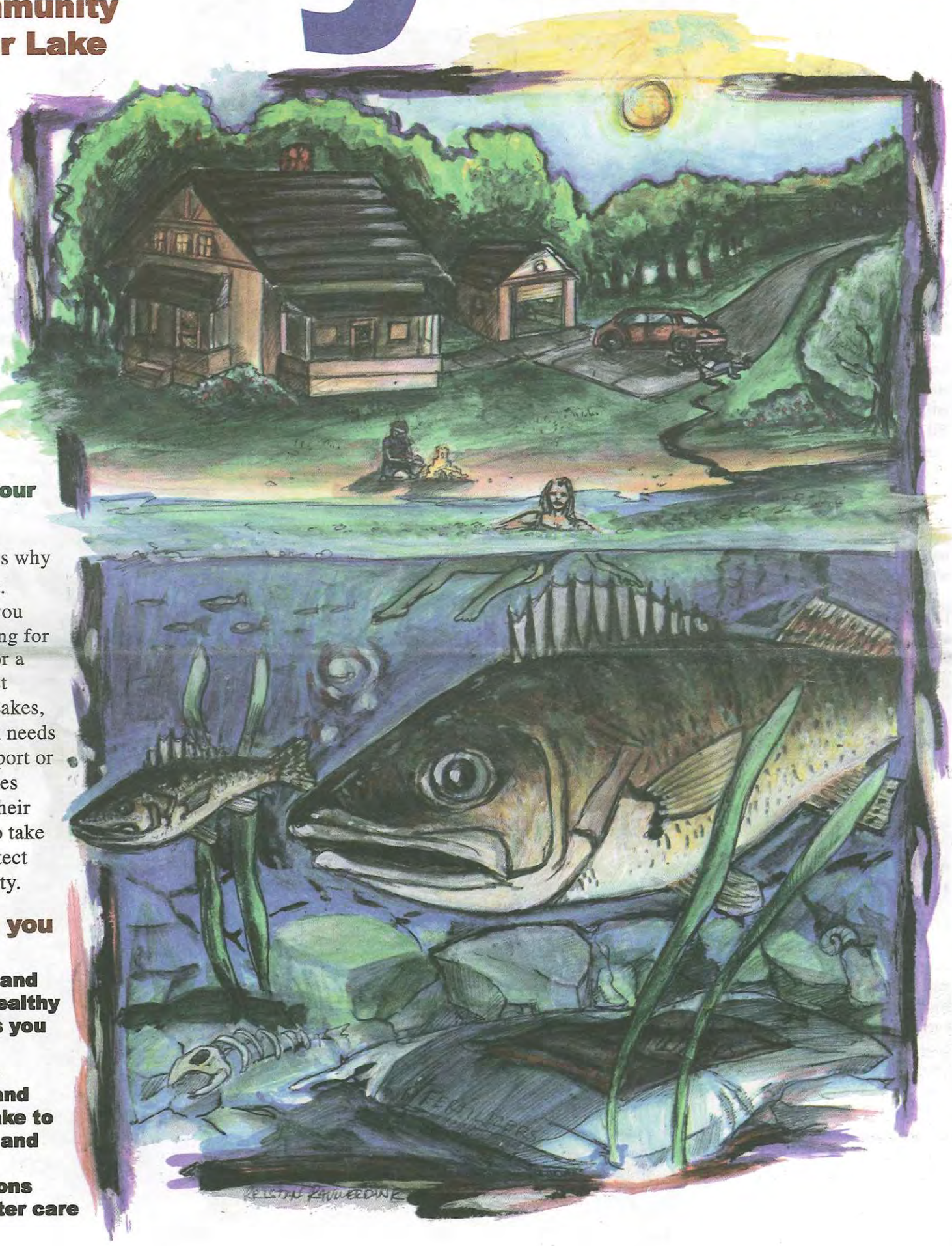
your lake & you!

Simple, Concrete Steps You Can Take in Your Home, Yard, and Community to Protect Your Lake



What you do in your house and yard directly affects your lake. You *CAN* make a difference by learning exactly what your lake needs to be healthy and by taking simple, concrete steps to protect that health. This booklet is designed to help you better understand what you can do to adequately care for your lake.

You love your lake which is why you are reading this booklet. When you love something you want to take care of it. Caring for a lake is similar to caring for a child: it takes more than just intuition to be successful. Lakes, like children, have complex needs that your actions either support or hinder. By learning how lakes work and how you fit into their ecosystem, you can begin to take the appropriate steps to protect your lake's health and vitality.

In this publication you will learn:

- **How your lake works and what it needs to be healthy**
- **Basic, concrete steps you can take to prevent problems in your lake**
- **Advanced steps you and your neighbors can take to fix existing problems and prevent future ones**
- **Books and organizations that can help you better care for your lake**

"A lake is the landscape's most beautiful and expressive feature. It is earth's eye; looking into which the beholder measures the depth of his own nature."

Henry David Thoreau in Walden

what is a lake?

A lake is a depression in the landscape that holds water. Lakes are formed by glaciers, volcanic eruptions, the movement of the earth's crust, and other processes. Lakes are also formed by humans when they build dams along rivers and "impound" the water into artificial lakes. A spring-fed lake is one fed by groundwater, while a drainage lake is one fed by water flowing over the land. The surface area of lakes can range in size from less than an acre to the 31,700 square miles of Lake Superior, the world's largest freshwater lake.

Lakes are considered temporary features in the landscape because all lakes eventually disappear as they slowly fill in with soil, dead plants and fish, and other materials. This natural aging process of lakes is called eutrophication. Eutrophication takes hundred or even thousands of years depending on the lake's size, surrounding geology, and other factors.

How Does a Lake Work?

Connections is the most important concept to keep in mind when considering how a lake works. Because of connections, any change in one part of the lake's ecosystem affects the rest. The symptoms of these effects can range from very subtle ones, like a teaspoon of new algae in an area of the lake that has been clear until now, to drastic ones like floating, dead fish. To assess your lake's health is to study its connections.

The Lake Ecosystem

The word "eco" comes from the Greek word *oikos* meaning home. Your lake's ecosystem is home to many creatures like frogs, fish, insects, ducks, otters, crayfish, microscopic animals like daphnia, birds, and people. The lake's water, the land surrounding it, the plants, animals, and minerals, all waters draining into the lake as well as the natural processes described below, are all part of the lake ecosystem. These components of the lake ecosystem interact with one another in very complex and interdependent ways.

The Properties of Lakes

Lakes have interrelated physical, chemical, and biological properties. Disruptions in one property affects the others. For example, when rain washes chemical fertilizers off your lawn and into the lake, this alters the chemical properties of the lake. The altered lake chemistry can result in new conditions in the lake that may, for example, increase the growth of algae and zooplankton and help certain types of fish species prosper while others decline. Thus the changed chemistry can actually increase the biological productivity of the lake. This *may not be good. With more* fish in the lake, bottom sediments may be more easily disturbed thus affecting the physical properties of the lake such as water clarity.

Lake Cycles and Processes

Lakes are governed by cycles and processes. In the hydrological (or water) cycle, water moves in a roughly circular pattern. Water falls from the air (in the form of rain or snow) to the surface of the land, rivers, and lakes. The water then moves across the land and flows into lakes and rivers or perhaps seeps through to groundwater. Finally, water returns to the air due to either 1) evaporation from lake or land surfaces or 2) transpiration from plants.

Plants, especially algae, are the foundation of the food web in a lake ecosystem . Green plants use sunlight in a process called photosynthesis to create oxygen and sugar from water and carbon dioxide. Fish and other lake organisms use the oxygen to breathe, and bacteria and fungi use it to decompose plant and animal matter on the bottom of the lake.

what *can go* wrong?

Lakes age just like people, only their natural life span is much longer. A lake may start out as a large body of water, but over hundreds or thousands of years it will fill in with plants and debris and gradually get shallower and shallower. Eventually it will become a wetland, then a soggy area, and finally it will no longer be lake-like at all. This process of natural aging is called eutrophication, a Greek word meaning well-nourished.

The Big Danger: Cultural Eutrophication

The problem is that lakes age more quickly when humans get involved. Without realizing it, we can add too much food to our lakes and cause them to age and "die" very quickly—in decades rather than hundreds of years. This is called cultural eutrophication because certain practices in our human culture—like adding fertilizers to our lawns and farm fields—cause our lakes to age much faster than if we left them alone. The excess "food" leads to increased productivity in the lake until it is choked with algae and weeds. The result is an imbalance in the numbers and types of plants and fish, decreased lake clarity, and low oxygen levels. Not only can your lake begin to look green, but these decaying materials can quickly deplete enough of the oxygen in the lake's water to kill fish and other aquatic organisms because they can no longer breathe.

While humans can't stop the process of eutrophication, we can work to stop cultural eutrophication which hastens the natural aging process. The key is not to feed your lake nutrients like phosphorus or nitrogen. Phosphorus and nitrogen are the chemicals in our homes and yard that cause cultural eutrophication. Phosphorus comes from fertilizers, detergents, and organic matter. Nitrogen comes from fertilizers, manure, and organic matter. Phosphorus and nitrogen can overstimulate aquatic plant growth and speed eutrophication.

If you learn how to keep the chemicals out of your lake by taking the steps on the next few pages, you can begin to help your lake age naturally, not culturally. In this way your grandchildren and great-grandchildren will be able to enjoy a vital, healthy lake, too.

Beware of Toxic Chemicals

A second key point is don't poison your lake with toxic chemicals. Toxic materials in your lake can contaminate fish and other aquatic organisms, the larger fish and birds, and even the humans that feed on them, as well as contaminate drinking water supplies. The amount from one home or yard may not be significant, but when added to the contributions from all the other homes and yards in and around the lake it may lead to a serious problem.

The main toxic chemicals of concern for lake homes are the gasoline and petroleum products used in the engines of lawn mowers and boats. One gallon of gasoline can contaminate as much as one million gallons of groundwater. Also of concern are pesticides. Pesticides not only can be directly toxic to animals and fish, but some types accumulate in the tissue of fish and are passed up the food chain to other creatures including humans. Finally, all household toxic materials including cleaning supplies and paint products are potential problems for your lake.

How to Love Your Lake

A lake is a complex living system whose health depends on you to understand and properly care for it. A frog or a fish can't sit and negotiate with you for good care. On the following pages are ideas to help you provide that good care. The **basic steps** will help you as an individual better care for your lake by preventing problems. The **advanced steps** describe ways you can work with others to protect the lake and its watershed in more comprehensive and sophisticated ways.

Take Care of Your Ecosystem!

Try to care for your lake and its watershed from the viewpoint that humans belong to a larger ecosystem community. As Aldo Leopold observed, "We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong we may begin to use it with love and respect."

Protect Your Watershed!

Every lake has a watershed which is like a bowl surrounding the lake. The edges of the watershed are the highest ridges around the lake. Water hitting the far side of the ridge flows away from your lake, but all water falling on the near side flows toward your lake carrying with it soil, chemicals, and other materials which can harm your lake. This makes your lake very vulnerable to everything lying within its watershed.

Beware of Toxic Chemicals!

Remember not to poison your lake with toxic chemicals. Avoid or be extremely careful with gasoline, oil, pesticides, paint, and other toxic materials in your home and yard.

Lake Bookshelf

The Lake in Your Community
by Lowell L. Klessig, Nicholas W. Bouwes, and Douglas A. Yaggen
(1994, 24 pages): to order Publication G3216 send $4 (plus sales tax if you live in Wisconsin) to Cooperative Extension Publications, 45 N. Charter St., Madison, WI 53715, or call 608/262-3346. 877/947-7827 (toll-free).

The Lake Book: Actions You Can Take to Protect Your Lake
by the Maine Congress of Lake Associations
(1993, 35 pages): to order the general edition send $5 plus $1.50 shipping to COLA, PO Box 38, Readfield, ME 04355, www.mainecola.org or call 978/469-8297 for information on how to customize this publication for your lake.

A Citizen's Guide to Lake Protection
by the Freshwater Foundation in cooperation with the Minnesota Pollution Control Agency
Available on-line at: www.pca.state.mn.us/water/lakeprotection.html

basic steps

Getting Your House and Yard In Order

There are many things you can do right in your home and yard to protect your lake. By keeping things out of your lake you can actually prevent problems. The most important things you can do are:

- *conserve water*
- *control the use of chemicals*
- *manage your shoreline*
- *improve lawn-care practices*
- *maintain your septic system*
- *compost wastes*

Conserving Water: Old-Fashioned, But It Works

Chances are your parents taught you to conserve energy by turning off the light when you left a room and by turning down the heat at night. The same principle can help save your lake by working to prevent pollution. When you conserve water in your yard, then less water will reach your lake, carrying with it potentially harmful materials and chemicals. Also, when you conserve the use of water inside your home, then your septic system doesn't have to work as hard. This means you can extend the life of your septic system (which helps your pocketbook) while increasing your septic's ability to keep nutrient-rich human wastes out of the lake.

Conserving Water Inside Your Home

Half of the water your household uses is inside your home and the other half is outside in your yard. Of the half used inside your home, 75 percent is in the bathrooms so concentrate your efforts there.
To use less water:

- *change the way you do things: take shorter, less frequent showers; put less water in the tub or take a shower instead; and turn off the water while you shampoo, brush your teeth, and shave.*
- *install water-saving devices: use toilet dams or plastic milk jugs filled with rocks inside your toilet tank (don't use bricks because they can break apart and get into your plumbing); install low-flow shower heads and water-flow regulators for your faucets; and purchase water-saver toilets.*

The cost of retrofitting your bathrooms will be well under a hundred dollars (unless you purchase a new toilet), a worthwhile investment for basic lake protection.

In the rest of your house you can conserve water by repairing leaky faucets, only running your washing machine and dishwasher when they are full, and by installing water-flow regulators for all your sinks. Also make sure none of your pipes, such as the drain pipe from your washing machine, flow into the lake.

Conserving Water in Your Yard

The other half of water used by households is for lawns and gardens along with washing cars.

Use Smart Lawn-Watering Techniques

- *if possible, don't water your lawn– dormancy is a natural progression for cool-season grasses during a drought.*
- *change the way you water your lawn. Install pistol spray heads; water in small amounts, and water during the day (water in the evening can promote disease).*
- *contact your county extension officer for drought-resistant turf-grass recommendations for your area.*

Keep your gutters and drain spouts free of leaves. Clean leaves out of your gutters so that rainwater flows into the downspouts rather than over the edges. Make sure that rain that runs down your drain spouts soaks into the soil by your house and doesn't run into your lake.

Avoid washing your car near the lake. You're at the lake so relax and forget about washing your car. If you must, go to a car wash or use a minimal amount of water to flush off the car and then wash it in an area that will let it drain away from the lake if possible. Make sure you use low-phosphate, biodegradable products.

Controlling the Use of Toxic Chemicals

All chemical products in your home or yard have the potential to harm your lake. If you follow the water conservation and yard-care tips presented here you will be reducing the amount of toxic materials reaching the lake. Other ways to reduce the risk of toxic chemical pollution in your lake are:

- *don't change your car's oil near the lake*
- *handle all gasoline and petroleum products with extreme care*
- *keep your boat and motor in good repair*
- *avoid using bleach, drain cleaners, and other strong cleaning agents and most pesticides and fertilizers*
- *take extreme care when using paints and paint removers*
- *investigate non-toxic household products and safe pest-control methods with your county extension agent*

Reference:

How to Conserve Water in Your Home and Yard, Michigan State University Cooperative Extension Bulletin, No. WQ16, Michigan residents can get one free copy; additional copies or copies for non-Michigan residents cost 25 cents each from Michigan State University Bulletin Office, 10-B Agriculture Hall, East Lansing, MI 48824-1039, or Michigan residents only call 517/355-0240.

Managing Your Shoreline

If properly managed, your shoreline can be an efficient natural buffer system between the lake and the surrounding landscape. In fact, shorelines are the most important tool you have to protect your lake. Some specific steps you can take are to:

- *leave an unmowed buffer strip along the lake at least 20-feet wide*
- *set your lawn mower to leave the grass two or three inches long*
- *plant steep banks with native vegetation that binds the soil and traps water*
- *terrace steep banks when possible to further slow water and sediments*
- don't tamper with existing wetlands

Less Lawn Care Means More Lake Protection

If we love our lakes, we need to change our idea about what looks good. That short, weed-free lawn that many of us admire can actually hurt our lake because it:

- *takes more chemicals to keep it green*
- *does not provide good habitat for wildlife*

Less chemicals: Excess fertilizers and pesticides can go into the nearest lake, river, or well. The resulting algae blooms and floating, dead fish remind us that using less chemicals is better. If you must use fertilizer, have a soil test done first and follow the recommendations. Try to use phosphorus-free fertilizers, slow-release nitrogen, and leave a buffer area near your lake where no chemicals are used.

Less waste: Grass clippings are high in nutrients so you want to keep them out of your lake. Bag grass clippings and fall leaves and add them to a compost bin or use a mulching mower on both (see articles in right column). Composting is a clean, efficient way to allow these wastes, along with food scraps, to naturally decompose into wonderful rich soil that can be used in your garden.

Maintaining Your Septic System

Conscientious maintenance of your septic system is one of the most critical steps you can take to protect your lake. A septic system is a two-step process to treat human wastes. The wastes flow into a tank where the solids settle out. The liquids then flow into a drainfield or another type of system where they are decomposed by soil microbes. These wastes are very high in nutrients. With properly sized, located, and maintained systems, septic tanks can effectively prevent nutrients from entering your lake. However, if a public sewer is available, the best thing you can do for your lake is to hook up to the sewer system.

When putting in a new septic system, keep these steps in mind:

- *make sure it is the right size for your household*
- *keep it at least 100 feet from the lake*
- *install a second drainfield when possible*
- *hire only quality contractors*

Once installed, these steps will help protect your lake:

- *keep the drainfield clear*
- *clean the septic system regularly and have it inspected every one to two years*
- *avoid or limit the use of toxic chemicals in the home*

Daily actions can be taken to help your septic system work less:

- *avoid using a garbage disposal; compost food wastes instead*
- *avoid chemical products for your septic that boast less-frequent tank pumping. (these products can add excess nutrients to the lake by liquefying more of the sludge)*
- *many of the steps you take to protect your lake–such as conserving water–also help keep your septic system operating efficiently and for a long period of time*

Reference:

Septic Systems and Water Quality
by the Tip of the Mitt Watershed Council
(3-fold brochure): order for 50 cents each (which includes postage) from PO Box 300, Conway, MI 49722, or call 616/ 347-1181.

Your State Lake Organizations* Suggest:

Don't feed your lake: reduce or eliminate lawn fertilizers, and don't fertilize your lawn unless a soil test says so

Leave or create at least a 20- to 30-foot buffer strip at the edge of your lake

Maintain your septic system

Maintain emergent plants at your water's edge

Don't dump lawn clippings or other waste in your lake or near the shoreline–compost instead

Control shoreline erosion

Check your boat and bait bucket so you don't bring zebra mussels to your lake

Learn and observe water laws, regulations, and etiquette

Use natural stone to protect the shoreline

Respect the property of others

Maintain a 10 mph speed limit on small lakes for boats and jet skis

*see back page for a listing

Composting Your Wastes

When we compost we mimic nature by setting up a natural system in our own yard to decompose wastes. The only cost is our time which can vary from a few minutes a week to a few hours depending on our goals. Composting helps:

- *keep unwanted nutrients out of the lake and septic system*
- *save valuable landfill space*
- *obtain a constant supply of free, rich, sweet-smelling soil for your garden*

Harmonious Technologies provide a "Crash Course in Composting" in their excellent publication *Backyard Composting*. Harmonious explains that composting is a simple process of:

- *balancing brown and green wastes*
- *alternating wet and dry layers*

"Brown" wastes are dry leaves, twigs, wool chips, and other plants.
"Green" wastes are grass clippings and food scraps. By keeping each at about 50 percent of the total you should be able to maintain an active composting bin. Avoid adding meat scraps or any fat or grease for they do not readily break down and instead attract animals.

What about mulching lawn mowers?

Consider a mulching lawn mower because they are designed to return the clippings (and nutrients) to the soil. Mulching lawn mowers require more frequent mowing but less time because bagging is eliminated. Just make sure the clippings stay on the lawn and out of the lake.

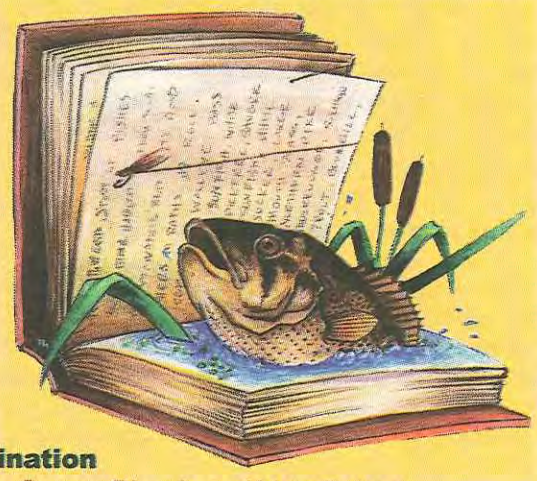
What about too many trees for composting?

If your lake property includes large numbers of deciduous trees, you can leave the areas under the trees as a forest floor and let the leaves decompose naturally. Otherwise you can plant ground covers such as pachysandra or ivy that can help collect and decompose the leaves in place.

What about wildlife?

Remember that your lake's ecosystem is naturally rich with wildlife. As you adopt the natural look for shoreline, wildlife such as birds, turtles, and frogs will probably increase in numbers. You can make your yard even more welcoming to wildlife by planting certain types of native vegetation that serve as food and shelter for these critters. Consult your local county extension office or the National Audubon Society for ideas on how to plant for wildlife. However, avoid directly feeding certain types of wildlife that can become a nuisance (such as waterfowl).

Basic Steps Bookshelf



Life on the Edge: Owning Waterfront Property
by Michael D. Dresden and Robert M. Korth
(1994, 95 pages plus appendices): to order send $3 plus $1.50 shipping and handling to the UW-Extension Lakes Program, College of Natural Resources, University of Wisconsin, 1900 Franklin St., Stevens Point, WI 54481.

Your Yard and Water Quality: Simple Things Gardeners Can Do to Prevent Water Contamination
by Van Bobbitt, Robert Fox, Holly Kennell, Curt Moulton, George Pinyuh, and Mary Robson
Available on-line at http://cru.cahe.wsu.edu/CEPublications/eb1744/eb1744.html.

Backyard Composting: Your Complete Guide to Recycling Yard Clippings
to order send $6.95 plus shipping to Harmonious Technologies, PO Box 1716, Sebastopol, CA 95473, or call 707/823-1999, ext. 42. Discounts available for bulk orders. Visit www.homecompost.com for more information.

advanced steps

Working with Others To Get Your Watershed In Shape

Is My Lake Sick?

Most people begin to question their lake's health when they see green things in their lake. Green things are either 1) algae or 2) aquatic or wetland plants. Algae floats in the water, is very small, and is a natural part of the lake ecosystem. Aquatic and wetland plants–which many people call "weeds"–grow in sediment on the bottom and along the shores of your lake or sometimes float. Aquatic plants are also a natural part of the lake ecosystem.

However, not all algae and aquatic plants are created equal, and the quantity and type you find may indicate problems. Excessive algae growth can be caused by cultural eutrophication stemming most often from too much phosphorus. Excessive plant growth in and near your lake can be caused by the invasion of an exotic species such as Eurasian water milfoil or purple loosestrife, changes in water clarity, or other disturbances.

When to Call the Doctor

A lake "doctor" is called a limnologist. *Limn* is a Greek word meaning marsh. Limnologists study the living and nonliving features of lakes. Limnology is a complex science involving geology, chemistry, biology, meteorology and other sciences. While other types of professionals can sometimes work on specific problems on your lake, most limnologists are trained to look at your whole lake and assess its overall health. Many limnologists are also specialists in one or two areas such as algae or lake chemistry or fisheries.

If you suspect your lake is having problems, you can work with your lake association and neighbors to:

- *find a limnologist to work with to assess your lake's health*
- *develop a lake management plan*
- *clean-up excess exotic weeds in your lake*
- *reduce excess nutrients coming into your lake*
- *establish greenbelts–groundcover and trees–of native vegetation along the shoreline*
- *work to get stricter local ordinances that regulate septic systems, erosion control, setback requirements, stormwater management, greenbelts, and so on*
- *educate people in your watershed about lake protection*
- *work to sewer your lake*

Strategies to Protect Your Lake

Lake Protection strategies either 1) prevent future problems or 2) remedy existing problems. It is important to keep this in mind so you don't spend time and money fixing things that don't need fixing, or concentrating totally on prevention when you may need to take more immediate steps to remedy existing problems.

Studying your lake's watershed

- *learn the watershed boundaries*
- *find the water sources, both surface and ground*
- *study land uses and runoff patterns*
- *document lake levels and dams used to control lake levels*
- *study the history of your lake and its watershed*
- *monitor the current condition and uses of your lake*

Watershed issues include controlling:

- *land use*
- *runoff*
- *septic systems*
- *storm sewers*
- *sedimentation*
- *exotic species*
- *wetlands*
- *toxic materials*
- *shoreline structures (docks, riprap, dikes)*
- *public access points including roadway ends*

Treat the Causes Not the Symptoms

When someone has high blood pressure you can treat the symptoms with medication or you can treat the causes by increasing exercise, reducing stress, avoiding salt, and making other life-style changes. A lake is similar. You can address causes by reducing nutrients and not spreading exotics to your lake.

Don't Bring in Hitchhikers!

An exotic species is one not native to a given area. Because they are not native, they don't have natural predators or competing vegetation to keep them from spreading. Boats and bait buckets can spread troublesome exotic species like Eurasian water milfoil, purple loosestrife, and zebra mussels from one lake to another.

What is a Lake Association?

A lake association is a group working together to address issues about a particular lake. Quite often lake associations form during a crisis. If there isn't a lake association for your lake you might want to organize one. A lake association can be as informal or formal as needed. Informal lake associations meet for educational and social reasons. Formal associations are incorporated and may have achieved not-for-profit status so they can accept grants and raise money through dues and tax-deductible donations. Because serious lake problems involve everyone around your lake and many others within your watershed, a lake association is a good forum to address problems. Educational events can increase you and your neighbors' understanding of the importance of taking steps to protect your lake. Lake fairs can bring together large numbers of people to have fun, eat good food, and enjoy the waterfront while still learning about important issues confronting your lake. You can organize a lake association to address just about any issue and often in very creative ways.

Keep Exotics Out of Your Lake

Eurasian water milfoil and purple loosestrife are exotic plant species from Europe and Asia that are very troublesome to lakes. Milfoil is an underwater aquatic plant and loosestrife is a wetland plant. Milfoil grows into thick floating mats, crowding out native vegetation and becoming a hazard to boats, fishing, and swimming. Milfoil tends to invade areas that have been cleared of native vegetation, and spreads when subject to mechanical cutting. Milfoil can spread easily from lake to lake from small pieces left on boats and trailers.

Loosestrife forms very dense groupings along marshes, lakeshores, and ditches that threaten rare and endangered plant species and is not a suitable habitat for waterfowl, turtles, frogs, muskrats, and so on. Maintaining your lake's natural shoreline plantings–by avoiding cutting, dredging, and use of chemicals–is the best way to try to prevent the invasion of these troublesome species.

Zebra mussels are very small mussels that were brought to the U.S. in the ballast water of a foreign ship. These tiny mussels have spread throughout the Great Lakes region in just a few short years and are now being spread to inland lakes by boats and bait buckets. Once these critters reach an inland lake they can spread rapidly and become a nuisance as they cover docks, rocks, boats, and anything found in the lake.

To prevent the spread of these creatures to your lake, make sure you "wash your bottom and dump your bucket" because small pieces of milfoil, loosestrife, or small young zebra mussels (often carried on aquatic weeds) could be lurking there:

- *Thoroughly wash the bottom of your boat and the motor right at the lakeshore after you take it out of the water. Let it dry completely for 2 days before you put it into another lake. If there are still signs of algae, remove completely before putting your boat into another lake.*
- *If possible flush out your engine cooling system, bilge areas, and live wells with hot tap water. Do not use chemicals.*
- *Dump your bait bucket and discard all bait on land before leaving. Do not dump it in or near any lake, river, or other body of water.*

How to Enjoy a Green Lake

Many people who live on lakes would like to walk out their door onto a pure sand beach and then wade out for a swim. Very few of us, however, actually live on this type of lake, and turning our weedy shoreline into a sandy beach can actually work to kill the very thing we love most, the lake! A new sand beach may seem like a good idea, but that's because we are thinking culturally, not ecologically. Similarly, clearing out those "weeds" on the edge of the lake may seem like a good idea, but those "weeds" usually are valuable aquatic plants. The best thing you can often do is to keep them in place, or even encourage them to expand.

Green lakes can be enjoyed just as much as deeper blue lakes, so be creative:

- *buy rubber shoes so you don't feel the "yucky" bottom*
- *study the wildlife*
- *take up fishing (most green lakes are full of pan fish like sunfish)*
- *curl up with a good book*
- *take up rowing or canoeing (good for your body and soul)*

However, it is still important to follow the basic and advanced steps presented here to slow further degradation of your lake.

Advanced Steps Suggested by Your State Lake Organizations*

Join or start a lake association

Control watershed erosion by using sediment ponds to catch silt coming into your lake through streams and rivers

Install a central sewage system when septic systems are inadequate

Provide dump sites for boats with toilets

Promote safe, clean boating

Reduce shoreline erosion by keeping boats a safe distance from shore so their wakes don't disturb the shoreline

Develop an aquatic plant management program

Maintain wetland areas around your lake and in your watershed

Cast a vote for candidates that support lake protection

Attend local planning and zoning commission meetings to voice your support for responsible development in lakes, rivers, and watersheds

Respect the viewpoints and interests of people from different perspectives

Educate yourself about lakes, watersheds, and environmentally sensitive areas by attending conferences and events sponsored by the North American Lake Management Society (NALMS) and your state lake organization, your local lake association, and other groups such as Trout Unlimited and Audubon Society

Learn about the authority of various governmental agencies such as your local city or township, county, state department of natural resources or environmental protection, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Soil and Water Conservation District, and U.S. Forest Service

Support local lake and watershed protection projects to the best of your ability (that is, your time and money)

Encourage your local lake association to join their state lake organization

*see back page for a listing

Advanced Lake Bookshelf

Limnology
by Alexander J. Horne
(2nd edition, 1994): check your local library (ISBN 0-07-023673-9) or order this advanced textbook from McGraw-Hill Higher Education, Burr Ridge, IL 60521, or call (630) 789-4000. Web site - http://www.mhhe.com/

Understanding Lake Data
by Byron Shaw, Christine Mechenich, and Lowell Klessig, University of Wisconsin-Extension
to order Publication G3582 send $2.75 (plus sales tax if you live in Wisconsin) to Cooperative Extension Publications, 45 N. Charter Street, Madison, WI 53715, or call 608/262-3346, 877/947-7827 (toll-free).

What is a Lake Association and Starting a Lake Association
(one-page fact sheets): to order at no charge contact UW-Extension, Lakes Management Program, College of Natural Resources, University of Wisconsin, Stevens Point, WI 54481, or call 715/346-2116.

North American Lake Management Society (NALMS) Publications:
NALMS members receive 20% discount on these items. Visit the NALMS BookStore at www.nalms.org for a complete listing of available publications and software as well as more information on the publications listed below.

Send orders to NALMS, PO Box 5443, Madison, WI 53705-0443 or call 608/233-2836.

Lake and Reservoir Management
NALMS' quarterly journal of lake-related research. Visit www.nalms.org for specific article titles. $25 plus shipping and handling.

Lake and Reservoir Restoration Guidance Manual
New, updated edition available Fall 2001.

LakeLine Magazine
NALMS' quarterly magazine. Each issue focuses on a specific lake-related issue. Visit www.nalms.org for specific issue themes. $5 plus shipping and handling.

Monitoring Lake and Reservoir Restoration
(1990, 566 pages) Companion publication to the Lake and Reservoir Restoration Guidance Manual. *$25 plus shipping and handling.*

Etiquette For Boaters and Jet Skiers

- Be courteous on the water
- Know and obey boating safety rules
- Operate a boat that is the right size and speed for your lake
- Put all trash including food wastes into a bag to dispose of in a trash can on shore
- Observe no wake zones
- Maintain a 10 mph speed limit on small lakes
- Operate motorized boats at slow speeds in shallow water (under 15 feet deep)
- Prevent the spread of zebra mussels and other exotic species
- Run your boat or jet ski during hours when most people are awake
- Stay at least far enough away from the shorelines to protect the ecology, shoreline, and uses of the shoreline like swimming and fishing off docks
- Stay off shallow and small lakes with motorized craft
- Special note for ice fishing: pack up all trash including food and fish entrails
- Special note for bass fishing tournaments: watch speed near shoreline and in boat traffic

who to turn to for help

Your **local lake association** will usually have information, educational forums, and networks of people that you can work with to improve the quality of your lake.

Your **county extension office** is a good source for advice about lakes, lawn care, composting, soil testing, water conservation, chemical use, and many other subjects.

As you get more and more interested in lake protection, you will want to join and get active with your **state lake organization** (listed below).

Your state lake organization will be able to answer questions about lake care and water laws, refer you to lake experts, help you locate or organize a lake association, and introduce you to others concerned about lakes.

Michigan Contacts

Michigan Chapter of NALMS (MCNALMS)

Contact the NALMS Office for current contact information
Phone: (608) 233-2836
E-mail: nalms@nalms.org
Web Page: www.nalms.org

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John Engler, Governor
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www.deq.state.mi.us

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Michigan Lake and Stream Associations, Inc.

Web Page:
www.mlswa.org

Contacts:
Donald E. Winne, Executive Director

Pearl Bonnell, Director of Operations

Main Office:
PO Box 249
Three Rivers, MI 49093
Phone: (616) 273-8200
Fax: (616) 273-2919
E-mail: info@mlswa.org

Northern Office:
PO Box 303
Long Lake, MI 48743
Phone: (517) 257-3583
Fax: (517) 257-2073
E-mail: pbonnell@mlswa.org

Other Organizations

US Environmental Protection Agency Clean Lakes Program
Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, NW
Washington, DC 20460
Phone: (202) 260-2090
Web Page: www.epa.gov/owow/lakes/lakes.html

US Bureau of Reclamation
1849 C Street NW
Washington, DC 20240-0001
Web Page: www.usbr.gov

US Geological Society
USGS National Center
12201 Sunrise Valley Drive
Reston, VA 20192
Phone: (888) ASK-USGS (275-8747)
Web Page: www.usgs.gov

USDA - Natural Resources Conservation Service (NRCS)
Watershed and Wetland Division
PO Box 2890
Room 6012 - So. Agriculture Building
Washington, DC 20013
Web Page: www.nrcs.usda.gov

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