



Cass County Shoreland Homeowner's Guide to Lake Stewardship



This *Cass County Shoreland Homeowner's Guide to Lake Stewardship* was produced as a project of the Leech Lake Area Watershed Foundation, Cass County Environmental Services, and the Association of Cass County Lakes. Excerpts are contained in this Guide from the *Aitkin County Shoreland Homeowner's Guide to Lake Stewardship* and the *Crow Wing County Landowner's Guide to Lake Stewardship*.

Funding for this publication was provided by the Minnesota DNR Shoreland Habitat Program, the Central Regional Sustainable Development Partnership, Leech Lake Area Watershed Foundation, and Cass County Environmental Services.

Printed: August, 2008

Production Credits:

Content: Paula West

Design: Marlene Waller,
The Paper Plan-it

Printing: Range Printing

Printed on 10%
post-consumer
recycled fiber content.



Table of Contents:

Introduction	1
Curb Pollution: Reduce Phosphorus and Other Pollutants	2,3
Curb Pollution: Inspect and Maintain Your Septic System	4,5
Reduce Runoff	6,7
Reduce Runoff: Curb Erosion	8,9
Reduce Runoff: Preserve or Restore Native Shoreline Vegetation	10,11,12,13
Capture and Cleanse Runoff Manage Your Stormwater	14,15
Capture and Cleanse Runoff: Use Rain Gardens and Rain Barrels	16,17
What Can I Do On My Shoreland Property? What Permits are Required?.....	18,19
Cass County Permit Requirements.....	20
Homeowner's Checklist & References	Inside Back Cover
Contract Information & Additional Resources	Back Cover

Photo Credits:

Cover photo: Carol Wedin, Stony Lake

Smaller photos, front cover: Brenda Leavelle, turtles on Sibley Lake; Terrie Christian, Columbine on Medicine Lake. Back cover: John Szafranski, loons in the mist on Cullen Lake; Laurel Mezner, reflections from the raft on White Sand Lake.

Shoreland Homeowner's Guide to Lake Stewardship

Congratulations on owning shoreland property in Cass County. Whether you are a full time or seasonal resident, living by the water provides a special opportunity to participate in water-related recreation, such as boating, swimming, or fishing; to observe wildlife in its natural habitat; or simply enjoy the beauty of watching a sunset over the lake and experience the serenity and sense of well-being experienced around water and nature.

When you own shoreland you do have certain riparian (near the water) rights and privileges, such as the right to put a dock out to a navigable depth; to take water for domestic and agricultural purposes; and to fish, boat, hunt and swim. But, these rights must be exercised in compliance with local rules and regulations and those of the State of Minnesota. For example, there are limits on the size of docks; regulations about construction and disturbing land in the shoreland zone (within 1,320 feet of a lake or river); removal of aquatic plants; placement of wells; and maintenance of septic systems. These rules are in place for the benefit of your health and safety and the health of the adjacent lake or stream.

Along with those rights also comes the responsibility to protect, improve, and enhance the quality of the water for your enjoyment and that of future generations to come, keeping in mind that the water itself is a public resource for everyone to enjoy. **That's called stewardship: the individual responsibility to manage one's life and property with regard for the rights of others.** The lake is a living ecosystem and part of the larger ecosystem of all living plants and animals to which we also belong.

This Guide will provide you with basic information on good lake stewardship, which if practiced by you and collectively by others around the lake and in the watershed, will keep the lake healthy to protect your investment in shoreland property (healthy waters=higher property values), your enjoyment of the lake, and also preserve its ecological integrity.

What We Do On the Land Matters

Water quality is primarily dependent on what happens on the land around the lake, along the river, or within the watershed. It's the runoff from the land, and the pollution that is carried with it, that can determine the quality of the water. While the land activity in the watershed—the land area that drains to a lake or stream—contributes pollution to the lake, the shoreland zone is the lake's first line of defense. What you and your neighbors do—or don't do—on your shoreland property can have a significant impact on the quality of the lake. Managing water quality means appropriately managing the land use around the lake to reduce the amount of pollution that enters the lake.

In this Guide, we'll look at two primary ways you, the shoreland homeowner, can manage your property to protect water quality. They are:

- 1. Curbing pollution at the source; and**
- 2. Reducing, capturing, and cleansing runoff.**

Proper lawn care, pet waste disposal, and use of household products; shoreline erosion control; and septic system maintenance can help curb pollution. Runoff that can pick up pollution and carry it to the lake can be reduced by minimizing hard surfaces on your property and limiting clearing and grading. It can also be captured and cleansed so it doesn't reach the lake by using shoreland vegetative buffers and by redirecting it to rain barrels and rain gardens. Let's learn more.

“**C**onservation is a state of harmony between men and land...”

A land ethic reflects the existence of an ecological conscience, and this in turn reflects a conviction of individual responsibility for the health of the land. Health is the capacity of the land for self-renewal. Conservation is our effort to understand and preserve this capacity...

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.”

Aldo Leopold, A Sand County Almanac, 1949

“**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

Curb Pollution: Reduce Phosphorus and Other Pollutants

The shoreland zone where you live is the lake's first line of defense.

Nitrogen, potash, and phosphorus are the nutrients necessary for plant growth. Phosphorus is the key nutrient needed for aquatic plant and algae growth. When excessive phosphorus reaches the lake, it fuels the overgrowth of aquatic plants and algae, those microscopic organisms that give water a greenish tinge and can cause blue-green, toxic scums along the shore. Excessive plant and algae growth decreases water clarity, interferes with the recreational use of the lake, and diminishes oxygen for fish in the water, generally causing declining water quality.

Natural rainfall contains high amounts of phosphorus, which we can't control, but we can control our own shoreland practices that can contribute phosphorus to the lake. Excessive phosphorus can get into lakes from shoreland properties in a number of ways, including:

- excessive application to and runoff from lawns;
- decomposition of leaves and other plant material;
- erosion of soil, which has phosphorus particles attached to it;
- improper human and pet waste management, both of which contain high amounts of phosphorus; and the
- use of household products high in phosphorus.



One pound of phosphorus can feed the growth of over 500 pounds of algae.

Apply Fertilizer Sparingly and Use Zero-Phosphorus Lawn Fertilizer—It's the Law in Minnesota

By law since 2005, Minnesota homeowners cannot use fertilizers containing phosphorus, except for exemptions for new lawns or when a soil test indicates a need for phosphorus. In much of our area, soils are naturally high in phosphorus so lawns generally don't need extra phosphorus.



When shopping for fertilizer, buy a brand that has a middle number of zero i.e. 22-0-15. The law did not prohibit retailers from selling phosphorous fertilizers, and even though most retailers are carrying more zero phosphorus fertilizers, it's up to you to make sure you comply with the law.

If you have left over phosphorus fertilizer, using it on the garden is a good way to dispose of it.

Other herbicide and pesticide cautions to follow:

- Eliminate the use of fertilizers near water or wetlands.
- Before you consider fertilizing your lawn, aerate it first and see if that improves its health.
- Use the minimum amount needed to replenish the soil and apply at the right time of year, usually spring and early fall. Water lightly after fertilizing to ensure absorption by the roots before a heavy rainfall.
- Sweep fertilizer that has spilled on hard surfaces back onto the lawn to prevent runoff.

Managing water quality means appropriately managing the land use around the lake to reduce the amount of pollution that enters the lake.

- Keep lawn healthy to avoid the need for herbicide applications. When necessary, use the least toxic and most degradable herbicide and follow directions carefully. Never use near the lake.
- Remove dandelions and other unwanted plants from your lawn using hand-tools instead of chemical applications. If you feel you must use a herbicide for control, do not apply it to the whole lawn. Instead, use an applicator which allows you to direct a small spray towards each unwanted plant.

Keep Grass Clippings, Leaves, and Washed Up Aquatic Plant Material Out of the Lake

Grass clipping, leaves, and aquatic plant material that wash up on shore all contain phosphorus, which is released when the plant material decomposes. To prevent phosphorus from getting into the lake:

- Use a mulching lawn mower and leave grass clippings on the lawn as natural fertilizer.
- Collect and compost leaves and clippings, or haul them away from the lake to a disposal site.
- Rake up aquatic plants, leaves, and other organic matter on the shoreland and dispose away from the lake. *Hint:* It makes great mulch on the garden which can later be worked in as a soil amendment.
- Do not burn leaves near the lake; it destroys the organic matter releasing the phosphorus, which could be washed into the lake.

Locate Fire Pits Away from the Shoreland and Dispose of Ash

The leftover ash from burning wood is very high in phosphorus. If the fire pit is located near the lake, rain can wash the ashes into the lake.

- Locate the fire pit at least 50 feet away from the lake; and,
- Remove ashes from the fire pit to prevent the nutrient-loaded ashes from being blown or washed into the lake.

Properly Dispose of Pet Waste

Improper disposal of pet waste not only jeopardizes water quality, but your health as well. Pet waste contains phosphorus and may contain disease causing organisms, which, if washed into the water, can make it unsafe for swimming.

- Pick up pet waste in the yard or near the shore and dispose of it properly.

Use Phosphorus-free Household Products

Read labels carefully and select bio-degradable, non-phosphorus dishwashing detergents, and reduce the use of commercial cleaners. Learn about and use natural, non-toxic household alternatives.

Practice Low-Impact Boating

To reduce the pollution impact of motorized watercraft on the lake:

- When fueling the boat, take precautions not to overfill the fuel tank. If you do spill, wipe it up with a rag, do not hose into the water.
- Boat slowly; motors stir up sediments releasing nutrients that can lead to deterioration of water quality—a 50-horsepower motor operated full throttle can stir the water column to a depth of 15 feet.
- Keep your motor well-tuned; use four-cycle motors.
- Inspect your boat and trailer to avoid transporting aquatic invasive species, like Eurasian watermilfoil, Curlyleaf pondweed, or zebra mussels into the lake if you've had your boat in another waterbody.

Household hazardous waste (HHH), such as paints, cleaners, garden chemicals, automotive products and aerosol cans, should be disposed of properly to protect the environment. Dumped on the ground or down the drain can contaminate ground and surface waters and/or impair septic systems.

Beware of any products that have labels including the words: flammable, toxic, corrosive, or reactive. See the back cover for HHH disposable options in Cass County.

Read product labels carefully and buy the least hazardous products, use according to package directions, and store in a safe place away from heat, flames, and cold temperatures.

Curb Pollution: Inspect and Maintain Your Septic System

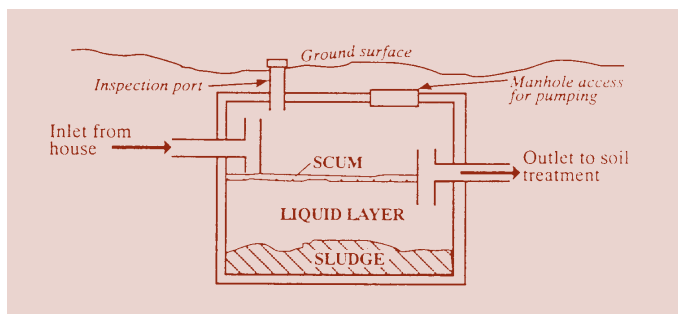
Most homes in shoreland areas rely on Subsurface Sewage Treatment Systems (SSTS), commonly known as the septic system. Your septic system, if designed, installed, and maintained properly, will effectively treat wastewater before it is returned to the environment to protect public health and prevent pollution of a nearby lake or river.

Understand How Your Septic System Works

Understanding your system is essential to proper operation and maintenance. The basic components of most systems are the:

➔ **The Septic Tank** receives the wastewater from the household plumbing. In the tank, the solids are separated from the liquid. Here, naturally occurring bacteria decomposes food particles and human waste and the remaining solids settle to the bottom until they are pumped out on a regular basis. The tank will have an inspection pipe for monitoring of the tank and a manhole for access when pumped. The size of the tank is based on the home's potential water use and types of appliances installed. When the capacity of the tank is reached the excess liquid flows, or is pumped, over into the drainfield.

➔ **The Soil Treatment System (drainfield)**, which is typically a network of perforated pipes surrounded by small rock and soil. The liquid, which contains pathogens (disease-causing organisms), nutrients such as phosphorus, and fine solids, is cleansed naturally by bacteria as it percolates down through the soil. The design of the treatment system (trench, mound, etc.) is based on the soil conditions on your property, which must allow for at least three feet of unsaturated soil for the wastewater to percolate through for proper treatment. The correct type of system needed for your property will be determined by a state-licensed septic designer. Where gravity flow is not enough to move the liquids from the tank to the soil treatment system, pumps or lift stations are common—this is typical with mound systems.



Source: University of MN Extension Protecting Our Waters Series, #2

What Causes a Septic System to Fail?

Septic system failure is most commonly the result of:

- Improper design or installation of the system;
- Overuse of water in the home; and/or
- Improper maintenance.

When your system, or a neighbor's system fails, untreated wastewater could come in contact with people, causing a public health hazard, or enter the groundwater and eventually the lake, adding pollution that can contribute to increased algae and plant growth.

What are the signs of a failing system?

- Sewage backup into the house or slow toilet flushing,
- Frozen pipes or soil treatment areas,
- System alarms sounding,
- Wet and/or black areas around a septic mound,
- Algal blooms and excessive plant growth in the water near shore,
- Sewage odors indoors or outdoors,
- Water or sewage surfacing in the yard or a nearby low spot, or
- High levels of nitrates or coliform bacteria in well water tests.

If you have a problem:

- Contact Cass County Environmental Services for advice and/or licensed septic inspector. http://www.co.cass.mn.us/esd/esd_ists.html
- If the drainfield or household pipes are not clogged, have the system pumped for both solids and liquids as a temporary measure.
- If there is surface pooling of wastewater, fence off the area to prevent contact with humans or pets.

Properly Operate and Maintain Your System

Proper operation and maintenance will extend the life of your system for many years and prevent costly repairs.

✓ Pump the Tank Regularly

Have a licensed professional pump the solids (floating scum and sludge) that have accumulated from the septic tank every one to three years—the more use, the more often pumping is needed. Make sure they pump through the manhole. While garbage disposal use is not recommended with septic systems, pump annually if you are using one. Failure to remove the solids can cause them to enter the drainfield, which can result in expensive repair or replacement. For licensed and certified septic system maintenance services, refer to the yellow pages under septic tanks and systems-cleaning.

✓ Practice Water Conservation

Too much water flowing into the tank will cause the tank to back up and lead to ineffective treatment of wastewater. To prevent this:

- Repair all leaky faucets, fixtures, and appliances.
- Install low water-use fixtures and appliances (especially toilets and shower heads).
- Do not empty roof drains and sump pump water into the septic system.
- Wash only full loads of clothing and dishes, and spread out water use, such as laundry, throughout the day and week. Consider front loading machines; they use less water.
- Reduce the length of showers and the number of toilet flushings, especially during high use periods.
- Reroute water softener discharge water out of the septic system.
- Do not hook floor drains or drain tile into the septic system.

✓ Limit What Goes Down the Drain

- Do not put household cleaners, paint, solvents, medications, and other chemicals down the drain.
- Limit the use of antibacterial products. As the name suggests, they can reduce the amount of working bacteria in the septic tank.
- Use only the recommended amounts of liquid non-phosphorus detergents and cleaners.
- Prevent food particles, grease, lint, coffee grounds, plastics, and other non-degradable solids from getting into the system.
- Use single-ply toilet paper for the best decomposition.

✓ Do Not Use System Additives

It is not necessary to use starters, feeders, cleaners, or other septic additives to enhance the performance of your system. If your system is properly maintained and operated, it will operate at maximum performance with the use of naturally occurring bacteria.

✓ Protect Your Drainfield

Compacting or obstructing the soil over the treatment area can cause malfunctioning of the drain field. To protect it:

- Keep heavy vehicles off the drainfield.
- Maintain vegetative cover, but do not plant trees or shrubs on the drainfield because the roots may penetrate and clog the distribution system.
- Mow the area, but do not fertilize or water.
- Reroute roof drains and drain tile away from the drainfield.

Protect Your System from Freezing in the Winter

Common causes of septic system freezing during the winter can be lack of snow cover, extreme cold, compacted snow, irregular use of the system, leaking plumbing fixtures, pipes not draining properly, or a water-logged system.

What to do if the system freezes? Unplug your pump and call a septic system professional. Do not add antifreeze, additives, or continuously run water to try to unthaw the system.

To prevent freezing, follow these general guidelines:

- Fix any leaking plumbing or appliances prior to winter.
- In the fall, leave the grass longer over the tank and drainfield for better insulation.
- Add a layer of hay or straw mulch (8-12 inches) over the pipes, tank, and soil treatment area.
- Keep ATVs and snowmobiles off the drainfield.
- Spread hot water use (laundry, showers, dishwasher) out over the day and week. If you'll be gone for extended periods, consider having someone stop by to run hot water regularly.
- High efficiency furnaces, water softeners, and iron filters have the potential to cause problems in the winter because of slow and/or periodic discharges of water. For suggested precautions, see: <http://septic.umn.edu/homeowner/factsheets/furnaces-softenersironfilters.html>
- Talk with a professional before installing heat tapes or tank heaters.

Cass County Requirements

Who regulates? The design, inspection, and installation of septic systems (SSTS) are regulated by Cass County and must be done by professionals licensed by the state. Lists of licensed professionals and permits for septic system installation can be obtained from the Cass County Environmental Services Department or online at: <http://septic.umn.edu/homeowner/locatinglicensedprofessionals/index.html>.

What records are required? All septic systems must have a Certificate of Compliance indicating they meet the Cass County SSTS requirements, sometimes referred to as "up-to-code." A Certificate is good for five years from the date of original installation, and must be renewed every three years thereafter.

When are inspections required? If applying for a building permit for new construction, a compliant septic system is required. A building permit for any addition to current buildings, including a deck or garage—attached or non-attached, requires a current Certificate of Compliance for the septic system. If one is not currently on record or it is not current, an inspection of the septic system will be required and, if the system is found to be noncompliant, modification or replacement of the system may be necessary before a building permit is issued.

What about property transfers? A Certificate of Compliance is required before a title transfer can occur on any shoreland property with a septic system. If the system is not compliant, it must be brought into compliance, or an agreement must be filed to update/escrow for later compliance, before occupancy and title transfer to new owner.

Call the Cass County ESD for questions about septic system requirements.

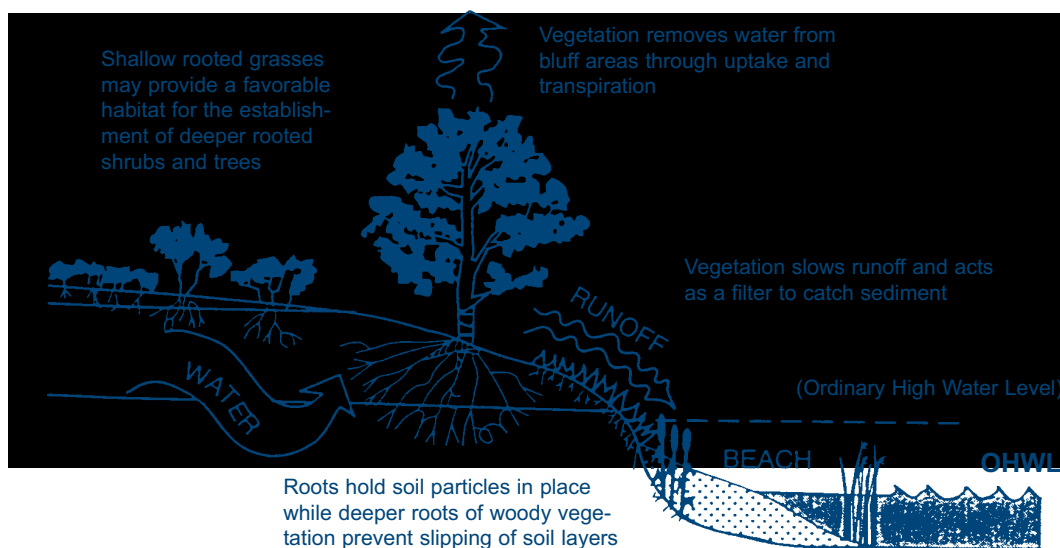
Reduce Runoff

What is runoff?

Snow melt or rainwater that does not soak into the ground and instead runs off hard surfaces such as roofs, driveways, sidewalks, and compacted soils or washes off lawns and steep slopes is called runoff. It is also referred to as stormwater. When runoff reaches the lake, it can carry with it nutrients, eroded soil sediments, toxic materials, bacteria and other pollutants that can be detrimental to water quality and fish and wildlife habitat.

Reducing runoff decreases the pollutants that can eventually reach the lake.

Managing stormwater on your property so it soaks into the ground (infiltrates) rather than running off is the best way to reduce runoff and filter out pollutants before they reach the lake. Hard or paved-over surfaces do not allow the absorption of water. Any green space, including gardens, trees, shrubs or landscaping allows water to infiltrate slowly down into the soil and roots.



Shoreland Best Management Practices Fact Sheet #5, University of Minnesota Extension.

Practice Good Lawn Management

Reduce the Amount of Lawn

Bringing the suburban lawn mentality to the lake has also brought more opportunities to degrade the quality of our lakes. Limit the amount of lawn and keep as much natural vegetation as possible, or replant natural vegetation—especially near the lake. Not only will you reduce runoff, you'll reduce the amount of yard work, freeing you up to recreate instead.

Maintain a Healthy Lawn to Absorb More Water

- Mow to a height of two to three inches; mow when dry to prevent clumping. Taller grass provides shade for better root growth, which helps with water absorption.
- Consider replacing some of the grass in your lawn area with clover, native grasses, or other groundcovers that don't need watering.
- If watering is necessary, water deeply, but infrequently, to encourage deep root growth. Water with lake water. (*Hint:* use the nutrients in the lake to make a healthy lawn instead of frequent fertilizer applications.) Water in the morning, not mid-day or evening.
- In hot weather, allow lawn grasses to go into a state of dormancy so that they require less water and nutrient intake for survival. Water 1/4 to 1/2 inch every two or three weeks to keep crowns from dehydrating beyond the point of recovery.

Managing stormwater on your property is the best way to reduce runoff and pollutants before they reach the lake.

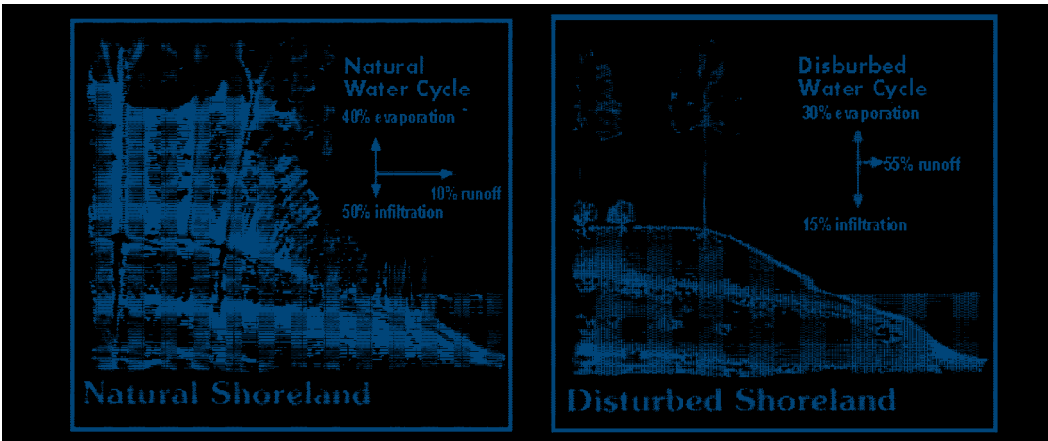
If we love our lakes we have to change our ideas about what is a good lawn at the lake.

That beautiful manicured lawn takes more chemicals and more work to maintain and does not provide good habitat for the wildlife that share the shoreland with us.

Maintain Natural Vegetation

Natural vegetation will naturally reduce runoff by holding back the water to provide time for it to soak into the ground.

- When clearing your lot, minimize the removal of wooded areas, trees and low growing shrubs. Their removal causes more rain to fall to the ground instead of landing on leaves and branches.
- Grading large areas of land removes the natural depressions of land where water can pond and soak in.
- Carefully landscape your yard near roads, driveways, and along the shoreline to direct runoff away from the lake.



When there is precipitation, water will evaporate, run off the land, or soak (infiltrate) into the ground. The amount of vegetative cover on the ground will significantly impact the amount of runoff and infiltration. Natural vegetation will hold back the runoff providing time for it to soak into the ground.

Make Friends With the Ice Ridge

Ice ridges are formed by the pushing action of the lake's winter ice sheet against the shore and can be more pronounced in years when there is little insulating snow cover. Unless the ice ridge is impeding your use of the lake or access to your dock area, consider making friends with the ice ridge and leave it alone. They are natural features of lakeshore that have been forming for thousands of years. The ice ridge has many benefits to the lake. It is a natural berm to protect the lake from runoff. Nutrients collect on the landward side of the mound, producing fertile soil where trees and plants thrive and provide roots systems to hold soil in place. They provide a natural form of shoreline protection. If you want to remove an ice ridge, contact Cass County Environmental Services before beginning work; a permit will be needed. See page 20 for specifics.

Precaution During Construction

To reduce runoff during construction projects, erosion and sediment containment is required. If more than one acre of land is disturbed, an MPCA stormwater permit will be required along with a stormwater management plan. Follow these temporary practices to reduce construction runoff.

- Seed exposed areas with annual grass or mulch during long-term projects where soils will be exposed for more than a couple of weeks; for small areas of dirt piles, cover with plastic or a tarp.
- For large exposed stockpiles close to a ditch, stream, wetland or lake, build a berm or install a silt fence to prevent sediment runoff. Berms are typically built about 3 feet tall at the crest and 1.5 to 2 times the height in width. Stockpile material can be used to build the berm; then stabilize it with shredded mulch.
- Install down slope perimeter control prior to soil disturbance. A silt fence installed to manufacturer's specifications or a stabilized top soil berm are two options.

The Wisconsin DNR calculated runoff volume from an undeveloped shoreland lot compared to a large lake home (approximately 4,000 square feet of impervious surfaces) on a lot entirely converted to lawn. They found up to a:

- 500% increase in runoff volume,
- a 700% increase in phosphorus washing into the lake, and
- a 900% increase in sediment flowing to the lake on the large home lot.²

Reduce Runoff: Curb Erosion

Any exposed soil can be washed away with stormwater. When soil washes into the lake, it carries with it phosphorus—the desired nutrient for weed and algae growth—along with debris and other toxic materials that may be on the land. It causes sediment build up in the lake; increases turbidity after rain events, which interferes with normal lake functions; and impacts fish and wildlife habitat. Degradation to water quality is a result. Curbing the erosion of soil will reduce pollutants reaching the lake.

Monitor Construction or Renovation Projects

Have an erosion control plan and carefully monitor all construction or renovation projects to ensure that soil and construction materials do not runoff the exposed soils.

- Properly dispose of all construction materials each day.
- Use nontoxic, biodegradable or recycled materials.
- Wash or clean any liquid materials in-doors or directly into a container.
- Install silt fences along the shoreland to capture any sediment runoff that might occur.
- After construction, establish vegetation right away.
- Minimize land alteration around your construction projects to take advantage of existing soil stability.

Stabilize the Soil in Steep Areas

The erosion potential on steep slopes and bluffs can be reduced by:

- Diverting water away from steep slopes by rerouting drainpipes and gutters. If diverting water away from the bluff is impractical, it should be routed through a non-perforated plastic drain pipe that outlets at the very bottom of the bluff into rock drainage.
- If you need a walkway to the shore, follow the natural contours of the slope to go across or around the slope, or use steps when a walkway must go directly up and down a slope, but minimize destruction of natural vegetation during construction.
- Keep the moisture- and nutrient-absorbing natural vegetation on steep slopes by limiting clearing and grading.
- Replant vegetation on barren slopes.
- Create a view corridor through the trees with selective pruning for an excellent view while maintaining the natural trees and shrubs.



Source: *Lakescaping for Wildlife and Water Quality*³

Naturalizing your shoreline or maintaining the natural shoreland vegetation is the most important way to reduce shoreland erosion.

Reduce Shoreland Erosion

If your shoreland is eroding away, stabilizing the shoreland will be necessary to reduce erosion. Possible causes may include:

- fluctuating water levels,
- increased wave or wake action, ice pushes in the spring, or
- loss of natural vegetation to hold the soil in place.

Each shoreland situation is different. Consulting shoreland landscaping professionals, the DNR Area Hydrologist, or the Soil and Water Conservation District is encouraged to determine the best solution for your shoreline erosion situation.

Rip rap and retaining walls are usually not the best choice for stabilizing shoreland erosion. They can negatively impact the lake by creating an unnatural barrier between upland areas and the shoreland environment that destroys vegetative transition areas and eliminates critical habitat for many species. Retaining walls deflect wave energy back to the lake instead of diffusing it, which can undercut the base of the wall and cause increased erosion at the ends making the water more turbid. Neither rip rap or retaining walls will prevent ice ridges from forming—rock cannot withstand the up to 30,000 pounds of ice pressure per square inch. Natural shoreline vegetation is the best protection from both wave erosion and ice heaves, and it's less expensive and longer lasting.

Slow the Boat Down

Boat wakes can cause tremendous shoreland erosion, so boat slower. In shallow areas (less than 15 feet), motor at slow-no-wake speeds (5 mph or less) to reduce the boat wake and the consequent wave action that can erode your shoreline and other's around the lake. Observe all posted "no-wake" and low-speed zones. For personal watercraft, running at slow, no-wake speed within 150 feet of the shore is the law.

Boating slowly makes less wake, less noise, reduces pollution and is less disruptive to wildlife and other people—plus you'll see more and enjoy the lake longer. When running at higher speeds, keep the motor properly trimmed to reduce noise and the boat wake.



On steep bluffs, selectively prune trees to create a view corridor of the lake. Keep the vegetative undergrowth to stabilize the soil on the bluff.

Shoreland Alterations are Regulated

In Cass County, any dirt moving in the Shore Impact Zone (SIZ) requires a permit. Intensive vegetation clearing within bluff impact zones and on steep slopes is not allowed. In the Shore Impact Zone 1, no trees or shrubs can be removed except to accommodate placement of stairways, landings, or access paths. In Shore Impact Zone 2, the removal of 25% of trees, in a random pattern, and 100% of shrubs is permitted.

- The shore impact zone (SIZ) 1 is the distance from the ordinary high water level to one half the structure setback. This varies according to lake classification.
- The shore impact zone 2 is the distance from the SIZ 1 to the structure setback.
- The bluff impact zone includes the bluff itself and an area within 30 feet from the top and the bottom of the bluff.

Reduce Runoff: Preserve or Restore Native Shoreline Vegetation

A natural shoreline is a bridge between two worlds—the land and water. Studies show that there can be as much as 500% more diversity of plant and animal species along a natural shoreline compared to upland areas.

A native vegetation buffer between the land and the water restores and maintains the ecological function of lakeshore.

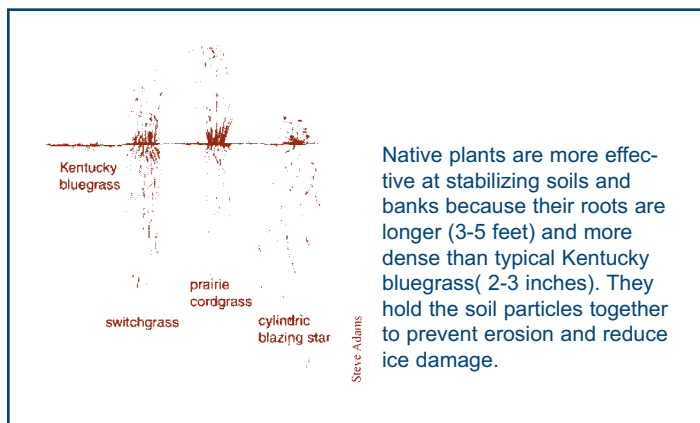
A natural shoreline is a complex ecosystem that helps protect the entire lake. Preserving or restoring your shoreline with native vegetation is the best way to reduce shoreland erosion, protect water quality, and improve the health and diversity of shoreland and upland birds, wildlife, and aquatic plants.

A natural shoreline is a bridge (a buffer) between two worlds—the land and water. It reduces runoff to prevent erosion and sedimentation to the lake and intercepts nutrients that can degrade water quality by increasing algae and aquatic plant growth. Studies show that there can be as much as 500% more diversity of plant and animal species along a natural shoreline compared to upland areas.

A mostly natural landscape has only 10% runoff.

If your shoreland is already natural vegetation, congratulations—please keep it that way. If you have lawn to the water's edge, or very little native vegetation near the shore, consider a natural shoreland landscaping project to restore the native vegetation by creating a shoreland buffer zone—an area of native vegetation along the water's edge.

Creating and maintaining a natural buffer zone along your shore does not mean your property has to look messy, but it may mean you have to re-think what your shoreland should look like. Buffers of native trees, flowers and shrubs can bring natural beauty to your yard. One of the greatest benefits of establishing native vegetation is their deep root systems that stabilize the shore from erosion and ice damage and provide an area for rain to soak into the ground instead of running off to the lake.



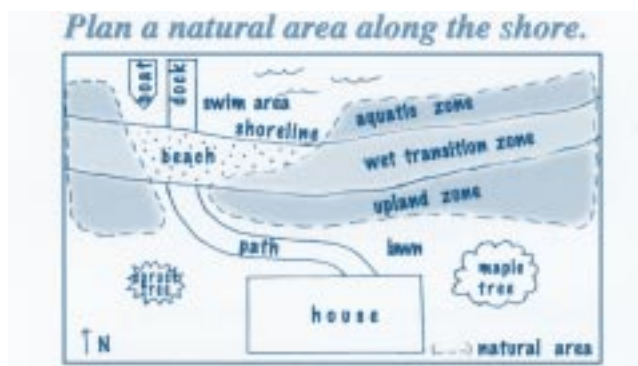
Even if your neighbors are not restoring their shoreland, it is important for you to proceed because it helps improve your property and water quality, and you can serve as a good role model for others to follow. The individual choices by many can have cumulative impacts on the lake and its ecosystem. Ultimately, keeping the water clean can be far less costly than cleaning up a damaged lake, and clean waters framed by natural vegetation often have the highest property values.

What is a shoreland buffer zone?

A buffer zone is an unmowed strip of native vegetation that extends both lakeward and landward from the water's edge. A buffer zone of native plants that extends 25-50 feet landward from the shore is preferable, but even adding a buffer as narrow as 10-15 feet can restore many functions critical to the health of the lake that may have been eliminated previously by sod, hard structures, or mowing. **When it comes to shoreland buffers, wider is better for more benefits.**

A shoreland buffer zone consists of:

- The shallow **aquatic zone** of the emergent, submerged, and floating leaf aquatic plants that provide food and shelter for ducks, songbirds, frogs and other amphibians, and fish. The taller plants, like bulrush, sedges, and cattails can reduce the energy of wave action to minimize erosion and help maintain water quality.
- The **wetland transition zone** of more water-loving plants that bind the lake bed to the upland soils.
- The **upland zone** of native trees, shrubs, grasses, and wildflowers slows rainwater running over-land, making sediment drop out, absorbing water and nutrients, and breaking down pollutants.



Source: University of Minnesota Extension Service, 2005; Item #08308



Getting Started Creating a Shoreland Buffer

Before You Start

There are a number of ways to create a shoreland buffer depending on the characteristics of the shoreland and the desires of the property owner. Before you decide how to approach establishing a shoreland buffer, thoughtfully assess your shoreline and what you want to accomplish.

- Do you have erosion problems to correct? Problems with Canada geese? What kind of wildlife would you like to attract?
- Consider the specific conditions at your site, including light, moisture, orientation, and degree of slope.
- Identify soil type and the type of lake bottom (mucky, sandy, rocky).
- Think about where you're located on the lake – do you get a lot of wind and wave action, or direct sunlight for much of the day? Shoreline revegetation is most likely to succeed in areas that are sheltered and experience little or moderate wave action, do not experience significant changes in water level during the growing season, and are not very steep.
- Also consider the different ways you use the shoreland area and the amount of shoreland that you want to restore. How much area is really needed for lake access for boats and swimming? Limiting the beach and dock area to 15-20 feet and leaving the rest of the shoreline natural is ideal to have both the benefits of the buffer zone while having recreational access to the lake. Resource professionals recommend that you maintain a shoreland buffer along 75% of the shoreline frontage.

Resource professionals recommend that you maintain a shoreland buffer along 75% of the shoreline frontage.

Next, decide how you want to establish a shoreland buffer. Here are some options.

Don't Mow, Let It Grow A simple, no-cost way to get started in restoring your shoreland is to stop mowing for the width of the desired buffer strip. Turf grasses will grow 12-24 inches before going to seed, after which seeds in the soil will germinate and valuable native plants will begin to appear. You can note the types of native plants and wildflowers growing on natural shorelands around lake to get an idea of what is likely to appear or will be suitable for growing in your area. While the buffer is getting established, you may need to weed out nuisance species or add native plants for diversity, but not mowing will get you started. Over time, shrubs and trees will naturally fill in and provide a more diverse plant cover.

Additional benefits of shoreland buffers:

- Less time spent mowing; more time enjoying the lake.
- Attracts birds and butterflies.
- Enhances your view of the lake by adding interest, texture and color.
- Provides more privacy from people using the lake or neighboring properties.
- Protecting water quality is protecting your real estate value.
- Taller native plants create a biological barrier that will deter Canada geese from loitering on the lawn.
- Well-established emergent aquatic plants discourage the establishment of non-native invasive species.



Building a home and establishing a lawn to the water's edge can cause seven times the amount of phosphorus and 18 times the amount of sediment to enter the water compared to a natural shoreline.⁴

Do-It-Yourself

Many of the local nurseries and garden centers now carry native plant stock and can recommend the best plants for your site. Plants used should be indigenous to Minnesota—don't buy plants from a mail order catalog grown in another part of the country and expect them to grow. The DNR website has a list of native plant suppliers and landscapers. Consult with the regional Extension Office or a DNR Shoreland Habitat specialist for resources. Take one of the many classes offered throughout the summer on the basics of shoreland restoration. Professionals teaching the classes will help you design your own project and may later be available for further consultation. Many classes include an opportunity to participate in the planting of a restoration project to give you experience for planting your own project.

The book *Lakescaping for Wildlife and Water Quality* and the CD *Restore Your Shore* are two highly recommended resources to get you started. Financial assistance for your project may be available; check with the Cass County Environmental Services or the DNR Shoreland Habitat Restoration Grant Program.



Hire a Professional

Shoreland restoration is a rapidly growing field among landscape professionals and a number of professional resources are available in Cass County. Consult the yellow pages, the University of Minnesota Extension, or contact Cass County Environmental Services. Ask for recommendations from other property owners who have completed revegetation projects. When working with a professional you should expect a detailed site analysis, a site plan developed with you and your interests taken into consideration, and professionally installed plantings. They may also be available for maintenance of your site as it's getting established. If your site has a steep slope or other unusual characteristics, getting professional assistance will be important to the success of your project.

Maintaining Your Restored Shoreland

A shoreland restored with native vegetation should maintain itself once it is established. Apply mulch to new planting beds to prevent soil erosion, hold moisture in the soil, and control weeds. You may need to water and weed the first season, but once the plants are established, they will be able to out-compete most weeds. Native species should never be fertilized because they are adapted to the nutrient levels found in local soils, and fertilizers and pesticides applied to areas near shore can be a threat to aquatic life and water quality. Plants left standing in fall and winter provide seeds and shelter for wildlife, add interest to the winter landscape, and protect the soil from wind erosion. If some plants do not survive the first year, replant as quickly as possible to maintain a continuous vegetative cover. As your shoreland buffer grows, you may want to trim some tree branches or shrubs to keep your view of the lake clear while maintaining the benefits of a natural shoreline.

Protect the Aquatic Zone

The aquatic zone is a vital part of the shoreland buffer. Emergent vegetation helps purify the lake by removing contaminants and calming the water, which allows suspended soil particles to settle to the lake bottom. They provide shelter and spawning areas for fish and other wildlife and add oxygen back into the water. If submerged aquatic plants are interfering with swimming, clear by hand only what is needed to provide a small swimming area. Leave other submerged plants in place. Any chemical treatment of aquatic plants or the destruction of cattails, bulrushes, or wild rice will require a permit from the appropriate DNR Fisheries office.



More than 25% of the emergent vegetation in Minnesota's lakes has been lost as a result of shoreland development.

As part of your project, you may want to plant more aquatic vegetation. This will require a permit from the DNR, but generally a permit fee is waived because this activity is encouraged. Once planted, it may be necessary to install wave break structures to protect young plants from wave damage until their roots are established.

Learn to identify aquatic invasive species, such as Curlyleaf pondweed and Eurasian watermilfoil, and report any suspect plants to the DNR. These invasive species can replace native plants that are vital to the lake ecosystem, and they create recreational nuisances and impact water quality.

Leave Fallen Trees and Branches Alone



Unless they are interfering with your recreational access, leave trees and branches that have fallen into the water alone. They form critical habitat for aquatic organisms that fish and other aquatic life feed on, provide cover from predators for small fish, and they serve as a dock for turtles, kingfishers and other interesting wildlife. The fish and wildlife will appreciate you.

Common Plants for Shoreland Buffers

These plants are commonly used in creating shoreland buffers or are found naturally along shorelines. There is a wide variety of other sedges and plants native to Minnesota that can also be used.

Aquatic Zone

Bulrush
Pickerelweed
Water shield
White and yellow water lily
Arrowhead
Bur-reed

Wet Transition Zone

Marsh marigold
Swamp milkweed
Blue flag iris
Canada bluejoint grass
Blue vervain
Sedges

Upland Zone

Wild rose
Canada anemone
Little Bluestem
Wild bergamot
Black-eyed susan
Red-osier dogwood
High bush cranberry

For a Cass County native plant list, see:
http://www.co.cass.mn.us/esd/pdfs/fact_sheets/plant_materials.pdf

Capture and Cleanse Runoff: Manage Your Stormwater

Low Impact Development (LID) gets water into the ground near where it falls through:

- Infiltration
- Rain gardens
- Less impervious surface
- Pollution prevention

The new way of managing rainwater (stormwater) is to get the water into the ground near where it falls instead of letting it run off to eventually make its way to a nearby waterbody carrying with it pollutants, chemicals, soils laden with nutrients and other materials that can impact water quality, aquatic life, and wildlife. Learn to view rainwater as a resource. This approach to stormwater management is called **Low Impact Development (LID)**.

This new way of thinking about rainwater mimics the natural water cycle and pre-development patterns on a property, keeping the drop of water as close to where it fell in the watershed so it can soak into the ground. This principle gets closer to the natural cycle of 50% infiltration/10% runoff for vegetated shorelands that is discussed on page 11.

Key LID concepts include:

- **Conserve:** preserve native trees, vegetation, and soils, and maintain natural drainage patterns.
- **Control at the source:** minimize runoff volume at the source by collecting or directing it to vegetated areas where it can infiltrate (soak in to) the ground slowly.
- **Customized Site Design:** each home or commercial/industrial site can help protect the watershed through the appropriate combination of LID techniques.
- **Pollution Prevention and Maintenance:** reduce pollutant loads to waterbodies and increase efficiency and longevity of infrastructure with proper and timely maintenance.

LID uses techniques that **infiltrate** (soak in to the ground), **filter, store, evaporate,** and **detain** runoff close to its source. These include the use of infiltration basins, rain gardens, rain barrels, grassy swales, and general reduction of the amount of impervious pavement. In addition, LID also emphasizes protecting natural areas important for water transport and filtering, such as wetlands, streams, and vegetation buffers near water. Remember—every part of your lot is part of a larger watershed. The degree to which water is properly managed at the lot scale is the degree to which habitat and water quality degradation can be minimized to the adjacent lake or river, or other waterbodies in the watershed and groundwater can be recharged.

When Building or Altering the Landscape:

Any new development or alteration of the landscape should have site design and planning that takes the natural vegetation and drainage patterns into consideration.

- Minimize grading and clearing. Carefully assess the property and its natural drainage patterns before designing the house and its placement on the lot.
- Keep wetlands and as much native vegetation as possible. Wetlands filter out nutrients and native trees provide shade, filter and soak up water, and are habitat for birds and wildlife. They require less care and can tolerate a wide range of conditions.
- Conserve the soils that will allow good infiltration of rainwater and place rain gardens and swales in those locations.
- Slope paved surfaces toward vegetated low areas to allow water to soak in.
- Landscape with rain gardens to hold runoff on the lot and to filter rainwater and recharge groundwater.
- Retain rooftop runoff in a rain barrel for lawn and garden watering—your garden will love the natural nutrients.
- Combine rain gardens with grassy swales to replace curb and gutter.
- Reduce impervious surfaces. When building, construct smaller houses or building footprints; build up rather than out. Minimize the amount of driveway, roof area, and

sidewalks. Cover worn paths that may be compacted with mulch to absorb water. For patios and walkways, use permeable pavers or interlocking pavers or flat stones set in sand instead of concrete.

- Minimize or discontinue using fertilizers and herbicides. These chemicals easily run off into lakes and streams, triggering algae blooms and fish kills.

Assess Stormwater Management on Your Lot

Take a look at your current landscaping and drainage patterns. Are there locations on your property where significant volumes of stormwater runoff are being generated? If yes, begin thinking about how you might reduce runoff using the techniques outlined in this Guide. Could you move or remove what is causing the runoff or managing the runoff using diversion, infiltration, and/or storage practices? Are the soils on your site suitable for infiltration stormwater management practices? In general, sandy and gravelly soils work quite well, while soils with more than 30 percent clay or more than 40 percent silt and clay do not infiltrate well.



Judicial Center Showcases LID Techniques

The new Judicial Center in Brainerd uses a combination of three rain gardens, planted in May 2007, and other LID techniques to infiltrate the parking lot runoff. The curb cutouts allow rainwater and snowmelt runoff to enter this rain garden located in the center of the Judicial Center parking lot.

Lakes Area Clean Waters Council

The Lakes Area Clean Waters Council was recently established to provide education on stormwater management focused on homeowners, businesses, and contractors. The Council is made up of representatives of Crow Wing and Cass County local governments, businesses, nonprofits, and interested citizens.



For homeowners, the Council is encouraging the installation of rain gardens, rain barrels, and shoreland buffers as a means to control stormwater runoff. By 2010, the Council has a goal of awarding 1,000 residents in Crow Wing and Cass Counties with signs and space on their website to showcase their projects. Registered projects will receive appropriate signage for their property.



Contact the Council at: www.dropstopabsorb.org or in Cass County call:

Tamie Fairbanks, Cass County
Environmental Services
218-547-7241, tamie.fairbanks@co.cass.mn.us

Capture and Cleanse Runoff: Use Rain Barrels & Rain Gardens

Use Rain Barrels to improve water quality, conserve water and energy, and provide great water for your plants.

How much rain do I need to fill a 50-gallon barrel?

For every inch of rain that falls on one square foot of your roof, you can collect just over half a gallon of rainwater (0.6 gallons).

For example, if you have a shed that is 10' x 10' and you collect roof runoff from all 100 square feet of your roof, you can collect 60 gallons of rainwater during a 1-inch rain event.⁶

When It Rains, It Pollutes

Rain naturally contains pollutants, including phosphorus and mercury. You cannot do much about this source of the pollution, but you can **capture** some rainwater and allow it to be **cleansed** through natural soil processes to prevent it from running off into the lake, where it can be detrimental to water quality.

The best way to do this is to: divert rainwater off roofs, driveways, and other hard surfaces into rain barrels or to the lawn, or create a special garden—a rain garden—designed to capture and clean the rainwater naturally.

Divert Rainwater Off Roofs and Driveways

Roofs of houses and other buildings, especially larger houses, and driveways comprise most of the impervious (impermeable) surfaces. Redirect rainway flow from drain spouts, roof gutters, and driveways onto vegetated areas and away from the lake, steep slopes, and bluffs. There it can be captured and have time to infiltrate naturally into the soil or be used later for watering, instead of getting to the lake.

Install a Rain Barrel

A rain barrel is any type of container used to catch water flowing from a downspout and store it for later use.

The rain barrel is placed underneath a shortened downspout diverting the roof runoff into the barrel. The rain barrel has a spigot to collect the stored water for use in watering flower gardens, house plants and lawns—it's a natural way to fertilize.

Due to lack of research at this time, water collected in a rain barrel is not recommended for watering vegetable gardens. Humans and pets should not drink the stored water. Non-toxic mosquito dunks are available at garden supply stores and mail order catalogs to prevent the breeding of mosquitoes in rain barrels.

Rain barrels need to be cleaned routinely during spring and summer months to reduce algae growth. During winter months, take your barrel out of operation by simply turning it upside down at the same location or storing elsewhere.

Rain barrels are available from Cass County Environmental Services (ESD) for \$56 plus tax. Pay at the ESD office, Courthouse, Walker, and pick up the barrel at various locations throughout the County. You can also order rain barrels online from many garden catalogs or you can make your own (see resources).



Plant a Rain Garden

A rain garden is just what it sounds like—a garden to soak up rain water. It is a recessed planting bed, shaped like a saucer or shallow bowl, designed to collect runoff from driveways, roofs, and other hard surface or sheet flow of rain from lawns. The collected water is then infiltrated into the ground instead of running off to the lake.

Rain gardens are planted with hardy, water-loving native perennial plants that have deep roots, which along with the soil, work to provide a filter system to catch pollutants such as phosphorus, oil, mercury and other heavy metals in rainwater that run into the garden area. Rain gardens allow sediments that are carried with runoff to settle so plants can absorb the nutrients. During a rainfall, the highest concentration of pollutants is during the first inch, or first flush of a storm, which is retained in the rain garden.

In general, typical rain garden should be located at least 10 feet from the house and will range from 100 to 300 square feet in size with a depth of 6 inches to 12 inches. As a rule of thumb, one garden will handle the runoff from a hard surface that is about 10 times their size. For larger surfaces, more than one rain garden may be needed to handle the runoff, perhaps locate one rain garden near each down spout. Rain collected will infiltrate into the ground within a few days, sometimes even hours depending on your soil type.

To be effective, rain gardens must be properly designed for the right shape and size to accommodate the amount of roof, driveway, and other hard surfaces on your property as well as your soil conditions. Plants must be used that are appropriate for your soil type and will also tolerate standing water for up to 48 hours.

For proper design, it is recommended to consult resources to help you determine the proper plants and dimensions. Talk with the local extension agent or a landscaping professional knowledgeable about rain gardens. See the “How-To” resources or do an internet search for additional resources.

Use rain gardens in combination with natural shoreland landscaping for optimal runoff control on your shoreland property.



Rain Garden Tips:

- Don't worry about mosquitoes. Most rain gardens will not hold water long enough for mosquitoes to reproduce.
- When first planted, hand weed biweekly until native plants are established.
- Don't fertilize near the rain garden, it will stimulate weed competition without benefiting the native plants.
- During heavy rains, your rain garden may fill up and overflow. Make sure the overflow drainage follows the drainage designed for your lot.

Source: Taylor Creek Restoration Nurseries

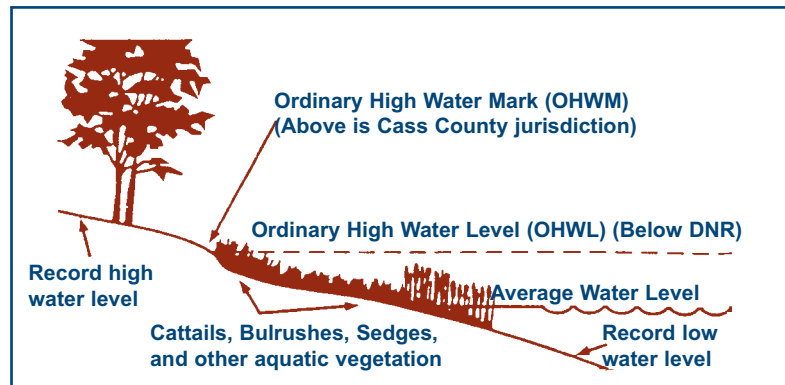
Locate utilities before you dig—
call Gopher One State,
Minnesota toll free 800-252-1166.

What Can I Do On My Shoreland Property? What Permits are Required?

Who Has Regulatory Authority in the Shoreland Zone?

The shoreland zone in Cass County is defined as the land within 1,320 feet of a lake or river plus the near shore waters.

- **For any actions in the water or on the land below the ordinary high water level (OHWL) of a public water (lakes, rivers, streams, wetlands),** check with the appropriate Minnesota Department of Natural Resources (DNR) office for permits that may be required.
- **For any actions on the land above the OHWL (the upland areas of your property) and within the shoreland zone,** contact the appropriate county office. If located within the boundaries of a city, contact city offices.



See the Shoreland Homeowners Checklist for the appropriate authority in various situations.

Knowing what you can and cannot do in the water and on the adjacent shoreland area, and following the regulations that apply, is an important stewardship practice.

Any activity that disturbs land, plant or animal life or chemicals applied in the water is a regulated activity to ensure that the quality of the environment is not compromised by the activity.

How do I know where the ordinary high water level (OHWL) is? For lakes and wetlands, the OHWL is the highest water level that has been maintained for a sufficient period of time to leave evidence on the landscape; it is not necessarily the highest place the water has been. It is commonly that point where the natural vegetation changes from predominately aquatic to predominantly terrestrial.

The OHWL is a reference elevation that defines the DNR's regulatory authority, and it is used by Cass County to determine their regulatory zone and appropriate setbacks for buildings.

If there is a question about the OHWL on your property, contact the DNR Area Hydrologist or check with the Cass County Environmental Services.

Commonly Asked Questions about Shoreland Activities:

What are the requirements for installing a retaining wall or rip rap for erosion control? A DNR public waters work permit is required to build a retaining wall along your shoreline if the structure is proposed below the OHWL. Cass County requires a permit for rip rap above the OHWL. Retaining walls are discouraged, particularly on relatively undeveloped lakes. Planting vegetation for erosion control is preferred; rip rap (coarse stones, boulders, or rock placed against the bank or shore) may be allowed without requiring a DNR permit if specific conditions are followed in installation. For either a retaining wall or rip rap installation, you will need technical advice for the best success. Contact both the DNR Area Hydrologist and the Cass County Environmental Services for assistance. Refer to the DNR Shoreland Alteration fact sheet.

Do I need a permit for a sand blanket or beach development? Everyone wants a nice sandy beach area, but trying to create a sandy beach where it has not existed naturally may not always be successful. Before making your decision, be aware that wave action can erode the beach, and sand will migrate down shore, possibly damaging fish and wildlife habitat. If the lake bottom is soft, the sand will only sink into the muck and disappear. Sand blankets cannot be applied over bulrush and cattails; vegetation will constantly emerge.

Before installing a sand blanket below the OHWL, contact the Area DNR Waters office for installation and possible permit requirements. Refer to the DNR Shoreland Alteration fact sheet for specifications. A permit will be needed from Cass County Environmental Services if you are installing a sand blanket above the OHWL.

What rules apply to docks? Docks are privately owned structures, which are allowed to be placed in public waters of the state to provide access to the use of the water. Dock rules are established by the DNR to prevent the deterioration of the lake's ecosystem from excessive or inappropriate dock placement. Local governments have the authority to regulate docks; Cass County currently defers to state rules.

In choosing the right dock and boat lift configuration for your property, it is important to keep in mind that a dock is private property placed on a public resource, and they can have detrimental impacts on the lake. They may shade out important aquatic plants and cause fragmentation and destruction of important emergent and submerged aquatic vegetation that provides habitat where fish spawn, feed, grow, and find shelter from predators. Keep dockage appropriately balanced between reasonable access and resource protection. Do not use docks for activities that are better intended for land, such as barbecues and porches.

No DNR permit is needed to install, construct, or reconstruct a dock on shoreline if:

- The dock, not including the watercraft lift or canopy, is not wider than 8 feet and is not combined with other structures that create a larger structure.
- The dock is no longer than is necessary to reach navigable water depth, is not a safety hazard, it does not close off access for others to the lake, allows for free flow of water under it, and is not intended for use as a marina.

A temporary 2008 general permit allows for a modest platform at the lake end of the dock under the following circumstances: 1) a single temporary platform up to 120 square feet measured separately from the access dock, or; 2) 170 square feet including the area of the adjacent access dock. The access dock must be 5 feet or less in width and is located on a lake with a classification of General Development or Recreational Development. If a dock exceeds these conditions, a DNR Waters permit will be required. For more information, see "Dock Rules" in the Resource Section.

Can I control aquatic plants in front of my shoreline?

The removal or destruction of aquatic plants is a regulated activity under the DNR's Aquatic Plant Management Program. Aquatic plants are a valuable part of the lake system. They stabilize bottom sediments, protect water clarity, prevent shoreline erosion and provide fish habitat.

You are encouraged to keep destruction of aquatic plants at a minimum. Unless aquatic plants are interfering with lake access, swimming, or other water recreation activities, they should be left alone. If you are seeing unusually high plant growth where it has not previously occurred, look for possible sources of phosphorus getting into the lake from your property that might be fueling this growth, such as excessive runoff, a septic system, or shoreland erosion.

If management is desired, consider managing plants only in the swimming area; it is not necessary to have the entire shoreline devoid of submerged aquatic plants. For management, you need to know:

- ⇒ No emergent plants can be destroyed (bulrushes, cattails, wild rice) unless authorized by a DNR permit.
- ⇒ Submerged vegetation can be manually controlled (hand cutting or pulling) in an area not exceeding 2,500 square feet or wider than 50 feet along the shore or half the width of your property, whichever is smaller; more than that requires a permit.
- ⇒ Cut or pulled vegetation must be removed from the water and the cleared area must remain in the same place from year to year.
- ⇒ A permit from DNR Fisheries is needed to:
 - Use any chemicals or automated mechanical devices (such as the Crary WeedRoller, Beachgroomer or Lake Sweeper).
 - Use copper sulfate for swimmers itch control.
 - Remove floating leaf vegetation in an area larger than a channel 15 feet wide to open water.
 - Remove or relocate a bog of any size that is free floating or lodged elsewhere than its original location.
 - Plant aquatic plants below the OHWL as part of a shoreline restoration project. This activity is encouraged and there is generally no permit charge.

These activities are not allowed in any circumstances:

- Excavating the lake bottom for aquatic plant control, using lake-bottom barriers to destroy or prevent the growth of aquatic plants,
- Removing vegetation within posted fish-spawning areas,
- Removing aquatic plants from an undeveloped shoreline, and
- Removing aquatic plants where they do not interfere with swimming, boating or other recreation.

If you see violations of these permit requirements, or any other permit requirements, contact Cass County Environmental Services if the violation is above the OHWL, or your DNR Conservation Officer if it is below the OHWL.

Cass County Shoreland Permit Requirements

For shoreland properties within municipal boundaries, check with the city's Planning & Zoning office for permit requirements. Bungo and Maple townships have permitting authority; check with them before beginning projects. For all other areas of Cass County, the following permit requirements apply in shoreland areas.

Building Permits for New Construction, Remodeling, Decks, Garages, etc:

Contact Cass County Environmental Services (ESD)

No permit is required for accessory structures of 150 sq. feet or less that meet setbacks and have no intended human habitation. Permits will be required for accessory structures of more than 150 square feet in shoreland areas. A permit is required for a deck. For new residential construction, check with the Cass ESD for specific parcel requirements. No paved access in the shoreland impact zone or filling of wetlands is allowed.

Construction in Bluff Zones:

See sidebar on page 9 for bluff requirements. Contact Cass ESD for topographic definitions of a bluff and building requirements.

Non-Conforming Lots and Uses

Contact Cass County Environmental Services

A variance may be required for projects on non-conforming lots. Some non-conforming lots recorded before 1972 may be buildable without a variance; check with ESD. Shoreline buffer establishment is required in conjunction with most shoreland variance approvals.

Boat Houses

Contact Cass County Environmental Services

No new boat houses are allowed in the shoreland zone. Existing non-conforming boat houses can be replaced with no changes in size, location, or use; contact ESD for a permit.

Dirt Moving in the Shoreland Zone (ice ridge removal, shoreland landscaping, etc)

Contact Cass County Environmental Services

Any dirt moving, including ice ridge manipulation, in the Shore Impact Zone (SIZ) requires a permit. Contact the ESD for specific requirements for historic ice ridges. In general, movement of up to 50 cubic yards of soil requires a shoreland alteration permit; movement of more than 50 cubic yards requires a conditional use permit and an engineered plan and performance bond. Contact ESD for specific requirements in SIZ 1 & 2.

Wetland Alterations

Contact Cass County Environmental Services

No wetland alterations are allowed in the SIZ. Work in any wetland must be undertaken in accordance with the Minnesota Wetlands Conservation Act.

Vegetation Alterations

Contact Cass County Environmental Services

See page 9 for shoreland alteration regulations. No fertilizer application is allowed in SIZ 1 & 2. Naturally dead or diseased trees may be removed in both zones. Removal of emergent aquatic vegetation requires a DNR permit; see page 19 for requirements.

Docks and Beaches

Contact Cass County Environmental Services

Docks must meet MN DNR requirements (see page 19) and a 10-foot setback from the nearest lot line. They must not block access to open water for adjacent properties and shall be placed within permitted shoreland alteration areas. New beaches on residential shoreland lots shall not exceed 14 feet in width and shall be incorporated in the lake access area. With a shoreland alteration permit, a one-time addition of up to 10 cubic yards of sand may be placed on existing sand beaches. Berms shall be placed landward of all beaches to prevent erosion from runoff. If removal of aquatic vegetation is required, contact the DNR.

Septic Systems

Contact Cass County Environmental Services

See page 5 for Cass County regulations. Low interest loans for 5 years at 3% interest are available to repair or replace an existing non-conforming or failing septic system.

Before purchasing a shoreland property, ask these questions and/or check with the Cass County ESD:

- Do all of the structures meet the setbacks?
- Does the parcel meet other building requirements for the lot?
- Have all existing structures on the property been built with a permit?
- Is the septic system in compliance with Cass County regulations?

It is better to ask far enough in advance than to find out later you will not be able to build what you planned.

Additional Information on Cass County Land Use Ordinance and Permit Requirements

See the Land Use Ordinance on the County website. For more specifics on land use topics, see fact sheets at http://www.co.cass.mn.us/esd/esd_fact_sheets.html.

✓ Cass County Shoreland Homeowner's Checklist:

Contact Cass County Environmental Services before:

- Buying, clearing, or developing shoreland property.
- Building a new structure, remodeling or adding on to an existing structure.
- Installing a septic system.
- Building a boardwalk, raised path to the lake, or anything that does not meet setback requirements.
- Building or repairing any accessory structure near the shore (boat house, gazebo, storage locker).
- Building stairways, landings, or clearing access paths in bluff areas.
- Draining, excavating, or filling a wetland anywhere in Cass County.
- Any kind of dirt moving, shoreland alterations, or changing the appearance of your shoreland building setback zone (shoreland impact zone) or near shore area by clearing, cutting, planting, grading, or filling.
- Installing a sand blanket above the ordinary high water level.

If you are in doubt or need clarification about any activity, contact: Cass County Environmental Services Department; 218-547-7241 cass.esd@co.cass.mn.us

Contact the Minnesota Department of Natural Resources before:

- Removing emergent vegetation (cattails, bulrushes, wild rice).
- Using chemicals to control aquatic vegetation.
- Altering a lake bed.
- Any work done below the ordinary high water level (OHWL).
- Installing any form of riprap or installing a retaining wall.
- Any land disturbance below the ordinary high water level.

References:

- ¹ *Protecting Your Waterfront Investment*, Center for Land Use Education, UW Extension; 2005.
- ² *Shoreland Property: a guide to environmentally sound ownership*; 2002; Southeast Wisconsin Fox River Basin Partnership Team, University of Wisconsin-Extension and Wisconsin Department of Natural Resources.
- ³ *Lakescaping for Wildlife and Water Quality*, State of Minnesota, Department of Natural Resources; Henderson C; Dindorf C; Rozumalski, F.
- ⁴ Minnesota DNR Shoreline Alternations Fact Sheets: Natural Buffers, Lakescaping; Riprap, Sand Blankets.
- ⁵ *The Shoreland Stewardship Series: A fresh look at shoreland restoration*; DNR FH-430-00; RP-03-10M-50-S; University of Wisconsin-Extension, Wisconsin Lakes Partnership, Wisconsin Department of Natural Resources and the GMU Teams, and the Wisconsin Association of Lakes.
- ⁶ Rain Barrel Fact Sheet, Crow Wing County Extension, 2007.

Frequent Contact Information

Cass County Offices

Cass County Website:

www.co.cass.mn.us Click on various departments.

Cass County Environmental Services

Courthouse, 1st Floor

303 Minnesota Avenue W., PO Box 3000, Walker, MN 56484-3000 (218) 547-7241

www.co.cass.mn.us/esd/home_esd.html

cass.est@co.cass.mn.us

Soil and Water Conservation District

(218) 547-7399

Assessor: (218) 547-7298;

cass.assessor@co.cass.mn.us

Regional Extension Office:

322 Laurel Street, Ste 21, Brainerd

(218) 547-7298

Boat and Water Safety: (218) 547-7329;

Permits required for rafts; \$10/2 years

Extension: (218) 587-8280;

mnext-cass@umn.edu

Land Commissioner: (218) 947-3338;

cass.land@co.cass.mn.us

Sheriff: 1-800-450-COPS (2677)

For emergency, dial 911

Other Services:

Household Hazardous Waste Disposal

Drop-off Center Location: Solid Waste Transfer Station, 2 miles N of Pine River on Hwy 371. HHW is accepted by appointment only. Call (888) 910-2425, ext. 2. Mobile hazardous waste collections are held in various locations during the summer.

Additional Resources:

Aquatic Plant Management: <http://www.dnr.state.mn.us/shorelandmgmt/apg/permits.html>

DNR Water Permits Requirements: <http://www.dnr.state.mn.us/permits/water/answers.html#ohwl>

Dock Rules: See "Dock Information" at <http://www.dnr.state.mn.us/waters/index.html>

Erosion Control for Home Builders: <http://cleanwater.uwex.edu/pubs/storm.htm#erosion>

General Shoreland Homeowner Information: www.shorelandmanagement.org

Non-Toxic Household Product Alternatives: <http://www.reduce.org/toxics/index.html>

Rain Barrels/Gardens:

- Constructing a rain barrel: http://www.shorelandmanagement.org/quick/easypdf/rain_barrel_const.pdf
- Rain Garden: A How -To Manual: http://cleanwater.uwex.edu/pubs/pdf/home_rgmanual.pdf
- Rain Garden Design Fact Sheets: <http://www.appliedeco.com/NLD.cfm>

Septic System Design and Maintenance: <http://septic.umn.edu/homeowner/index.html> or call 800-322-8642.

Shoreland Alterations Fact Sheets:

(Docks, Rip Rap, Sand Blankets, Ice Ridges, Lakescaping)

<http://www.dnr.state.mn.us/waters/index.html>; see Shoreland Management Section.

Shoreland Landscaping:

- The Water's Edge: <http://files.dnr.state.mn.us/assistance/backyard/shorelandmgmt/savewateredge.pdf>
- *Lakescaping for Wildlife and Water Quality*: Available in bookstores or from Minnesota Bookstore, 800-657-3757, <http://www.comm.media.state.mn.us/bookstore/bookstore.asp>
- *Restore Your Shore CD*: www.dnr.state.mn.us/restoreyourshore/index.html
- *Living Shore Video/DVD*: A 17-minute video showing the importance of leaving a natural buffer zone on the shore; check with your county Extension Office for a loaner copy.
- Native Plants for Sustainable Landscapes www.extension.umn.edu/distribution/horticulture/DG7447.html

Stormwater Management:Minnesota Stormwater Manual

www.pca.state.mn.us/water/stormwater/stormwater-manual.html

Yard Waste:

Grass clippings, leaves, and pine needles can be dropped off at:

- Longville:Slagle Transfer Site
- Mark's Farm and Garden, Hackensack
- Walker/Hackensack Transfer Site

Tree trimmings and brush can be brought to the Slagle and Walker/Hackensack transfer sites.

Composting is encouraged.

Minnesota State Offices

DNR Waters/Area Hydrologist

Michele Puchalski: (218) 308-2620

DNR/Shoreline Habitat Specialists

In Southern Cass County, contact: Heather Baird (218) 833-8368, heather.baird@dnr.state.mn.us

Rest of Cass County, contact: Lindy Ekola

(320) 634-4573, lindy.ekola@dnr.state.mn.us

DNR Regional Fisheries/Aquatic Plant Permits

Bemidji Fisheries Office: (218) 308-2623

Brainerd Fisheries (for Southern Cass):

(218) 828-2735

Conservation Officers:

Toll Free: (888) 646-6367

Walker Area: Gary Sommers, (218) 547-4501

Cass Lake Area: Mark Mathy, (218) 547-0807

Remer Area: Larry Francis, (218) 566-4833

Longville—temporarily vacant

Pine River: Nikki Shoutz, (218) 692-3456

Southern Cass County/Brainerd: Randy Posner, (218) 575-2289

Turn in Poachers: (800) 652-9093

Minnesota Department of Health/Bemidji

(218) 308-2100

