ALUM to the RESCUE

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

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Many watershed management plans recommend that some lakes be treated with the chemical alum to improve their water quality. An alum treatment will reduce algal bloom conditions effectively and safely. Here are answers to some frequently asked question about lake alum treatments.

Why are we treating lakes with alum?

The alum treatment will provide safe, effective and long-term control of the amount of algae in our lakes. The result? Cleaner, clearer water and a more pleasurable environment for recreation on and around the lakes.

Alum (aluminum sulfate) is a compound derived from aluminum, the earth's most abundant metal. Alum has been used in water purification and wastewater treatment for centuries and in lake restoration for decades.

What does alum do?

Alum reduces the growth of algae by trapping the nutrient phosphorus—algae's food source—in sediments. 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 lake. Phosphorus already in the lake 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.

Alum is used primarily to control this internal loading of phosphorus from the sediments of the lake 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 lakes because of historic inputs of phosphorus from the urban storm water runoff. Phosphorus in runoff has concentrated in the sediments of urban lakes as successive years' algal blooms have died and settled to the lake bottoms.

This phosphorus is recycled from the lake sediments into the overlying waters, primarily during summer periods, when it contributes to the growth of nuisance algal blooms.

How does alum trap phosphorus?

Alum is injected into water several feet below the surface. On contact with water, alum becomes aluminum hydroxide (the principal ingredient in common antacids such as Maalox). This fluffy substance called floc, settles to the bottom of the lake.

On the way down, it interacts with phosphorus to form an aluminum phosphate compound that is insoluble in water. The result? Phosphorus in the water is trapped as aluminum phosphate and can no longer be used as food by algae.

An added bonus: As the floc settles downward through the water, it also collects other suspended particles in the water, carrying them down to the bottom and leaving the lake noticeably clearer.

And what happens at the bottom of the lake?

On the bottom of the lake, the floc 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.

How long will the alum treatment last?

An alum treatment can last 10–15 years or even longer, depending on the level of external phosphorus loading to the lake.

The less phosphorus that enters the lake from external sources, the more effective the treatment. (Alum is effective only at controlling internally released phosphorus.)

How can we make the treatment last longer?

We can extend the effectiveness of the treatment by limiting the amount of phosphorus in surface runoff entering our lakes from leaves, grass clippings, soil erosion, fertilizers, animal droppings and other sources.

As phosphorus from these external sources builds up in our lakes, alum becomes unable to continue to control it. By being good stewards of our watershed, we can postpone the buildup of external phosphorus and help the alum continue to do its job. By recognizing how watershed activities affect water quality, we can make a difference.

Is alum an algicide?

No. By definition, an algicide kills algae present at the time of application.

An alum treatment does not kill algae. What is does is greatly reduce the availability of phosphorus—the necessary food source for algae. This "phosphorus inactivation" can last for many years, as opposed to the very short-term effectiveness of an algicide.

Is alum safe?

Yes. Alum is used extensively in lake restoration and in water/wastewater treatment processes. Water treatment plants through out the United States use hundreds of thousands of tons of alum annually. Many U.S. municipalities also use alum for wastewater treatment.

The floe is harmless to water creatures and aquatic plants. (Therefore, alum does not control rooted aquatic plants, including curlyleaf pondweed.)

No evidence exists to suggest that aluminum ingested in water poses a health threat. While there have been past reports linking aluminum in drinking water with Alzheimer's Disease, this assertion has been disproved, conclusively. The Food and Drug Administration, the U.S. Environmental Protection Agency and leading medical experts all concur that aluminum is not a risk factor in the onset of Alzheimer's Disease.

When is this the right time to treat our lakes?

Control of external sources of phosphorus loading to lakes should be completed before an alum treatment is made.

How long does it take to complete an alum treatment project?

Alum treatments are generally made either in late fall or early spring and require 7–10 days to complete.

Will recreation around the lakes be affected?

People will be asked to stay out of the area during the actual treatment process. Most shoreline uses of the lakes will not be affected.

How quickly will results be seen?

Because the floe collects suspended particles as well as phosphorus, lake transparency will increase dramatically—even within a few hours.

The effects of the primary purpose of the alum—to "starve" the algae by trapping its food source in the sediments for many years—will take a bit longer to see. Reductions in algae should be noticeable within one year.

Protecting a unique and irreplaceable water resource

An alum treatment is a safe, economical component of a comprehensive watershed management program to reduce phosphorus levels in lakes. By controlling external sources of phosphorus entering our lakes, while also reducing internal loading by trapping phosphorus in the sediments for many years, we can improve the quality of water in our lakes.

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