Cass County
Shoreland Homeowner's Guide to Lake Stewardship

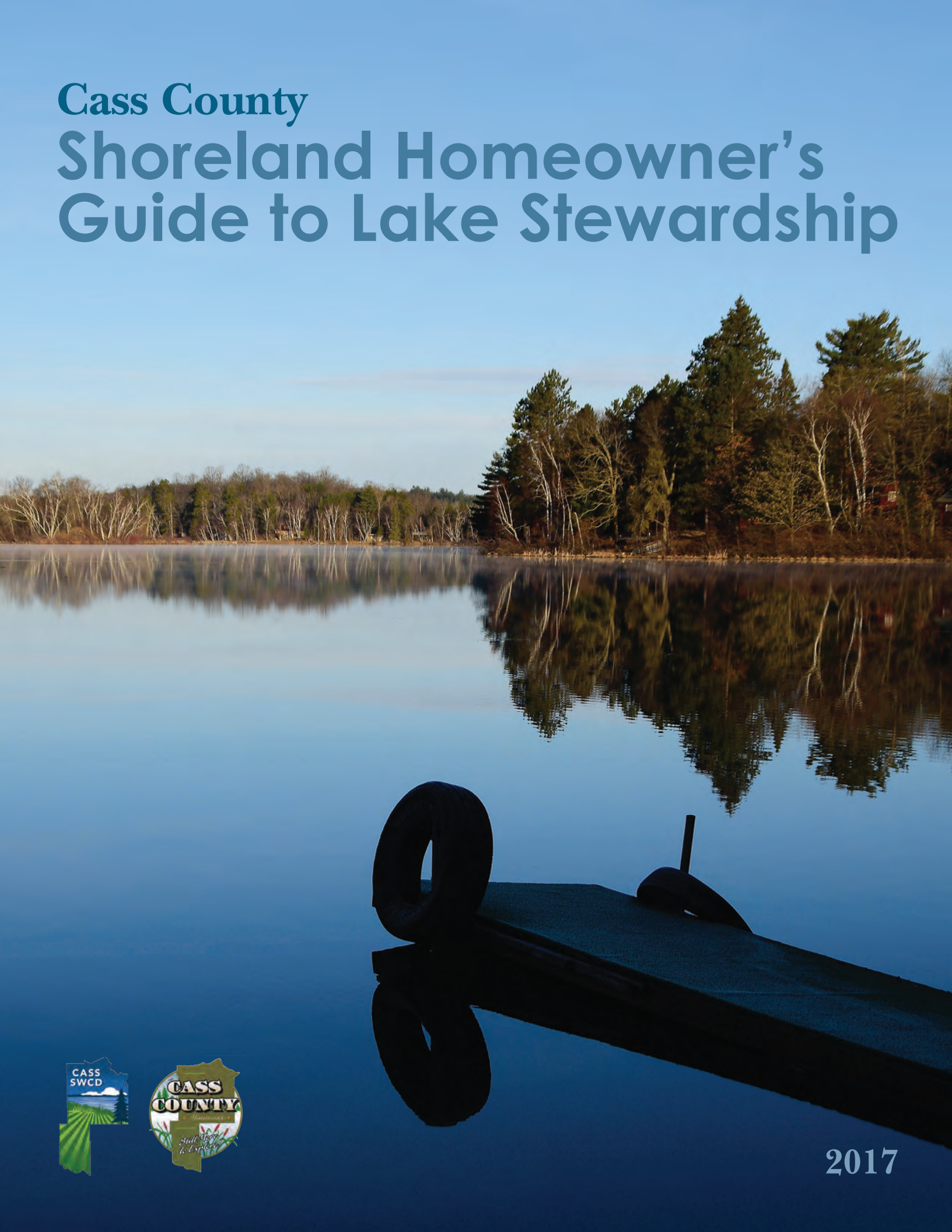

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Photo by Carol Wedin

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Printed on 10% post-consumer recycled fiber content.

References:

[1] *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.

[2] Rain Barrel Fact Sheet, Crow Wing County Extension, 2007.

Cass County Shoreland Homeowner's Guide to Lake Stewardship

Introduction

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 around water and nature.

Photo by Carol Wedin

Cass County has 1,054 lakes—some of the most pristine and highest quality lakes in Minnesota. These lakes not only provide for your enjoyment, they also draw visitors from all over the country to enjoy their beauty and recreational opportunities, provide a strong foundation for economic stability, and enhance the quality of life for all who live and play in Cass County.

When you own shoreland property 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. Rules are in place for the benefit of your health and safety and the health of the adjacent lake or stream.

With the enjoyment of these lakes comes the responsibility to protect, improve, and enhance the quality of these waters for your enjoyment and that of future generations, keeping in mind that the water itself is a public resource for everyone to enjoy. **It'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 you, the shoreland owner, are part of the larger ecosystem of all living plants and animals.

It's Up to Us

This *Shoreland Homeowner's Guide to Lake Stewardship* will provide you with basic information on good lake stewardship. You'll learn about ways you can manage your property to protect water quality by: 1) **curbing pollution at the source**; and 2) **reducing, capturing, and cleansing runoff** that can carry pollutants to the lake. Plus, this guide also provides information on preventing the spread of aquatic invasive species (AIS) that can impair recreational enjoyment and impact water quality as well as specific local and state rules and regulations for shoreland living and development.

If you who live around the lakes practice the ideas in this guide, the lakes will stay healthy to protect your investment in shoreland property and insure your continued enjoyment while preserving their ecological integrity.

Photo by Steve Mortensen

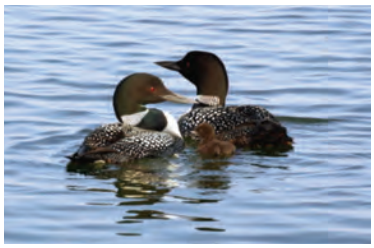


Photo by Steve Mortensen

"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."

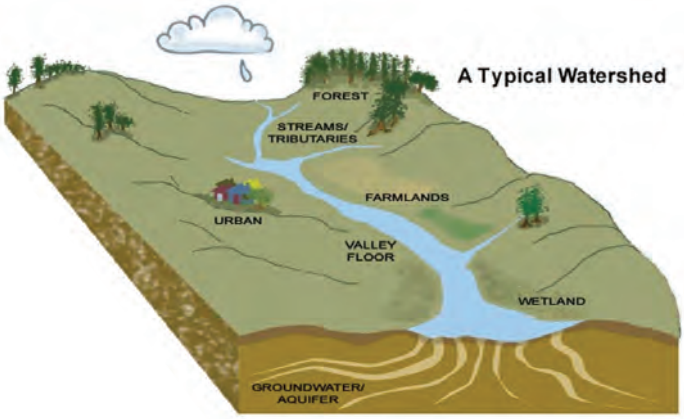
~Henry David Thoreau in Walden

Watersheds: Keeping Our Lakes Healthy

What is a watershed? Most people are familiar with the term "lake" but don't understand that a lake is part of a larger landscape, the watershed. **Water quality is primarily dependent on what happens on the land around a lake and within the lake's watershed.**

A watershed is an area of land in which all the precipitation that falls within it could flow to a certain point, usually a receiving waterbody–a river, lake, or stream.

It's the water runoff from the land, and the pollution that is carried with it, than generally determines a lake's water quality.

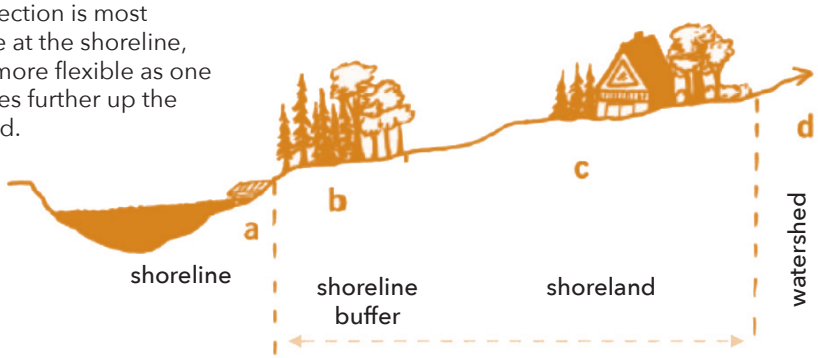


We all live in a watershed. Each lake has its own watershed or land that directly influences what comes into the lake. Each lake watershed is part of a larger watershed where activity on the land can influence water quality. **A healthy lake depends on a healthy watershed.** No matter the location of your property in Cass County, you are in one of six (6) major watersheds in Minnesota; there are a total of 80 major watersheds. Each of the major watersheds has a number of minor watersheds. There are 193 total minor watersheds in Cass County where water is flowing in or out of the County. The lake's watershed is part of one of these 193 minor watersheds. To locate the minor watershed for your lake, see the Cass County Water Plan on the Cass County Environmental Services web pages at: co.cass.mn.us.

Your Lake's First Line of Defense

While the land activity in the watershed contributes pollution to the lake, there are four major zones of lake protection. The immediate 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.

The 4 zone approach to lake protection is most restrictive at the shoreline, and it is more flexible as one progresses further up the watershed.



The 4 Zones:

a) At the shoreline interface of land and water;

b) The shoreline buffer zone is the distance from the shoreline to the setback for the building envelope. The set back distance is determined by the classification of the lake (i.e. a general development lake is 75 feet; a recreational development lake is 100 feet; and natural environment lake is 150 feet).

c) The shoreland zone is 1,320 (1/4 mile) from the lake or 500 feet from a river or stream;

d) The lake's watershed is the greater drainage area to the lake.

Curb Pollution: Reduce Phosphorus and Other Pollutants

Nitrogen, potash, and phosphorus are the essential 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 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.

Natural rainfall contains some phosphorus, which increases when the rain hits a surface and picks up dirt. We can't control rainfall, but we can control our own shoreland practices that contribute phosphorus to the lake. Excessive phosphorus and other harmful pollutants can get into lakes from shoreland properties in a number of ways, including:

- excessive fertilizer application;
- 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 and/or toxic chemicals.

The average one acre lawn can potenially yield about one pound of phosphorus to the lake every year. One pound of phosphorus can feed the growth of over 500 pounds of algae.

Apply Fertilizer Sparingly. 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 Cass County, 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 primarily sell zero phosphorus fertilizers, it's up to you to make sure you comply with the law. Note: In Cass County, fertilizer application is not allowed in shoreland impact zones 1 and 2.

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

Other herbicide and pesticide precautions 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 the driveway and other hard surfaces back onto the lawn to prevent runoff.

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

Curb Pollution: Reduce Phosphorus and Other Pollutants

Use Herbicides and Pesticides Sparingly, or Not at All

- Keep lawn healthy to avoid the need for herbicide applications.
- When necessary, use the least toxic and most degradable herbicide and follow directions carefully.
- Use corn gluten meal, a byproduct of the corn milling process, as a natural pre-emergent herbicide that stops the root growth of germinating plants. If you can't find it in major retail stores, ask them to carry it.
- 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.
- Identify the pest and learn about the best way to control it; there are many methods of control other than pesticides. See Integrated Pest Management resources.
- When you use pesticides outside your house, on the lawn and in the garden, use them according to the instructions on the label to prevent spillage on the ground, where watering or rain can percolate it into the groundwater or wash it into the lake with runoff.

Do Not Dump Yard and Aquatic Plant Waste Near 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. Keep out of wetlands.
- Leave a strip of taller grass along the lake to catch windblown leaves and debris.
- Do not burn leaves near the lake; it destroys the organic matter releasing the phosphorus, which could then be washed into the lake.
- Remove washed up or harvested aquatic plant material away from the shore; compost or use as mulch in the garden.

Locate Fire Pits Away from the Shore 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 phosphorus-loaded ashes from being blown or washed into the lake. Hint: Ashes make a great garden soil amendment.

Pick Up 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.

Seal Abandoned Wells

An unused water well—abandoned well—provides a direct route for pollutants to reach groundwater, your primary drinking water source and interconnection to the lake. Sealing the abandoned well is a safeguard against unwanted pollution. It must done by a licensed groundwater professional. The Cass Soil and Water Conservation District (SWCD) offers a cost share program for well sealing that will pay up to $250 per well.

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 and do not hose into the water.
- Boat slowly and do not power load boats at accesses. Motors stir up sediments to release nutrients and toxic mercury tied up with the sediments. A 50-horsepower motor operated full throttle can stir the water column and sediment up off the bottom in water as deep as 15 feet.
- Keep your motor well-tuned; use four-cycle motors.

Never use fertilizers, pesticides, or herbicides near the lake. Runoff can carry these products into the lake and harm fish, plants, and other wildlife and accelerate the growth of unwanted aquatic plants and algae.

Curb Pollution: Manage Waste Properly

Don't Burn Garbage

Burning household garbage in burn barrels, wood stoves, and fire pits creates pollution that's dangerous to human health and contaminates the air, water, and soil. **It's against the law in Minnesota.**

Garbage today contains a lot of plastics; paper treated with chemicals, coatings, and ink; and many other chemicals. Backyard burning is a low-temperature fire that receives very little oxygen and produces lots of smoke. Under these conditions, a variety of toxic substances are produced and released primarily into the air close to ground level, where they are easily inhaled—with no pollution controls! Dioxin, a potent human carcinogen, is the major health risk posed by residential garbage burning. U.S. EPA research shows that burn barrels are the #1 source of dioxin in the U.S. Instead of burning garbage, dispose of it properly.

REDUCE, REUSE, RECYCLE.
REDUCE the amount of waste you create by buying products with less packaging and buying items that last longer instead of disposable ones. REUSE the durable packaging you get (like wash out that sour cream container and use it to put leftovers in). RECYCLE all the materials you can, like cardboard, newspapers, plastic grocery bags, cans and bottles.

Just one burn barrel can produce as much or more dioxin as a full-scale municipal waste combustor burning 200 tons/day.

Properly Dispose of Household Hazardous Waste

Household hazardous waste (HHH), such as paints, cleaners, garden chemicals, automotive products and aerosol cans should be disposed of properly to protect the environment. Dumping 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. 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. See the back cover for HHH disposable options in Cass County.

Safely Dispose of Unwanted/ Expired Medications

Expired or unwanted prescription or over-the counter medications from households have traditionally been disposed of by flushing them down the toilet or drain. This has been demonstrated to cause adverse effects to fish and other aquatic wildlife when these medications get into water systems.

The Cass County **Take It to the Box Program** provides a safe disposal box for any unneeded over-the-counter medications, prescription or narcotic drugs. Boxes are located at the Cass County Sheriff's Office in the Courthouse in Walker and at the Cass Lake, Lakeshore and Pine River City Hall; look for the logo. For medications placed in the box, leave the name of the medication on the container but black out with a marker your name and other identifying information. NOT accepted: syringes, needles or sharps, biohazardous waste, cancer treatment drugs or radioactive medications. The service is a free, anonymous, no-questions-asked program. For more information call 218-547-7428.

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 drain field.

- The **Soil Treatment System** (drain field), 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, nitrates, 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.

What Causes a Septic System to Fail?

Septic system failure is most commonly the result of:
- Improper maintenance;
- Overuse of water in the home; and/or
- Improper design or installation of the system.

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.
- 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 check their website for a list of licensed septic inspectors.
- If the drain field 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 drain field, 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.

Curb Pollution: Inspect and Maintain Your Septic System

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 for laundry, dishes and showers 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 system additives (i.e. Rid-X, Septic Cleanse, etc.) 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 Drain field
Compacting or obstructing the soil over the treatment area can cause malfunctioning of the drain field. To protect it:

- Keep heavy vehicles off the drain field.
- Maintain vegetative cover, but do not plant trees or shrubs on the drain field 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 drain field.

Protect Your System from Freezing in 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.

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 drain field 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 drain field.
- 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.
- Talk with a professional before installing heat tapes or tank heaters.

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.

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 the Environmental Services website.
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 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. Low interest septic loans are available to county residents.

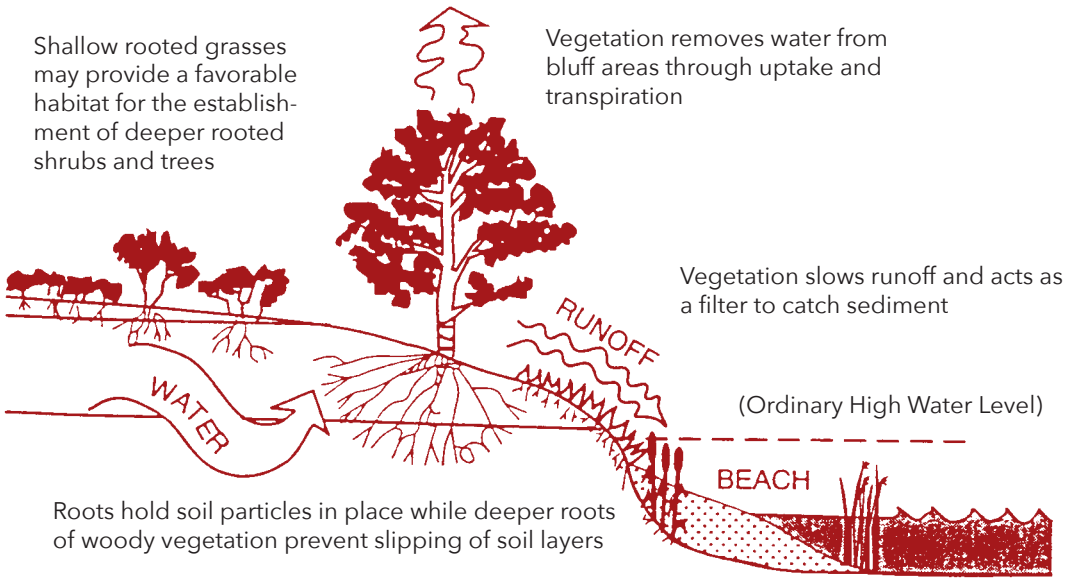
Reduce Runoff: It Doesn't Go Away

What is Runoff?

Snow melt or rainwater that does not soak into the ground and instead runs off impervious surfaces (hard surfaces that water doesn't penetrate 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. **Reducing runoff decreases the pollutants that can eventually reach the lake.**

Managing stormwater (rainwater) 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. Impervious (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.

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



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 dormant 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.

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

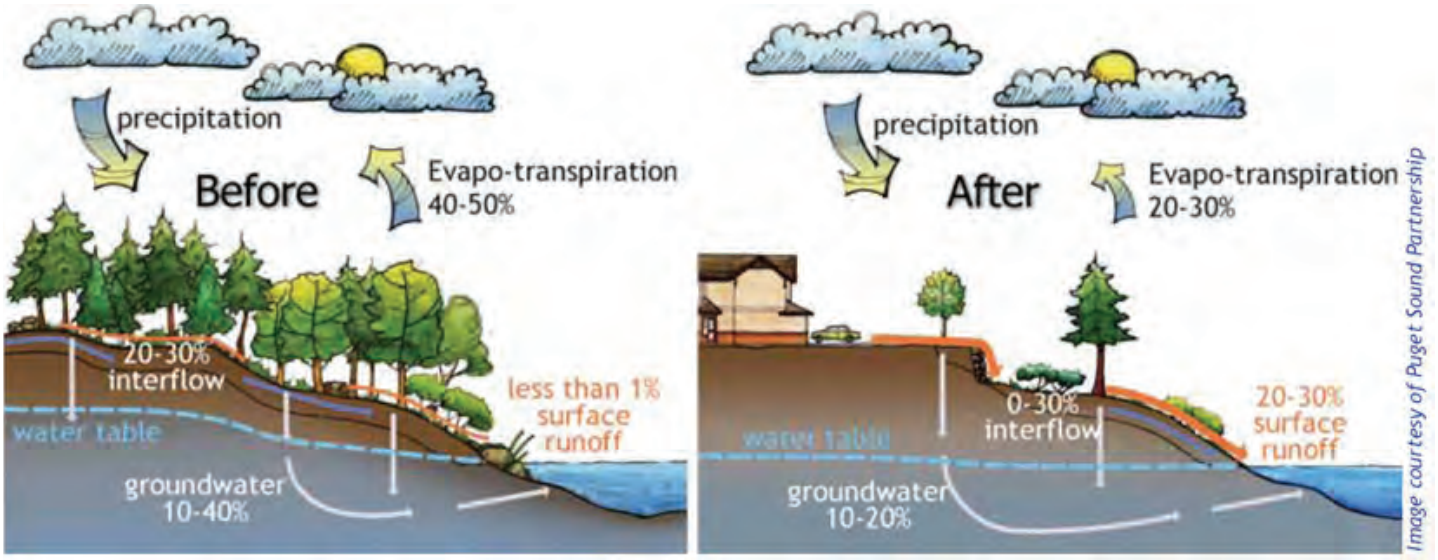
That beautiful manicured lawn takes more chemicals and more work to maintain and does not provide good habitat for the wildlife that share the shoreland with us.

Reduce Runoff: It Doesn't Go Away

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 directly on 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.

Reduce Hard Surfaces, Like Roofs and Driveways

Since impervious surfaces cannot absorb water, reducing the amount of impervious surfaces on your lot will reduce the volume of runoff.

- When considering additions, decide if the extra space is really necessary. Could you build up instead of out to reduce the roof size?
- Minimize the amount of paved surfaces, such as driveways and sidewalks. Locate driveways, sidewalks, stairways, and footpaths away from steep slopes.
- If you're installing a new patio or rebuilding a sidewalk or walkway, use bricks, interlocking pavers or flat stones set in sand instead of concrete. Consider using pervious pavers, where water runs through it, and pervious asphalt for driveways.
- Cover well worn paths, that may be compacted and act like asphalt, with mulch to absorb water.

Cass County limits the amount of impervious surfaces on shoreland parcels; contact Environmental Services for more information.

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.

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. [1]**

Reduce Runoff: Preserve or Restore Natural Shoreline Vegetation

Scientific research shows that the way we treat our shorelines affects lake water quality and fish and wildlife habitat. **To protect and improve our lakes, we need to improve our shorelines.** The best way we can do that is by adding or keeping a buffer strip of natural vegetation along the shore. Buffer strips of native wildflowers, grasses, trees, and shrubs protect water quality and provide habitat for fish and wildlife.

If you have lawn to the water's edge, lawn behind rip-rap, steep slopes, or little 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.

Rethinking How our Shorelands Should Look

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. Lawn-to-lake shorelines are no longer ecologically smart. Creating or keeping a native shoreline buffer reduces the amount of nutrients entering the lake along with providing better wildlife habitat. For example, a 20-foot buffer strip along the lake can trap about 80% of the phosphorus runoff and about 90% of the sediment pollutants.

This house-to-the-lake lawn on Birch Lake was labor intensive to maintain. Fertilizer and grass clippings may have added nutrients to the lake leading to weed and algae growth. A shallow-rooted lawn (turfgrass) has a minimal ability to filter nutrients and sediment entering from rainwater runoff and is ineffective at allowing infiltration of water into the soil. The shallow roots leave subsurface runoff untreated while native plant roots intercept and withdraw the nutrients and water.

The same property with a shoreland buffer of native vegetation now added will protect the shoreline, maintain the natural landscape, prevent erosion, and filter out boat noise. Many plants are suitable that are low growing and won't impede your view of the lake. Using ornamental grasses, perennials and smaller woody plants will significantly reduce and filter runoff while restoring the natural beauty to the shore, and they are less work so there's more time to recreate.

Benefits of a Shoreland Buffer

1. **Enhances water quality.** A good buffer protects your lake, stream, or wetland by slowing runoff and allowing it to soak into the ground.
2. **Stabilizes shorelines.** Buffers prevent fluctuating water levels, moving ice, flooding, surface runoff and wave action from eroding your shoreline.
3. **Provides fish and wildlife habitat.** The shoreline buffer provides habitat for fish and cover for birds, butterflies, turtles, and other wildlife.

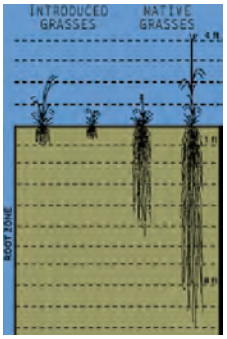
Elaine Leach property/Lake Margaret

4. **Enhances aesthetics.** Natural buffers beautify your yard with a variety of colorful wildflowers, create a natural screen for privacy, and enhance that "Up North" feeling.
5. **Increases property value.** A high quality buffer is an asset that can add resale value.
6. **Limits nuisance bugs and wildlife.** A native plant buffer creates a natural barrier to Canada geese.

Reduce Runoff: Preserve or Restore Natural Shoreline Vegetation

Buffer the Lake From Runoff

One of the greatest benefits of establishing native vegetation is their deep root systems that stabilize the shore from erosion and ice damage, and they loosen the soil allowing the rain to soak into the ground instead of running off to the lake.



Native plants are more effective at stabilizing soils and banks because their roots are longer (3-5 feet) and more dense than typical Kentucky bluegrass (2-3 inches). They hold the soil particles together to prevent erosion and reduce ice damage.

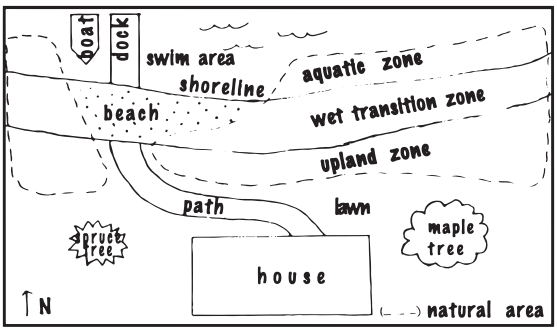
What is a Shoreland Buffer?

A shoreland buffer 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 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.

Plan a natural area along the shore



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

Getting Started Creating a Shoreland Buffer

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. Some decisions in creating a buffer are easy, such as: "How tall do you want the plants to be?" Others, are more complicated, like: "What is your soil type and holding capacity?"

The Cass SWCD can assist you with, and possibly help fund, the installation of a shoreland buffer on your property. Contact the Cass SWCD:
Cass County Courthouse 1st Floor
218-547-7399
co.cass.mn.us - see Government menu

Native Shoreland Buffer

Photo courtesy of Steve Hall, Shoreline Creations, shorelinecreations.net

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

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

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. Perennial native plants will take three to five years to become apparent.

Reduce Runoff: Preserve or Restore Natural Shoreline Vegetation

Buffer the Lake From Runoff

Restore Your Shoreline

Local nurseries and garden centers are starting to carry more native plant stock and can recommend the best plants for your site. Plants used should be native to this region of 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 DNR Shoreland Restoration Specialists or the Cass Soil and Water Conservation District for resources and fact sheets on designing your project, selecting plants, preparing the site, and planting. Take one of the many classes, tours, and open houses 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.

Hire a Professional

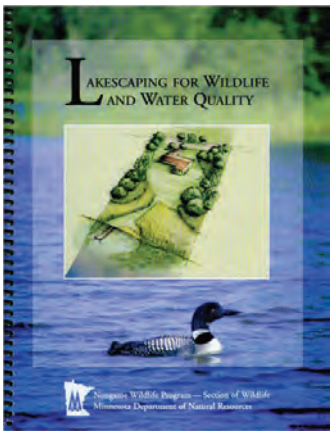
Shoreland restoration is a rapidly growing field among landscape professionals; consult the yellow pages or watch for promotions. Ask for recommendations from other property owners who have completed re-vegetation projects. If your site has a steep slope or other unusual characteristics, getting professional assistance will be very 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, protect the soil from wind erosion, and capture windblown leaves and debris.

Green Hill Town Homes on Gull Lake

Photo by Steve Mortensen



The book *Lakescaping for Wildlife and Water Quality* and the DNR CD *Restore Your Shore* are two highly recommended resources to get you started. They are available in bookstores and online through the Minnesota Bookstore at mnbookstore.com

The *Restore Your Shore* CD is also online at dnr.state.mn.us/rys/index.html.

Reduce Runoff: Preserve or Restore Natural Shoreline Vegetation

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.

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 sunning and roosting area for turtles, kingfishers and other interesting wildlife. The fish and wildlife will appreciate you.

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

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	Wet Transition Zone	Upland Zone
Bulrush	Marsh marigold	Wild rose
Pickerelweed	Swamp milkweed	Canada anemone
Water shield	Blue flag iris	Little Bluestem
White and yellow water lily	Canada bluejoint grass	Wild bergamot
Arrowhead	Blue vervain	Black-eyed susan
Bur-reed	Sedges	Red-osier dogwood
		High bush cranberry

For a Cass County native plant list, see: Cass County Environmental Services web pages.

Reduce Runoff: Curb Erosion

Rainwater runoff or waves lapping at the banks of your shore can erode the shoreline, silt up the water, and wash away sand blankets and impair fish spawning areas. When soil washes into the lake, it carries with it phosphorus, the desired nutrient for aquatic plant and algae growth. It causes sediment to 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 the result. **Curbing the erosion of soil into the lake will reduce pollutants reaching the lake.**

Shorelines can erode through many processes. Natural causes of erosion include currents, waves, ice, and rain. Many human activities may significantly increase the rate of erosion. Some common causes of erosion include:

- removal of natural vegetation for property development, both on shore and in the lake, or creation of beaches.
- improper installation of erosion control structures, such as retaining walls.
- increased wave action from watercraft traveling close to the shore.
- dredging, filling, or construction on or near the shoreline.
- trampling of banks by human, animal, or vehicle traffic.
- inadequate protection against stormwater runoff from roofs, driveways, streets, and other paved or hard surfaces.

Neither rip-rap or retaining walls will prevent ice ridges from forming because rock cannot withstand the up to 30,000 pounds of ice pressure per square foot.

Signs of a Serious Problem

- A large area of bare soil on a steep, high shoreline bank.
- A noticeable recession of the shoreline over a period of time.
- Large patches of muddy water near a lakeshore, or unusually muddy streams during periods of high water or following a rainstorm.
- Excessive deposits of sand or other sediments on the stream bed, or very wide, shallow areas in a stream.

Erosion may be accelerated by activities such as boat wakes or high waves during storms. Each year erosion causes the loss of valuable shorefront property. Contrast the eroded shoreline lacking vegetation (foreground of photo) with the well-vegetated, uneroded shoreline in the distance.

How Can Shoreline Erosion Be Controlled?

If your shoreland is eroding away, stabilizing the shoreland will be necessary to reduce erosion.

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

Rip-rap, stone, retaining walls, or turf grass might seem like good solutions for stabilizing erosion, but they are not usually the best choice. Rip-rap reflects wave energy back towards the lake causing previously sandy areas to erode to gravel or cobblestones. Water can undercut retaining walls and turf grasses. Rip-rap and non-native grasses don't reduce chemical runoff polluting the water and causing unsightly algal blooms. These choices 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. And, neither rip-rap or retaining walls will prevent ice ridges from forming because rock cannot withstand the up to 30,000 pounds of ice pressure per square foot.

Reduce Runoff: Curb Erosion

Preventing Erosion

Some basic preventive actions include:

- Preserve existing rock and vegetation that naturally occur along the shoreline.
- Stop mowing a strip of land near the shoreline or restore a shoreland buffer of native vegetation.
- Prevent impervious surface (i.e. roofs, driveways, etc.) runoff from flowing to the shoreline, steep slopes and bluff areas.
- Avoid construction within 100 feet of the shoreline, steep slopes or bluffs.
- Protect berms pushed up by ice action along lakeshores. They prevent excessive surface runoff and trap sand which "nourishes" the beach.
- Limit the amount of foot traffic and other recreational activities in erosion prone areas. Regardless of preventive measures, the right combination of conditions, such as high water level, violent windstorms, drastic ice movement, and certain shoreline configurations, may result in serious shoreline erosion.

Preventing Erosion on Steep Slopes and Bluff 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.

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. Clearing is limited to a width of 8 feet and no mechanical equipment can be used. In the Shore Impact Zone 2, the removal of 25% of trees, in a random pattern, and 25% of shrubs is permitted.

- The Shore Impact Zone 1 (SIZ 1) is the distance from the ordinary high water level to one half the structure setback. This varies according to lake classification. For general development lakes this would be 37.5 feet; recreational development lakes would be 50 feet; and 75 feet on a natural environment lake.
- The Shore Impact Zone 2 (SIZ 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 .

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

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.

Reduce Runoff: Capture and Cleanse Runoff-Manage Your Rainwater

The best 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 a natural cycle of 50% infiltration and 10% runoff that is achieved with vegetated shorelands.

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.
- 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.
- 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. For patios and walkways, use permeable pavers or interlocking pavers or flat stones set in sand instead of concrete.

Photo by Carol Wedin

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

Infiltration • Rain gardens • Less impervious surface • Pollution prevention

Reduce Runoff: Capture and Cleanse Runoff-Manage Your Rainwater

Allow Water to Settle Into the Soil-Not Run Off Into the Lake

The fewer impervious surfaces there are for rainwater to collect and run off the less likely there will be erosion and runoff into the lake. The key to solving this problem is to stop water from running off your property so it can soak into the ground. You can capture rainwater and allow it to be cleansed through natural soil processes.

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

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.

Example: 100 square feet of roof could collect 60 gallons of rainwater during a 1-inch rain event.[2]

Sixty-five (65) percent of all annual rain events are one inch or more.

To collect twice the volume from the same downspout, connect the overflow hose from the first rain barrel to a second rain barrel.

Divert Rainwater off Roofs and Driveways

Paved driveways and roofs of buildings comprise most of the impervious surfaces on a lot. Redirect rainwater flow from downspouts, roof gutters, and driveways onto lawns or into a rain garden where it will have time to naturally infiltrate into the ground. Or, capture the water in a rain barrel, where it can be used later for watering.

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. Rainwater is naturally high in phosphorus; it's a natural way to fertilize.

Humans and pets should not drink the stored water, nor should it be used on food products. A screen should be installed on the barrel to keep mosquitoes and debris from entering. Mosquitoes cannot breed if the barrel is drained weekly.

Rain barrels need to be drained regularly 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 it elsewhere. Rain barrels can be purchased at garden centers, ordered online from garden catalogs, or you can make your own-search online for instructions.

Reduce Runoff: Capture and Cleanse Runoff-Manage Your Rainwater

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, and it is designed to collect runoff from driveways, roofs, other hard surfaces. The collected water is absorbed 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.

Rain gardens capture nutrients that are carried in runoff so plants in the garden can absorb them. During a rainfall, the highest concentration of pollutants is during the first inch, or first flush of the storm, which is retained in the rain garden. Rain gardens are designed so any water collected will be absorbed into the ground within a few hours of the rainfall ending.

To be effective, rain gardens must be properly designed for the right shape and size to accommodate runoff from the amount of roof, driveway, and other hard surfaces on your property as well as your soil conditions. For proper design, it is recommended to consult the Cass SWCD or a landscape professional. Remember to always call the Gopher State One Call at 800-252-1166 before digging to prevent cutting into an electrical line or cable.

Use Pervious Pavement and Pavers

Pervious pavement and pavers are made of special materials that allow the water to flow through and infiltrate into the ground. They can be used for driveways, sidewalks, walkways, and patios. Pavers are quite attractive and some have a 5-year life span. A 1,000 square foot pervious driveway can infiltrate over 12,000 gallons of water per year. Runoff from rooftops and lawns can be diverted to pervious areas for additional water treatment.

Photo by Beth Hippert, Crow Wing SWCD

Suggested Rain Gardening Plants:

- Butterfly Weed
- Smooth Blue Aster
- Common Yarrow
- Stiff goldenrod
- Little Blue Stem
- Beaked Sedge
- Bush Honeysuckle
- Pagoda Dogwood
- Downy Arrowwood

Rain Garden Tips:

- Don't worry about mosquitoes. Most rain gardens should 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.

Source: Taylor Creek Restoration Nurseries

Additional Resources of Rain Gardens in Minnesota:

blue-thumb.org/raingardens/

nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_023098.pdf

Working Around Wetlands

What are Wetlands?

Wetlands are a vital transitional link between land and water. When you think of wetlands you probably think of wet, swampy, marshy areas. This would be true for some, yet other types of wetlands may be dry most of the year and support trees and shrubs. Generally, a wetland is defined as an area that is mostly wet soil, is saturated with water either above or just below the surface, and is covered with plants that have adapted to wet conditions.

Wetlands have extremely valuable benefits, including:

- Water quality protection: Wetlands filter and absorb polluted surface water runoff before it enters groundwater, lakes and rivers.
- Flood control and groundwater recharge: Wetlands serve as holding areas for water, slowing flood damage and soil erosion during heavy rainfalls.
- Fish and wildlife habitat: Wetlands provide homes, nesting areas, and feeding areas for wildlife. Wetlands along shorelines are especially important due to the habitat they provide to aquatic insects and amphibians, which are also food sources for fish.
- Reducing shoreline erosion: Wetlands, and the deep rooted plants that grow in them, protect shorelines from the forces of wave action that erode away the shoreline.

Who Has Permit Authority?

Despite all of their benefits, wetlands have been considered nuisances in the past and have been drained or filled in shoreland areas for development.

In 1991, the Minnesota Wetland Conservation Act (WCA) was passed to stop the loss of wetlands. To accomplish this, anyone proposing to drain, fill, or excavate in wetland areas must first try to avoid disturbing the wetland; second, try to minimize the impact on the wetland; and finally, mitigate, or replace the square footage of wetland loss. Some exemptions to the law may apply in certain situations. Generally, wetlands in shoreland areas are given extra protection due to the benefits they provide to lakes.

If access to the lake is limited due to the presence of wetlands along the shoreline, boardwalks and docking is encouraged. The Cass County Environmental Services can provide assistance in helping you determine if wetlands are on your property and what permits may be needed. Work that is done below the ordinary high water level (OHW) in lakes, rivers or public waters will require a permit from the DNR Public Waters Work Permit Program.

Statewide, Minnesota has lost over 50% of its pre-statehood wetlands and has about 9 million acres of wetlands remaining. Let's protect what we have left.

There are approximately 401,000 acres of wetlands in Cass County; about 25% of the total land area.

Contact Cass County Environmental Services at 218-547-7241 for permit information and requirements when working around wetlands.

Photo by Steve Mortensen

Stop the Spread of Aquatic Invasive Species (AIS)

Aquatic Invasive Species (AIS) are plants and animals released either accidentally or intentionally into areas where they are not native. Such introductions usually occur through human activities and often are spread through boating activity. They can cause great environmental and economic harm to our lakes.

How Do They Harm the Lake?
Aquatic invasive plants, like Eurasian watermilfoil, Curlyleaf pondweed, and Starry stonewort replace native aquatic plants important for fish and wildlife as well as interfering with recreation on the lake. Aquatic invasive animals, like zebra mussels and spiny waterfleas, interrupt the natural food chain in the lake impacting fish and other wildlife. Rusty crayfish can eliminate aquatic plant beds important for fish spawning.

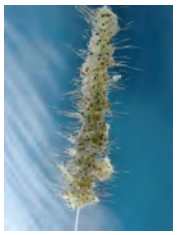
Common AIS in Minnesota Lakes:

Eurasian watermilfoil
(Myriophyllum spicatum)
Eurasian watermilfoil (EWM) is now in over 225 lakes statewide. It forms dense mats that interfere with boating and swimming. The plant has delicate feather like leaves arranged in whorls (circles) of 3-5 around the steam; leaves are limp out of the water. Each leaf has 12-21 leaflet pairs. Northern watermilfoil is a native look-alike but it has only 7-10 leaflet pairs. Herbicide-resistant hybrid forms of watermilfoil are now being found in Minnesota lakes.

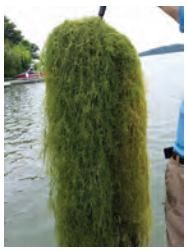
Curlyleaf pondweed
(Potamogeton crispus)
Curlyleaf pondweed forms aquatic plant mats that can shade out native plants and impede recreation. The plant has stiff, wavy leaves with fine-toothed edges that are ½ inch wide and 2-3 inches long, arranged alternately around the stem. When it dies back in mid-summer it releases nutrients, which can cause summer algal blooms.

Zebra mussels
(Dreissena polymorpha)
Zebra mussels filter water and take the plankton out of the water that young fish rely on for food. Initially upon infestation the filtering makes the water clearer, but eventually they damage the lake ecosystem and can impact fish populations. Their sharp edges impede swimming. They are yellowish-brown mussels, up to 2 inches long, have light and dark stripes on the "D" shaped shells. They use byssal threads to attach to all hard surfaces making them easy to transport, and they are very difficult to remove. It is the only freshwater mussel that can attach to objects. One female zebra mussel can produce up to 1 million eggs in one year. Over 130 waterbodies are currently listed as infested with zebra mussels.

Rusty crayfish
(Orconectes rusticus)
Adults are 3-5 inches long and have claws that are larger and smoother than other crayfish. They graze on and can eliminate aquatic plant beds that are important to fish and wildlife, hybridizing with and displacing native crayfish. They are easily identified by their black-tipped claws and rusty-colored spots on either side of their body.



Spiny waterflea
(Bythotrephes longimanus)
Fishhook waterflea
(Cercopagis pengoi)
Spiny waterflea is a tiny crustacean (< ½ inch) that competes with small fish for food and fouls up fishing gear with gelatin-like clumps of waterfleas. It has 1-4 barbs on the tail and is difficult to distinguish without magnification. The spiny and fishhook water fleas are planktivores. Unlike other zooplankton that feed primarily on planktonic algae, these water fleas feed on other zooplankton, like Daphnia, which is also the preferred food of juvenile fish. Although very small in size spiny waterfleas can have a big impact on a waterbody. They reproduce very rapidly and can establish a large population in a short time. One spiny water flea can eat 20 organisms in a day.



Starry stonewort
(Nitellopsis obtusa)
This is a large plant-like algae that can form dense mats in lakes and ponds. This species is native to Europe and Asia, first being discovered in the St. Lawrence River in 1978. At this time, little is known about the effects of Starry stonewort as an invader because it is considered endangered in its native habitat.

Since Minnesota's first discovery of starry stonewort in Lake Koronis/Stearns County in 2015 and in several lakes in Beltrami, Cass, and Itasca County in 2016, the urgency of identifying new infestations has moved to the forefront for 2017. It resembles our native charophyte (green algae) species and is easily mistaken to be chara, a common green algae growing in shallow water. Native stoneworts and musk-grass are both commonly found in Minnesota waters. A unique identifying feature of starry stonewort is the small, white bulbils that can mature to a star shape. Typically these aren't apparent until late July/August or later in the summer. It is from these "starry" bulbils the grass-like fronds emerge.

For help in species identification, call the DNR AIS specialist at 218-732-8960 or bring a sample to the nearest DNR Fisheries office.

Stop the Spread of Aquatic Invasive Species (AIS)

Clean, Drain, Dry

To Stop the Spread of AIS

REMOVE visible plants, animals, and mud from the boat, trailer and other boating equipment (anchors, centerboards, rollers, axles). On jet skis, clean out all water intakes and other parts before transporting.

DRAIN water from your boat, motor, live well and bait containers before leaving the water access. You must remove the drain plug and leave it removed prior to leaving any water access and while transporting the boat.

DISPOSE of unwanted bait in the trash. Never release live bait. When cleaning off fishing lines while fishing, collect plant fragments in a bucket and dispose of onshore.

SPRAY, RINSE, DRY boats and recreational equipment before transporting to another water body. Spray/rinse with high pressure and/or hot tap water (above 140 degrees F); locate the nearest boat decontamination station in Cass County. This is critical when leaving any zebra mussel infested waters. **Or**, dry for at least 5 hot, sunny days, preferably more depending on temperature and humidity. Between 60 - 80 degrees F air temperature, the optimum drying time is 14 days; above 80 degrees air temperature, 7 days.

To locate boat decontamination stations:

- **Contact the Cass SWCD at (218) 547-7324.**
- **Call the Cass County Decontamination Hotline at (218) 682-2225.**
- **Ask an access inspector** where the nearest boat decontamination station is located in Cass or adjacent counties.

Know the Law–Pull the Plug

In Minnesota it is unlawful to:

- **Transport** aquatic plants, ruffe, round goby, zebra mussel or any other prohibited invasive species on any road.
- **Leave** any body of water before removing drain plugs and draining all water related equipment (including live wells and bait containers). Note: to keep unused bait, drain and replace with tap or spring water.
- **Launch** a watercraft with aquatic plants, zebra mussels or any prohibited invasive species attached.
- **Harvest** bait (minnows, frogs, crayfish, or other wild animals) from designated infested waters.

Know what waters are infested in Cass County; check lake accesses for DNR infested waters signs. A complete list of infested waters can be found at dnr.state.mn.us/invasives/ais/infested.html.

Photo by Kristina Knutson

Photo by Kristina Knutson

Stop the Spread of Aquatic Invasive Species (AIS)

What You Need to Know

- **If you hire a business to install or remove your boat, dock, or lift,** or other water-related equipment, make sure they have completed AIS training and are on the DNR's list of **Permitted Service Providers**. Lake service providers that have completed DNR training and obtained their service provider permit will have a permit sticker in the lower driver's corner of their vehicle's windshield. They have attended training on AIS laws and many have experience identifying and removing aquatic invasive species. Ask the business if they are permitted before you hire.
- **If you plan to move a dock, lift or other water equipment from one lake or river to another**, all visible zebra mussels, faucet snails, and aquatic plants must be removed whether they are dead or alive. According to Minnesota law, the equipment must be free of AIS and dried for 21 days before it can be placed in another waterbody.
- **When removing water-related equipment for the winter**, it is legal to take the equipment out of infested waters – even if it has zebra mussels or other prohibited invasive species attached – and place it on the adjacent shoreline property. Boat lifts, docks, swim rafts, weed rollers, irrigation equipment, or pumps can be removed from infested waters and placed on the shore without a permit. However, if you personally want to transport a dock or lift from infested waters to another location for storage or repair, you must have a DNR authorization form to move it legally to the new location. You can download, fill out, and sign the form, which is valid for only one day and one-way transport. Carry it with you during transportation of the boat, equipment, or plants. Forms can be found at: dnr.state.mn.us/invasives/ais_transport.html
- **When removing boats for winter storage**, there are two important things to know:
  1) It is illegal to transport any watercraft with zebra mussels, faucet snails, or other prohibited invasive species attached away from a water access or other shoreland property, even if you intend to put it in storage for the winter.
  2) To transport watercraft at the end of the season, the DNR has developed a special one-way pass, or authorization form. The form allows boaters to move watercraft to another location to clean off invasive species, and once cleaned, to store it for the winter. See same website as above for form.

Matted Eurasian watermilfoil on lake surface

Lakes/Rivers Currently Infested with AIS in Cass County as of April 2017

Eurasian watermilfoil:
Leech
Town Line
Washburn
Roosevelt

Zebra mussel:
Bass (or Ray)
Greens
Gull
Gull River
Leech
Margaret
Pike Bay
Spider
Stream connecting Pike Bay and Cass Lake
Upper Gull
Winnibigoshish

Other AIS:
Winnibigoshish
(faucet snail, starry stonewort)
Cass
(starry stonewort)
Leech River-Mud Lake to Mississippi River
(faucet snail)

For more information on Aquatic Invasive Species and what you can do to stop the spread see: dnr.state.mn.us/invasives/aquatic/index.html or call the Cass County AIS Coordinator at 218-536-0584.

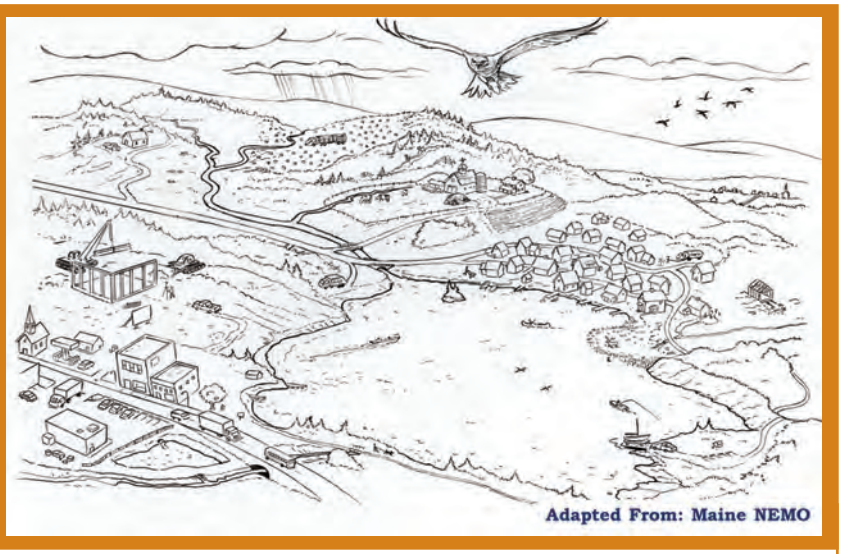
Watershed Stewardship: Beyond the Shoreland Zone

A lake's water quality is impacted not only by what happens in the immediate shoreland zone of the lake, but also by the activities on the land within the lake's watershed. Each lake has its own watershed or land that directly influences what comes into the lake. Each lake's watershed is part of a larger minor watershed (193 total in Cass County) and one of Minnesota's 80 major watersheds (see page 2).

A healthy lake depends on a healthy watershed.

Water running off the land in the watershed, and nutrients like nitrogen and phosphorus and other pollutants such as gas, oil, pesticides, and other chemicals carried with the water, will impact a lake's water quality. Because water moves downstream in a watershed, any activity on the land or in the water that affects water quality or quantity at one location can change the characteristics of the watershed at locations downstream. **This means everyone who lives or works in a watershed needs to take measures to protect watershed health.**

With the natural hydrologic cycle, precipitation is either absorbed into the ground (infiltrates) or runs off the landscape to a river, stream, or lake—the focal point of the watershed. Some water will evaporate. Trouble for water quality happens when development alters the natural water cycle. Trees that were cleared for development no longer intercept rainfall. More impervious surfaces from construction, buildings, parking lots, etc. no longer allow the rainwater to infiltrate into the ground increasing the amount of runoff and limiting the amount of water that naturally recharges groundwater—your drinking water resource. Clearing forests for commercial agriculture not only increases runoff but the additional chemicals applied to the new agricultural land increases the pollution carried with the runoff.



Sources of runoff from land activity within the watershed include: logging and farming; forest, wetland, grassland, and agriculture; residential and urban impervious areas; septic and wastewater treatment facilities; shoreline erosion; commercial and industrial activity; and construction.

Controlling stormwater pollution and runoff throughout the watershed will help reduce impacts to water quality. However, it is a challenge because sources of pollution come from many locations across the landscape and can also be associated with weather events—something we cannot control.

Following the guidelines in this *Shoreland Homeowner's Guide* is the first step in controlling stormwater pollution within the lake's watershed.

- Encourage and respect land use controls that are designed to minimize runoff.
- Keep forests as forest.
- Speak up and act.

Controlling stormwater pollution requires everyone's actions–from homeowner to business owner and local, state and federal governments.

Cass County administers about 254,000 acres of tax-forfeited land (20% of the county's total area); three-quarters of this land is forested. The single largest forest cover type is aspen, which covers 63% of the commercial forest.

Private Forest Management

Financial Incentive Options for the Private Landowner

*Per acre annual cash payments through the Sustainable Forestry Incentive Act (SFIA) or a reduction in property taxes (2c Managed Forest Land classification) based on acres enrolled in either program.

*The Cass Soil and Water Conservation District (SWCD) has funds available to help lower the cost of writing a private forestry management plan.

*Plans are written specifically with landowner visions in mind by a SWCD- contracted plan writer.

*Plans give landowners a great picture of the quantity, quality, diversity, age and value of their property's timber stands and outline how to manage the forests for sustainability.

For more information, contact:

Cass SWCD

P.O. Box 3000 Walker, MN 56484

218-547-7399

Watershed Stewardship: Private Forest Management

Cass County has an abundance of high quality forests, yet many people don't recognize the connection between healthy forests and healthy waters. **Reality is—forests provide protection to lakes in a multitude of ways.** Their roots hold soil in place reducing erosion; they serve as natural sponges collecting and filtering nutrients and pollutants from rainwater; and they slow down and cool the flow of water before reaching a lake, river, or stream.

Natural resource managers and scientists have demonstrated that if a watershed can maintain 75% of its land in natural forest cover, the surface waters within the watershed can also maintain high water quality. **As a watershed's forest cover disappears a reduction in water quality can be expected.** This is an alarming fact considering that all major watersheds in Cass County are in the top ten watersheds in Minnesota to protect the drinking water for residents of the Twin Cities metro area.

In Cass County, local, state, and federal governments and the Leech Lake Band of Objibwe manage forest lands in their ownership for productivity and sustainability—ultimately a benefit to water quality. For the private forest landowner, good forest management can also be a gain for water quality as well as fish and wildlife habitat and can contribute to the landowner's financial well-being (see side bar).

Cass SWCD is combining forces with private landowners and forestry consultants throughout the county to provide financial incentives to keep private forests as forestland. Landowners should contact the Cass SWCD to learn more about options for creating a Forest Stewardship Plan for managing their forestlands and the benefits associated with those options. A Forest Stewardship Plan allows the landowners to be eligible for financial incentives or tax benefits, and in return the SWCD is able to provide clean water protection vital for drinking water, recreational enjoyment of the County's water resources, and maintaining ecological integrity for fish and wildlife habitat.

Chris Brokl, Northern Forestry Management, working on a Private Forest Stewardship Plan

Cass County currently has about 25,000 acres of private forest lands under Forest Stewardship Plans and hopes to double that number in the next few years.

Watershed Stewardship: Land Conservation

If you value your shoreland and adjacent lands as a "special place" that you would like to preserve in its natural state for the continued enjoyment of your family and future generations and protect fish and wildlife habitat and water quality, there are several land protection options you can consider. **These options will permanently limit development and preserve the land's natural features as a living legacy of your conservation ethic.**

Land Conservation Options

1. **Donate or sell your private land** to a public entity, such as the state of Minnesota, local government, or other qualified non-profit conservation organization, to be managed in perpetuity for aquatic and wildlife habitat protection and public use and enjoyment. If land value is donated, you may be eligible for an IRS charitable donation for the conservation value of the land.

Mule Lake Wildlife Management Area (WMA)
The Leech Lake Area Watershed Foundation (LLAWF) spearheaded a $2.4 million DNR acquisition of 363 acres and 3 miles of shoreland on Mule Lake from a private landowner. The WMA is now in public ownership and open for public enjoyment in perpetuity.

2. **Place a conservation easement on your property** that prohibits or limits future development on the land. The easement is a legally binding agreement between a qualified entity that holds the easement (government agency or qualified non-profit conservation organization) and you, the landowner, who voluntarily limits the use and development of the land in order to permanently preserve the land's natural features and conservation value.

You still retain ownership and use of the land and the easement passes on to future owners to insure permanent protection of water quality and a healthy environment for fish and wildlife. Each easement is unique and tailored to the specific property and the landowner's interests. There can be potential tax benefits (income, estate, or property) to the landowner, depending on the circumstances and how the easement is defined. Preserving the land with a conservation easement has helped many families transfer their land to the next generation with the natural features intact.

A conservation easement was donated by a private landowner to the Minnesota Land Trust, with assistance from LLAWF, permanently limiting development and protecting almost two miles of shoreland on the Pine River in Cass County.

"The trouble with land is that they're not making it anymore."

~Will Rogers

Shoreland conservation easement donated by a landowner on Little Boy Lake.

"Conservation is a state of harmony between men and land."

~Aldo Leopold

Assistance with Land Protection

The Leech Lake Area Watershed Foundation (LLAWF) can assist Cass County shoreland owners with exploring their land protection options. Through their Clean Water/Critical Habitat Program, LLAWF has financial assistance grants for qualifying landowners for conservation easements. These grants are available with funding from the Minnesota Clean Water Land & Legacy Amendment and Minnesota Environment and Natural Resources Trust Fund.

Contact LLAWF at 218-675-5773 or info@leechlakewatershed.org. For more information on conservation easements, read "Protecting Land With Conservation Easements" at leechlakewatershed.org.

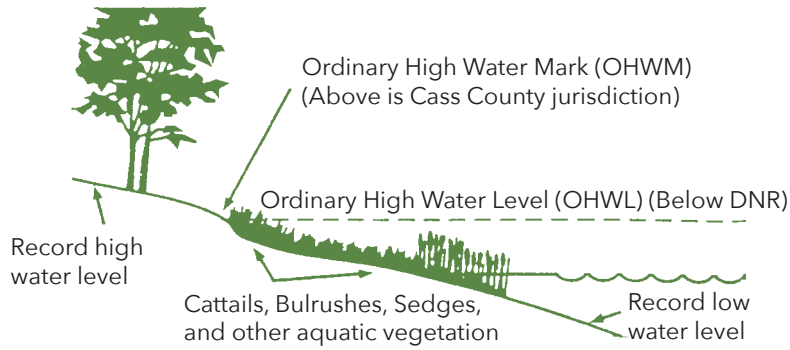
What Can I Do On My Shoreland Property? What Permits are Required?

An important stewardship responsibility is knowing what you can and cannot do in the water and on adjacent shorelands and understanding local and state regulations.

Who Has Regulatory Authority in the Shoreland Zone?

The shoreland zone in Cass County is defined as the land within 1,320 feet (1/4 mile) 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 Cass County Environmental Services office. If located within the boundaries of a city, contact city offices.



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

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 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. If above the OHWL, a permit is required by Cass County for a retaining wall. In general, retaining walls are discouraged, particularly on relatively undeveloped lakes. Planting vegetation for erosion control is preferred. If rip rap (course stones, boulders, or rock places against the bank or shore) is used, a permit is required by Cass County. If rip-rap is installed on over 200 lineal feet, the DNR also needs to review the plans. Refer to the DNR Shoreland Alternation Fact sheet (resources on the inside back cover) for more specifics on design Contact Cass County ESD for assistance.

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 is usually not very 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 barbeques 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 DNR 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 a 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 native 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 or 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.
- 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 square 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:

Contact Cass County Environmental Services
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 maintained and replaced with no changes in size, location, or use; contact ESD for a required 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 alternations 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
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 27 for requirements.

Docks and Beaches

Contact Cass County Environmental Services
Docks must meet DNR requirements (see page 27) 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 alternation 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 alternation 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 7 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 then 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 Cass County Environmental Services webpages at co.cass.mn.us.

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.
- Installing any form of rip rap or installing a retaining wall.

Contact the Cass Soil and Water Conservation District for:

- Soils information for your property.
- Assistance with shoreland buffers and vegetation protection.
- Technical assistance for erosion control practices.
- Information on sealing abandoned wells.
- Cost share programs for installing conservation practices on your property.
- Technical and financial assistance with private forest management plans.

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.
- Conducting work done below the ordinary high water level (OHWL).
- Disturbing land below the ordinary high water level.

Important Resources

Aquatic Invasive Species:
Minnesota DNR: dnr.state.mn.us/invasives/aquatic/index.html
University of Minnesota Sea Grant: seagrant.umn.edu/ais/
Wildlife Forever: CleanDrainDry.org
Protect Our Waters: protectyourwaters.net
Aquatic Plant Management: dnr.state.mn.us/shorelandmgmt/apg/permits.html
DNR Water Permits Requirements: dnr.state.mn.us/permits/water/answers.html#ohwl
Dock Rules: files.dnr.state.mn.us/publications/waters/shoreline_alterations_water_access.pdf
Erosion Control for Home Builders: clean-water.uwex.edu/pubs/pdf/erosion.pdf
General Shoreland Homeowner Information: shorelandmanagement.org
Non-Toxic Household Product Alternatives: reduce.org/toxics/index.html
Rain Barrels/Gardens:
Constructing a rain barrel: shorelandmanagement.org/quick/easypdf/rain_barrel_const.pdf
Rain Garden: A How -To Manual: dnr.wi.gov/topic/shorelandzoning/documents/rgmanual.pdf
Rain Garden Design Fact Sheets: appliedeco.com/RainGarden.cfm
Septic System Design and Maintenance: septic.umn.edu/owners/index.htm or call the Onsite Hotline with questions at 800-322-8642.
Shoreland Alteration Fact Sheets
(Docks, Rip Rap, Sand Blankets, Ice Ridges) dnr.state.mn.us/publications/waters/shoreline_alteration.html
Shoreland Landscaping:
The Water's Edge: files.dnr.state.mn.us/assistance/backyard/shorelandmgmt/savewateredge.pdf
Lakescaping and Shoreland Restoration: dnr.state.mn.us/lakescaping/index.html
Restore Your Shore CD: 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.
Lakescaping for Wildlife and Water Quality: available in Minnesota Book Stores

Frequent Contact Information

Cass County Offices

Cass County Website:
co.cass.mn.us Under Government tab,
click on departments under County Directory.

Cass County Environmental Services
Courthouse, 1st Floor, 303 Minnesota Avenue W.,
PO Box 3000, Walker, MN 56484-3000; (218) 547-7241
Click Environmental Services on Cass County website.
cass.esd@co.cass.mn.us

Soil and Water Conservation District
(218) 547-7399; cass.esd@co.cass.mn.us

Aquatic Invasive Species (AIS):
Rima Smith-Keprios, AIS Coordinator
(218) 536-0584; rima.smith.keprios@co.cass.mn.us

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) 547-7330;
Permits required for rafts; $10/2 years;
cass.watersafety@co.cass.mn.us

Land Commissioner: (218) 947-3338;
cass.land@co.cass.mn.us

Sheriff: (800) 450-COPS (2677);
For emergency, dial 911

Other County Services:

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.

Well Testing: Water test kits for private well owners are available from Cass Environmental Services; landowner is responsible for testing costs.

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 (218) 587-3500. Mobile hazardous waste collections are held in various locations during the summer.

Minnesota State Offices

DNR Waters/Area Hydrologist
Darrin Hoverson, Park Rapids Office
(218) 732-8960 x225

Aquatic Plant Permits/DNR Regional Fisheries Offices
Permits for aquatic plant management and nuisance control such as algae, snails, and leeches are available upon application at area Fisheries offices. Applications available online. Fees vary with type of control.
Brainerd Fisheries (218) 203-4301;
brainerd.fisheries@state.mn.us
Bemidji Fisheries (218) 308-2339;
bemidji.fisheries@state.mn.us
Walker Fisheries (218) 547-1683;
walker.fisheries@state.mn.us

Conservation Officers:
Toll Free: (888) 646-6367
Walker Area: (218) 766-7940
Cass Lake Area: (218) 333-3561
Remer Area: (218) 553-1638
Longville: (218) 566-3062
Pine River: (218) 820-4598
Crosslake: 218-513-6184
Southern Cass County/Staples: (218) 894-3577
Brainerd/Cass #1: (218) 575-2289
Brainerd/Cass #2: (218) 825-3828
Water Enforcement/Southern Cass: (218) 204-1212
Water Enforcement/Northern Cass: (507) 696-3753
Turn in Poachers: (800) 652-9093

Do I need a permit?
dnr.state.mn.us/permits/water/needpermit.html
info.dnr@state.mn.us

Minnesota Department of Health/Bemidji
(218) 308-2100


Photo by Tom Sorenson


Photo by Steve Mortensen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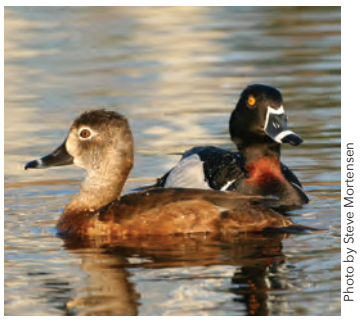
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