, faucet, pipe and hose leaks promptly.
- Plant native drought-tolerant plants in areas you normally water around your house and cottage to reduce outdoor water use and provide habitat for birds and butterflies.

In the Kitchen

- Only use a dishwasher when full; use the cycle that requires the least water.
- Hand-wash dishes in a partly filled sink. Instead of using running water to rinse dishes, fill a separate sink or use the faucet spray attachment.
- When rinsing fruits and veggies, put a basin below the faucet and recycle the captured water for thirsty plants or sluicing off the deck chairs.
- Keep a container of drinking water in the refrigerator instead of running tap water until it is cold.

In the Bathroom

- Check for toilet tank leaks and repair promptly. Toilets use the largest proportion of household water. To test for leaks put a few drops of food colouring into the tank. If the colouring appears in the bowl without being flushed, you have a leak.
- Use toilets only for their intended purpose. Do not flush paper towels, cotton swabs or cigarette butts. Never flush paints, solvents, pesticides, or other chemicals since these are hazardous to the aquatic environment - the eventual recipient of all those toilet flushes.
- Flush less. A toilet dam or displacement device in the tank reduces the amount of water being flushed. The toilet dam is a simple tool that holds back water from the flapper valve. Displacement devices can be DIY – set a full plastic water bottle in the tank (don't use a brick; it can disintegrate, ruining the valves).
- Water efficient six litre or dual flush toilets are available and are practical for home and cottage use. Check the **Canadian Water and Wastewater Association** website at **www.cwwa.ca** for the latest list of water efficient toilets that work well.
- Composting toilets that meet N**ational Sanitation Foundation** (NSF) international standards are another option.
- Use a partially filled sink rather than running water continuously while washing your hands. Brushing your teeth for two minutes with the tap running loses about 11 litres of water down the drain; a mug of water for brushing and rinsing does the job with much less waste.
- Short showers use less water than full baths. For bathing, fill only half the tub with water.
- Install a low-flow showerhead, especially if long-showering teenagers hang out at your cottage. A low-flow aerator can cut the water flow by 50 per cent without lessening the spray.

Laundry

- Front loading washing machines tend to be more water and energy efficient.
- Only use the washing machine when full; use the cycle that requires the least water.
- Adjust the water level if smaller washes are necessary. If you have a septic system, limit the number of loads per day to avoid overloading it.

Pollution and Nutrients in Water

Pollution Source

A combination of natural factors and human activities contribute to the varying quality of surface water and groundwater in the province. Salts, arsenic, uranium and wildlife waste are some of the natural substances that can pollute water. Human contributions include contamination from leaking septic fields, municipal wastewater facilities, petroleum storage tanks, fertilizers, pesticides, pharmaceuticals and livestock waste.

Sources of Nitrogen and Phosphorus

Nutrients are commonly found in:

- human sewage
- drainage from bog areas
- greywater
- pet and livestock feces
- lawn and garden fertilizers
- cleaning products
- agricultural fertilizers
- leaching or weathering of rock
- industrial effluent
- soil erosion

How Nutrients Affect the Aquatic Ecosystem

Water temperature, clarity, depth, the amount of dissolved oxygen, available nutrients and plant growth are all interrelated. The growth of aquatic plants and algae requires the penetration of sunlight through the water in combination with sufficient nutrients. In turn, the dissolved oxygen produced by these plants is essential for fish and aquatic insects. A progressive increase in nutrients causing excessive plant and algal growth can eventually have a profound effect on the physical, chemical and biological characteristics of the lake or river. Often, different plant and fish species begin to appear while those less tolerant to changing conditions begin to disappear.

Lakes are categorized as either oligotrophic, mesotrophic, or eutrophic, depending on the concentration of nutrients. Clearwater Lake and West Hawk Lake are oligotrophic - they are deep and cold, and have low concentrations of nutrients. Mesotrophic lakes, like Barren and Brereton lakes, are warmer with enough nutrients to support weeds and occasional algal blooms. Eutrophic lakes are usually shallow and enriched with an overabundance of nutrients. The south basin of Lake Winnipeg is eutrophic and may have dense algal blooms because of excess nutrients.

Eutrophication - A Natural Process

Eutrophication is the natural aging process for all lakes. Under normal conditions, this process takes thousands of years. Enriching our lakes with nutrients from municipal wastes, industrial wastes, poor land-use and fertilizer practices and faulty septic systems can artificially accelerate the process of eutrophication to a few short years. A nutrient-enriched or eutrophic lake will have frequent algal blooms and excessive weed beds along the shoreline. Fish kills are more frequent in these lakes because the low oxygen content is further depleted as excess plant material is decomposed, especially during winter.

On Manitoba's prairies, many lakes are eutrophic because of the rich soils in the drainage basin. In northern and eastern Manitoba, most lakes are mesotrophic or oligotrophic because they are situated on bedrock with little soil cover to naturally increase nutrient levels. Although Manitoba's lakes are influenced by naturally occurring processes, we can help protect and enhance water quality by ensuring our sewage and greywater

does not reach surface waters, by matching nutrient applications with nutrient residuals in soil and crop uptake needs, by limiting the use of fertilizers on land adjacent to waterbodies, by improving land-use practices and by using phosphate free cleaning products.

Nutrients in Lake Winnipeg

Excessive concentrations of nitrogen and phosphorus in Lake Winnipeg are causing gradual changes to occur in the lake's water quality and biological communities. Nutrients are directly associated with the production of nuisance growths of algae - affecting fish habitat, recreation, drinking water quality and clogging fishing nets. Some nuisance growths of algae can also produce toxins. Nutrients are contributed from virtually all of our activities across the watershed – human and animal sewage, agricultural and industrial activities, cleaning products, lawn and garden fertilizers and erosion. The Lake Winnipeg watershed covers an area of almost one million square kilometres and stretches from the Rockies in Alberta to northwestern Ontario and south into four American states. The watershed is home to eight million people and 20 million livestock. Many of the nutrients generated within this large watershed eventually end up in Lake Winnipeg.

Some Nutrients are Toxic

Ammonia, in its un-ionized form, is toxic to fish and other aquatic organisms, depending upon ambient temperature and pH. Groundwater quality is affected by the concentration of available nitrates. High concentrations of nitrate in drinking water can result in nitrate poisoning, a condition known as blue baby syndrome in infants. Nitrate is very soluble in water and can move readily through the soil to the groundwater. Potential sources of nitrate in groundwater include leaky septic systems, animal wastes, industrial wastes and fertilizers applied to home, cottage and agricultural crop land.

Sewage Disposal

Holding Tanks Best for the Environment

Proper treatment and disposal of sewage is essential for the protection of water quality. Most urban Manitobans are serviced by municipal wastewater treatment plants. Rural residents use septic fields, holding tanks or ejectors for sewage disposal. Outhouses may be found on cottage properties. Pump-out systems - like holding tanks - generally provide the highest level of protection to surface water and groundwater. The sewage is hauled to a wastewater treatment plant or sewage lagoon and treated before being discharged to the environment. Holding tanks must be checked regularly for leaks.

Septic Systems Safe if Used Properly

A septic tank and leaching field is a subsurface system. Household sewage and greywater flow by gravity or are pumped into the septic tank. In the tank, heavier particles settle to the bottom, while grease and oil rise to the top. Solids, oil and grease remain in the tank while the liquid effluent flows out into the leaching field. Microscopic organisms begin to break down the waste before it leaves the septic system. Once it filters into the ground, the sewage effluent is further broken down by bacteria and organisms in the soil.

Septic systems are effective when they are located in the proper soil type – one that allows the effluent enough time for treatment before it reaches groundwater or surface water. When the system is improperly installed or used, it can become a public health and environmental hazard.

Outhouses should be used only for sewage disposal and should be located at least 30 metres from the shoreline. Greywater should be disposed of in a septic field or holding tank. Composting toilets that meet National Sanitation Foundation (NSF) international standards are another safe alternative.

Septic System Problems

Failure to pump out the tank - if your septic tank is not pumped out regularly, the solids may flow into the leaching field, clogging the bed or backing up into your house.

Overloaded systems - septic fields are often too small for the volume of waste generated, having been designed before the addition of dishwashers, extra washrooms, or other high water-use appliances. Sewage may pool above the leaching bed of an overloaded system because the soil is saturated.

Improper installation - when the water table is high or when a field is built with improper fill, the saturated soil conditions can cause pipes to break or to become blocked.

Treatment failure - septic fields built in coarse, sandy soils may appear to be functioning properly but the effluent may be passing through the soil too quickly for treatment. Contaminants like phosphorus and nitrates will then enter the groundwater or nearby lakes or rivers, leading to contamination of domestic groundwater supplies or proliferation of algae and other aquatic plants in nearby surface waters.

Signs of Failing Systems

Common symptoms of failing septic systems include:

- unusually green or spongy grass above the leaching field
- offensive odours, particularly after a rain
- slow-draining sinks and toilets, sludge backup into the house
- sewage pooling above the field

What You Can Do

The life expectancy of a septic system under optimum conditions is about 15 to 25 years. Regular maintenance will keep your system operating properly.

Follow these steps:

- Have your septic tank pumped out regularly by a qualified hauler. Keep a sketch of the location of your septic system handy for service and repairs.
- Do not drive or park vehicles or erect buildings or decks over the system.
- Plant grass, trees and shrubs downhill from your system - these plants will absorb nutrients,preventing them from reaching surface waters.
- Practice water conservation to keep from overloading your system. Install water-saving devices, such as low-flush toilets and low-flow faucet aerators.
- If you're having a huge crowd to the cottage, say for a wedding, rent a porta-potty instead of stressing the septic system.
- Dispose of oil, grease and cigarette butts in the garbage and place vegetable scraps and coffee grinds in your compost. Solid material will clog the field, resulting in costly repairs.
- Keep paint, paint thinners, drain cleaners, pesticides and other chemicals out of your septic system to protect beneficial microorganisms that break down wastes.
- Use only environmentally sensitive products in your home (see Environmentally Sensitive Choices). Locate your septic field at least 15 metres from a well and 30 metres from an uncased well.
- Harmful bacteria, viruses, and nitrates from your field could render your drinking water unfit for consumption. Have your drinking water tested if in doubt.
- If your system shows symptoms of failure call a qualified service contractor immediately. This will save you money in the long run and protect the environment.

Did you know?

- A Gull Lake water quality study found that septic fields were a significant source of nutrients, causing severe algal blooms, extensive aquatic weed growth and fish kills. The Gull Lake Basin Management Board worked co-operatively with the local municipal government to pass a by-law requiring cottages to convert from septic fields to holding tanks. The cost of a pumpout is less than a hundredth of the cost of a septic system replacement.
- Manitoba Conservation has regulations in place controlling the location, installation and operation of septic systems, holding tanks and outhouses. Call the nearest Manitoba Conservation office for more information or a copy of the regulations.

Photo by Ron Thiessen

Algae

Algae range extensively in size and shape, from microscopic single cell organisms to giant seaweed several metres long. They are an important part of the aquatic ecosystem, providing food and oxygen to many aquatic organisms. Sometimes algae make drinking and recreational water supplies unusable when they reach nuisance proportions.

What are Algal Blooms?

When algae become very abundant and form floating clumps or scums along shorelines, they are called algal blooms. The water looks like thick pea soup and may emit a strong odour. Aphanizomenon, Microcystis and Anabaena are common types of nuisance blue-green algae found in Manitoba surface waters.

Causes of Algal Blooms

Algae occur naturally in all surface waters. Algal blooms are common in many of Manitoba's lakes, rivers and streams. Nitrogen and phosphorus - found in sewage, greywater, animal feces, fertilizers, or silt from land erosion - can lead to excessive algal growth. Heat, a lack of wind and plenty of sun create optimum conditions for algal growth. Clear water transmits more light and can support more algae when available nutrients are present.

Potential Problems

Extensive algal blooms can cause a number of problems:

- Reduced recreational appeal - water with a large algal bloom looks murky and smells foul, making it undesirable for swimming, wading and waterskiing.
- Degraded aquatic habitat - too much algae can result in low oxygen levels in the water when the algae decays, leading to winter and summer fish kills.
- Toxic algae - some species of blue-green algae produce liver and nerve toxins that can cause illness or death in livestock or pets drinking the water. People have reported incidents of skin irritation from swimming in waters with toxic algae. In addition, drinking water containing toxic algae can cause gastroenteritis, or stomach upset and diarrhea. More serious long-term health effects may result from long-term exposure through drinking water. Because they are likely to swallow water while swimming, it is best to keep small children out of the water where algal blooms are present.
- Drinking water problems - excessive algae in municipal drinking water supplies can affect the taste and odour. Algal blooms can also increase water treatment costs by clogging water filters.

Did you know?

- The frequency and intensity of algal blooms can be reduced by minimizing the concentrations of nitrogen and phosphorus in surface waters. When nitrogen and phosphorus are applied to land surfaces in higher amounts than can be used by growing plants in a season, they can runoff into surface water with heavy rainfall, floods and melting snow.
- If phosphorus levels exceed 0.025 milligrams per litre, a lake may experience periodic algae blooms. Typical concentrations of phosphorus can range from less than 0.001 milligrams per litre, as is generally found in West Hawk Lake, to more than 1.0 milligram per litre, found in some prairie lakes.
- Only laundry detergents must limit phosphate content to less than five per cent under federal legislation. Other household cleaning products often contain high amounts of phosphates.
- Manitoba Water Stewardship tested a number of surface waters in the province and found liver toxins produced by bluegreen algae in many lakes and farm dugouts. Levels in treated drinking water have, at times, exceeded guideline levels.
- Increased ultraviolet radiation resulting from the thinning of the ozone layer can significantly affect the growth of algae and may affect freshwater and marine food webs. The long-term ecological consequences of this are not well known.

What You Can Do

You can help reduce algal blooms by minimizing the amount of sewage, greywater, fertilizers and silt that reach surface waters.

- Dispose of domestic sewage and greywater properly. Build your outhouse or septic field at least 30 metres from surface waters - further if the soil is sandy or rocky. If you have waterfront property with water under pressure, consider installing a holding tank instead of a septic system. Always use low-nutrient cleaning products and keep greywater and sewage from entering lakes and rivers.
- Use fertilizers carefully. Do not use fertilizers on land adjacent to a lake or river. Heavy rains or lawn watering can wash fertilizers off the land into the water where algae will use them to grow.
- Protect and enhance your shoreline vegetation. Shorelines with little vegetation are easily eroded and allow nutrient-rich runoff water to reach surface waters.

Photo by Chanda Hunnie

Shorelines

Shorelines are one of the most attractive features of Manitoba's lakes and rivers. In addition to the view, shorelines offer people a place to swim, tie a boat or build a dock. Shorelines also provide essential habitat for numerous plants, fish and animals.

Causes and Effects of Shoreline Erosion

Owners often remove rocks, trees, and other vegetation from the shoreline to build structures or pathways or provide access to water for livestock. This can result in shoreline erosion. Excessive wave action created by using power boats and personal watercraft too close to the shoreline also causes erosion.

Vegetative Buffer Reduces Erosion

A vegetative buffer of trees, shrubs and grasses extending 30 - 50 metres from the waterline provides water quality protection. It prevents erosion by holding soil, provides a wildlife corridor and habitat and shades and cools the water for aquatic life during the summer months. In addition to stabilizing the shoreline, a well-maintained vegetative zone will filter out sediments, nutrients, pesticides and heavy metals carried by rain and snow-melt runoff.

You can reduce erosion on your property by maintaining a vegetative zone through grading, planting a permanent vegetative cover and improving soil stability. Removing vegetation to improve access or the view, leads to erosion, gullies and bank slumping. The short-term gains from tilling to the water's edge are lost when more land disappears during a heavy rain or snow-melt, or from large waves during storms.

Water Wears Away Sediments

Moving water has considerable potential to cause erosion - the gradual wearing away of surfaces. Generally, the faster the water moves, the faster the rate of erosion. Erosion rates also depend upon the nature of the soil. Soils from sloping lawns and fields, stream banks and stream beds are all susceptible to erosion by flowing water.

The products of erosion include tiny particles of silt, clay and sand. The settling of these particles is known as sedimentation. It occurs in locations where slow-moving water loses its ability to transport heavier particles.

The natural rate of erosion can be accelerated by any human activity that increases the rate of water movement or decreases the physical stability of stream beds and shorelines. Obstructions placed in streams - boat docks, piers and dams - speed up water flowing around them and increases the energy that can erode the stream bed or bank. Removing trees, shrubs and rocks from stream banks and shorelines, and tilling fields or gardens close to the water's edge can also increase the risk of erosion.

Land drainage is often necessary but the design of the project must fully incorporate all hydrological considerations. Construction techniques to reduce erosion of the drain include the use of in-stream baffles or rapids made with rocks to reduce erosive energy that might develop, and grass-covered drains to remove sediments from runoff water.

Physical and Biological Impacts of Erosion

Eroded materials that are deposited in waterbodies range in size from very fine silts and clays to coarse sands and gravel. The results of these deposited materials include increased turbidity or murkiness, the formation of deltas, clogging of channels, impairment of flows with an increased risk of flooding and the premature infilling of lakes and ponds. These physical impacts can sometimes be remedied, but dredging and other forms of channel clearing are costly.

Erosion of waterfront properties can mean substantial losses for more than just the property owner. As erosion reduces the value and productivity of land, sediments reduce the value and change the biological productivity in water.

Did you know?

- Flood-reduction drainage projects can be a major source of sedimentation in lakes and other waterbodies.
- Erosion of the Edwards Creek drain near Dauphin, constructed more than 40 years ago, has deposited millions of tonnes of sediment into Dauphin Lake creating a new delta.
- Access points to stream crossings by cattle, all terrain vehicles and other large machinery exposes the stream to land runoff, carrying silt and pollutants, like herbicides, pesticides and fertilizers.
- Altering your shoreline will affect water quality for downstream users.

Photo by Ron Thiessen

Biological impacts on fish and other aquatic life are more subtle than physical ones. Less sunlight penetrates turbid waters, reducing the growth rate of aquatic plants and algae - the food source for all aquatic organisms including fish. Northern pike and trout - which rely on their vision to feed - are less able to find food in turbid waters. Erosion of stream beds and banks and adjacent yards and fields, directly and indirectly, affects the amount of food available to fish and other aquatic organisms.

Sedimentation Can Destroy Aquatic Habitats

Sedimentation, especially if erosion occurs on a large scale, or in a very short time period, can physically affect aquatic organisms. For example, benthic or bottomdwelling organisms, such as clams and caddisfly larvae, can be buried deeply by sediments. Deposited material may also be unsuitable for habitat. Gravel and pebble bottoms - habitat required by stoneflies and some species of mayflies - can also be buried by sediments, making them unsuitable for these organisms. Many fish species, such as walleye, trout, and bass, require coarse sands and gravel for spawning purposes; such spawning sites are destroyed by sedimentation.

Human uses of water can also be affected by erosion. Treatment costs for drinking water escalate when turbidity increases. Also, turbid waters with sediment build-up in beach areas are less attractive to people for swimming, water-skiing and boating.

What You Can Do

- Maintain or enhance the vegetative zone. Allow natural vegetation to grow or plant more trees and shrubs with deep root systems along your shoreline. This will slow down nutrient rich runoff and help prevent shoreline and bank erosion. View the **Living By Water Project** at **www.livingbywater.ca** or the book ***On the Living Edge*** for more information.
- Hook a rainbarrel up to your eavestroughs. By catching rainfall before it hits the ground, you can greatly reduce runoff. (For those who only associate runoff with summer rainfall, it also comes in winter and spring, in the form of snowmelt.) Even temporarily storing rain in a barrel until after a storm lets up helps reduce erosion. Newer rainbarrels are designed to keep out mosquitoes so the water won't become a breeding pool for them.
- Leave large boulders along your shoreline to stabilize it and provide habitat for terrestrial and aquatic organisms, like turtles, waterfowl and fish.
- Re-establish vegetation on steep slopes by holding groundcover seedlings in place with mulch and loose-weave mesh or burlap.
- Build steps or a ramp for access between the top and bottom of the bank.
- Driftwood and fallen trees at the shoreline provide hiding places, feeding grounds, and spawning areas for lots of aquatic creatures, such as fish, frogs, and salamanders. They can also act as a breakwater to prevent erosion.
- Don't strip the entire waterfront of its aquatic vegetation, which holds sediment in place and provides critical food and shelter for many water dwellers, from bass to water striders. Instead, designate a small activity area for swimming, preferably less than two metres wide, and contact your local government for a work permit before you remove any amount of aquatic vegetation. Easier still, put a ladder at the end of your dock and skip the shallows entirely.

Did you know?

- The Transport Canada Boating Restriction Regulations require a 30-metre band along shorelines where power boats are limited to a speed of 10 kilometres per hour. This protects both shorelines and swimmers.
- Boats may affect nesting waterfowl by driving adult birds from their nests, exposing eggs or young to predators.

The Effects of Boating and Docks on Shorelines

Increased wave action from motor boats and personal water craft, especially in areas where waves do not naturally occur, will erode shorelines. Eroded sediments may reduce depth, cloud water and introduce nutrients into the water. The nutrients will increase the growth of algae and aquatic weeds, reducing the recreational appeal of the lake.

Power boats, including personal water craft, can stir up bottom sediment in shallow water, causing murky waters and increasing the release of nutrients into the water. Fish often spawn in the shallow shoreline areas of lakes. Operating these craft too close to shorelines can destroy spawning areas and disturb waterfowl nests. Out of respect for your neighbours and wildlife, reduce your speed appropriately.

Building a Boathouse or Dock

Here are a few things to keep in mind when you are building a boathouse or dock at the water's edge:

What You Can Do

- Opt for a low-impact dock. If you're ready for a new dock, choose a floating, pipe, or a cantilever dock, which cause much less disturbance to lakebed habitat and life than the traditional crib dock. Ideally, choose a design that minimizes modifications to the shoreline.
- **Fisheries and Oceans Canada** has produced a cottagers guide containing helpful information on how to protect your shoreline and build a dock that meets your needs. Information is also provided on the approvals that might be required before you begin to build.
- Place only clean gravel - free from fine materials and organic matter – along the lakeshore or riverbank.
- When constructing docks, minimize interference with the natural movement of water and sediment by supporting the structure with piles or floats.
- Use rip-rap (large rocks) to protect banks from erosion.
- Leave as much natural vegetation as possible. When natural disturbances occur, immediately stabilize and re-vegetate shorelines. Contouring the shape of the shoreline or using untreated logs or timber with rocks will encourage plant life to become established.

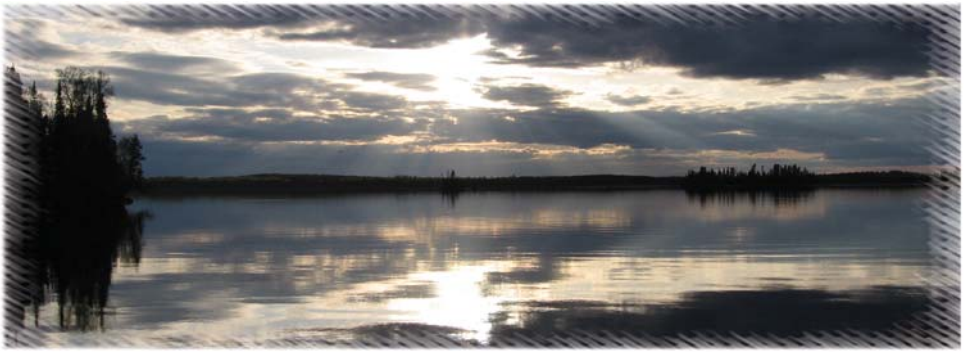

Photo by Chanda Hunnie

Wildlife

A "getaway" is, of course, what most people want, or profess to want, from a cottage. The idea of stripping oneself of urban clutter, getting closer to nature, remains central to the cottaging mystique. Yet it's a principle we seem to be rapidly abandoning – just when we need it most. As increasing numbers of us pursue the cottage dream, bringing extra pressures to bear on already taxed environments, the case grows stronger for leaving behind, or minimizing as much as possible, the urban habits that are changing the place we love. Some cottagers, recognizing that the privilege of owning a piece of waterfront property carries with it an obligation to act as stewards of that land, are taking small but significant steps to reduce their impact.

The Special Role of the Landowner

Whatever land holdings you possess, there is a great deal you can do to make your land a haven for wildlife.

What You Can Do

- On forest land, link forest patches with corridors of trees and shrubs to allow wildlife to move under cover. Remember to use native species. Our songbirds take more readily to a familiar thicket of native dogwood or willow than to introduced, exotic species such as weeping mulberry. Native species provide food as well as cover, and are not as likely to dominate other native plants as introduced species often do.
- When cleaning up your property, think about how wildlife might use it. Rabbits, rodents, and birds will use brush piles for cover. Manage your woodlot with wildlife in mind. For example, standing dead trees or "snags" play a wide variety of wildlife roles. Insects live in the wood; fungi break it down. Fungi and insects provide food for other creatures. Pileated Woodpeckers will visit the snag to feast on the insects or make nesting holes. These, in turn, eventually become homes for cavity-nesters like other woodpeckers, Wood Ducks, flying squirrels, and raccoons. Even after the tree falls, it has an important role to play for wildlife: salamanders, small rodents, and a variety of invertebrates and other organisms will live under it. Ants will live in it. If the tree falls over a stream, it will provide shade and cover for fish.
- Because old trees are still wrongly considered useless and inherently dangerous by many people, there can be a shortage of snags for wildlife in some areas. Nest boxes provide a short-term solution to this problem, replacing the nesting cavities that snags would provide. Eastern Bluebird and Wood Duck populations have come back in North America thanks to hundreds of landowners who provided nest boxes for them. You can also put out boxes for chickadees, wrens, and kestrels; roosting boxes for bats; and posts with platforms for raptors. The long-term solution is the preservation of a mixture of healthy, dying, and dead trees in managed forests and elsewhere, as long as the snags are not a hazard to people or property.
- If you provide bird feeders or nest boxes be sure to thoroughly clean them periodically. Hummingbird feeders should be checked and cleaned frequently as the sugary syrup may ferment into alcohol and cause liver cirrhosis. Feeding ducks breadcrumbs is a popular pastime, but remember that ducks eating bread will feel full and not seek more nutritious food. Ducks have died of malnutrition from eating bread instead of the aquatic plants and invertebrates that are their natural diet.
- Finally, there is a growing land trust movement in Canada, in which landowners agree not to develop their land, but to leave it in a natural state. If there is a land trust movement in your area, you could join it. If not, consider starting one. Since 1995, over 200 Canadians have donated lands and conservation easements valued at $25 million to conservation organizations under the **National Ecological Gifts Program** administered by **Environment Canada**.

People and Wildlife

Cottages are often built on lands that are home to wildlife so it is important to maintain the health of the environment to insure that wildlife do not become a problem. Keeping surrounding natural habitats intact minimizes the need for wildlife to seek shelter or food from the residences of their human neighbours. Responsible waste disposal and clean-up will also help to prevent property damage and eliminate potential dangerous encounters with wildlife.

Black Bears

Much of a bear's behaviour is governed by its search for food. To satisfy its insatiable appetite, it will cover different parts of its home range at different times of the year, depending on the availability of food. Most young black bears have no established home ranges and are often forced into less preferred habitat by older, more dominant bears. When natural foods are in short supply or when there is high recruitment, bears may be forced to venture beyond their home or maternal ranges. During their travels, they are more likely to come upon garbage and foods left at improperly maintained campsites, residences, garbage cages and landfills.

Non-natural foods, such as human garbage and birdfeed, become attractive to bears because they are high quality foods that require little effort to acquire. A bear that learns to associate human activity with something to eat becomes "food-conditioned," and may select for people's food or garbage because of its availability and predictability. A bear that is repeatedly exposed to humans at close range without experiencing negative consequences, learns to tolerate people at these distances and becomes "habituated." Bears that are both "habituated" and "food-conditioned" are the most likely to be a problem, and may, on occasion, become aggressive.

What You Can Do

- Learn about black bears, their ecology, behaviour, food habits and habitat use.
- Do not feed birdseed or liquid sugar to birds from late April through October.
- Never put meat, fish, bones or seafood shells in the compost. (Store them in the freezer until you are ready to dispose of them). Turn compost often to prevent odours.
- Although composting correctly will not attract bears or other wildlife, you may want to consider composting indoors. If you're at your cottage at least every other weekend, you can compost your food scraps indoors, using worms. They create beautiful compost in special "vermicomposting" containers that emit little or no smell, so they aren't a wildlife attractant. However, the hardworking worms need to be fed a minimum of once every two weeks. For more information on composting contact **Resource Conservation Manitoba** at **www.resourceconservation.mb.ca**.
- Keep barbeque grills clean and free of grease. Store it in a shed if possible.
- Make sure garbage containers have secure lids and are emptied frequently. This will keep other animals such as skunks and raccoons from becoming a problem.
- Do not leave food at the cottage that may spoil when you are not there. Inspect all windows and doors to make sure they are locked and secure.

Photo by Ron Thiessen

Did you know?

- Aquatic plants do not attract leeches or act as breeding grounds for mosquitoes. Leeches prefer soft sediments in shallow, calm water and will be in these areas whether or not plants are present. Mosquito larvae cannot survive the intense predation by fish and aquatic insects in aquatic plant stands.
- Utricularia or bladderworts, are common in Manitoba waters. These submerged carnivorous plants trap and consume small insects and aquatic animals that they trap in their tiny bladders.

Photo by Chanda Hunnie

Aquatic Plants

The Importance of Aquatic Plants

Aquatic plants are a natural and important part of the aquatic ecosystem. They provide excellent habitat for fish, aquatic insects and terrestrial wildlife. They are an important constituent in the diet of muskrats and moose and are a source of food and nesting material for waterfowl. Aquatic plants help prevent turbidity - cloudy, silty water – by stabilizing lake sediments. They also protect shorelines from excessive erosion by absorbing the force of wave action. These plants use up large amounts of nutrients, reducing the amount available for algal growth and they absorb potentially toxic substances – like mercury and lead - improving water quality.

Problems Caused by Too Many Aquatic Plants

Excessive growth of aquatic plants in recreational waterbodies and drinking water reservoirs can create a number of problems, including:

- **swimming nuisances** - excessive aquatic plant growth in shallow water discourages swimming and interferes with activities along shorelines and beaches.
- **boating difficulties** - plants clog motorboat propellers and interfere with sailboat centreboards.
- **less appealing drinking water** - aquatic plant decomposition can lead to foul odour, taste and discolouration of drinking water, making more advanced water treatment necessary.
- **less dissolved oxygen in the water for fish** - a result of the decomposition of excessive amounts of aquatic plants.
- **dense aquatic plant growth in small streams and drains** - can impede water flow and contribute to flooding.

High densities of aquatic plants may be an indicator of water quality problems. If your lake or river has too many plants, it may mean that there is too much nitrogen and phosphorus entering the water. Check to see which of the following nutrient sources you can control: fertilizers, sewage, greywater, pet feces, cleaning products or shoreline erosion.

What You Can Do

- Disrupt as few aquatic plants as possible - remember that they provide essential habitat for fish and waterfowl.
- Don't use herbicides in lakes and rivers - it is illegal.
- Consider the role that aquatic plants play as home to waterfowl, fish, amphibians and aquatic insects.
- Don't soap in the lake, ever. Even if a soap says it's phosphate-free and biodegradable, don't assume it's safe for the lake. The soap can be harmful to fish and other aquatic animals; all "biodegradable" means is that it's capable of breaking down (with the help of soil bacteria) into its constituent parts. However, do use this type of soap if bathing on land, and dump the washwater well back from the lake, so it doesn't filter down as runoff. For more information on "guilt-free soap" visit the **Cottage Life** website at **www.cottagelife.com**.

Did you know?

- In Manitoba, there are about 90 families (large groupings of organisms with similar characteristics) of insects with at least one aquatic or semi-aquatic species.
- The open seas and oceans are the only habitat where aquatic insects are virtually non-existent.
- There are over 300 species of midges in Manitoba, most of which have aquatic larvae. Midges sometimes resemble mosquitoes in size and body-form, but do not bite. On the other hand, there are only 45 species of mosquitoes in Manitoba, most of which will bite humans.
- Giant swarms of midges which look like grey smoke, can sometimes be seen along the shores of Lake Winnipeg and Lake Manitoba. These swarms provide food for local and migrating birds.
- Only female mosquitoes, blackflies, horse flies and deer flies take a blood meal. They require the protein from blood to produce eggs.
- Some biting flies (horseflies, deer flies and stable flies) have a more painful bite than others because of the structure of their mouth parts and how they obtain a blood meal.
- Dragonflies are predators as adults and nymphs. The adults hunt and capture their prey on the wing, scooping-up other insects with their front legs. The nymphs stalk their prey along the water bottom. When disturbed, the nymphs 'jet propel' themselves through the water by contracting large muscles forcing water out of their rectum.
- The larvae of hover flies (those flies that seem to suspend themselves in air and resemble a bee) can live in polluted water because they breathe surface air through a long retractable siphon. These larvae are commonly called rattailed maggots.
- There are at least 150 species of caddisflies in Manitoba. The larvae of some species construct cases around their bodies from materials like sand grains, sticks, leaves and stems, held together with silk. Caddisflies can frequently be seen walking on submerged plants or rocks, carrying their cases.
- Although they are not insects but crustaceans, water fleas act as 'water lawn mowers' often controlling the abundance of algae in surface waters.

Aquatic Insects

Most of us have come in contact with insects such as mayflies, mosquitoes, water boatmen and diving beetles, which spend some or most of their life cycle in the aquatic environment. They can be found in lakes, rivers, streams, dugouts, wetlands and even in the water-filled leaves of the carnivorous pitcher plant.

Aquatic insects occupy a variety of habitats. They live in bottom sediments, swim freely through the water column, attach themselves to submerged rocks and vegetation or walk on the water's surface. Although extremely well adapted to water, they depend directly on the terrestrial environment for at least part of their life cycle.

All aquatic insects require oxygen to survive. Those spending their immature stages as larvae or nymphs in the water must obtain oxygen through their skin or gills. Once these insects develop into adults, they breathe surface air through respiratory tubes at their posterior end or by capturing and swimming with an air bubble under their body, similar to scuba divers.

Some aquatic insects, like mayflies, midges, horseflies and caddisflies, emerge as adults in enormous abundance usually because of appropriate environmental conditions (such as temperature and light), foods that are seasonally available (such as plants or other insects), and/or to avoid adverse physical conditions (such as drought or low oxygen levels).

Aquatic insects are essential in the food chain, both in the water and on land. They are food sources for predatory insects, invertebrates, fish, bats and birds. They also help decompose vegetation.

Insects as Indicators of Aquatic Health

The abundance and diversity of aquatic insects are an important indicator of the health of the aquatic environment. Generally, the greater the number of insect and invertebrate species in a particular area of a lake or reach of a river, the healthier the environment. For example, if too much sediment enters the aquatic environment, invertebrate species unable to tolerate these conditions will disappear. This information has been used to develop indices that can reflect ecosystem health. These are being used by Manitoba Water Stewardship to evaluate site-specific conditions.

What You Can Do

Aquatic insects rely on relatively undisturbed aquatic habitat. You can provide a diverse habitat for the insects by maintaining a healthy population of aquatic vegetation, putting rocks in riffles and leaving some fallen tree stumps in the water.

Did you know?

- Manitoba surface waters support more than 90 species of fish.
- Lake sturgeon - Manitoba's largest fish - have been around for thousands of years. Female sturgeon reach sexual maturity after about 25 years and can live up to 150 years.
- If you wear wet wool gloves while handling fish, you can help reduce the damage to the fish's protective slime layer.
- The Red River supports a world class channel catfish fishery.
- Mercury is a naturally occurring element that is generally found in low concentrations in air, water and soil. Consequently, mercury residues are naturally present to some degree in plant, fish, animal and human tissues.
- The long-term flooding of land, due to natural circumstances or human developments like hydroelectric or flood-protection dams, often leads to elevated mercury levels in the water. Naturally occurring mercury released from soils and rocks is converted by microorganisms to a form more easily absorbed by fish and other aquatic life.
- Consumption guidelines have been developed for mercury in fish from some of the major southern and northern lakes and rivers. Southern waters include the Assiniboine, Little Saskatchewan, Pembina, Plum, Red, Souris and Winnipeg river systems. Northern waters include the Churchill, Nelson, Rat and Saskatchewan river systems. This information may be obtained from Manitoba Water Stewardship.
- Predatory fish, such as walleye and northern pike, will usually have higher mercury residues than bottom or insect feeding species, such as whitefish or goldeye. Lower mercury residues usually occur in the smaller and younger fish of a species.
- Other metal residues in fish - arsenic, chromium, cadmium, copper, lead, nickel, zinc and selenium - are found to be within normal ranges in Manitoba fish and do not pose a health risk to people.
- Contaminants, such as PCBs and residues from insecticides like DDT, have not exceeded existing guidelines for commercial sale of fish for human consumption in Canada. Since the banning of PCB production in North America in 1978, traces of PCB residues have declined.
- Children under 15 and women of child-bearing age should only eat fish with a mercury concentration of 0.5 micrograms or less per gram of fish flesh and follow advice from the consumption guidelines on acceptable. amounts.

Fishing

Many Manitobans enjoy fishing for both food and recreation. Whether angling from shore or boat, anglers can do their part to ensure a healthy water environment and the health of the species.

What You Can Do

- Use only live bait that has been obtained from a licensed Manitoba bait dealer or catch your own in designated areas.
- Clean fish in a designated area and discard fish remains in the trash.
- Always discard fishing line in the trash. Most lines do not decay and can injure fish, birds and other wildlife that get tangled in the line.
- Ensure that six-pack plastic rings and metal drink can tabs are placed in the trash-these can also injure fish and other wildlife.
- Practice selective harvest and catch-and-release fishing.
- When fishing in Manitoba, refer to the consumption guide for recreationally angled fish to determine allowable limits for eating due to mercury. Those fish not recommended for consumption should be released unharmed.
- If you are a hunter or angler, use non-lead shot and fishing gear so birds ingesting spent shot or lost sinkers will not be poisoned by lead. Follow the regulations regarding seasons and catch limits and report poachers through your provincial or territorial wildlife agency or the RCMP or Crime-stoppers.

Did you know?

- One female zebra mussel can produce up to one million eggs each year.
- The rainbow smelt was first found in Lake Winnipeg in 1990. It has now spread throughout the Nelson River and as far as Hudson Bay.
- The zebra mussel was first introduced into Lake St. Clair in the Great Lakes around 1986. Within 10 years, zebra mussels had invaded the Hudson River in New York, the St. Lawrence River near Quebec City, the Mississippi River at New Orleans and a tributary of the Arkansas River in Oklahoma.
- Live zebra mussels have been found attached to boats at inspection stations in California. The boats were being transported from the Great Lakes – a distance of over 1,000 kilometres. Zebra mussels can live out of water for up to 12 days, depending on the temperature and humidity.
- Results of a survey conducted at Manitoba and northwestern Ontario border crossings showed 93 per cent of the vehicles with boats came from places with zebra mussels. Although five per cent of the boats had been in waters with zebra mussels in the previous five days, no zebra mussels were found on them. Ninety-three per cent of the boaters knew that zebra mussels were present in their jurisdiction of origin.
- Since the 1800s, at least 136 exotic species have been introduced into the Great Lakes. About 37 per cent were unintentionally released and 32 per cent were brought in with ship ballast water.
- Float planes and scuba divers' wet suits can also inadvertently transfer zebra mussels.
- Until a few years ago, plant nurseries were still selling hybrid cultivars of purple loosestrife. Purple loosestife is a weed that chokes out native wetland vegetation, creating a dense purple landscape inhospitable to many species of wildlife. Recent research has shown that the hybrids will crosspollinate with wild strains and cause further spread.

Invasions of Exotic Species

A Form of Biological Pollution

Exotic species are organisms accidentally or intentionally introduced into habitats where they are not naturally found. World-wide, they have caused damage to aquatic habitat, loss of species diversity and costly damage to drinking water supplies and recreational waters. Approximately 90 per cent of those organisms that are accidentally introduced do not survive. However, the surviving 10 per cent often thrive in the new habitat because of ample food supplies, limited competition for space and other resources, few natural predators and limited natural parasites and diseases.

Exotic species intentionally introduced - like the common carp and purple loosestrife - often have unexpected detrimental impacts. Bottom-feeding carp have stirred up sediments in the Delta Marsh, on the south shore of Lake Manitoba, reducing aquatic plant growth. Purple loosestrife has choked out much of the natural shoreline vegetation along portions of the Assiniboine River. Exotic species are a form of biological pollution, and can be as disruptive to ecosystems as chemical pollution.

While zebra mussels have not invaded Manitoba, they have caused millions of dollars of damage in the Great Lakes including clogging water intakes, severely reducing recreation at beach areas, and reducing species of algae and microscopic aquatic animals that are important in the food web.

Species Threatening to Invade

A number of exotic species have already invaded Manitoba or are located in nearby waters and have the potential to invade and thrive in Manitoba. Exotics already in Manitoba include the wetland plants purple loosestrife and flowering rush, and the fish species common carp and rainbow smelt. Exotic mollusks, crustaceans, fish and aquatic plants poised to invade Manitoba include zebra and quagga mussels, spiny water flea, rusty crayfish, round goby, tubenose goby, white perch, ruffe, curly-leaf pondweed and Eurasian water-milfoil, and others.

What You Can Do

Boats are the major mode of transportation for zebra mussels and other exotic aquatic species. Boaters, anglers, water-skiers, scuba divers, sailors, float plane pilots and canoeists need to take the following important precautions to prevent the accidental transport of exotic species from one lake or river to another or from neighbouring jurisdictions to Manitoba:

- Inspect your boat, motor, trailer and boating equipment, such as anchor, centreboards, rollers and axles. Remove all visible zebra mussels and other plants and animals before leaving any waterbody. Drain water from the motor, live well, bilge and transom wells onto land before leaving the area.
- Wash or dry your boat, tackle, downriggers, trailer, and other boating equipment to kill harmful species that were not visible at the boat launch. Since some aquatic species can survive more than two weeks out of water, it is important to:
  - Rinse your boat and any equipment that normally gets wet, with hot tap water, 40°C or more.
  - Spray your boat and trailer with high pressure water - at least 250 pounds of pressure per square inch.
  - Dry your boat and trailer in the sun for at least five days before transporting them to another body of water.
- Learn to recognize zebra mussels and other exotic species. If you suspect that zebra mussels or other species have spread to a new location, report it to your local **Manitoba Water Stewardship** or **Manitoba Conservation office**.
- Never release live bait or unwanted aquarium fish into lakes or rivers and never release aquatic animals from one waterbody into another.

Cottage & Property

Few people have a better opportunity to observe the effects of human activities and pollution on the wilderness than cottagers, many of whom return each year to the same location and whose knowledge of the local area may have been passed down by previous generations. With over half a million cottages across Canada, cottagers, as a group, can have quite a positive or negative impact on the environment.

What You Can Do In General

- Keep your domestic animals under control. Respect local leash laws. Dogs running free can harass and kill wildlife. A bell around the neck of an outdoor cat gives birds more of a chance. Domestic cats kill millions of songbirds a year.
- Use cars less. Cars pollute. As well, a lot of wild animals are killed trying to cross busy highways.
- Buy food grown without herbicides and pesticides. This supports farmers whose land is the most "wildlife friendly." Buy other "green" goods, such as ecocertified lumber and papers, for the same reason.
- Reuse or recycle your plastic products and avoid products with disposable plastic packaging. Animals have been known to die after swallowing plastic debris or becoming entangled in plastic six-pack holders.
- Participate in the land-use planning process in your community to ensure that wildlife habitat, especially habitat for endangered species, is protected.
- Teach others what you know.

Environmentally Friendly Landscape Practices

Lawn and Garden

The cottage epitomizes the nature lovers dream. It is a place of captivating beauty where you can spend time amidst the wonders of the natural landscape. Not only is a lush landscaped lawn contrary to this appeal, but often, due to the nature of the landscape and soil, lawns and gardens at the cottage are often impractical. Instead, maintain the area's natural allure by supporting the reestablishment of native species or by leaving unaffected area naturally vegetated. The ***Naturescape Manitoba*** book can help you to landscape with nature in mind.

If you do have a lawn or garden, consider reducing its area. Here are additional things you should know.

Photo by Ron Thiessen

Did you know?

- A typical garden hose can use 180 litres of water in just five minutes.
- Organic or natural fertilizers, such as manure is beneficial only if used properly; over-application can be just as detrimental to groundwater and surface water as the over-application of inorganic or man-made fertilizers.
- Up to 30 per cent of the waste produced by each householder can be composted in the backyard, reducing domestic waste and extending the lives of landfill sites.

Responsible Fertilizer Use

Most commercial fertilizers are man-made and easy to use because the amount of nutrients being applied is known; however, they do not enhance the organic content of the soil. Most synthetic fertilizers are water soluble and may leach out of the soil. Organic fertilizers, such as manure, are beneficial because they increase the organic matter and help hold moisture in the soil. However, too heavy an application of any fertilizer, synthetic or natural, can burn plants. Applying more nutrients that can not be absorbed by the plant may result in excess fertilizer entering surface water or leaching to groundwater.

Soil composition is an important consideration when applying fertilizers to enhance plant growth. Heavy clay soils will retain more fertilizer than sandy, silty soils. Homeowners with lawns on the edge of a stream, river or lake need to take special care to prevent fertilizers from entering surface water where they will encourage nuisance plant growth and may cause fish kills. In Whiteshell Provincial Park, the thin layer of soil covering the bedrock cannot hold much fertilizer, therefore it eventually leaches to surface waters.

Various landscaping techniques are available to keep fertilizer from draining off your property into surface waters. A vegetative buffer of trees, bushes, shrubs and natural grasses will minimize natural disturbance of soil, slow surface runoff and filter sediments and nutrients before they reach the lake or stream.

Don't Use Pesticides

Pesticides are toxic chemicals used to eliminate or control unwanted insects, plants or other organisms.

Pesticide use can be toxic to both beneficial and nuisance insects and plants. Pesticides can also leach through the soil and end up in groundwater and surface water. Once in lakes and streams, they may become a threat to aquatic life. Some chemicals bioaccumulate or become more concentrated through the food chain, resulting in long-term negative effects to animals such as an inability to successfully reproduce. In addition, fish and wildlife may accumulate concentrations of toxins making them unsuitable for human consumption.

Alternative Fertilizers and Pesticides

Fertilizers:

- Well-rotted manure - livestock waste adds organic material, opens up soil to air and helps retain water.
- Compost - rotted plant material adds rich organic material to soil and planting beds.
- Mulch - bark chips, straw, leaves or grass clippings smothers weeds, helps retain soil moisture and maintains warm soil temperature.

Did you know?

Environment Canada and Health Canada have identified many hazardous chemical substances in wood smoke, including, but not limited to, the following:

- **PM10** (inhalable particulate matter less than 10 microns in diameter) – PM10, which consists of a mixture of microscopic particles of varied size and composition, has been declared a toxic substance under the Canadian Environmental Protection Act. These particles originate from both natural and human-related sources and activities. They can be inhaled deep into the lungs, leading to serious respiratory problems. Several recent community health studies indicate that significant problems are associated with exposure to respirable particulate matter. These include premature death, hospital admissions from respiratory causes and increased respiratory symptoms. Children, the elderly and people with cardiovascular disease or lung diseases such as emphysema and asthma are especially vulnerable.
- **Carbon monoxide** (CO) – CO can reduce the blood's ability to supply necessary oxygen to the body's tissues, which can cause stress to the heart. When inhaled at higher levels, CO may cause fatigue, headaches, dizziness, nausea, confusion and

Pesticides:

- Beneficial insects and insect-eating birds - maintaining a balance of predator and prey is essential to a pest and pesticide-free landscape.
- Manual maintenance - remove insects by hand.

What You Can Do

- Use fertilizers sparingly; use fertilizers in multiple applications rather than one large application.
- Compost kitchen and garden wastes to provide a natural supplement to yards and gardens.
- Xeriscape your yard - it requires less pesticide, fertilizer, water and maintenance. Put plants with similar water needs together, use compost and manure to improve water retention and percolation in soil, irrigate efficiently, reduce lawn area; choose native plants or those from similar zones and use mulches to reduce surface evaporation of water.
- Encourage beneficial insects (and insect-eating birds too) by promoting natural habitats.
- Do not use bug zappers as they will kill beneficial insects which are important to a pest-free landscape.
- Pull weeds and pick harmful insects off your plants.
- Avoid using railway ties for landscaping or dock construction. Railway ties are generally treated with creosote, which is a mixture of toxic chemicals. These chemicals can leach into the soil or water and are toxic to plants and people.

Understanding Health and Heating with Wood

Many Canadians use wood to heat their homes or to simply enjoy a wood fire, but burning wood can also release pollutants into the air we breathe when poor burning techniques are used. Wood smoke contains harmful pollutants that can trigger coughs, headaches and eye and throat irritation. They also contribute to increased incidences of emergency room visits, hospitalizations and days lost from school and work – even in otherwise healthy people.

Wood-smoke emissions can be reduced, indoors and out, by learning to burn more efficiently and improving your wood-burning practices. Replacing your existing wood burner with a new-technology appliance that meets the U.S. Environmental Protection Agency (EPA) and Canadian Standards Association (CSA) emissions standards can help to further reduce the emissions of pollutants by up to 90 percent. These advanced appliances burn the smoke inside the stove, resulting in less air pollution with the added benefits of more heat to your home and a safer system.

Did you know?

disorientation and, at very high levels, lead to unconsciousness and death. Fire Prevention Canada advises that CO detectors be installed in every home that has a combustion appliance or an attached garage. CO detectors must be maintained regularly, just as you would a smoke detector.

- **Oxides of nitrogen** (NOx) – NOx can lower the resistance to lung infections. In particular, nitrogen dioxide can cause shortness of breath and irritate the upper airways, especially in people with lung diseases such as emphysema and asthma.
- **Hydrocarbons** (HC) – HC can damage the lungs.
- **Volatile organic compounds** (VOCs) – VOCs can cause respiratory irritation and illness. Some VOCs emitted by wood-burning appliances, coughing, headaches and eye irritation and can act as a trigger for people with asthma.
- **Polycyclic aromatic hydrocarbons** (PAHs) – Prolonged exposure to PAHs is believed to pose a cancer risk.
- **Dioxins and furans** – Some dioxins and furans are carcinogenic.
- **Acrolein** – Acrolein can cause eye and respiratory tract irritation.

Reducing Pollution and Improving Efficiency

What You Can Do

- Burn small, hot fires – they produce much less smoke than ones that are left to smoulder.
- Burn seasoned wood – burning "green" or wet wood produces significantly more smoke. Firewood should be seasoned for at least six months.
- Split wood into pieces that are 10–15 cm (4–6 in) in diameter. Fires burn better with more surface area exposed to the flame.
- Never burn garbage, plastics, cardboard or Styrofoam. Burning garbage releases poisons.
- Never burn wood that has been taken from salt water. Chlorine combines with the smoke to produce dioxins and furans, which are dangerous carcinogens.
- Burning treated or painted wood, particleboard or plywood represents a health hazard. Wood treated with varnishes and sealants, wood from orchards sprayed with pesticides and pressure-treated wood may contain toxic chemicals. Burning treated wood may release these toxic chemicals into the environment in the smoke or in the ash that is disposed of later.
- Store wood outside, off the ground and covered. Bring it into your home as needed. The excess moisture found in green wood increases the relative humidity of the indoor air, which can lead to mould and mildew growth. Both can cause severe allergic reactions and asthma attacks.
- Use a high-efficiency wood stove, fireplace or insert that is certified as low emission by the EPA, a standard accepted in Canada. These wood-burning appliances burn most of the smoke right in the firebox and can cut emissions by up to 90 percent.
- Reduce your heating needs by making your house more energy efficient.
- Regardless of the type of wood-burning appliance, it should be installed by professionals and inspected and cleaned at least once a year by a technician certified under the Wood Energy Technical Training (WETT) Program or, in Quebec, the Association des professionnels du chauffage (APC). These certified installers and chimney sweeps have gone through a rigorous training program that is recognized by the industry and by government.

Shrink Your Cottage Energy Bill

Most of us don't realize that hydroelectric power generation has such a significant effect on our lakes, rivers, and streams. Hydroelectric dams flood land area and alter ecosystems such as wildlife habitat. Efficient energy use should be practiced at home and at the cottage. Here are some ways to reduce your cottage energy consumption.

What You Can Do

- **Retire that old beer fridge** It's been great for your overflow beer stash, but that ancient fridge in the boathouse is sucking more than four times the electricity of a newer, energy-efficient model, and costing you almost $130 a year. Be a greener beer drinker and retire the clunker. At the very least, unplug it between visits and definitely over winter. As for the kitchen fridge, another energy hog if it's 10 or more years old, keep it out of the sun, away from the stove, and in an area that allows air to circulate to improve its efficiency. Also check the door seal: If it isn't tight enough to hold a piece of paper in place when closed, repair or replace it
- **Beware the phantom load** Some electrical devices that use a remote control, like televisions, DVD players, or stereos, or use an adaptor, such as computers, continue to steal power after they're turned off. Unplug these or hook them into a power bar with a switch so you can really turn them off when not in use.
- **Switch the cottage wattage** Even the few table lamps and overhead lights that illuminate the corners of your cottage would cost a lot less to you and the environment if you switched from incandescent bulbs to compact fluorescent bulbs. They last up to 10 times longer and use about one-quarter the electricity. Turn off inside lights and other electrical equipment whenever you leave the cottage.
- **Don't be a night polluter** Floodlights and other high-wattage outdoor bulbs are not only energy eaters, they are inappropriate at the cottage. They cause light pollution on our lakes, messing up the mating and feeding behaviour of wildlife, reducing boaters' ability to see navigation lights, and stealing our view of the stars. Replace them with low-wattage lamps; and turn them off unless you really need them.
- **Hold the heat in hot water** Wrap your hot water tank in an insulating jacket, available at most hardware stores. When you're away for the week, turn down the setting from "hot" to "warm" or "low." Or get rid of the tank entirely for an on-demand system, which heats water only when required.
- **Put the kettle on** Keep a kettle full of water on the woodstove. Even if you don't use it, water has a high heat capacity and will continue to warm (and humidify) the room after the stove has gone out.
- **Listen to Charlotte** When sealing up cracks in the cottage, keep an eye out for spider webs. Spiders like to weave them in the path of airflow (a.k.a. air leaks) to catch insects.
- **Plant a tree or two** Green giants are great insulators of the cottage. Plant deciduous trees on the south and west sides of the cottage, to provide shade in summer and let sun inside throughout the winter. Conifers on the north and northwest sides block cold winds in winter with their thick evergreen boughs.
- **Hang curtains or blinds** And keep them closed as much as is practical – they help hold cool or warm air inside (and they're much better at preventing bird-window collisions than bird silhouettes). In the winter, curtains on south-facing windows should be opened during the day to let the sun in and closed at night to keep the heat in. Insulated curtains, such as window quilts, are an excellent way to increase your heat efficiency.

More Energy-Savers

- Paddle a canoe or kayak, row a boat, or sail a windsurfer or sailboat instead of using a powerboat to travel on the lake or river. These activities are quieter so they don't disturb wildlife, and they increase your chances of seeing wildlife. Remember that loud noises in winter disturb animals at a time when they need to rest and conserve energy.
- Buy four-stroke engines if purchasing an off-road vehicle or outboard motor. Four-stroke engines are more efficient and produce fewer emissions than two-stroke engines.
- Save electricity by turning off lights and other electrical equipment when you leave the cottage after a visit, and shut down the system, if possible, at the end of the season.
- Use fluorescent lighting or long-life bulbs instead of incandescent lights to save on replacement costs and energy bills.
- Purchase equipment with automatic power-saving devices.
- Use solar energy panels, if possible.
- Replace your old "airtight" and "potbellied" woodstove with a safer, more efficient, and less polluting U.S. Environmental Protection Agency (USEPA)-approved woodstove.

Household Hazardous Waste

There are many products used in, and around our homes, cottages, garages, boats and cars that may not look hazardous, but can injure people or damage the environment if improperly used or disposed. Hazardous products are those that contain chemicals considered toxic to humans, aquatic life, wildlife, or have other harmful properties, like high flammability.

Examples of Hazardous Household Products

- household bleach, drain cleaners, oven cleaners, furniture polishes, aerosol spray cans
- oil-based paint, wood stains and preservatives, turpentine, paint strippers, solvents
- pesticides - weedkillers and bug sprays
- gasoline, diesel fuel, motor oil, antifreeze, transmission and brake fluid, car batteries

The Damage They Do

Products containing lye, phenols, petroleum distillates and trichlorobenzene are toxic. These products should never be poured down drains, storm sewers, nor placed in the garbage. When they reach our streams, rivers, and lakes, they can kill or cause chronic problems, such as cancers, lesions and infertility in aquatic wildlife.

Hazardous household cleaners can disrupt the natural biological processes taking place in a septic system. In addition, not all of the toxins in sewage hauled from a holding tank or flushed down the toilet into a sewer system will be removed at a sewage treatment facility. Proper disposal can minimize the amount of contaminants reaching our rivers, lakes, streams and groundwater.

Antifreeze should never be poured on the ground where it can poison pets and wildlife and potentially contaminate surface water and groundwater.

Proper Disposal

Many hazardous household products can be disposed of at hazardous household waste depots or are now being accepted in organized recycling events held throughout the city. If you throw them in the garbage, toxic waste accumulates at landfill sites.

Photo by Ron Thiessen

What You Can Do

- Avoid purchasing products that are toxic and hazardous.
- If you must purchase toxic products, buy only the amount you need, read the label carefully and use the product only as directed.
- Keep unused products in their original containers so the label can be referred to for product use and disposal.
- Store hazardous products in a safe place and handle them with care.
- Take items such as old batteries and used oil to the proper waste disposal facility and not to the landfill.
- Keep sawdust, cat litter or another absorbent material handy in case of an accidental spill.
- Use hazardous chemicals far from wells, cisterns or waterbodies.
- When you need to top up gas tanks, such as chainsaws, generators, pumps, and boat engines, do it well back from shore, preferably over a tray and in a shelter with a hard floor.
- Use a non-toxic antifreeze for winterizing your boat since this gets discharged on your first launch.
- Wash your boat on dry land only; avoid using harsh cleaners, soaps, or detergents.
- Never pour household chemicals down the drain, storm sewer or on the ground.
- Find out if your community has a program for the disposal of hazardous materials; if it does not, suggest your local government start one.
- See if your neighbour can use your leftover hazardous household products or exchange those products at community events, like paint swaps.
- Some used building supply stores will also accept partial cans of paint and other products.
- Miller Environmental Corporation, a hazardous waste company, holds Hazardous Household Waste Days for Winnipeg homeowners to discard unwanted toxic chemicals.
- Some municipal waste disposal grounds recycle hazardous materials. Miller Environmental Corporation holds over 10 recycling events in rural Manitoba every year. Check with your localrecycling program or municipality for events planned in your area.
- Organize a Storm Drain Marking event with your classroom or neighbours to inform people that water from the street enters storm drains and ends up in our lakes, rivers and streams.

Environmentally Sensitive Choices

Consumers have many choices, including a wide range of environmentally friendly products. Whenever possible, choose those less likely to harm the environment. In most cases, reading the product label will help determine whether or not the product contains hazardous substances.

Is it Really Biodegradable?

Purchase biodegradable products - those that are broken down in the environment by micro-organisms. Substances can also be degraded by light, heat and chemicals naturally found in the environment. Some or all of these processes can act together to degrade or decompose a substance. Examples of biodegradable material include sewage, fertilizers and some household cleaners. Be cautious of the product claims - as of 2006, in Canada there are no legal requirements to substantiate that a product is biodegradable, environmentally friendly, green or non-polluting.

Look for the EcoLogo

Environment Canada's **Environmental Choice Program** at **www.environmentalshoice.ca** ensures that products or services carrying the EcoLogo are leaders in environmental responsibility. This is not only true for the product itself, but can apply to the packaging or to the end product. EcoLogo products and services can improve energy efficiency, reduce hazardous by-products, contain recycled materials or may be reused. When you see the EcoLogo, it is an indication that the product or service has been rigorously examined or tested to ensure that it is a better environmental choice.

Did you know?

Safer Household Cleaners

Elbow grease: probably the most reliable and dependable

Baking soda: a good scouring and deodorizing agent that can be used for cleaning appliances, vinyl, stainless steel sinks, toilets, deodorizing rugs and drains

Vinegar: in water, it is a great glass cleaner - undiluted, it removes mildew

Pure soap: a good all-purpose cleaner for anything from clothes to dishes to boats

Borax: sodium borate or borax is a natural mold inhibitor and can be used to deodorize and clean floors, walls and tiles

Natural oils: mixtures of lemon oil, mineral oil and even olive oil can be used for furniture and wood polish, including wooden floors

Explore the Alternatives

There are thousands of commercial products to clean, remove, eliminate or kill unwanted substances or pests. There are also many cheaper and less harmful methods to achieve the same result. For example, instead of using an insecticide, sprinkle chili pepper or borax across ant entrance trails to discourage and repel them. Keep in mind that much of what you flush, rinse and dispose of down the drain will likely end up in rivers, lakes or groundwater. Many of these products are cleaners. Check your local library or the Internet and explore the alternatives (for DIY recipes see the **Less Toxic Guide** at **www.lesstoxicguide.ca**). Consumers buying environmentally friendly products will encourage manufacturers to produce more environmentally sensitive products.

What You Can Do

- Phone the company if you cannot find the information that you need on the product label - some companies now have 1-800 numbers listed on their products.
- Buy phosphate-free detergents for laundry and dishes.
- Purchase products with the EcoLogo stamp of approval.
- Buy biodegradable products.
- Purchase products with minimal packaging. Buy refills and reuse your containers. Call suppliers if you feel they are using too much packaging.
- Reuse grocery bags, or better still, use cloth bags while shopping.
- Carry your own coffee mug to avoid using disposable cups.
- Try the following alternatives to household insecticides: to remove food sources store cereals in air-tight containers, store excess flour in the freezer, clean crumbs and sticky spills and use fly paper rather than bug spray. Remove clutter, especially in damp areas of your basement, to eliminate hiding and breeding areas for unwanted pests.
- Consider reusing before recycling.

Photo by Chanda Hunnie

Glossary of Terms

Biodegradable — A product which can be broken down in the environment by microorganisms.

Composting — The natural decomposition or breakdown of organic material by bacteria and other soil organisms to produce humus.

D.I.Y. — Do-it-yourself techniques.

Ecosystem — A group of plants or animals together with that part of the physical environment with which they interact.

Effluent — The liquid waste from sewage or industrial processing.

Erosion — The gradual wearing away of land surfaces due to wind, water, or wave action.

Eutrophic lake — A lake with a high concentration of nutrients. Eutrophic lakes are often shallow and exhibit periods of oxygen deficiency.

Exotic species — A species which is accidentally or intentionally introduced into habitats where it is not naturally found.

Greywater — Kitchen, shower, and bath water, excluding toilet water.

Inorganic material — Chemical substances of mineral origin not containing carbon to carbon bonds.

Leaching — The separation of constituents from the soil by the movement of water through the ground. The soluble components are carried down by the moving water where they may enter groundwater aquifers.

Organic material — Substances containing carbon.

Pesticides — Toxic chemicals used to eliminate or control unwanted insects, plants, or other organisms. Pesticides include insecticides, herbicides, and fungicides.

Sedimentation — The deposition of silt, soil, or sand particles in locations where slow-moving water loses its ability to hold heavier particles in suspension.

Turbidity — A measure of the amount of material suspended in water including clay, silt, organic and inorganic chemicals, as well as small aquatic organisms. Turbidity affects the amount of light which is able to pass through the water column.

Water softener regeneration — Involves removing calcium (which clogs pipes) and magnesium (which mixes with soap to create a sticky scum) from hard water. The process involves the mixing of a brine solution of sodium chloride (salt) to remove the calcium and magnesium which is then flushed out resulting in salty wastewater.

Watershed — The area which supplies water to a stream and its tributaries by direct runoff and by groundwater runoff is the drainage area or watershed for the stream.

Xeriscape — A landscape technique which has reduced requirements for water by using native plants and shrubs.

Credits

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