

## Expert Input Regarding Dane County Phosphorus in Lawn Fertilizer Ordinance: Synopsis of Themes

Dane County Lakes and Watershed Commission  
November 13, 2003

In October 2003, the Dane County Lakes and Watershed Commission requested input from retailers/commercial interests and technical experts to inform the Commission's development of a countywide ordinance restricting phosphorus in lawn fertilizers.

The complete set of expert responses (Expert Input Regarding Dane County Phosphorus in Lawn Fertilizer Ordinance: Complete Responses to Questions) is available at [www.countyofdane.com/commissions/lakes/phosphorus.shtml](http://www.countyofdane.com/commissions/lakes/phosphorus.shtml).

This document excerpts key responses from that larger document. A key to the full names and affiliations of those who provided the comments summarized below is found at the end of this document.

### ***Comments on the justifications for an ordinance restricting phosphorus in lawn fertilizer***

- If soil phosphorus levels in urban areas are high (question #T6) **Bannerman, Bennett, Combs and Kussow** all cited specific studies showing "excessive" soil test P levels. (All who commented agreed that soil tests measure the amount of P available to plants during the growing season.) Among the respondents, **Bennett** cited the greatest number of lawn samples (236), and that of these tests showed that the average available soil P concentration as 54 ppm. **Kussow** said that no P is needed on soils with a test level of 20 ppm. **Combs** said optimum soil test P levels for established lawns are 11-15 ppm. **USGS** cited research on soil cores from a lawn known not to have fertilizer applied for 28 years that still contained soil phosphorus above suggested lawn growth levels.
- The amount of P runoff that comes from lawns (question #T2). Responses ranged from 6% (existing urban figure from Lake Mendota project, provided by **Kussow**) to 19% (urban sources of P to Lake Mendota, calculated by **Carpenter**). Lawns would be one of several sources of urban P runoff reflected in these numbers. **Bannerman** said that for Dane County the contribution of the urban areas is somewhat related to the percentage of the watershed occupied by the urban area. In a watershed with about 20% urban area and 80% agricultural area, the urban portion will probably produce a little less than 20% of the annual phosphorus load. **Bannerman** thinks the Lake Mendota plan's estimate of urban phosphorus contribution in that watershed (5%) is probably low, and that it is closer to 15%. He added that streets and lawns will together produce over 50% of the phosphorus from the urban area with streets producing the most; and that lawns might produce about 20% of all the phosphorus from an urban area.

- Benefit of an ordinance limiting P-containing fertilizer use (question #T4). Responses ranged from “very minimal/none” (**Kussow, Swingle, Stier**) to “1 to 5 additional clear water days each summer month” (**Carpenter**). **Armstrong and Bennett** said that restricting P in lawn fertilizer would eventually lead to a reduction in P loads to waterbodies. **Potter** noted that stored P in lake bottom sediment would continue to release phosphorus. **Bannerman** said that the annual load reduction of a P ban to Lake Wingra would be about 5%, and to Lake Mendota would be less than 1%. Bannerman also said these values are low because lawns are only one source of phosphorus; that lawns that have not been fertilized still produce high phosphorus concentrations; and that all lawns produce high phosphorus concentrations compared to other source areas.
- If P-containing fertilizers should be added even when soil test levels are high (question #T7 and #T13). **Armstrong** said no. **Kussow, Stier, and Swingle** all said new turf establishment, environmental stresses that kill roots, and fill-in of turf require P even if soil test shows high existing P levels. **Combs**, in response to question #T6, said that even at optimum soil test P levels, a maintenance turf fertilizer (i.e. 27-3-3) is recommended in order to supply a rate of 1 lb N per 1000 square feet applied 3-4 times/season. She said it is not that the turf requires the P, but that nitrogen is easily available and easily used by homeowners in the 20 lb bag of maintenance fertilizer containing P. **Bannerman** said that plants do not need P levels higher than the criteria, and that all of our lawns exceed that level. He also said that P not used by the plants does build-up in the soil, and this extra P can be washed off the lawns with the particulate matter.
- If P in lawn fertilizer runs off lawns and reaches our waters (question #T8). **Kussow** said that significant amount of P in runoff from urban landscapes comes from vegetation, some of which can be allocated to fertilizer. Kussow estimated that no more than 50% of runoff water P can be attributed to fertilizer; to a maximum of 0.4 lb P/acre/year. **Good, Armstrong, Bennett, Carpenter and Combs** said that P applied to grass surfaces can run off. **Potter** said he is certain that P applied to lawns ends up in our lakes. **USGS** cited numerous studies showing 1) P concentrations in lawn runoff was higher in lawn runoff than from other urban sources, 2) total and dissolved P are mobile and easily transported in high concentrations offsite by runoff, and that lawns are a major contributor to P runoff loads. USGS also cited research saying that well-established healthy lawns and other lawn best management practices reduce runoff. **Stier** said that P in lakes cannot be directly traced to lawn fertilizer. **Swingle** said that lawn fertilizers are not likely to be a direct source of P in runoff.
- If turf research can be extrapolated to our watersheds (question #T12, 14) **Kussow** said that he went to great lengths to simulate a home lawn in his research, but notes that his research has been criticized on the basis that the quality of the turf exceeded an average home lawn, but that he followed UWEX recommended maintenance practices to show what is possible when these practices are followed. **Carpenter** said that to be relevant, research on lawns or

turf must meet several requirements: 1) must be conducted on watersheds similar in size, topography, soils, land use and land cover to those encountered in lake management, 2) test watersheds must contain lawns managed by a diversity of practices resembling those used in actual neighborhoods by citizens of the region, 3) experimental watersheds must include treatments of P-containing fertilizer (with other nutrients such as N and K) and treatments of zero-P fertilizer (other nutrients such as N and K, but no P), 4) experiments must include pre-treatment and post-treatment monitoring at the full subwatershed scale following publishable practices of ecosystem science. Carpenter is not aware of any lawn or turf research that meets these minimal scientific standards. He did note many measurements of P runoff from urban and suburban watersheds that show elevated discharge of P to streams or lakes. **Bannerman** said the better the quality of lawn the less runoff. Lawns in poor condition (lots of bare spots) produce more runoff than lawns with thick grass, and that the role of P in maintaining the healthy lawn is poorly identified. He noted that a lot of the turf studies compare using fertilizer to not using fertilizer; that these types of studies have not isolated the importance of the P; and that the results might be the same without the P.

***Comments on possible exemption of compost, etc. (question #T15)***

- P in composts or palletized biosolids (e.g. Milorganite) will be less bioavailable than from commercial fertilizers, therefore these products should not be banned for use on lawns because the benefits of improved soil physical properties far outweigh their potential contribution to runoff P (**Cooperband**).
- Can't imagine people applying compost to lawns unless they are planting a new lawn or putting it on a garden, both of which are contemplated for exemption by Dane County, so it seems silly to exempt compost (**Bennett**)
- Any material containing a relatively high P<sub>2</sub>O<sub>5</sub> content, whether inorganic or organic, can result in accumulation of soil test P. The issue is overapplication when not needed and application to areas that are impervious – not the formulation used. (**Combs, Swingle, Stier**)
- Turfgrass takes up N and P<sub>2</sub>O<sub>5</sub> in the ratio of 4:1. In a product such as Milorganite and most natural organic products, this ratio is 3:1 or less. This means that repetitive application of these products will build up soil test levels of P, contradictory to what the ordinance is attempting to achieve. (**Kussow, Swingle, Stier**)
- An exemption for compost is essential, as compost will likely be a major tool in dealing with compacted soil. (**Potter**)
- Using “waste” products that have plant nutrient value is a benefit to society by recycling materials and preventing materials such as animal and human waste from being disposed of without any benefit gained. Ordinances banning P in lawn fertilizer, which almost all natural organic sources contain, could disrupt the possibilities for these waste products to be used beneficially, economically, and sensibly for fertilizer. (**Swingle**)

***Comments on possible exemption of vegetable and flower beds (question #T5)***

- **Kussow** said that P losses from vegetable gardens are higher than from turf; therefore gardens should not be exempted. **Potter** said that most gardens probably do not produce runoff, so not much P control would be lost by exempting gardens from the ordinance. **Bannerman**: Exempting flower and vegetable gardens should not have much effect on the benefits of the ordinance. These gardens probably represent a small acreage and their locations near the building or in the back yard make the delivery of the runoff pollutants less likely.

***Comments from retailers on ordinance implementation (questions #R1-3)***

- Many retailers and golf courses have already placed fertilizer orders for 2004 sales (for spring, with some saying that fall orders are placed in January/February), although supplemental orders can be placed throughout the year. (**Boston/Steil, Johannsen, Milles**)
- 2005 implementation date makes sense (**Boston/Steil, Johannsen**)
- Store orders for fertilizer are placed early in 2004 for spring availability; they are very responsive to changes in market/regulation (**Condon, Shepard**)
- They cannot return/exchange fertilizers once they have been delivered to their stores, or if they can it is very expensive. (**All**)
- P-free fertilizer is readily available. It's just a matter of providing enough lead time for ordinance implementation to retailers and commercial users (to use up ordered inventory), some of whom already offer P-free products to customers (**Milles, Condon, Johannsen, Shepard**)
- Ordinance must clearly state to which products it applies (see **Johannsen** response to question # R3 re: product labels for Miracle-Gro and other plant foods)
- Assistance needed for retailers: education, display information for stores. They are very willing to help customers understand requirements and benefits. (**All**)
- Manufacturers could be requested to create eye-catching displays about ordinance and P effects, so that they would be consistent for all Dane County retailers (**Boston/Steil**)
- Retailers do not want to be placed in a position of enforcing the ordinance (evaluating soil test results, determining whether or not someone has a new lawn, determining whether or not someone is a Dane County resident subject to the ordinance)(**Boston/Steil, Johannsen**)
- Retailers don't want to have some products (e.g. phosphorus-containing fertilizer) available only upon customer request and obtained from a back room. (**Boston/Steil, Johannsen**)

The complete text of responses to questions is found on the Lakes and Watershed Commission web site, at ([www.countyofdane.com/commissions/lakes/phosphorus.shtml](http://www.countyofdane.com/commissions/lakes/phosphorus.shtml)). That document includes information on related topics not summarized above, including: significant factors affecting P surface water runoff (question #T1); other work being done to control P sources from urban and rural areas (question #T3); what a soil test actually measures (question #T9); the role of shoreline buffers in reducing P runoff (question #T11); and how soil P, P fertilizer application, and P runoff are related (question #T13).

***Key to experts noted above:***

Armstrong = Dr. David Armstrong, Professor, UW Civil and Environmental Engineering

Bennett = Dr. Elena Bennett, Research Associate, UW Center for Limnology

Bannerman = Roger Bannerman, DNR runoff researcher

Boston/Steil = Steve Boston, Blain's Farm & Fleet Lawn & Garden Merchandise Manager for 3 state region, and George Steil, Jr. – Corporate Attorney, Janesville, WI

Carpenter = Dr. Steve Carpenter, UW Center for Limnology

Combs = Sherry Combs, Director, UW Soil and Plant Analysis Lab

Condon = Tom Condon, Home Depot Central Division lawn and garden manager, Arlington Heights, IL

Connors/Jones = Kevin Connors, Director Dane County Land Conservation Department; Sue Jones, Watershed Management Coordinator for the Dane County Lakes and Watershed Commission

Cooperband = Dr. Leslie Cooperband, Associate Professor, UW Soil Science

Good = Dr. Laura Ward Good, Research Associate, UW Soil Science

Johannsen = Karen Johannsen, owner Johannsen's Greenhouse & Gifts (Sue Jones notes from telephone interview)

Kussow = Dr. Wayne Kussow, Professor, UW Soil Science

Milles = Jeff Milles, Wisconsin Golf Course Superintendents, Big Bend, WI

Potter = Dr. Ken Potter, Professor, UW Civil & Environmental Engineering

Shepard = Tom Shepard, owner of Ace Hardware on Willy St. in Madison (Sue Jones notes from telephone interview)

Stier = Dr. John Stier, Associate Professor, UW Horticulture

Swingle = Brian Swingle, Executive Director, Wisconsin Landscape Federation, Greenfield, WI

USGS = collaborative response from the U.S. Geological Survey Water Resources Division in Middleton, submitted by Herb Garn

----Prepared by Sue Jones, 11/7/03