

Renovation of Turf Areas¹

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Introduction

Renovation is the improvement of a turfgrass stand without complete reestablishment. It typically involves removing as much shoot material as possible to stimulate new growth and to reduce buildup of thatch. Renovation steps include scalping, verticutting, sweeping, and top-dressing. Depending on the severity of the renovation, some or all of the steps may be performed.

Reestablishment refers to complete destruction of the old stand, as well as site preparation and replanting. The decision on whether to renovate or reestablish is usually based on turfgrass species and how much desirable turf cover is present. If there is less than 60% desirable cover, reestablishment should be considered.

Factors that can cause deterioration of turfgrass include one or more of the following:

- Use of species or cultivars that are not adapted to the site.

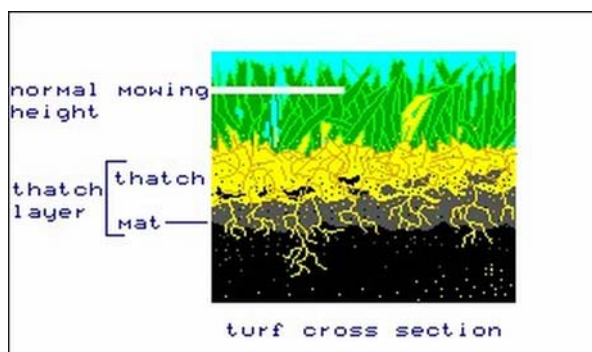
- Improper cultural practices, including improper mowing height or frequency, or excessive or insufficient fertilization, irrigation, and pest control regimes.
- Excessive thatch accumulation.
- Undesirable physical soil conditions like compaction, rock layers, buried foreign matter, severe soil layering, or poor drainage.
- Chemical soil conditions such as acidity, alkalinity, or salinity.
- Excessive shade plus tree or shrub root invasion.
 - Severe damage by diseases, insects, nematodes, or the toxic effect of chemicals.

Causes for turf deterioration must be determined prior to dethatching and renovation. If the environmental causes for poor turf quality and growth are not altered, the renovation procedure will not provide the desired results over time. In addition to environmental factors, it is also important to note that

1. This document is RFLH032, one of a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. This information is included in the Florida Lawn Handbook, SP-45. For a copy of this handbook, request information on its purchase at your county extension office. Original publication date May 1991. Revised April 2004. Visit the EDIS Web Site at <http://edis.ifas.ufl.edu>.

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the practice may be injurious or fatal to the grass if not done by properly trained personnel.

Turfgrass Renovation

The first step in deciding if turf needs to be renovated or reestablished is to carefully examine the turf. Factors to consider include turf type; turf quality in terms of density, color, and weed infestation; thatch thickness; depth and density of the root system; and soil conditions.

Turf Type

Species will recover from verticutting at different rates, which will influence whether or not the procedure should be done. Bahiagrass, bermudagrass, and zoysiagrass will require approximately 30 days for full recovery during the growing season if vertically mowed in two directions, while St. Augustinegrass and centipedegrass may require 30 to 90 days.

Turf Quality

Renovation is best done on actively growing turf. Turf that is excessively spongy but has fairly good color and density and minimal weed contamination is healthier and can be more successfully renovated than turf that has deteriorated to the point where it has become thin and weed-infested.

Thatch Thickness and Root Quality

These factors are usually evaluated jointly since thatch thickness indicates the quantity of organic matter that should be removed, while root system quality usually dictates the extent of permissible renovation. To evaluate the roots, grab a handful of turf and vigorously attempt to pull it out of the soil,

much like a piece of carpeting. Poorly rooted turf may be due to one or more of the following:

- poor management practices (watering, mowing, etc.),
- excessive thatch,
- poor soil topdressing practices,
- improper herbicide use, and/or
- insect and nematode damage.

Turf that has a poor root system or is in a weakened condition should not be verticut. The mechanical slicing action may loosen and strip the turf from the soil in patches. This will further weaken it, causing death following renovation. Options for such a situation include:

• **Reestablishment.** This is recommended when evaluation indicates it to be less expensive than renovation or when the turf is considerably weakened.

• **Scalping.** Poorly rooted bermudagrass and zoysiagrass may have much of the aboveground vegetation and thatch removed by mowing at a low height of cut or scalping. This is not as effective in removing thatch as is vertical mowing, but may precede vertical mowing in the renovation process. Note that scalping is *not* recommended as a general maintenance practice.



• **Thatch thickness.** One method for examining thatch thickness and root quality is to use a straight bladed garden spade to remove a 4- x 8-inch cross section of turf with approximately 6 inches of attached soil. If the thatch layer exceeds 1 inch, it is considered excessive and needs to be removed.



Thatch profile examination can also reveal, to a certain degree, past cultural practices that may affect renovation. For example, very little dead and decomposed thatch in relation to a relatively thick layer of green thatch indicates rapid buildup over a short time span, probably from excessive fertilization and watering. Scalping combined with reduced fertilization and watering may be all that is required to effectively renovate the turf at this time.

Rooting Depth and Density

Depending upon original thickness, previous applications of soil topdressing may occur in sample cross sections as alternating layers of soil and buried organic matter. One should gently attempt to pull the sample apart while grasping the lowermost soil portion in one hand and pulling on the thatch layer with the other hand. A reasonably clean separation at any of the layers indicates the effective rooting depth. Carefully shake or wash soil and/or organic matter from the sample to expose roots and their density. If the sample does not separate at any of the layers, then carefully shake and/or wash the entire sample to expose root systems.

There are no quantitative guidelines for root system evaluation relative to vertical mowing, but successful renovation becomes more difficult as root

system depth and density decreases. A majority of the root system should extend a minimum of 6 or more inches into the underlying native soil. A healthy root system will include a large number of fibrous white roots in the sample. Roots which are yellowish-brown, stubby, and when pulled, slough away from the core are indicative of nematode infestation. If you suspect a nematode problem, have an analysis made to determine if control is necessary.

Soil Conditions

If soil is compacted or water-logged, it may respond to core aeration and topdressing to improve soil properties over time. This may improve root functioning. If reestablishing turf, this is an excellent time to incorporate organic matter or any other soil amendments that may be needed.

Steps In Turfgrass Renovation

1. Determine Extent of Weed Populations

If undesirable weeds or grass species are a problem, a decision must be made on whether to use a selective or nonselective herbicide for weed control. The presence of a large population of weedy perennial grasses usually dictates spot treatment with a nonselective herbicide such as glyphosate (Roundup[®], Kleenup[®]) or glufosinate (Finale[®]). Advance planning is necessary for this procedure since the choice will determine whether delays between steps are necessary. Removing the weeds will reduce competition within the turf stand and allow for faster recovery from the renovation procedure.

2. Remove Thatch and Dead Vegetation

Begin by flagging irrigation heads, ground-level rocks, concrete slabs, electrical outlets, and other obstructions that may damage or be damaged by equipment during renovation. Standard irrigation marker flags are excellent for this purpose. Remove concrete doughnuts or rings used to protect irrigation heads during regular mowing. Tell the maintenance company where all irrigation and electrical lines are deeply buried to avoid damage to or by equipment, or injury to personnel during renovation.

3. Scalp

Some grasses, such as bermudagrass and zoysiagrass, can be scalped to remove topgrowth. Adjust mower height as low as possible for the mower or for the turf being renovated. A grass catcher, a vacuum, or a trailing brush-type sweeper should be used to remove the majority of clippings prior to vertical mowing.



4. Vertical Mow

Consult Table 1 for recommended blade spacing. Changing blade spacings and/or reels is a difficult operation and is usually performed prior to the delivery of equipment to job sites. Blade spacings listed in Table 1 are adequate for most situations, but experience may dictate changes for optimal performance.

The most practical method for determining proper vertical mower blade depth is to make a series of downward adjustments followed by short test runs to determine the degree of thatch removal. Ideally, soil penetration of 1/4 inch will cultivate and topdress while removing thatch. The equipment operator should keep in mind that additional green vegetation will be removed when the area is vertically mowed a second time at right angles to the first mowing. A heavy duty vertical mower is usually best for areas reasonably free from obstructions, thus permitting straight line mowing. A lightweight, highly maneuverable unit is more suitable for restricted areas. Thatch or debris brought to the surface as a result of vertical mowing should be removed each time the area is vertically mowed to reduce equipment flotation and drag on subsequent cuts.

Failure to remove debris increases mower power requirements necessitated by having to recut debris left on the surface. Contact your county Cooperative Extension agent for more information on thatch removal by vertical mowing.



5. Vacuum Sweep

The final step in thatch removal is to vacuum sweep the entire area to remove remaining debris and as much fine or powdery thatch as possible. Final scalp and vacuum sweep operations often are reversed since vacuum sweeping has a tendency to produce a slightly irregular surface.

Topdressing

Topdressing is the application of a thin layer of soil to the entire turf surface to level renovated areas or to fill small depressions. Topdressing is also a good method of controlling thatch, as it provides an ideal habitat for soil microorganisms that decompose thatch naturally. It is very important to topdress with soil similar to the native soil on which the turf is growing and use as little as possible to minimize layering. Never bury turf with topsoil when leveling or filling depressions. St. Augustinegrass should be topdressed lightly or conditions favorable for brown patch disease may develop. Sterilized topsoil should be used to prevent weed seed introduction. Soil should be screened to remove foreign material such as small twigs and rocks. Table 2 contains volumes of topsoil required for varying thickness of topdressing.



Aerification

This is an optional but sometimes very important step in the renovation process. Severe compaction of the soil surface or presence of soil layers differing in texture in the surface two inches are conditions that require core cultivation or aerification. This improves aeration and water penetration and reduces surface layering problems. Grooving and slicing are also used in cultivation. Any of these procedures are preferred to spiking since they bring soil to the surface and penetrate to a greater depth. Repeat cultivations are generally necessary for best results. If aerifying is done, vertical mowing or dragging of the area with a steel dragmat may be necessary to break up the cores and scatter the soil over the surface. Aerification does not remove excessive thatch and should complement, not substitute, for vertical mowing.



Planting

Grass should be replanted in thinned or bare areas. Procedures for reestablishment into these areas are the same as those that would be followed for a

new turf area. Sprigs removed during vertical mowing are an excellent source of vegetative material for planting.



Fertilization and Cultural Practices

Soil tests should be run to determine pH level. Additional tests may be run for phosphorous (P) levels. Correction of pH or the addition of phosphorus should be done at this time if necessary. Fertilization should also be done at this time to stimulate regrowth from the renovation. A water-soluble nitrogen source will apply readily available nitrogen for growth and will speed up recovery time. Apply 1/2 lb. of nitrogen per 1,000 square feet of turf. Water the fertilizer into the soil immediately following the renovation procedure.

Maintenance practices including mowing and control of insects and disease should be resumed immediately following renovation. Dead organic matter exposed in renovated areas dries quickly, becoming hydrophobic (water repelling), and further stresses renovated turf. Treat renovated turf as a new installation and irrigate two or three times daily until the turf is capable of surviving with less frequent watering. A good irrigation policy is to irrigate twice during the day. One-tenth inch of water (62 gallons per 1000 square feet) applied at 11:00 am and again at 2:00 pm should be adequate. The preceding water quantities should suffice under most conditions, but might require adjustment to better fit all local conditions.

Daily irrigation should be discontinued as soon as the turf becomes sufficiently rooted to withstand early morning watering only. Irrigation frequency and quantity should then be adjusted to avoid daytime wilting. Irrigate on an as-needed basis as soon as the renovated turf has fully recovered.

Equipment Requirements

Table 3 is intended to serve as an equipment guide for small residential lawn maintenance companies or small commercial turf areas such as motels, hotels, and condominiums. Requirements for larger turf areas differ in that larger, high-speed equipment is required.

Table 1. Recommended vertical mower blade spacings.

Grass Type	Inches	Centimeters
Bahiagrass	3.0	7.5
Bermudagrass	1.0 - 2.0	2.5 - 5.0
Centipedegrass	2.0 - 3.0	5.0 - 7.5
St. Augustinegrass	3.0	7.5
Zoysiagrass	1.0 - 2.0	2.5 - 5.0

Table 2. Volumes of topsoil required for topdressing at a normal rate per 1000 square feet of turf area.

Topdressing Thickness	Cubic Volume		
	Inches	Feet	Yards
1/8	10.42	0.39	
1/4	20.83	0.77	
5/16	26.04	0.96	
3/8	31.25	1.16	
1/2	41.67	1.54	
5/8	52.08	1.93	
3/4	62.50	2.31	
1.0	83.30	3.09	

Table 3. Suggested equipment requirements.

Quantity	Description	Intended Use
1	Heavy duty, self-propelled, vertical mower, 1012 HP.	Straight-line vertical mowing in open, readily accessible areas.
1	Medium duty, self-propelled vertical mower, 47 HP.	Close work around flower beds and other tight areas.
1	Heavy duty, self-propelled, walk-behind or riding rotary mower with catcher.	Scalping and clipping prior to removal and following vertical mowing. Primarily for use in open, readily accessible areas. Mowing swath, HP, etc. to be determined primarily by size of areas normally selected for renovation.
1	Medium duty, self-propelled, walk-behind rotary mower with catcher.	Scalping and cleanup work around flower beds and other tight areas.
1	Self-propelled, walk-behind, or trailing brush-type sweeper.	Debris removal following vertical mowing.
1	Self-propelled, walk-behind vacuum sweeper.	Final cleanup and for removal of fine mat.
1	1-ton pickup with high sides.	Equipment and personnel transport. Haul away debris removed during renovation.
1	Rototiller.	Prepare soil where areas need reestablishment.
1	Utility trailer with sides.	Equipment transport and debris removal.
1	Aerifier.	Core cultivation where compaction or layering is a problem.
--	Miscellaneous hand tools, (e.g., rakes, trash forks, brooms, etc.).	--