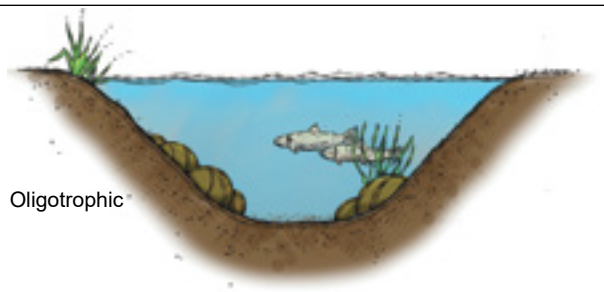
Phosphorus

The Nutrient Driving Lake Productivity

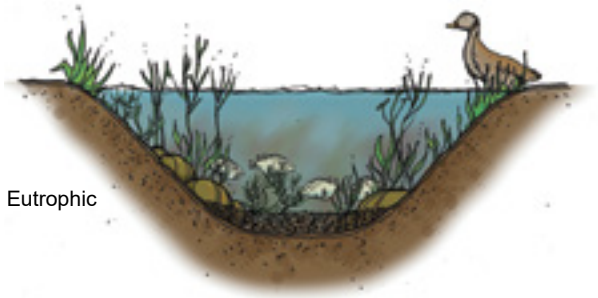
Lakes can be classified into three broad categories based on their productivity or ability to support plant and animal life. The three basic lake classifications are “oligotrophic,” “mesotrophic,” and “eutrophic”. Oligotrophic lakes are generally deep and clear with little aquatic plant growth. These lakes maintain sufficient dissolved oxygen in the cool, deep bottom waters during late summer to support cold water fish such as trout and whitefish. By contrast, eutrophic lakes are generally shallow, turbid, and support abundant aquatic plant growth. In deep eutrophic lakes, the cool bottom waters usually contain little or no dissolved oxygen. Therefore, these lakes can only support warm water fish such as bass and pike. Lakes that fall between these two extremes are called mesotrophic lakes.


Oligotrophic

A lake's natural progression from oligotrophic to eutrophic is accelerated by increased phosphorus loading (or input). The quantity of phosphorus present in the water column is important because phosphorus is the nutrient that most often controls aquatic plant growth and the rate at which a lake ages and becomes more eutrophic. In the presence of oxygen, phosphorus is retained within the lake sediments, making it unavailable for aquatic plant growth. However, if bottom-water oxygen is depleted, phosphorus will be released from the sediments. In some lakes, the internal release of phosphorus from the bottom sediments is the primary source of phosphorus loading.


Mesotrophic

By reducing the amount of phosphorus in a lake, it may be possible to lessen the amount of aquatic plants and nuisance algae growth. In general, lakes with a phosphorus concentration greater than 20 µg/L (micrograms per liter, or parts per billion) are able to support abundant plant growth and are classified as nutrient-enriched or eutrophic.


Eutrophic

There are ways to reduce phosphorus in a lake in order to slow the lake aging process. Alum is a chemical that has been used successfully in many lakes to lower phosphorus levels by preventing phosphorus release from lake sediments. Once applied, alum binds with phosphorus in the water column and settles to the bottom as fine particles. This layer of particles inhibits the release of phosphorus from lake sediments. Alum is commonly used to treat wastewater and drinking water and, over the last half-century, there have been hundreds of lake alum treatments. Alum treatments require special application equipment and can be quite costly.

Lanthanum is another chemical being used to bind phosphorus in Michigan's inland lakes. Because they are relatively new, the effective duration (length of time that binding and bottom release of phosphorus is inhibited) is generally unknown for lanthanum treatments. The mode of operation is similar to alum in that it strips phosphorus throughout the water column and settles to the bottom, preventing phosphorus release. Although comparable in cost, application of currently available lanthanum-based products are more easily applied to lake waters than alum.

For more information regarding Michigan's inland lakes, please visit michiganlakeinfo.com

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