Four Popular Myths About Turf

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MYTH #1: Conversion of farmland into turf areas increases surface and groundwater contamination with sediment, nitrogen and phosphorus.

This myth persists because the public is uninformed, misinformed, or certain groups choose to ignore current scientific evidence. The facts are that while the amounts of runoff water from agronomic crops and turf may be similar, losses of sediment, nitrogen, and phosphorus are worlds apart. This is evidenced by the research data presented in Tables 1 and 2. The data show:

- **Sediment losses** from agronomic crops are measurable in terms of tons per acre. Losses from turf range from zero to 15 to 20 pounds per acre.
- **Nitrogen in runoff water** totals 100 to 200 times more for agronomic crops than for turf, even though annual nitrogen fertilization rates for turf often equal or exceed those for agronomic crops.
- **Phosphorus in runoff water** averages 1 to 6% of the amount from agronomic crops.
- **Nitrogen leached** each year from cropland often is in the range of 20 to 40 lb/acre. The figure for turf is 0.2 to 2.2 lb/acre.
- **Nitrate-nitrogen concentrations in leachate** from agronomic crops often exceed the U.S. drinking water standard of 10 mg L-1 by 25 to 100%. Nitrate-nitrogen concentrations in leachate from turf are commonly 35 to 95% below the drinking water standard.

MYTH #2: Subsoil compaction during building construction and the layering of topsoil over subsoil for turf establishment greatly increases runoff and must be regulated.

TABLE 1. Runoff loss of water, sediment, nitrogen, and phosphorus from agronomic crops and turf.

References	Situation	Water runoff	Sediment loss	Nutrient loss Nitrogen	Nutrient loss Phosphorus
		inches/yr	T/M/yr	lb/A/yr	
Burwell et al. (1975)	Continuous corn or corn-oat-hay rotations 10-year study	1.87 to 5.2 Avg 3.14	<0.1 to 7.4 Avg. 4.2	4 to 20 Avg. 32	<1 to 17 Avg. 10
Kussow (1995)	Simulated urban lawn; compacted subsoil, etc. 2 years	1.02 to 1.91 Avg. 1.35	0	0.20 to 0.28 Avg. 0.24	0.21 to 0.59 Avg. 0.32
Gross et al. (1990)	Kentucky bluegrass—T. fescue lawn 2 years	0.05 to 0.36 Avg. 0.20	0.001 to 0.007 Avg. 0.005	0.15 to 0.16 Avg.0.16	0.005 to 0.026 Avg. 0.016\

TABLE 2. Leaching of nitrogen from agronomic crops and turf.

Reference	Situation	Nitrogen leached: Total Amount	Nitrogen leached: Nitrate concentration
Logan et al. (1980)	Numerous crops and years Midwest USA	21.0	20.5
Randall et al. (1995)	Continuous corn 11 years Minnesota	37.6	12.7
Kussow (1995)	Simulated urban lawn 2 years	2.2	2.8
Gross et al. (1990)	Lawn 2 years Maryland	0.17	0.94
Mitner et al. (1996)	Lawn 2 years Michigan	1.4	0.47

The fact is, in climates such as that in southern Wisconsin, 60% or more of the annual runoff from turf is from frozen soil (Table 3). During the growing season, the influences of subsoil compaction and topsoil layering on runoff are negligible except when 2 inches or more of rain falls on already wet soil. The net results are that subsoil compaction and topsoil layering have no significant or consistent effects on runoff or nitrogen and phosphorus losses (Table 3).

Particularly noteworthy in Table 3 are the data that show that, on average, more than 60% of the nitrogen and 80% of the phosphorus in runoff water from turf comes when soil is frozen. This observation is consistent with reports that the phosphorus load in urban stormwater is primarily in snow melt. A secondary flush of phosphorus is associated with leaf fall in autumn.

MYTH #3: Natural organic fertilizers are less contaminating than "synthetic" fertilizers.

As noted by other researchers, the data in Table 4 show that nitrogen and phosphorus losses from turf fertilized with natural organic or synthetic are equally low and do not differ significantly.

The same holds true for liquid versus dry forms of fertilizer (Gross et al., 1990).

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MYTH #4: Banning fertilizer use on turf in urban areas will protect or improve surface and groundwater quality.

The fact is that failure to fertilize turf leads to declines in ground cover and stand density. After a single year without fertilization, runoff from unfertilized turf may exceed runoff from fertilized turf by 30% or more (Table 4). This, in turn, leads to more runoff loss of nitrogen and phosphorus from unfertilized than fertilized turf.

Nitrogen leaching from turf may be increased somewhat by fertilization (Table 4), but clipping management has even greater effects. Mulch mowing, as compared to clipping removal, may increase the amounts of nitrogen leached by 50% or more.

TABLE 3. Subsoil compaction and topsoil layering effects on runoff loss of water, nitrogen and phosphorus from a simulated urban lawn in southern Wisconsin (Kussow, 1995).

Soil treatment	Runoff water		Nitrogen loss		Phosphorus loss	
	Summer	Winter	Summer	Winter	Summer	Winter
	Inches/yr		lb/A/yr			
Subsoil						
Not compacted	0.60	0.96	0.20	0.57	0.09	0.85
Compacted	0.44	0.84	0.21	0.25	0.08	0.42
Topsoil						
Not layered	0.48	0.83	0.26	-.32	0.07	0.68
Layered	0.51	0.92	0.14	0.25	0.09	0.45

TABLE 4. Fertilization and clipping management effects on runoff and nitrogen and phosphorus losses from a southern Wisconsin lawn (Kussow, 1997).

Fertilization	Clipping management	Runoff losses			Nitrogen leached
		Water	Nitrogen	Phosphorus	
		inches/yr	lb/A/yr		lb/A/yr
None for 2 years	Mulched	1.55	0.17	0.41	3.2
	Removed	1.60	0.17	0.46	1.8
174 lb N/A/yr As Milorganite 6-2-0	Mulched	1.04	0.11	0.25	4.9
	Removed	1.15	0.14	0.20	1.5
174 lb N/A/yr As Scotts Turf Builder 29-3-8	Mulched	1.07	0.13	0.25	3.0
	Removed	1.53	0.14	0.32	1.5

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