



HOME*A*SYST Home Assessment System

This assessment examines the special role shoreline property owners have in preventing contamination of their lake or stream. Use this publication as a supplement to the Home*A*Syst book.

Three areas are covered in this supplement:

1. Household Wastewater Management

*(Home*A*Syst chapter 5)*

2. Lawn and Garden Care

*(Home*A*Syst chapter 6)*

3. Stormwater Runoff Management

*(Home*A*Syst chapter 4)*



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Managing Shoreline Property to Protect Water Quality

If you live on lake or stream property, you have a special responsibility to prevent pollutants from entering the water. Since many activities on or around your property can affect water quality, you can significantly improve what happens along the shore of your property. This supplement lists some special water quality concerns for shoreline property owners and actions you can take to avoid contaminating surface and groundwater.

Why are shoreline areas vulnerable to pollution?

In contrast to areas away from the water, activities you do on shoreline property are more likely to pollute the water. Because homes are often closer together and native plants and wetlands are replaced with lawns, beaches or seawalls, pollutants coming from shoreline areas have less chance of being filtered before reaching the water.

There are several symptoms of lower water quality:

- Increased weed and algae growth due to excess nutrients, especially phosphorus.
- Cloudy water due to sediment (soil) and algae growth.
- Poor fishing and increased numbers of stunted fish.
- Evidence of coliform bacteria in the lake (indicates the presence of human or animal waste).

Common shoreline pollutants

- Lawn fertilizers
- Runoff from driveways, roofs and walkways
- Lawn clippings and leaves (they contain phosphorus)
- Soil from shoreline erosion
- Lawn and garden pesticides
- Oil and gas from boats
- Septic system effluent

Three chapters in the Home*A*Syst book warrant special attention by shoreline owners: Household Wastewater (chapter 5), Lawn and Garden Care (chapter 6), and Stormwater Runoff (chapter 4). This supplement contains special information for shoreline owners that applies to each of these Home*A*Syst chapters. Complete the Home*A*Syst evaluation, then look at the corresponding section in this supplement for more information.

The Home*A*Syst Assessment Guide (Extension Bulletin WQ-51) is available from county MSU Extension offices.

Part 1: Household Wastewater Management in Shoreline Areas¹ (*supplement to Home*A*Syst chapter 5*)

If you live on shoreline property, maintaining your septic system requires more care and work than maintaining similar systems located in other places. That's because soil and water conditions make your system less efficient in treating waste, which could cause harmful pollutants to get into your lake.

Soil type and distance from the drainfield to the shore and to groundwater are important factors that determine the risk your system places on water quality. Loam and clay soils, for example, have a greater long-term ability to hold nutrients and prevent them from moving through the soil than do sandy soils. Although clay soils adsorb nutrients more readily, septic systems are more likely to clog-up and fail, causing nutrients and contaminants to bubble to the surface, eventually traveling to the shore. On the other hand, very sandy soil may allow nutrients to leach quickly to drinking water. Therefore, both very sandy and very heavy (clay) soils create higher risk for water contamination from septic system waste.

After leaving the septic tank, nutrients or biological contaminants that encounter soil saturated with water can move much greater distances - in some instances, as much as several hundred feet or more. In soil not saturated with water, biological contaminants (bacteria and viruses) are usually rendered inactive within a few feet of the drainfield. Some nutrients, on the other hand, can travel much greater distances, depending on the type of soil, the amount and concentration of waste and the age of the system.

Because septic systems on shoreline property are often close to the water and are sometimes saturated during high water periods, they are very likely to leak wastes into lakes and streams. Shoreline erosion can also shorten the distance between the septic system and the shoreline, making it more likely that liquid waste could move to surface water.

This pollution can happen even though your system appears to be working well and complies with local health department codes.

What to do

Pay special attention to the recommendations in the Household Wastewater section of the Home*A*Syst packet. Those actions are especially important in shoreline areas.

In addition, consider the following recommendations:

- **If you convert or expand your home, improve the septic system at the same time.** One of the biggest risks from septic systems occurs when seasonal homes are converted to year-round use or are expanded. Frequently, these improvements are made without updating and expanding the existing septic system. The increased load on the septic system may cause contaminants to enter your lake or stream. Remember, contamination can occur even though the septic system appears to be working fine.

¹Portions of this section adapted from MSU Extension Bulletin WQ13, Maintaining Your Septic System: Special Considerations For Shoreline Property Owners, by Dean Solomon and Eckhart Dersch, June 1987.

- **Plant a buffer strip of plants and bushes between the drainfield and the shoreline.** These buffers can absorb some of the nutrients before they reach water. See the next section, Yard and Garden Care, for more details on how to establish a buffer.

- **Hook up to a community sewage system or alternative disposal method, if available.** Sometimes these systems offer cost-effective, long-term solutions to lake or stream water-quality problems caused by septic systems. The use of these systems is restricted by local health department codes and requires design and construction by experienced engineers and contractors.

- **If you are building a new home, construct the septic system as far away from the shoreline as possible.** This distance should be even farther than health department codes require. Those regulations are designed primarily to protect human health rather than prevent other effects, such as excessive weed growth. Try putting the septic system on the side of the house away from the lake. Also, design the system to meet your present and future needs.

Before selecting one of these alternatives, be sure that it will yield the hoped-for results. Many factors may contribute to excessive weed growth, so it is possible in some situations that wastes from septic systems may have a relatively minor impact on lake or river quality.

✓ Assessment 1 - Reducing risks from shoreline septic systems

	1. Low risk/ recommended	2. Medium risk/ potential hazard	3. High risk/ unsafe situation	Your risk
Distance of drainfield to groundwater	Water table always more than 4 feet below drainfield.	Water table sometimes less than 4 feet below drainfield.	Water table often very close to or above the drainfield.	
Distance to shoreline	Septic system located more than 50 feet from shore.	Septic system located between 10 and 50 feet from shore.	Septic system located less than 10 feet from shore.	
Soil type	Loam or sandy loam soil.	Loamy sand soils.	Sand or clay soils.	
Home conversion or expansion (bedrooms or baths added)	If home has been converted from seasonal to year-round use or expanded, septic system upgraded.	If home has been converted to year-round use or expanded, septic system maintained and monitored more often.	Home converted from seasonal to year-round use or expanded without any changes to septic system.	
Presence of shoreline algae or excessive weeds	No unusual algae blooms or excessive weeds near shore.	Occasional increased algae or weeds near shore.	Frequent algae blooms or excessive.	

Part 2: Yard and Garden Care (supplement to Home*A*Syst chapter 6)

Proper yard and landscape care is especially important in shoreline areas. Since the shoreline zone is the last defense against pollutants, how you design and maintain that area can have significant impacts. On the positive side, creative landscaping in shoreline areas can greatly enhance the beauty and enjoyment of your lake while improving water quality.

Of special focus is the 30-foot deep zone adjacent to the shoreline.

The goals of improved shoreline landscape management are to:

- Use landscape plants that minimize the need for fertilizer and chemical pest control.
- Reduce use of pesticides and fertilizers near the shore.
- Reestablish a buffer of plants, shrubs and trees near the shore.
- Reduce landscape maintenance practices that allow nutrients to wash into the water.

Landscape design

Before Michigan inland lakes and streams became popular home building sites, they were surrounded by native plants, trees and shrubs that acted as filters and held the soil in place, effectively limiting the amount of nutrients entering the water. That native vegetation also provided important habitat for wildlife. During building development these natural barriers were often removed and replaced with lawns or other vegetation. Roads and other impervious surfaces were built which increased surface runoff.

An important goal of shoreline management is to reestablish this natural buffer. Ideally, a buffer strip should be 30 feet wide or greater and made up of low maintenance (preferably native) grasses, wildflowers, perennials, shrubs and trees. Low-growing species should be closest to the water, trees and larger plants farther from shore. The perfect buffer strip is wide, continuous and dense. However, most shoreline property owners

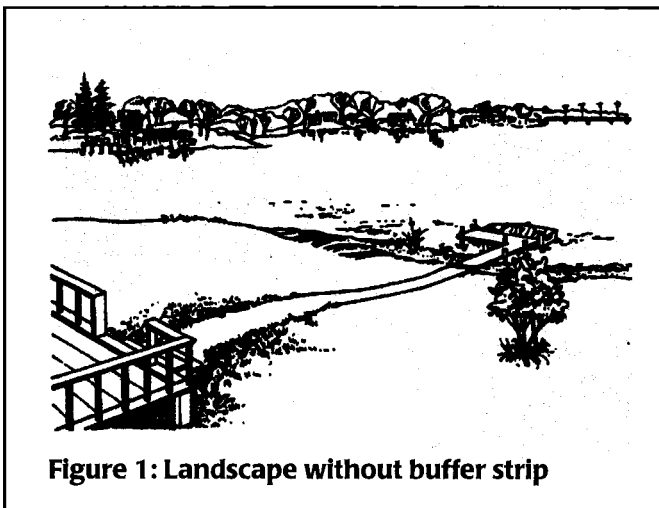


Figure 1: Landscape without buffer strip

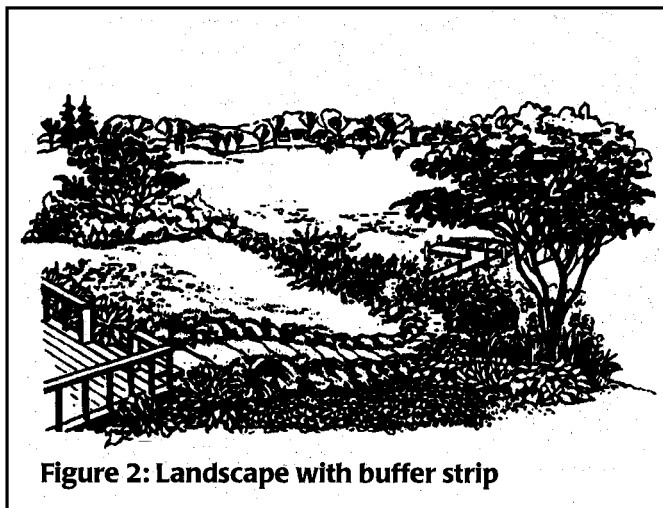


Figure 2: Landscape with buffer strip

prefer something less dense which still allows easy shoreline access and views of the water. This modified design will still provide an effective buffer (fig. 1 and 2).

An enhanced lakeside landscape can also extend into the water. Water plants add to the beauty and uniqueness of the lakeside landscape while reestablishing the natural shoreline area.

Michigan's growing conditions are extremely variable. For specific landscape species recommendations for your area, contact your local county MSU Extension office.

Landscape maintenance

A key goal of lakeside landscape management is minimizing nutrients and chemicals entering the water. As with septic systems, the major nutrient of concern is phosphorus. It is contained in commercial fertilizer, compost and animal manure. To minimize the impact of nutrients and chemicals:

- **Use fertilizer containing no phosphorus.** The numbers on a fertilizer bag show the percent nutrients (nitrogen, phosphorus, potash) in the formulation. The middle number is always the percent of phosphorus, by weight, in the bag (e.g., 27-3-3). Zero phosphorus fertilizers are available from many local sources. When asked, many commercial lawn care companies will apply no-phosphorus fertilizer for their shoreline customers.
- **Be careful when applying fertilizer, regardless of type.** When using a broadcast spreader, take care that fertilizer is not applied too close to or directly into the water.
- **Keep compost piles and animal manure as far from the shore as possible.** Place them in a location where runoff from the piles will not flow into the water. This greater distance will also help prevent nutrients from percolating into the soil, then into lakes or streams.
- **Never burn yard waste along the shore.** The ashes contain phosphorus and can easily make their way into the lake. Always rake leaves, sticks and grass clippings away from the shore.
- **When using pesticides, read the label carefully.** Some pesticides can be harmful to aquatic life and contain warnings about application near lakes and streams. Even some commonly used household pesticides can be dangerous along the shore.
- **Don't feed wildlife near the shore.** Waste produced by wildlife, especially ducks, geese and swans, can be a significant source of nutrients to the water. Feeding wildlife adds to the problem.

✓ Assessment 2 - Reducing risks from shoreline lawn and landscape maintenance

	1. Low risk/ recommended	2. Medium risk/ potential hazard	3. High risk/ unsafe situation	Your risk
Vegetative Buffer strip	Buffer strip 30 feet wide or greater of native plants and shrubs.	Buffer strip of unmowed grass, 10 feet wide.	No buffer strip, or lawn mowed to shoreline.	
Lawn fertilizer type	Minimum fertilization with zero phosphorus fertilizer. No fertilizer within 10 feet of shore.	Fertilization with phosphorus-containing fertilizer, but no fertilizer within 10 feet of shore.	Intensive fertilization with phosphorus-containing fertilizer.	
Fall clean-up	Raking leaves and sticks at least 30 feet away from the lake and composting.	Composting leaves and sticks at least 10 feet from shore.	Burning leaves along shore and washing ashes into the water.	

Part 3: Stormwater Management *(supplement to Home*A*Syst chapter 4)*

Water running off your property after storms contains soil, nutrients, oil, chemicals and other contaminants. Since lakes are lower than the surrounding area, they serve as collecting areas for runoff. Lakes also can be contaminated by shoreline erosion. To prevent runoff from polluting your lake, take special care to manage the water from your property and the water running through your property from other sources.

The goal of managing stormwater runoff in shoreline areas is to slow the water, filter it, and allow it to enter the lake or seep into the ground slowly. Several methods, in addition to the suggestions in the stormwater section of Home*A*Syst, will accomplish this goal:

- **Minimize the amount of impervious surfaces on your property.** These include paved areas, buildings or heavily compacted areas. The greater the percentage of your property that is impervious to water, the greater the likelihood that rain and snowmelt will carry contaminants to lakes or streams.
- **Dig small ponds in drainage ways.** These holding areas retain stormwater and allow sediment to settle before the water seeps into the ground or enters the lake.
- **Plant a dense area of wetland plants such as cattails or wetland grasses at places where runoff enters the lake.** These plants help filter the runoff.

• **Create meandering walkways made of porous paving materials.**

Straight paths, especially those with lots of side walls or steps, concentrate runoff and can cause erosion. Designing paths that follow natural contours (slope) reduces risk and creates a more visually interesting landscape. Use porous paving material such as wood decking, bricks, or interlocking stones instead of asphalt or concrete.

Seawalls constructed of wood or concrete are common methods of stabilizing shorelines. The disadvantages of these structures are that they are a hindrance to wildlife species and reptiles that use the shoreline area for feeding and shelter, detract from the beauty of the shore, and sometimes increase wave and ice damage on adjacent properties. Moreover, they may or may not effectively protect the shoreline area from erosion and ice damage.

There are some situations where seawalls are the best alternative for shoreline protection. Often, though, other methods may provide better protection and improve the shoreline environment. One alternative is to reestablish the natural slopes leading to the shore and into the lake, then stabilize the area with a plant buffer strip (see landscape design section). On more difficult sites, it may be possible to partially reestablish the original slope, then add rock rip-rap to stabilize the area. With any of these methods, it is desirable to consult an engineering company specializing in shoreline protection or your local Soil Conservation District.

✓ **Assessment 3 - Reducing risks from shoreline stormwater runoff and erosion**

	1. Low risk/ recommended	2. Medium risk/ potential hazard	3. High risk/ unsafe situation	Your risk
Walkways	Meandering walkway made of porous paving blocks.	Paved walkway meandering to follow natural contours.	Paved walkway leading straight to lake without regard to slope.	
Seawalls	Shoreline with original slope and native vegetation to water's edge.	Shoreline stabilized with rock rip-rap following natural contour.	Abrupt concrete or wood seawall.	
Storm runoff	Runoff filtered through wetland or allowed to seep into the ground.	Runoff flows into temporary pond and allowed to drain slowly into the lake.	Runoff flows directly into lake.	

✓ Action checklist

Go back over the assessment charts in this worksheet, then review the assessment charts on corresponding sections of the Home*A*Syst book. For each medium and high risk listed, write down the improvements you plan to make. Use recommendations from this worksheet and other resources to decide on action you are likely to complete. A target date will keep you on schedule. You don't have to do everything at once, but try to eliminate the most serious risks as soon as you can. Often it helps to tackle the inexpensive actions first.

Write all high and medium risks here.	What can you do to reduce the risk?	Target date for action:

This Home*A*Syst supplement was developed by Dean Solomon, District Extension Natural Resources Agent, Michigan State University Extension.



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