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Best Management Practices for Nutrient Management of Turf in New Jersey

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This outline of turf management BMPs is recommended by RCRE for turf managers, consultants, and policy makers regarding nutrient management in turfgrass systems. Additionally, these can be used as guidelines for common management practices within the turfgrass industry. BMPs should be based on the specific needs of the site and should be recommended and used to better advise and educate managers and land owners.

1. Turfgrass Species Selection:

- Choose or recommend the best-suited turf species based on the best available technologies (i.e., new improved cultivars/varieties)
- Choose or recommend turf species that have minimal nutrient needs, reduced maintenance requirements, and are tolerant to important pests and drought conditions

2. Planting Practices to Prevent Nutrient Loss in Sedimentation Erosion:

- During grow-in period, stabilize soil with weed-free straw, spray tack, hydromulch, mulch pellets, sod, etc.;
- Develop and implement strategies to stabilize soil and control sediment runoff from areas of disturbed soils;
- Design active areas to minimize disruption of natural waterways and native sites;
- Irrigate seeded soil lightly and frequently to prevent soil runoff;
- Ensure compliance with storm water law, regulations and standards under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq. and implementing rules.

3. Nutrient Management Practices to Prevent Over or Unwarranted Applications of Nutrients:

- Apply smaller amounts of nutrients more often as opposed to large amounts only a few times/year;
- Use slowly available fertilizer when applicable;
- Limit nutrient application before a storm event (heavy rainfall) when the turf or soil is saturated by evidence of standing water or frozen;
- Avoid fertilizing on non-target areas such as impervious surfaces and around bodies of water. All fertilizer spills must be cleaned immediately and any fertilizer that has been incidentally applied to any impervious surface such as streets, parking areas and sidewalks, must be redirected (swept/blown) immediately after application;
- Calibrate fertilizer spreader for accurate application amount and placement;
- Establish buffers (at least 3 feet) in sensitive areas (waterways, wells, impervious surfaces, pond/stream edges) for the purpose of restricting or limiting fertilizer application;

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- Implement turfgrass cultural practices including aeration, topdressing and vertical mowing when necessary to maximize effectiveness of nutrients.
4. Nutrient application rates must be based on the best available technology.
- Recommendations for nitrogen needs in higher-cut turf and golf course turf are provided in the table below; amounts of N fertilizer in the table presume established turf conditions. The function, vigor (health) and maintenance practices of the turf must be determined for each site. Assessment of function, vigor, and management intensity should include mowing, traffic (intensity of use), stress levels, compaction, pest pressure, irrigation and others.
 - The annual application rate of phosphorus to soil at soil test phosphorus levels classified as optimum or higher cannot exceed the rate of 1 pound of P₂O₅ per 1,000 ft.² per year. Higher application rates of phosphorus should be based on soil testing recommendations.
5. Larger acreage sites with more than one type (function, vigor, management level) of turf will need the turfgrass manager, consultant and/or property owner to evaluate and determine where there are distinct types of turf. A site map is useful to illustrate these areas. Considerations for determining a maintenance level follow:
- **Function of turf function.** That is, playing surface, intense traffic, lawn area, utility (soil stabilization), etc.
 - **Current vigor (health) and client expectations (color, density and weeds).** Are the current level of weeds, turf color and shoot density acceptable to the client?
 - **Current fertility level.** The current fertility level will help to determine what additional fertility is needed on the property. Past fertility records and soil testing will help to determine this.
 - **Mowing.** The level fertility needed depending on clipping management. Removal of clippings increases the need for fertilization. Frequent mowing is an indicator of higher maintenance turf.
 - **Irrigation Availability.** Readily available and frequently used irrigation increase the need for fertility since it lengthens the growing season and increases biomass production (nutrient immobilization / crop removal).

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Guidelines to develop a fertilization schedule for established turfs in New Jersey.

Type of Turf	Annual N ¹	Timing of Application				
		Mid-Mar. to Apr. ²	May to mid-Jun. ³	Late Jun. to early Aug.	Mid-Aug. to mid-Sep.	Early Oct. to early Dec. ⁴
Management of General Turf above 1-inch Mowing		<i>pounds per 1000 ft²</i>				
Irrigated, clippings removed	3 to 5	½ to 1	½ to {1}	not required	1	1 to (2)
Irrigated, clippings not removed	2 to 4	½ to 1	½	not required	1	1 to (1½)
No irrigation, clippings not removed	1 to 2	½	not required	not required	½ to (2)	not required
Zoysiagrass	1 to 2	Apply no N	½ to {1}	½ to {1}	Apply no N	Apply no N
Golf Course Turf						
Putting Green	1½ to 4	0 to 1	¼ to {1¼}	¼ to {1}	¼ to 1	½ to 2
Tee	2 to 6	0 to 1	½ to {1½}	½ to {1}	½ to 1½	½ to 1
Fairway	1½ to 3	0 to 1	½ to {1½}	0 to {¾}	½ to 1	½ to 2
Roughs	1 to 3	0 to 1			1 to 2	0 to 2
Utility	0 to 2	0 to ½			0 to 2	

¹ Use lower rates for older (mature) healthy turfs that have been properly managed for many years and receive low to modest amounts of traffic (play). Use higher rates for turf that receives intense use (traffic) or is recovering from other forms of damage.

² The March-April nitrogen application may not be needed if you fertilize late in the season (September to early December) the previous year. When spring green-up and growth is satisfactory, delay fertilization until May or June, or possibly later.

³ To avoid excessive growth approaching the stressful summer months, use a slowly available source of nitrogen (sulfur-coated urea, polymer-coated urea, IBDU, methylene urea, or natural organic fertilizers) for amounts of greater than ½ pound of nitrogen applied per 1000 square feet of turf. Application shown in {}.

⁴ Apply only when grass is still green. Do not apply if grass is dormant (brown). Use higher nitrogen applications where greater turf cover (quality) is desired or turf requires recovery from extensive play (wear). Nitrogen applications above 1 pound per 1000 square feet must contain slowly available sources of nitrogen; 50% or more of slowly available nitrogen is suggested.

- On very sandy soils, do not fertilize turf at more than ¾ pound of N per 1000 ft² in a single application after early October to avoid nitrogen leaching. Use slowly available nitrogen fertilizers at N rates above ¾ pound per 1000 ft² on sandy soils to reduce the potential for leaching losses.
- Fertilizer should not be applied near water bodies or impervious surfaces where rain can wash fertilizer nutrients into water bodies. Excess nutrients entering streams, ponds, and lakes will lower water quality.

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7. Irrigation Management to Prevent Nutrient Transport as Runoff:
 - Irrigate lightly after application to wash fertilizer into soil/turf;
 - Irrigation intensity should be low enough to allow infiltration (that is, avoid ponding and runoff);
 - Irrigate turf based on weather and soil water availability (as-needed) and not on a calendar schedule. Irrigation controller technology should be optimized to ensure efficient irrigation patterns. Rainfall shutoff sensors should be used with irrigation systems to avoid excessive application of water that would result in runoff or leaching;
 - When feasible, direct surface water runoff to catch basins or ponds that recycle water back to irrigation holding ponds;
 - Avoid irrigation during times of high humidity and early evening hours (before turf wets with dew) to discourage the incidence of turf disease;
 - Avoid automatic irrigation during dry, windy conditions to limit evaporation losses and non-uniform irrigation coverage.

8. Mowing Practices Related to Nutrient Management:
 - Leave grass clippings and other organic materials in place when feasible;
 - Recycle removed turf clippings as a nutrient resource when feasible (compost, mulching, organic matter supplement, etc.);
 - Do not mow turf during periods of severe plant stress or disease pressure;
 - Mowing frequency should increase during rapid, vigorous plant growth and decrease during dry stressful periods.