IRON to the RESCUE

A phosphorus "trap" to improve water quality in our lakes

RILEY PURGATORY BLUFF CREEK
WATERSHED DISTRICT

The use of iron filings in stormwater ponds has been successfully tested by the University of Minnesota in improving water quality. The District, City and the University of Minnesota are working together to test this innovative approach. The City will be dispersing iron filings in your neighborhood stormwater pond to help reduce phosphorous concentrations exiting the pond effectively and safely. Here are answers to some frequently asked questions about pond iron treatments.

Why are we treating ponds with iron?

The iron filings treatment will provide safe, effective control of the amount of phosphorus exiting our ponds and therefore reducing concentrations in our lakes and streams. The result? Less algae, and cleaner/clearer water!

What does iron do?

Iron reduces the growth of algae by trapping the nutrient phosphorus—algae's food source— in sediments. Iron filings strongly bind to phosphorus, thereby decreasing the release of phosphorous from sediments and to waterbodies downstream. Like most other plants, algae require phosphorus to grow and reproduce. Algal growth is directly dependent on the amount of phosphorus available in the water. Without available phosphorus, algae cannot continue to grow and reproduce.

Where does phosphorus come from?

Phosphorus enters the water in two ways:

- Externally: from surface runoff entering the water or from groundwater.
- Internally: from the sediments on the bottom of the pond

Phosphorus already in lakes/ponds naturally settles to the bottom and is periodically re-released from the sediments back into the water.

So both sources of phosphorus need to be controlled?

Yes. Even when external sources of phosphorus have been reduced or eliminated through best management practices, the internal recycling of phosphorus can still support explosive algal growth. Iron is used primarily to control this internal loading of phosphorus from the sediments of the pond bottom. The treatment is most effective when it occurs after external sources of phosphorus have been actively controlled or eliminated.

Internal phosphorus loading is a large problem in Twin Cities Metropolitan Area because of historic inputs of phosphorus from the urban storm water runoff. Phosphorus in runoff has concentrated in the sediments of urban ponds. This phosphorus is recycled and can be released downstream from the pond into lakes and streams, primarily during summer periods, when it contributes to the growth of nuisance algal blooms.

How does iron trap phosphorus?

Iron is dispersed evenly across the pond during winter. Once the pond ice melts the iron sinks to the bottom covering the pond sediments. Once on the bottom, iron filings will supply ferrous and ferric iron phases that will strongly bind phosphorus, thereby decreasing the release of phosphate from sediments. The result? Phosphorus in the water is trapped and can no longer be used as food by algae.

And what happens at the bottom of the lake?

On the bottom of the pond, the iron forms a layer that acts as a kind of phosphorus barrier by combining with (and trapping) the phosphorus as it is released from the sediments. This reduces the amount of internal recycling of phosphorus in the lake.

More Questions contact:

Josh Maxwell at jmaxwell@rpbcwd.org

Dr Poornima Natarajan at pnataraj@umn.edu