SERIES #5:
MAINTAINING LANDSCAPES

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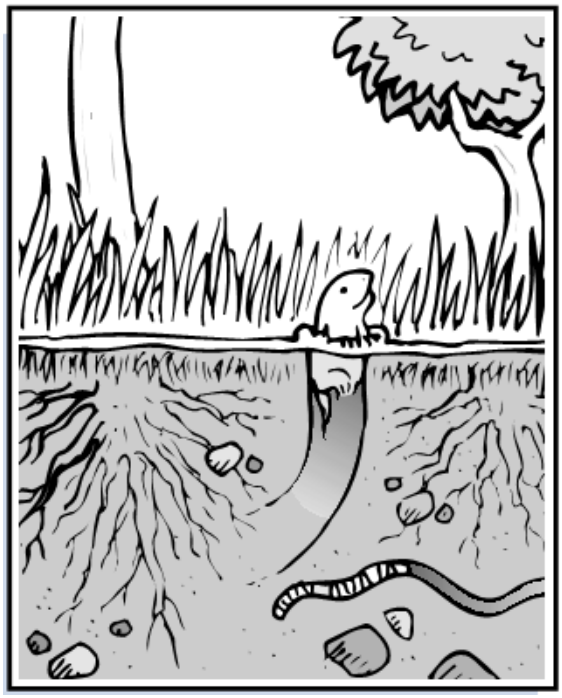
Maintaining Landscapes



Hands In for Healthy Streams is a cooperative effort between the City of Buford and the local business community.

HANDS IN FOR HEALTHY STREAMS

NOTE: This handbook is one in a series of handbooks that describe specific practices businesses can use to protect water quality. A complete list of all handbooks and fact sheets available through the *Hands In for Healthy Streams* program is provided on the back cover. To obtain other handbooks in this series, contact Buford City Hall at the address provided below.

City of Buford
2300 Buford Highway
Buford, GA 30518
www.cityofbuford.com

We hope you'll join with the City of Buford and other area businesses by participating in the *Hands In for Healthy Streams* program. Through this Program, you can help protect our local streams. To participate, review the enclosed Fact Sheets No. 5.1 through 5.4, and then fill out the self-assessment at the back of the Handbook. We appreciate your continued cooperation and stewardship in protection of our water quality.

This Program is modeled on the Community Partners for Clean Streams program created through a US EPA Clean Water Act Grant by the Office of Washtenaw County Drain Commissioner Janis A. Bobrin, Washtenaw County, Michigan. Portions of this Handbook are borrowed from the Community Partners for Clean Streams series, with designs and illustrations developed by David Zinn.

SERIES #5: MAINTAINING LANDSCAPES

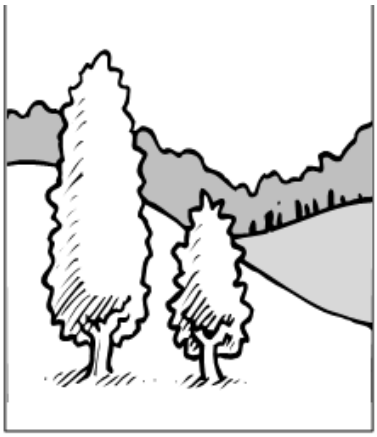
Fact Sheet No. 5.1
Maintaining Healthy Lawns, Shrubs and Trees

Why be concerned?

Landscaping practices affect both the quantity and quality of stormwater runoff. Compacted soils, thatch build-up, and overwatering increase the volume of runoff. Fertilizers and pesticides impair stormwater quality. Good soil preparation and low-maintenance plantings reduce the need for irrigation, fertilizers and pesticides. In addition to protecting water quality, minimizing the use of water and chemicals makes good economic sense.

Gwinnett County UGA Extension has a variety of publications and services available to help develop an environmentally responsible program for any landscape. The Extension Service handles requests every year for information about everything from how to select appropriate plantings to the identification and treatment of specific plant diseases and pests. For more information, call the UGA Cooperative Extension Service for Gwinnett County at (678) 377-4010 or visit:

www.caes.uga.edu/extension



Three Steps to a Strong Soil Foundation

1. Have the pH and fertility of your soil tested by UGA Extension - your soils may not require *any* fertilizer. If, based on soil testing, it's determined that fertilizing is required, follow the recommendations in **Series #5, Fact Sheet 5.2**.

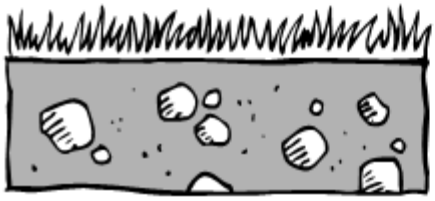
2. Test soil compaction. Compacted soils are unhealthy for plants and can generate as much runoff as pavement. To test for soil compaction, try sinking a screwdriver into the ground. If the screwdriver doesn't penetrate easily, aerate the soil with a hand or mechanical corer. Don't use spike type rollers; these actually make compaction worse. Sometimes, aeration is the only thing that's needed to turn a problem landscape into a thriving one.

3. Examine soil texture and drainage. Neither very sandy nor heavy clay soils provide a good foundation for lawns or other plantings. To examine soil texture, squeeze a hand full of soil into a ball. If the soil falls apart it's too sandy; if the soil holds its shape, it has too much clay. In general, soil with good texture is spongy.

To improve soil texture and drainage, amend soils that have too much sand or clay as follows:

Sandy soils: add compost or other organic matter to hold nutrients and prevent leaching.

Clay soils: add organic matter and sandy loam for coarseness. Don't use sand, since mixing sand with clay will produce a soil similar to concrete.



Water With Care

Overwatering sandy soils can cause nutrients to leach away too quickly. Since heavy soils are easily saturated, overwatering clay soils can cause plants and microorganisms to drown. (Microorganisms both aerate the soil and help to break down thatch.)

Proper watering will depend on a number of factors including soils and current weather patterns. (If soils are healthy, turf grass should only need about 1 1/4" of water a week in warm weather.) In general:

- Adjust timers on automatic sprinkler systems every week or so, depending on the weather.
- Avoid overspray onto sidewalks and parking lots.
- Maintain irrigation systems. This may involve repairing leaks, broken heads, and risers, and adjusting application patterns and rates to minimize runoff.

Non-Toxic Pest Control

Maintaining a healthy landscape will enable plants to resist pests and crowd out weeds. If you must actively control pests, select the least toxic methods available. For more information about controlling weeds and pests, see **Series #5, Fact Sheets 5.3 and 5.4.**

Converting Lawns to Low-Maintenance Plantings

Reduce the need for fertilizers, pesticides, mowing, and watering by replacing turf grass with lower maintenance plantings. Most lawns have areas that aren't suited for growing grass (for example, steep slopes or areas that are very wet or shaded). While it's possible to grow grass in these places, higher water and chemical usage is usually needed to compensate for inhospitable conditions.

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Examine your lawn for opportunites to convert it to other plantings. These can range from expanding flowerbeds and other plantings to using turf *only* to fulfill a particular function, such as active recreation. In areas that must be maintained as lawn, plant grass species that are well adapted to our local climate. If you need assistance identifying the plant species that are best suited for a specific site and purpose, contact UGA Extension.

High Mowing, Deep Roots

High mowing will keep lawns thick and healthy and significantly help to crowd out weeds. Adjust mowers so that only the top one-third of the grass blade is cut and/or leave grass at least 3" high. Shorter grass blades don't produce enough carbohydrates to feed root growth. In well prepared soil, roots extend 4" to 6" deep.)

Recycle Clippings

Clippings left on the lawn provide important moisture and nutrients (clippings can provide up to half the nitrogen needed by your lawn). Since they're about 85% water, clippings quickly break down and *don't* cause thatch.

If your grass grows vigorously, you may need to periodically collect clippings. If they haven't decomposed before the next mowing, remove clippings and recycle them by using them as mulch, adding them to soil or mixing them with compost. As the season progresses and grass growth slows, clippings can again be left on the lawn.

Managing Thatch

Thatch consists of the woody remains of grass roots, stems, and sheaths. Thatch builds up when there aren't enough microorganisms in the soil to break woody grass remains down.

Avoid using insecticides and aerate soil to encourage microorganisms and reduce thatch. If thatch builds up over 1/2", aerate the soil and sprinkle compost or sifted topsoil over the lawn (a practice called top dressing) instead of fertilizing.

"WEED & FEED" COMBINATIONS: A Dangerous Diet

Many lawn care companies routinely combine fertilizers and pesticides in a series of applications throughout the spring, summer and fall. These multi-step programs are promoted as the sure and easy path to a "perfect" lawn. The pressure to have a perfect lawn, however, has clouded a number of issues and literally mixed ingredients that should be kept separate:

Routine insecticide application. Since most insects found on a lawn are beneficial, insecticides should rarely be part of a lawn care program. Research indicates that only about one lawn in 200 will need an insecticide application in a given year. Even on lawns where harmful insects exist, better horticultural practices or other natural controls often can be used to reduce their threat.

Routine herbicide application. Weeds aren't the cause of an unhealthy lawn, they're the *result* of one. The best defense against weeds is a thick healthy lawn that comes from proper soil management, watering, fertilizing and mowing. Routine herbicide applications are unnecessary and their effects can be misleading. For example, herbicide/fertilizer combination products are widely used to kill dandelions in the spring, when the flowers are most noticeable. While the curling weeds seem to indicate that the herbicide has been effective, in fact, it probably killed only the top of the weed, not the roots.

Routine nutrient application. Most commercial fertilizers contain phosphorus, a major water pollutant. Yet many soils already contain enough phosphorus for a healthy lawn. This underscores the need for soil testing before applying fertilizer. Low-phosphorus or phosphorus-free fertilizers can provide necessary nutrients while avoiding the threat to water quality. Both garden stores and commercial applicators can provide them.

Given the amount of damage that lawn care chemicals cause to human health and the environment, changing our aesthetic values is one of the most important things we can do to protect water quality.

Composting

Consider installing a compost facility at your business site. If you're a landscaping contractor, encourage your clients to compost. Be sure to locate your compost area so that it doesn't leach into a stream or storm drain.

If you don't compost on-site, try to take plant waste to a municipal composting facility. For locations, see the numbers listed under "Getting Help."

Maintaining Vehicles and Equipment
Keep vehicles and equipment clean and regularly inspect them for leaks. Leaking pollutants can soak through the soil or wash off with stormwater. For more information about maintaining equipment and vehicles, see **Series #3**.

GETTING HELP

UGA Cooperative Extension Service
for Gwinnett County
(678) 377-4010.

Georgia Department of Agriculture
(404) 656-3685.
….Pesticides Division…….
(404) 656-4958.

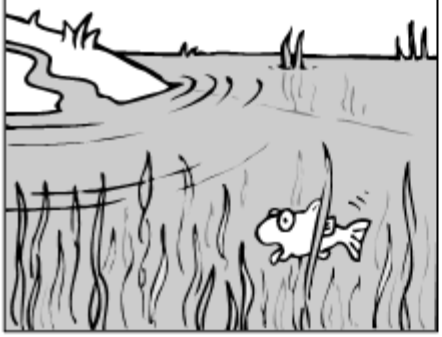
City of Buford, Georgia

Fact Sheet No. 5.2
Using Fertilizer

Why be concerned?

Excess fertilizers can wash into waterways, stimulating nuisance weed and algae growth. Excessive plant growth can choke slow moving waters, and take up oxygen in the water needed by fish and other aquatic life.

Most commercial fertilizers contain phosphorus, a major water pollutant. High phosphorus levels can stimulate nuisance weed and algae growth.



Soil Testing: The 1st Step

Before applying fertilizer, have your soil tested, such as by Gwinnett County UGA Extension. An Extension agent can then tell you the exact types and amounts of fertilizer your soil will need to support the desired use. Depending on the plantings and use desired, your soil may not require any fertilizer.

Choosing the Right Fertilizer

In general, nitrogen promotes leafy top growth, phosphorus promotes root growth and potassium improves overall plant durability.

In addition, slow-release fertilizers provide plants with a lower concentration of nutrients released over a longer period of time. Fast-release fertilizers do the opposite.

- Use slow-release fertilizers on sandy soils, to ensure that concentrated amounts of nutrients aren't available for leaching.

- Use fast-release fertilizers on heavy, clay or compacted soils - the longer a fertilizer granule remains undissolved, the greater its chances of being washed into waterways.

If a slow-release fertilizer is required, consider using an organic fertilizer such as manure or bone meal. Compared to synthetic fertilizers, most organic fertilizers contain relatively small concentrations of nutrients and release these nutrients more slowly. If manure is applied in hot weather, till it well into the soil to avoid ammonia volatilization.

*Since phosphorus is a pollutant of concern, avoid the use of phosphorus unless it's **specifically** recommended based on soil testing.*

Fertilizing Lawns

Lawn fertilizing programs should begin in early October, rather than in Spring. Spring applications can actually harm lawns by promoting more top growth than root growth. Shallow root systems do not sustain lawns through a drought or harsh winter. Fall fertilizing promotes deep, healthy root systems and hardy lawns.

By leaving clippings on the lawn, nitrogen applications can be reduced by up to 50%. Contrary to popular belief, grass clippings *don't* cause thatch. Thatch is the woody remains of grass (roots, stems, and sheaths), which can build-up due to compacted soils and improper insecticide use.

Fertilizing Shrubs and Trees

Healthy trees and shrub do not require annual fertilizing. If woody plants appear unhealthy, it may be due to poor soils, insects, disease or current weather patterns. Fertilizers should be applied only when a tree or shrub does not thrive and the problem can't be traced to other causes. For help diagnosing problems before applying fertilizer, contact UGA Extension.

If trees or shrubs do require fertilizer, apply it when the plants are dormant, in late fall or early spring. Fertilizing in *early* fall or *late* spring stimulates growth that depletes stored food supplies and weakens the plants ability to survive harsh winters and summers.

Applying Fertilizers

When applying fertilizers, follow the label directions *exactly* and keep fertilizers off paved areas. If you use a liquid fertilizer, be careful to avoid overspraying and drift. The fertilizer may land on an area that drains straight into a storm drain or stream.

Combining Fertilizers and Pesticides

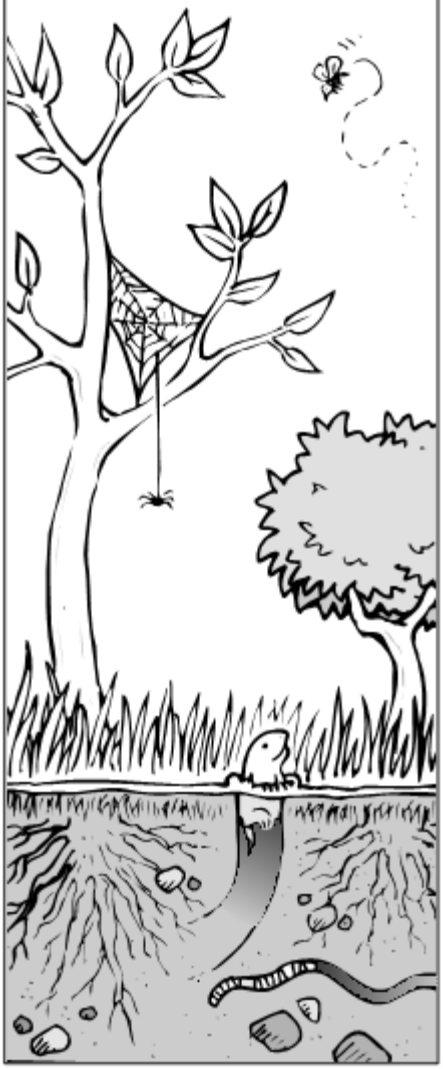
Using fertilizer-pesticide mixes usually leads to unnecessary pesticide applications. For more information about using fertilizer-pesticide combinations, see **Series #5, Fact Sheet 5.1.**

SERIES #5: MAINTAINING LANDSCAPES

Fact Sheet No. 5.3
Integrated Pest Management

Why be concerned?

Synthetic pesticides are poisonous substances. Many of them are harmful to plants, animals and people. Many commonly used pesticides are carcinogenic and/or neurotoxins.) Integrated Pest Management (IPM) is an approach that minimizes the use of chemical pest control, providing a safer, less expensive and more consistent eradication of any pest over the long term.



What is Integrated Pest Management?

Since pests are an integral part of the natural system, IPM works to keep them at tolerable levels by using cultural, mechanical and biological controls instead of chemical ones, whenever possible. IPM practitioners closely monitor the landscape and manage it to provide optimum growing conditions, since healthy plants are less susceptible to pests. This includes the elimination of conditions favorable to pests and promotion of natural controls such as beneficial insects.

If additional pest controls are needed, the pest and its stage of development are identified, and the least toxic control possible is used.

Pesticides should be used only as a last resort and only in a way that maximizes their effectiveness and minimizes damage to the environment.

Choosing Plants

Select plants that naturally tend to be free of major pests and diseases, and are well-adapted to our temperate climate and to the specific soil, light and moisture conditions on-site. For example, plants that require shade are more susceptible to pests when grown in full sun. pH levels also affect a plant's ability to withstand pests.

For help identifying the plant best suited for your purposes and site, contact UGA Extension.

Keeping Plants Healthy

Weeds, pests and plant diseases are usually the *result* of poor growing conditions, not the cause of them. To keep plants healthy, use established horticultural techniques. Maintaining good soils and other growing conditions are the foundation of any IPM program. The following steps are suggested:

- Plant seeds and plants when they are the least susceptible to stress.
- Maintain a variety of plants instead of only one or two species.
- Aerate and add organic matter to the soil.
- Water and fertilize plants only as needed.
- Mow grass as high as possible (2.5" - 4") and leave clippings on the lawn.
- Space, thin and prune shrubs and trees to promote air circulation.

Promoting air circulation is the first and most important thing that can be done to manage plant disease.

Observing Your Landscape

Monitor the site at regular intervals. Learn to identify pests and diseases, as well as beneficial insects. Learn about the development stages of pests and what they need to survive. This way, you can time control actions so that they take place during the most vulnerable stage of weed, insect or disease development.

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Defining "Damage"

Decide when a pest problem is serious enough to justify taking action. For example, broadening your definition of "lawn" to include certain "weeds" can reduce the need for chemical herbicides. Changing our aesthetic values is one of the most important things we can do to protect water quality.

Protecting Sensitive Areas

If a site is near a water body, a dry pond or drainage ditch, vegetable garden, children's play area, or public place, select a pest management technique that minimizes harm to these sensitive areas.

Evaluating Your Actions

Notice whether the treatment you selected worked and consider adjustments that might work better. Keep records of your observations, actions taken, and the results of those actions.

The Secrets of Chemical-Free Pest Control

When treatment becomes necessary, select methods that are least disruptive to natural pest controls and least hazardous to human health and the environment. Start with cultural, mechanical or biological controls.

Cultural Controls

Cultural controls are practices that will keep plants healthy by selecting disease and pest resistant varieties and maintaining a good soil foundation. Redesigning the landscape so that it can't support the pest can be the most cost-effective long-term cultural control strategy. For more information about maintaining a healthy landscape, see **Series #5, Fact Sheet 5.1**.

Mechanical Controls

Mechanical controls include:

- removing insect eggs, larvae, cocoons, and adults from plants by hand
- removing pest-infested plant residue in the fall.
- covering the garden with landscape fabric or mulch to prevent weed germination.

Biological Controls

Many organisms feed on or infect pests. These natural enemies frequently prevent the pest population from reaching damaging levels. Biological controls include predators, parasites, pathogens, pheromones, and juvenile hormones. For more information about these and other chemical-free control techniques, contact UGA Extension.

Chemical Pesticides: a Last Resort

Chemicals are just one small part of the IPM plan. If pesticides are used, the least toxic one should be chosen and applied at the most effective time in the pest's life cycle. For more information about using pesticides, see **Series #5, Fact Sheet 5.4**.

Fact Sheet No. 5.4
Using Pesticides

Why be concerned?

Pesticides can harm people and pets, kill helpful organisms (such as bees, earthworms, and a pest's natural enemies), and pollute ground and surface waters. The potential harm from pesticides depends on many factors such as how persistent the pesticide is, whether it affects a few or many species, and whether it accumulates in living tissue.

The risks of using a pesticide are greatest when the label directions aren't followed *precisely;* not following the directions is against federal law. It's also illegal to apply pesticides for hire on someone else's property without a commercial applicator's license from the Georgia Department of Agriculture, Pesticide Division.

Choosing Pesticides

The fact that a pesticide is labeled "natural," "organic" or "biodegradable" doesn't guarantee that it's safe. For example, pesticides derived from plants such as *rotenone, nicotin, ryania, pyrethrum,* and *sabadilla* may not be any safer than many synthetic pesticides.

Carefully read product labels for information about the pesticide's toxicity and persistence. A pesticide's persistence is the length of time it takes to break down to one-half it's previous concentration (also called half-life). In general, avoid pesticides with half-lives longer than 21 days. For more specific information about choosing the least toxic pesticide, contact one of the agencies listed under "Getting Help."

Developing a Pesticide Plan

For each landscape that your business is responsible for maintaining, develop a pesticide plan that lists:

- specific uses for selected pesticides;
- brands, formulations, application methods and quantities to be used;
- equipment use and maintenance procedures;
- safety, storage and disposal methods, and;
- monitoring, record-keeping, and public notice procedures.

Establish procedures for reviewing pesticide plans annually. Be sure to evaluate the effectiveness of all treatments used, public concerns, effects on sensitive areas, and any recent toxicological information.

Mixing and Applying Pesticides

- Schedule applications to take place during the most vulnerable stage in the pest's life cycle and when least disruptive to naturally existing pest controls.
- Always wear protective clothing when handling pesticides.
- Know what to do if spills occur and take steps to prevent them. Close containers tightly after each use, even if you plan to reopen them soon. Be sure to have adequate clean-up materials readily available. For more information about spill prevention and clean-up, see **Series #1, Fact Sheet 1.2**.
- Mix pesticides where spills won't be able to soak into the ground or enter a storm drain or stream. When using large tank sprayers, mix only the amount needed at the job site.
- Follow the label directions *exactly.* Never use rough estimates when mixing or applying pesticides. Never mix different pesticides unless explicitly instructed to do so on the product label.
- Calibrate application equipment frequently and be aware of weather conditions that can cause wind drift. Use application equipment that can be shut off immediately in an emergency.
- Apply pesticides to the problem areas *only.*
- After each application is made, evaluate its effectiveness.

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Cleaning Containers

Immediately triple rinse or power rinse empty containers in the field, at the time of application. UGA Extension recommends triple-rinsing, using the following steps:

1. Allow the concentrate to drain from the empty pesticide container for 30 seconds.

2. Fill 20% of the emptied container with water, replace the lid and shake the container so that all interior surfaces are rinsed.

3. Drain the rinse water into the spray tank, allowing it to drain for at least 30 seconds.

4. Repeat steps #2 and #3 two more times for the pesticide.

5. Use the rinse water (or "rinseate") according to label directions.

Unlike triple rinsing, pressure rinsing requires the use of a special nozzle. Studies indicate that pressure-rinsing may be up to three times more effective than triple-rinsing and can take less time. To pressure-rinse, wear protective clothing (especially gloves and goggles) and follow these steps:

1. Allow the residue or concentrate to drain from the empty pesticide container for 30 seconds.

2. Push the pointed pressure-rinse nozzle through the pesticide container while holding it over the spray tank.

3. Pressure-rinse the container for 30 seconds, allowing the rinse water to drain into the spray tank.

4. Triple-rinse the container cap with a slower flow of water, capturing the rinse water in the spray tank or appropriate receptacle.

Disposing of Empty Containers

Be sure to dispose of containers in accordance with label directions and federal, state and local laws. If empty pesticide containers can't be refilled, reconditioned, recycled or returned to the manufacturer, crush, break or puncture them so that they can't be reused.

Clean and Leak-Free Equipment

- Keeping application equipment free of leaks will prevent pesticides and other fluids from being deposited onto the ground.

- Clean equipment immediately after use - don't leave equipment that contains pesticide residue at the mixing, loading or application site. You can reduce equipment cleaning by clustering jobs that use the same spray solution.

- Don't allow rinse water to flow into water systems, including storm drains, ditches, wells, and streams. Collect rinse water and apply it to a compatible site at or below the labeled rate. Don't add rinse water to a pesticide mix if it could be incompatible with the mix or if it contains a cleaning agent that could harm plants and animals.

For more information about properly cleaning and maintaining equipment, see **Series #3** or call one of the agencies listed under "Getting Help."

Storing Pesticides

- Before buying pesticides, calculate how much you need and purchase only that amount.

- Mark the date of puchase on each container so that older materials can be used first.

- Locate storage areas at least 150 feet from any drinking water well and at least 200 feet from any area that holds water, even intermittently, such as a drainage ditch or dry detention pond.

- Store pesticides indoors, in areas designed to *completely* contain leaks and spills. Clearly mark pesticide storage areas with warning signs. For more information about properly designing storage areas, see **Series #1, Fact Sheet 1.1**.

GETTING HELP

UGA Cooperative Extension Service for Gwinnett County: (678) 377-4010.
Georgia Department of Agriculture: (404) 656-3685.
…..Pesticides Division: (404) 656-4958.

This concludes Fact Sheets 5.1, 5.2, 5.3, and 5.4 of the Housekeeping Practices series. To create your own Water Quality Action Plan, please complete the Water Quality Assessment provided on the following page.

SERIES #5 Assessment

The following Assessment and Action Plan asks you to evaluate your current activities and identify any specific actions needed to prevent pollution. For each question, check the appropriate box in the Assessment column. Next, in the corresponding box in the Action Plan column, fill in the proposed *date* by which the activity will be completed. Thank you for your good faith commitment to water quality.

Series #5, Housekeeping Practices: Maintaining Landscapes	ASSESSMENT			ACTION PLAN	
	Not Applicable	Needs Improvement	Always	Plan to Improve	Plan to Continue
1. Zones of mixed, undisturbed vegetation (at least 10' wide minimum) are maintained along all water bodies.					
2. When choosing plant materials, the lowest maintenance (including most disease- and pest-resistant) species are selected.					
3. Soils are amended and aerated whenever necessary (to reduce the need for landscape chemicals).					
4. Soils are tested before applying fertilizer to determine the most appropriate type/formulation.					
5. Fertilizers are applied only when, and in the amounts, required (according to soil test and plant requirements).					
6. Lawn mowing heights are set as high as possible and clippings are left on the lawn.					
7. Irrigation systems are regularly monitored, adjusted, and maintained to ensure proper watering.					
8. Chemical-free methods are used to control weeds and lawn and garden pests whenever possible.					
9. When pesticides must be used, they're applied only where needed, when target pests are most vulnerable, and when least disruptive to natural controls.					
10. When purchasing pesticides, the least toxic and least persistent product is selected.					
11. Comprehensive records are kept of all pesticide applications.					
12. Label directions are strictly followed (e.g. estimates are never used) when mixing, applying, and disposing of pesticides.					
13. Empty pesticide containers are triple- or pressure- rinsed and the rinse water is managed according to label directions.					
14. Landscaping wastes are composted.					