Turf Fertilizer Laws Midwest

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Water quality is a priority in Minnesota
Shapiro et al., 1974

- Study conducted on health of lakes in TCMA
- Street sweeping reduces P concentration in runoff

<table>
<thead>
<tr>
<th>Time of Year</th>
<th>Storm Drain TP Conc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb. to mid-June</td>
<td>0.587 mg/L</td>
</tr>
<tr>
<td>Mid-June to mid-Oct.</td>
<td>0.256 mg/L</td>
</tr>
<tr>
<td>Oct. after leaf fall</td>
<td>1.095 mg/L</td>
</tr>
</tbody>
</table>
Shapiro et al., 1974

• “Institution of the use of fertilizers with zero-phosphorus will probably not materially reduce the concentration of phosphorus in runoff.”
<table>
<thead>
<tr>
<th>Year</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>First city passes “low P” (3% $P_2O_5$ or less) ordinance. Several cities followed suit with “low P” ordinances over next ten years.</td>
</tr>
<tr>
<td>1996</td>
<td>First city passes “zero P” ordinance for commercial applicators.</td>
</tr>
<tr>
<td>2000</td>
<td>First cities pass “zero P” ordinance for both commercial and private applicators. Served as model for state legislation.</td>
</tr>
<tr>
<td>2000 - 2001</td>
<td>MN Department of Agriculture twice sponsored legislation for state restrictions on phosphorus lawn fertilizer use. Bills did not pass but raised awareness of issue by legislators, policy makers, and public.</td>
</tr>
<tr>
<td>2001 - 2002</td>
<td>Broad coalition formed to promote state legislation. MN Department of Agriculture active in bringing groups together and refining legislation.</td>
</tr>
</tbody>
</table>
A restriction, not a ban ...

- Law allows the use of phosphorus lawn fertilizer but only when these situations exists:
  - A soil test or plant tissue test shows a need for P;
  - A new lawn is being established by seeding or laying sod;
  - P fertilizer is applied on a golf course by trained staff;
MN Golf Course Personnel

• Over 475 people have attended
  – 4hr core training
  – Offered yearly
  – Award winning Extension Program

• Paper published in Journal of Extension

1. 82% of lawn fertilizer sold in 2006 was “zero P”.
3. No reports of law being enforced by local governments (warnings made, no fines).
By 2010.....

- 91% of lawn fertilizer sold in 2010 was “zero P”; up from 82% in 2006.
- Phosphorus sold decreased 77% from 2003 to 2010.

Tons of phosphorus contained in sold lawn fertilizer

![Bar graph showing tons of phosphorus over years](image-url)
Evaluation Report - 2007

4. No changes in water quality documented.

5. Research needed to:
   a) quantify changes in water quality
   b) turf health impact
5-yr P fertilizer runoff study

- 86% of phosphorus runoff when soil was frozen.
- 78% of water runoff when soil was frozen.
- 72% of runoff P was water soluble
- Reduce P runoff by not applying P with high soil test P levels
- Properly fertilized turf can reduce runoff and P in runoff.
Significant Runoff Factors
(Easton and Petrovic, 2004)
Hollow vs. Solid Tine Aerification
Bentgrass fairways

(2 and 63 days between aerification and runoff)

Runoff volume

- 55% reduction with hollow tine aerification (2 d)
- 10% reduction with hollow tine aerification (63 d)
Midwest P Lawn Fertilizer Laws Compared

- Minnesota 2002 / 2004
- Illinois 2010 / 2010
- Michigan 2010 / 2012

(Year law passed / Year “zero-P” restriction implemented)
## Midwest P Lawn Fertilizer Laws Compared

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Illinois</th>
<th>Michigan</th>
<th>Minnesota</th>
<th>Wisconsin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administered by:</td>
<td>Dept of Ag</td>
<td>Dept of Ag</td>
<td>Dept of Ag</td>
<td>Dept of Ag</td>
</tr>
<tr>
<td>Applicators affected:</td>
<td>For hire</td>
<td>All</td>
<td>All</td>
<td>All</td>
</tr>
<tr>
<td>Exempted applicators:</td>
<td>Golf courses; Sod farms</td>
<td>Golf courses; Sod farms</td>
<td>Golf courses; Sod farms</td>
<td>Sod farms</td>
</tr>
<tr>
<td>When P lawn fertilizer can be applied:</td>
<td>Deficiency; Est. new turf; Lawn repair</td>
<td>Deficiency; Est. new turf</td>
<td>Deficiency; Est. turf</td>
<td>Deficiency; Est. turf</td>
</tr>
<tr>
<td>Exemption for types of manure or sewage sludge:</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Application to paved surfaces: (All types of lawn fertilizer)</td>
<td>Prohibited, Clean up</td>
<td>Clean up</td>
<td>Prohibited, Clean up</td>
<td>Prohibited, Clean up</td>
</tr>
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# Midwest P Lawn Fertilizer Laws Compared

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<tbody>
<tr>
<td>Setbacks from water: (All types of lawn fertilizer)</td>
<td>3 ft to 15 ft setback</td>
<td>3 ft to 15 ft setback</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Restrictions on frozen and saturated soils: (All types of lawn fertilizer)</td>
<td>Not on frozen or saturated</td>
<td>Not on frozen or saturated</td>
<td>No restrictions</td>
<td>Not on frozen</td>
</tr>
<tr>
<td>Restrictions on P lawn fertilizer sales:</td>
<td>No restrictions</td>
<td>No restrictions</td>
<td>No restrictions</td>
<td>No display; No sale if ill intent known</td>
</tr>
<tr>
<td>Enforcement:</td>
<td>Dept of Ag; Atty General</td>
<td>Dept of Ag; Atty General</td>
<td>Local units of gov’t</td>
<td>Dept of Ag</td>
</tr>
<tr>
<td>Penalty amounts:</td>
<td>$250 - $1,000</td>
<td>$50 - $1,000</td>
<td>Varies by local unit</td>
<td>$50 - $500</td>
</tr>
<tr>
<td>State needs to provide consumer information:</td>
<td>No requirement</td>
<td>Required</td>
<td>Required</td>
<td>No requirement</td>
</tr>
</tbody>
</table>
Wisconsin (NR-151)

- The application of lawn and garden fertilizers with pervious surface over 5 acres each, shall be done in accordance with a site specific nutrient application schedule based on appropriate soil tests. The nutrient application schedule shall be designed to maintain the optimal health of the lawn or garden vegetation. Consider use of slow-release fertilizers or spoon-feed nutrients to reduce NO$_3$ load to groundwater.
UW-Extension Response

• Affected: 500 golf courses, thousands of schools, hundreds of municipalities, countless private and commercial properties

• Developed instructional materials and resources for writing nutrient management plans

• Conducted nutrient management planning workshops around the state 2007-2009.
  – Trained at least 500 turf managers and dozens of consultants and sales staff who would go on to write plans for their customers
Conclusions

• Precedent setting (state-wide in MN; NR-151)
• Laws has been largely “self implementing” through education and altering type of product offered for sale.
• The law has effectively reduced amount of phosphorus sold in lawn fertilizers.
• MGCSA encouraged the law to demonstrate stewardship
• No changes in water quality due to MN law documented
• Benchmarked
QUESTIONS
Recommendations

- Know phosphorus status in your state’s lawns. If levels are low, passing zero-P law is not advised.
- Engage state ag agency, turf industry, and university specialists early in the process.
- Give manufacturers adequate lead time to clear out stock.
- Allow homeowners to use up old stock to avoid “weed & feed” from becoming hazardous waste.
- Require all lawn fertilizer to be cleaned up (not just P fertilizer).
- Don’t promise a “silver bullet”. 

MDA photo
Objective: Evaluate the effect of grass clipping management and fertilizer inputs on P runoff from home lawns.

Runoff collected during winter thaw.

Contact: Drs. Brian Horgan and Carl Rosen, University of Minnesota
Fertility Effect on Mean Soluble Phosphorus Runoff (2007) per Event

- **No fertilizer**
- **Fertilizer, no P**
- **Fertilizer, 14 lb/ac P$_2$O$_5$**
- **Fertilizer, 42 lb/ac P$_2$O$_5$**

Soluble Phosphorus Runoff (mg)

A

No fertilizer

Fertilizer, no P

Fertilizer, 14 lb/ac P$_2$O$_5$

Fertilizer, 42 lb/ac P$_2$O$_5$
The Minnesota law...

- Does not restrict the **sale** of P lawn fertilizer (display of product, need to show soil test, etc.).
- Does not exempt organic fertilizers.
- Defines “zero P” to be 0.67% P$_2$O$_5$ or less.
- Enforcement is delegated to local units of government.
- Requires consumer education, research evaluation and reporting.
The Minnesota law...

- Preempts regulation of all fertilizers by local units of government. (Local ordinances regulating the sale of P lawn fertilizer were grandfathered.)
- Did not provide funding.
- Did not promise but inferred cleaner lakes.

Education promoted “package approach”:
- Use “zero P”
- Sweep up clippings
- Rake up leaves
- Pick up poop
- Control erosion
How did it work?

• Implementation went smoothly!
  – Legislative process provided awareness.
  – Local ordinances started the process.
  – Two-year lead time was provided.
• “Self-fulfilling” implementation:
  – Stores knew customers needed zero-P
  – Stores stocked zero-P
  – Customers bought and used zero-P
• Team approach to public education.
• Even with lead time, questions on using left-over P lawn fertilizer arose.
Factors in passage of the 2002 law

• Science based.
  – 1972-76 soil test survey showed 70 – 80% of Twin City lawns have soil P levels in “very high” range.
  – Subsequent 1991-94 soil test survey supported findings.
  – Based on “fertilize according to plant need” university recommendation long used by agriculture.
  – Subsequent expansion of law in 2004 to include entire state not supported by data.
Factors in passage of the 2002 law

• Coalition of city, landscape industry, and environmental interests.
  – Cities and landscape industry wanted to avoid “patchwork” of local ordinances.
  – Cities and environmental groups wanted to protect lakes.
Lawn fertilizer; a source of phosphorus

- Typically lawn fertilizer contains N-P-K, nitrogen, phosphorus, and potassium.
- It is nitrogen that “greens up” lawns.
- Phosphorus (P) content is expressed as phosphate ($\text{P}_2\text{O}_5$). ($\text{P}_2\text{O}_5 \times 43\% = \text{P}$)
- Maintenance lawn fertilizers have 3% $\text{P}_2\text{O}_5$, starter lawn fertilizers have 20% - 40% $\text{P}_2\text{O}_5$.
- A “zero in the middle” indicates a phosphorus-free fertilizer.
- Need for phosphorus-free lawn fertilizer noted in 1979 study.
Phosphorus needed; not necessarily bad

- Fertilization should be based on plant need, ideally indicated by soil or tissue testing.
- Aquatic systems require 1,000 times less P than terrestrial systems – that is where problems start.

30 parts per MILLION

60 parts per BILLION

graysgardens.com

MPCA photo
For more information:

Ron Struss
Minnesota Department of Agriculture
651-201-5259
ron.struss@state.mn.us
Results: Turfgrass Quality and STP Level

Representative of All Months and Ratings
(Color, Yield, etc..) During all 16 Rating Months
Interests in MN Law

• The debate in MN dates back to early 1970’s

• 6 manuscripts published
• 16 articles in trade magazines nationally
• 30 presentations made
  – 20 states
  – China
  – Europe
  – Scandinavia