

TURF NUTRIENT MANAGEMENT

RESIDENTIAL, COMMERCIAL, GOLF COURSES, & PARK LAND

INTRODUCTION

Urban land uses comprise at LEAST 6% of the Murderkill watershed land area. Activities in this area, such as the maintenance of residential and commercial lawns, and parklands, use nutrients in ways that may adversely impact the River and its ponds and tributaries.

WATER QUALITY IMPACTS & TYPICAL LOADINGS

Little data has been collected regarding nutrient loading from urban turf acreage in the Murderkill watershed. However, Helen Waite compiled information for the state of Delaware as a whole.

While proper management of turf should be pursued, the management of urban landscapes is likely to result in minor nutrient loading reductions since they cause a much smaller portion of nutrient loading than other sources:

1. only 6% of the land is urban,
2. transport of applied nutrients from turf is likely to be less than from row crop acreage, and
3. 42% of ALL turf is not fertilized
 - Over 82% of total turf is home lawns
 - 55% of residential lawns are not fertilized
 - 13% homes serviced by professional lawn services.

Turf covers the ground year-round and typically covers the surface comprehensively, so nutrient uptake can occur for a greater period of time—resulting in less erosion and less runoff than for row crop acreage.

Home Owners:

Estimated residential turf in Delaware = 72,485 acres
Typical application rates for homeowners fertilizing their own lawns:

- 2.4 lb. N/1000 ft²/yr. (University of Delaware typical recommendation = 2 to 4 lb. N/1000 ft²/yr)
- 0.3 lb. P/1000 ft²/yr. (University of Delaware typical recommendation = 0.4 – 1.4 P/1000 ft²/yr)

Professional Lawn Care Services:

Estimated total turf managed by all known landscapers (with Pesticide Applicator Licenses) = 8,628 acres (may include residential, commercial, athletic fields)

Typical application rates for professional landscapers:

- 1.0 lb. N/1000 ft²/yr.
- 0.2 lb. P/1000 ft²/yr.

Golf Courses:

Estimated Total Delaware acres of golf course = 3,762
(golf course sizes range from 24 to 400 acres)
Total Delaware golf course acreage in greens and tees = 290

Reported application rates are within rates the University of Delaware Soils Lab recommends:

- *Greens* receive 5 - 30 applications of 0.125 lb. to 1.0 lb. N/1000 ft²/yr.
- *Tees* receive 4 - 8 applications of 0.16 lb. to 1.0 lb./1000 ft²/yr.
- *Fairways* receive ≤ 4 applications, 0.33 lb. to 1.0 lb./1000 ft²/yr.
- *Roughs* receive 0 - 2 applications ≤ 1 lb./1000 ft²/yr.

Direct transport of nutrients from urban landscapes occurs where fertilizers fall onto adjacent impervious surfaces and wash into storm drains or into adjacent surface waters. For golf courses and athletic fields, improperly located mixing pads facilitate nutrient transport. In Delaware surveys, superintendents report that overflow from runoff/irrigation ponds could enter wetlands on 21% of golf courses, and could enter surface waters on 37% of golf courses. Runoff from mixing/wash pads is allowed to reach wetlands or natural surface waters on 4% of golf courses; 33% of golf courses have active play areas adjacent to surface water bodies, and 65% of those courses reports have vegetative buffers along the interface.

Parks:

The State fertilized 26 acres of 18,976 park acres statewide in order to recover damaged areas or establish plantings. Application rates:

- 2.3 lb. N/1000 ft²/yr.
- 0.2 lb. P/1000 ft²/yr.

Athletic Fields: 145 acres statewide, with sizes ranging from 1.5 to 25 acres; 60% use professional landscapers.

Commercial/Industrial: 59,356 acres statewide—much in impervious surface.

MANAGEMENT TECHNIQUES & TYPICAL REDUCTIONS

Nutrient losses can be mitigated by: structural controls, such as use of sediment ponds; land management practices, including proper timing and placement of nutrients and proper irrigation; and source control, through reduced application of fertilizer. Generally, absorption of fertilizers is dependent on soil moisture and rainfall intensity. To prevent runoff, fertilizer should not be applied directly before or after a precipitation event. Also, phosphorus concentrations in runoff corresponded directly to the amount of phosphorus applied. In other words, several small applications of fertilizer through the year are preferable to one large application once a year. Finally, if possible, have a soil test done by a professional

in order to establish exactly what nutrients an area is lacking¹.

For more specific methods of runoff management, please see below.

Golf Courses:

Loading reductions are best captured through environmentally sound design and construction methods. Delaware golf course superintendents have, on average, strong educational backgrounds: 92% have specialized post-high school education in turf management. 42% of Delaware golf courses were actively involved in Audubon Cooperative Sanctuary Program for Golf Courses.

Home Owners

There is more land under care of homeowners than golf courses. Homeowners have little training or knowledge of nutrient application. Inputs appear to be moderate where fertilizers are applied.

- Establish the Cooperative Extension System's Water Wise Gardener program with pre and post surveys to determine changes in knowledge and management.
- Target higher income neighborhoods, since they are more likely to fertilize, irrigate, and use professional lawn services.

Professional Lawn Care Services:

These services affect more turf acres than all homeowners. They appear to be working within standard recommended application rates. Staffs are required to take pesticide training regularly.

- Perhaps this mechanism can be used to extend training for environmentally sound nutrient management practices.

IMPLEMENTATION ISSUES

- ☞ It is difficult to track and calculate load reductions.
- ☞ A great number of homeowners must be educated to make a difference.
- ☞ It is difficult for homeowners to buy fertilizer that does not contain phosphorus, even though their soil survey may indicate adequate levels of P.

MURDERKILL WATERSHED

This fact sheet was prepared by the Delaware Department of Natural Resources and Environmental Control's Whole Basin Team, at the request of the Murderkill Tributary Action Team, for citizens and stakeholders interested in one of Delaware's most environmentally and economically attractive areas—the Murderkill Rivers and its surrounding lands, surface and ground waters.

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Delaware's good nature depends on you!

¹ *Phosphorus and Nitrate Nitrogen in Runoff Following Fertilizer Application to Turfgrass L.M. Shuman, 2002.*

