

Chapter SITE ASSESSMENT 2

Is your soil sandy or gravelly? Does it drain quickly?
Does stormwater runoff from your property flow into the lake or a tributary of the lake?
Do you store hazardous chemicals on your property?

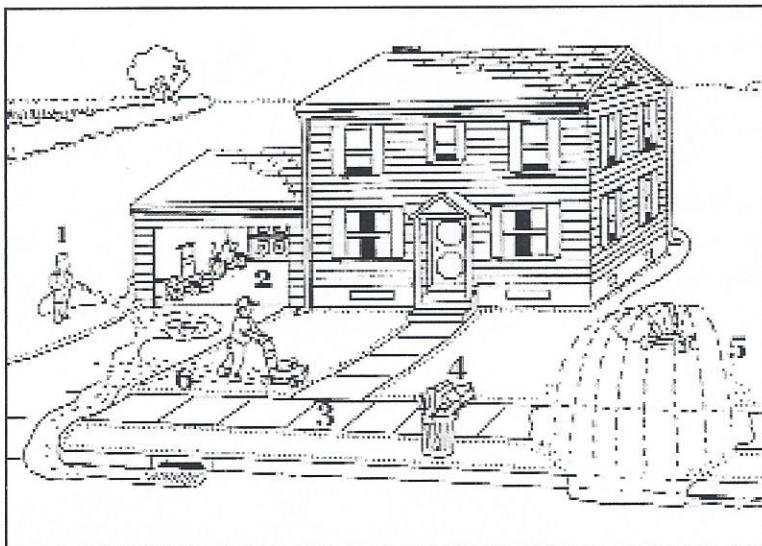
This chapter will help you become familiar with your lakeside property and how you manage it so you can identify potential risks to water resources. Completing this chapter will provide background information you can use throughout this guide. This chapter covers two areas:

1. Physical characteristics of your property
Examples of characteristics include soil type; depth to bedrock; depth to the water table; and location of storm drains, creeks, streams or other pathways to surface water.
2. Making a map of your home and property. A map of your property showing buildings, roads and other constructed or natural features can help you identify potential sources of trouble.

Why Should You Examine Your Property's Physical Characteristics and How You Manage Your Home?

What you do in and around your home can affect water quality both below the ground and in the lake. This chapter will help you identify some important characteristics of your property such as soil type, geology, depth to groundwater and proximity to the lake.

This chapter also invites you to draw a simple "aerial view" map of your home and property. Your completed map will show the locations of important features and help you identify activities in and around your home that may pose risks to your health and the environment. Remember – this assessment is a starting point. It is meant to encourage you to complete some, or all, of the other LakeSmart chapters. To begin thinking about how your activities and site conditions can harm water quality, consider some examples of typical home practices that can lead to health



Homeowner impacts

risks and water pollution:

1. Washing spilled motor oil and grass clippings into gulleys, creeks or the lake
2. Storing gasoline and other hazardous chemicals outside or near children's toys
3. Paving walkways instead of using porous materials, thus increasing runoff
4. Not separating garbage for recycling
5. Improperly adjusting sprinklers, wasting water
6. Plantings that require fertilizers and pesticides close to gutters and storm drains

What Is a Watershed?

The water from city taps and in nearby lakes or streams is part of a much larger water system. While not everyone lives next to a lake or a stream, we all live in a watershed — the land area that contributes water to a specific surface water body, such as a pond, lake, wetland or river. The landscape's hills and valleys define the watershed, or "catchment" area.

A watershed is like a bathtub. The watershed outlet — the mouth of a pond, lake or river — is the tub's drain. The watershed boundary is the tub's rim. The watershed's drainage system consists of a network of

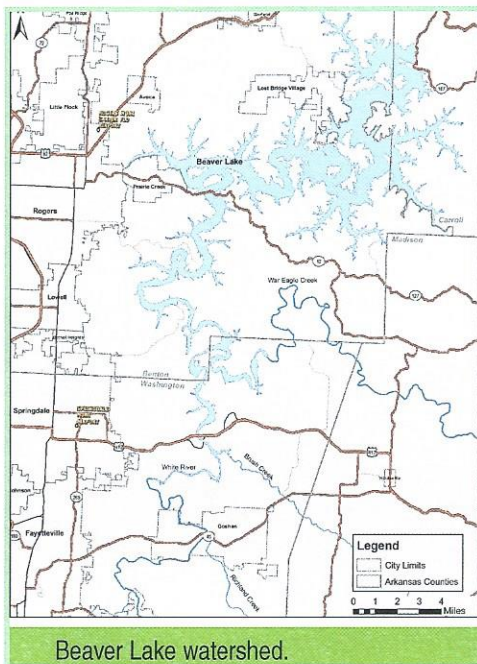
rivers, streams, constructed channels and storm drains, wetlands and the underlying groundwater.

Common activities like fertilizing your lawn and garden can affect water quality, even when you do these things far from any water bodies. By paying careful attention to how you manage activities in and around your home, you can protect your watershed and the water you drink.

What Influences the Quality of My Water?

Understanding the site characteristics of your residence and the location of potential contamination sources are important first steps in safeguarding your water. Water is continuously moving through the air, over land and through the soil and land use activities across the watershed can affect groundwater, stream and lake quality at lower elevations in the watershed.

Physical characteristics, like soil type, depth to groundwater and distance to surface water, can hasten or limit a contaminant's effect on water quality. Water quality is also affected by many activities such as the use and storage of household chemicals, fertilizers, pesticides and automotive fluids, waste disposal methods, and soil erosion. Animal wastes can be another threat to water quality, particularly if large amounts from dogs or other animals are allowed to accumulate on your property. To protect your water, all of these factors need to be considered.



Part 1 - Physical Land Characteristics of Your Property

Every home comes with its own unique set of physical site conditions such as soil type, depth to the water table (groundwater) and depth to bedrock. While these physical conditions cannot be changed, once aware of them, homeowners can better understand risks that may result from their decisions and actions that can be changed.

The Role of Soils in Water Quality

Soil plays an important role in determining where contaminants go and how water moves. Chemicals applied to a lawn, for example, can flow across the land and reach surface water supplies. On the other hand, the same lawn chemicals may soak into the ground and move down through the soil into groundwater supplies. It becomes easy to see how typical household activities can produce problems that go beyond property boundaries as pollutants can be transported through surface runoff and leaching.

It is also important to recognize that groundwater and surface water are interconnected. Groundwater generally flows downhill, following the same path as surface water, and eventually discharges into rivers, lakes, springs and wetlands. If you keep pollutants out of surface water, but do not protect groundwater – or vice versa – contamination may occur where you least expect.

To better understand how water contamination can occur, let's examine some physical site conditions which can affect the risk for ground and surface water quality.

Soil Type

Soil is composed of mineral particles, organic matter (decomposed plants and animals), microorganisms

(bacteria, protozoans, fungi and worms), water and air. Typically, soils are classified by the relative amounts of the three mineral particle sizes – sand, silt and clay. Fine soils (clays, silty clays and sandy clays) have a high percentage of the tiniest mineral particles – clay. Medium soil types (loams, clay loams, silt loams and sandy loams) are composed of a mixture of small (clay), medium (silt) and large (sand) mineral particle sizes. A coarse soil type (loamy sands and sands) is predominantly composed of sand, the largest particles. Much of the information on soils and water table was included in the percolation (perc) test results when your property was assessed for a septic system. If you don't have a copy, you can get a good idea about your soil type by rubbing a moist sample between your fingers. Is it sticky like clay, gritty and crumbly like sand or somewhere in between like one of the loams?

How Does Soil Type Affect Groundwater?

Nearly all soils are permeable – which means water and other fluids can percolate or seep through them. Soil particle size influences pollutants that are able to reach groundwater. Some soils are better at trapping pollutants than others. Clay soils, which are made of tiny particles, slow down the movement of water and in some cases can impede water movement completely. Sandy soils pose the greatest risk because water seeps downward through them readily without filtering out or decomposing pollutants. The ideal soil is a mix of large and mid-sized particles to allow infiltration and tiny particles, like clay or organic matter, to slow water movement and filter pollutants.

What Are the Risks to Surface Water?

Soil type can also affect surface water contamination. Although runoff can occur on all soil types, clay soils (which are least permeable) are more likely to cause surface water runoff. During a storm or flood, or even when watering your lawn, this runoff can wash contaminants from the land's surface into nearby surface waters. Eroding soil is also considered a water pollutant. Bare soil, especially on sloping land, can be carried in runoff and be deposited in streams, rivers and lakes.

Depth to Bedrock

Bedrock depth varies; it can be at the land's surface, just below the surface or hundreds of feet down. The type of bedrock influences pollution risks. Shale, granites and other impermeable types of rock make an effective barrier that blocks the downward movement of water contaminants. Limestone geology (karst) weathers easily and forms cracks, fractures, caves and sinkholes, allowing water to move freely into groundwater. When bedrock is split or fractures, water can move through it unpredictably, rapidly spreading pollutants over long distances.

Depth to Groundwater

If you dig a hole, you will eventually reach soil saturated with water. This water table marks the boundary between the unsaturated soil (where pore spaces between soil or rock contain air, roots, soil organisms and some water) and the saturated soil (where water fills all the pore spaces). In a wetland, the water table is at or just below the soil surface.

Your local water table fluctuates throughout the year but is usually highest in the wet months of spring and in late fall. In general, the closer the water table is to the land's surface, the more the groundwater is susceptible to contamination. Deep soils offer a better chance of filtering or breaking down pollutants before they reach groundwater. Usually, a water table that is less than 10 feet from the surface presents a higher risk for groundwater contamination. Generally, soils that are less than 3 feet deep present the highest risk for groundwater.

Groundwater is the water below the surface of the earth that, from the water table down, saturates the spaces between soil particles or fills in the cracks in underlying bedrock.



The table “Assessment - Lake Impacts Based on Physical Site Conditions,” is similar to the assessment tables in the other LakeSmart chapters. For each question, three choices are given that describe your property’s physical site conditions that could lead to high, medium and low risks to human or environmental health. For each question, check your risk level in the right-hand column. Some choices may not be exactly like your situation, so choose the response that fits best. Then look to the appropriate section for tips.

Do not depend solely on the physical characteristics of your soil, bedrock or other site features to protect water quality. You must take informed steps to prevent pollution. Although you cannot change your soil type or the depth to bedrock, you can account for these factors when choosing home management practices that are better for preventing environmental problems. Especially note the medium and high risks you identified. Keep them in mind as you complete your property map and work on other LakeSmart chapters.

Part 2 – Pollutants in Runoff

Runoff starts as rain or melting snow that does not

readily soak into the ground. This water flows from rooftops, over paved areas, on saturated or compacted soil and across sloped lawns. The flowing runoff picks up and transports pollutants such as yard and pet waste, sediment, fertilizer, chemicals, oil, grease, and other possible contaminants becoming polluted stormwater. Polluted stormwater then enters lakes, streams, and rivers. But, keep in mind you don’t always need a heavy rainstorm to send pollutants rushing toward the lake - your hose can supply enough water.

Completing this section’s self-assessments helps you find out how runoff affects the environmental quality of your own property as well as the lake that is down-slope or “downstream” from your residence. This section also gives you tips on reducing stormwater runoff pollution risks.

Why Should I Be Concerned?

Polluted runoff can degrade your lake and its tributaries. Soil particles cloud water and degrade the habitats and food supply of fish and water plants by filling in the lake bottom and stream beds. Muddy, murky water also makes the lake less aesthetically attractive.

Assessment - Lake Impacts Based on Physical Site Conditions

	Low Risk	Medium Risk	High Risk	Your Risk
Soil type and risks to surface water (creeks, river, lakes) from runoff	Sand/gravel (large particles)	Silt/loam (mid-size particles)	Clay (very tiny particles)	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Soil type and risks to groundwater from infiltration	Clay (very tiny particles)	Silt/loam (mid-size particles)	Sand/gravel (large/particles)	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Soil depth	Deep (over 12 feet)	Moderately deep (3 - 12 feet)	Shallow (less than 3 feet)	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Bedrock	Solid, not permeable or fractured	Solid limestone or sandstone	Fractured bedrock (any kind)	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Depth to water table	More than 20 feet	10 - 20 feet	Less than 10 feet	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Proximity to surface water	More than 100 feet	25 - 100 feet	Less than 25 feet	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High

Nutrients such as nitrogen and phosphorus promote the growth of algae, which crowds out other aquatic life. Nutrients in runoff can stem from overuse of fertilizers on lawns and gardens. It can also be a result of improper timing of fertilizer use. Many of our lawn care products are great for turf yards, vegetable gardens and landscaping beds, but can cause problems if they get into nearby waterways.

Toxic chemicals such as antifreeze and oil from leaking cars, carelessly applied pesticides and zinc from galvanized metal gutters and downspouts can threaten the health of fish and other aquatic life in the lake.

Bacteria and parasites from pet waste and improperly managed septic systems can make the lake unsafe for wading and swimming after storms. Recreational beaches have been temporarily closed due to high fecal coliform levels.

Stormwater also can flow down a poorly sealed well shaft and contaminate groundwater used as a drinking water source. These pollutants, often in minute concentrations such as parts per billion, are not detected by taste or odor, but can be a threat to human health. (continued on Pg. 12)

Where Do Pollutants Come From?

Pollutant	Common Sources
Silt, sand and clay particles and other debris (sediment)	Construction sites Bare spots in lawns and gardens Cars and trucks washed on driveways or parking lots
Nutrients (phosphorus, nitrates, etc.)	Fertilizers (overused or spilled) Pet waste Grass clippings and leaves
Disease organisms	Pet waste and garbage
Hydrocarbons (toxic chemicals)	Car, truck and lawnmower exhaust Leaks and spills of oil and gas Open burning of leaves and garbage
Pesticides and herbicides (toxic chemicals)	Applications before rainstorms Spills and leaks
Metals (toxic chemicals)	Cars and trucks (exhaust, brake and tire wear) Galvanized metal gutters and downspouts

Nonpoint source pollution such as runoff cannot be collected and treated centrally in the same way as pollution from point sources, such as wastewater treatment plants. Runoff pollution does not come from a few sources. Rather, runoff carries pollution from every street, parking lot, yard and garden. Solving the problem requires everyone's help.

Take a few minutes to go through the following assessment to determine your risk of contribution to runoff pollution from your property. Then read about the areas where you have the highest risk to learn more about things you can do to reduce the potential for runoff pollution from your property.

Assessment – Reducing Pollutants in Runoff

Use the table below to rate your risks related to your potential stormwater runoff pollutants. For each question, check your risk level in the right-hand column. Some choices may not be exactly like your situation, so choose the response that fits best. Then look to the appropriate section for tips.

The goals are to help make you more aware of the potential problems associated with nonpoint source pollution from runoff and to help you lower your risks of contributing to these problems. The following pages will help provide you with ways to improve on the areas identified as “high” or “medium” risks in the assessment above. Keep in mind that the keys to reducing pollution caused by runoff are:

1. Keep pollutants from being carried by the runoff, and
2. Reduce the amount of water that travels in the form of runoff.

Assessment – Reducing Pollutants in Runoff

	Low Risk Recommended	Medium Risk Potential Hazard	High Risk Unsafe Condition	Your Risk
Storage of pesticides, fertilizers and other potentially harmful chemicals	Stored in waterproof container in garage or shed out of reach of rainfall. Containers clearly labeled and out of the reach of children. Buy only what you need to reduce the need to store leftovers.	Stored in waterproof containers but within reach of rain water. Containers not clearly labeled. Buy chemicals based on price instead of actual needs.	Stored in non-waterproof containers. Not clearly marked. Accessible to children. Storage area often wet.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Handling and use of pesticides, fertilizers and outdoor chemicals	Keep absorbent material like cat litter on hand for spill clean-up. Apply only recommended amounts and control the watering-in of fertilizers immediately after application. Delay applications to avoid rain.	Don't delay applications to avoid rain. Sometimes increase the recommended rate based on my own judgment.	Don't clean up spills. Rinse equipment out on my driveway. Generally try to over apply to be sure the product is doing some good. Try to wait until right before a rain to fertilize.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Car washing	Cars and trucks taken to a commercial car wash or spray booth.	Vehicles washed on lawn instead of driveway.	Vehicles washed on driveway.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Automotive wastes	Always clean up oil spills with absorbent material. Take used oil to collection center. Store anti-freeze in a safe place.	Don't clean up oil spills. Anti-freeze stored in areas accessible to children or pets.	Wash oil spills off the driveway and into the street. Pour old gasoline or used motor oil in ditch or on the grass.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High

Assessment – Reducing Pollutants in Runoff (cont.)

	Low Risk Recommended	Medium Risk Potential Hazard	High Risk Unsafe Condition	Your Risk
Pet and animal wastes	Bury pet wastes away from garden, ditch or children's play area, dispose of in toilet or dispose of in trash.	Pet wastes left to decompose on grass or soil. Wastes scattered over wide area.	Animal wastes usually concentrated in grass area and not picked up. Any droppings on driveway are washed into the street.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Grass clippings, leaves and other yard wastes	Sweep clippings, leaves and other yard wastes off paved surfaces and onto lawns or landscape planters away from water flow routes. Leaves and other yard wastes are composted or used for mulch.	Leaves and other yard wastes are sometimes removed or composted. Clippings are swept off of paved surfaces around the house only, but not areas like the street.	Leaves, clippings, and other yard wastes are left where they fall. -	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Paved surfaces	Paved surfaces are kept to a minimum, and alternatives, such as wood chips, stepping stones or paver blocks are used when possible.	Some small areas are paved for patios, basketball, or tennis, but there are also some larger grassy areas.	A large portion of the property is paved, and there are only small areas of lawn.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Exposed soil	Bare spots in the lawn are promptly seeded and covered with a layer of straw and garden areas are mulched.	Grass is spotty, especially on sloping ground. However, all areas of bare soil are surrounded by grass.	Bare spots in the lawn or garden are without mulch or vegetation for long periods of time. Mounds of bare soil are present or bare spots are near pavement.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Landscaping to prevent erosion.	Yard is landscaped to slow the flow of water and allow storm water to soak into ground.	No areas allow water to soak into ground. Mowed grass or spotty vegetation near water.	No erosion control landscaping. Erosion on banks and shores.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High

Question - Are household products stored outside the reach of runoff?

Answer - Most households store lawn and garden products – weed and insect killers, fertilizers, etc. Rain, stormwater or floodwater reaching these products can transport them into surface water or local groundwater supplies.

- Choose plants which require less fertilizer for yards.
- Store chemicals in waterproof containers in a covered storage area.
- Choose the most environmentally friendly pesticide for the job if one must be used.
- Quickly clean up spills, especially on paved surfaces.
- Lightly water-in fertilizer so it will soak into the soil.
- Rinse pesticide spray equipment out on the yard, not the drive.
- Leave an untreated strip along the edges of your yard to act as a filter strip when fertilizing.
- Maintain a good cover of grass on the yard to minimize the water that runs off from it.

Question - Is stormwater carrying away any car or truck wastes?

Answer - A rainstorm can easily carry away oil stains on your driveway, and outdoor spills of antifreeze, brake fluid and other automotive liquids. Runoff from your driveway that has an oily sheen is a sure sign you need to be more careful.

- Use an absorbent material such as sawdust or cat litter to soak up spilled auto fluids. They can then be swept up to keep them from being washed down to the lake.
- Used oil is flammable and toxic. It contains hazardous ingredients such as hydrocarbons (like benzene) and heavy metals. When poured onto the ground, used oil tends to move through the soil, stressing soil microbes and other small organisms. Loss of these reduces nutrient cycles and can stress the plant foundation of the food chain. On water, oil spreads on the surface and eventually settles as a tar-like substance on the bottom. The oil stresses plants, microbes, aquatic insects, fish and other organisms by clogging their breathing mechanisms,

interfering with temperature regulation or it also may accumulate in their tissue such as muscle.

- Washing your car in the driveway creates runoff problems even without a rainstorm. Your hose provides the water. Try washing your car on the lawn. Or better yet, take it to a commercial car wash or spray booth that sends its dirty, soapy water to a wastewater treatment plant.

Answer - Droppings from dogs and cats, and from commonly-kept animals like rabbits, goats and chickens, can be troublesome in two ways. Pet wastes contain nutrients that can promote algae growth if the



Question - Do you keep animal wastes from becoming a pollution problem?

wastes enter streams and lakes.

- The chances of stormwater contamination increase if pet wastes are concentrated or left on slopes, sidewalks, streets or driveways where runoff occurs.
- Droppings should be buried if local laws allow, flushed along with human wastes down the toilet or put in a securely closed bag in the trash (especially used cat litter).

Part 3 - Landscaping and Site Management to Control Runoff

Some stormwater risks can be controlled by changes to buildings, paved surfaces, landscape and soil surfaces. This section reviews some easily addressed problems, as well as major landscape alterations you might want to consider.

Paved Surfaces

Concrete or asphalt roads, driveways, and walkways prevent rainwater from soaking into the ground. If possible, disconnect paved surfaces by draining them onto lawns or forested areas instead of into drainage ways or streams. If you have a choice, consider using alternative materials, such as gravel or wood chips for walkways to let water infiltrate the soil. Where you need a more solid surface, consider using a "porous pavement" made from interlocking cement blocks or rubber mats that allow space for rainwater to seep into the ground.

Slow or Capture Runoff

Include vegetated areas at the base of downspouts and adjacent to paved surfaces to capture water and allow it to infiltrate and recharge groundwater. This can be as simple as including a grass swale or low area that holds stormwater, allowing it to slowly soak into the soil. Also consider designing curved paths and drives to prevent runoff water from being directed to the lake. This will also create a more attractive design.

Dealing with Bare Soil

Areas of bare soil are common in garden areas, on newly seeded lawns, and around construction projects. Rainwater and melting snow can remove large amounts of soil and carry it into surface waters including rivers, lakes, and streams. Plant groundcovers or apply mulch to gardens or newly seeded areas to slow erosion and prevent soil from polluting surface water.

Reducing Erosion with Landscaping

Gardens, lawns and construction sites with areas of bare soil, especially on sloped land, are prone to soil erosion. You can protect soil and reduce erosion by planting groundcover vegetation or using wood-chip mulch or landscape fabric. Many lawns are sloped to encourage water to run off onto neighboring property or into the lake. On steep slopes, plant a vigorous ground cover, build terraces, or use retaining walls on slopes to help prevent soil loss. Swales (small dips in the ground) and berms (raised earthen areas) can help divert runoff that rushes from your yard. By landscaping low areas with shrubs and flowers, you can instead encourage water to soak into the ground. To prevent concentrated erosion near your home, direct

drainage from your roof to your lawn or flower bed. If you have a large lot, consider naturalizing parts of it with prairie, woodland, or wetland plants. Since your property adjoins the lake and/or a stream, consider leaving a buffer strip of thick vegetation that includes trees and native grasses.

Question - *Do you keep yard and garden wastes out of stormwater?*

Answer - If left on sidewalks, driveways or roads, grass clippings and other yard wastes will wash away with the next storm.

Although leaves and other

plant debris accumulate naturally in streams and lakes, you and other residents can contribute excess amounts of plant matter. This can lead to water that is over-fertilized and unsuitable for recreation (like swimming, boating and fishing).

- Burning is not an environmentally friendly alternative. Hydrocarbons and nutrients (like phosphorus and nitrogen) released by burning leaves contribute to water and air pollution. Rain washes smoke particles out of the air and runoff picks up dust and ashes left on pavement or in ditches.



- Avoiding the problem is easy — mulch mow grass clippings back into your lawn, use leaves as landscape mulch and compost leaves on your property to recycle nutrients for later use. Never place grass clippings, yard wastes or trash in drainage ditches or alongside the lake.

Question - *Are there areas of bare soil around your home?*

Answer - You can find areas of bare soil in vegetable and flower gardens, newly-seeded lawns, steeper slopes and around construction projects. Even on gentle slopes, water from rain can remove large amounts of soil and deliver it to rivers and lakes.

- Planting grass or other ground covers is the best way to stop erosion. A good stand of thick grass is one of nature's best filter systems.
- Putting a straw or chip mulch over gardens or newly seeded areas will slow erosion.
- Diversion ditches and commercially available silt fences around construction sites can help slow runoff and trap sediment on-site.

Question - *Can you eliminate paved surfaces or install alternatives?*

Answer - Concrete and asphalt roads, driveways and walkways prevent rainwater from soaking naturally into the ground.

- When you have the choice, consider alternatives such as gravel, wood-chip or brick walk on driveways or patios.
- Where you need a more solid surface, consider using a "porous pavement" made from porous concrete, interlocking cement blocks, pavers, or gravel that allow spaces for rainwater to seep into the ground.
- If you do pour concrete, keep the paved area as short and narrow as possible.

Question - *Does water from roofs flow onto pavement or grass?*

Answer - Your house roof, like pavement, sheds water. If downspouts from roof gutters empty out on grassy areas, the water will have a better chance to soak naturally into the ground.

- Aim your roof downspouts away from foundations and paved surfaces. This will allow the water that runs off your roof to have a chance to soak into the ground and not simply run off.

- For roofs without gutters, you can plant grass, spread bark mulch or use gravel under the drip line to prevent soil erosion and increase the ground's capacity to absorb water.

Question - *Can you change the layout of your landscape to reduce runoff?*

Answer - An essential part of runoff management is keeping water from leaving your property or at least slowing its flow as much as possible.

- Many home lawns are sloped to encourage water to run off onto neighboring property, streets or the lake. Instead, you could provide low areas landscaped with shrubs and flowers, adapted to temporary wet conditions, where water is encouraged to soak into the ground.
- If your property adjoins a stream or ditch, or slopes strongly to the lake, one of the best ways to slow and filter runoff is to leave a buffer strip of thick natural vegetation along the lower areas. See the Resources Section to contact your local Natural Resource Conservation Service/Soil and Water Conservation District for ideas.

Part 4 – Lakeshore Vegetation

The Role of Vegetative Buffers

A vegetative buffer zone is an undeveloped area directly adjacent to a pond, stream, or lake. Buffers can be comprised of existing plants on the site and/or new plantings. Buffer zones include aquatic plants in shallow water, moisture-loving plants along the shore, and upland plants in dry soils.

The primary purposes of vegetative buffer zones are to:

- Reduce runoff by increasing stormwater infiltration into soil. Less runoff means less nutrients and other pollutants entering the water -- excess nutrients are the primary cause of algal blooms and increased aquatic plant growth:

- Stabilize soils with plant root systems
- Reduce shoreline erosion due to wave action
- Purify water with aquatic vegetation
- Improve wildlife and fish habitat by providing food, shelter, and shade

Some additional benefits of maintaining a more natural, vegetated shoreline include spending less time doing yard work and more time relaxing. In addition, a vegetated lakeside buffer zone can create a more aesthetically pleasing shoreline for you and your neighbors to enjoy.

Landscape design and management that creates sustainable shoreland landscapes is referred to as lakescaping. Incorporation of a native plant vegetative buffer zone is a key element in creating successful lakescaping plans that are good for water quality and wildlife as well as being beneficial to property owners. The wider the buffer zone the better it will function. A 25-foot native plant buffer from your lakeshore/U.S. Army Corps of Engineers property line would be a great start!

As you consider buffer designs for water quality protection, also consider the types of wildlife you would like to encourage and determine the type of habitat needed. For example, many birds are ground nesting and require thick vegetation for protection. Woody debris provides habitat for insects and amphibians on which other species depend. Logs in the water and along the shoreline provide attractive perching sites for birds and turtles. Replacing a natural shoreline with mowed grass creates habitat that is suitable for few species except geese -- lots of geese. Including a vegetative buffer zone in your design will discourage geese while providing food and shelter for more desirable species. A well-designed vegetative buffer zone should not block views. It is easy to maintain views between the shrub layer and the tree canopy with careful plant selection and a little pruning. Vegetation can actually be a means to frame desired views and restrict undesirable views.

The first step in creating any landscape design plan

is to do a property site survey that inventories the landscape features, plants, and structures. The materials you need to make your map are readily available: a measuring tape, a clipboard, a pencil and grid (at the end of this chapter). The map you create will be an aerial view—the way your property would look if you took a photo of it from the air. A sample map is provided on page 18 and grid on page 19. Draw a

base plan indicating where structures and plants are located along with drainage areas, attractive and unsightly views, topography, and accurate site measurements.



A site survey for shoreland property should include:

- Water depths along the shore
- Steepness of slope moving inland from the shore
- Soil type (sand, clay, gravel, muck)

for major areas

- Areas prone to erosion - both upland and along the shoreline
- Inventories of existing plants should indicate problem plants, invasive species, existing native plants, and dead trees (standing snags and downed logs are valuable for wildlife), and areas where wildlife is observed
- areas where runoff water flows into Beaver Lake or a tributary
- existing use areas such as beaches, boat dock, picnic area
- winter storage areas for boats and docks
- access roads/driveways/paths

In addition, note if water levels tend to fluctuate, signify where the ordinary low and high water marks are, which direction is north, and indicate the shoreline's exposure to wave action.

Using the information gathered with the site survey, evaluate the site's challenges and strengths such as undercut shore needing stabilization. Determine how much area is actually needed for lake access and

recreation and which areas can be left undeveloped or earmarked for restoration.

Part 5 - Add Property and Homesite Details to Your Map

By adding detail to the map of your property, you will take another step toward more fully understanding your potential water quality impact risks. Although your property has physical features you cannot change, there are many things that you can do to minimize risks. Your map will identify areas where you can focus your efforts. It will also help you complete other LakeSmart chapters. And if you involve children as you make your map and conduct the assessment, you will help teach them the importance of having and protecting clean water.

Use the table below to rate your risks related to your lakefront vegetation. For each question, check your risk level in the right-hand column. Some choices may not be exactly like your situation, so choose the response that fits best. Then look to the appropriate section for tips.

Assessment – Lakefront Vegetation

	Low Risk Recommended	Medium Risk Potential Hazard	High Risk Unsafe Condition	Your Risk
Lakeshore plant types	A combination of native plant, shrub and tree species.	Some invasive plants mixed with native species and turf grass.	Mostly invasive species with limited native species or turf grass.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Vegetative buffer width	There is >25 feet of additional vegetative buffer inland from the U.S. Army Corps of Engineers property line.	Vegetation is thriving within U.S. Army Corps of Engineers property line adjacent to lake.	There is limited vegetation adjacent to the lake.	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
Mowing/maintenance of vegetation	Vegetation is allowed to flourish without mowing.	Vegetation is mowed 2-3 times a year.	Vegetation is regularly mowed (every 1-2 weeks.)	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High

Several home management practices and home site characteristics can have major effects on water quality. As you survey your property to make your map, be especially watchful for the following:

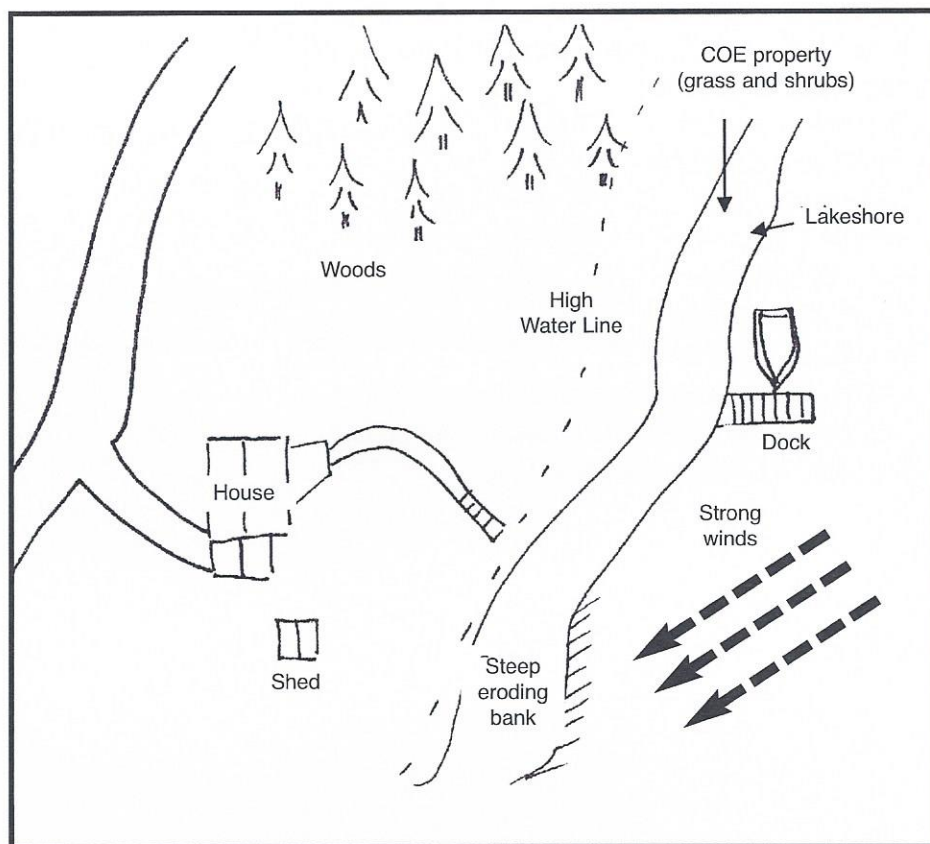
1. Improper storage, use or disposal of yard and garden chemicals and other hazardous products like paints and solvents
2. Stockpiled pet waste, animal pens or kennels close to a well, the lake, or a stream
3. Underground or above-ground storage tank containing fuel oil, gasoline or other petroleum products

On your map, note the areas where you store and use chemicals and other potential hazards by using letter codes. Make up your own code letters or symbols as needed. Examples might be:

- A – Automotive products like motor oil, gasoline and antifreeze
- P – Pesticides, herbicides
- H – Hazardous products like solvents, acids, paint and thinners
- W – Animal waste

For larger-view maps, add landscape features such as hills, ponds and human-built features such as docks and pathways down to the lake, runoff drainage ways, roads and bridges. You might also note potential sources of contamination beyond the boundaries of your property. Indicate seasonal changes at your homesite. One example might be high water levels experienced with spring flooding.

Inquire about previous or current industrial or agricultural activities in the area. Old landfills and buried fuel tanks are just a few examples of what you might find. Determine if any underground fuel tanks exist on



Sample site assessment diagram

neighboring or area properties.

The final step is to put both pieces of your assessment together – the assessment table results and map – so you can identify potential problem areas on your property. If you have rated any of the items in the table as medium or high risks and have identified potential contamination sources, then you should be concerned.

If you identify potentially hazardous or unsafe situations, what should you do? There are five other chapters in this *LakeSmart* handbook that address specific concerns. For example, Chapter 6 on Managing Household Hazardous Products contains information on the safe management of gasoline, heating oil, diesel and other fuels. This chapter and others will help you identify problems and develop an action plan for protecting your family's health and the local environment.

This *LakeSmart* handbook covers a variety of topics to help homeowners examine and address their most

important environmental concerns. See the complete list of chapters in the table of contents at the beginning of this handbook.

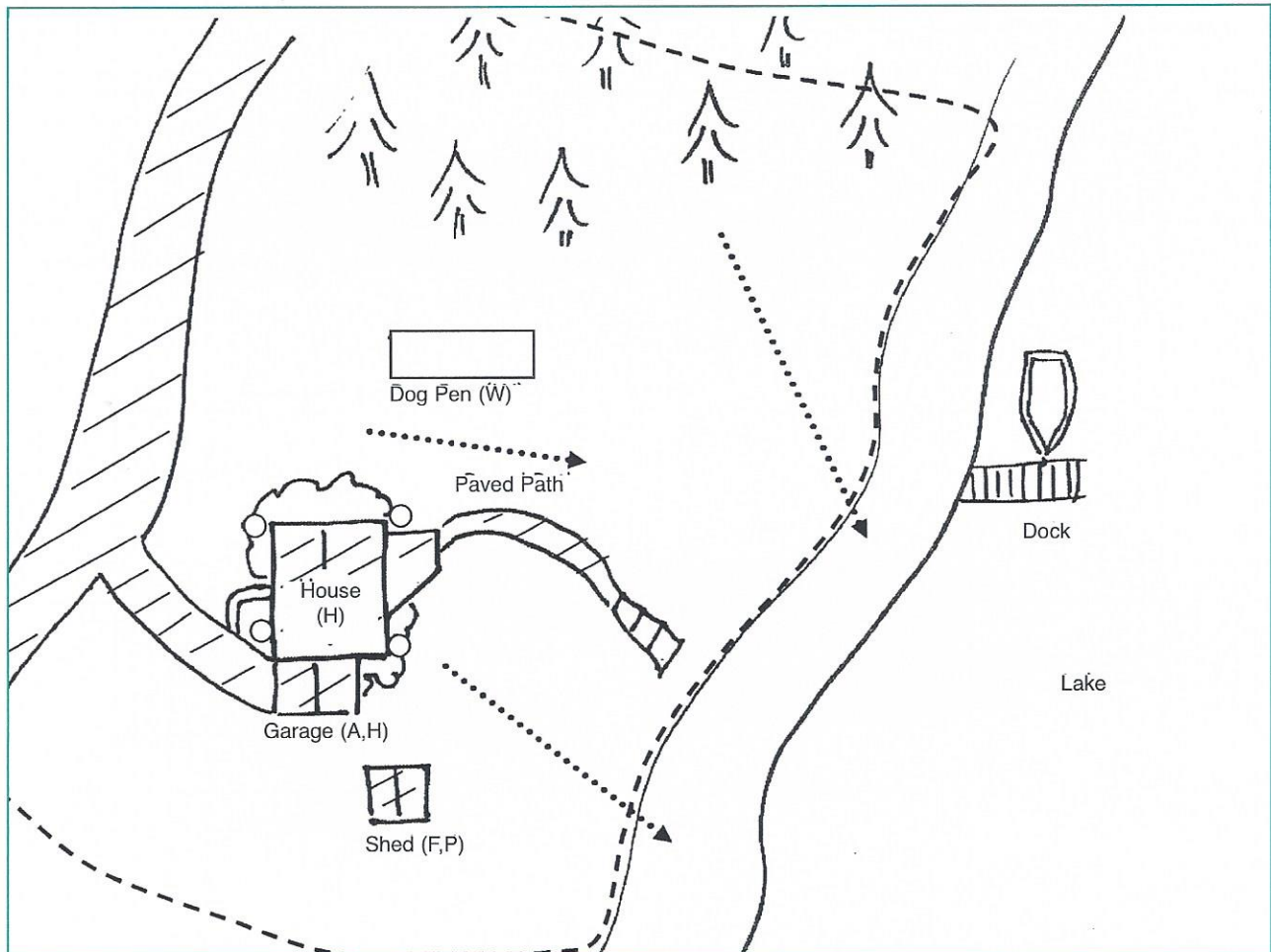
For more information about topics covered in LakeSmart, Urban Home*A*Syst, Home*A*Syst and Farm*A*Syst, or for information about laws

and regulations specific to your area, contact your local University of Arkansas Division of Agriculture Cooperative Extension Service office.

Using the information gathered with the site survey, evaluate the site's challenges and strengths such as undercut shore needing stabilization.



Sample map



Sample Map

Property boundaries

- House and garage
- Outbuildings, sheds
- Gutter down spouts
- Nearest surface water
- Roads, driveways
- Drainage ditches
- Impervious surfaces (such as patios or sidewalks)
- Lawn areas
- Vegetable and flower gardens
- Animal waste storage areas
- Nearest storm drain
- Slope/drainage direction

..... 30-foot property boundary

A = automotive products

P = pesticides, herbicides

H = hazardous products

F = liquid fuel

W = Animal waste

/// = impervious surface

..... = slope/drainage direction

O = downspout from gutters

This chapter was written by Alyson McCann, Water Quality Program Coordinator, University of Rhode Island Cooperative Extension, Kingston, Rhode Island. It was adapted for *Urban Home*A*Syst* by Katie Teague, University of Arkansas Division of Agriculture Cooperative Extension Service. Information on lakeshore vegetation management is from the University of Minnesota Sustainable Urban Landscape Information Series, <http://www.sustland.umn.edu/related/water2.html>.

Sample grid

[illegible]