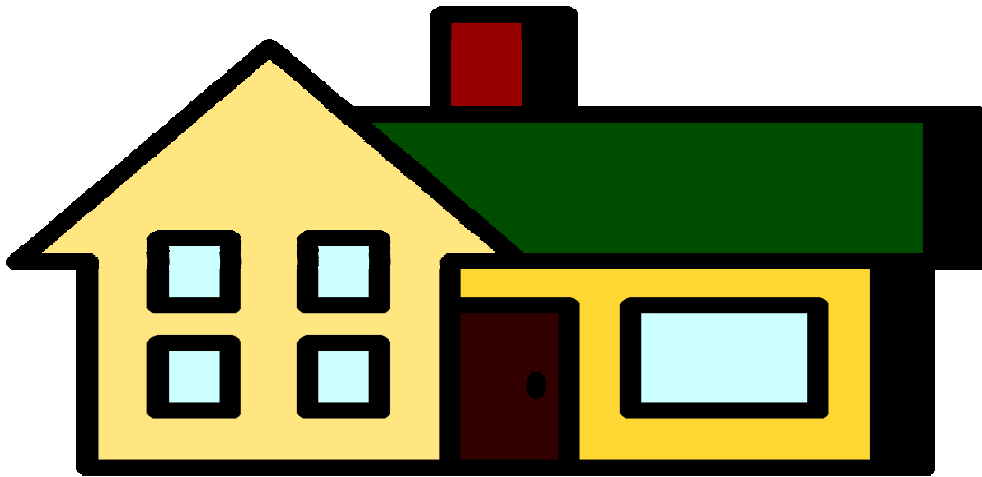


Improve Your Property  
Improve the Environment



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## We Have Heard It All!

*"#\*#, George! You've gotta do something about that miserable septic system! I'm tired of screaming at the kids, ' For Heaven's sake! Don't flush the pot or it will be all over the bathroom floor for the third time today!'"*

*"Marge, I'm going over to our neighbor's and give him a piece of my mind! I'll tell him if he doesn't keep his own #?\* water off my back yard, I'm gonna dam up the drainage way and float him right out his front door the next time we get a big rain!"*

*"Joe, let's move out of this swamp! We've spent a fortune the last two years re-doing the septic, pumping the basement, and hauling all the laundry to town. You go off to work every day, but I have to stay right here and live in this mess. If we're still here next spring I'll lose my mind! They've promised us a drought this summer -- good time to get rid of this place. Let's wait till August, pray it doesn't rain, and sell it!"*

We hope you are beginning to get the point. Drainage problems can affect every homeowner. This manual offers suggestions for drainage and erosion control which may be useful whether you are building or buying a home or home site.

## Introduction

**NOTE:** This guide contains successful methods of residential drainage and water management. Local ordinances, building codes and other regulations may alter or limit their use.

A home represents the largest investment many people make in a lifetime. The average new home buyer or builder gives a lot of thought to the house floor plan and room arrangement, but often little or no thought to drainage. Yet much of the enjoyment of living in a newly purchased or newly constructed home can be ruined by the headaches of poor drainage.

Whether you plan to build on a small city lot or a 40 acre rural estate, good drainage is vital. Living with poor drainage conditions can result in feelings of frustration and hopelessness and even physical and mental stress. A dream house can become a nightmare.

A new house is no more exempt from drainage problems than an older one. There have been new homes where occupancy was denied until drainage problems were corrected.

Proper drainage is best provided at the time of new construction. If care has been used in home site selection, usually most drainage needs are met by proper planning before construction begins.

It is much more difficult and often impossible to completely correct drainage problems for an existing home. After the home is built, drainage improvements are invariably a compromise resulting in something less than the ideal solution. However, to the degree they can be implemented, the basic needs and principles of drainage which apply to a new home also apply to an existing home.

### How Do I Get Started?

If you are constructing a new home, a building permit should be acquired from the township or municipality . There are several items you will need when applying for this permit.

You need the deed or abstract on the property and a plot plan of the property showing the location of the proposed building. If the property is zoned agriculture, you need the number of acres, whether or not there is road frontage, and the entrance/exit information.

The property needs to be confirmed whether or not it is in a flood plain. This requires the section, township, and range so the flood plain map can be checked. If you are building in a subdivision, the flood plain information will have already been checked at the time of rezoning and plat presentation. However, you should double check these issues before purchasing.

You need to have a copy of your permit for a new septic system .

If access to your property will be from a state maintained road, you will need to obtain a permit from Pennsylvania Department of Transportation to access their roadway.

This book was originally published by the Jennings County Soil and Water Conservation District in cooperation with the Jennings County Health Department, Area Plan Commission, and the Jennings County Chamber of Commerce of North Vernon and Vernon, Indiana.

This book was adapted for Pennsylvania through a cooperative effort between the PA Chesapeake Bay Program - Education Office, The Fulton County Conservation District, The Bedford County Conservation District, Ms. Terry Carnila - Bedford County Garden Club, Mr. Steve Wacker - DCNR- Bureau of Forestry, and Mr. Tom Ford - Penn State Extension Office - Fulton County.

As a homeowner you may have many questions such as how to best care for your property, what to do about a drainage problem, how to dispose of used motor oil, etc.

This residential guide contains practical information which will aid homeowners in the economical care and maintenance of their property.

Fortunately, many of the same techniques used to beautify the landscape and aid in waste disposal can improve soil, prevent water pollution and provide other environmental benefits for you, your neighbors and future generations.

# CONSERVATION DIRECTORY

## Fulton County Commissioners

### Fulton County Court House

201 North Second Street  
McConnellsburg, PA 17233  
(717) 485-3691

## Fulton County Conservation District

216 North Second Street  
McConnellsburg, PA 17233  
(717) 485-3547

## Penn State Cooperative Extension Office - Fulton County

214 North Second Street  
McConnellsburg, PA 17233  
(717) 485-4111

## DCNR - Bureau of Forestry

RD 2, Box 3  
McConnellsburg, PA 17233  
(717) 485-3148

## USDA - Farm Service Agency

216 North Second Street  
McConnellsburg, PA 17233  
(717) 485-3231

## USDA - Natural Resources Conservation Service

216 North Second Street  
McConnellsburg, PA 17233  
(717) 485-3812

## Fulton County Emergency Management

214 North Second Street  
McConnellsburg, PA 17233  
(717) 485-3201

## Fulton County Planning Commission

214 North Second Street  
McConnellsburg, PA 17233  
(717) 485-3717

## Pennsylvania Department of Transportation (Penn DOT)

P.O. Box 656  
McConnellsburg, PA 17233  
(717) 485-3816

## PA Fish and Boat Commission

Local Waterways Conservation Officer  
(717) 263-0059

## PA Game Commission

1-800-422-7554 or (814) 643-1831

## McConnellsburg Sewage Authority

P.O. Box 681  
South Second Street  
McConnellsburg, PA 17233  
(717) 485-4728

## McConnellsburg Water Authority

Fulton House  
McConnellsburg, PA 17233  
(717) 485-5001

## Fulton County Chamber of Commerce/Tourist Promotion

112 North Second Street  
McConnellsburg, PA 17233  
(717) 485-4064

## Attracting Wildlife to Your Yard

The presence of wildlife can make a backyard or woodlot a special place. Watching a squirrel scamper along the branches of a tree or listening to the song of the robin in the spring can go a long way towards easing the tensions of everyday living.

Urban and suburban development is rapidly displacing many birds and mammals from their natural habitats. By creating a mini-sanctuary on your property, however, you can attract and hold many species of wildlife.

Space is usually at a premium in city or suburban lots, but there is often space not used for recreation, gardening, or other activities which could be landscaped for wildlife.

Before you begin any improvements for wildlife, make a drawing of your property and start putting your ideas on paper. Plan so that you can see the wildlife-attracting features from a convenient window, patio or deck. It's important to include the three basic elements which all wildlife requires: food, water, and cover.

The ideal wildlife management plan includes as much food as possible by providing a variety of fruit-bearing vegetation from berries to nuts, in order to meet the year-round needs of many species. Select plants that will flourish in your yard's unique conditions of soil type, moisture, light, exposure, and slope. Emphasize less flavored food or food that will be available during critical mid and late winter.

On a typical residential lot, it's difficult to produce enough natural food for wildlife to last all winter. Supplemental feeding will help bridge the gap for your backyard winter residents and provide your household with many hours of enjoyment. Seed eaters such as sparrows, cardinals, and grosbeaks will consume a variety of food including sunflower seeds, cracked corn, millet, and commercial seed mixes. The fruit-eating mockingbirds, catbirds, robins, and jays enjoy raisins and chopped fruit, especially apples. High energy suet is favored by woodpeckers, chickadees, and nuthatches. Select a feeder, tray, or holder designed for the food you plan to provide and place it in a secure location that can be viewed easily from your home. Remember to keep your feeders well stocked until spring when natural sources of food become more abundant.

A simple bird bath or ground watering device can supply wildlife with water for drinking and bathing. If you have room, a small pool with an area large enough to support plants that grow in water, as well as around the edge, is especially attractive to wildlife. Encourage winter activity by keeping a section of the pool ice-free using a livestock trough warmer or small aquarium heater.

Your wildlife plan should include both escape cover, to serve as a home base for wildlife, and nesting cover, to provide a safe place for producing and raising young. Concealed places for hiding from predators and nesting can be created by planting trees and shrubs with overhanging branches, using prickly or thorny plants in a few areas, and establishing ground covers or prairie grasses in several areas.

Rows of trees and shrubs can provide cover and act as a wildlife corridor while providing privacy and screening out noises. "Living fences" of dogwoods, redbuds, Osage orange, pyracantha or forsythia create ideal habitat. Such hedgerows can be established by making plantings in staggered rows at a spacing of six feet. Replant annually until a dense hedgerow is established. Be sure to mark it carefully to prevent accidental mowing.

Clump plantings of trees are attractive to birds and mammals. White pine, Norway spruce, and wild crabapples are recommended species that can be planted in spacing of eight feet minimum. Mowing between the seedlings during their first two years will help them become established. As with hedgerows, mark the plants to prevent accidental mowing and replant annually until a solid stand is established. If you establish more than one clump, a hedgerow planting to connect them will act as a travel lane.

Wildlife plantings that provide both food and cover can make the difference between survival and death during severe winter weather. Evergreens, forsythia, and honeysuckle's are among the plants that provide good winter protection. In addition to food, water, and cover, good wildlife habitat features variety in plant species, in slope and terrain, and in the transition between plant communities. For assistance in planning the best wildlife landscaping, contact the Penn State Cooperative Extension Office listed in the "Conservation Directory" in the appendix.

## **Getting Started**

Invite wildlife to your yard by providing these essentials of a suitable natural habitat:

- cover to nest, rear young, and escape from enemies and severe weather
- food from fruit and seed-producing plants
- water from a dependable source throughout the seasons and
- a variety of plants to attract the largest number of birds and mammals

## Caring for Your Lawn

A dense, healthy lawn can be a valuable asset to your property and your neighborhood. In addition to its attractiveness, a good lawn has several important environmental benefits. When combined with sound landscaping practices, your lawn can reduce erosion, moderate summer heat, filter rainwater runoff, and actually improve soil structure and infiltration by adding organic matter. Streams, lakes, and public roadways can benefit from the reduced runoff and filtering capacity provided by lawns and landscaping.

On the other hand, when homeowners indiscriminately apply fertilizers and herbicides, lawns can become a source of pollution. Broad spectrum pesticides have already been implicated in harming beneficial lawn organisms, pollinating insects, songbirds, and wildlife, as well as people and pets. The use of lawn chemicals can be limited because environmentally safe practices can produce a turf vigorous enough to control the growth of most weeds and withstand pest damage.

Maintaining your soil pH and proper mowing is the best way to manage your lawn.

Planting the right type of grass is an important first step in developing a healthy lawn. Among the grasses best suited for our region are Kentucky bluegrass, fine fescue, and perennial ryegrasses. Penn State Cooperative Extension Office or a local nursery can help you select a blend appropriate for your lawn's growing conditions. Sunlight, drainage, depth of soil and pH (in that order) are the most important factors in growing.

Whether you're establishing a new lawn or developing a denser lawn, a soil test is needed to determine if your soil needs lime (to raise its pH), phosphorus or potash. Some home sites, especially in newer subdivisions, may have so little topsoil that you will have to haul some in if you plan to establish a nice lawn. The proper amounts of fertilizer and lime can be mixed directly into the top few inches of this new soil before planting. If top soil is unavailable or the cost is extreme, consider using a decent quality compost.

Either seed or sod can be used to establish a successful lawn; each has distinct advantages. Seed is readily available and is initially less expensive than sod. Sod, however, provides an immediate eye-pleasing turf that almost eliminates the problems of weed invasion

and excessive erosion. Seeding is most successful in early spring or early fall, while sod can be installed during most of the year.

If seeding is your choice, prepare a smooth firm seedbed. Then sow the seed in crisscross directions either by hand or with a seed broadcaster, mixing the seed, but avoid creating a completely smooth surface. Mulch the area with straw or other suitable material so that approximately half the soil surface is covered. For best results, water frequently until seedlings become established and keep pets and people from walking on the area.

When sodding, prepare the soil the same way as for seeding, but take special care to avoid creating any deep depressions such as footprints or vehicle tracks. On hot summer days, dampening the soil just before laying the sod will promote good root development. Try to install sod within 36 hours after obtaining it, because it is perishable. If an unexpected delay in laying it occurs, keep the sod moist. Lay the sod lengthwise across your lawn area to reduce the number of short pieces you'll need. A sharpened concrete trowel is handy for cutting sod and leveling small depressions. Immediately after the sod is laid, roll it and keep it moist until it becomes well rooted in the soil (a two to three week process).

After your lawn is established, you can increase its density through proper fertilization and maintenance. Here are some guidelines to follow:

- FERTILIZING - Because excessive fertilizing can cause water quality problems, use fertilizers wisely. Apply according to instructions-- at the proper time and rate-- and avoid spreading it on sidewalks and driveways where it can be washed into storm drains.

- RESEEDING - Seed added to existing lawns is usually wasted unless it is preceded by cultivation. To increase your chances of success, reseed by raking, adding topsoil if necessary, sowing seed, lightly raking again and keeping the area moist. Use a seed mixture similar to that prevalent in the surrounding lawn.

- MOWING - Most grasses in our area should be mowed to a minimum height of 2 1/2 to 3 inches so that a sufficient blade remains to absorb sunlight and manufacture food. Mow enough so that no more than 35 to 40% of the blade is removed at one time. Unless grass clippings are excessive, they do not have to be routinely removed from most lawns. Allowing them to decompose recycles plant nutrients and reduces the solid waste disposal problem and the time and effort required for mowing.

- WATERING - During the dry, hot days of summer, grass survives by naturally "shutting down" above ground to conserve its food supply in the roots. Brown grass, therefore, is not necessarily dead grass. If you choose to water your lawn, do so every seven to ten days so that the equivalent of one inch of rain is delivered to the area being watered. Shorter, more frequent waterings are much less beneficial and can produce a shallow, more vulnerable root system. Be careful not to water your lawn faster than the soil can absorb it.

- CONTROLLING LAWN PESTS - Although a thick, healthy turf is the most satisfactory means of controlling lawn pests, the application of a herbicide or pesticide occasionally may be useful. Before applying any substance to your lawn, identify the problem and determine the most effective control method. Contact your Penn State Cooperative Extension agent for information on targeting a specific lawn pest. Consider the least toxic alternatives for controlling pests.

- OTHER LAWN PRACTICES Dethatching and aerating are among other lawn practices that can build a dense healthy turf.

After reading the preceding section, you've probably concluded that complete lawn care is a big job. Lawns are not natural systems, but are actually manmade "monocultures". Because nature tends toward diversity, the quest for a weed-free lawn can be a struggle. Knowing this, chemical lawn treatment companies have proliferated in recent years, offering a quick solution to busy homeowners. If you decide to use a professional, ask for a contract that specifies how long the service will run, lists which chemicals will be used and allows you to reject products you do not want. Ask the company to customize its services to your needs.

- Do not expose yourself, family or pets to the treatment chemicals, and remember it may take 7 to 10 days for the chemicals to soak into the ground. Stay off the grass during that period.

- Let your neighbors know when treatment is scheduled. You may want to post a warning sign.

- Make sure the company sprays on a calm day and that chemicals are blended in proper proportions.

- Evaluate your need for service each year instead of automatically extending the service.

- Strive to achieve a Grass-Clover mixture. Clover is a legume that provides nitrogen for the grass.

## Getting Started

If you're willing to change your attitude about a totally weed-free lawn and tolerate some non-grass vegetation, caring for your lawn will become less of a struggle and you'll be protecting your environment.

Here are some things to keep in mind when planning and caring for your yard:

- Keep the mowing height high to shade out unwanted sun-loving plants.
- Remove built-up thatch because it can encourage fungus and prevent water from soaking in. Purchase a dethatching attachment for your lawnmower or rent a dethatching machine. Early fall is the best time for this procedure.
- Consider planting low maintenance groundcovers in areas where it's difficult to grow grass.
- Start using biodegradable products to treat lawn pests. Look for them at your nearby garden store. Because they are manufactured from fatty acid soaps and contain no petrochemicals, they are safe for humans, pets, and wildlife.
- You may also want to consider renting or borrowing an aerator every couple of years for heavy soils.

## Check List For Building On A Lot

1. Has the home been designed with the soil limitations in mind?
2. Have adjacent drainage ways, creeks, or rivers been analyzed for flooding?
3. Before construction of a home on a lot in which there are no sanitary sewers, fence off area where septic absorption field will be located. Permit no traffic on this area.
4. If there is an existing septic tank, have you inspected it to ensure its durability?

5. For any trees that are to be saved, fence the tree(s) out to protect the root system from compaction damage from any equipment.
6. Install a stone base for the driveway before starting construction and instruct all deliveries to be made only using the driveway.
7. Review the list in this book called "**Check list for purchasing an existing home**" Page 38. Be sure the designers have included the recommendations listed in this guide.
8. Is there a plan to control erosion during and following the construction phase?
9. What are the conditions of the drainage along the public road?

## **Additional Information When Purchasing A Lot Or Home**

Ask the seller or their agent for the following documents (as they apply):

1. Copy of recorded plat of lot. Available at the Recorder's of Deed's office.
2. Copy of covenants and restrictions (if any).
3. Copy of the development plan for the secondary plat (shows the public utilities, house pad elevation and easements for the subdivision). Available from the Planning Commission and/or Township/Municipality.
5. Copy of soils map. Available from the County Conservation District and the Natural Resources Conservation Service.
6. Is flooding in the area a problem? Maps can be checked at the Planning Commission Office.
7. Does the site appear to have good surface drainage and if so, is there a proper outlet for surface water to drain away from the lot?
8. Is there a drawing showing any on-site subsurface drainage?

9. Where is the nearest outlet to drain a subsurface drain (if needed)? Will an easement have to be purchased to get to a proper outlet?

10. Can I get a septic permit to build a house on the lot?

## Check List For Purchasing An Existing Home

1. When you drive in, do the grass, trees, shrubs look healthy?
2. Is the ground elevation around the home 18 inches higher than the street? Does the ground around the house slope 6 inches in the first ten feet away from the house?
3. Do the down spouts have drains that take the water at least 10 feet away from the house?
4. Are there swales in the rear and side yards to carry the surface runoff water to a proper outlet?
5. Have adjacent drainage ways, creeks, or rivers been analyzed for flooding?
6. If on a slab, do the heat ducts have water in them or is mold growing on the walls?
7. If on a crawl space, was it constructed as suggested in the guide? Does the crawl space show signs of wetness, mold or rotten wood? Does the crawl space have a footing drain or sump pump?
8. If it's a shallow or full basement, was it constructed as suggested in the guide? Does it show signs of dampness or water marks on walls or floors? Have the appliances, etc. been raised off the floor to prevent damage if flooded?
9. If there is a sump pump, does it have a proper outlet? Is the sump pump outside or inside? If inside, is there a battery backup system?
10. Check concrete floors, porches, walls and paint for evidence of settling, heaving and excessive moisture.
11. Have you asked nearby property owners if they are aware of any drainage problems with the house or neighborhood?

### Checking Your Soil's Suitability

When you are buying or building a home, planning a room addition or beginning a major landscaping project, it's a good idea to check your soils. The type of soil you have will effect what type of septic

system will be permitted, as well as what the drainage will be like on your property.

The soils in our region are not all alike. In fact, they may vary from your front yard to your back yard. What is put on or in the land should be guided by your soil's unique characteristics. Here's a soil checklist for homeowners:

- Is the soil stable or likely to shift?
- Are there steep slopes that may erode?
- Are there depressions in the soil surface?
- Will it be necessary to provide a drainage system or take other measures to remove excess water?
- Is the property subject to flooding?
- Is there a seasonable high water table that could cause problems such as basement flooding?
- Is the soil suitable for a standard septic system or other types of individual wastewater treatment systems?
- Are there industries nearby which might affect your soil?

You can discover the answers to these questions by carefully inspecting the site, then checking for additional information in the soil survey published for your county. The survey includes aerial maps showing the extent and location of each soil type. After finding your area of interest on the soil map, you can read the survey's soil description and learn about the soil's suitability for your project. Soil surveys are available from your County Conservation District Office or the local Natural Resources Conservation Service. If you have any difficulty understanding the soil survey, contact your County Conservation District staff or the local Natural Resources Conservation Service personnel.

If you decide to improve the soil on your property, arrange to test your soil to determine the amounts of nutrients present and available for use by plants.

### Getting Started

Before buying, building or starting a major home project involving soil, you will save time and money by visually inspecting your site's soils and slope, consulting your county's soil survey and testing the soil if detailed additional information is needed. REMEMBER: There's more to soil than meets the eye!

## Conserving Your Streambank

A small stream flowing through your property can be a valuable asset if it is clean, attractive, and free of erosion. Unfortunately, streambank erosion has become a major problem, particularly in urban and suburban areas where continued development has increased pavement, rooftops, and other impermeable surfaces which prevent water from soaking down into the soil. This increases the volume of water, pollutants, and sediments in the stream and causes streambank erosion.

Controlling streambank erosion can be challenging because the problem typically extends beyond your property. Solutions frequently involve cooperation among several property owners. In complex cases, a large-scale watershed management program may be the ultimate approach to the problem. On the other hand, if erosion has not progressed too far, you and your neighbors can minimize erosion by following simple conservation measures.

Attractive vegetation buffer zones near streams can enhance your property and intercept eroded soils and nutrients before they reach the water. An extensive list of plants recommended for waterside landscaping follows this section. Also don't overlook the native plants that may already inhabit the landscape.

Trees are especially important to streambank stability and the health of the stream itself and should not be cleared away. Tree roots not only stabilize banks but also remove nutrients and sediments harmful to streams. By providing shade, trees decrease stream temperature and create a more favorable environment for fish and other aquatic life.

Sometimes streambank erosion has progressed too far for simple measures to be effective. In these cases, structural restoration may be necessary. Such techniques as tree revetment, placement of rock rip-rap, and installation of gabions require consultation with a trained professional. Free advice is available from your local Conservation District and the Natural Resources Conservation Service (see the "Conservation Directory" in the appendix). The services of a professional engineer also may be required. On streams, permits are required prior to any structural modifications.

After you've stabilized your problem area, it's essential to carefully maintain your plantings or erosion control structures to make sure they will continue protecting your streams and your property value.

## Getting Started

Most streambank stabilization projects involve working together with other property owners. Here are several things you can do to clean up your stream and minimize erosion:

- Remove obstructions and litter from your stream.
- NEVER dump leaves, grass clippings, or other organic matter near or into a stream.
- Keep people, cars, and grazing animals away from the water's edge.
- Keep paved areas to a minimum near a stream.
- Build steps or a ramp between the top and bottom of the streambank if you need access.
- Avoid heavy loads on the top of the streambank.
- Control runoff by improving drainage around your home.
- Plant and protect suitable vegetation along the streambank and adjacent areas.

## Handling Hazardous Household Materials

You need look no further than your kitchen sink, the bathroom cabinet, the garage, or the basement to find an assortment of products that are potentially harmful to people and to the environment. Because landfills are running out of space and our water supplies are threatened, it's important for everyone to learn the facts about hazardous household materials. This section lists common items and describes their safe use, storage, and disposal.

All of us accumulate products that must be used with care. Household items that are considered hazardous include the following:

- Automotive products - motor oil, batteries, antifreeze, gasoline
- Pesticides and fertilizers weedkillers, fungicides, insecticides, pet flea collars, flea shampoo, no-pest strips
- Home maintenance supplies - paint/varnish/lacquer, turpentine, woodstains, wood preservatives, asphalt, roofing tar, swimming pool chemicals
- Household cleaners - drain cleaners, oven cleaners, disinfectants, mothballs/flakes, ammonia, furniture polishes, deodorizers, spot removers

It is often possible to use a less toxic alternative for household chores and maintenance. When you feel, however, that it's necessary to use products containing potentially hazardous materials, special precautions should be followed:

- READ THE LABEL THOROUGHLY and follow the directions carefully. Be alert to potential hazards. Highly toxic products should be labeled "Danger". Medium toxicity products read "Warning", and those with low toxicity read "Caution".
- Make sure you use the product only with the proper protective equipment (e.g., clothing, rubber gloves, masks) and under the appropriate ventilation and weather conditions.
- Open chemical containers carefully to avoid damage to your skin or eyes. Avoid the inhalation of dusts and fumes.

- Make sure people (especially children) and pets are out of the area when dangerous chemicals are used. Also remember to remove or cover exposed food, cooking utensils, and pet dishes.
- Never apply chemicals near wells, cisterns, and natural waterways unless instructions specifically permit such use. Bare ground and eroded areas also should be avoided.
- Use only as much of the product as you need to do the job.
- Do not smoke while using hazardous materials.
- When the job is finished, wash your hands thoroughly and change your clothes or shower, if necessary.

Unfortunately, accidents sometimes occur where hazardous chemicals are used. You'll be able to handle these situations more effectively if you're completely familiar with the product label. To clean up a small spill, surround the affected area with dirt, if available, then sprinkle the spill with an absorbent material such as sawdust or kitty litter. The absorbent material can then be shoveled or swept into a sturdy plastic bag, secured, and placed in the trash.

If a spill occurs on the garage floor or other hard surface, disinfect the area with a solution of water, bleach, or strong detergent. Remember to wear the proper protective clothing when handling spills and keep people and pets away. When chemicals spill directly into waterways, it's important for you to notify the PA Fish and Boat Commission and the local Emergency Management Office authorities (see phone numbers in the Conservation Directory located in the appendix) as well as the Department of Environmental Protection - Bureau of Water Quality Protection as soon as possible.

If you accidentally swallow a chemical or feel ill after use, contact your physician or your Poison Information Center immediately.

Dangerous situations can be avoided by storing household chemicals beyond the reach of children and pets. A locked metal cabinet in the garage is often a good storage place. Here are additional storage tips:

- Always store products in their original containers so you can refer to the label and also to avoid leakage.
- Never mix similar products together because dangerous chemical reactions can occur.

- Store products in a well-ventilated place that is insulated from temperature extremes and out of direct sunlight.

Never flush or dump toxic chemicals down the drain. They should never be poured onto the ground or into gutters where they can pollute groundwater or nearby streams. There are several other steps you can take for safe disposal:

- Paints, wood preservatives, brush cleaners, and other similar solvents contain a wide range of chemicals, some of which are suspected carcinogens. Dispose of them by stuffing their cans and containers with newspapers and allowing them to dry before placing them in the trash. Some solvents, such as turpentine, can be filtered and reused.

- Don't ever burn or bury leftover chemicals or their containers.

- Used motor oil and antifreeze should be poured into a sturdy container like a plastic milk jug and taken to a local service station or oil recycling center. Ask your local garage about properly disposing of automotive batteries which are made of lead and filled with sulfuric acid.

- Try to use up products, but if you can't, give the leftovers to neighbors who you think will use them properly.

## Getting Started

By becoming an educated consumer, you can avoid stockpiling household chemicals and thereby decrease your future disposal problems. Here are some smart ways to get started:

- Think before buying any toxic substance. Ask yourself if you really need the product or if a less or non-toxic alternative would work as well.

- Select biodegradable, recyclable or rechargeable products whenever possible. Rechargeable flashlight batteries will cost more, but will last longer and will reduce your disposal problem.

- If you have a choice, buy non-aerosol sprays.

- Keep aware of community efforts and new products aimed at minimizing household chemical wastes.

- Attend workshops, read relevant articles, and share your new found knowledge with others.

## Guidelines For Surface Drainage Around The Home

1. The ground elevation around a house should be a minimum of 18 inches higher than the street.
2. The soil around the house should be graded so it slopes away from the house at least 6 inches in the first 10 feet.
3. The front half of the house and lot should be graded to drain to the street and the back half of the house and lot should be graded to drain to the side and rear yard swales.
4. All lots should have some form of swales on the property to take surface water away from the house. Swales are generally "V" shaped with mowable side slopes and a minimum slope of 12 inches per 100 feet. (Swales not having the minimum slope should have a subsurface drain the length of the swale to keep them dry.)
5. All downspouts should be extended on top or below the ground at least ten feet from the house. Ideally all down spouts would be extended below ground to the nearest swale. It is best to use solid plastic tile for extending down spouts. (Slotted tile will put some water next to the foundation when installed above ground and roots will grow into it when installed below ground.)
6. Some lots end up with low areas that "pond" water. In many cases regrading or filling with a little more topsoil will eliminate that problem. But in some instances regrading or filling will only move the problem somewhere else. In that situation it is recommended that subsurface tile be run under the ponding area to dry it up.
7. Remember, the previous recommendations work for most typical or ideal lots. But in some cases a lot may have special characteristics. For example, extra thought may be needed for planning and design of a lot that is very rolling with a front yard that slopes towards the house. A solution to this situation would be to install a swale in the front yard that would divert surface water away from the front of the house and take it to a rear or side yard swale. Also, the ground around the house should be a minimum of 18 inches above the top of the swale and should be sloped toward that swale.

## Improving Drainage

Homeowners who have experienced the inconvenience and unpleasantness of flooded basements, wet yards and malfunctioning

septic systems will find this topic of special interest. Solving the problems created by surface runoff and poorly drained soils will not only improve your property and protect your investment, but will also yield benefits to rivers, streams, and reservoirs.

Rain runoff from roofs, patios, and driveways, carry soil from bare spots in yards and vacant lots into culverts, roadside ditches, and waterways. This sediment adversely affects the appearance of streams, smothers fish, and blankets bottom-dwelling animals. Oil, pesticides, and fertilizers also can be carried by runoff from your property to cause pollution to surface waters and groundwater.

Pollution can occur, too, when soils become so soggy that they cannot filter the outflow from home septic systems. Foul-smelling effluent can rise to the surface and flow into streams with the first heavy rain.

By encouraging rainwater to move slowly across the soil, most of it will be absorbed by the ground. This section includes several practical ways to improve the drainage patterns around your home.

Slow soil permeability commonly contributes to drainage problems. Restricting heavy foot traffic on your lawn during wet periods helps prevent soil compaction. If your home site has a dense layer of clay, the flow of water through the soil may be restricted and water may collect or "pond" on your lawn. When the clay layer is near the surface, you can improve a small low-lying wet spot by digging a small trench through the clay layer and filling it with sand, gravel, pine bark, or other porous material.

Larger wet areas may require the installation of 4 to 6 inch subsurface drains at a depth of 2 to 5 feet. Backfill the trench with 6 to 12 inches of American Association of State Highway and Transportation Officials (AASHTO) #57. For maximum effectiveness, the trench should be backfilled to within one foot of the ground surface. Use topsoil to fill up to the surface layer. For soils that lack cohesive properties, a filter fabric around the tile is recommended to prevent movement of soil particles into the drain.

A seasonable high water table can be another common cause of poor drainage. The water table, or level below which the soil is saturated with water, may fluctuate by several feet annually depending on soil, topography, and weather. Some soils in our region have a seasonable high water table very near the ground surface - a good reason to check the soils before buying a new home site.

If a seasonable high water table is already creating difficulties for your home, possible remedies include installing drains around the outside walls or beneath the basement floor. Special care should be taken in lowering the water table under the basement floor because unequal settlement on some soils, especially slow-draining silts and clays, may crack the walls.

Where a high water table affects a limited portion of your lawn, a small excavated pond may be an interesting solution. If you have the time and energy for such a project, you can transform a soggy nuisance area into an attractive landscape feature. Before beginning, however, remember to check state and local regulations concerning pond construction.

A system of berms (low ridges) and swales (shallow depressions) may be designed to channel surface runoff. Another good runoff management practice is the installation of gravel trenches (at least 12 inches wide and 3 feet deep) along your driveway or patio.

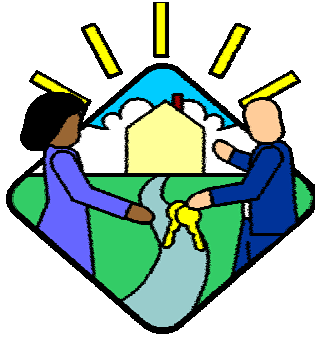
Your yard should be graded to convey surface water away from your house. A minimum grade of 1 foot per 100 feet (1% slope) is usually adequate. Good gutters and well-functioning downspouts are also essential to improving drainage around your home.

Drainage problems can occur when your home is located on a flood-prone site. If your home is in a flood plain, severe problems may occur when streams overflow during heavy rainfall or snow melt. Often, community-wide measures are necessary to provide adequate property protection. If you are selecting a new home site, check to make sure the area is not highly flood prone and build the foundation above any expected flood level.

Even in upland areas, flooding can occur if your home is located in the path of natural drainageways or on a site that is lower than the surrounding area. In some instances, measures to remedy this potential hazard will require the cooperation of several homeowners.

Improving drainage becomes essential if your site includes a natural spring or seep which flows near your house, affects your lawn, or impairs use of an onsite septic system. Subsurface drains (made of clay tile or perforated plastic, for example) should be properly installed to collect the groundwater and divert it from such areas. Be sure to check local building codes for approved materials and other drainage regulations.

There are many ways you can improve drainage on your property. Some approaches are simple and inexpensive while others are more complex and costly. If you plan to contract work out, be sure to get more than one estimate and carefully evaluate each method recommended.



### Getting Started

Even if your property has no obvious drainage problems, it is wise to periodically check your home's gutters and downspouts. What should you check? Here are some tips to help you begin:

- Make sure the gutters are firmly attached against the faceboard (fascia) at the eave ends of your house. This will prevent seepage that could rot the faceboard or leak through the walls.
- Check to see if your gutters are slightly sloped towards the downspout. The low end of a 30 foot gutter, for example, should be nearly 2 inches lower than the higher end.
- Keep your gutters clear and clean, especially during fall and winter when leaves and ice can clog them. Plastic gutter guards may be useful if deciduous trees are nearby.
- Place a splash block directly below your downspout to absorb some of the energy from the falling water and prevent it from gouging a gully in your yard.
- If a splash block is not sufficient to prevent surface erosion, an additional measure is to attach flexible perforated plastic tubing to the end of the downspout. This will automatically unroll during a rain and diffuse the flow of water.

### Subsurface Drainage - General Information

Subsurface drainage tile is usually a perforated or slotted hollow pipe that is buried underground and allows excess water in the soil to enter and flow from one point to another.

Soils in Pennsylvania vary from region to region as well as from municipality to municipality. For example, if your soil is classified as Basher Silt Loam, it is generally a wet soil, has the ability to hold water and is usually found in a flood plain. Therefore you would know that a portion of your property would be wet most of the time. You should carefully check the soils on your property before installing subsurface drainage tile.

Tile can be made of concrete, clay, flexible or rigid perforated plastic or other materials designed for subsurface drainage. The size of tile needed will depend on the area to be drained. However, for use around the home a size of four to six inches (inside diameter) should be sufficient.

The outlet of a tile is the single most important component of a drainage system. A proper outlet is another tile, storm sewer, pond or open ditch (creek, river, etc.). Once you have identified a proper outlet for your drain tile, a plan should be devised to install the tile. Remember, as a landowner, you are responsible for observing all local and state drainage codes. You may have to seek permission, purchase an easement, or work out an agreement with neighbors to get to a proper outlet.

### **Gravity Flow Outlets**

Use gravity flow subsurface tile systems whenever possible. They require no energy source, and are simplest and cheapest to maintain. A gravity flow system should have a minimum slope of one inch per 50 feet of tile length.

### **Intercepting Field Tile**

Always assume the tile carries water, even if it is currently dry. If you cut through an existing field tile when you dig your crawl space, septic system or basement, reroute the tile (with the same size) around the house or septic field and then reconnect it.

### **Tile Maintenance**

Tile drains work for years with very little care. Some old clay farm tiles have been working for over 80 years. Caring for the tile on your own lot is your responsibility, but the outlet for your drain may

require some form of community organization for maintenance. Many community groups such as Homeowners Associations maintain tile drains. If you are planning on connecting to or altering any community maintained drain, you must first get permission from the proper authorities.

Maintenance for other tile outlets may be more complicated. If your outlet is a natural stream, drainageway, private open ditch or tile, you will have to negotiate the use of the outlet. A maintenance easement is one way to allow access to keep a tile outlet in good working order. A tile outlet should be checked at least once or twice each year.

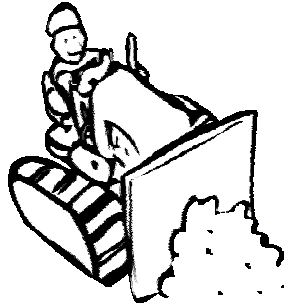
### **Root Blockage**

Tile installations designed to lower water tables must have joints, holes or slits which allow entry of ground water. Tree and shrub roots can enter at these points in search of moisture and may eventually block the tile. Water loving trees, like willows and maples can be especially troublesome. Here are some ways of keeping roots from blocking tile lines:

1. Solid plastic tile can be used to pass through existing tree and shrub areas.
2. Trees and shrubs planted later should be located away from tile lines.
3. A minimum of six inches of AASHTO #57 around a tile will help discourage roots.
4. Inspection - breather vents to the surface can be placed at upstream ends of lines to permit adding copper sulfate or other root killing chemicals and provides a place to visually check to see if the system is working.

### **Sump Pumps**

In some situations the lowest floor level (i.e. basement or crawl space) may be lower than the closest proper outlet. A sump pit and pump will then be needed to lift the water up to a proper outlet. Since this type of system needs electricity to operate it is advised that a battery back up system also be installed if the sump pit is inside the basement or crawl space. It is recommended that the sump pump and pit be installed outside the basement wall, then if the sump pump fails, water will not flood the basement.



## Selecting A Home Site

The type of home construction you plan should be influenced by soil conditions and have a bearing on the degree of drainage you will need to provide. For instance, building a basement on depressional soils with a high water table may be asking for trouble even though corrective measures are applied. In the case of a dry site with sand and gravel underneath and no seasonable high water table, you are free to choose whatever type of construction is best suited to your family's needs.

### **Types of Home Construction**

Concrete slab, crawl space, shallow basement (bi-level or multi-level) and full basement are the common types of residential construction. Earth shelter homes need special drainage designs. The deeper construction goes into the soil profile the more likely it will be for you to encounter drainage problems.

#### **Concrete Slab**

It is recommended to install subsurface drainage under slab construction. This prevents the water table from getting up near the slab and allowing water into the heat ducts. Under the slab there should be a minimum of 2 inches or more of AASHTO #57 or sand to stop capillary water movement. This should be topped with a double sheet of 4 mil. polyethylene plastic or other suitable moisture vapor barrier immediately under the slab.

#### **Crawl Space**

The majority of homes are built with this type of construction. A cavity is provided under the house for access to utilities. Although proper drainage of crawl spaces may be less essential than for a basement they can end up wet or dry depending on proper drainage planning.

Crawl spaces are usually partly above and below the original ground line. In most cases a majority of the crawl space is below ground line. Because the ground water table can be within 0-1 foot below the surface in poorly drained soils, it is easy to understand why crawl spaces can be wet. A tile should be placed outside and below the footing and backfilled with AASHTO #57. It is recommended that the inside surface of the crawl space be topped with a layer of AASHTO #57. To avoid dampness in the crawl space, add a heavy sheet of 4 mil. polyethylene plastic on top of the finished crawl space all the way out to the foundation walls. Some homeowners like to add a protective layer of AASHTO #57 on top of the plastic. Some builders suggest that many homes would have better surface drainage if the foundation was elevated one row of block higher. This would reduce the excavation of the crawl space and provide more slope away from the house. Top soil may need to be purchased for the finish grading around the house.

### **Shallow Basements**

Bi-level and multi-level homes can have the lowest floor level one-half below and one-half above ground. For planning of proper drainage, they may be considered shallow basements. They are usually located at lower elevations in the soil profile than crawl spaces. Consequently, drainage problems with them are more likely than with crawl spaces, but usually not nearly as severe as for full basements. Tile drainage around the foundation footing is usually necessary. Gravity flow tile outlets are possible to use with shallow basements.

### **Full Basements**

This type of residential construction requires the deepest excavation into the soil profile, perhaps 8 feet or more, and as would be expected, encounters the most drainage problems. In poorly drained soils, the ground water table exerts great pressure on the deeper basement walls and floor. The ground water is trying to equalize the pressure by entering the basement. The result is a damp or wet basement without proper drainage.

Basement floors have been known to literally explode upward to relieve this pressure. Concrete block basement walls sometimes collapse, though this usually happens during or just after construction with settling of fresh soil backfilled against the outside basement walls or when proper structural supports were not used.

### **Tile Installation for Basements**

There are some key elements when constructing shallow basements or full basements. Once the footing has been poured, a drain tile system should be installed on the inside and outside of the footer. The footing drains then outlet either to a gravity drain or to a sump pump pit. Floor drains should not be connected to the footing drain. This prevents back-up water from entering the basement if there is a failure in the outlet drainage system.

The tile on the inside of the footer should be backfilled to the level needed to support the concrete floor. Then install a double layer of 4 mil. polyethylene plastic on top of the AASHTO #57 to prevent dampness of the concrete floor. The floor is then poured on the plastic.

### **Water-Proofing a Basement**

On the outside of the foundation and wall, backfill over the footer drain with AASHTO #57. Then waterproof the basement walls before backfilling with a core of 6 to 12 inch wide AASHTO #57. Installing more than 12 inches (width) of AASHTO #57 could be harmful to basement walls and/or plantings next to the home.

### **Damp - Proofing vs. Water - Proofing**

Damp-proofing is merely applying a thin layer of liquid tar to the outside of the basement wall. This is sufficient for crawl spaces or where the soils are extremely well drained and dampness would not be a problem. Water-proofing typically involves not only a layer of tar, but also some other layer(s) of fibrous materials. Your contractor should know the current method for water-proofing your concrete or block wall.

### **Earth Homes**

This type of residential construction presents many of the same drainage problems as do full basements, or more so. Earth homes should each have an individual drainage design tailored to its own specific site and construction details. They should be built only where gravity type subsurface drainage is available. Drainage designs for this type are like those for full basements.



## Landscaping for Best Results

Planting trees, shrubs, and groundcovers benefits the environment and also enhances the appearance and value of your property. Because it reduces runoff and minimizes erosion, good landscaping not only protects your land but reduces damage to roadside ditches and waterways. Trees and shrubs are invaluable in reducing air pollution by removing carbon dioxide from the air and manufacturing and releasing essential oxygen.

Well-planned landscaping can reduce the cost of heating and cooling your home by as much as 30 percent (see "Attracting Wildlife to Your Yard" Pg. # 21).

Trees, shrubs, and groundcover require less maintenance than grass. They generally require less fertilizer and fewer chemicals than grass. They also help reduce pollution caused by lawn care chemicals.

You should choose plants suited to your yard's unique growing conditions of light, exposure, soil type, moisture and slope.

Choosing plants appropriate for your yard will save you time and money by reducing insect problems and the need for excessive fertilizing and watering.

Native plants are usually easier to establish and maintain than non-native plants.

Trees and shrubs are available for purchase either balled and burlapped, container grown or bare root stock. Balled and burlapped and container plants have a higher survival rate, but require a much larger planting hole. For best results, bare root stock should be planted soon after purchasing. If you are unable to plant immediately, care should be taken to prevent moisture loss by watering the roots and storing the plants in a cool, dry place out of direct sunlight.

When planting trees or shrubs there are some basic planting recommendations that you should follow for transplant success. First, the planting pit should be dug such that the walls of the pit are vertical or sloping outwards. In heavy clay soils the walls of the planting pit should be scarified to ease the penetration of roots into the existing soil.

Planting pits must be a minimum of 9 inches larger on every side of the rootball. The pit should be deep enough to allow the top one eighth of the rootball to be above the existing grade. For best results, plants should rest on undisturbed soil or compacted backfill.

Place the tree or shrub in the pit by carefully lifting the tree or shrub by its rootball. Never carry any plant material by the trunk or branches or serious damage could result.

Currently, most horticulturists are not recommending using soil amendments for most tree and shrub plantings. Research has shown that amendments are rarely needed and their usage can delay a plant establishment into the existing soil. If the soil is extremely poor and the existing turf or vegetation is very sparse, then amend the soil with compost or fine pine bark.

Backfill the planting pit carefully. Fill the pit halfway and tamp the soil down as you backfill. Remove any wire, rope, plastic, or burlap from the rootball before backfilling the hole completely. Cut away any string or plastic that encircles the trunk and then finish backfilling. Remember, never cover the top of the rootball with soil!

Form a saucer around the outer rim of the tree pit above the existing grade. Mulch the top of the rootball and the saucer to a minimum depth of 2 inches and to a depth not to exceed three inches. Water the tree thoroughly and prune out any dead wood or broken branches.

Container plants should be popped out of their container and the rootball should be scored heavily with a knife to disrupt the circular root pattern. These plants should be planted in such a manner that the top one sixth of the rootball is above grade with no soil covering the top of the rootball.

Here are some guidelines for tree and shrub care after planting:

- WATERING - Water is essential to successful plant establishment and growth especially during the first growing season. Water plants twice a week during hot weather unless there is at least one inch of rainfall every 7-10 days. At each watering, soak the soil thoroughly to the base of the root system.

- MULCHING - All landscape plantings should be mulched thoroughly utilizing 2-3 inches of accumulated pine bark, composted hardwood bark, pine straw or rotted sawdust. Mulching conserves valuable soil moisture and limits the encroachment of weeds into ornamental

beds and landscapes. Overmulching (4-6 inches accumulated) can cause shallow rooted plants like boxwood, azalea, and rhododendron to decline. Mulch should not be allowed to come in contact with the trunk or stems of landscape plant materials or injury could result.

- WRAPPING - Wrapping newly planted trees reduces moisture loss and damage from sun scald and tree-boring insects. Start wrapping the tree at the lower branches and continue downward in a spiral, overlapping fashion. Twine can be used to reinforce the wrapping. Plastic tree guards will discourage rabbits from eating the trees. If the tree comes wrapped from the nursery, it is all right to let the wrap on for one year.

- STAKING or GUYING - Most trees over one inch in diameter should be supported by a stake or guy wires to keep them upright and prevent root damage. Trees up to three inches in diameter can be supported with stakes, but trees of larger size require guy wires. Attach trees to stakes by a wire run through a garden hose, soft rope or other similar materials. Never use bare wire alone. Remove after one year.

- PRUNING - The best time for pruning most trees is late winter or early spring while they are still dormant. Spring flowering trees, however, can be pruned after blossoming. In general, when pruning, cut back to healthy wood at a lateral side branch or bud. The cut should be 1/8 to 3/8 inch above the bud and slightly slanted. Hedges should be trimmed narrower at the top so that the lower branches will receive sufficient light. Keep pruning tools sharp to make the job easier and ensure smooth, even cuts.

- GROUNDCOVERS - Hardy, low-maintenance groundcovers have become increasingly popular in recent years for planting in shady areas, on slopes and other difficult spots. Although most groundcovers can survive under a variety of growing conditions, it's best to break up the soil to allow pore spaces for air, water, and nutrients. Mulching after planting will help conserve both moisture and soil. Many groundcovers can be trimmed in spring either by hand or at the highest lawnmower setting.

## Getting Started

Landscaping will increase your home's value and will decrease potential erosion. Follow these simple guidelines to landscape for best results:

- Landscape your property to minimize rainwater runoff.

- Preserve the established trees in your neighborhood to minimize erosion damage and air pollution.
- Choose groundcovers, trees and shrubs that are well suited for your soil. Don't select plants that require lots of watering (which increases surface runoff).
- Consult your Cooperative Extension Office or local nursery for advice on which plants will thrive in your yard.

## Maintaining Your Well

If you're one of the thousands of homeowners in the region who use drinking water from a well, it's up to you to make sure your water is clean and safe. Even though wells can become contaminated by bacteria or chemicals, few government regulations apply to private water supplies. At present, wells are subject to regulations only when they are installed.

When obtaining clean water as a do-it-yourself operation, the health of everyone in your household is at stake. It's essential to protect the water entering your system, to properly maintain your well, and to check that your water is safe and free of offensive tastes or odors.

### WELLS

Chemical disinfection by chlorination is necessary to assure safe bacterial levels in new or repaired wells. The most readily available disinfectant is a solution of one gallon of ordinary laundry bleach (5.25% chlorine) thoroughly mixed with four gallons of water. After preparing the disinfectant, follow these steps:

- Remove the well cap or the vent pipe plug if your well is equipped with a sanitary well seal.
- Pour half of the chlorine solution directly into a dug well or between the drop pipe and outer casing of a drilled well.
- Using a garden hose, run water directly into the well until you detect a chlorine odor. Continue adding water for 15 minutes.
- Turn off the water supply to the hose and proceed to systematically open the hot and cold water valves for each fixture in the house. Allow the water to run until a distinct chlorine odor is present.
- Close all valves, stop your pump, and add the remaining chlorine mixture to your well. Then recap the well or replace the vent pipe or plug. Leave all valves in the house closed for 12 to 24 hours. (Toilets may be flushed, however, when necessary.)

- After 12 to 24 hours, restart the pump and open every household fixture and the garden hose and let the water run until the chlorine odor disappears.

Your well should now be properly disinfected, but before using the water, have it tested.

Even disinfection cannot ensure the safety of private water supplies that are not properly located or constructed. Local conditions including topography and soil types will determine the minimum distance required between a private water supply and potential contamination sources such as septic tanks and agricultural sites. Check with township officials for local restrictions.

Because proper maintenance of your cistern or well is so important to the well-being of everyone in your household, we recommend that you consult additional resources as needed.

### **Getting Started**

If you're purchasing a residence with an existing well or cistern and are not familiar with private water supplies, here are some points worth noting:

- Before buying a home with a cistern or well, obtain written proof of the safety of the water and specific details on the construction and siting of the water supply (and any treatment system attached).
- Have the water supply tested for bacteria, nitrates, and any other substances as warranted by local conditions. Dug (shallow) wells tend to be more vulnerable to contamination than drilled wells.
- Learn how to properly use and dispose of toxic household and yard chemicals to prevent contamination of your water supply.
- Continue monitoring your water by testing it at least once a year.

### **Managing an Onsite System**

Township sewage enforcement officers assist with determining a suitable location and design for a septic system as well as issuing the permit for the system. A soil scientist conducts a soil evaluation at the site. This test will determine the type of system that will need to be installed.

Scattered throughout our area are thousands of residences that are not served by central sewage treatment systems. At these homesites, sewage treatment becomes a do-it-yourself operation. These homeowners must give consideration to processing and disposing of wastewater right on their property, in other words, "onsite". Some homeowners give little thought to their onsite system or, amazingly, even realize they have one until it malfunctions causing odors, sogginess, potential health hazards, and water pollution. Remember *permits and an approved design are needed before installation of a sand mound or septic tank* on your property. If you have an onsite system, it's important to understand how it works and how to keep it working smoothly in order to add life and save you money by doing regular maintenance.

The most widely used type of onsite system in our region (and in the U.S.) is the septic tank with a soil absorption system. It provides wastewater treatment in two stages. First, wastewater is discharged to a septic tank, a buried watertight tank in which household wastes can settle to the bottom to be decomposed by bacteria into sludge. Lighter materials such as grease float to the top and form scum which is trapped in the tank by baffles.

During the second stage of treatment, the septic tank liquid or effluent discharges to a soil absorption system (also called a drain field or leach field). This system is a network of underground perforated pipes, out the holes, and into the soil which acts as a filter, removing the remaining suspended substances, pollutants, and bacteria.

In our region, the operation of conventional onsite systems frequently is hampered by steep slopes, seasonal high water tables, limited depth to bedrock, and low permeability of soils.

Modifications to conventional systems or alternative onsite systems often provide more effective treatment. Alternative systems in use include sand filters, aerobic systems ("cavitette" units), and mound systems. Both sand filters and mound systems are used in combination with septic tanks. Like conventional systems, alternative systems require careful siting, design, and maintenance to ensure proper functioning.

There are several things you can do to help your onsite system perform well. The following guidelines are most applicable to conventional systems, but in some ways also apply to alternative systems:

- Know the location of your septic tank and soil absorption field. This information is essential for routine maintenance and when digging in your yard.
- Have your septic tank pumped at least every three years to remove the accumulated sludge and scum (called "septage"). Larger households will generally require more frequent septic tank pumping. Also, keep track of when your tank is pumped.
- Don't use septic tank additives or "starters". Chemicals, yeast, bacteria, enzymes, or other products which claim to improve septic tank operation may actually harm the system and contribute to groundwater pollution.
- If your system has a pump or other electrical components, be sure to properly maintain them. Make sure that all electrical components are waterproof. After a power failure, it's important to check that all components are again operating properly.
- Practice water conservation to avoid overworking your system and to extend its life. Some ways of lowering water use include installing flow restrictors in the shower, using low water-use washing machines, toilets and dishwashers, not letting household water run excessively, and quickly repairing leaky faucets and fixtures.
- Divert runoff away from your soil absorption system to avoid saturating the soil. Excess water may cause effluent to rise to the surface causing soggy ground and foul odors. Make sure that water from gutter downspouts and runoff from driveways and other paved areas is directed away from the drain field.
- Don't construct anything over your onsite system. Structures and pavement can compact the soil and prevent it from absorbing, filtering, and evaporating the effluent. They can also hinder routine maintenance or repair of the system.
- Don't park or drive cars over your onsite system. Heavy vehicles can not only compact the soil and reduce its ability to filter effluent but can compress or break underground pipes and they can also make access to the system difficult for pumping, inspection, and repair. Grass or other low-growing plants are the best vegetative cover for an onsite system.
- Be careful about what you flush into the system. Substances that do not readily decompose can clog the system and increase the need for pumping.

- If your onsite system has two alternating drain fields, switch them every 6 to 12 months to allow the resting field to rejuvenate.

- Inspect your system at least once a year. Bright green grass growing over the drain field, especially during the drier months, often indicates that the system is malfunctioning and effluent is rising near the surface. It's also wise to check sludge and scum levels inside the septic tank and make sure the tank's baffles are intact.

By understanding and properly managing your onsite system, you will not only enhance your property and immediate neighborhood but you will also prevent public health hazards and the pollution of groundwater and nearby streams and lakes.

Managing your individual onsite system can begin with a simple awareness of your household habits. Here are a few "do's" and "don'ts" to start practicing right now:

- Do wash only full loads of laundry and spread your laundry chores throughout the week to avoid overloading your onsite system.

- Do use phosphate-free detergent to prolong the useful life of your system.

- Do use good quality toilet paper that breaks up easily when wet.

- DON'T deposit coffee grounds, cooking fats, wet-strength paper towels, disposable diapers, facial tissues, cigarette butts, or similar materials that do not easily decompose.

- DON'T dump grease down the drain. It can build up in the septic tank and plug the inlet.

- DON'T use a garbage disposal unless you're prepared to have your septic tank pumped out at least once a year.





## Making "Garden Gold" (a.k.a. Compost)

For a rich source of mulch, fertilizer, and soil conditioner, try a two bin method for making compost from organic materials. Construct the bins simply by attaching ordinary wires or boards to solid posts. Each bin should be 4 to 6 feet high, 3 to 5 feet wide, and any convenient length. One side of each bin should be removable for convenience in handling the compost material. In late fall, a temporary piece of wire fence may be used to increase the height about 2 feet. After the material settles in spring, this piece of fence can be removed.

Now you can begin composting your leaves, grass clippings, garden stems and stalks, corn husks, fine twigs, and kitchen food wastes (most anything except bones, meat scraps, and milk products). Start by filling one bin with alternating layers of organic matter 6 to 12 inches thick and of garden soil about 1 inch thick. To each layer of organic matter, add one of the following:

- 2/3 cup ground dolomitic limestone,
- 2/3 cup ordinary limestone + 1 tablespoon Epsom salts

Construct at least four or five layers until the compost pile is 4 to 5 feet high. High, well-filled bins heat quickly, effectively killing disease organisms and insects present in the material. When you have finished, pack the material tightly around the edges but only lightly in the center so that the center settles more than the edges and water does not run off.

Allow the compost to decompose for at least three to four months of warm weather before turning it by moving the material from the first bin to the second one. Compost made from leaves in late fall can be turned the following May or June.

The freshly turned compost should now be ready to be used for gardening and landscaping. Apply it generously. Unlike chemical fertilizers, it won't burn the plants or harm the environment. And to top it off, it's free!

## Managing a Pond

A well managed pond can enhance a residential landscape and be a sign of soil and water conservation practices at work. Ponds provide many practical benefits to small property owners including erosion control, fire protection, improved wildlife habitat, and recreational opportunities such as fishing and swimming.

A pond is so attractive, in theory, that it's easy to forget that a pond is a dynamic "system" requiring long-term management. It's been said that from the day a pond is constructed, natural processes begin working to restore the area to its former state. Pond management really is an ongoing process that can make heavy demands on a homeowner's energy, time, and resources.

Two types of ponds are typical of our region: An **embankment** pond is formed by building an embankment or dam across a stream where the stream valley is depressed enough to permit storing at least 6 feet of water. An **excavated** pond is usually built where the water demand is small and is formed simply by digging a pit and placing fill around it. Surface runoff or groundwater maintain the water supply.

Whether you are planning to construct a pond or already have one on your property, there are several factors to consider for success.

- PROPER SITE SELECTION - This all-important factor warrants very careful study. To minimize future problems, choose a location well removed from septic tanks, construction sites, or actively-eroding areas. Avoid sites beneath pipelines, cables or other utilities. Never locate your pond where failure of a dam could cause loss of life or injury to persons or animals or damage to private or public property.

- ADEQUATE SIZE - A pond that is too small may quickly become an eyesore filled with sediment and unwanted aquatic plants. To avoid this problem, your pond should have a minimum surface area of 1/4 acre with 50% of the pond bottom six feet deep or 25% eight feet deep. The area must be large enough to allow construction equipment to work and, in case of an excavated pond, room for disposal of excavated material. The size of the watershed (the area that drains into the pond) is also important. The ratio of watershed to pond area should generally be between 6:1 and 20:1.

- SUITABLE SOIL - Successful ponds require bottom soils capable of holding water. The most satisfactory soils tend to be fine-textured clays or silty clays that extend well below the proposed pond depth.

Coarse-textured sands and gravel or limestone outcroppings usually are poor locations due to cracks or seeps which allow water to escape. The best way to determine the soil's suitability for a pond is by consulting your county's soil survey, then making test borings over the proposed site. Guidance on soils and borings is available through your County Conservation District and Natural Resources Conservation Service (see the "Conservation Directory" in the appendix).

Sites where inadequate soils are encountered during construction or existing ponds with leaks can be sealed with a "clay blanket" or well graded materials containing at least 20% clay. Bentonite, chemical additives, or water proof linings can also act as sealant.

- A SOUND DAM - A well-engineered dam is critical to the success of an embankment pond. Make sure all rocks, stumps, and debris have been cleared from the area before construction. The dam core should be filled with moist, impervious clay soil. Most embankment ponds need both an emergency and principal spillway. The installation of antiseep collars around the spillway pipe will help prevent seeps, dam wetness, and possible failure. Dam design and construction is an important topic extending beyond the scope of this section.

- A GOOD VEGETATIVE COVER - To stabilize the dam and prevent erosion, a good vegetative cover should be established as soon as possible after construction. Grasses like tall fescue will grow quickly. Crownvetch can also be planted on the backslopes of the dam. Avoid planting trees or other woody vegetation on the dam. Extensive root systems can cause seepage paths for water.

- APPROPRIATE SAFETY MEASURES - Several safety precautions are essential if your pond is to be used for recreation. Be sure that all trees, stumps, wire, fences, and rubbish are removed from any areas likely to be used for swimming or wading. Eliminate drop-offs or holes in the swimming area, mark it with a float line, and place warning signs at potential danger points. For rescue operations, place lifesaving equipment such as ring buoys, ropes, planks, or long poles on shore. Similarly, long planks or ladders should be available in ice skating areas. Finally, learn about your state and community laws regarding liability.

The living things which inhabit a pond make each pond unique. Within the pond, animals and plants form an ever-changing system. This intricate and sensitive web of life creates special challenges for the pond manager. To add to the factors previously discussed, a

successful pond should have SUFFICIENT OXYGEN, A WELL-BALANCED FOOD WEB, and SUITABLE VEGETATION.

A sufficient supply of oxygen is vital to the health of a pond. Under extensive winter ice covers, excessive pond vegetation can deplete the available oxygen, stressing fish and other animals. More commonly, oxygen problems occur during the hot, still days of summer when dying masses of algae deplete oxygen as they decompose. Although temperature changes and wind combine to periodically cause a pond's reaeration, various artificial circulation and aeration devices can be introduced to assist the process.



Fishing is no doubt one of the most appealing benefits of owning a pond. Maintaining a well-balanced fish population, however, requires proper stocking and sound management practices. Channel catfish and largemouth bass are among the most desirable fish to stock in our region. Catfish are bottom-feeders foraging on a variety of foods, but adult bass feed almost exclusively on other fish. Bluegill and redear sunfish are good forage species to stock with bass. Your state fisheries biologists can recommend stocking rates and species.

Excessive aquatic plants can cause problems ranging from unsightly appearance to impaired recreational use. Several methods of controlling aquatic vegetation are available: for example, hand-pulling or mechanical harvesting, yield immediate results, but provide only a short-term solution unless plant roots are removed. The introduction of grass carp is a viable long-term control, but requires careful planning because overstocking can cause turbidity, shoreline erosion, and even the complete eradication of vegetation. Aquatic herbicidal chemicals, which can provide prompt relief, have improved in recent years, but, like all herbicides, demand special precautions during application. Many of them also require a post-application waiting period before various pond uses can be resumed.

Because pond management is such a broad subject, we recommend that you consult additional resources on management aspects of special interest.

## Getting Started

So you want to build a pond. Before you get started, do some honest thinking on these facts:

- If you want a crystal clear swimming area, you will be much better off if you build a swimming pool.
- If you are worried about people's safety in or near the water, you should teach them about water safety before you develop a pond.
- The cost of a properly constructed 1/4 acre pond will be at least \$3500.
- To build the minimum sized pond recommended (1/4 acre), you will need a minimum of 1/2 acre of area.
- There are regulations pertaining to embankment ponds. Are you aware of the laws that apply to your pond site?

## Managing a Wooded Home site

Often taken for granted, mature trees give homesites a natural beauty that otherwise might take decades to achieve. A house with trees on the property usually sells for a higher price than one without and tends to move faster on the marketplace.

If you are selecting a site for a new home, consider the size of the lot. One-third of an acre is about the minimum size on which you can build and still have a few trees.

Many builders are seeing the wisdom in keeping mature trees as part of the landscaping around new homes and buildings.

Before building, be sure that the trees you expect to save are clearly marked so the contractor knows you want to keep them.



Build temporary fences so construction equipment will not damage trees or pack soil around their roots. It is also possible to move especially desirable trees from construction sites to other locations on the property. It's best to seek professional advice when considering this.

Cutting into the tree's roots and changing the ground level around a tree are the two most common causes of tree death or damage during construction. If a change in grade is necessary, build a retaining wall at a distance sufficient to save as many of the tree's roots as possible. Roots can extend far beyond the limits of the tree's leaf canopy. A stone well can help keep soil away from the trunk.

Rising land values, expanding highway and utility systems, greater personal income and more widespread enactment of zoning regulations have contributed to single-family home development on small, rural tracts of land within our region. Many homeowners find themselves with the opportunity and challenge of managing 3 to 15 or more acres. Instead of converting it all to grass and spending hours each week mowing, many owners prefer to establish woodlands through planting or natural succession. Re-establishing

trees and shrubs in non-wooded areas can serve several purposes including screening or buffering adjoining properties or land uses.

Effective woodlot management begins by determining your objectives in view of what is most feasible for your land. If much of your home site is already wooded, you may wonder if you should preserve it in its natural state, enhance its use for recreation, or harvest some of the wood. Fortunately, woodlands are adaptable enough to be managed for more than one purpose.

Most small stands can sustain a limited annual cut of firewood, but few can generate enough wood for a timber sale. It's important to remember that as the size of a woodland tract diminishes, so does its ability to yield frequent crops of high-valued, marketable timber. The value of trees varies according to the demand for them and the quality of their wood. When cutting firewood, harvest the most undesirable trees including those that are poorly formed or damaged by insects, fire, or weather.

Growing and selling Christmas trees on tracts as small as one acre is also possible. Their production, however, requires the use of the land for at least eight years. Among the factors to consider when growing Christmas trees are soil suitability, site preparation, pest and weed control, tree pruning, and marketing.

Woodlands and wildlife can be managed compatibly. Some homeowners prefer to manage their woodland tracts for game to develop a private hunting area while others enjoy preserving wildlife to observe. Different management techniques are required for different animals, but you can create desirable habitats for each species if your tract is large enough.

Woodlots are a poor place for livestock because the forage is sparse and of poor quality. Livestock not only trample young trees and injure the larger ones, but compact the soil. This compaction reduces tree growth, increases water runoff during heavy rains, and promotes soil erosion.

Developing hiking trails, picnic areas, and other recreational facilities on your wooded home site should be done very carefully to prevent tree damage and erosion. Locate trails on the contour whenever possible. Install culverts or bridges when necessary and use gravel, wood chips, or other suitable material on the paths.

Proper management practices are essential to protect your woodland from insect damage, undesirable vegetation, and fire.

Trees are subject to attack from many insects. A poorly managed forest of weak trees is usually more susceptible to insect damage than a well managed one. Insects attack by defoliating, boring into the twigs and roots, and by girdling the stems. Some insects also attack the fruit and seeds, reducing the tree's reproductive capacity. Close observation and early control measures can prevent excessive insect damage.

Carefully select and control vegetation as needed. Prolific, obnoxious, non-native competitors such as bush honeysuckle should be eliminated to improve the visibility in the woods and encourage the growth of the more desirable vegetation. It would be impractical to eliminate all of the poison ivy, but you can spot control with a suitable herbicide or mow where a person may come in frequent contact with it.

Prevention is critical to protect your woodland from fire damage. Many trees are lost because of careless trash burning, campfires and smoking. Small woodlots can receive protection by clearing firebreaks at least eight feet wide. Do not burn debris or trash near the edge of a weedy field or woods. Keep a strip of mowed grass around the house, keep a break between home and woods ( i.e. wood piles and shrubs should not connect home to woods). Keep roofs clear of debris like branches and leaves, keep branches away from chimneys, screen chimneys to arrest sparks especially from fireplaces. All entrance roads and driveways should be at least 16 feet wide.

Successfully managing a wooded home site involves a wise investment of labor, time, and money. As with other investments, careful planning and research are needed before you invest your resources. Additional technical assistance can be obtained by contacting your Penn State Cooperative Extension Office or DCNR - Bureau of Forestry.

## **Getting Started**

You will gain the maximum benefit from your wooded home site by determining your land's assets and setting realistic management goals. Here's how to begin:

- Make an inventory of your trees to determine their species, size, condition, and density.

- Mark your property boundaries to avoid the possibility of accidental timber trespass and other management problems. When boundaries are in doubt, a professional survey may be necessary.
- Determine what benefits you want from your woodlands -- natural beauty, recreational opportunities, wildlife enhancement, firewood, timber, etc.
- Develop and implement a plan including necessary thinning, pruning, elimination of unwanted species and fire protection. Consult local resources listed in the "Conservation Directory" in the appendix for technical assistance.
- Resist the urge to mow your woods. A mowed woods may appear more pleasing to some, but the wholesale elimination of understory plants can cause injury to larger, established trees.
- Allow the woodland's natural materials such as leaves and twigs and large branches to decompose and return nutrients to its system.
- Allow dead trees to stand wherever practical. Many species of wildlife depend upon dead and dying trees.

# Ornamental Waterside Plants

## Hardy Perennials

*Acorus calamus* (3-5') Sweet Flag - variegated and dwarf forms, may require containment

*Astilbe* sp. *Astilbe* - attractive compound leaves, featherly "spirea-like" flowers

*Berginia cordifolia* - beautiful foliage, good fall colors, bell-shaped

*Hibiscus moscheutos* (6')- Swamp Rose Mallow - Very large striking flowers

*Hemerocallis* sp - Day Lily - great foliage and flowers, several moisture-loving species

*Hosta* sp. - Plaintain Lily - many species, attractive foliage

*Iris ensata* (kaempferi) - Japanese Iris - large unique flowers, several varieties, prefers drier soil in winter

*Iris fulva* (1.5 - 2') - Red Iris - coppery flowers, graceful foliage

*Iris sibirica* - Siberian Iris - graceful foliage, many varieties

*Iris versicolor* and *Iris virginica* - Blue Flag - delicate blue flowers, common wildflower

*Lobelia cardinalis* - Cardinal Flower - - vibrant red flowers, will not withstand competition, plant in groups

*Lobelia siphilitica* - Blue Cardinal Flower - small blue flowers, nice foliage

*Menyanthes trifoliata* - Bog Bean - trails over water, fascinating flowers

*Myosotis alpestris* - Forget-me-not - clumping habitat, delicate blue flowers

*Polugonum bisorta* 'Superflame' (2') - Snakeweed - pink flower spikes, an improved variety

*Pontederia cordata* - Pickerel Weed - soft blue flowers, also white flowers

*Sagittaria sagittifolia* 'Flore Pleno - superb flowers Arrowhead

*Saururus cernuus* - Lizard's Tail - beautiful, graceful foliage, handsome flower spikes

*Zantedeschia aethiopica* - Arum Lily - dramatic spathe, nice foliage

#### Hardy Ground Covers

*Cornus canadensis* - Bunchberry - requires light shade

#### Tropical and Annuals

*Acorus gramineus* Grassy-leafed Sweet Flag

*Colocasia* sp. Taro and Elephant Ears

*Caladium* sp. Mother-in-law Plant

*Cyperus alternifolius* Umbrella Sedge

*Cyperus isocladius* & *papyrus* Dwarf Papyrus & Papyrus

#### Hardy Ferns

*Adiantum pedatum* - Maidenhair Fern - mulch in winter

*Osmunda cinnamomea* (3') - Cinnamon Fern - cinnamon brown leaves when spores mature

*Osmunda regalis* (4') - Royal Fern - very attractive

*Matteuccia struthiopteris* (5') - Ostrich Fern - tolerant, very invasive

#### Hardy Hedges

*Salix purpurea* - Purple Osier - attractive gray/purple leaves, dwarf and pendulous forms

#### Hardy Shrubs

*Andromeda polifolia* (1') - Bog Rosemary - pink to white flowers in nodding umbels, several varieties

*Cephalanthus occidentalis* - Buttonbush - handsome, striking flower  
(good in wet areas)

*Clethra alnifolia* (8') - Sweet Pepperbush - flowers in erect  
cylindrical clusters up to 6" long

*Kalmia anugustifolia* (3') - Sheep Laurel - bell-shaped flowers in  
bunches, several varieties

*Rhododendron viscosum* - Swamp Azalea - white or pink flowers

### Trees

*Acer rubrum* (120') - Red Maple - numerous interesting varieties

*Acer saccharinum* (130') - Silver Maple - numerous varieties, requires  
judicious pruning - keep away from buildings, at least 75'

*Betula nigra* (100') - River Birch - young trees have beautiful  
exfoliate bark

*Betula papyrifera* (100') - Paper Birch - classic riparian tree, pest &  
disease prone

*Cercis canadensis* (40') - Eastern Redbud - large dark green leaves,  
beautiful spring Flowers

*Fagus sylvatica* (80') - European Beech - many interesting varieties

*Fraxinus americana* (120') - flood plain species - White Ash

*Juniperus Virginian* - Eastern Red Cedar - many attractive varieties

*Larix sp.* (60') - Larch - deciduous conifer, great fall color

*Pinus resinosa* (90') - Red Pine - high water table species

*Pinus strobus* (130') - White Pine - high water table species

*Tsuga canadensis* - Canadia Hemlock - delicate foliage, several  
beautiful varieties

## Reducing Erosion

Erosion occurs when beating rain and moving water dislodge and carry soil particles, organic matter and plant nutrients into waterways. Erosion affects us directly and indirectly. Valuable soil can be lost from your property when it is washed or blown away. Bare, eroded areas not only detract from a home's appearance, but can cause more serious consequences. Erosion along a home's foundation can eventually undermine it. Gullies may form and mud from eroded areas can build up on driveways, sidewalks, and other places.

Eroded soil can cause serious problems by filling roadside ditches, plugging culverts and clogging stream channels, impairing their use for flood control and wildlife habitat. AS TAXPAYERS, WE ALL PAY FOR THE HARMFUL EFFECTS OF EROSION.

Your property's vulnerability to erosion depends on several factors including the soil type, vegetative cover, length and steepness of slopes, and the degree to which the soil has been disturbed. Some evidence of erosion is easily seen, but other signs are more subtle and may be visible only following a rain. Small problems require prompt attention so that they don't become larger problems.

Be alert to these signs of erosion:

- Bare spots anywhere on your property
- Tree roots exposed above ground (except for certain species that grow naturally, such as maples)
- Small stones or rocks appearing on the ground surface
- Small rills or gullies beginning to form
- Build-up of silt in certain areas
- Soil splashed on windows and outside walls
- Soil washout along driveways

Erosion not only occurs on bare soil, but where grass is thin, where leaves have been raked away, where weeds with poor root systems grow, and where water flow prevents vegetation from getting

started. After you've identified your erosion problems, you can tackle them with sound conservation practices.

Because of their high potential for erosion, bare areas should receive your attention first. Select appropriate plants based on sunlight, drainage, soil and maintenance requirements.

The following seed mixture which will cover 1000 square feet is recommended for our region: 5 lbs. turf-type tall fescue and 1 lb. perennial rye and 25 lbs. 12-12-12 fertilizer. Mulch with three bales of straw. You should consult a garden center or landscaping firm for other mixtures that may be applicable to your lawn.

The section titled "Landscaping for Best Results" (page 13) will be helpful in selecting plants for erosion control. Contact your Penn State Cooperative Extension Office, local nursery, or a professional landscaper about other plants that would grow well in your setting. It may be wise to have your soil tested before you begin to plant. After you've prepared and planted bare spots, remember to mulch with straw, bark, or other materials to protect the soil until the new plants are well established.

What about areas that are not totally bare? If suitable plants are already growing there (crownvetch or tall fescue for example), you can quickly increase their coverage simply by fertilizing and liming at the recommended rates. This will stimulate them to cover the entire area. On the other hand, if the existing vegetation consists of summer annuals, briars, or other plants which do not hold the soil well and provide little cover, you may need to eradicate or replace them. However, be sure to follow sound conservation practices.

In deeply shaded areas where plantings may not be successful, a permanent mulch of woodshavings, stone, or other materials may be the best solution (such as a shade tolerant grass and creeping red fescue). There may be other problem areas where vegetation is impossible to establish, for example, in heavy traffic areas along driveways. In such places, gravel or stepping stones may be the best solution.

Most erosion problems occur on sloping ground (which describes much of the land in our region). Slope erosion can be reduced by terracing at horizontal distances that do not exceed 10 feet vertically. If your slope is greater than 45 degrees, it may require a masonry wall, railroad ties, or other durable materials to stabilize it.

## Getting Started

Here are some suggestions for reducing erosion in your yard:

- Inventory your property for problem areas.
- Attack bare spots first by carefully selecting and planting the species best suited. Remember to mulch.
- Increase plant coverage by fertilizing and liming according to directions.
- Check to make sure that drainage patterns don't undermine your erosion control efforts.
- Discourage weeds by mulching then, place stepping stones or gravel where foot traffic is heavy

## Site Preparation For Grass Seeding

**NOTE:** If a deep crawl space or basement is contemplated, the top soil should be removed and stock piled. The next layer of soil is the subsoil which should be separated into a second pile. When grading begins around the home the subsoil should be spread first and then the topsoil graded over the subsoil to provide good material to grow a lawn and for positive drainage away from the home. It is difficult to grow plants in the subsoil material because of its structure, low fertility and low pH.

1. Solve any surface or subsurface drainage problems and construct permanent erosion control structures.
2. Remove all rocks, roots or other materials that may interfere with seedbed preparation.
3. Perform the major filling, shaping and smoothing of gullied or severely eroded areas.
4. Have soil tested to check pH and fertility levels (Soil test kits can be obtained from your local Penn State Cooperative Extension Office). Apply lime to raise pH and add fertilizers to levels required for the type of vegetation being grown (Ten pounds of 10-10-10 fertilizer per 1000 sq. ft will work in most situations).
5. Work the lime and fertilizer into the soil to a depth at 2-3 inches with a small disc, harrow or rake operated across the slope as much

as possible. Note: Lime can take up to six months to begin working effectively. You may need to plan accordingly.

6. Firm the soil seed bed where possible. Do not compact the soil which can restrict water and root penetration into the soil.

7. Review charts for the best plant species to fit conditions.

8. Mulching is simply applying plant residues or other suitable materials to conserve moisture, prevent surface compaction-crusting, reduce runoff and erosion, control weeds and help establish new vegetation. A mulching material that is very common, readily available and least expensive is wheat straw. The straw is spread evenly over the area that has been seeded. Apply three bales per 1000 square feet.

## Recycling at Home

Every day in America over 400,000 tons of garbage are thrown away. That's about 3.5 pounds of trash per day for each man, woman, and child. At least half of that garbage is recyclable, but once we throw it away its value is lost forever.

Recycling is simply using something over and over again. It involves converting garbage into valuable resources. It's easy to do, saves energy, conserves and protects resources, and can even put cash in your pocketbook.

### What can you recycle?

- **Newspaper** is one of the easiest things to recycle, yet every week 500,000 trees are made into newspapers that aren't recycled. A stack of newspapers only 3 feet high contains the amount of wood pulp found in one tree. Recycled newspaper is made into new boxes, newsprint, and tissue paper.

- **Glass containers** (bottles and jars), are crushed into cullet which is used instead of raw materials to make new containers. Using cullet to produce glass saves energy because it allows for lower temperatures to be used to heat the glass furnaces, saving fuel and reducing air emissions. With all these benefits, it's amazing that every two weeks Americans throw away enough glass to fill the twin towers of the World Trade Center in New York!

- **Aluminum products** such as cans, pie plates, pots and pans, and even foil can be recycled into new aluminum products. One reason manufacturers of aluminum encourage recycling and offer buy-back programs is because it takes the same amount of energy to make one can from raw aluminum ore as 20 new cans from recycled ones. While about 50 percent of aluminum cans are recycled, every three months we still throw away enough aluminum to rebuild our entire commercial air fleet.

- **Oil** is a non-renewable resource that can be reprocessed into heating oil, lubricating oil, or used to manufacture other products. Because oil is a hazardous waste, dumping it is illegal. Just one quart of oil can contaminate 2 million gallons of drinking water or cause an oil slick almost 2 acres in size.

- **Other items** that may be recycled include corrugated cardboard, tin cans, office paper, scrap metals, paper grocery bags, appliances, and car batteries.

Recycling at home takes just a little more space than traditional garbage disposal. Many people use a three container method: one for newspapers, one for glass, metal, and plastic products (to be sorted at the recycling center later), and one for trash. The method that works best for you will depend on what items you are recycling and the requirements of your local recycling center. For more information on how to recycle products, call the *PA Recycling Hotline at 1-800-346-4242*.

Requirements for accepting recyclables vary, but here are some of the basics:

- All containers must be rinsed and free of food or other debris.
- Paper labels must be removed from metal cans, although they may remain on glass.
- Metal rings should be removed from glass bottles.
- All glossy inserts must be removed from newspapers.
- Corrugated cardboard should be flattened and bundled.
- Metal cans and plastic milk jugs should be flattened to save space.

With one third of our nation's landfills closing over the next five years, recycling is only one step towards solving the solid waste crisis. Other steps are to reduce the amount of waste we create and reuse materials whenever possible.

How can you reduce and reuse common household materials? Diaper services using cloth diapers are cheaper than disposables and don't deposit raw sewage and plastics in the landfill. Clothing and furniture are welcomed by charitable organizations or can be sold to secondhand shops. Wire hangers can often be returned to dry cleaners and many mailing services will accept Styrofoam peanuts to recycle for packaging. Yard wastes and vegetable scraps can be composted into a rich natural fertilizer (see "Gardening the Natural Way" pg.18 for details).

Exercise your consumer influence by requesting, using, and buying products made from decomposable materials -- paper bags vs.

plastic, paper vs. Styrofoam, reusable vs. disposable. You can help create a demand for recycled products by purchasing them instead of products made from raw materials. Throw away that throw-away habit!

Newspapers are used by farmers for animal bedding and veterinary centers use newspapers for litter purposes. Sticks and branches can be used for brushpiles and chopped for mulch. Add some larger branches on the top of mulch in flowerbeds thus becoming beneficial for amphibians, birds and other wildlife. They also catch blowing leaves which allows for the nutrient value to stay in the flowerbed.