Nonpoint Source Pollution Management Program

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Eutrophication

What is it?

Eutrophication is the process by which lakes age.

What happens?

When a lake is first formed is has very low nutrient levels, appears clear, and has few aquatic plants. This is the oligatrophic stage. As the lake matures, it gains nutrients, plants, and other organisms which help achieve the most productive, eutrophic stage. In the middle of these two extremes is the mesotrophic stage. These differing stages are typical of most lakes but, there are many exceptions. Some lakes never appear clear (most often human-made lakes), and others continue to remain clear, accumulating very few nutrients over time (usually the case high altitude lakes). Naturally, eutrophication takes 100s to 1000s of years to occur, but with human influence, can happen in only 10s of years. Due to the nature of this process it often becomes difficult to determine what may be influencing the lake. By doing continuous monitoring lakes can be evaluated to see what impact humans are having and what stage the lake is in.

Symptoms of human-induced (cultural) eutrophication are:

- increased algal growth (stimulated by increased supply of nutrients);
- increased rooted aquatic plant growth (stimulated by increase in nutrient supply as well as additional shallow growing areas due to accumulation of sediments, silt, and organic matter); and
- lower dissolved oxygen concentrations in all or parts of the lake (resulting from increases in plant respiration and organic decomposition. This lack of oxygen can kill fish and other aquatic life).

In addition to eutrophication there are other cycles that dictate what and how many organisms are able to survive. One such cycle is **stratification**. During the warmer months the water temperature becomes layered with the warm water remaining on top and the more dense cooler water sinking to the bottom. In between the extremes is the thermocline layer that consists of rapidly changing temperatures. Stratification affects oxygen content, light penetration, and photosynthesis which then determines what organisms are able to survive in the different temperature regions.

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