Practical lawn care for western Oregon

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Maintaining an attractive lawn that is both functional and beneficial to the urban environment is easier than you might think. Lawns are a valuable way to conserve soil, reduce runoff, improve air quality, help purify water, reduce urban heat loads, and sequester atmospheric carbon. Turfgrasses also provide green space for recreation in the form of parks and athletic fields, and are a calming influence in urban environments (Figure 1).

This publication provides recommendations for maintaining an aesthetically pleasing and functional lawn while reducing the environmental impact of lawn-care practices. It also discusses:

- Appropriate places for lawns
- Realistic expectations for lawn performance
- Selecting grasses for conventional lawns and development of a climax lawn
- Alternatives to conventional lawns
- Cultural practices needed to maintain lawns.

Figure 1. Grass provides an aesthetically pleasing surface that is both functional and recreational.

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Why lawns sometimes struggle

Figure 2. Lawns that are located in hard-to-maintain areas can struggle. For example, lawns located within the interior of tree groups (above left) may not get enough light. Lawns that are full of obstacles (above right) will be difficult to maintain, as will lawns planted in isolated areas or steep slopes (lower right).

Appropriate places for lawns

Lawns can bring form and function to many urban landscapes. However, turfgrass is not the answer to every landscape design problem, and should not be located in hard-to-maintain areas such as steep slopes, areas with abundant obstacles (light poles, utility fixtures, and street signs), or extremely narrow parking strips where fertilizer and irrigation are likely to spill onto city streets (Figure 2). Although some grasses are shade tolerant, most grasses struggle in the deep shade of buildings or the interior of tree groupings. Turfgrass thrives when exposed to 8 hours or more of daily sunlight. Lawns will not perform well on compacted soils that limit root development or impede water movement.

Realistic expectations for lawns

A strip of turf along a high-speed road does not need the same level of care as a golf course putting green. When developing a maintenance plan for your lawn, decide what areas matter the most and require higher inputs, and what areas can be maintained acceptably with lower inputs. For example, you may decide a front lawn is a high priority and requires supplemental irrigation to keep it healthy and functional throughout the summer months, while a peripheral area, like a side yard, is less important and doesn't need to be irrigated during the summer. The following table provides maintenance recommendations for high-, medium-, and low-maintenance lawns (Table 1, page 3).

Table 1. High-, medium-, and low-input lawn maintenance calendar

High-input lawns

	Notes	J	F	M	A	M	J	J	A	S	O	N	D
Mowing	Increase frequency with increased growth												
Fertilization	*4–6 lb N/1,000 ft²/yr. April application may not be needed. Utilize slow-release materials.												
Irrigation	Monitoring will indicate when needed at start of season												
Core aeration	Relieves compaction and improves percolation; can combine with overseeding												
Overseeding	Prevents weed encroachment in bare areas.												
De-thatching	Only if > 3/4″ layer												

Medium-input lawns

	Notes	J	F	M	A	M	J	J	A	S	O	N	D
Mowing	Increase frequency with increased growth.												
Fertilization	*2–3 lb N/1,000 ft²/yr.												
Irrigation	Monitoring will indicate when needed at start of season												
Core aeration	Relieves compaction and improves percolation; can combine with overseeding												
Overseeding	Prevents weed encroachment in bare areas.												
De-thatching	Only if > 3/4″ layer.												

Low-input lawns

	Notes	J	F	M	A	M	J	J	A	S	O	N	D
Mowing	Less water = less mowing												
Fertilization	*1–2 lb N/1,000 ft²/yr.												
Irrigation	Monthly during period of peak drought stress												
Core aeration	Every 2–3 years will improve percolation												
Overseeding	Prevents weed encroachment in bare areas												

*Grass cycling ads up to 2 lbs N/1000 ft2/yr.

Selecting grasses for conventional lawns and development of climax lawns

Lawns in western Oregon transition from planted grasses to a climax community of plants that includes the planted grasses, naturalized grasses, and various broadleaf plants that tolerate regular mowing. The species composition of a climax lawn is ultimately affected by the naturalized species present in the soil seed bank and the level of maintenance the lawn receives.

The most commonly planted grasses for western Oregon are mixtures of perennial ryegrass, fine fescue, and Kentucky bluegrass, with each of these grasses providing a different benefit. Perennial ryegrass provides rapid germination and establishment, while fine fescue is adapted to partial shade and drought conditions. Kentucky bluegrass, meanwhile, stabilizes the soil and recovers from traffic with its rhizomatous growth habit.

Figures 3a and 3b. Lawns are typically planted with blends of three or more ryegrass cultivars (3b) and then quickly evolve (3a) into mixed stands of perennial ryegrass as naturalized species like annual bluegrass and creeping bentgrass become blended in.

After establishment, lawns that receive regular mowing, as well as high levels of fertilization and irrigation, often transition to stands dominated by annual bluegrass and rough bluegrass, and remnants of the planted grasses (Figures 3a, 3b). In these lawns, broadleaf plants typically do not make up a significant portion of the lawn. Low-input lawns that receive little or no irrigation and little to no fertilization will likely be populated by bentgrasses (dryland bentgrass, colonial bentgrass, or creeping bentgrass), tall fescue, velvetgrass, and fine fescues. Rat-tail fescue, a winter annual that will turn brown in summer, often becomes a dominant component in lawns without irrigation. Broadleaf plants will be more competitive in these lawns and include false dandelion, common dandelion, common yarrow, English daisy, and mousear chickweed.

Table 2 on page 5 is a compilation of commonly planted turfgrass species, naturalized grasses, and broadleaf plants, and the respective environmental conditions in which they thrive.

Figures 4a and 4b. Eco-lawns containing mixtures of perennial ryegrass, micro-clover, and yarrow will provide green cover year round with minimal irrigation.

Alternatives to conventional lawns

Eco-lawns consist of turfgrass mixed with select broadleaf plants offering a diverse species composition that is friendly to pollinators and capable of supplying its own nitrogen requirements. Additionally, eco-lawns can be maintained with less mowing and irrigation (Figures 4a, 4b). Typical maintenance for eco-lawn mixtures containing perennial ryegrass, micro-clover and yarrow includes 1 to 2 cuttings a month at 2.5 to 3 inches, irrigation once a month during June, July and August, and no fertilization. During drought conditions, the turf in these mixtures stops growing and turns off-color, or even straw brown, while the clover and yarrow remain green, resulting in a lawn with an overall green appearance (Figure 5).

Cultural practices

The primary cultural practices essential to successful turfgrass management are mowing, fertilizing, and irrigating, with mowing being the most important and taking up the majority of your time. Irrigation is necessary if you desire green grass in the summer, and periodic fertilization will be needed to

Figure 5. During periods of drought and heat stress in western Oregon, lawns established with a mixture of turf and selected broadleafs, like micro-clover and yarrow (top half of photo) will maintain their green color while lawns with only ryegrass will turn brown.

Table 2. Planted grasses, naturalized grasses, and common weeds for western Oregon

Common name	*Scientific name*	*Environmental conditions*
Commonly planted grasses of western Oregon		
Perennial ryegrass	*Lolium perenne*	High fertility, water, and sunlight
Kentucky bluegrass	*Poa pratensis*	High fertility, water, and sunlight
Red fescue	*Festuca rubra ssp. rubra*	Low fertility, drought and shade tolerant
Chewings fescue	*Festuca rubra ssp. Commutata*	Low fertility, drought and shade tolerant
Hard fescue	*Festuca trachyphylla*	Low fertility, drought and shade tolerant
Tall fescue	*Lolium arundinaceum*	Low fertility, drought tolerant, full sun
Annual ryegrass	*Lolium multiflorum*	Junk grass included in cheap seed mixes. Does not persist
Common naturalized grasses of western Oregon		
Annual bluegrass	*Poa annua*	High fertility and frequent irrigation
Roughstalk bluegrass	*Poa trivialis*	High or low fertility, shade tolerant, strong winter grower
Dryland bentgrass	*Agrostis castellana*	Low fertility, drought tolerant
Creeping bentgrass	*Agrostis stolonifera*	Tolerates wet and dry soils and low fertility
Orchardgrass	*Dactylis glomerata*	Fairly rare
Velvetgrass	*Holcus lanatus*	Low fertility, wet and dry soils
Rattail fescue	*Vulpia myuros*	Low fertility, winter annual
Common broadleaf species found in western Oregon lawns		
False dandelion	*Hypochaeris radicata*	Low fertility, drought tolerant
Common dandelion	*Taraxacum officinale*	Low fertility, drought tolerant
White clover	*Trifolium repens*	Low fertility, drought tolerant, clay and silt
Subterranean clover	*Trifolium subterraneum*	Winter annual
English daisy	*Bellis perennis*	Low fertility, wet or dry sites
Black medic	*Medicago lupulina*	Drought tolerant, short lived in dry sites
Mousear chickweed	*Cerastium vulgaris*	Wet or dry soils ?
Heal-all	*Prunella vulgaris*	Wet or dry soils ?
Common yarrow	*Achillea millefolium*	Drought tolerant
Ladies bedstraw	*Gallium verum*	Drought tolerant

Figure 6. The primary cultural practices are mowing, fertilization and irrigation, which means more time and money should be spent on these practices than the other cultural practices.

maintain turf at high standards. Secondary cultural practices include core aeration and overseeding (Figure 6).

Mowing

Regular mowing stimulates lateral shoot growth, increases density, and minimizes weed encroachment. The general rule is to never remove more than one third of the leaf blade at any one time. For instance, if you are maintaining your lawn at 2 inches, you should mow it before it gets longer than 3 inches (Figure 7). This is designed to prevent scalping, which causes a brown appearance, stops growth and development, depletes carbohydrate reserves, and makes the turf more susceptible to environmental stresses. Maintaining your lawn using the one-third rule translates to weekly mowing at a minimum during periods of peak growing conditions. During the winter months, an occasional mowing may be helpful to keep turf upright and help in removing debris.

The optimal height of cut for common grasses of the Willamette Valley will vary from 1 inch for the bentgrasses to 3 to 4 inches for tall fescue. Fine fescue, perennial ryegrass, annual bluegrass, and rough bluegrass will all do well mowed at 2 to 3 inches (Table 3, page 7).

With these mowing height recommendations in mind, most 21-inch rotary mowers can be set between 1.5 to 3.5 inches. Riding mowers typically can't be set lower than 2 inches and can be set as high as 5 inches. Rotary mowers set at low heights are prone to scalping on undulated, uneven, or rutted surfaces. Push reel mowers are good for shorter heights of 0.75 to 2 inches, but lose their effectiveness when grass is longer than 2 inches (Figure 8). Push reel mowers are environmentally

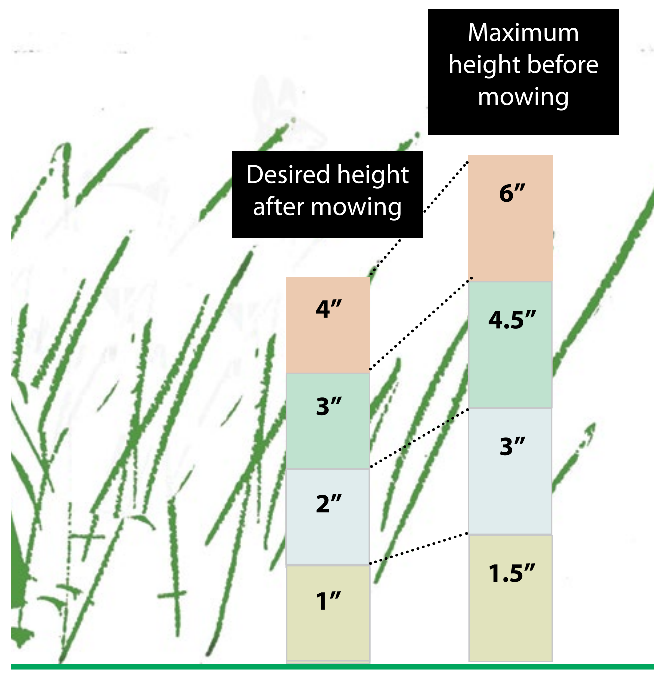

Figure 7

Figure 8: Rotary mowers (above left), while durable, typically cannot be set to a height below 1 inch. Push reel mowers (above right) typically cannot be set higher than 2 inches.

Table 3. Recommended mowing height for cool season grasses		
Turfgrass	**Species**	**Maximum mowing height**
Tall fescue	*Festuca arundinacea*	3″–4″
Creeping red fescue	*F. rubra ssp. rubra*	2.5″–3″
Chewings fescue	*F. rubra ssp. Commutate*	2.5″–3″
Kentucky bluegrass	*Poa pratensis*	2.5″
Perennial ryegrass	*Lolium perenne*	2″
Roughstalk bluegrass	*Poa triviallis*	1″–1.5″
Annual bluegrass	*Poa annua*	1″
Highland bentgrass	*Agrostis castellana*	1″
Colonial bentgrass	*Agrostis capillaris*	1″
Creeping bentgrass	*Agrostis palustris*	1″

friendly and an excellent way to return grass clippings as long as you are mowing frequently. Rotary mowers effectively manage leaves and debris, and also are good for mowing in wet conditions or periods of heavy growth when excessive clippings are produced. Other options for lawn mowers include corded, rechargeable, and solar-powered electric mowers.

Fertilization

Lawns with adequate levels of fertility will grow vigorously, out-compete most weeds, and better resist disease, insect damage, and adverse environmental conditions. The amount and timing of fertilization will depend on your desired turf quality, the type of fertilizer used, the dominant type of turfgrass you have in your lawn, and whether you return clippings.

Newly planted lawns will generally require more fertilizer than older, well-established lawns. A newly planted perennial ryegrass lawn often calls for 4 to 6 pounds of actual nitrogen per 1,000 square feet of lawn annually, while a 10-year-old climax bentgrass lawn will do fine with only a pound or less of actual nitrogen per 1,000 square feet of lawn annually as long as clippings are returned.

The goal for a fertilization program should be to apply the least amount of fertilizer needed to produce healthy turf while meeting the aesthetic and functional standards for the area. Typically, recommendations range from 1 to 5 pounds of actual nitrogen per 1,000 square feet of lawn annually. If clippings are returned, they will reduce the amount of fertility your lawn requires by providing as much as 2 pounds of actual nitrogen per 1,000 square feet of lawn annually.

The three primary nutrients necessary to sustain growth of turf, just like any other plant, are nitrogen (N), phosphorus (P), and potassium (K). The front of a fertilizer bag will display the product's concentrations of (N-P-K). Nitrogen is the element needed the most by turfgrass for growth and is at the center of most fertilization programs. While P and K are essential nutrients, lawns require much less to sustain adequate plant health and growth.

For instance, turfgrass can tolerate P levels as low as 10 parts per million (ppm) once established, suggesting that most soils have sufficient levels to support turfgrass growth. The environmental fate of P has recently become a concern because the addition of this nutrient to ponds and lakes results in accelerated eutrophication, a process that stimulates algae growth, depletes the water of oxygen, and ultimately suffocates the living organisms in the water system.

When shopping for a lawn fertilizer, consider a complete fertilizer with high concentrations of N, and very low levels of P and K. If you choose to apply a fertilizer without P, have a basic soil test done every 3 to 5 years to determine if a deficiency has developed. A basic soil test will also determine your pH and subsequent lime requirements.

Grass-cycling or mulch mowing (return of clippings) is an excellent way to return N and other nutrients to your lawn, and does little to contribute

Figure 9. The double blade pattern of a mulching mower is designed to thoroughly mulch grass clippings.

to thatch build-up (Figure 9). Clippings contain roughly 3 percent N, 0.4 percent P and 1.88 percent K by dry weight. This could return up to 2 pounds of actual nitrogen per 1,000 square feet of lawn annually, a considerable amount when typical recommendations suggest 2 to 5 pounds of actual nitrogen per 1,000 square feet of lawn annually. If you choose to bag clippings, and they are free of herbicide residues, use them in your compost pile, mixing the green clippings with brown materials (dried tree leaves or wood chips) at a 2:1 ratio.

When choosing between an organic or synthetic fertilizer program, it is important to remember that there are advantages and disadvantages to each. Synthetic fertilizers primarily contain the macronutrients (N, P, and K) at concentrated levels, which are easily converted to plant-available forms and provide a predictable release. These products are also available in slow-release formulations that utilize sulfur or polymer coating to control the release of nutrients.

Organic fertilizers contain macronutrients at relatively low concentrations (Figure 10), as well as many micronutrients, but are dependent on microbial activity for decomposition, resulting in a slow and sometimes unpredictable release. Because of this, newly established organic fertilization programs may experience a lag in nitrogen response with some of the applied N carrying over to the following growing season. Formulations of organic N mixed with quickly available synthetic N provide a portion of immediately available N along with the slower

Figure 10. The amount of product needed to supply 1 pound of actual nitrogen (N) for both organic (right) and synthetic (left) fertilizers.

release characteristics from the organic portion and may be a good product to use if transitioning to organic fertilizers.

For detailed information on nitrogen sources, fertilizer timing, and application rates, and tips on avoiding fertilizer pollution, please refer to *Fertilizing Lawns* (EC 1278) in the Oregon State University Extension Catalog (http://extension.oregonstate.edu/catalog/).

Irrigation

Irrigation practices also can range substantially according to your maintenance standards. High maintenance lawns will require supplemental irrigation applied regularly during the summer. Depending on the year and the standards you have set for your lawn, irrigation will be needed from mid-May to early September. Cool nights, shorter days, and the impending seasonal rains of the western Oregon climate make post-Labor Day irrigation only necessary in the driest years.

Low-maintenance lawns can survive the summer without irrigation, but they will enter a period of summer dormancy and turn straw brown. Unirrigated, dormant lawns will not stand up as well to wear and are susceptible to weed invasion. These dormant lawns will begin growing again in the fall when the rainy season returns. An early September soaking in advance of the fall rains will help dormant lawns get a jump on recovery, and will make fall coring or overseeding projects more effective.

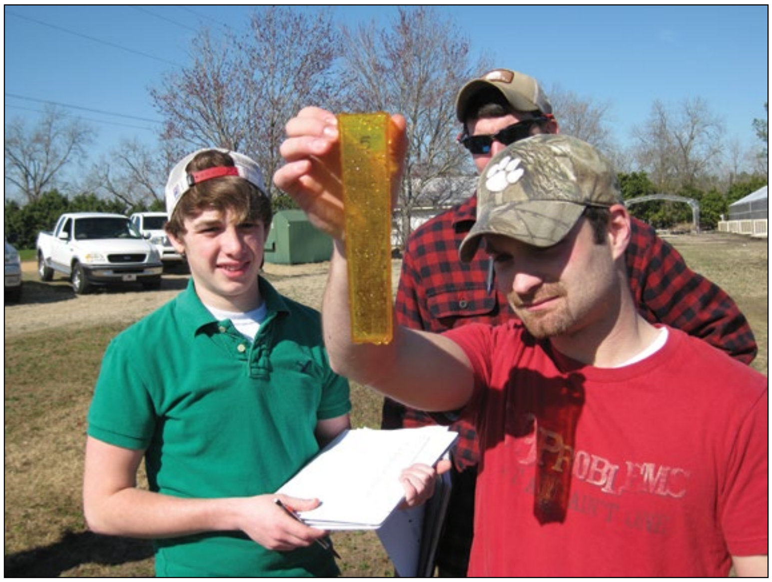

Figure 11. Use a rain gauge or catch to determine your irrigation rate in inches per hour. Irrigation events typically should not exceed 0.5 inches in a single application.

When planning for a new irrigation system or the improvement of an existing system, the primary goal should be to design a system that applies water efficiently and uniformly. Use pressure-compensating sprinkler heads with drainage seals at low points to maximize water use. For the best possible uniformity — a critical step to water savings — irrigation heads should be placed with head-to-head overlapping coverage.

Evapotranspiration (ET) is the amount of water lost to the atmosphere through two processes: evaporation and transpiration (the release of water to the atmosphere by plants). This total amount of water lost will determine how much you should irrigate your lawn. When it is warm and the humidity levels are low — a common occurrence in western Oregon in July and August — the ET will be high, and your lawn will need more water.

Before you can decide how long to water your lawn so that you can replace what is lost through ET, you need to know the precipitation rate of your sprinklers. For instance, a pop-up sprinkler with a fixed spray nozzle will apply 2 to 3 times the amount of water as a rotary sprinkler over the same time period. Those same spray heads will replace a quarter of an inch of water (a common ET for a warm July day) in as little as 8 minutes, while a typical rotor may need 40 minutes to do the same job. To determine your precipitation rates, first place rain gauges or empty tuna fish cans throughout the area you intend to water (also, plastic freezer containers are cheap and work really well). Run the sprinklers for 20 minutes and then measure the depth of water in each can to calculate the average precipitation rate (Figure11). Precipitation rates should not exceed 0.5 inch per irrigation event, which would translate to three irrigations if your target rate is 1.5 inches per week.

Soil probes are an extremely effective way to manually monitor soil moisture content. If you don't have access to a soil probe, a quick and easy way to check for soil moisture is by inserting a screwdriver into the soil. If it penetrates the soil easily, reduce your irrigation rates and or frequency. If it takes some effort to push it in, and the surface of the screwdriver or knife is dry after it is removed, then increase your rates. You can also use this technique at the start of the season to determine when you need to start watering your lawn. Table 4 depicts seasonal variations in plant-available water and corresponding irrigation rates needed for replacement.

If you have an automated irrigation system, it should be checked each spring well in advance of

Table 4. Seasonal variations in plant available water for western Oregon

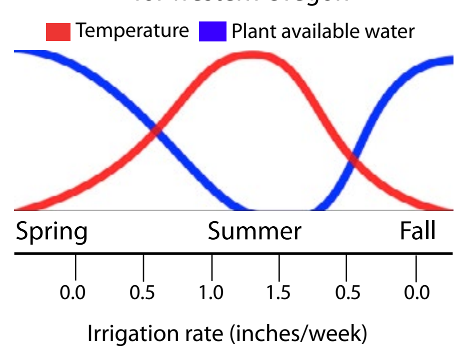

Figure 12. A core aeration unit (left) will relieve soil compaction and reduce thatch by pulling a soil core (right). these cores can be incorporated back into the turf using a rake or rotary mower.

peak demand. By the time summer dry spots show up in your lawn, the damage has been done and the area will be difficult to re-wet. In the early spring, turn the system on and check for leaks, or for sprinklers that sit low or are not perpendicular to the ground. Remove foliage that is blocking spray patterns and check individual nozzles for clogs or poor performance. Avoid overspray onto impermeable surfaces by adjusting nozzles so they are in alignment with lawn edges.

These practices will help make your irrigation system efficient, but it is also important to adjust the controller to meet day-to-day and seasonal changes in the weather. Research has shown that homeowners using automatic irrigation systems are more likely to overwater than residents who water by hand using a hose and sprinkler. Irrigation controllers often are set to water in amounts that meet peak demand, and then are left to run under the same settings throughout the entire season, regardless of changes in temperature and precipitation.

WaterSense, a program developed by the U.S. Environmental Protection Agency to improve the water efficiency of homes, promotes the use of WaterSense-labeled controllers, which utilize soil sensors or weather data to adjust water demand and delivery on a daily basis. For more information regarding WaterSmart Irrigation and WaterSense controllers, visit:

- www.epa.gov/WaterSense/docs/water-efficient_landscaping_508.pdf
- www.epa.gov/WaterSense/products/controltech.html

Core aerate to relieve compaction

Compacted soils will compromise root development and turf density, inhibit infiltration, and increase surface runoff. Coring opens up the surface of compacted soils, improves water percolation, and encourages root development (Figure 12).

When determining if core aerification is necessary for your lawn, consider these problems:

- Is your soil compacted?
- Has water penetration reduced over time?
- Do you have localized dry spots or excessive thatch?

If you have one or more of these problems, consider core cultivation. Otherwise core cultivation is not necessary.

Overseed to increase turf density and mitigate weed encroachment

Overseeding can be used to increase turf density and prevent the intrusion of weeds into bare areas. Spring and fall are optimum periods for turfgrass germination, and therefore are the best times to overseed. Overseeding after core aeration is an excellent way to create the seed-to-soil contact necessary for successful germination. For small repairs, rough up the soil with a garden rake or cultivator to enhance seed-to-soil contact (Figure 13).

For more information on overseeding and lawn renovation see *Practical Lawn Establishment and Renovation* (EC 1550) in the Oregon State University Extension Catalog (http://extension.oregonstate.edu/catalog/).

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Figure 13. Overseeding, which should be done in the spring or fall months, will increase turf density and mitigate weed encroachment.

For more information:

EPA Phase 3 Small Engine Emission Standards

http://www.epa.gov/otaq/smallsi.htm

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Use pesticides safely!

- Wear protective clothing and safety devices as recommended on the label. Bathe or shower after each use.
- Read the pesticide label—even if you've used the pesticide before. Follow closely the instructions on the label (and any other directions you have).
- Be cautious when you apply pesticides. Know your legal responsibility as a pesticide applicator. You may be liable for injury or damage resulting from pesticide use.

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