

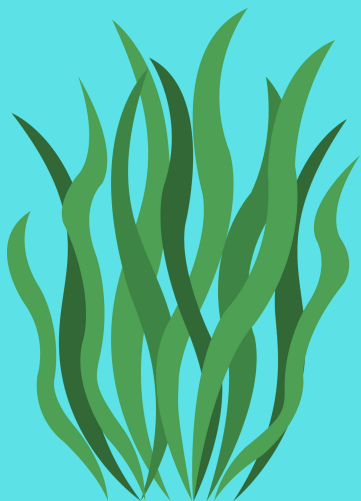
WHAT IS SOLUBLE REACTIVE PHOSPHORUS?

Phosphorus is a naturally-occurring nutrient that can be harmful at excessive levels in aquatic ecosystems. **Soluble reactive phosphorus** refers to the fraction of phosphorus that can pass through a filter (because it is “soluble” and has dissolved in the water) and will react with the chemical reagents in the test (making it “reactive”).

WHY DO WE MEASURE SOLUBLE REACTIVE PHOSPHORUS?

The fraction of phosphorus that makes up **soluble reactive phosphorus** is considered “immediately bioavailable,” meaning it can easily be taken up by plants and algae. Other forms of phosphorus, such as soluble unreactive phosphorus or even particulate phosphorus (phosphorus bound to particles such as clay or soil), can become bioavailable eventually. Soluble reactive phosphorus (SRP), however, is often seen as the most direct measurement of dissolved phosphorus that is readily available for uptake as a nutrient directly from the environment.

In New York State, phosphorus levels are regulated only by a narrative water quality standard that states “none in amounts that will result in growths of algae, weeds and slimes that will impair the waters for their best usages.” Phosphorus levels are not regulated by a numeric standard.



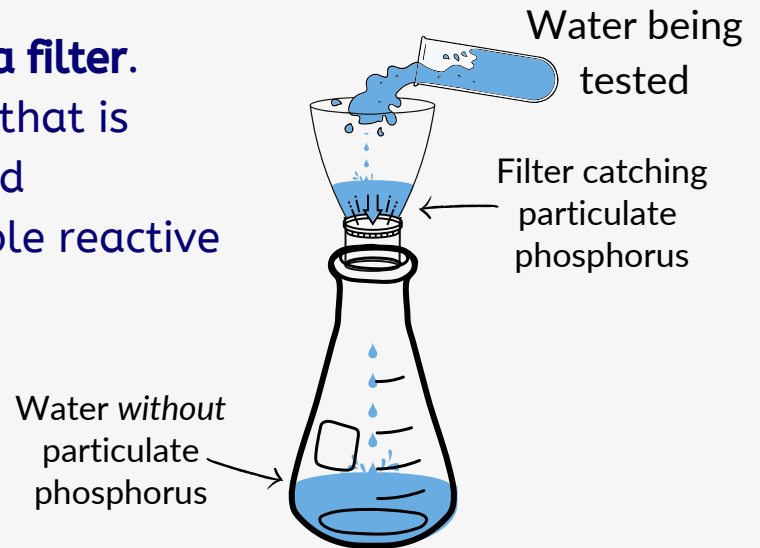
For total phosphorus, a statewide guidance value of 20 $\mu\text{g}/\text{L}$ is suggested for ponded waters like lakes and reservoirs that are used for swimming or drinking. Soluble reactive phosphorus makes up a proportion of total phosphorus, so we can usually expect soluble reactive phosphorus levels to be lower than total phosphorus levels. If there is very little particulate phosphorus in the water, total phosphorus and soluble reactive phosphorus levels may be about the same. Soluble reactive phosphorus levels, then, should also be below 20 $\mu\text{g}/\text{L}$.

HOW DO WE MEASURE SOLUBLE REACTIVE PHOSPHORUS?

To measure **soluble reactive phosphorus**, a water sample is first filtered through a 0.45 micron filter. Filtration can either occur in the field (making it "Field-Filtered") or in the laboratory. Then, as is done in the total phosphorus test, the filtered water is tested by a process called "colorimetry."

First, samples are **passed through a filter**.

This separates out the phosphorus that is attached to eroded sediment, called "particulate phosphorus." The soluble reactive phosphorus test only measures the phosphorus that can pass through the filter.



Next, the colorimetry process begins.

Ascorbic acid and a compound containing the mineral "molybdenum" are added to the filtered sample. Molybdenum generates a blue color in the presence of phosphorus in an acidified sample.



Samples are left to sit to allow the color change to occur.

A square vial (a "cuvette") containing the now-blue water sample is placed into a machine that measures how light interacts with it.

The amount of light the sample absorbs at a given wavelength (the "absorption") is directly proportional to the concentration of phosphorus in the sample.

In other words, a sample that absorbs *more* light (a bluer sample) has a greater concentration of phosphorus than a sample that absorbs *less* light (a less blue sample).

