How Nuisance Growths Occur

Understanding how pond plant overabundance happens helps in determining how to prevent it or how to do something about it once it has happened.

Shallow ponds and shallow parts of deep ponds tend to be ideal places for plant growth. Most of the water and pond bed are well lighted. The water here becomes warm. Pond vegetation increases until it has used up the nutrient substance which is scarcest relative to the needs of the plants. The vegetation will increase and decrease during the growing season according to availability of the key nutrient, called the "limiting factor." Therefore, controlling the availability of that key nutrient controls the amount of pond vegetation.

The key nutrient is usually phosphorus. Even if phosphorus is not the limiting factor in a particular pond at the moment, it usually can be reduced enough to make it the limiting factor. Nitrogen tends to become the limiting factor in ponds which receive more phosphorus than the plants need. But in these cases, it may be much easier to lower the phosphorus supply below the level where it becomes limiting than to sufficiently reduce the nitrogen supply. This is because nitrogen is readily available as a gas in the air. Certain algae and bacteria convert it to a form that pond plants can use. In contrast, phosphorus doesn't occur as a gas in air. It is tightly held in land vegetation and topsoil. Nuisance-causing amounts of phosphorus aren't usually available to pond plants unless human activity disturbs surrounding land, and topsoil erodes into the pond—or unless fertilizers and the wastes of humans or animals are allowed to wash into the pond. These unnatural sources of phosphorus can often be much reduced or completely eliminated.

A deep pond with much of its bed below the well-lit zone absorbs more nutrient without undergoing nuisance plant growth and has greater self-restorative powers, once the nutrient oversupply is shut off. Phosphorus becomes tied up in the bodies of plants and other organisms which die and drift to the pond bed, forming organic deposits rich in this nutrient. Where the pond bed is so deep as to prevent the mud from receiving enough light for plant growth, most of the phosphorus stays locked away in the mud, as long as the water just at the mud surface contains dissolved oxygen. Without oxygen, chemical reactions occur which allow phosphorus to diffuse back up into the pond. If the mud deposit builds up high enough that its surface is raised to a level receiving enough light for rooted plants to grow in it, these plants will pump phosphorus from the mud into the pond water. This accelerates overenrichment and plant production throughout the pond.

Vegetation Control by Restricting Phosphorus Supply

Because high phosphorus levels usually contribute to nuisance plant growth, reducing the pond's phosphorus supply is usually the most essential step in controlling plants. There are many sources of phosphorus, however, the most important ones and some actions to remedy them are:

Materials from Surrounding Land

Soil erosion from land disturbance, such as cropland tillage or road and housing construction. Keep landscape disturbance to a minimum in the pond's drainage basin. Tillage and construction should be done in ways that cause as little erosion as possible.

Inflow of storm water, whether directly from surrounding slopes or through ditches and pipes. The problem is made worse by pavement, roofs and other hard surfaces that prevent water from soaking into the ground. Do not connect ponds with storm drains. Divert local runoff away from ponds with berms and ditches. Keep a buffer strip of vegetation around as much of the pond edge as possible, so as to intercept local runoff. Soil, leaves and other nutrient material washed or blown from surrounding land will largely be caught in a "bristle filter" of high grass and marsh plants.

Table 10-1. Common nitrogen sources for lawn fertilization.

Type of fertilizer	Common name	Nitrogen content & release rate	Lbs. needed to equal 1 lb. nitrogen	Remarks
Water soluble, inorganic	Ammonium nitrate	33% (rapid)	3	Most effective for rapid green-up and growth when soil temperature is below 55-60°F (before May 15). Strongly acidifying on soil. May cause burning of growing turf if not watered-in immediately.
	Ammonium sulfate	20% (rapid)		
Water soluble, organic	Urea	45% (rapid)	2.2	Slightly less available than soluble, inorganic forms when soil temp. is below 55-60°F, but other characteristics are similar. May cause burning of growing turf, if not watered-in immediately.
Water insoluble, natural organic	Processed sewage	5 to 6% 5 to 10% (moderately slow)	20-17 20-10	Also contains some phosphorus. Release of available nitrogen forms most rapid when soil temperature is above 55-60°F. Minimum danger of burning turf.
Water insoluble, synthetic organic	Urea formaldehydes	38% (slow)	2.6	Slow nitrogen release until soil temperature is above 55-60°F. Normally mixed with soluble, readily available forms. Minimum danger of burning turf when used alone.
	IBDU	31% (slow)	3.2	Faster nitrogen release with higher soil moisture. Larger IBDU particles give slow nitrogen release. Not greatly affected by temperature. Minimum danger of burning turf when used.