Lawn Maintenance

Description

Lawn maintenance includes mowing, irrigating, pesticide and fertilizer management, soil management, and the disposal of organic debris such as lawn clippings, leaves and pruned branches and twigs. This BMP also briefly discusses home gardens. For the purposes of this BMP, "lawn" and "turf" are used interchangeably.

Other Terms Used to Describe

Urban Lawn Care
Rural Lawn Care

Pollutants Controlled and Impacts

Proper maintenance results in healthy lawns. Healthy lawns will:

-help keep soil on the site, thereby preventing erosion
-take up nutrients
-reduce the volume and rate of runoff and increase groundwater recharge
-decrease the need for pesticides

Application

Land Use
This practice is applicable to all land uses.

Soil/Topography/Climate
Lawn maintenance practices will differ, depending upon the soils, topography and climates.

When to Apply
Apply this BMP throughout the year.

Where to Apply
Apply on all lawns and gardens.

Relationship With Other BMPs

The Pesticide Management BMP walks users through the proper selection of turf species (the first and most important part of an integrated pest management program), as well as the proper use, storage and disposal of pesticides. Establishment of turf by seeding is discussed in the Seeding and Mulching BMPs. Establishment of turf by sodding is discussed in the Sodding BMP. This Lawn Maintenance BMP assumes turf is already in place.

Specifications

The following specifications are provided **to maintain healthy turf areas.** Much of the information, including both tables, is extracted from "Turfgrass Pest Management: A Training Manual for Commercial Pesticide Applicators", Michigan State University, Cooperative Extension Service, Bulletin E-2327.

Mowing:

Different types of grasses have different mowing requirements, based on the turf species and the intended use of that species. When you lower the mowing height, you reduce the root system. Root reduction decreases the amount of water available to support the turf stand. In addition, since close mowing weakens cool-season grasses, it invites weed invasion. Crabgrass, in particular can be reduced by the shading effects of the taller, denser growth of plants.

The chart below shows the proper cutting heights for typical cool-season grasses. Use this chart as a general guide. Where the mowing height is not dictated by the turf's use, mow at the "preferred height" listed in the chart.

Table 1

Cutting Heights for Cool-Season Grasses

Grass Type	Low Cut (inches)	Preferred Cut (inches)	High Cut (inches)
Kentucky bluegrass common types	1¼	2 to 3	4
Kentucky bluegrass improved types	¾	2	3
Perennial ryegrass common types	1½	2 to 3	4
Perennial ryegrass turf types	¾	1½ to 2	3
Fine fescue	1	1½ to 3	4
Tall fescue pasture types	2	2½ to 3½	4
Tall fescue turf types	1¼	1½ to 3	3
Creeping bentgrass	¼	½ to ¾	1
Colonial bentgrass	½	¾ to 1	2
Annual bluegrass	¼	½ to 1	2
Smooth bromegrass	2	3 to 4	5

From *Landscape Management* by J.R. Feucht and J.D. Butler.

During hot, dry periods turf stands need more water. Where uses don't limit mowing height, and to conserve water in grass plants experiencing drought, consider mowing less frequently and at a higher height of cut.

Grass clippings should be left on the grass because they offer a "free" source of nitrogen, and will decompose without affecting the quality of the grass. When clippings are regularly removed, fertilization must be increased by 25-50%. Grass clippings do *not* contribute to thatch. Mulching mowers can be used to cut the grass into tiny pieces which degrade faster.

Watering (Irrigation):

Too much water is as damaging to turf as drought. When turf is saturated, transpiration is slowed and infectious diseases encouraged.

Proper irrigation depends on weather conditions, soil type, grass variety preference, and turf use and maintenance practices. Generally, most turfs require about 1 inch of water per week. For site-specific water requirements, it is important to use a rain gauge to measure rainfall and determine the amount of irrigated water needed. Computer models are also available which can help determine watering requirements.

An irrigation system is complex and should be designed only by professionals experienced in their design. Each irrigation system should be custom designed to fit the site conditions--soils, availability of water, vegetation needing irrigating, etc.

For many purposes, the crude, but effective "footsteps" method can be used. With this method, you need to irrigate when turf begins to wilt and does not spring back when crushed (footsteps linger in turf). Other watering guidelines are discussed below.

In general:

1. The total precipitation and irrigated water should amount to about an inch of water per week. To determine how much water small sprinklers deliver, place a coffee can in a straight line from your sprinkler to the edge of the watering area. Turn the water on for 15 minutes and measure the average depth of the water that collects in the can. Multiply this number by four to determine the amount of water that would cover your lawn in one hour. Then calculate the amount of time (in hours) that it would take to apply an inch of water.

   With sprinkler systems, the uniformity of water application depends on the spacing, choice of sprinkler, water pressure, and wind velocity. System efficiency and effectiveness, in turn, is dependent on uniform application of water.

2. Do not apply water faster than it can soak into the soil. Any water running off the lawn indicates that the application rate is too high.

3. Many sources recommend applying supplemental water once a week during the early morning hours. However, during hot, droughty periods, turf may benefit from daily, light, afternoon waterings. Water during the heat of the day cools grass plants and replaces evaporated water. In addition, research conducted at Michigan State University found that injury due to patch diseases, including necrotic ring spot, was reduced on susceptible turf that received light, frequent waterings during the summer.

4. When a groundwater well is used, the well should be sited and constructed to avoid potential contamination of the groundwater supply. Locate the well on high ground to exclude the entrance of surface and near-surface water that may contain potential sources of contamination; such as drainage fields, and fertilizer and chemical storage and preparation areas. Adequate ground protection should include extending the well casing above grade, using a sanitary well seal or pitless adaptor at the well head, and sealing or grouting between the well casing and borehole. All wells must comply with state water laws and regulations.

   Any discharge pipe from the well or to the system must be protected against backflow in the well by installing backflow prevention devices.

5. By law, all abandoned wells must be sealed. Contact the local health department for assistance in sealing abandoned wells.

Dethatching:

A layer of thatch exists in all turf between the green vegetation and the soil surface. Thatch is composed of tightly intermingled living and dead stems, leaves and roots. A small amount of thatch in turf is beneficial in that it reduces soil compaction, moderates soil temperature, and limits evaporation of soil water.

Turf-inhabiting organisms such as earthworms break down thatch. In areas which are highly managed, excess fertilizer and routine pesticide applications significantly reduce these organisms. To keep beneficial organisms in turf, apply fertilizers and pesticides according to BMP specifications.

Because production of thatch is increased and break-down decreased, excessive thatch can be a problem of intensively-managed turf. Too much thatch restricts the movement of water, air, fertilizers and pesticides into the soil, encourages disease and insect pests, and reduces cold and heat tolerance. To determine if a stand has excessive thatch, cut a pie-shaped wedge out of the turf and measure the thickness of the thatch layer. If it is greater than one-half inch thick, take steps to reduce thatch.

To reduce thatch:

Practices that relieve soil compaction also help break down thatch. Vigorous hand-raking will remove thatch on small turf areas. Machines equipped with vertical knives or tines can remove thatch on larger areas. Dethatching machines cut and extract organic debris from turf. Because dethatching thins turf stands, thatch removal should be done during cool, moist periods when turf can recover quickly.

Organic Debris Disposal:

The following is summarized from the Organic Debris Disposal BMP. Refer to that BMP for the disposal of all leaves, grass and pruned branches:

1. Leave grass clippings on the grass.

2. Where it is necessary to remove grass clippings or leaves, dispose of them by composting. Information on how to construct and maintain a composting pile is discussed in the Organic Debris Disposal BMP.

3. Pruned branches should be disposed of either by chipping or by composting. Wood chips can be used as part of the landscaping.

4. Do *not* dispose of organic debris by dumping it in or near water bodies. Do not dump or sweep leaves, grass (or anything else) into sewers--storm sewers discharge into waterbodies. Do not put debris in the floodplains of rivers or streams. Follow all other Organic Debris Disposal specifications.

Fertilizers:

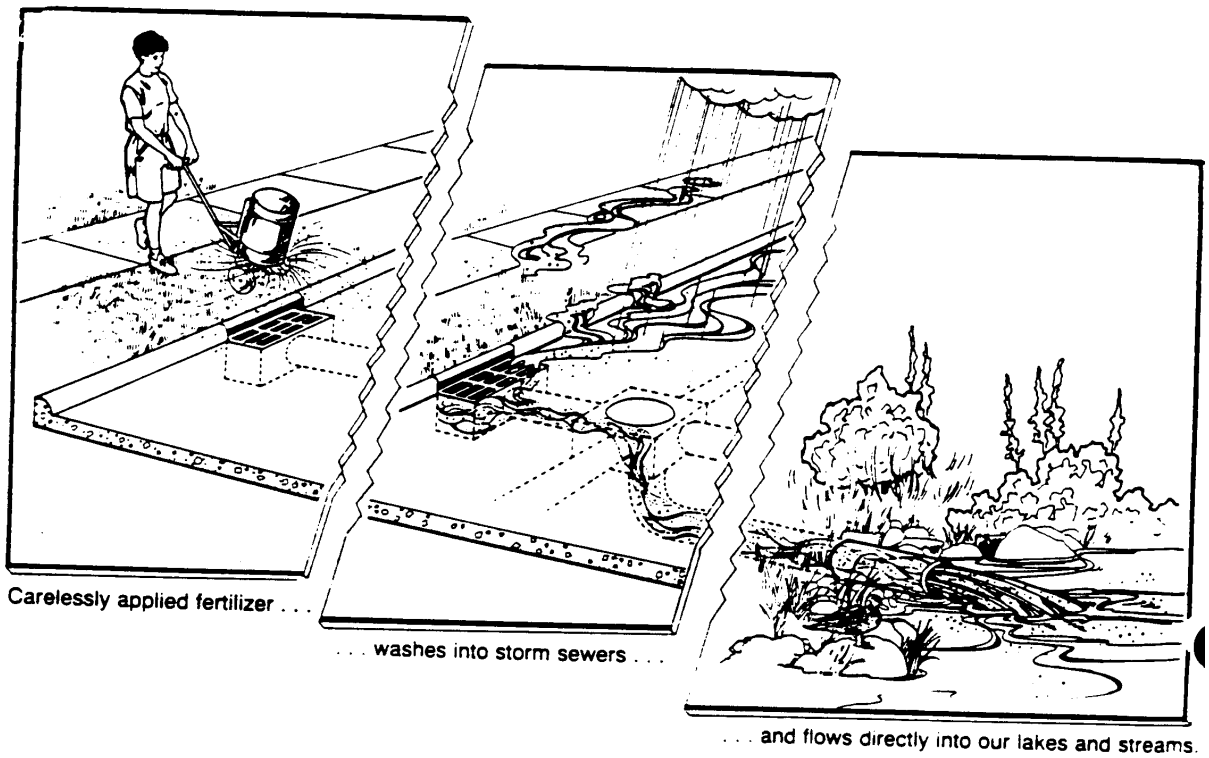
Plants require a certain amount of nutrients (nitrogen, phosphorus, etc.) to grow, thrive and stay green. Nutrients which are applied beyond that needed by the plant can be either washed off the soil and into lakes, streams and wetlands, or leach into groundwater. Nutrients such as nitrogen and phosphorus which enter surface waters can result in algae blooms and nuisance aquatic plant growth.

Groundwater can also be impacted by nutrients. Nitrogen readily converts to nitrate which, when leached to groundwater, can contaminate drinking water supplies. Coarse soils such as sands and loamy sands are more susceptible to leaching than fine-textured soils such as silts or clays. Phosphorus generally does not leach into groundwater because it binds readily with soil.

Complete fertilizers contain nitrogen, phosphorus, and potassium. The ratio of the three nutrients is called the fertilizer analysis. Common turf fertilizer analyses include 20-10-5, 20-5-10, and 21-3-7. A 100 pound bag of complete fertilizer with an analysis of 20-10-5 contains 20 pounds nitrogen, 10 pounds phosphorus and 5 pounds potassium.

Slow-release fertilizers are formulated so that elements are released relatively slowly over time. Fertilizers are also available that do not contain one of the three common nutrients. For example, in areas where soil tests indicate phosphorus levels are adequate for turf growth, you can use fertilizers which contain no phosphorus.

A fertilizer program for lawns should begin in the fall (as opposed to the spring) to promote deep, healthy root systems and hardy lawns. This, in turn, will help grass compete with unwanted grass species and weeds in the spring. Spring applications of fertilizer will help the grass start growing, but may promote more top (leaf) growth than root growth. Shallow root systems are unable to sustain lawns through a drought or a harsh winter.



Source: University of Wisconsin - Extension bulletin: Lawn and Garden Fertilizer.

Application rates for fertilizers should always be based on soil tests. To take soil samples, follow directions in the Soil Management BMP. Where soil samples cannot be taken, follow the "Nitrogen guidelines" in the attached exhibit.

Fertilizers should *not* be applied to turf when the soil is frozen because turf cannot utilize the nutrients, and runoff rates are high. Fertilizers should *not* be applied before significant intensive rainfall events.

Always follow all specifications in the Fertilizer Management BMP for the proper handling, storage, use and application of fertilizers. Calibration procedures are also included in that BMP.

Pesticides:

Pesticides are a family of chemicals which kill insects (insecticides), weeds (herbicides), fungus (fungicides) and rodents (rodenticide). Over-application of pesticides can results in fish kills in lakes and streams, contaminated groundwater, and damaged turf.

When most people identify a weed or insect problem, the most common response is to buy pesticides to eliminate the problem. However, in some situations, hand removing weeds and large insects will be as effective as spot spraying them. It is also possible to interfere with the pests' habitat by altering the landscaping in a way which will not attract the pest. Using biological controls, such as the pests' predators, should also be considered. Keep in mind that not all pests are "bad". Many insects, for example, are natural predators of more harmful insects.

The Pesticide Management BMP discusses integrated pest management techniques, and the proper handling, application, storage and disposal of pesticides. Always follow the specifications in the Pesticide Management BMP whenever a pest is encountered.

The local Cooperative Extension Service (CES) office or a reputable private consultant can also be contacted for information on the best way to get rid of your problem pest. These professionals may ask you to bring in sample weeds, leaves or small branches to help identify the specific pest. CES staff and reputable consultants will then suggest ways to eliminate the problem, following the principles in the Pesticide Management BMP.

Gardens and Other Bare Soils:

Ideally, gardens and other bare soils in and around lawns should be covered with a light layer of organic material (such as grass clippings or leaves) to keep soil on-site. Organic material will reduce the impact of raindrops and allow rain to soak into the ground. Sweep any soil off paved areas (i.e. sidewalks and driveways) to prevent the soil from entering the storm sewer system.

For Unhealthy Turf:

The turf manager must first determine the reason for the unhealthy turf, then take steps to address the problem. The Pesticide Management BMP contains a section on monitoring techniques for turf. It may be necessary to take soil samples, following specifications in the Soil Management BMP to help determine the problem. Make soil amendments, including liming and sulfur additions for pH, and coring for compaction problems following BMP specifications. If soil tests indicate nutrients are lacking, add fertilizers following the Fertilizer Management BMP. If pests are the problem, determine the threshold of the pest, then use the Pesticide Management BMP to control or reduce the pest population. Sometimes unhealthy turf may benefit simply from adjusting irrigation schedules and/or raising mowing heights.

Shade may also be a problem for turf. The Pesticide Management BMP contains turf species which do better in shade than others. If trees which provide shade are hindering the growth of the turf, it may be beneficial to prune lower branches and thin out the crowns of shade-producing trees and shrubs. This increases the amount of light and air movement to the turf. It may also be necessary to aerate or adjust the pH of soils underneath trees, especially in areas where decomposing leaves may turn the soil acid. If all efforts to improve the turf fail, you may want to consider using mulch or shade-tolerant ground covers such as periwinkle, pachysandra, purple winter creeper, and English ivy in the place of turf.

To **irrigate** diseased turf: Managers of diseased turf should replace only the water lost in evapotranspiration (the amount of water that evaporates from turf stands plus the amount of water used in transpiration). Do not saturate the thatch. During hot, dry periods, apply daily a small amount of water (one-two tenths inch) during the heat of the day. Since this practice will not deliver a full inch of water per week, regularly check the moisture of deeper soil and apply additional water when necessary.

Exhibits

Exhibit 1: Nitrogen for New Lawns and Vegetable Gardens: Modified from Protecting Water Quality in Urban Areas, State of Minnesota. Table: Modified from University of Wisconsin-Extension.

Exhibit 1

Nitrogen Guidelines if Soil Tests Are Not Possible

New Lawns:
Apply 0.5 pounds nitrogen per 1,000 square feet before planting. Incorporate the nitrogen 0.5 to 1 inch into the soil, and mulch on top. (See the Mulching BMP).

Existing Lawns:
Several bulletins for lawn fertilizer applications recommend applying fertilizer two-four times a year, with a maximum of 1 pound N per 1,000 square feet. To save money and prevent excess nutrients from entering surface waters, we recommend starting with an application of 0.5 - 1.0 pounds (8 - 16 ounces) nitrogen per 1,000 square feet two times a year, once in May and once in October. Grass clippings left on your lawn is a source of nitrogen for your lawn and, if evenly distributed, can be equal to one fertilizer application per year.

If your lawn is not staying healthy with these rates, then use the chart below to increase your fertilizer use. Never apply more than 1.0 pound per 1,000 square feet in any one application. (Example: 20-5-10 is 20% nitrogen, so 5 lbs. of 20-5-10 is applied per 1,000 square feet in order to apply 1 lb. of actual nitrogen).

Nitrogen Application Guidelines for 4 Times/ Year Application
Pounds of Nitrogen per 1,000 square feet

Time of Application	Grass Clippings Removed	Grass Clippings Not Removed
October 1	1.50	1.50
Late May	1.5	1.00
Late June	0.75	0.50
Late August	0.75	0.50

Source: Modified from University of Wisconsin-Extension

Vegetable and Flower Gardens:
Apply 0.2 pounds (3.2 ounces) nitrogen per 100 square feet. An additional 0.18 pound (2.9 ounces) nitrogen per 100 square feet may be needed for corn, tomatoes and pole crops (beans).

To avoid nitrogen loss **on sandy soils** (and to protect groundwater supplies from nitrate contamination) apply nitrogen at one-half the rate but twice as often. Another option is to use slow-release nitrogen or natural organic nitrogen sources.

Source: "Protecting Water Quality in Urban Areas," State of Minnesota.