The MONTANA LAKE BOOK

Actions You Can Take to Protect Your Lake

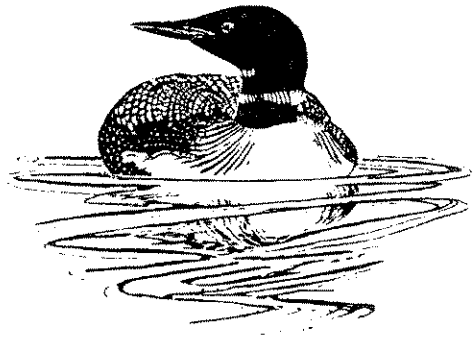
Get Involved and Stay Involved

Individual actions can make a difference. If you live in a lake watershed and care about protecting the lakes in your area, get involved:

- Join your local lake association, or if there isn't one, help form a lake association.
- Volunteer to serve on the local planning board.
- Support responsible lake protection legislation.
- Volunteer to serve with the Board of your County Conservation District.

Finally, if you see blatant violations of the law, report them to the local code enforcement officer or to your state environmental agency. The laws are there to protect the lake, but to be effective, they must be enforced.

THE MONTANA LAKE BOOK



Actions You Can Take to Protect Your Lake

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Introduction

Lakes are among our most valued — and most threatened — natural resources. Many have clear, clean water — water that is critical for drinking water supplies, fish and wildlife habitat and recreation.

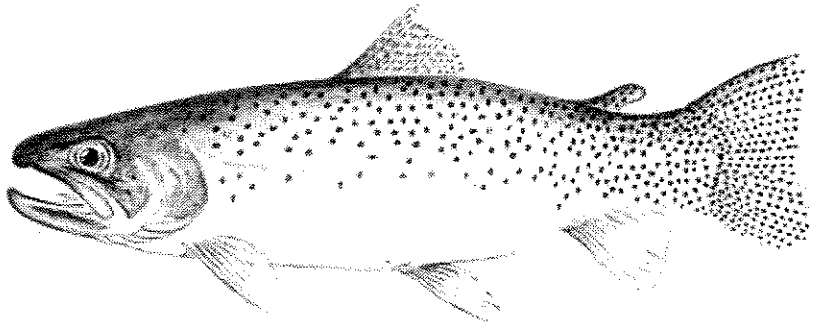
The problem is that our day-to-day actions can inadvertently damage lakes. Even those of us living miles from a lake probably live in a lake watershed. Many things we do, such as caring for our lawns, washing our cars, clearing and building on the land and growing crops, can add to lake pollution.

The "good news" is that it's not too late: lakes can still be protected. Each of us — as individuals and working with our neighbors and lake associations — can be part of the solution.

What is The Montana Lake Book?

The Montana Lake Book explains how lakes function, how they are threatened and how they can be protected. It also spells out simple actions you can take to help protect and preserve lakes.

Lake protection is an investment in our future and our children's future. Learn how you can make a difference.

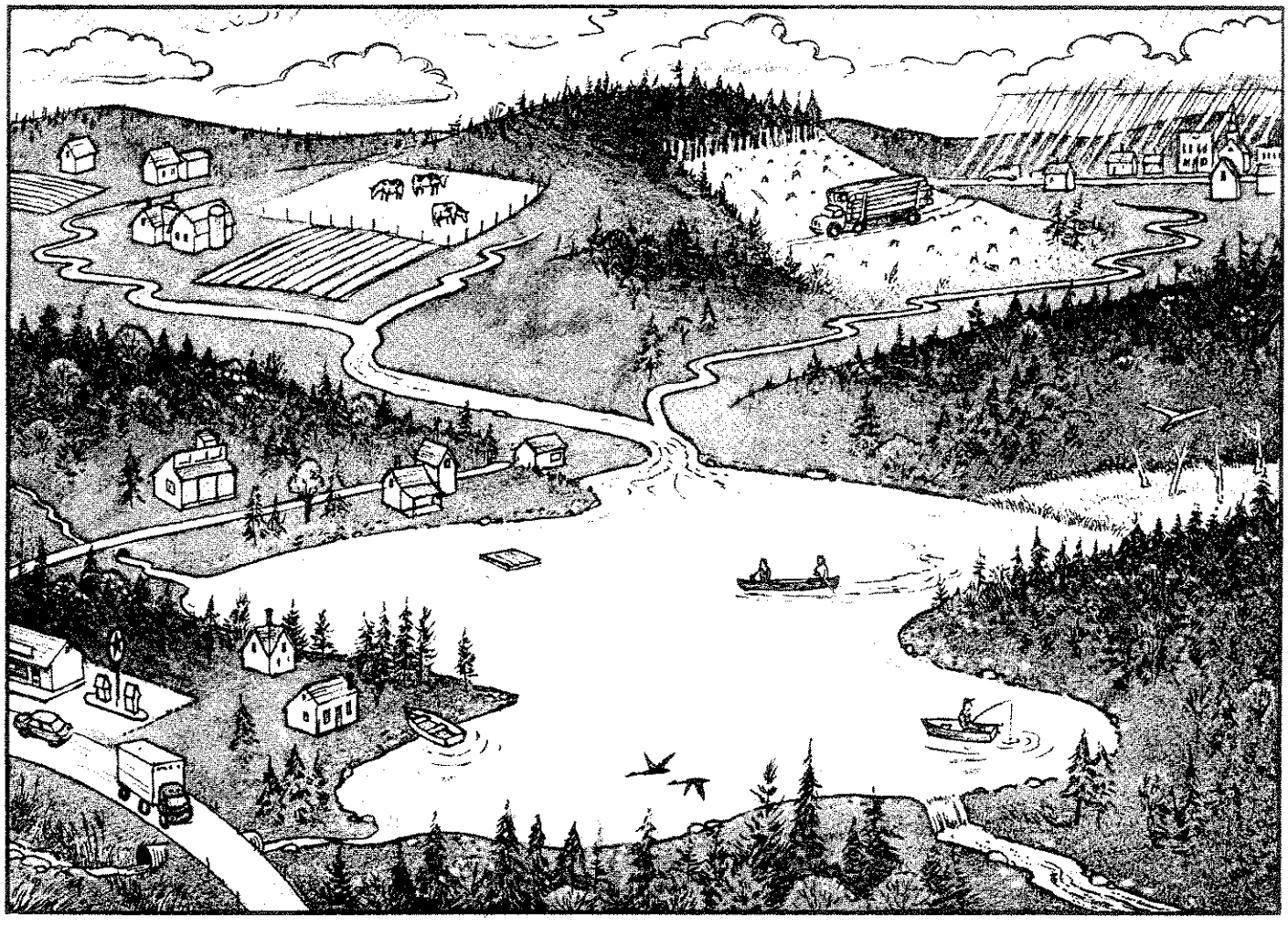


You Can Make a Difference

Your actions can affect the quality of a lake, even if you don't live on the lake, stream, or river, but simply within the lake watershed.

Things you do every day without thinking can affect groundwater, rivers and lakes. Little things, like leaving bare, exposed soil all season, or fertilizing the lawn, or failing to have your septic system pumped out, all add up. For many lakes, time is running out and damage will be done, especially if these problems are not controlled.

Just as these little things add up to cause pollution problems, simple actions we take can help stop the pollution. You can make a difference; "The Montana Lake Book" tells you how.



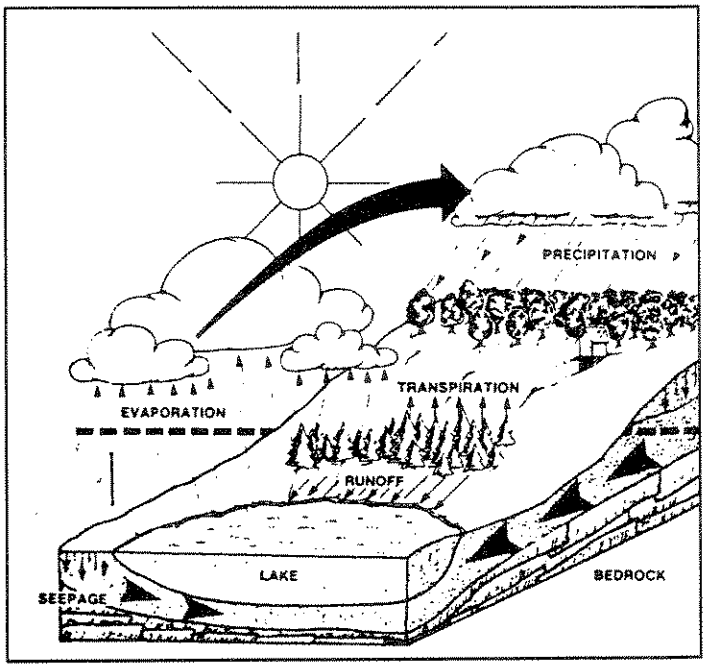
A Lake Watershed: *A lake's watershed consists of all the surrounding land that drains into that lake. Watersheds can extend for miles.*

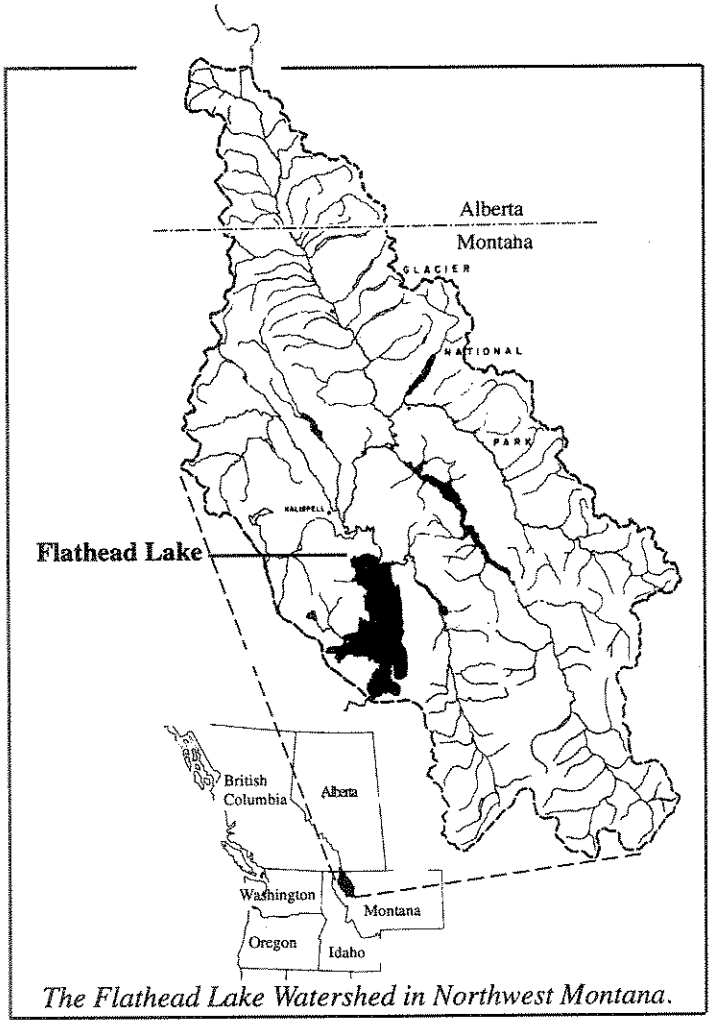
Lake Basics

The Water Cycle

Lakes are one part of the planet's water cycle. Snowmelt and rainwater flowing over the land fill our lakes, rivers, streams and oceans.

In a natural setting, the storm water is cleansed and filtered by the leaf litter and soil. Some water penetrates deeply into the ground to become groundwater and eventually discharges into lakes, rivers and oceans. Evaporation starts the cycle all over again.





The Flathead Lake Watershed in Northwest Montana.

The Watershed

A watershed consists of all the land that contributes water to a body of water. To outline watershed boundaries, connect the points of highest elevation around a lake on a topographic map. Water falling within this bowl flows by gravity in streams and groundwater to the lake.

A watershed can extend for miles. So, lake protection must extend to the entire watershed.

Picture a drop of rainwater landing in your yard three miles from a lake. It washes into the driveway and down to the roadside ditch where it flows into a culvert under the road, which then empties into a stream that feeds the lake.

That drop of water might contain phosphorus from residential lawn fertilizer, cow manure from the farm downstream, motor oil from the road, or dirt from the new development across the street. It all ends up in the lake.

Nutrients: The Green Machines

The nutrients phosphorus and nitrogen are the major threat to lake water quality.

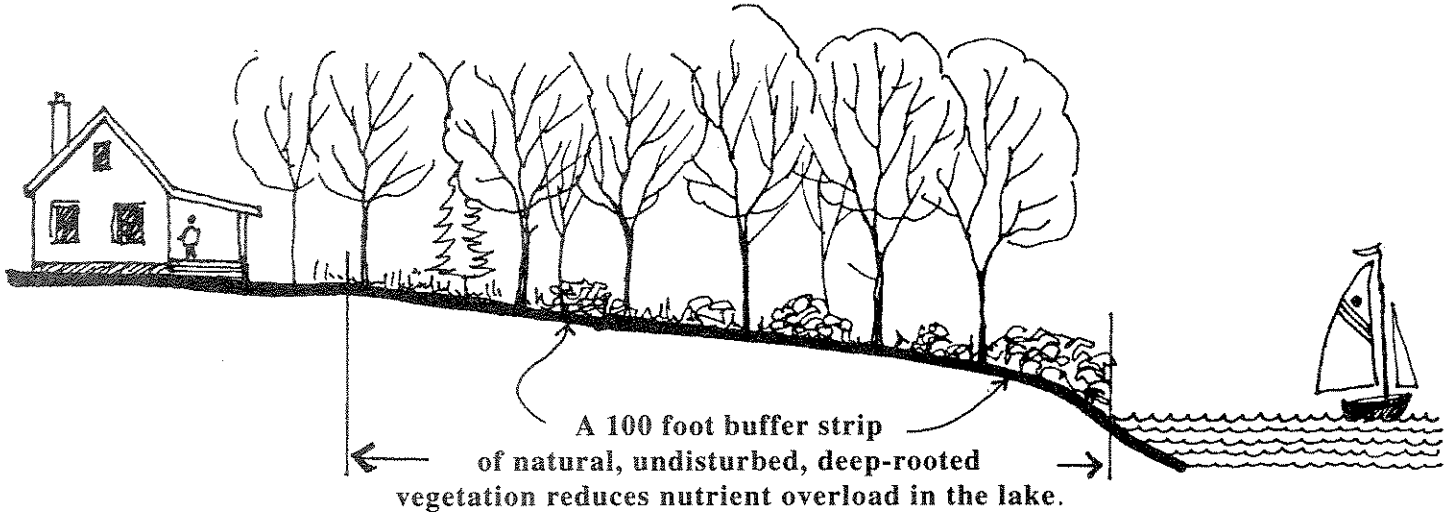
Phosphorus is a natural element found in rocks, soils and organic material. In nature, it is essential for plant growth. Indeed, people use it as a fertilizer. Human activities, however, contribute higher concentrations of phosphorus to lakes than nature does. The lake becomes overloaded.

In a lake, phosphorus feeds microscopic plants called algae. When phosphorus increases, algae feed on it and multiply. Massive quantities of dead algae then fall to the bottom of the lake, decompose and deplete oxygen levels. The loss of oxygen in the bottom waters can free phosphorus previously trapped in the sediments, further increasing the available phosphorus.

In a clear, cold lake, this gradual decrease in dissolved oxygen could cause deep-water trout as well as other fish and aquatic organisms to die. In a lake with a high phosphorus concentration, algal blooms turn the water green and cloudy, fish die, and unpleasant odors and tastes arise. Such a lake loses its appeal for swimmers and boaters and, if it is a drinking water supply, greatly increases costs. Property values may plummet.

Many seemingly harmless activities added together can cause phosphorus overloads. For example, development, not just during the building phase, but long after everything has stabilized, can increase phosphorus concentrations in storm water, Concentrations can be increased by up to 10 times by eliminating natural "filters" and "sponges" (such as trees, bushes, and puddles) and by creating hard, easily washed surfaces (such as lawns, driveways, roads, and rooftops).

The solution, of course, is to take action. Some of the ways to take action include protecting or creating buffer strips and using responsible building techniques. (See the following pages.)



Vegetated Buffer Strips

Vegetated buffer strips are areas of natural vegetation left undisturbed or replanted with native species. Properly functioning buffer strips are composed of trees, shrubs, and a thick duff layer (pine needle, bark mulch or ground cover). Vegetated buffer strips provide a filter and percolation area for the run-off that comes from our homes, work, and recreation areas. The vegetation in the buffer uses nutrients carried in stormwater run-off before it reaches the lake. If the nutrients reach the lake, the aquatic plants will use them to produce algae blooms and may result in diminished water quality.

AVOID NUTRIENT OVERLOAD: USE BUFFER STRIPS

Actions You Can Take *(See Appendix: Buffer Strips and Landscaping Ideas)*

Where to place a buffer strip

Buffer strips need to be located between developed areas and lakes and streams. Vegetated buffer strips can filter storm water run-off from houses, garages, driveways, roads (paved or graveled), parking and recreational areas.

Planting a vegetative buffer

COMPOSITION: Select a variety of native trees, shrubs, grasses, and ground covers to be used in your buffers. All of these types of plants should be included, because, in combination, they take up the most water and nutrients. To make the best choice, look at what is already growing naturally in your immediate area or consult a landscape professional with native plant experience. Where lake views are desired, you can plant shrubs in place of trees, provided the opening remains small. When you eliminate trees, you also reduce the quality of the buffer for deflecting raindrops and taking up nutrients. The natural duff layer that occurs on the forest floor is also important to a properly functioning buffer. A thick layer of mulch material can be used to recreate a duff layer.

GRADING: Leave your buffer area as natural as possible but avoid channeling the run-off. Water must flow through the buffer strip as a sheet flow (1/4 inch deep at most) for the buffer to effectively treat the run-off. In areas that have previously had foot or vehicle traffic, loosen the soil prior to replanting or seeding, allowing the plants to re-establish themselves.

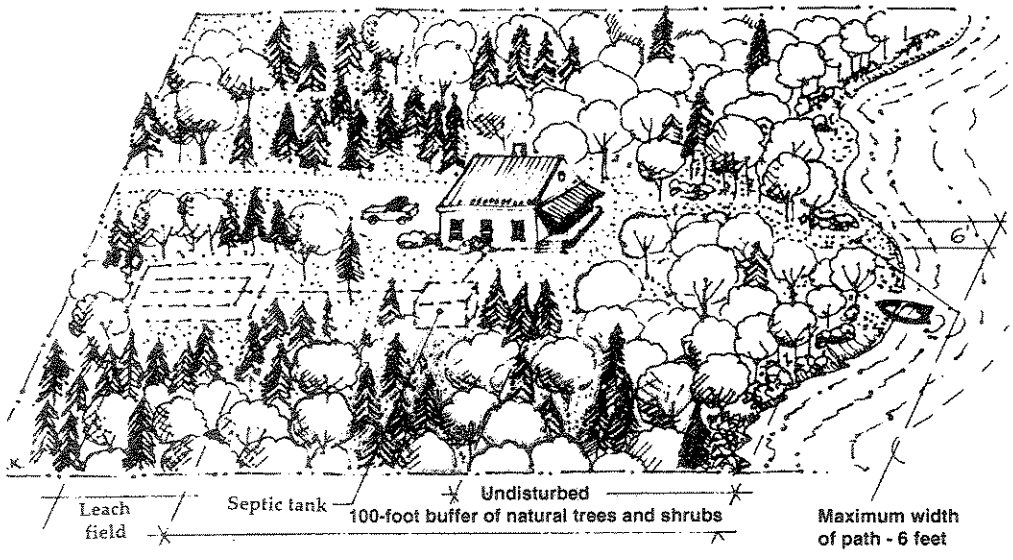
How to make a buffer

- Leave at least 100 feet of naturally vegetated areas along lakeshores and river banks if you have that much area available. If not, use as wide a buffer strip as possible, but **at least** 10 feet minimum. Leave 25 feet, preferably 50 feet or more, along road ditches and intermittent streams.
- Leave the depressions and irregularities in your lawn. Don't grade your property to drain directly into the lake.
- Don't mow down to the edge of the lake. Leave as much natural shrub and tree growth as possible between developed areas and the lake.
- If you have flat wet spots on your property, direct run-off through them as a filter. Allow these wet areas to grow naturally.
- For new construction, minimize the amount of roof, driveway and parking area, as well as other impervious surfaces. On slopes greater than 3:1 use erosion control measures.
- Minimize the size of your lawn and other developed areas.
- Minimize bare areas by defining and limiting your parking area, beach area, and foot paths. Wind foot paths down to the lake and keep them under 6 feet in width. Stabilize heavily trafficked areas with wood chips, bark mulch, etc.
- If the natural buffer has been removed, plant natural, deep-rooted, woody vegetation in its place.
- Use soil and leaf litter as a natural filter.

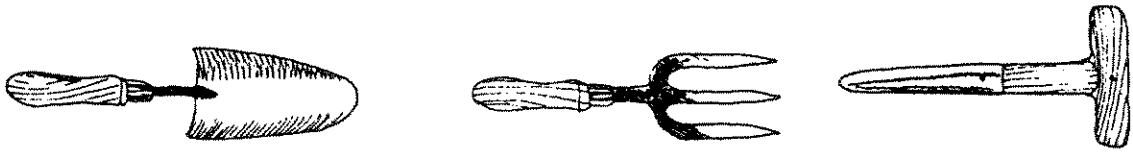
AVOID NUTRIENT OVERLOAD: BUILD RESPONSIBLY

***Actions You Can Take** (See Appendix: Construction Activities)*

- Control erosion by finding a builder who follows good soil protection practices. Minimize the area disturbed and use liberal amounts of hay and other mulches to prevent erosion.
- All disturbed areas should be mulched within one week and should be seeded or mulched within one week of final grading.
- On erodible soils or on slopes, use filter fabric fences or hay bale dams to control erosion that does take place.
- Follow local and state lake protection laws and obtain necessary permits. Both you and the builder may be legally responsible. Information about laws is available from your city planning office and state environmental agencies.
- Leach field setback should be at least 100 feet. The distance may be greater due to soil types and distance to groundwater.
- Design a system to collect roof water and transport it to a vegetated depression.
- Build on flat or gently sloping land. Steep slopes (over 20%) mean a greater likelihood of erosion and run-off problems.
- Preserve existing ground features and leave as much of the native vegetation as possible. Natural depressions allow water to puddle and soak in, instead of running off. Minimize impervious surfaces such as driveways and roofs.
- Don't construct ditches that run directly into lakes and streams. Detain run-off in depressions or divert flow to flat, wooded areas. Flowing water carries sediment and nutrients. Detaining or dispersing water allows it to seep into the soil where sediment and nutrients are filtered out.
- A storm water permit may be required from the Montana Department of Environmental Quality if soil is disturbed. In addition, if dredge or fill material may end up in a wetland, pond, or lake, a permit may be required from the Corps of Engineers in Helena.



Put septic leach field as far from lake as possible (check local laws).



LANDSCAPE WITH CARE

Actions you can take *(See Appendix: Landscaping Ideas)*

- Keep your lawn, garden and other cleared areas small. Enjoy the natural beauty and privacy of the site; maximize the opportunity for nutrient-rich water to soak into the ground by preserving natural buffer strips.

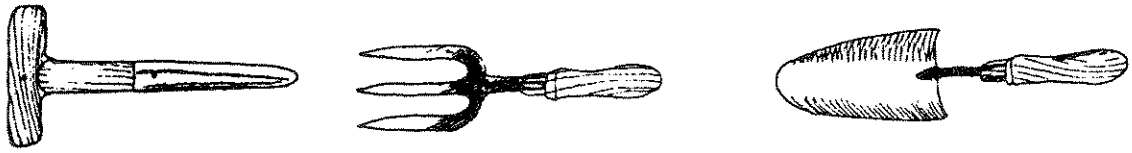
- Don't rake leaves or other forest floor debris. They help trap and filter water and prevent erosion.

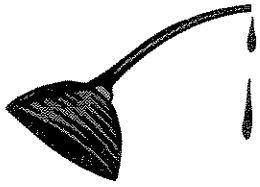
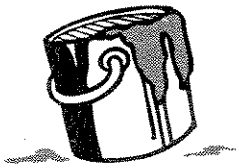
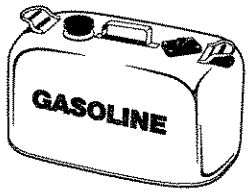
- Use fertilizers only if a soil test indicates the need. Then, follow these guidelines: apply small amounts over a period of weeks and never apply fertilizer before or right after a heavy rain. Liquid fertilizer may be best to prevent run-off of excess phosphorus, if properly applied. Use compost which is a natural fertilizer.

- Choose natural alternatives to herbicides or pesticides for your garden and lawn. Herbicides and pesticides are poisonous and easily carried by run-off water into lakes and drinking water supplies. Consider maintaining a large area of undisturbed, native trees and vegetation. This will require less maintenance.

- Use non-phosphate detergents or use plain water when washing a car or other large item. Don't let the detergent and rinse water get into the lake or streams.

- Phosphorus is banned in laundry detergents in some Montana counties. If there is a choice, pick a detergent without phosphorus.



REDUCE HAZARDOUS MATERIAL USE

Actions you can take *(See Appendix: Hazardous Materials)*

- Store hazardous materials in contained, safe areas. Containment prevents contamination of water supplies and lake water from undetected leaks.

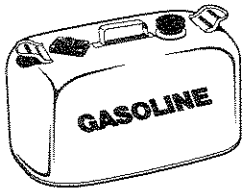
- Dispose of paint thinners and other chemical products responsibly — not on the ground or down the drain. These products cannot be removed by natural processes. Instead:

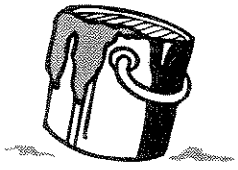
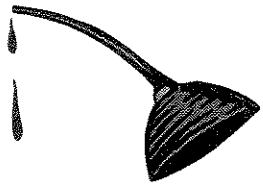
  1. Let latex paint air dry in a well-ventilated place until it hardens, then put it in your garbage. This will help prevent toxic waste leaking into a landfill.

  2. Allow used paint thinner and solvents to settle, then pour off the clear liquid and reuse. The sludge should be air-dried and put in the garbage.

  3. Take oils and petroleum products to a service station that collects used motor oil. These products are high in phosphorus and contain other toxics, but usually can be recycled. Never dispose of these products on driveways or roads.

  4. Dispose of hazardous household materials by taking advantage of special collection days provided by many counties or other organizations.



Checking Lake Water Quality

There are many measures of lake quality, including clarity and suitability for swimming and drinking.

Clarity

Most people are concerned about how clear and clean the water is, but clarity is not necessarily a measure of purity: many toxics are invisible. Clarity, however, does indicate the amount of suspended material, such as silt and algae, that is in the water. Poor clarity may indicate a phosphorus problem since algae are usually the most abundant substance.

Lake transparency is commonly measured by lowering a black and white disk (called a Secchi disk) into the water until it just disappears from sight. Volunteers can be trained to use Secchi disks to monitor their lakes for possible changes in water quality.

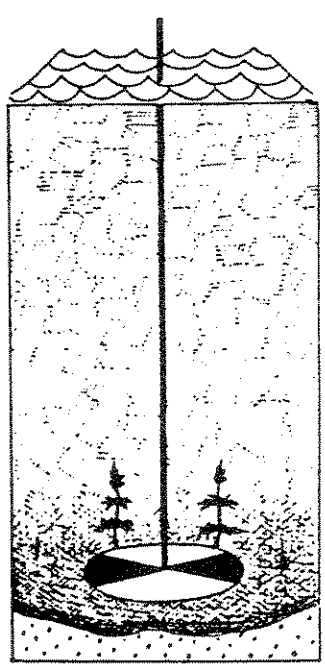
Suitability for Swimming

Lakes are valued for swimming, but under some circumstances may not be swimmable. Algal blooms may make swimming undesirable. Also, occasional high bacteria counts at a local beach or in a bay will temporarily close that area to swimming. Often the problem is from too many swimmers and not enough use of toilet facilities. A day or two is usually sufficient to allow nature to lower bacteria counts, unless the source is a poorly maintained septic system.

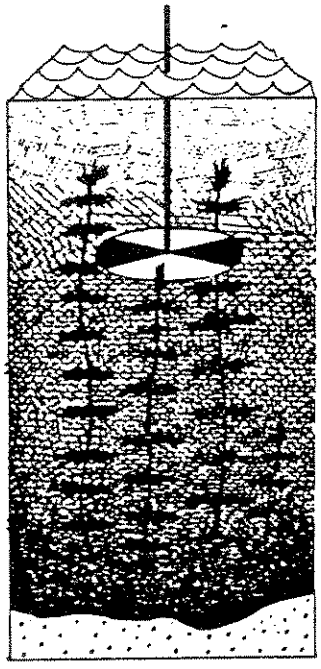
Suitability for Drinking

Do not drink lake water without disinfecting it. Bacteria, viruses or parasites can cause sickness. They may come from a malfunctioning septic system or from warm-blooded animals.

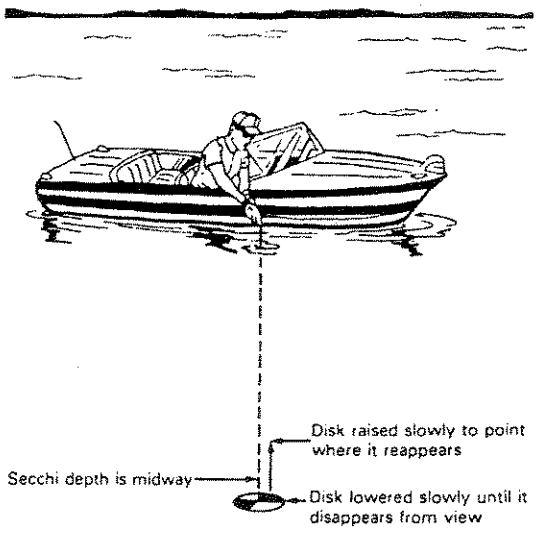
MEASURING WATER CLARITY WITH A SECCHI DISC



A clear lake



A turbid lake



CHECKING WATER QUALITY

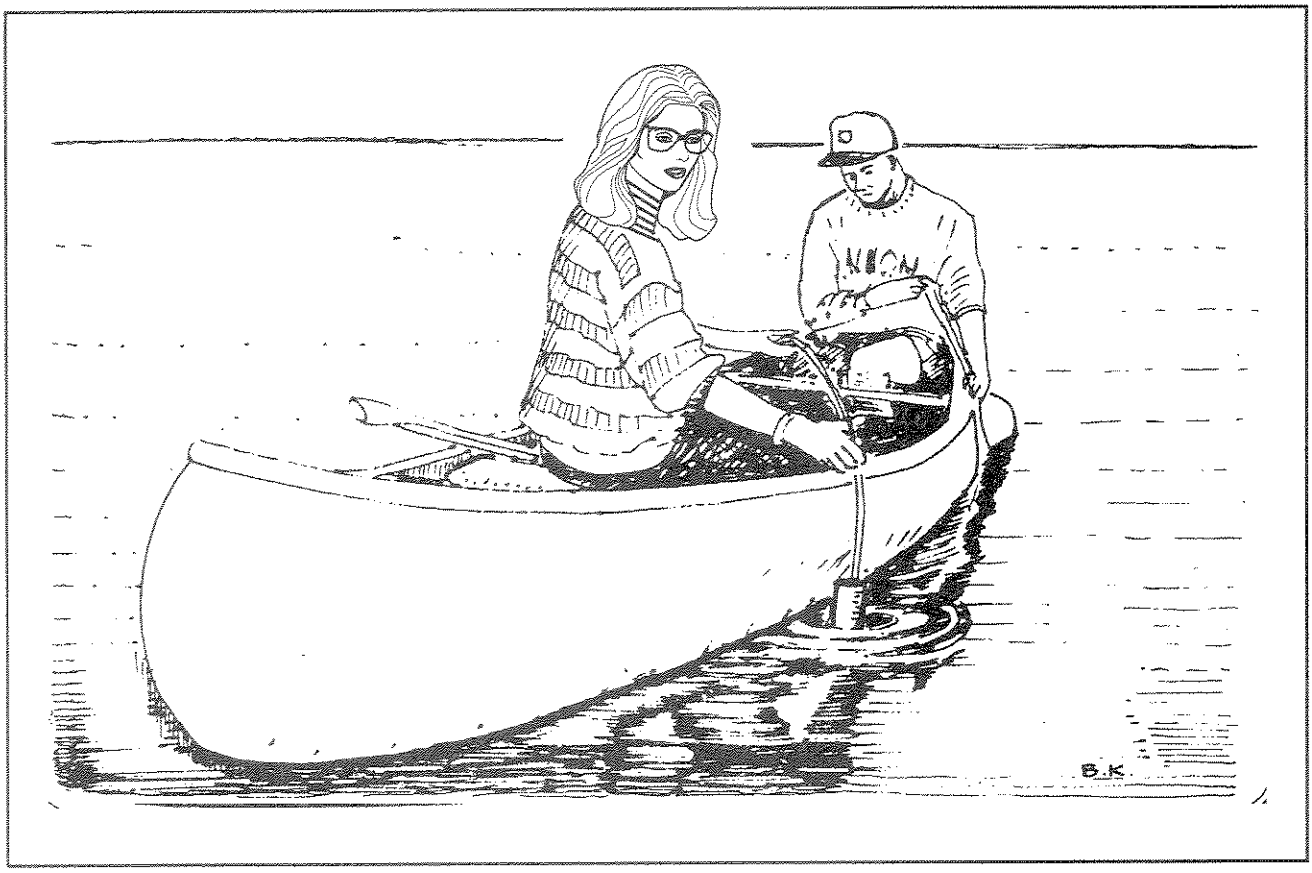
Actions You Can Take *(See Appendix: Water Quality)*

- Find out about the water quality of your lake by contacting the Planning, Prevention and Assistance Division of the Montana Department of Environmental Quality at 406-444-6697.

- Volunteer to monitor the water quality of your lake. Ongoing and properly conducted monitoring of water quality is the best way to determine the health of lakes. Monitoring can help detect trends — both good and bad — in water quality. Such information may be useful to residents, government agencies, and land managers in identifying contributing factors to water quality trends and helping to identify measures that will help maintain a high level of water quality. Due to insufficient government funding for such monitoring activities, the involvement of citizen volunteers is essential.

- Participate in a training program for volunteer monitors. In Flathead and Lake counties, contact the Flathead Basin Commission at 406-752-0081. In Lincoln County, contact Montana Fish, Wildlife & Parks Region One at 406-752-5501. For lakes elsewhere in the state, contact the Montana Watercourse at 406-994-5398.

- Have the water at your local beach tested at high use times or after a period of heavy run-off due to rain. Your local county health department may be able to do the test or direct you to someone who can.



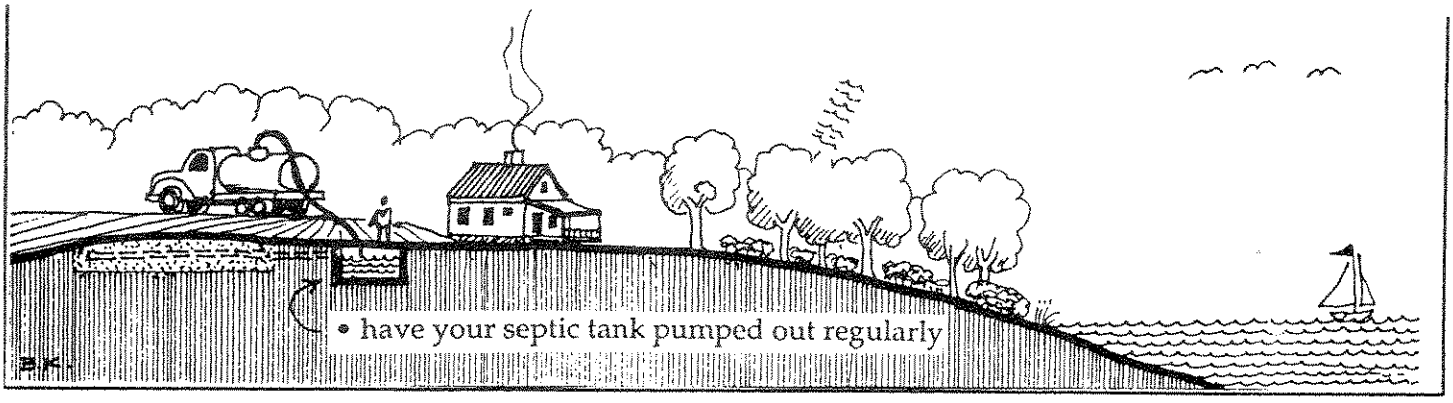
Understanding Septic Systems

A septic system relies on a tank to collect and separate household waste, and a leach field to filter pollutants and wastewater. The system relies on natural microorganisms to consume much of the waste.

A well designed, constructed and maintained septic system does not contaminate water supplies. But if the tank is too full or the microorganisms are dead, solids will overflow into the leach field and clog the system. Neglected or malfunctioning septic systems will cause bacteria and nutrients to be flushed into the groundwater, stream, or lake.

This is why it is critical to:

- be sure your septic leach field is at least 100 feet from water (check local regulations for your area)
- have your septic tank pumped out regularly
- keep products that cannot be broken down out of the system
- avoid using chemicals that kill microorganisms.



Actions You Can Take *(See Appendix: Septic Systems)*

Keep these things out of your septic system

1 Liquids that kill the natural microorganisms that break down the waste:
•strong cleaning agents (bleach, drain cleaner, etc.) • paint • chemicals

2 Products that fill up a septic system and cannot be broken down:
• cigarette butts • paper towels • grease • sanitary napkins • diapers

3 Waste that overburdens the septic system:
• ground-up garbage from a disposal

4 Commercial products which "clean your septic tank."

MAINTAIN A HEALTHY SEPTIC SYSTEM

***Actions You Can Take** (See Appendix: Septic Systems)*

- Install a properly designed septic system that protects water quality. Locate it as far from the water as possible so there is ample soil to remove phosphorus and bacteria.

- Check the sludge level in your septic tank **every year.** Pump it when floating solids and sludge fill about 30% of the tank (the average is every 2-3 years for year-round residents, 5-6 years for seasonal residents). If settled solids are not removed from the tank, they will wash into and clog the leach field.

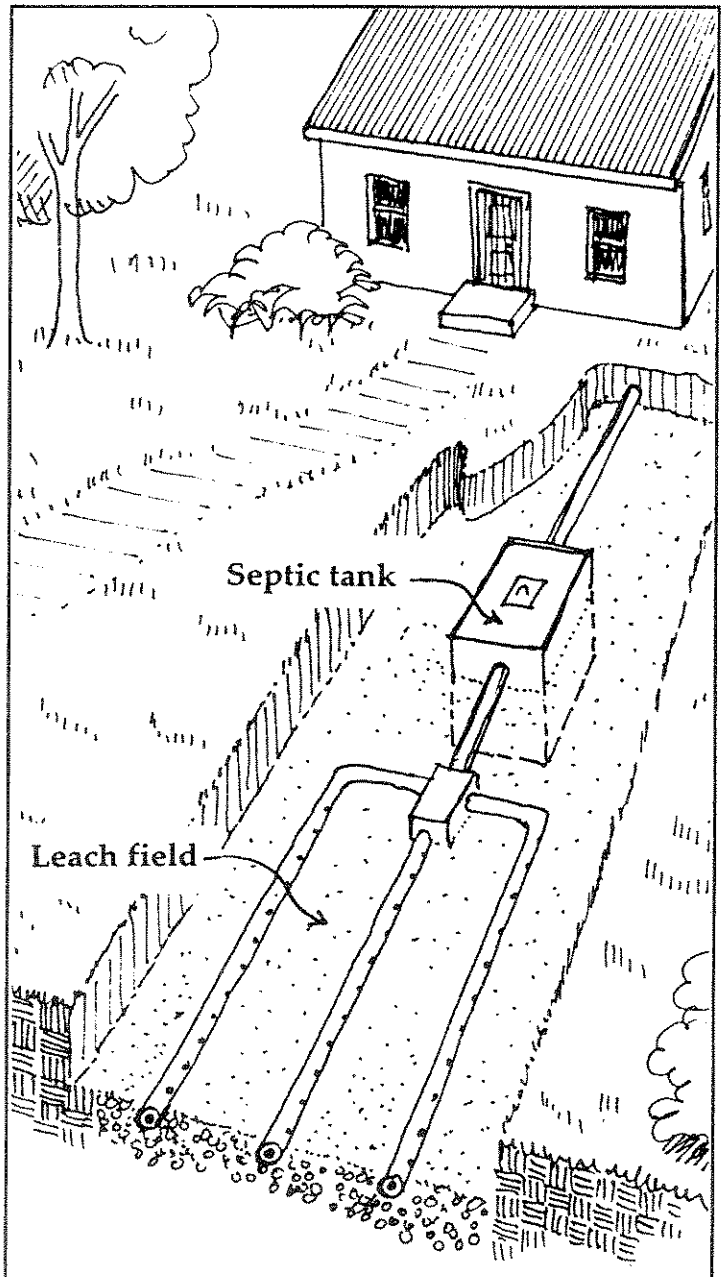
- When checking the sludge level, also look at the tank to be sure the concrete is in good condition. A tank may last indefinitely, but if you see signs of cracking or chipping, check with your county sanitarian to see if it may need to be replaced.

- Organize neighborhood septic tank pumping. Pumpers usually reduce the price for large volume jobs.

- Conserve water; give the septic system time to "rest" after heavy use. The less water you use, the better your septic system will work.

- Use non-phosphate detergents. (Some counties ban phosphate detergents.) Generally, liquid detergents have no phosphate, and powder detergents have some, but be sure to check the product labels. Phosphate detergents can double the amount of phosphorus entering a septic system. Leach fields can only treat a finite amount of phosphorus. Reducing the amount of phosphorus prolongs the life and efficiency of a septic system.

- DON'T use commercial products that claim to clean your septic tank without pumping. These products can clog your leach field, and many contain chemicals which can contaminate groundwater.



• Install a properly designed septic system.

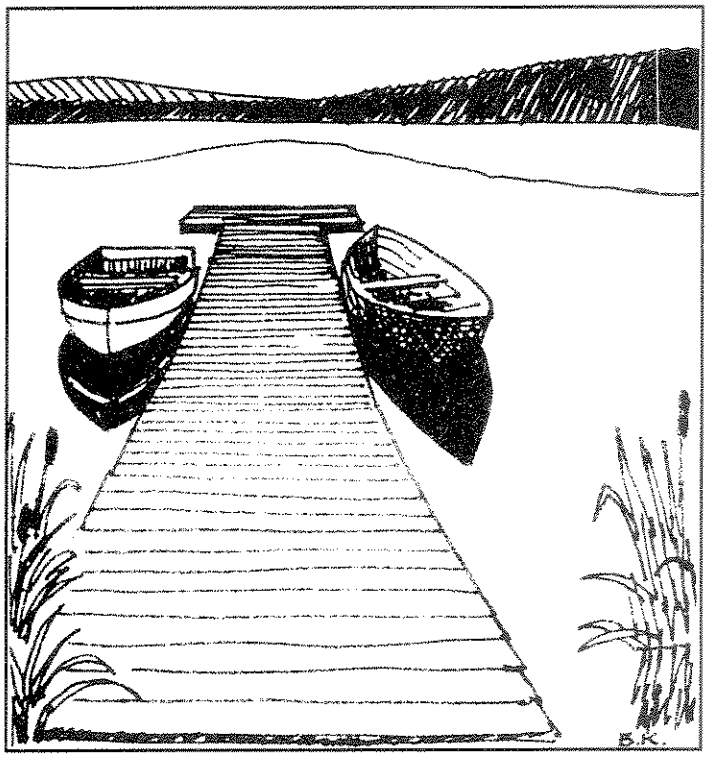
Lakeshore Views and Habitat

People value lakes because of their natural and scenic qualities.

Few can "own" a view; it belongs to everyone. Your view could be ruined by a thoughtless person who builds too close to the lake, paints the residence a highly visible color, or cuts too many trees on the lakeshore. Likewise, you are part of someone else's view.

The natural landscape, your view, is also critical for wildlife. To survive, wildlife and fish need the clean water, food and habitat found in and around lakes. When people build houses, lawns, roads, fences and docks, they reduce wildlife habitat.

Lakeshore property owners have an obligation to protect views to and from the lake. Think of yourself as a partner with the other owners. Keep your section of lake front as natural as possible and encourage your neighbors or "partners" to do the same. At the same time, you will be protecting wildlife habitat.

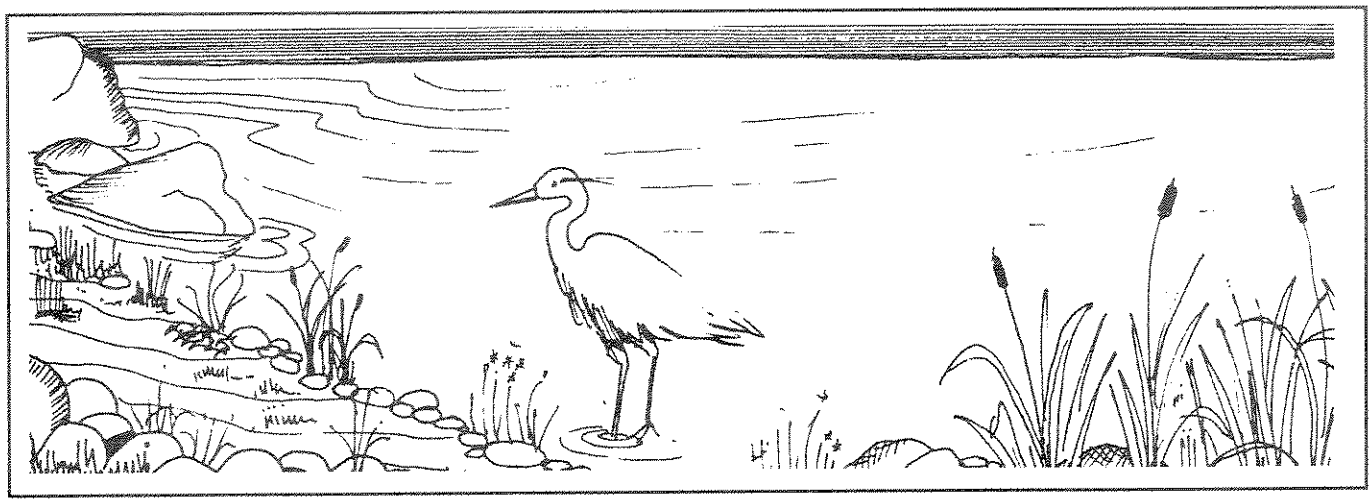


PROTECT THE VIEW

Actions You Can Take
(See Appendix: Landscaping Ideas)

- Minimize the area you set aside for buildings and lawns.
- Keep the shoreline free from permanent structures such as docks, retaining walls and boat houses. Permits may be required for any structures or developments on the lakeshore.
- Maintain low visibility. Leave a natural, undisturbed, wooded buffer strip between the developed area and lakeshore (see page 6). Besides protecting water quality and wildlife habitat, a buffer strip will provide you greater privacy. (Also, buffer strips may be required under local and state laws.)
- If you've removed the natural buffer strip, plant a new one and encourage natural vegetation to grow back (see page 6).
- Place new buildings well back from the shoreline and paint them a dark color to blend in with the natural landscape.
- Use a winding footpath, not a paved road or sweeping lawn, to get to the lake. A winding path prevents erosion.
- Avoid bright outdoor lights. Even one light on the lake can destroy that feeling of remoteness.
- Limit clearing to pruning the lower limbs of trees between your house and the lake; severely limit any tree cutting within 100 feet of the lake. Check local and state laws regarding clearing.

No Beach Is a Good Beach



The first thing you may want to do as a new owner is create your own beach. That is one thing you shouldn't do!

Some lakes have natural beaches. They were created over time by geology and water movement and therefore are stable unless the water level in the lake is controlled by a dam. Plants and animals adapt to these beach environments.

A load of sand or rock dropped at the edge of the lake, however, is a form of pollution, and the combined effect of many beaches can harm a lake. Sand is a significant source of phosphorus and can cover critical edge habitat, suffocate freshwater organisms, and eliminate fish breeding areas.

Finally, artificial beaches won't stay and are illegal. The water currents and waves will wash away the sand, and without a continual source for new sand, the beach will disappear.

KEEP THE SHORE NATURAL

Actions You Can Take *(See Appendix: Construction Activities)*

- Leave the shoreline in its natural condition; don't build an artificial beach. Leave existing rocks and aquatic plants in place to break waves. (They prevent erosion and stabilize the shoreline.)
- Use temporary docks, which are put in and removed seasonally. Creosoted or pressure-treated wood is prohibited in some counties. Cedar is a better option and is very durable.
- Don't build a permanent dock (except on Flathead Lake where severe wave action can necessitate a permanent dock). A permanent dock will disturb bottom habitat, alter wave patterns and cause erosion where none occurred before.
- New plastic and vinyl products offer an alternative to wooden docks.
- White styrofoam docks are prohibited in some counties.
- Use a public beach, boat launch, or marina for access to the lake. By concentrating recreational uses in one area, you protect the shoreline habitat elsewhere.

NOTE: Check with your city, county, state or tribal environmental agencies about permits before you start a project in the lake or on the shoreline.

UFO's: Unidentified Floating Objects

1. Murky, Green-Colored Water.

Description: Murky, green-colored water, possibly scum, that looks like blue-green paint on the windward shore; unpleasant odor.

Analysis: Algal Bloom. Algae are microscopic plants that are natural components of lakes. When very high phosphorus concentrations occur, one species of algae will out-compete the others and become so abundant that the water becomes murky.

2. Yellow-Green Dust.

Description: Yellow-green dust on the lake in early summer

Analysis: Pollen from nearby pine trees. The pollen might look similar to algae, but pollen is yellow-green and dust-like and floats mainly on the surface. (An algal bloom is green to blue-green.) Over time the pollen will become water logged and sink from sight. Pollen usually has little effect on water quality.

3. Dark Cloud.

Description: Dark cloud in the water accompanied by an oily sheen.

Analysis: The cloud is probably insect cases left behind from a hatch of aquatic insects; the insects hatch any time during the open-water season. The wind often concentrates the cases along the shore and, as they decompose, an oily film sometimes forms on the water surface.

4. Dead Fish.

Description: Dead fish floating on the water or washed up on the shore.

Analysis: An occasional few dead fish along a shore is not significant. Sometimes anglers release injured fish which die. Other causes of dead fish are stress due to low oxygen over winter, spawning, or bacterial infections due to warm water in mid to late summer.

Numerous dead fish (i.e. dozens), or dead fish of more than one species is a cause for concern. Report your find to your state environmental agency or to Montana Fish, Wildlife & Parks.

5. Green Cotton Candy.

Description: Green, cotton candy-like clouds floating in shallow waters.

Analysis: Filamentous algae are common in some lakes and may not indicate a water quality problem. These clouds may appear after heavy run-off in the spring or following a long, hot spell in the summer.

However, concentrations of this form of algae only in specific areas may indicate a local pollution source such as a contaminated stream or failing septic system. If a lake develops this type of algae around the entire shoreline, it may be the first indication of a phosphorus problem in the entire lake.

6. Foam.

Description: Foam "soap suds" on the surface or along the shore.

Analysis: Foam along the shore does not necessarily indicate pollution from laundry waste. Virtually all detergents today are a biodegradable form which is easily broken down by bacteria. Most foam is natural.

Foam is created when the surface tension of water is reduced and air is mixed in, causing bubbles. Many natural organic compounds will reduce surface tension, including those from decomposing algae or fish. In a lake, these organic compounds are mixed with air by wind and currents to produce foam.

Large quantities of foam are often found on windward shores, bays and in eddies. Natural foam has a somewhat earthy or fishy aroma. Detergent foam, in contrast, will have a noticeable perfume smell.

7. Red, Itchy Rash.

Description: A red, itchy rash on swimmers soon after coming out of the water.

Analysis: Swimmer's itch, which a doctor must diagnose, is a rash probably caused by cercariae, parasites that must, at one point in their life cycle, locate and penetrate the tissue of a vertebrate. If the cercariae encounter a swimmer, they will partially penetrate the bather's skin. Waterfowl and snails are intermediate hosts.

The swimmer may notice a prickling sensation after getting out of the water. This is the body's natural defense system rejecting the cercariae. Red spots and swelling, similar to the reaction some people have to mosquito or black fly bites, develop later and can last a week or longer. Some people are more resistant to swimmer's itch than others.

To help prevent swimmer's itch, vigorously towel off immediately upon leaving the water. This will destroy many of the cercariae before they enter the skin. A fresh water shower taken immediately after leaving the water is also effective. Swimming in deeper water usually reduces contact with the cercariae. Also, once swimmer's itch is detected in one area, try another area; swimmer's itch can be very localized and the other side of a bay or beach may not be infected. Outbreaks of swimmer's itch usually occur in mid to late summer. Over the counter medications for itching may provide some relief, but you may have to consult medical assistance for severe cases.

8. Worm-like Animals.

Description: Flat, worm-like animals stuck to your skin.

Analysis: Leeches are found in shallow, protected waters, and are active on hot summer days and most active at night. They are attracted to water disturbance around docks and swimming areas.

The best way to avoid leeches is to swim in deep waters off a boat or float.

One successful way to control leeches is bait trapping. Punch small holes in the sides of a metal can with a recloseable lid (e.g., a 1-pound coffee can). Bait it with raw meat. Once the leeches have entered and fed, they cannot leave. Remove the can from the water and dispose of it properly.

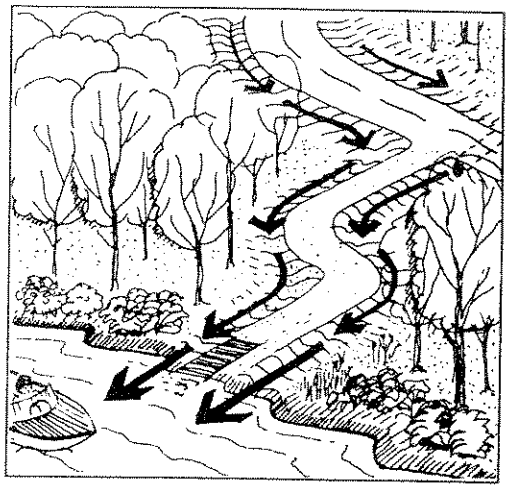
Ducks have been used to control leech populations, but an overabundance of ducks can create other problems. Ducks host a number of parasites, including those that cause swimmer's itch, and duck waste is high in phosphorus.

Roads & Ditches: Phosphorus Highways

Eroding dirt or gravel roads, ATV trails, new roads close to the shore, culverts and roadside ditches — even worn footpaths — are all highways for sediment and phosphorus to get to a stream or lake.

It doesn't take much to start the process: a heavy thunderstorm will scour open ground on a construction site, erode a sloping path, or wash out a newly constructed or recently cleared roadside ditch. An erosion site miles from the lake, but still in the watershed, can alter lake water quality. And numerous erosion sites along miles of roads and ditches have a severe, cumulative effect on water quality, especially during a downpour.

Flowing water scours erosion channels and picks up sediments which carry nutrients. The faster the water flows, the more nutrients and sediments end up in a lake.



BUILD RESPONSIBLY

Actions You Can Take
(See Appendix: Road Construction)

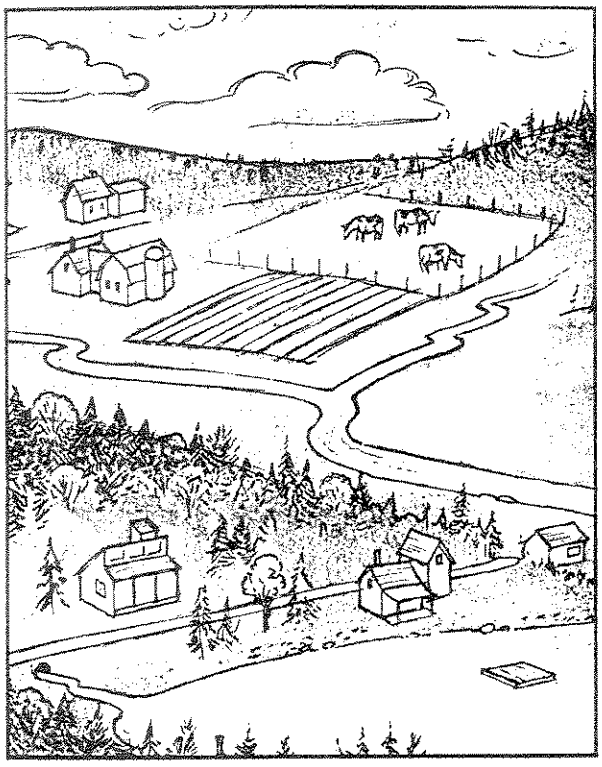
- Limit the clearing of natural vegetation to reduce disturbance of the duff layer (that stores nutrients) and to reduce compacting of soils.
- Reduce the number of paved roads. They increase the flow of nutrients into nearby water sources
- Design and build new roads and driveways with culverts, drainage diversions, ditches and roadside buffers to deal with run-off from major storms. Ask your county Conservation District for help.
- Work with your town to adopt town road standards that will reduce nutrient run-off.
- Avoid construction on steep slopes (greater than 20%). On lesser slopes, use water bars and diversions. Most towns do not allow roads with slopes greater than 10%.
- Keep road and driveway length to a minimum. Clustering development reduces road length.
- Improve poor roads and driveways by diverting storm water off them into roadside ditches that are vegetated or stone-lined and that are U-shaped — not V-shaped.
- Divert water flowing in roadside ditches that have long sloping runs into flat wooded areas where phosphorus and soil are filtered out. Use frequent ditch turn-outs to slow the water flow.
- Retain or plant buffer strips along roads and uphill from ditches to intercept nutrient-rich run-off before it gets into the ditch.
- Use the public boat launch if there is one instead of building your own.
- Organize volunteers to go out during or right after a heavy rainstorm to identify and trace sources of erosion. Determine which streams and rivulets are brown with silt and find out where erosion is worst. Then work with landowners to correct the problems. For assistance, check with your state environmental agency's lakes program, your county Conservation District or lake association.

Farming, Fertilizers & Phosphorus

In many lake watersheds, agriculture is an extremely significant source of nitrogen and phosphorous pollution.

Large expanses of bare or freshly tilled soil are prone to erosion. Commercial fertilizers and manure, if not carefully stored and applied, can also end up fertilizing the lake. Livestock allowed unlimited access to streams and rivers break down streambanks, increasing erosion. Manure in and near streams and lakes can also contaminate the water. But there are actions farmers can take to protect lake quality and increase crop productivity.

Question: What is wrong with this picture?



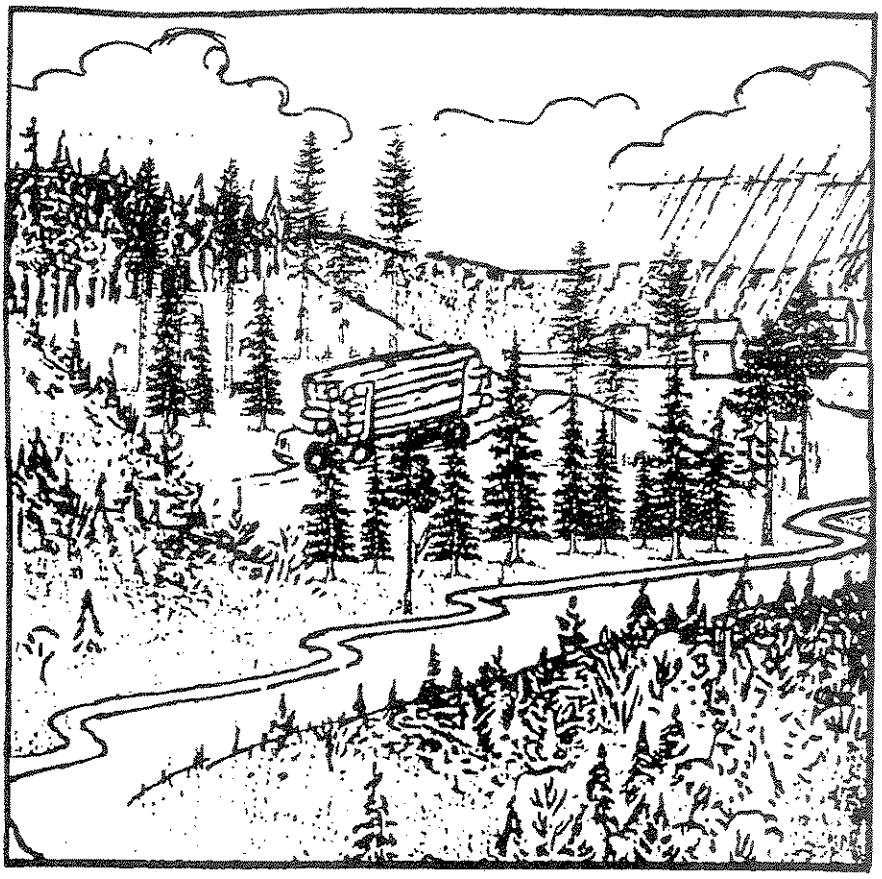
Answer: This area lacks buffer strips around agricultural land and lakeshore property.

FARMING AND WATER QUALITY

Actions You Can Take *(See Appendix: Agricultural Practices)*

- Plant winter cover crops (if needed) to reduce erosion. The roots stabilize soil during run-off.
- Maintain or create buffer strips of dense native vegetation at least 100 feet in width along all streams, rivers and lakes.
- Strip crop and contour plow where appropriate to reduce the potential for erosion; these practices break up large expanses of tilled soil and slow the flow of storm water.
- Avoid the use of pesticides since they can contaminate groundwater, rivers, lakes and streams.
- Apply fertilizer only during the growing season when it can be utilized by the plants, but not before a storm.
- Store and apply commercial fertilizers carefully.
- Store manure in properly designed pits or stacking sites to reduce nutrient-rich run-off which can contaminate groundwater and lakes.
- Use best management practices; consult your county Conservation District or the Montana Department of Environmental Quality Nonpoint Source Pollution Coordinator.

Forestry and Timber Harvest



Forestry operations can be a significant source of phosphorus pollution. Timber harvesting operations, especially, can be a problem when logging roads, stream crossings, skid trails and log landings are improperly built and used.

AVOID EROSION ON LOGGING JOBS

Actions You Can Take *(See Appendix: Timber Harvesting)*

- Avoid removing tree cover along the lakeshore because this can increase run-off and erosion.
- Leave broad strips of undisturbed wooded land along the lakeshore (at least 50 feet). Check local and state forest practices for specific cutting limitations.
- Use "Forestry Best Management Practices" to prevent erosion during and after timber harvest and road construction operations.
- Consult with Montana Department of Natural Resources and Conservation personnel before you plan your timber harvest. They can provide information about professional logging contractors and forestry consultants who can help you with your harvest.
- Check with your local Conservation District to find out if you need a permit for crossing streams or wetlands on you property. Not all crossings require permits, and some crossings are permitted without review. Both the landowner and the contractor may be legally responsible for obtaining permits.
- Avoid working in extremely wet areas and during wet weather. The soil's ability to hold and filter water can be damaged by heavy equipment. Consider harvesting wet areas when the ground is frozen.

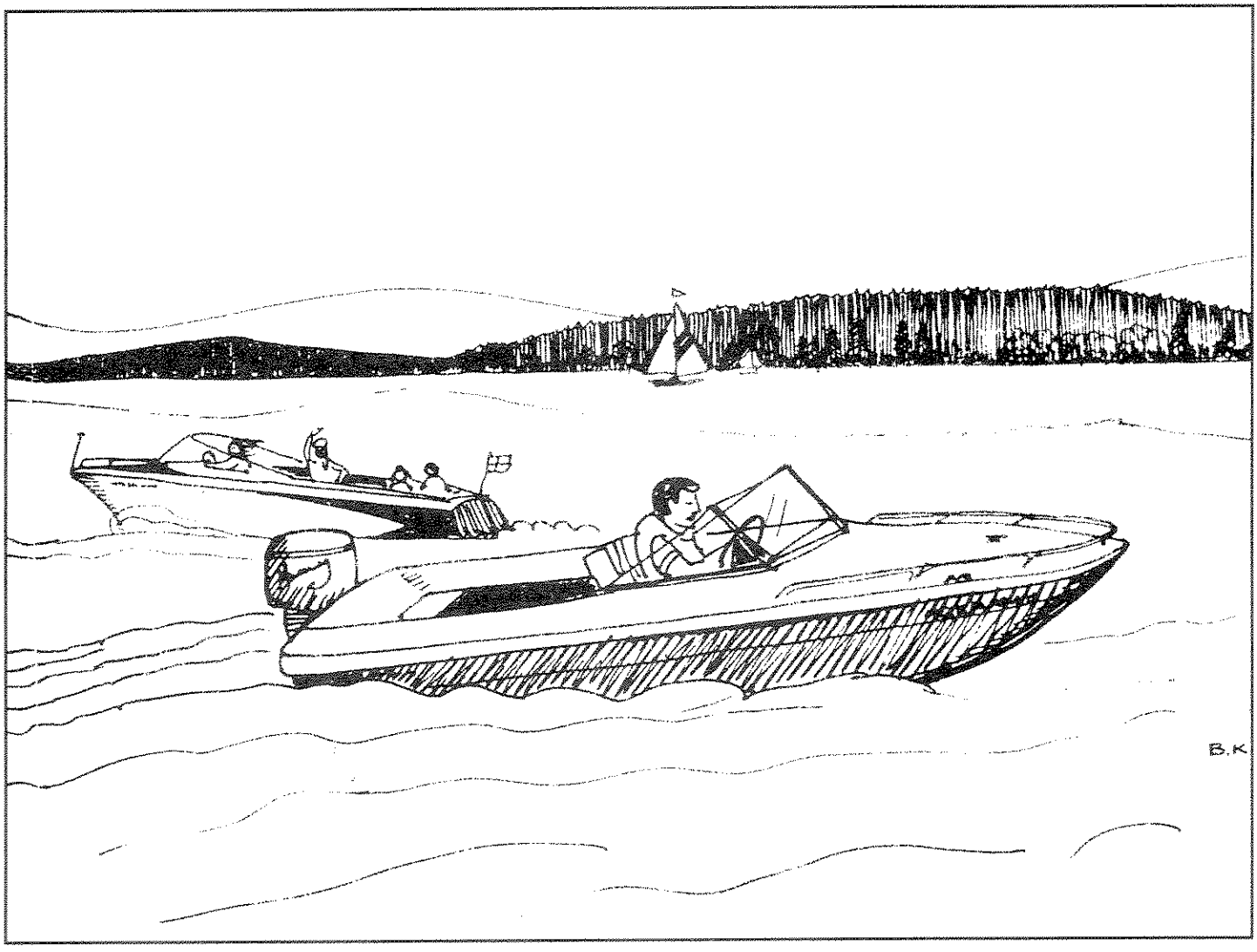
Boating Boom...erang!

Many lakes are suffering from a "boomerang" affliction: they attract boaters and jet skiers because of their beauty and accessibility, but too many water craft and/or careless boating decreases their attractiveness.

Boating has always been part of the lake experience. However, as motors have gotten bigger, problems have increased. The most serious boating problems are directly related to increased motor boat and jet ski use: safety, congestion, noise pollution, accelerated shoreline erosion and sedimentation from bigger wakes, air and water pollution from poorly tuned engines, wildlife harassment, gas spills, and human waste.

Each of us must be responsible for our own actions and then work to change the actions of others.

Boating laws are administered in Montana by Fish, Wildlife & Parks; this varies from state to state. In some states, towns that have worked with lake associations have hired their own harbor masters or other officials to patrol lakes and enforce boating laws. If you have concerns, talk with your local police department, sheriff's department or Montana Fish, Wildlife & Parks.



PRACTICE COURTEOUS, RESPONSIBLE BOATING

***Actions You Can Take** (See Appendix: Courteous Boating)*

When buying a boat:

- Choose a boat that fits the size and depth of the lake. This applies to both length and horsepower.
- Buy an engine with good fuel-burning efficiency. Make sure the engine and boat complement each other.
- Use correct gasoline/oil mixtures. Use lead-free gas.
- Be careful when handling gas to avoid spills. Fix leaks.
- Make sure the engine has current air emission controls which prevent smelly clouds of exhaust from escaping. Have frequent tune-ups.
- Keep your muffler in good condition. Exhaust pipes should be below the water line.
- Consider the advantages of a 4-stroke engine.

When driving a boat:

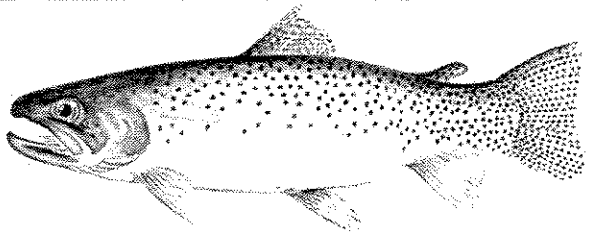
- Drive at safe, fuel-efficient speeds.
- Watch your wake and slow down if it gets too big; large wakes erode the shoreline and damage wildlife habitat.
- Refrain from operating motorized watercraft within 200 feet of any shoreline (including islands) at greater than no-wake speed.
- Operate motorized watercraft away from shallow areas. Motors churn up bottom vegetation and habitat, scare nesting birds off their nests and re-suspend nutrient-rich sediments.
- Keep a trash bag handy and make sure nothing is thrown into the lake. Never leave cut fishing line or plastic materials in the water.
- Dispose of boat sewage and waste water by keeping it in a sealed holding tank and pumping it out at a marina. **Overboard discharge of sewage and waste water is illegal.**
- Enjoy the natural quiet of being on the lake. Consider canoeing, rowing and sailing. Avoid playing loud radios or tape recorders. Sound travels easily over water to everyone on the lake.
- Stay away from birds and animals and their nests. It is illegal to harass wildlife. Following or chasing them in a boat may separate parents from their young or frighten animals from their natural habitat.
- Obtain a copy of Montana's boating laws and know the "rules of the road."
- Operate jet skis, wet bikes, surf jets and similar vehicles responsibly, safely, and courteously, and well away from congested areas.
- In Montana, the owner who permits another person to operate his or her watercraft is liable for violations by the operator.

Volunteer Water Watch Program

Montana recently embarked on an innovative program that teams concerned citizens with the Montana Fish, Wildlife & Parks in an effort to make our waters safer for recreation. This program is patterned after the highly successful Neighborhood Watch. If you are interested in being a Volunteer or have any questions about this program or about boating laws, contact the local FWP.

Different Fish for Different Lakes

To fish, not all lakes are alike



Some lakes are shallow, warm and have lots of aquatic plants. Bass, perch and pike, for example, like these warm-water lakes.

Other lakes are deep, with a large volume of cold, well-oxygenated water. These lakes support trout and salmon fisheries.

Temperature and oxygen levels are the two major factors that control whether or not certain fish species are present. Other factors such as available habitat, competing species and stocking practices are influences as well.

Declining water quality may result in the loss of a cold-water fishery. Increased nutrients, for example, ultimately leads to the loss of oxygen in the deeper regions of the lake (see page 5). Once cold water fish habitat is lost, usually it cannot be regained. Restoration of poor water quality lakes is expensive and can improve lakes only to a certain degree, not enough to support trout and salmon.

No fish for some lakes

Some lakes and streams naturally lack fish. These waters provide very important habitat for frogs and salamanders. Introduction of fish to such areas can decimate the amphibian population. Numbers of many amphibians have decreased dramatically worldwide, and it is important to protect all remaining habitat.

PROTECT YOUR LAKE'S FISHERY

Actions You Can Take *(See Appendix - Lake Biology)*

- **Do not release any fish into your lake that were not caught there. IT IS ILLEGAL. Introduced species may out-compete existing species for food and habitat, may introduce diseases, and may decrease water quality.**
- Keep sediments from entering the lake. Sediments can smother lake spawning areas, aquatic plants and fish food such as crayfish, insects, etc.
- Prevent nutrients from getting into the lake. Follow actions described on pages 5-9.
- Do not remove cover in the water such as trees, logs or weed beds.
- Guard against the introduction of aquatic plants, invertebrates and fish species not naturally found in your lake.
- Don't leave cut fishing line in the water. Carry a trash bag in your boat and pick up any line that other people have left. Make sure trash bins are available at boat launches.
- When cleaning fish, either sink the entrails in deep water or put them in garbage cans.
- Drain your live wells, transom wells, and bilges thoroughly and away from any river, lake, or water body.

Illegal Fish Introductions

What's the problem?

Montana's lakes, rivers and streams constitute a multi-million dollar resource which we all enjoy. Our sport fisheries are among the finest in the world. However, when people illegally introduce fish to these waters, they jeopardize those fisheries.

Illegal introductions cause serious problems. Fish like carp, yellow perch, suckers, shiners, sunfish and even certain game fish can severely affect a sport fishery. So, when people move live fish from one body of water to another, the future of their own fishing is at stake.

Some of the earliest fisheries management in the United States centered around the introduction of game fish. In fact, 1989 marked the centennial of the arrival of rainbow and brown trout to Montana's waters. Those introduced trout are the foundation for Montana's internationally famous fishing. Our waters have also been planted with northern pike, walleye, bass, crappie, sunfish, golden trout, salmon, yellow perch and carp, among others.

Some introductions are planned management plants that benefit certain waters. But sometimes anglers have illegally introduced species by using live bait, dumping bait buckets, and even intentionally stocking rivers and lakes.

One example of a drastic change caused by an introduction is that of the *Mysis* shrimp into Flathead Lake which caused the collapse of the kokanee fishery in the lake, in addition to the potential for other, unknown changes.

Why not introduce species?

Moving live fish or insects from one body of water to another is a CRIME. You can be arrested and fined for any such activity in the state of Montana.

There are important reasons for this law. Introduced fish may:

- compete with native or already established species.
- behave differently in a new habitat — they may not improve and are likely to harm the fishery.
- interbreed with established species.
- carry and spread new diseases and parasites.
- actually alter the existing habitat.
- raise management costs by requiring planting of more or larger fish or even chemical rehabilitation to maintain or restore the fishery. The result is less fishing opportunity and higher costs for anglers.

In Montana, fisheries managers emphasize preserving and enhancing wild fish populations. They also give special consideration to populations of native fish. And Montana is the home of many valuable native species: white sturgeon, mountain whitefish, grayling, bull trout and cutthroat trout, among others. Montanans should take pride in their natural fisheries.

Because of our rich fishery resource, the Montana Fish, Wildlife & Parks maintains a cautious attitude toward any introduced species. Introduced fish can pose a threat to our valuable natural fish and aquatic resources. When we introduce a new species to our waters, the native fish and habitat can suffer.

WHAT CAN WE DO?

Actions You Can Take
(See Appendix: Lake Biology and Habitat)

- **Don't** move live fish or insects from one body of water to another for any reason.
- **Don't** release any aquarium fish or bait fish into natural waters.
- **Do** report any such moves you see or hear about to MFWP as soon as possible.

Aquatic Habitat for Plants & Fish

Rooted aquatic plants grow in shallow, protected waters. Although they may seem like nothing more than nuisance weeds at times, their overall benefit is immense.

They provide spawning habitat for certain fish species and nursery areas for virtually all warm-water fish.

They provide habitat for many small insects and crustaceans, which in turn are important food sources for fish.

They stabilize lake sediments by absorbing the force of waves and reducing shoreline erosion. Their roots trap sediment particles and hold them in place.

They absorb nutrients, such as phosphorus, and thus reduce undesirable algae growth.

The presence of aquatic plants does not necessarily indicate a pollution problem. They may thrive, however, where tree removal, filling and construction, and shoreline erosion have occurred.

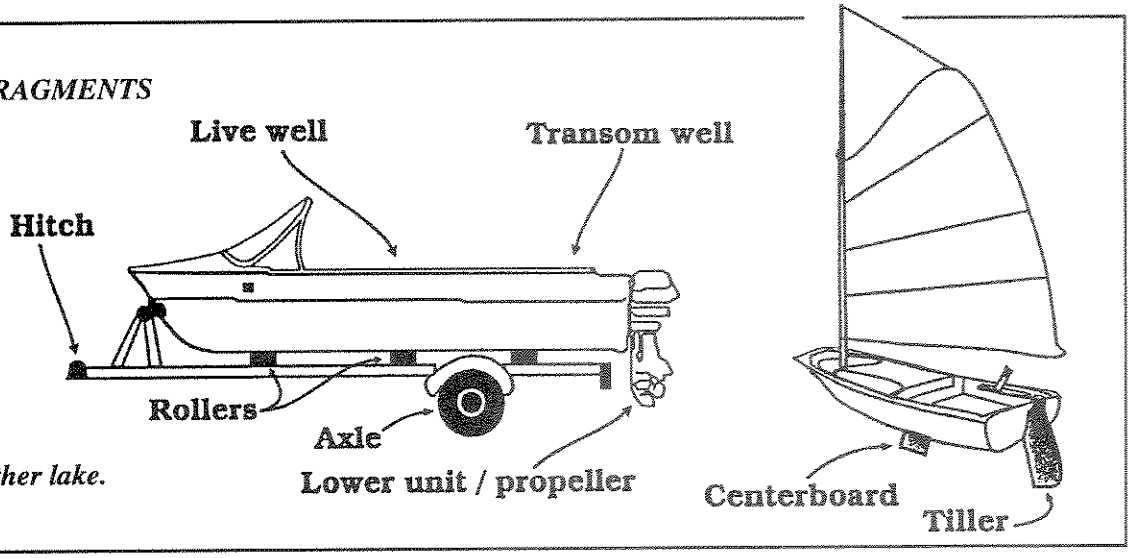
Some people complain about aquatic plants, but we need to learn to live with these plants and recognize their vital role in nature. Furthermore, the removal of plants is only temporary. They quickly grow back.

LEARN TO LIVE WITH AQUATIC PLANTS

Actions You Can Take *(See Appendix: Lake Biology)*

- Don't remove plants until you have checked to determine if a permit is needed. Removal by hand-cutting, raking or pulling is least harmful to the lake.
- Don't use herbicides. Many lake residents use their lakes as a water supply. An herbicide application could contaminate your neighbor's drinking water. Furthermore, the dose of herbicides needed to kill aquatic plants will also kill other aquatic organisms vital to the food chain. The released nutrients could lead to an algal bloom.
- Remove plant fragments from boats and trailers before leaving a lake. Plant fragments and attached organisms can travel with the boat to a new lake where they can spread. Even if your lake has not been invaded by nuisance species, it could happen if you are not vigilant. It is especially important to check your boat when travelling from one lake to another.

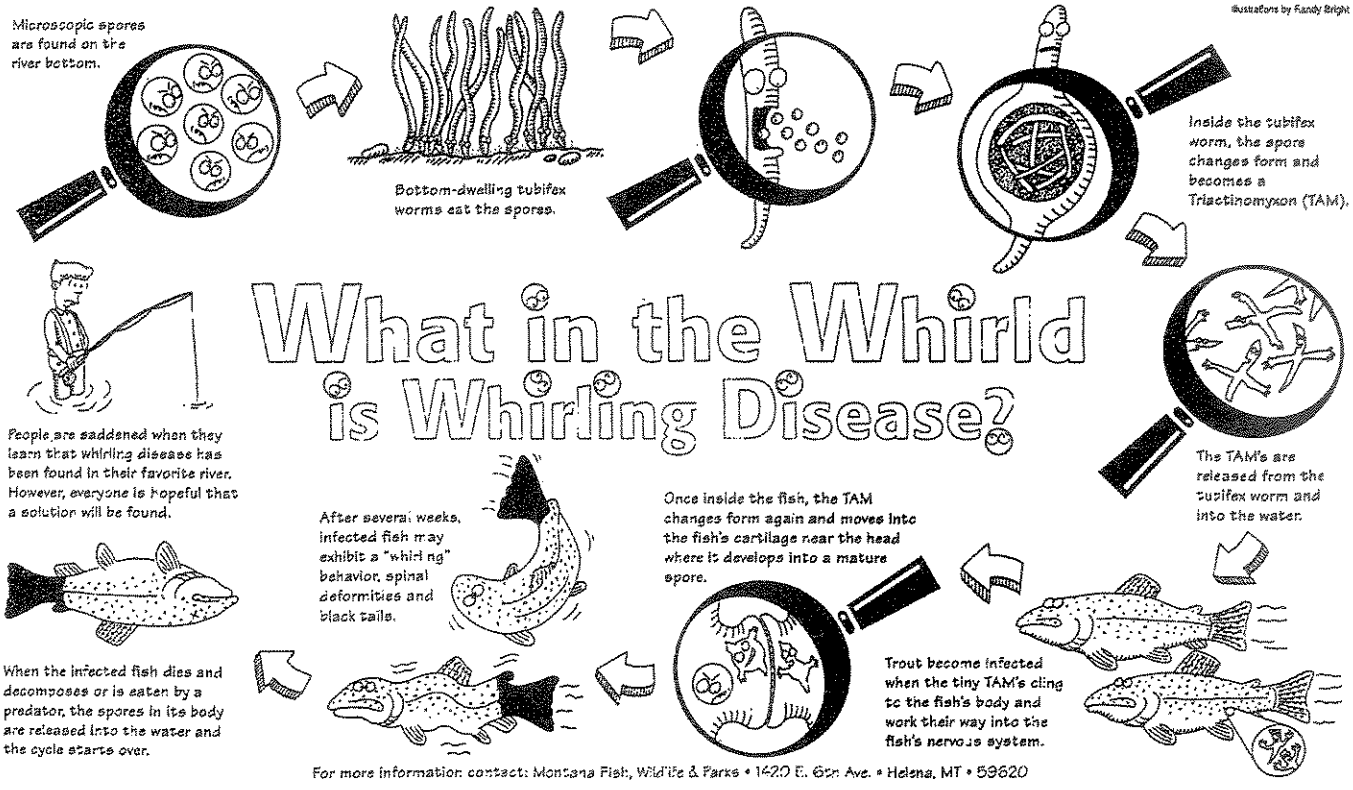
REMOVE PLANT FRAGMENTS from all parts of boats and trailers before leaving a lake. If you don't, plant fragments and attached organisms can travel with the boat, allowing nuisance species to invade another lake.



Whirling Disease in Montana

Whirling disease takes its name from an erratic, whirling behavior exhibited by some trout that have been infected by the parasite, *Myxobolus cerebralis*. Whirling disease affects the cartilage of young trout, and severe infections can lead to physical deformities that reduce their ability to feed and avoid predators.

Whirling disease has been in the U.S. since 1956, but it was first discovered in Montana in 1994. The disease-causing parasite has a complex, two-host life cycle — first aquatic worms, then fish. The Governor's Whirling Disease Task Force considers whirling disease to be the single greatest threat to Montana's wild trout.



COMBAT WHIRLING DISEASE

Actions you Can Take (See Appendix: Lake Biology and Habitat)

- Never transport live fish from one place to another. In Montana, it is illegal!
- Before leaving the stream or lake, be sure to thoroughly check your boating and fishing equipment for mud and aquatic plants. Mud and aquatic plants could be holding tubifex worms and whirling disease spores, so if you find them clinging to your equipment, wash or scrape them off before departing the water.
- Don't dispose of fish entrails or skeletal parts in a kitchen disposal. It is believed that whirling disease spores can survive wastewater treatment systems.
- Don't collect sculpins (also known as bullheads) or use them as bait. It is illegal!
- Don't use trout, whitefish, or salmon parts as cut bait. It is illegal!

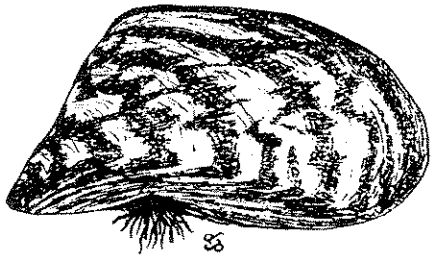
The Zebra Mussel: A Threat on the Move

The zebra mussel is a tiny black-and-white striped shellfish, discovered in the Great Lakes in 1988. It is native to the Eurasian waters and may have "hitched a ride" to the U.S. in ballast water of tankers from that area.

These creatures can cause considerable damage — and, at the rate they are spreading, could do so in Montana. A zebra mussel uses its gluey foot to attach itself to nearly anything in fresh water. It attaches to boat hulls, engines, and docks. It will colonize and clog raw water intake pipes and screens at municipal water facilities, power plants, industrial facilities and lakeshore residences. The mussel disrupts supplies of drinking, cooling, processing and irrigating water.

The zebra mussel reproduces abundantly and feeds on the food supply normally used by native fish. It changes the entire food web in a very short time. It also produces foul smells and bad tastes in water supplies as well as littering beaches and producing unpleasant odors.

These shellfish have been moving west across the United States and are a major threat to water quality and native species. In the larval stage they are able to remain alive for long periods of time (in a boat). Simply driving a boat from Lake Erie to Fort Peck could easily introduce them to a Montana lake!



WHAT YOU CAN DO

Actions You Can Take

(See Appendix: Lake Biology and Habitat)

When boating outside your area:

- Inspect your boat and trailer for weeds. Remove and discard any you find—they may harbor zebra mussels.
- Flush the cooling system, bilge areas and live wells with tap water.
- Discard all bait that has contacted waters that might be infested.
- Leave your boat out of the water to dry for 48 hours or until it is completely dry.
- Wash down the hull at a car wash. Hot (140 degree) water and high pressure spray will help. Wash fouling off your boat away from water sources!
- Learn more about the zebra mussel threat.
- Share information, ideas and monitoring tasks with other members of your lake association or other groups.
- Report any sightings to Montana Fish, Wildlife & Parks personnel. Preserve specimens in alcohol if possible and note the location where they were found. Confirm suspect sightings with any authority before alarming others.

Montana, the Last Best Place:

TO HELP KEEP IT THAT WAY, THE FOLLOWING REGULATIONS HAVE BEEN PUT INTO PLACE

MONTANA LAKE LAWS
MONTANA CODE ANNOTATED
PART 2

75-7-201. Policy. The legislature finds and declares that the natural lakes of Montana are high in scenic and resource values and that the conservation and protection of these lakes is important to the continued value of lakeshore property as well as to the state's residents and visitors who use and enjoy the lakes. The legislature further declares that local governments should play the primary public roles in establishing policies to conserve and protect lakes. Local governments do not have adequate statutory powers to protect their lake areas, and it is the purpose of this part to confer such powers on local governments, provided that such powers are exercised to maintain public health, welfare, and safety.

75-7-202. Definitions. As used in this part, the following definitions apply-(Area of Jurisdiction).

"Lakeshore" is the perimeter of a lake when the lake is at mean annual high-water elevation, including the land within 20 horizontal feet from that high-water elevation.

75-7-203. Change in definition of lake by local government. A local governing body may by resolution change the minimum size in the definition of a lake so that this part may apply to natural lakes in the county no smaller than 20 acres in water surface area.

75-7-204. Work for which permit required.

(1) A person who proposes to do any work that will alter or diminish the course, current, or cross-sectional area of a lake or its lakeshore must first secure a permit for the work.

(2) Without limitation, the following activities, when conducted below mean annual high-water elevation, are examples of work for which a permit is required: construction of channels and ditches; dredging of lake bottom areas to remove muck, silt, or weeds; lagooning, meaning the placement of a narrow strip of land across a portion of a lake to create a lagoon; filling; constructing breakwaters of pilings; constructing wharves and docks.

Many counties in Montana have established regulations that address construction and development activities conducted 20 horizontal feet above the Mean Annual High Water Elevation.

75-7-205. Unauthorized work. A person who performs work in a lake after May 1, 1975, without a permit for that work shall, if required by the local governing body or the district court, restore the lake to its condition before he disturbed it.

75-7-208. Factors favoring issuance of permit. The regulations shall favor issuance if the proposed work will not during either its construction or its utilization:

(1) materially diminish water quality;
(2) materially diminish habitat for fish or wildlife;
(3) interfere with navigation or other lawful recreation;
(4) create a public nuisance; or
(5) create a visual impact discordant with natural scenic values, as determined by the local governing body, where such values form the predominant landscape elements.

75-7-210. Application for permit-fee-limitations. (1) A person seeking a permit for work in a lake or on a lakeshore shall apply to the local governing body and shall pay a permit fee established by the governing body.

RECREATIONAL LAW

23-2-522. Discharge of waste from a vessel. This law makes it illegal to discharge any garbage, waste, refuse, or sewage from any vessel into, upon, or near any of the waters of Montana.

87-3-125. Restrictions on motor driven vehicles. This law makes it unlawful to drive, rally, stir, or harass any wildlife with a motor driven vehicle or vessel.

23-2-523. Prohibited operation of boats. This law states: A person may not operate, or knowingly allow the operation of a vessel or similar device in a reckless or negligent manner so as to endanger the life, limb, or property of a person. Such reckless operation would include, but not be limited to:

weaving through congested traffic, following directly behind a water skier, speeding in confined or restricted areas, buzzing or wetting down others, jumping the wake of another vessel or skier within 100 yards of that vessel or skier, operating a vessel while under the influence of alcohol or drugs.

This Law also sets noise limitations for vessels and makes it unlawful for someone 12 years of age or younger to operate a vessel that is powered by a motor of more than 10 horsepower. A person 13 or 14 years of age may only operate a vessel powered by more than 10 horsepower if they possess a valid Montana motorboat operator's safety certificate. In all cases, a person under the age of 15 may still operate a vessel if accompanied by an adult.

Appendix

CONSTRUCTION ACTIVITIES, ZONING, SUBDIVISION REGULATIONS, AND SETBACKS

Flathead County
Flathead Regional Development Office
758-5980
Whitefish Lakeshore Protection
862-5697

Lake County
Lake County Land Services
883-7235

Confederated Salish And Kootenai Tribes
Shoreline Protection Office
675-2700

Lincoln County
Lincoln County Planning Department
293-7781

BUFFER STRIPS

Flathead County
Whitefish Water and Sewer District
863-4901

Bigfork Water and Sewer District
837-4566

Somers Water and Sewer District
857-2580

Lakeside Water and Sewer District
844-3881

Lake County
Polson Water and Sewer District
883-7235

Lincoln County
Libby Water and Sewer District
293-7781

WATER QUALITY INFORMATION, VOLUNTEER MONITORING

Flathead & Lake Counties
Flathead Basin Commission
752-0081

Lincoln County
Montana Fish, Wildlife & Parks
751-4554

University of Montana Flathead Lake Biological Station
at Yellow Bay
982-3301

LAKE ASSOCIATIONS

Flathead, Lake, & Lincoln Counties
Flathead Lakers
883-1346

Ashley Lake Association
756-5830

Bitterroot Lake Association
755-3964

Rogers Lake Association
257-8952

Lake Mary Ronaners
849-5730

Bull Lake Association
295-2201

Thompson Chain of Lakes Association
257-5703 or 293-3868

WEED CONTROL

Flathead County
Flathead County Weed Department
758-5798

Lake County
Lake County Weed Department
883-7330

Lincoln County
Lincoln County Weed Department
293-7781

SEPTIC SYSTEM INFORMATION/PERMITS, PUBLIC HEALTH CONCERNS

Flathead County
Flathead County Environmental Health
758-5760

Whitefish Water and Sewer District
863-4901

Lake County
Lake County Health
883-7236

Lincoln County
Lincoln County Health
293-7781

LANDSCAPING IDEAS
Flathead, Lake, & Lincoln Counties
Mt. Native Plant Society
387-5527

LAKE BIOLOGY & HABITAT
Flathead, Lake, and Lincoln Counties
University of Montana Flathead Lake Biological Station
at Yellow Bay
982-3301

Mt. Fish, Wildlife, and Parks
752-5501

U. S. Fish & Wildlife Service
758-6868

Confederated Salish and Kootenai Tribes
675-2700

ROAD CONSTRUCTION
Flathead County
Flathead Regional Development Office
758-5980

Lake County
Lake County Land Services
883-7235

Lincoln County
Lincoln County Planning Department
293-7781

AGRICULTURAL PRACTICES
Flathead County
Flathead Conservation District
752-4220

Lake County
Lake Conservation District
883-5875

Lincoln County
Lincoln Conservation District
293-7781

TIMBER HARVESTING ON PRIVATE LANDS
Flathead, Lake, & Lincoln Counties
Mt. Dept. of Natural Resources & Conservation
752-7994

Montana Logging Association
752-3168

MSU Extension Forestry
243-2773

COURTEOUS BOATING
WATERCRAFT REGULATIONS
Flathead, Lake, & Lincoln Counties
Mt. Fish, Wildlife, & Parks
752-5501

HAZARDOUS MATERIALS SPILLS
PUBLIC SAFETY
Flathead County
758-5561

Lake County
883-7253

Lincoln County
293-7781

SEARCH AND RESCUE
Flathead County
Flathead County Search and Rescue/County Sheriff
758-5610 or 911

Lake County
911

Lincoln County
911

PUBLIC LANDS & LAKES
Flathead, Lake, & Lincoln Counties
U. S. Forest Service
758-5200

National Park Service
888-5441

Mt. Department of Natural Resources
752-7994

WETLANDS CONCERNS
Flathead, Lake, & Lincoln Counties
U. S. Army Corps of Engineers, Helena
441-1375

CONSERVATION EASEMENT RECIPIENT ORGANIZATIONS
Flathead County
Flathead Land Trust
752-8293

Montana Land Reliance
837-2178

The Nature Conservancy
837-0909

State Contacts

WETLANDS CONCERNS
U. S. Army Corps of Engineers, Helena
(406) 441-1375

CONSERVATION EASEMENT RECIPIENT ORGANIZATIONS
Montana Land Reliance
(406) 837-2178

The Nature Conservancy
(406) 837-0909

CONSTRUCTION ACTIVITIES, ZONING, SUBDIVISION REGULATIONS, AND SETBACKS
Permits and Compliance Division
Water Protection Bureau
(406) 444-4626
Or contact your county planning office

BUFFER STRIPS
Montana Department of Environmental Quality
(406) 444-4643

WATER QUALITY INFORMATION
Monitoring and Data Management Bureau
(406) 444-5342 or (406) 444-5330

VOLUNTEER MONITORING
Montana Watercourse
(406) 994-6671

LAKE ASSOCIATIONS
Montana Department of Environmental Quality
(406) 444-2709

Montana Fish, Wildlife & Parks
(406) 751-4554

WEED CONTROL
Montana Department of Agriculture
(406) 444-5400

SEPTIC SYSTEM INFORMATION/PERMITS
PUBLIC HEALTH CONCERNS
Permits and Compliance Division
Water Protection
(406) 444-3639

Community Services Bureau
(406) 444-2667

LANDSCAPING IDEAS
Montana Native Plant Society
(406) 387-5527

LAKE BIOLOGY & HABITAT
University of Montana Flathead Lake Biological Station at Yellow Bay
(406) 982-3301

ROAD CONSTRUCTION
Contact your local county planning office.

AGRICULTURAL PRACTICES
Permits and Compliance Division
Water Protection Bureau
(406) 444-1454

TIMBER HARVESTING ON PRIVATE LANDS
Montana Logging Association
(406) 751-3268

MSU Extension Forestry
(406) 243-2773

COURTEOUS BOATING
WATERCRAFT REGULATIONS
Montana Fish, Wildlife & Parks
(406) 444-2535

HAZARDOUS MATERIALS SPILLS
PUBLIC SAFETY
Disaster and Emergency Services
(406) 444-5977

SEARCH AND RESCUE
Contact your local sheriff department or dial 911.

PUBLIC LANDS & LAKES
U. S. Forest Service
(406) 758-5204

National Park Service
(406) 888-5441

Montana Dept. of Natural Resources
(406) 444-2074

TRIBAL LANDS
Contact local tribal government.

Montana Lake Publications

Flathead Basin Comprehensive Report; Flathead Basin Commission; Kalispell, MT (406) 752-0081

Headwaters to a Continent: A Reference Guide to Montana Water Resources; Montana Watercourse; Montana State University; Bozeman, MT; (406) 994-6671

Who Does What With Montana's Water? - A Directory; Montana Watercourse; Montana State University; Bozeman, MT; (406) 994-6671

Yellow Bay Journal; Flathead Lake Biological Station; Polson, MT; (406) 982-3301

Flathead Lake Monitor; Flathead Lakers, Polson, MT 59860, (406) 883-1346

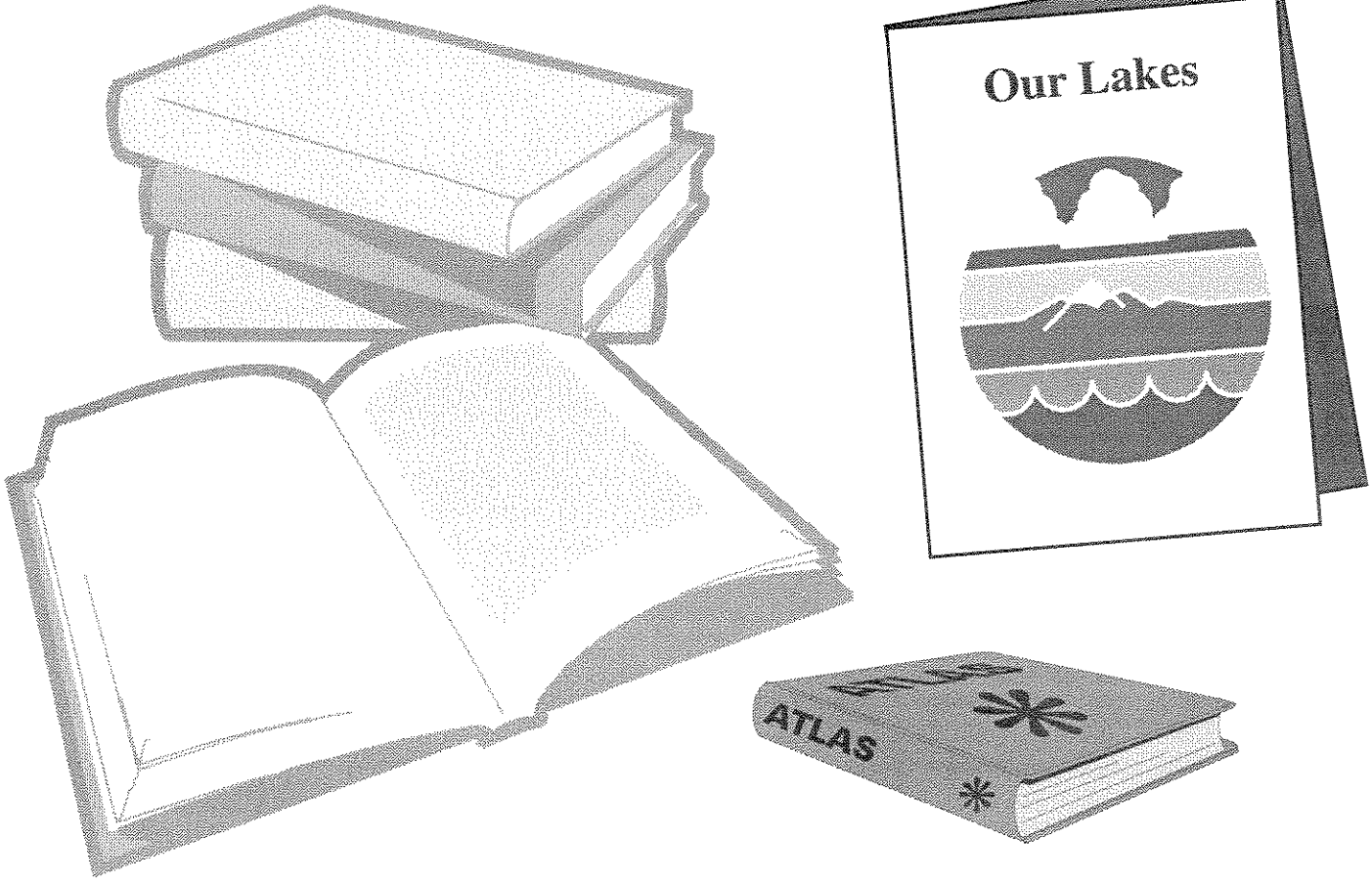
Nationwide Lake Resources

LAKELINE; North American Lakes Management Society; To become a member of NALMS and receive the publication contact NALMS; Alachua, FL.; (850) 462-2568 or (608) 233-2836

LAKESMARTS; (Do-It-Yourself Guide to Solving Lake Problems); Terrene Institute; Alexandria, VA; (703) 548-5473

Volunteer Lake Monitoring: A Methods Manual; Environmental Protection Agency; Office of Water, Washington, D. C.

The Volunteer Monitor; Newsletter of Volunteer Water Quality Monitoring; San Francisco, CA; (415) 255-8049



Web Sites of Interest

Here are some information resources available if you have access to the Internet.

Flathead Basin Commission
http://www.digisys.net/highwater/Basin/basnhome.html
This is a privately maintained site that presents basic information about the Commission, the issue of coal mining in the headwaters of the North Fork of the Flathead River in southeastern British Columbia, the Commission's Voluntary Nutrient Reduction Strategy, basin river flow data, and other topics of interest to residents of the Flathead Basin.

Montana Fish, Wildlife & Parks
http://fwp.mt.gov/
The website contains hunting, fishing and state parks information from this agency. Links also include What's New, FWPtalk, Montana Outdoors, Kids Page, Education, Resources, as well as places to report violations and make comments.

Montana Watershed Coordination Council
http://btc.montana.edu/watercenter/docs/watersheds/MWCChome.html
The MWCC serves as a statewide coordination effort for agencies and citizen groups working on watershed planning projects. The site includes information on local watershed efforts and resources of value to those involved in water quality work in Montana.

Montana Water Center (MSU)
http://btc.montana.edu/watercenter
Provides information on The Montana Watercourse and other important projects in the state, plus extensive links to other valuable sites.

Montana Natural Resource Information System (NRIS)
http://nris.mt.gov/
This project of the Montana State Library provides a wealth of information related to the state's natural resources. Data on surface and ground water, water quality and other issues can be accessed through the site's Water Information System.

U.S. Geological Survey National Water Quality Assessment Program
http://wwwrvares.er.usgs.gov/nawqa/nawqa_home.html
This site provides information the USGS is developing on surface and ground water quality and factors that influence water quality. Of regional interest is the agency's Northern Rockies Intermontane Basins Study Area, which includes the Flathead Basin.

Environmental Protection Agency (U.S. EPA)
http://www.epa.gov/surf/index2.html
This site allows you to search for a map of your local watershed, plus offering extensive links.

Kentucky Water Watch Volunteer Program
http://www.state.ky.us/nrepc/water/conf/wkswater.html
Use the Kentucky Volunteer Monitor Program's home page for links to volunteer programs in other states and other interesting water-related sites on the Web. The site also includes a tutorial on Web browsing and writing.

The Great American Secchi Dip-In
http://humboldt.kent.edu/~dipin
This Kent State University site presents transparency (Secchi disk) data collected annually by volunteers in local programs (including the Flathead Basin Commission's Basin Watch) throughout the U.S. and Canada.

Natural Resources Conservation Service (NRCS)
http://www.ncg.nrcs.usda.gov/
Contains general natural resource information and the NRCS Data Clearinghouse.

Flathead Lakers
http://www.flatheadlakers.org
Offers information about this nonprofit organization working to protect water quality in Flathead Lake and its watershed, and about issues affecting water quality within the Flathead watershed.

University of Montana Flathead Lake Biological Station
http://www.umt.edu/biology/flbs
Contains information about the water quality in Flathead Lake and research on other Montana lakes and streams. Recent issues of the Yellow Bay Journal are presented and excellent links to other science websites are made available.

Montana Department of Environmental Quality
http://www.deq.state.mt.us.
Contains information concerning environmental issues addressed by this agency such as environmental impact statements, environmental assessments, total maximum daily loads, etc. This website also provides a form that citizens can use to report pollution.

Acknowledgments

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