The Problem With Phosphorus (draft)

In June 2009 state regulators at CT DEEP proposed to reduce phosphorus in fresh waters, including the Quinnipiac River, in order to improve water quality. The Quinnipiac is one of many state rivers still on the "impaired waters" list due to unresolved pollution problems. The directive to reduce phosphorus came from US EPA as it became clear to scientists in the last decade that federal Clean Water Act goals could not be met unless phosphorus was reduced. Until recently, most river cleanup efforts focused on removing nitrogen, a fertilizer and pollutant of Long Island Sound, and bacteria. Much discussion on the phosphorus issue between DEEP, US EPA and stakeholders occupied the next 18 months, and after some revisions DEEP unveiled proposed reductions in February 2011. Now in February 2012 these reductions are appearing in draft sewage treatment plant permits and causing distress among municipalities. What is phosphorus, how does it affect the Quinnipiac, and how are towns and landowners responding?

Phosphorus is an element found in small amounts in nature that plants need in order to grow. When it is found in unnaturally high amounts, phosphorus causes algae blooms in rivers, ponds and lakes. An excellent example of overabundance of algae is found at Hanover Pond, Meriden in the summer, right behind QRWA's environmental education center. Hanover Pond is an impoundment of the Quinnipiac and is choked with aquatic plants and algal mats by August. The luxurious growth clings to paddles and makes canoe and kayak passage difficult. In September, when the growing season ends, the thick mats of algae and aquatic plants die off and decompose, consuming oxygen and harming aquatic life. The river itself is also carrying large quantities of microscopic algae, called diatoms, which create the river's distinctive grey-green color. There are even blue-green algae present in some parts of the Quinnipiac, which emit a toxin.

Fish, eagles and osprey have returned to the Quinnipiac in recent years--it is no longer an open sewer but is far from clean. Where Connecticut rivers still pass through a forested landscape (there aren't many of these left), a small amount of natural phosphorus is present and scientists give the water an enrichment factor of 1.0. This is the baseline—1.0 represents natural conditions in a modern-day forested watershed in Connecticut. Our Quinnipiac now has an enrichment factor between 30 (30 times the natural condition) at Southington to 66 at Wallingford. Phosphorus increases as we go down the river. Regulators want to get it below 6.0 at Southington (6 times the natural condition) and 8.4 at Wallingford and change that grey-green color that is the visible symptom of an over-fertilized river. The benefits will be a recreational-quality river with improved oxygen and abundant life—a swimmable, fishable community asset.

Towns along the Quinnipiac are questioning whether the entire burden should fall on their municipality's sewage treatment plant, and are seeking funding for phosphorus removal. Some have argued that only half the phosphorus is from municipal sewage, and landowners are responsible for the rest. However, DEEP scientists' computer modeling indicates that in the case of the Quinnipiac, an effluent-dominated river, the story is different. *In summer, more than half of the Quinnipiac's volume is treated effluent.* That's why the model reveals that at Southington the sewage treatment plant contributes 87% of the phosphorus in the river, by Cheshire, treatment plants have contributed 90%, by Meriden, plants have been responsible for 92%, and by Wallingford, treatment plants have produced 93.5% of the river's phosphorus. These sewage treatment plants will need to reduce their phosphorus by a factor of 4 to 8 times if we wish to

curb the over-fertilization and pollution of the Quinnipiac River. The towns have 5 years to comply with their planning and design, and Clean Water Act funding will likely be changed to allow loans for phosphorus removal. The towns have been making the case for financial relief to regulators as they struggle through difficult economic conditions.

How does phosphorus get into sewage in the first place? Much of it is eliminated from humans. Other sources are dishwashing detergents and drinking water, which is sometimes treated with phosphorus to eliminate corrosion in the system. Of course, some phosphorus also enters the river from landscaping practices. Homeowners, businesses and institutions can do their part to help clean the river by reducing their own fertilizer use and leaving a protective buffer of trees, shrubs and vegetation along the edge of any stream in their yard. Plants and soil in a vegetated buffer do a great job of capturing excess nutrients before they enter the Quinnipiac. Some homeowners also choose to install a landscaping feature called a rain garden—a depression in the yard, planted with flowers, that collects and filters water before it runs back to the river. Mother Nature used to do all that collecting and filtering on her own—remember forests and wetlands? Having taken apart Nature's pollution control system, and sending such a large volume of wastewater to a relatively small river, the densely populated communities along the Quinnipiac now face the prospect of engineering a solution to the phosphorus problem if we wish to see a recreational river in our lifetime.
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