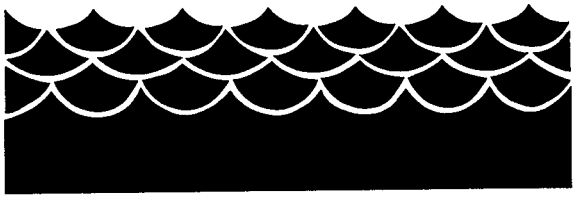
TURFGRASS MANAGEMENT
FOR PROTECTING SURFACE WATER QUALITY



Using Lawn Fertilizers and Pesticides Responsibly

Even when proper lawn care practices are used, usually at some point pest control or fertilizer supplements may be necessary to maintain a quality lawn. Following are some guidelines for using lawn fertilizers and pesticides in a responsible manner to help safeguard surface water.

General fertilization practices

- Never deposit or inadvertently apply any fertilizer materials into lakes.

- Fill granular fertilizer spreaders on a hard surface where spills can be easily cleaned up. NEVER wash off fertilizer spills into the street or other hard surface area where they can easily enter storm sewers and ultimately surface water. Wash off granular fertilizer spreaders over turfed areas to prevent runoff of fertilizer material from hard surfaces. Fill and clean liquid fertilizer applicators over turfed areas for similar reasons.

- Close the gate on the fertilizer spreader when crossing hard surface areas or sweep up the material off of hard surfaces and reuse it another time. Or put it back into the spreader.

- Use drop spreaders near shoreline areas to apply fertilizer to create a buffer zone. Drop spreaders are more precise but slower than rotary type spreaders. The rest of the area further away from the shoreline can be fertilized with a rotary spreader. Since the perimeter has already been carefully done with a drop spreader, it is not necessary to try to hug the shore, potentially getting fertilizer into the water. The same kinds of percautions should be taken when using liquid applications.

- Avoid getting fertilizer into natural drainage areas or pathways on a property. These may not necessarily be hard surfaced areas and can carry fertilizer directly into the surface water area before before having the chance to infiltrate into the surrounding turf/soil area.

- Leave a buffer zone of unmanaged grasses or natural vegetation along shoreline areas. This can help prevent soil erosion and retain some of the nutrients that might otherwise enter the lake.

Nitrogen management

The amount of nitrogen (N) required by a lawn or turfgrass area depends on the type of grass plants present and the management practices used. High-maintenance lawns often contain the more vigorous improved Kentucky bluegrass and turf-type perennial ryegrass varieties. These lawns perform better when adequate water and fertilizer are regularly provided. Low-maintenance lawns usually consist of common types of bluegrass in combination with a mixture of other grasses. These lawns grow and spread more slowly and usually receive little extra water or N fertilizer. Table 1 describes the annual application of N requirements for these lawn types and how leaving the clippings on the lawn impact yearly N requirements.

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Table 1. Annual Nitrogen Requirements and Application Timing for Lawns in the Upper Midwest.

Maintenance Practices	Nitrogen (N) to apply lbs. N/1000 ft²	Timing of Applications
High maintenance lawn		
(Irrigation, clippings removed)	4	May – June, Aug., Sept., Oct.– Nov.
(Irrigation, clippings not removed)	3	May–June, Aug., Oct. – Nov.
Low maintenance lawn		
(No irrigation, clippings removed)	2	Aug., Oct. – Nov.
(No irrigation, clippings not removed)	1	September

* Assume 1 lb. N/1000 ft² of a soluble, quick-release N source applied at each application.

Note: Lower, more frequent rates of a quick-release N fertilizer can be used on sandy to sandy loam soil. Slow-release N fertilizers could also be substituted for the quick-release types. Follow manufacturers' and/or Extension suggestions for proper application rates.

On highly leachable soils—sands, and sandy loams, the above recommended N application rates may result in excessive loss of nitrate-N due to leaching. Where soluble N sources are used on these soil types, reducing the N rates to 1/4 to 1/2 lb. N per 1000 square feet per application may minimize potential nitrate-N leaching. If frequent, lower N rate applications are not practical, slow-release N sources may be a better choice for these soils. This practice is adaptable to late-season N fertilization and may be especially true where sandy soils are in close proximity to surface water or groundwater.

Watering practices that result in water movement beyond the root zone may increase potential nitrate-N leaching. Frequent, daily irrigation during cool moist periods also can increase the leaching potential. Irrigation practices that consider the grass plant's needs during any particular climate condition are more effective. Adding enough water to compensate for that removed by plant uptake and evaporation minimizes potential N leaching. Sloped areas may require more frequent but smaller amounts of water per application as they are more vulnerable to runoff before ample water has infiltrated into the soil.

Irrigation of 1/4 to 1/2 inch of water immediately after an application of a quick-release N source will help move the N into the surface soil where it can potentially be used by the grass plant. Also, it will be somewhat protected from runoff and possible volatilization back to the atmosphere.

Grass clippings should be returned to the lawn area to decompose and recycle nutrients back to the turf area. They should not be blown or raked into street gutters or onto sidewalks and driveways where they may be carried in runoff to surface water. Nutrients released to water through decomposition may be responsible for causing undesirable algae and vegetative growth.

NEVER apply N fertilizers to water resources directly or apply them to frozen ground.

Phosphorus management

Phosphorus fertilizer additions to turf areas should be based on a reliable soil test. The soil test can be obtained from soil testing labs at land grant universities or private soil testing laboratories.

As P is quickly immobilized in the soil, it does not pose a threat to water resources from leaching. Where sediment is eroded from the site, it is likely that some amount of P will be carried with it. In established turfgrass areas, runoff potential is quite low due to the dense turfgrass canopy and extensive fibrous root systems. Therefore, where P is applied to turfgrass areas, it should be watered into the soil where it is immobilized and generally protected from loss by runoff.

During the winter months, leaves, dead

grass plant parts, and other organic debris may, upon breakdown due to freezing and thawing actions, release soluble forms of phosphate (and nitrates). These can potentially runoff from frozen ground, especially slopes, during spring snowmelt and early spring rains and possibly be carried into surface water areas. Thus, raking the lawn in the fall to remove excess organic debris also may be beneficial from a water quality standpoint. Grass clippings, leaf litter and other forms of organic debris should be removed and kept off of hard surface areas where they can be carried in runoff to surface water areas. Obviously, these same materials should not be dumped on or near shoreline areas where nutrients released during decomposition can move directly into the water.

As P is immobile in the soil it is often advisable to add some P at the time of establishment, even though soil P levels may be adequate for an established turf. This ensures that some P is available near the soil surface for the young developing grass roots. Protecting newly seeded areas, especially slopes, with some type of mulch cover during establishment helps prevent runoff and erosion of soil and possible nutrients. Applying P to an established turf following core cultivation helps move P down into the soil thereby protecting it from loss by runoff.

Responsible pesticide application
The first step in responsibly using any pesticide product is to follow the label directions exactly as stated on the product container. The label provides necessary information regarding proper product application and container disposal procedures. Labels are legal documents and are enforcible by law should the product be used in a manner inconsistent with directions.

Before applying insecticides and fungicides to a turf area, be sure that the apparent damage symptoms are being caused by an insect or disease. If an insect or disease pest is found to be causing serious turf damage, then select a proper control method. This may or may not involve the use of a pesticide.
Weeds should be identified to determine whether there is a need for a pesticide. They may only indicate whether other cultural conditions that also need to be corrected. As with fertilizers, extreme care must be taken to prevent the direct application of pesticides into surface water areas.

Properly timing pesticide applications is crucial to their overall effectiveness against the pest and to minimize adverse environmental impacts. Often minimal amounts of a pesticide can be used when the pest is in a young and/or highly vulnerable stage. When weeds or insects are quite large and mature, greater amounts of pesticides are usually needed and may not be that effective. Likewise, treating disease problems at very early stages of infection is more prudent and may require less fungicide than attempting treatment of large, heavily infected areas.

Proper timing also can relate to the time of year when a pesticide may be most effective. For example, fall is the best time to control perennial broadleaf weeds. At this time of year (mid-September to early October), these plants are actively growing and will more readily take up the herbicide. Often, lower rates and only one application of an appropriate herbicide are needed to be effective. As much of the other landscape plant material is either going dormant for the winter or has been removed from garden and flower beds, there is usually less chance for off-target plant injury. However, that does not give license to be careless when applying a pesticide product.

Sometimes it is necessary to water-in a pesticide treatment for it to be most effective. Pre-emergent types of herbicides typically used for controlling crabgrass and other annual weedy plants must be moved into the soil surface. Their mode of action is such that it affects the seed as it

begins to germinate but before it emerges from the ground. Depending on the soil type, 1/4 to 1/2 inch of moisture should be applied following application of these products. With most lawn sprinklers, this is about one to two hours of irrigation. Automatic irrigation systems may need to be adjusted accordingly. This not only puts the product where it will be the most effective but may move the material far enough into the soil that it will not be carried away in runoff.

A similar situation exists when using insecticides and fungicides. Those materials used for controlling thatch and soil inhabiting insects and diseases usually require some type of irrigation following application to move the product into the thatch and thatch/soil area. This puts the product where it is the most effective, reduces the chances of runoff, and potentially reduces exposure to the material. While thatch can facilitate the breakdown of these materials and potentially reduce their effectiveness, it also can shorten pesticides' persistence in the environment. Pesticide label directions will indicate whether or not post-application irrigation is needed.

In the case of herbicides, it is often unnecessary to throughly drench an area to achieve satisfactory weed control. This may be wasteful of both water and herbicide as well as moving the herbicide beyond the plants and into the soil where it may be more prone to leaching. Where plant cover is sparse, the herbicide could potentially be carried in runoff either directly or bound to sediment. Spraying just to wet the foliage without causing runoff is usually sufficient to get enough herbicide into the plant to be effective. Again, follow label directions for proper mixing and water volume to use with the product.

Protecting our surface water as well as groundwater is not something to be taken lightly. However, neglecting our turf areas for fear of introducing nutrients and pesticides into our water supplies is not a way to protect these resources. Evidence is beginning to build that properly maintaining turfed areas with appropriate but modest use of fertilizers and pesticides may do more to protect our water resources than to hurt them.

For additional information regarding the responsible use of lawn fertilizers and pesticides to protect surface water quality, see the following publications, available at county extension offices.

Turfgrass Management Practices for Protecting Surface Water Quality, AG-BU-5726-E
Lawn Care Practices to Reduce the Need for Fertilizers and Pesticides, AG-FO-5890-B
Responsible Use of Lawn Care Pesticides, AG-FO-5891-B
Phosphorus Management Practices for Lawns, AG-FO-5892-B
Nitrogen Fertilizer Use for Lawns, AG-FO-5893-B

Printed on recycled paper with agribased inks

A joint publication of the Minnesota Extension Service, University of Minnesota, and Iowa State University Extension.

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This material is based upon work supported by the U.S. Department of Agriculture, Extension Service, under special project number 91-EWQI-1-9265.