

Phosphorus Fact Sheet

1. What is Phosphorus and Why is it a Concern?

Phosphorus is a naturally occurring nutrient that in excess can cause algae blooms. Algae blooms can deplete the supply of oxygen in rivers and lakes, endangering fish and other aquatic life. Algae blooms can also be toxic and negatively impact swimming and fishing, which can decrease tourism.

2. What are the Sources of Phosphorus?

While phosphorus naturally occurs in all waters increased phosphorus concentrations due to human activities come from two kinds of sources:

- **Point Sources:** An industry, wastewater treatment plant, or other that has a pipe leading directly to water.
- **Nonpoint Sources:** Farm, rural, or urban runoff such as the following:
 - Excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas.
 - Oil, grease, and toxic chemicals from urban runoff.
 - Sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks.
 - Bacteria and nutrients from livestock, pet wastes, and faulty septic systems.

Generally, nonpoint sources constitute 80% of the phosphorus loading and point sources about 20%, although the specific amount will vary depending on the particular watershed. See attached charts.

3. What Regulations Currently Exist to Control Phosphorus?

To reduce the amount of phosphorus from going into rivers and lakes statewide, the Wisconsin Department of Natural Resources (WDNR) has two rules that address phosphorus.

- NR 217: Establishes phosphorus limits for point source discharges at 1.0 mg/l
- NR 151: Currently contains provisions to reduce runoff from farms, construction sites, and urban areas, but has no numeric controls on phosphorus from such sources.

4. What has been the Impact of the Current Regulations.?

Municipal wastewater treatment plants (publicly owned treatment works – POTWs) and other point sources have been subject to a numeric limit on phosphorus under NR 217 since 1992. As a result, POTWs have reduced phosphorus discharges by 80 to 90% or more.

Most agricultural sources are not regulated under the Clean Water Act and are only subject to state non-point rules under NR 151 AND ONLY to the extent cost share dollars are available. (There are approximately 188 Concentrated Animal Feeding Operations (CAFOs) that have permits which do not require cost share, but CAFOs are not required to meet numeric water quality standards).

5. What is DNR Proposing to do to Further Regulate Phosphorus?

To reduce the amount of phosphorus from going into rivers and lakes statewide, the Wisconsin Department of Natural Resources (WDNR) has proposed revisions to three administrative code rules that collectively are aimed at controlling phosphorus discharges to waters of the state:

- NR 102: Establishes water quality standards for surface waters of the state which will now include phosphorus.
- NR 217: Establishes the framework for implementing new water quality standards for phosphorus limits for point source discharges.
- NR 151: Additional provisions are proposed, including new agricultural performance standards that will place a numeric limit on the amount of phosphorus that can be applied on agricultural fields.

6. What Municipal Treatment Plants Will Be Impacted by the New Rule?

There are about 540 municipal treatment plants in Wisconsin with discharge permits. The translation of water quality standards into discharge limits will depend on several factors including the size and quality of the receiving water and the volume of the discharge. For more than half of the 540 municipal treatment plants it will result in an effluent limit in the range of 0.1 mg/l -- 10 times lower than the current standard in NR 217.

Under the proposed rules lagoon and stabilization systems will be able to apply for a one-time streamlined variance, but that only affects about 142 systems statewide. All other systems, including those currently exempt under the current NR 217 will be subject to the new standards.

7. What will the New Standards Mean for Municipal Treatment Plants?

Standard treatment technology for phosphorus removal in wastewater treatment plants involves either biological removal or chemical removal to achieve the current 1.0 mg/l standard. Current technology can treat to levels below 1.0 mg/l but they cannot achieve a 0.1 mg/l standard. In order to meet a 0.1 mg/l standard, treatment plants will need to add advanced filtration plants to their facilities.

8. What will the new treatment technology cost?

- A detailed study of the costs of treatment technologies for a range of target effluent concentrations was undertaken in Wisconsin. Looking just at the generic cost of the

filtration treatment technology, the aggregate statewide present worth cost for impacted POTWs ranges from **\$1.3 to \$1.8 billion dollars**.

- The actual cost to municipalities, taking into account site specific factors, is likely to be higher. Filtration facilities will require that most treatment plants reconfigure their sites, buy extra land to accommodate the plant or modify existing equipment in addition to the filtration plant itself. Cities that conducted site specific analyses showed costs that on average were 1.1 to 2.4 times the costs calculated using the generic model. If this factor is assumed to be representative of other facilities and is applied to the above generic cost, the aggregate cost would increase to **\$1.4 to \$4.3 billion dollars**.

8. Why is the Cost So High?

POTWs have already removed 80-90% of the phosphorus. Removing the last amount requires new technology and reconfiguring existing sites.

9. How Do Those Costs Compare With Controlling Phosphorus From Other Sources?

- The average unit cost ranged from **\$240 to \$304 per pound of phosphorus removed** for inland POTWs. Again, if site specific costs were considered the unit costs could double.
- There are a variety of ways of controlling agricultural runoff and other nonpoint sources of phosphorus. The costs of those measures varies, but common crop buffer areas and related practices are in the range of \$10-45 per pound of phosphorus removed.

10. What is Needed to Provide Water Quality Improvement in a Cost-effective Manner?

Successful and cost-effective reductions of phosphorus will only be achieved when the watershed is looked at as a whole, and all sources are required to work together.

- One way that can be accomplished is through **flexible watershed based permits and a trading program** that allows municipalities to make reductions offsite rather than building expensive new filtration systems. Municipalities should be given adequate time and flexibility to work with nonpoint sources so that cost effective solutions can be achieved.
- It is critical that DNR adopt and the legislature **support the change to NR 151** that create a phosphorus index which will serve to limit the amount of phosphorus agricultural producers can discharge to surface water.
- Besides including all sources of phosphorus, the proposed plan should include having **federal and state government as strong funding partners in this effort**. NR 151

requires state cost sharing. We must adequately fund cost share. If clean water is a priority that requires us to spend money we need to do so in a cost effective manner that gets results. **It is 10 times cheaper and much more effective to fund agricultural practices than impose filtration technology on municipal treatment plants and their ratepayers.**

- **NR 217 must incorporate flexible compliance options and phased implementation** schedules to allow sufficient time for trading, watershed based approaches and nonpoint controls to be implemented.

11. How Do TMDLs Relate to This Process

Total Maximum Daily Load (TMDL) is the amount of a pollutant an impaired waterbody can receive and still meet state water quality standards. TMDLs are established for waters that do not meet water quality standards and are designed to allocate between point and nonpoint sources the reductions needed to achieve water quality.

For the Rock and Fox River basins, and perhaps other areas in the future, TMDLs and their implementation plans will be designed to address phosphorus removal for point and non-point sources . This represents a site specific targeted approach to bringing impaired waters into compliance. However, there needs to be a mechanism in the new phosphorus rule to allow areas with a TMDL to govern implementation of phosphorus limits.

TMDLs only work with the existing state regulations. It does not remove the cost share requirement for nonpoint sources or create a nonpoint permit requirement.

12. What Happens if DNR Does Not Promulgate the New Rule?

EPA has required all states to promulgate nutrient standards. If DNR fails to do so EPA will mandate those standards. If EPA fails to do so, various groups have indicated an intent to file suit to force EPA to promulgate those standards. This has already happened in Florida.