Seven Things You Can Do To Reduce Nutrient Loss From The Golf Course

During the last 25 years, the USGA Green Section supported a wide range of research investigating the fate of fertilizers applied to golf course turfgrass. Providing a line of defense to prevent nutrients from entering surface water is good for the environment and good for golf. Here are seven things you can do to reduce the amount of nutrients entering streams, ponds or lakes—some are easy to do while others need significant planning and management:

The USDA Agricultural Research Service evaluated cartridge filters installed on drainage lines to reduce the amount of phosphorus entering a lake.

1. Schedule fertilizer applications to avoid rain storms

Rainfall or irrigation plays a key role in determining nutrient runoff and leaching. Runoff water volume increases with higher soil moisture before a rainfall event. So, avoid fertilizer applications when soils are near saturation and rain is possible. The first rainfall event after a fertilizer application will produce the greatest nutrient loss by runoff water. Apply fertilizer when significant rainfall is not expected for several days. Lightly watering in fertilizer will reduce off-site transport.

2. Do not apply fertilizer on dormant turf, or too early or late in the growing season

Turfgrass needs to be growing to use nutrients and water. Both nitrogen leaching and runoff follow a strong seasonal pattern. Nitrate concentrations in runoff and leachate are highest during winter months when turfgrass is dormant,

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precipitation is more plentiful, and soil microbial activity is reduced. Apply nitrogen fertilizer only during periods when turfgrass is actively growing.

3. Phosphorous-containing fertilizers should be applied in small amounts based on soil-test recommendations

Water quality studies show that phosphorus concentrations exceeded acceptable levels in 86 percent of ground- and surface-water samples. A reason for this large percentage is the low concentrations of total phosphorus allowed by the U.S. Environmental Protection Agency. Apply phosphorous-containing fertilizers in small amounts based on soil-test recommendations. Also, lightly watering in the fertilizer will reduce the floating of granular materials in surface runoff.

4. Controlled-release products can reduce nitrogen leaching and runoff

The amount of nutrient loss is tied to application rate. Higher application rates of nitrogen and phosphorus result in more nutrient runoff. The use of controlled-release sources of fertilizer can reduce the amount of nitrogen leaving turfgrass areas in leachate or runoff water.

5. Established turfgrass has lower fertilization requirements

The threat of nutrient runoff or leaching increases when fertilizer rates are higher than the amount that turf and soil microbes can use. While higher fertilizer rates may be acceptable for newly established turfgrass, mature turf with an extensive soil microbe population will need lower fertilization each year. Excessive fertilization to increase turfgrass color can negatively impact the water quality of streams, ponds or lakes on a golf course.

6. Use vegetative buffer strips around surface water

Buffer strips of native grasses, plants, or turf reduce nitrogen and phosphorous in runoff water. Buffer areas receiving infrequent irrigation and fertilization provide a filter for nutrients from surface runoff water. The dense vegetation of a buffer slows runoff and allows time for water to infiltrate into the soil. Swales or terraces can increase the amount of time a buffer strip has to trap nutrients. Vegetative buffer strips are a particularly useful around streams, ponds or lakes.

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7. **Constructed wetlands or filters to remove nutrients from runoff or drainage water**

During severe storm events, large amounts of water flow from playing surfaces. Constructed wetlands or filter beds help prevent nutrients from entering streams, ponds or lakes. Aquatic vegetation in wetlands absorb nutrients in runoff. Filter beds contain materials that bind nutrients. The use of constructed wetlands or filters is important when the golf course is next to sensitive environmental areas.

Final thoughts

Some preventative measures to protect ground and surface water are easy to do while others need significant planning and management. However, every preventative measure will help provide a line of defense against nutrients leaving a golf course. The golfing public needs to be aware of the environmental issues involved in providing quality playing surfaces for the game. Through USGA-supported research, scientists have identified potential problems, as well as management solutions to reduce the environmental impact. Support the efforts of golf course superintendents whose management practices reduce nutrient loss into golf course streams, ponds or lakes.

Source: Mike Kenna

Additional Information:

Steel Slag to Filter Phosphorus
Golf Course Watershed Management
Core Cultivation to Reduce Nutrient Loss
USGA-funded Nutrient Fate Research
Managing Golf Course Roughs to Reduce Runoff

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