



# LAWN

## establishment & renovation

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**A** healthy lawn provides play areas, adds oxygen to our air, filters pollutants from air and runoff water, cools the environment, prevents soil erosion, and increases the value of a home or business. This bulletin describes the steps needed to successfully establish a new lawn started from seed or sod and how to renovate a lawn that's in poor condition.

### Lawn establishment versus renovation

Establishment is the installation of a lawn on bare soil. Newly constructed home sites usually require lawn establishment either through seeding or sodding.

Renovation is the practice of restoring a lawn which is in poor condition (excessive weeds, patches of bare soil, etc.) to an acceptable level of quality. *Complete renovation* involves removing the existing vegetation and establishing new turf on completely bare soil. Only lawns that are infested with difficult-to-control perennial weeds such as quackgrass or Canada thistle or that have less than 50% turf cover are likely to require

complete renovation. *Partial renovation* improves turf quality without removing the existing lawn. Turf quality is improved by using best management practices and by overseeding (seeding directly into an existing lawn). Best management practices such as adequate fertilization, routine mowing, aeration to alleviate thatch and compaction problems, and weed control can turn a poor lawn into a reasonably good lawn within one or two growing seasons.

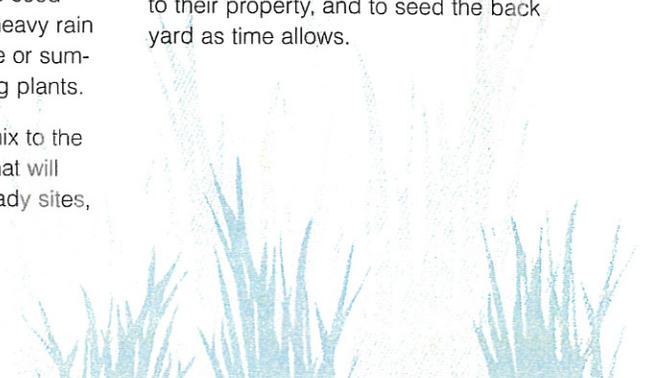
### To seed or to sod?

The decision to seed or to sod a new lawn depends on many factors. Seeding is inexpensive compared to sodding but requires a greater investment in time, irrigation, and weed control in the months following planting. Seeded lawns may require up to 2 months to become fully established. Inclement weather can require reseedings of certain areas or cause seedings to fail. For example, a heavy rain may wash seed from a slope or summer stress may kill the young plants.

Seeding lets you tailor the mix to the site. You can select mixes that will perform best in sunny or shady sites,

dry or moist conditions, high or low traffic areas, and based on desired amount of maintenance. Since most sod in Wisconsin is predominantly or completely Kentucky bluegrass, you can't adapt the selection for specific conditions. While Kentucky bluegrass performs well in most sites, it is a poor choice for shade. If sodding a shaded site, look for sod that includes fescue or supina bluegrass.

Sodding provides an instant lawn, which is important for aesthetic reasons and for immediate control of soil erosion. Weed problems are virtually nonexistent in newly sodded lawns when high-quality sod is used. In some areas, local regulations stipulate a lawn must be established shortly following construction and occupancy of a new home. In these cases sod is usually the only choice. Sometimes new homeowners elect to sod just the front yard to comply with local regulations and/or to add immediate beauty to their property, and to seed the back yard as time allows.



**Table 1. Recommended seed mixes for various turf sites.**

**Sunny areas and medium- to high-quality lawns**

50–100% Kentucky bluegrass  
25–35% fine fescues  
15–25% perennial ryegrass

**Shady areas and low-maintenance lawns**

**Dry sites**

≥ 50% fine fescues  
25–25% Kentucky bluegrass  
≤ 15% perennial ryegrass

**Moist sites**

≥ 20% rough bluegrass and/or  
≥ 10% supina bluegrass  
≤ 40% fine fescues  
≤ 40% Kentucky bluegrass  
≤ 15% perennial ryegrass

**Seed selection**

The long-term quality of a lawn begins with selecting the right species for the site. Table 1 suggests recommended proportions of species for different conditions; the characteristics of each species are described below.

**Kentucky bluegrass** is the most popular lawn grass in Wisconsin. It performs best in moist, well-drained soils and sunny locations. Kentucky bluegrass is cold tolerant and goes dormant during extended drought periods, growing new leaves after sufficient watering or rainfall.

**Perennial ryegrass** is frequently used in seed mixtures to provide quick cover due to its rapid germination. Perennial ryegrass should make up no more than 15–25% of any mix; higher

amounts will crowd out the more-desirable grasses. Perennial ryegrass has strong fibers in its leaves and is often sold as the predominant species in mixtures formulated for high-traffic areas. However, it is not the best choice for high-traffic areas because it is a bunch-type grass and cannot spread. Also, it is not as tolerant as Kentucky bluegrass of cold temperatures or diseases. As a result, lawns composed solely of perennial ryegrass will thin out over time as disease, insects, and traffic kill individual plants.

**Fine fescues** are a group of fescue species known for their extremely narrow (fine-textured) leaf blades. This group includes creeping red fescue, Chewings fescue, and hard fescue. Fine fescues spread slowly or not at all, as some species have short rhi-

**Reading seed labels**

**B**oth high-quality seed mixes and low-quality seed mixes are available. The only way to evaluate the quality of a mix is to read and understand the label.

Seed labels list the types and proportions of grass species and varieties. The purity and percent germination indicate the quality of the seed. High-quality seed has at least 90% purity and 75% germination. Items to watch for are shown in this example of a seed label.

A Grass Seed Company Lawntown WI Premium Sunny Lawn Mixture			
Percent	Ingredient	Germination	Origin
28.00%	Cynthia Ky. Bluegrass	85%	Washington
28.00%	Limousine Ky. Bluegrass	85%	Washington
12.50%	Scaldis Hard Fescue	85%	Canada
6.25%	Jamestown Chewings Fescue	85%	Canada
6.25%	Dawson Cr. Red Fescue	85%	Canada
8.75%	Saturn Perennial Ryegrass	90%	Oregon
8.75%	Pennfine Perennial Ryegrass	90%	Oregon
1.28%	Inert Matter		
0.20%	Other Crop Seed		
0.02%	Weed Seed		
Noxious Weed Seed: None Found			
		Tested: January 2000	
		Net Wt: 20 Lb. (9.07 kg)	
		Lot: NBG18	

**A**void mixes that contain annual ryegrass (*Lolium multiflorum*). This species, sometimes called Italian ryegrass, will die after 1 year and may prevent desirable grass species from becoming established.

**D**o not purchase seed with any noxious weed seed, or if the seed is labeled as "VNS" or "Variety Not Stated" as you cannot be sure what species of grass you are purchasing. Other crop seed is the amount of some crop seed, usually grass, such as rough bluegrass or bentgrass. Inert matter includes soil, chaff, or stems.

**P**urchase and use certified seed within 12 months of the date tested. Certified seed is tested periodically to ensure a specific percentage of germinating seeds. As seed ages, the percentage of seeds capable of germinating declines and will result in poor establishment unless higher seeding rates are used. Non-certified seed may be much cheaper but it can contain a high quantity of weed seed which may cause a severe weed infestation in the new lawn.

zomes while other species have bunch-type growth habits. Fine fescues require less fertilizer, water, and mowing than Kentucky bluegrass and perennial ryegrass but often turn brown during summer. Fine fescues are often combined with Kentucky bluegrass to make a seed mix that works well in sunny and shaded environments. Over time, the fine fescues will dominate the shaded and/or drier sites, while the Kentucky bluegrass will dominate the sunny and not so dry sites.

**Rough bluegrass** and **supina bluegrass** are light-green grasses that perform well in moist, shaded areas. They spread rapidly and may develop into undesirable patches that are easily visible due to their light green color.

**Turf type tall fescue** provides a drought tolerant, medium-quality lawn. Tall fescue is a bunch-type grass that is suited for sandy soils where water and fertility will be minimal and which may receive traffic. Tall fescue usually should not be mixed with other species as its rapid growth rate, coarse leaf texture, and lighter green color give lawns an unkempt appearance. Dwarf types of tall fescue can be used as these mix fairly well with Kentucky bluegrass.

**Undesirable lawn grasses**

—**Bentgrass** is not recommended for home lawns due to its intensive and expensive management requirements. Creeping bentgrass has an unkempt appearance when mowed higher than

¾ inch. The rotary mowers sold for home use cannot mow below 1 inch. The reel mowers used by golf courses are too expensive and require too much maintenance for general homeowner use.

—**Zoysiagrass** is frequently advertised for sale as vegetative plugs, but should not be planted in Wisconsin. This slow-growing, warm-season grass is best suited for areas south of the Ohio River. Zoysiagrass is green from June through August only; the rest of the year it's yellow-brown. The wiry growth of zoysiagrass requires sharp mowers for a good cut.

**Table 2. Seeding rates and characteristics of the common cool-season lawn grasses for Wisconsin.**

Species	Seeding rate		Days to germinate	Growth habit	Shade tolerance	Maintenance needs <sup>a</sup>
	lb/1000 ft <sup>2</sup>	seeds/in <sup>2</sup>				
<b>Kentucky bluegrass</b> ( <i>Poa pratensis</i> )	1.0–1.5	15–23	14–21	Spreading (rhizomes)	Poor <sup>b</sup>	Low to high <sup>c</sup>
<b>Rough bluegrass</b> ( <i>Poa trivialis</i> )	1.0–1.5	18–26	12–17	Spreading (stolons)	Good to excellent (moist areas)	High
<b>Supina bluegrass</b> ( <i>Poa supina</i> )	1.25–1.5	18–26	12–17	Spreading (stolons)	Good to excellent (moist areas)	High
<b>Perennial ryegrass</b> ( <i>Lolium perenne</i> )	7–9	11–14	5–7	Bunch type	Fair	Medium to high <sup>c</sup>
<b>Tall fescue</b> ( <i>Festuca arundinacea</i> )	7–9	11–14	7–10	Bunch type	Good	Low
<b>Fine fescues</b>	<i>In sunny sites, most varieties will turn brown during summer</i>					
<b>Creeping red fescue</b> ( <i>Festuca rubra</i> )	3.5–4.5	13–17	7–10	Weakly spreading (rhizomes)	Excellent (dry areas)	Low
<b>Chewings fescue</b> ( <i>Festuca rubra v. commutata</i> )	3.5–4.5	13–17	7–10	Bunch type	Excellent (dry areas)	Low
<b>Hard fescue</b> ( <i>Festuca longifolia</i> )	3.5–4.5	13–17	7–10	Bunch type	Excellent (dry areas)	Low

<sup>a</sup> Maintenance needs include frequency of mowing, fertilizer requirements, and water needs.

<sup>b</sup> Kentucky bluegrass cultivars listed as shade tolerant are shade tolerant only compared to other Kentucky bluegrass cultivars; none are as shade tolerant as the fescues.

<sup>c</sup> The quality of Kentucky bluegrass and perennial ryegrass lawns is often directly related to the amount of fertilizer and water received. During extended dry periods, lawns may go dormant and turn brown. They will turn green and resume growth 1–3 weeks following renewed rainfall or irrigation.

## Sod selection

Sod is generally sold for homeowner use in rolls that are approximately 8 square feet (2 ft x 4 ft). Many garden centers sell sod throughout the growing season and are a good source if you're covering a small area. For large areas (e.g., an entire lawn), it is usually more economical to purchase sod directly from a sod grower or through a landscaper. Some sod growers may offer limited delivery services while others are strictly on-site sales. Many landscapers will deliver and install sod. Try not to purchase more sod than can be laid and watered within 24–48 hours after harvest. Rolls of sod will survive slightly longer during cool, overcast conditions than during hot, dry, sunny weather.

Before purchasing or accepting delivery of sod, check to make sure the grass has a fresh green color. Avoid sod that has turned yellow or brown from being rolled up too long. Also look for the presence of disease, weeds, or insect pests. One of the most important weeds to watch for is quackgrass. Quackgrass is light green in color, has wide leaf blades, and is very fast growing. This weed is nearly impossible to control once it's established because there are no herbicides available that will remove quackgrass without also killing the desirable turfgrass.

## Steps to establishment

Successful turfgrass establishment depends on proper site preparation, selection of adapted turfgrass species, and adequate post-plant care. Neglecting any of these elements can result in poor turf establishment, and correcting the problem will cost more time, money, and effort than if proper procedures had been followed in the first place. The steps outlined below will help make the most of your investment. Every site is different, so some steps may not be needed. The following information will help you decide which steps are needed for your site.

### 1 *Have the soil tested*

A soil analysis is inexpensive and provides important information about soil nutrient levels and soil type. Liming, fertilizing, and seed selection may all depend on the results of a soil analysis. Collect a representative soil sample from the area and send it to a reputable soil analysis lab before establishing your lawn. If topsoil is added, test the topsoil. Keep samples of different soil types separated, e.g., a dark, clayey soil from one area of the yard must be kept separate from a light colored, sandy soil from another area of the yard. Results are usually returned in 10–14 days. For advice on collecting soil samples, see Extension publication *Sampling Lawn and Garden Soils for Soil Testing* (A2166). The University of Wisconsin has two soil testing labs, and there are private labs throughout the state.

### 2 *Prepare the site*

Control perennial weeds such as quackgrass with glyphosate (sold as Roundup or Kleenup). Glyphosate is a non-selective herbicide. Use it cautiously as it will kill all herbaceous plants it comes in contact with and will injure or kill woody plants. Following glyphosate treatment, you may seed grass or lay sod as soon as the existing vegetation is dead, usually within 10 days; most

other herbicides require a waiting period of 6 weeks to 6 months before turfgrasses can be planted.

It is essential that you control quackgrass *before* planting since it cannot be selectively removed from established turf. Tilling an area infested with quackgrass without first killing the rhizomes will only spread the infestation.

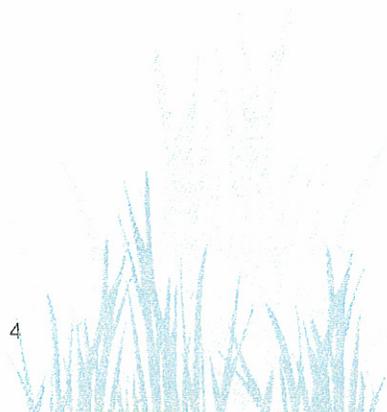
Till the ground to loosen soil and remove debris (gravel, construction waste, and stumps). Do not bury the debris, as it is likely to cause localized dry areas in the lawn, resulting in poor turf and possibly persistent weed problems. Remove stumps and lumber so mushrooms, toadstools, and fairy rings (rings of mushrooms or dark green to brown turf) do not develop in the turf as the wood decays. If possible, remove existing topsoil and stockpile it where it won't be in the way. Replace the topsoil after rough grading is finished. Turfgrass will grow better on topsoil than on subsoil.

### 3 *Rough grade the site*

Prepare the rough, or sub, grade for the area. On most new home sites, this step has already been performed. The land should slope away from homes or other buildings. A 1–2 percent slope (1- to 2-foot drop for every 100 linear feet) is usually sufficient. The rough grade should conform to the final layout of the area, including slopes and hills. Do not construct steep hills as grass will be difficult to establish and mow. Also, the turf will be continuously drought-stressed due to rapid surface drainage.

Drain tiles are not necessary or practical for home lawns. Usually there is no outlet available for drain tiles in an urban setting.

In-ground irrigation systems can be installed at this stage although care will be necessary to avoid damaging the system during addition of soil amendments and final grading. Irrigation heads will need to be positioned to achieve the proper height following final grading and turfgrass



establishment. Sometimes it is better to wait until grass is established before installing an in-ground irrigation system. This allows you to observe which areas need more or less water and configure the system accordingly.

## 4 Amend the soil

If adding soil to the site, add it after the rough grade has been finished. A topsoil depth of 3–4 inches is usually sufficient. Problems with water infiltration and turf growth may occur when one soil type is placed directly over a different type of soil. When possible, create a transition layer by adding about 2 inches of the topsoil to the area and tilling it into the top 2 inches of the underlying soil, then add the remaining topsoil. The transition layer will improve water movement from the surface into the entire soil profile and improve root growth into the subsoil.

If lime or other soil amendments were recommended in the soil test report, add them at this time and mix into the top 6 inches of the soil. The sole purpose of liming is to raise the soil pH. The optimal pH for most turfgrasses is 6.0–7.0. Usually only soils in the northern half of Wisconsin are sufficiently acid to require liming, and even then a soil test should be used to confirm liming requirements. In the southern part of the state the soil pH may be above 7.0. While sulfur can be added to reduce soil pH, the amount of sulfur and the time required to change the soil pH is not worth the effort. Gypsum (calcium sulfate) does not affect pH and is unnecessary in Wisconsin.

If soil analysis results indicate low levels of a nutrient, add the recommended amount at this time. (For information about what to expect from a soil test report and guidelines when purchasing fertilizer, refer to Extension publication *Lawn Fertilization*, A2303.) Soil test results showing less than 15 ppm (30 lb/acre) of phosphorus may warrant application of a starter fertilizer to

increase the soil phosphorus level. If potassium is low (less than 40 ppm, or 80 lb/acre), use a winterizer fertilizer. The fertilizer should be mixed thoroughly into the top 4–6 inches of soil. It is not necessary to add nitrogen at this step.

Small additions (10% by volume) of clay, soil, and/or peat can often improve water and nutrient retention in sandy soils. It is not worthwhile to try to improve drainage by adding sand to a clay soil as you won't see any benefits until at least 60% of the resulting mixture is sand. Additions of peat to clay soils may improve porosity and soil structure although the amount required usually isn't worth the small improvements.

## 5 Final grade the soil

The purpose of the final grade is to smooth minor irregularities in the seed bed and to remove stones the size of golf balls or larger. In a small yard, use a rake for the final grading. On large sites, a motorized vehicle pulling a drag mat, old mattress box springs, or a similar device can be used. Vehicles should be equipped with wide "turf" tires designed to minimize compaction. Lightly rolling a moist soil can help firm the soil; avoid using heavy rollers as they will compact clay soil. Irrigation or rainfall will often sufficiently firm the soil, although a crust may form as the soil dries, especially on clay soils. A soil crust will need to be broken apart with a rake prior to seeding or sodding.

## 6 Apply starter fertilizer

While most soils have sufficient phosphorus to maintain growth of mature plants, seedlings need an extra boost for germination and establishment. Apply 4–8 lb of a turf starter fertilizer (or equivalent) per 1000 ft<sup>2</sup>. Lightly rake the fertilizer into the top ½ inch of soil. Starter fertilizer contains a high ratio of phosphorus relative to nitrogen and potassium. It is available from your local lawn and garden center.

## 7 Spread seed

**Timing.** The best time to seed a lawn in Wisconsin is late summer through early autumn (mid-August to mid-September). During this period soil and daytime air temperatures are still warm but not unduly hot, while the nights are cool, all of which speeds establishment. Rainfall is often sufficient to supplement or even replace irrigation. Additionally, there is much less competition from annual weeds in the fall than in the spring. It's best to seed by mid-September to ensure that young plants will mature enough to survive winter.

Early spring is the next-best time to seed, although germination is often delayed due to cold soil temperatures. If possible, seed earlier rather than later—April is better than May—and be prepared to water the area to prevent drought and heat stress which can kill young plants. Annual weeds are often a problem with spring seedings. Applying a herbicide containing the active ingredient siduron at seeding will prevent growth of annual weeds during establishment. Read the label before using other herbicides; most require a lengthy waiting period before grass can be seeded.

"Dormant" seeding is sometimes done in November so that seed will germinate the following spring. This type of seeding is not recommended because the success rate depends on the severity of the winter, soil moisture and temperatures in the spring, and other factors. Also, some areas may require reseeding in the spring if seeds are killed or dislodged during the winter. Slopes where erosion is likely should not be dormant seeded unless an erosion control blanket is used to cover the area after seeding.

**Rate and equipment.** Seed the grass at the rates listed in table 2. For mixtures of two or more species, follow the seller's guidelines. Use a drop spreader or slit seeder to uniformly apply the seed. Small areas can be

hand seeded by sprinkling seed from a cup. Broadcast seeders may perform acceptably in some instances but they provide less uniform coverage than drop spreaders and the seed is more likely to be blown away from the targeted area during windy conditions.

Since most drop spreaders do not come with information about settings for seeding, use a setting to give the appropriate number of seeds per square inch (table 2). Start with a low setting and adjust upwards as necessary—more seed can always be applied, but it can't be readily moved once it's on the ground.

Slit seeders dig a shallow furrow, or trench, into the soil, and drop seeds into the furrow. Some slit seeders also have press wheels that partially cover the furrow with soil. Self-propelled slit seeders are becoming increasingly available for rental. Check with the rental agency for proper settings for a given type of seed.

**Technique.** Divide the seed lot into two equal parts. Apply half of the seed in one direction (e.g., north to south); apply the remaining seed in a perpendicular direction (e.g., east to west). If using a slit seeder, be sure to apply the seed in at least two directions; three to four directions should be used for planting bunch grasses such as perennial ryegrass, and tall, hard, or Chewings fescue.

Lightly rake the seed into the top ¼ inch of soil. Good establishment requires good seed-to-soil contact to keep seeds from drying out and provide a haven for the developing root system. Gently roll or tamp the area to ensure good contact.

## 8 Spread mulch

Adequate moisture is critical for establishing new turf.

Mulching a newly seeded area will help prevent the soil from drying out between waterings and inhibit erosion. Straw is usually the most effective and economical mulch available, but be sure to use clean straw that is

free of weed seeds. Marsh hay is also acceptable for mulching. You'll need approximately 65 lb of straw per 1000 ft<sup>2</sup> (1½ bales). Spread loosely so that about half of the soil surface is visible through the straw. The straw can be left in place following germination.

Alternatives to straw mulch include hydromulch, pellets, and "instant sod" blankets. Hydromulching, the application of shredded paper in a slurry, is generally only available through professional applicators. The slurry is typically dyed green for aesthetic reasons and some applicators include a small amount of fertilizer. For small areas, pellets made from paper waste are effective and decompose without affecting the turf; these are sold under a variety of brand names. Pellets are too expensive to be cost-effective for large areas. "Instant sod" blankets are made of wood fibers with grass seed embedded. Sod blankets are convenient to handle, but they require frequent irrigation to keep the seeds from drying out and may not contain the best seed mix for some locations.

## 9 Post-seeding care

**Irrigation.** Keep newly seeded areas moist during establishment. Thoroughly water the area after mulching. This will provide moisture for seed germination and help stabilize the straw so wind is less likely to blow it away. Be careful not to over-water or seeds will float to the surface.

Irrigate at least once each day for 2–3 weeks or until the turfgrass has uniformly germinated. During each watering, apply enough to keep the seed and soil moist, usually 3–5 minutes (¼–½ inch) will suffice. Timers on automatic irrigation systems may be useful. Hot, dry conditions and turf on sunny slopes may require more frequent irrigation. Following germination, water once every 2–3 days.

Early morning irrigation is best as it provides moisture throughout the day. Leaf surfaces remain wet longer when watered in the late afternoon or evening,

creating a prime environment for disease development.

**Mowing.** Wait until seedlings are 3 inches tall before mowing for the first time. Grass plants usually take 3–6 weeks to reach that height—the time required depends on the species planted and environmental conditions such as soil and air temperature, moisture, and fertilization. If an area is particularly weedy, you may need to mow a few weeks after germination to allow the seedlings to compete. Mow the grass to a height of 2–3 inches. Subsequent mowings will generally be required at about weekly intervals. Remove no more than one-third of the leaf height at any single mowing.

**Traffic.** Young seedlings are particularly vulnerable to damage. Try to keep all traffic off the area for at least 4 weeks after germination.

**Weed management.** If weeds become a problem, a herbicide can usually be applied following the third mowing. Most herbicides can injure young turfgrasses, so always read the label before application to avoid problems. Siduron is the only herbicide available for use on newly seeded lawns and will prevent some annual grass and broadleaf weeds from germinating without harming the newly seeded turf. Refer to Extension publication *Lawn Weed Prevention and Control* (A1990) or *Lawn Weeds and Their Control* (NCR26) for details about specific weeds and herbicides.

## Sodding a lawn

Complete steps 1–6 of "Steps to Establishment" before the sod arrives. Just before sodding, lightly moisten the soil to promote rooting. Sod will perform best if planted within 24–48 hours after harvest. Sod will die quickly if allowed to dry out or overheat.

When laying sod, offset the pieces like bricks in a wall to keep the ends from lining up in a row. The edges of the sod pieces tend to dry out after harvest. If the ends are aligned, long "trenches" formed by the dried out

edges will be apparent for several months until sufficient regrowth occurs. Staggering the sod pieces in adjacent rows will provide a more stable surface and promote the development of a more uniform lawn faster than if all the edges are aligned. Make sure each sod piece is tightly fitted against all adjacent sod pieces.

On slopes, lay the sod so that water flowing down the hill runs across the shortest edge of the piece. Stakes can be used to hold the sod on steep slopes. Leave the stakes in place until the sod has rooted.

Immediately after laying the sod, lightly roll it to remove air pockets and to ensure good contact between the sod and the underlying soil. Then irrigate thoroughly, applying about 1 inch of water, or enough water to moisten the soil 6 inches deep. Most lawn sprinklers deliver an inch of water in about 2 hours. To measure the amount applied, place one or more straight-sided cans (e.g., coffee cans) at various distances from the sprinkler. Irrigate thoroughly every 1–2 days, depending on the weather, until the sod has rooted into the soil and is difficult to pull up out of the ground (about 2 weeks after sodding). Do not irrigate so much that the soil becomes waterlogged as this will prevent root growth. Irrigate less frequently as the root system develops.

Keep all unnecessary traffic off the sod for the first 4–6 weeks until it is thoroughly rooted. Mowing can begin whenever the sod has started to root into the soil and can be mowed without displacing the sod, usually within 1–2 weeks after sodding. Always follow the “one-third rule” for mowing: never remove more than one-third of the leaf tissue at any one mowing.

**Note:** Most sod is grown on a soil high in organic matter (peat or muck soil). While this is a great medium for growing sod because it is very fertile, sod grown in these soil types may not always root well into a soil of a different type (e.g., clay soil or subsoil remaining after removal of topsoil). Topsoil may

be added to the site prior to sodding to improve conditions for the sod (a transition layer should be prepared as described in step 4 of seeding). In any case, core aeration approximately 4 weeks following sod establishment will improve root growth into the underlying soil. For details on equipment and technique, refer to Extension publication *Lawn Aeration and Topdressing* (A3714).

## Lawn renovation

Lawns may deteriorate for many reasons including poor management, diseases, insects, or environmental damage. While replacing a lawn that is in poor condition is always an option, it is often more practical to renovate the lawn. Renovation can often produce an acceptable lawn over several weeks to months, rarely more than 2 years, without the hassle and effort required to establish a new lawn.

### Eliminate common problems

Before renovating, it's important to identify why the existing lawn is failing. Correcting problems now will give the new grass the best chance for long-term survival. Turf decline may be due to any combination of the following factors.

**Problem:** Poor management practices.  
**Solution:** The following lawn management practices will help improve the health of your existing lawn and ensure the health of new plants.

1. Avoid removing more than one third of the leaf blade at a time when mowing.
2. Apply fertilizer three to four times annually to help thicken the turf. This will also help it withstand weed, pest, and traffic problems.
3. Irrigate during dry spells to keep a turf thriving and minimize weed and pest problems. Lawns should receive 1 inch of water per week to prevent dormancy during dry periods.

For more details, see *Lawn Maintenance and Problems* (A3435) and *Lawn Fertilization* (A2303).

**Problem:** Excess thatch and/or compacted soil.

**Solution:** A thick thatch layer (greater than 1 inch) can harbor disease and insect pests, plus create moisture and other problems for the turf; a compacted soil inhibits turf root growth and favors certain weeds such as knotweed and annual bluegrass. Core aeration every spring and/or autumn will alleviate thatch and compaction problems. Core aeration seems to damage the turf initially but the turf quickly recovers, usually in much better condition, provided the turf is cared for with proper mowing, fertilizing, irrigation, and pest management practices. For more details, consult Extension publication *Lawn Aeration and Topdressing* (A3710).

**Problem:** Too much shade.

**Solution:** Grass grown in the shade has different fertility and water requirements from grass grown in the sun. For lawn care advice tailored to low-light conditions, consult *Growing Grass in Shade* (A3700).

**Problem:** Weeds.

**Solution:** Applying a herbicide once or twice over 1–2 years can greatly improve a weedy lawn. Treat perennial weeds in the autumn, with a second application the following spring or autumn if needed. Herbicides are not essential. A decent, though not perfect, lawn can be obtained using best management practices. In fact, since annual weeds will die out with the first frost, good management practices will encourage the existing grass to fill in, particularly if the turfgrass has a creeping growth habit.

**Problem:** Diseases or insects.

**Solution:** Contact your county Extension agent for help identifying the disease or insect problem. Treat as needed.



## Partial renovation

Overseeding may be necessary if the lawn remains thin (low plant density) after proper management techniques have been applied. Often this can be accomplished without resorting to complete renovation in which the existing turf is killed off or removed.

Start by selecting seed that is suitable for the site. Apply the seed using a slit seeder (step 7 of "Steps to Establishment" has more information about slit seeders). If the soil is compacted, core aerate the turf, then broadcast the seed by hand or with a spreader. Use twice the amount of seed recommended in table 2 to ensure good germination. Apply 4 lb of starter fertilizer per 1000 ft<sup>2</sup>. Afterwards use a vertical mower (dethatcher) to break up the cores and mix the seed into the top ¼–¾ inch of the soil, or use a drag mat or similar device to drag over the area. Follow post-plant care described in step 9 of "Steps to Establishment."

## Complete renovation

Replacement of an existing lawn that contains over 50% weeds or undesirable grasses requires complete renovation. Renovation includes many of the same steps as establishment but without the grading and soil amending. As with seeding a new lawn, the best time to renovate is in the fall or spring.

- 1. Kill the existing vegetation** with a non-selective herbicide that contains glyphosate. Wait 10 days for the herbicide to act on the roots. Lawns infested with hard-to-control weeds such as quackgrass and creeping bentgrass may require a second application as new leaf growth occurs. In this case, wait an additional 10 days before proceeding to the next step.
- 2. Select high-quality seed** suitable for the location (e.g., Kentucky bluegrass/perennial ryegrass mixture).
- 3. Mow the turf as short as possible.** This will help expose the soil to ensure good seed-to-soil contact.
- 4. Remove thick thatch layers (>¾ inch) with a sod cutter.** If it's impractical to remove the sod or if thatch is less than ¾-inch thick, simply loosen and expose the soil using a core aerator, vertical mower (dethatcher), or rake. A core aerator pulls soil cores from the lawn and provides a good environment for seed germination. The blades on a vertical mower should be set so they cut into the top ½–1 inch of soil. If using a core aerator or vertical mower, go over the ground at least twice, in different directions. Small areas of exposed soil can be loosened with a rake.
- 5. Apply starter fertilizer.** Use approximately 4 lb of starter fertilizer per 1000 ft<sup>2</sup> to promote root growth.
- 6. Apply seed** using either a broadcast or a slit seeding method. For broadcast application, spread the seed with a drop spreader, seed spreader, or by hand. Use approximately 20% more seed than the rates listed in table 2 as some of the seed will land on existing thatch or debris and not survive. The seedling survival rate is higher when using a slit seeder compared to broadcasting, so the seeding rate does not have to be increased. If using a slit seeder, skip steps 7–9.
- 7. Gently rake the seed** into the top ¼ inch of soil or cover with ¼ inch of soil.
- 8. Lightly roll or tamp the soil** to ensure good seed to soil contact.
- 9. Mulch areas larger than 1–2 ft<sup>2</sup>.** Refer to step 8 of "Steps to Establishment" for information about types of mulches and amount needed.
- 10. Post-seeding care.** Refer to step 9 of "Steps to Establishment" for recommendations about watering, mowing, and weed management.

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