Renovation of Lawns

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Lawn renovation is time-consuming and expensive and should not be performed unless steps are taken to correct the underlying cause of turf deterioration. This publication includes information on problems that cause turf to deteriorate and provides suggested programs for revitalizing turfgrass areas.

Causes of Turf Deterioration

The first step in lawn renovation is to correct the primary cause of turf deterioration. Such things as drought, excessive shade, tree root competition, poor drainage, soil compaction, inadequate fertility, acid soils, weed or insect infestation, disease, thatch buildup, improper mowing, poorly adapted grass species and cultivars, and others may contribute to poor turf. Most of these problems can be corrected by renovation, proper turfgrass selection, and improved maintenance practices.

Shade Problems

Shade problems may require the removal of some trees, pruning, and planting turfgrass species that are adapted to shaded conditions. Tree roots may need to be pruned to reduce competition with grasses for water, air, and nutrients.

Poor Drainage

Poor drainage can often be corrected by breaking up compacted soil or installing drainage tile. Where surface drainage is insufficient, the site may have to be regraded so that water is removed from the lawn.

Soil Fertility and Acidity

You can determine if inadequate fertility or acid soils are limiting turf growth by testing the soil. Soil testing services are available from the Penn State Agricultural Analytical Services Laboratory (AASL) or through private laboratories. Mailing kits for the AASL tests are available for a nominal fee from the Penn State Extension office in your county. Soil testing laboratories will provide recommendations for the amounts of fertilizer and lime that need to be applied to the lawn.

Weeds, Diseases, and Insect Pests

The weeds, diseases, and insect pests that are causing the lawn to deteriorate need to be identified and managed. If you cannot diagnose the problem(s), take a fresh sample to a knowledgeable source to have it identified, or search the Internet for websites and/or books with photographs on turfgrass weeds, diseases, and insects.
Thatch

Thatch is a tightly intermingled layer of partially decomposed grass stems and roots that develops beneath the actively growing green vegetation and above the soil surface. Thatch decreases the vigor of turfgrasses by restricting the movement of water, fertilizers, and pesticides into the soil. Turfgrass roots also grow into the thatch and may become desiccated as the thatch dries. Thatch builds up over a period of years and must be removed periodically by mechanical means. Thatch-removal equipment can usually be rented from garden centers or rental outlets. It is best not to remove all the thatch from the site in one treatment.

Mowing

Lawns should be mowed above 2 inches and on a regular basis as long as the grass is growing. How frequently you should mow depends on the growth rate of the grass. During peak periods of growth in the spring, you may need to mow your lawn more than once per week. During periods of drought, your lawn may not require mowing until active growth resumes following rainfall events. Clippings do not need to be removed if the frequency of mowing is adequate. All mowing equipment should be properly adjusted and cutting blades should be sharpened periodically.

Turfgrass Species Selection and Management

Planting turfgrass species that are not adapted to site conditions and improperly managing turfgrass species are perhaps the most common causes of lawn deterioration. Other problems include the use of inferior turfgrass cultivars and poor-quality seed.
Renovation Programs

Program 1

(Early to mid-spring, or late summer to early fall)

This program is suggested when the existing population of turfgrasses includes 50 percent or more desirable turfgrass species, there are no infestations of perennial grass weeds (bentgrass, nimblewill, quackgrass, etc.), and the thatch layer does not exceed ½ inch.

1. **Soil test.** Be sure to take a soil test three to four weeks in advance of renovation activities. Soil testing services are available from the Penn State Agricultural Analytical Services Laboratory or through private laboratories.

2. **Weed control.** A herbicide containing a combination of 2,4-D, MCPP, and dicamba is suggested if broadleaf weed species such as dandelion, knotweed, clover, or ground ivy are present in the lawn. A waiting period of about four weeks will be required following use of this herbicide combination before seeding can begin. Be sure to follow the manufacturer’s recommendation on the label concerning the specific interval between herbicide application and seeding. Because of the long waiting period following herbicide application, broadleaf weed control is best done well in advance of the optimum time for seeding. After waiting the prescribed period and assuming adequate weed control has been obtained, you can proceed with the remaining renovation operations. These steps should be followed in sequence as one continuous operation.

3. **Mow.** Mow area closely (approximately ¾ inch) and remove all clippings, leaves, and other debris by sweeping or raking.

4. **Thatch.** Thatch is best removed using dethatching equipment with vertically rotating blades or core aerator equipment. Remove thatch only during periods of cool weather and adequate moisture. Thatch should not be removed during periods of high temperatures, drought, or during late fall when winter desiccation may occur. Thatch removal with dethatching machine in home lawn. Photo: Peter Landschoot

5. **Cultivation.** Mechanical core aerating machines which remove plugs of soil from the turf area can be used to alleviate soil compaction and to prepare a partial seedbed. Aeration during a renovation program should consist of eight to ten passes over the area with a core aerator.

6. **Lime.** Lime should be applied in accordance with a soil test recommendation either just before or immediately after cultivation. If the lime requirement exceeds 100 pounds per 1,000 square feet, apply 100 pounds per 1,000 square feet at this time and the remainder the following spring or fall.

7. **Drag or slice.** Following cultivation and application of lime (if needed), drag the area with a large mat or weighted section of chain link fence to break up cores and work lime into the cultivated soil, or use a vertical slicing machine to break up the cores. Wait until soil cores have dried before dragging or slicing.

8. **Fertilizer.** If seeding, apply a starter fertilizer at the rate recommended on the fertilizer label. Starter fertilizers contain nitrogen, phosphorus, and usually some potassium. Nitrogen and phosphorus are particularly helpful for rapid turf establishment. Depending on the results of a soil test, additional phosphorus and potassium may be beneficial for new seedings. These nutrients should only be applied in accordance with a soil test.

9. **Seeding.** A turf-type disk seeder is the best tool for seeding. This machine cuts the seed directly into the soil, ensuring firm contact between seed and soil, which is necessary for maximum germination. When no disk seeder is available, uniformly broadcast the seed over the area, preferable with a drop seeder. The total seed quantity should be divided into two equal lots, sowing one lot in one direction and the second at right angles to the first. Good quality seed of turfgrass species adapted to the site’s environmental, management, and use conditions. In open, sunny areas, good cultivars of Kentucky bluegrass, turf-type tall fescue, or perennial ryegrass can be used. In areas of partial shade and partial open sun a good-quality turf-type tall fescue or a mixture of a fine fescue (creeping red fescue, Chewings fescue, or hard fescue) and Kentucky bluegrass can be used. Heavily shaded areas having relatively dry soils may be seeded with 100 percent fine fescue.

10. **Roll.** Firm the seed into the soil by light rolling.

11. **Mulch.** Where there is little existing grass, a very light application of straw mulch may be applied to retain moisture and promote germination. Be sure the mulch is not heavy enough to smother or completely shut out light to the existing grass.

12. **Water.** The seeded area should be kept moist until the seed has germinated and the seedling plants have become well established.

Program II

(Early to mid-spring, or late summer to early fall)

For use when the thatch layer does not exceed ½ inch and the existing population of the area includes less than 50 percent desirable permanent turfgrass species and/or there is an infestation of perennial weed grasses such as bentgrass, nimblewill, or, quackgrass.
1. **Soil test.** Take a soil test three to four weeks in advance of renovation activities. Soil testing services are available from the Penn State Agricultural Analytical Services Laboratory or through private laboratories.

2. **Weed control.** Under the conditions described, it will probably be necessary to use a nonselective herbicide to kill all vegetation in the lawn. Glyphosate-containing products are suggested for this purpose. Turfgrass seed may be safely applied within a couple of days following application of glyphosate but seeding should be withheld until it becomes obvious that a good kill of existing vegetation has been obtained. Home lawn following treatment with glyphosate herbicide. Glyphosate kills all grass and weeds within about 14 to 21 days. Photo: Peter Landschoot.

3. **Mow.** See Program I, number 3.

4. **Thatch.** See Program I, number 4.

5. **Cultivation.** See Program I, number 5.


7. **Drag.** See as Program I, number 7.

8. **Fertilizer.** See Program I, number 8.

9. **Seeding.** If the dead cover is quite dense, it will be necessary to seed with a turf-type disk seeder in order to get the seed in firm contact with the soil. If no dense cover exists, proceed as in Program I, number 9.

10. **Roll.** See Program I, number 10.

11. **Mulch.** Typically, no mulching is necessary, as the dead vegetation will serve as a mulch. If there is little existing grass in an area, a very light application of straw mulch may be made to retain moisture and promote germination.

12. **Water.** See Program I, number 12.

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**Program III**

*(Early to mid spring, or late summer to early fall)*

For use when the thatch layer exceeds ½ inch.

1. **Soil test.** Be sure to take a soil test three to four weeks in advance of renovation activities. Soil testing services are available from the Penn State Agricultural Analytical Services Laboratory or through private laboratories.

2. **Weed control.** If perennial grass weeds such as quackgrass, bentgrass, nimblewill, etc., are present, treat with glyphosate as in Program II, number 2.

3. **Thatch removal.** Remove existing sod, including the thatch layer, with a mechanical sod cutter or till with a rototiller and rake out sod and thatch material.

4. **Grade.** Grade off high spots and fill low spots. It may be necessary to bring in additional topsoil.

5. **Lime.** Lime should be applied in accordance with a soil test recommendation.

6. **Basic fertilizer.** Apply phosphorus and/or potassium fertilizer in accordance with soil test results.

7. **Tillage.** Work lime and fertilizer (if needed) into the soil to a depth of 4 to 6 inches by tilling.

8. **Soil physical amendments.** If a soil test indicates low organic matter content, work the recommended amount of organic matter into the soil to a 2 to 4 inches in depth.

9. **Starter fertilizer.** Apply starter fertilizer in accordance with a soil test recommendation and lightly rake it into the soil.

10. **Seed.** Apply seed with a drop-type spreader. Seed according to seeding suggestions in Program I, number 9.

11. **Cover seed.** Lightly rake to cover seed.

12. **Firm Soil.** Lightly roll to place seed in firm contact with the soil.

13. **Mulch.** Mulch seeded area with clean straw or other mulching material. For best results mulch heavy enough to cover the soil. Remove part or all of the mulch within a few days after seed germination. Where equipment is available, area may be hydromulched with cellulose fiber.

14. **Water.** See Program I, number 12.

The above procedures are only the first steps in renovating the lawn. From this point on, a sound management program must be followed to ensure continued improvement of the lawn. Publications on various phases of turfgrass management are available through the Penn State Extension office in your county.

This publication was originally prepared by John C. Harper II and revised by Peter Landschoot, Professor of Turfgrass Science.