

Manufactured Fertilizer Reduction Ordinance

Phosphorus

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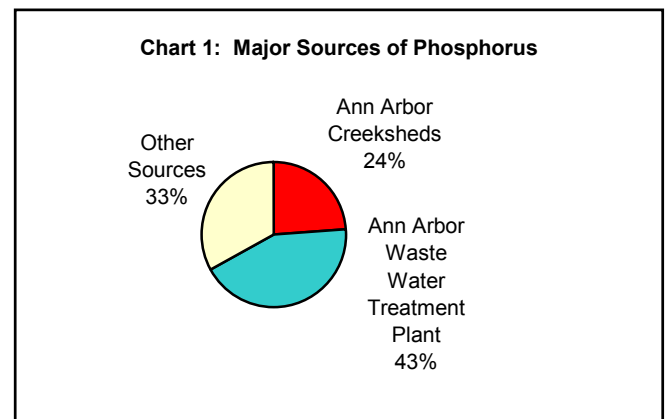
Introduction

What is Phosphorus?

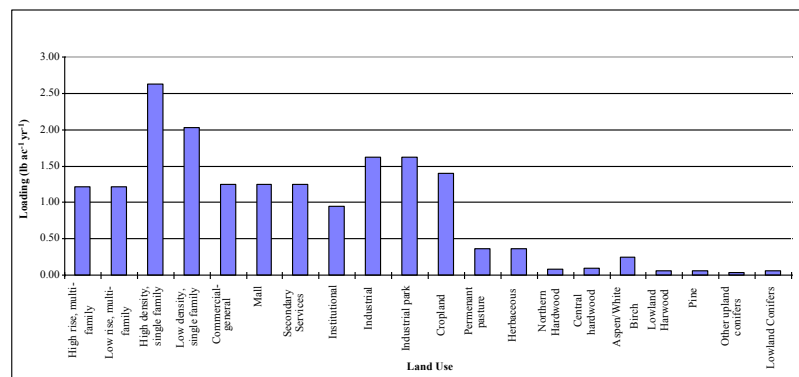
Phosphorus is a naturally occurring nutrient present in the soils of southeast Michigan. Excess phosphorus in lakes and reservoirs can produce anaerobic conditions that reduce available oxygen for fish and other aquatic organisms as nuisance plant growth consumes the oxygen. Under certain conditions, algal blooms form. This results in a reduction of light and oxygen availability as well as toxic blooms that kill fish. Full and partial body contact recreation also can be compromised.

What are the sources of phosphorus to the Huron River?

There are many sources of phosphorus loading to the Huron River including soil runoff, detergents, and fertilizers. Because phosphorus is a common element, a significant amount ends up at the City Waste Water Treatment Plant (WWTP). The chart above¹ shows that approximately 43% comes from the discharge point at the City Wastewater Treatment Plant, which is a combination of sanitary sewer and stormwater via footing drain connections and illicit connections to the sanitary sewer. The WWTP removes most of the incoming phosphorus before the treated water enters the Huron River. For example, during February 2002, the WWTP removed approximately 95.47% of the phosphorus coming into the plant. On average, 873 lbs came into the plant each day and 38 lbs went out. Chart 1 shows that Ann Arbor creeksheds are also significant sources of phosphorus, primarily due to runoff. The chart to the right shows that runoff is mostly from single and multi-family dwellings. Runoff from the use of fertilizers is a significant source of phosphorus to the Huron River. Research has shown that the City of Ann Arbor contributes at most 67% of the total phosphorus load to the



High rise, multi-family
 Low rise, multi-family
 High density, single family
 Low density, single family
 Commercial-general
 Mail
 Secondary Services
 Institutional
 Industrial
 Industrial park
 Cropland
 Permanent pasture
 Herbaceous
 Northern Hardwood
 Central hardwood
 Aspen/White Birch
 Lowland Hardwood
 Pine
 Other upland conifers
 Lowland Conifers



¹ Brenner, A.J. and P. Rentschler. 1996. The Middle Huron Initiative - Phosphorus Reduction Strategy for the Middle Huron River Watershed. Ann Arbor, MI: Huron River Watershed Council.

Why are we concerned about phosphorus?

The City of Ann Arbor is under a federal mandate to reduce phosphorus loading to the Huron River in order to meet water quality standards. As a signatory to the Middle Huron Agreement for Voluntary Reduction of Phosphorus Loading to the Middle Huron Watershed (1999), the City agrees to implement best management practices for non-point source control of phosphorus. If the phosphorus reduction goals are not met by 2004 when the voluntary agreement expires, then the City will be required to invest in technological solutions to limit phosphorus discharge from the City Waste water treatment plant. To make further phosphorus reductions, the WWTP would need to do additional chemical treatment. The capital cost estimate is \$1.5 million dollars with annual operating costs of \$167,000. Additionally, a 3-year plant-scale test could cost \$520,000.

What has been done so far to reduce phosphorus loading to the Huron River?

Voluntary efforts to reduce phosphorus loading have been pursued by the City and other Middle Huron Agreement partners since 1997. The efforts involve soft and hard engineering practices, information and education activities, and policy and regulation. In order to achieve the necessary reductions, policy is needed to support the information and education efforts. In a 1996 assessment of best management practices, adopting a policy to reduce phosphorus-fertilizer use ranked moderate or high among urban best management practices in the areas of effectiveness, acceptability, and sustainability.

Why should Ann Arbor regulate the use of phosphorus in fertilizers?

Research has shown that phosphorus is not needed as a soil additive in most areas within Ann Arbor. The MSU Extension Service provided soil sample results from 913 soil tests performed in the past few years from soils in Washtenaw County. The MSU Extension Service states that no phosphorus application is recommended for lawns if the test is above 40 lbs/acre. The review of the 913 tests shows that 84% of the samples do not need phosphorus³. Of those 913 soil samples, 47% came from within the Ann Arbor zip codes 48103, 48104, 48105, 48106, 48108, and 48109.

Table 1 – Soil Sample Results from Ann Arbor		
Zip Code	Number of Samples	Percent of Total
48103	177	19.39%
48104	71	7.78%
48105	76	8.32%
48106	15	1.64%
48108	40	4.38%
48109	47	5.15%
Ann Arbor		46.66%

² Brenner, A.J. and P. Rentschler. 1996. The Middle Huron Initiative - Phosphorus Reduction Strategy for the Middle Huron River Watershed. Ann Arbor, MI: Huron River Watershed Council.

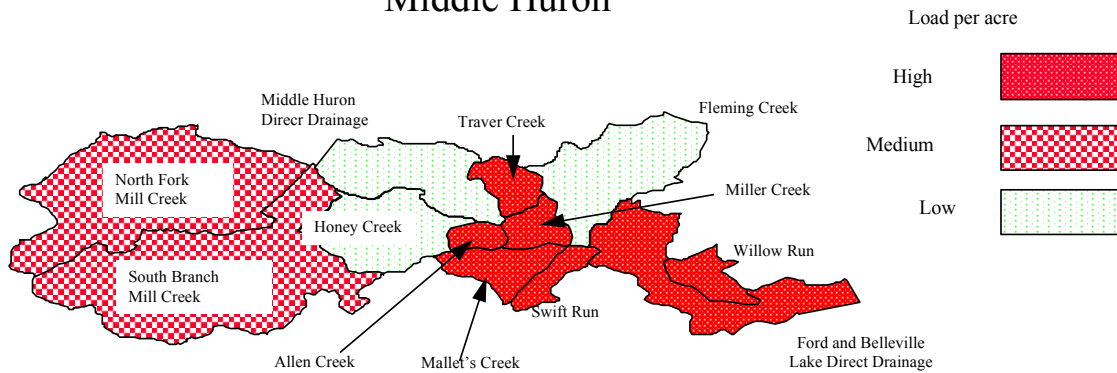
³**Phosphorus (P)** - reported in pounds per acre (lb/A); P levels below 20 lb/A are very low; no phosphorus is recommended for lawns if the test is above 40 lb/A. From the MSU Extension Service document “Understanding the MSU Soil Test Report”. <http://www.msue.msu.edu/aoe/turfgrass/local/Understanding%20the%20MSU%20Soil%20Test%20Report.pdf>

The following excerpt is taken from an MSU Extension Service document, "Turf Tips for Homeowners"⁴.

Soil Testing: Knowing the conditions of your soil is one of the most important factors in growing a healthy lawn.

Phosphorus is a common component in most turfgrass fertilizers. It is an important element for turf growth and is critical for establishment of new seedlings. Phosphorus levels in soil are stable and a soil test will reveal the amount needed annually on your lawn. Most Michigan soils have adequate phosphorus levels and therefore continual applications of phosphorus may not be necessary. Phosphorus is a primary water quality concern in Michigan. Phosphorus applied to lawns is quickly bound to soil particles after the fertilizer has been adequately watered into the lawn. It is important to sweep these fertilizer particles from impervious surfaces to reduce the potential for them to move away from lawn areas. Sensitive lawn sites adjacent to lakes, streams and ponds should use no-phosphorus fertilizers when soil levels for lawns are adequate.

Magnitude of phosphorus loadings in the Middle Huron



Is Phosphorus-free fertilizer available?

Phosphorus-free fertilizer is effective and readily available from major lawn care product manufacturers and distributors. Within Washtenaw County, local soy farmers have created fertilizer products that are also phosphorus free. Crushed soybeans are used to create a 7-0-0 (nitrogen only) fertilizer.⁵

How can you tell if your soil needs phosphorus?

Soil testing services also are readily available to demonstrate the need for phosphorus.

Soil Testing is an important diagnostic tool to evaluate nutrient imbalances and understand plant growth problems. Soil tests help growers and homeowners adjust fertilizer applications to provide only nutrients that are lacking or inadequate to their crops or lawns.

Sampling: For garden soils, sample 6" to 8" deep. For lawns, lift the sod and sample 3" deep. Take 15 to 20 sub samples in the area you are testing and mix them thoroughly in a clean plastic pail. Submit 1 to 2 cups of the mix, after it is air-dried. Cost: \$12.00 for basic soil test, includes mailing, \$16.00 with organic matter testing.⁶

⁴ www.msue.msu.edu/aoe/turfgrass/local/Fertilizing%20Home%20Lawns.pdf

⁵ www.cleangreenfert.com

⁶ www.washtenaw.org/government/departments/extension/ex_index.html

What would the expected result be of 100% compliance with phosphorus free fertilizer application in the City?

As part of the Malletts Creek Restoration Study⁷, estimates of full compliance in a phosphorus free fertilizer program within that creekshed would reduce phosphorus loading by 560 fewer lbs./yr. This equates to about 0.08 lbs/acre/yr.⁸ Phosphorus load from Malletts creek to the Huron River from May through October – using future baseline conditions – is modeled at 2,500 lbs. So, by extrapolating this finding to other Ann Arbor creeksheds, 100 percent compliance would result in a 22 percent reduction in phosphorus loading to the Huron River.

⁷ Funded by the City of Ann Arbor, WCDC, and Pittsfield Township

⁸ Malletts Creek Restoration Project. 2000. Prepared for the City of Ann Arbor, Pittsfield Charter township and the Washtenaw County Drain Commissioner's Office.