



ALGAE 101

How do algae get in our lake?

Algae are ubiquitous (they're everywhere). Algae require light, nutrients, and moisture to grow and reproduce. However, many types of algae produce cysts that allow them to survive with little or no moisture until a more suitable environment condition occurs. Accordingly, water (including snow), soil, and air all contain algae cells.

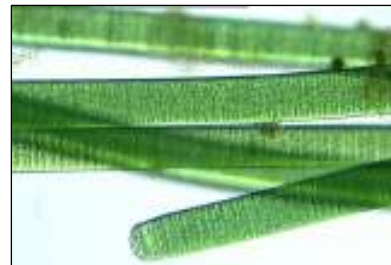
The most obvious source of algae found in a lake is the water that is used to fill the reservoir. Ground water, surface water, or reclaimed water can be used. Ground water theoretically should have no algae. Reclaimed water has some algae that is carried over from the wastewater treatment plant processes. Surface water, such as canal water, usually has a considerable amount of algae.

Even if a lake is filled with ground water, wind, dust, and runoff will carry algae cells into the basin. Additionally, the basin soils may contain algae before any water is added. Let's not also forget that birds and waterfowl may transfer small amounts of water from one place to another, transferring algae in the process.

What make the algae grow and multiply?

As mentioned above, algae require water, sunlight, and nutrients (nitrogen and phosphorus plus some trace elements) for growth. Our Arizona climate provides adequate intensity and duration of sunlight for algae growth, regardless of water source. Like most plants, warmer temperatures speed growth, and the same holds true for algae. Our warm spring and fall and hot summer stimulate algae to grow rapidly. Nutrient concentrations vary between water sources, but are typically lowest in ground water, moderate in surface water, and very high in reclaimed wastewater. The more nutrients present, the greater the potential for algae growth.

What kinds of algae growths occur?



Algae cells are microscopic. Most algae float freely in the water column (called planktonic or suspended algae). They may be single cells (unicells), groups of cells bound together (colonies), or chains of attached cells (filaments). [The photos below show each of the forms.] The filaments and some of the colonies can become of sufficient size to be seen with the unaided eye. Some algae have the ability to swim, others just move at the mercy of wind and currents. The planktonic algae are the

organisms that give water a green or blue-green color when the density of cells is quite high.

Attached algae include the three growth forms described above. They may be found growing on the lake bottom, along the shoreline, or intermingled in plants. These algae often produce a mucilage or slime that allows them to attach to the substrate. The filamentous forms growing on the lake sides can produce “stringers” or “beards” especially on lake edges with rough side walls. The filamentous forms may also intertwine and produce large floating mats on the lake surface. The bottom growers use both the nutrients in the water and those accumulated in the lake sediment for growth.

An assemblage of filamentous and mucilaginous algae that grow on the lake bottom can be problematic. These assemblages are not usually a problem because the lakes are very green and little light reaches the lake bottom. However, during periods when large quantities of well water (much clearer than the lake water and with much lower nutrient concentrations) are added to a lake, a short-term improvement in clarity occurs. This allows light to penetrate the water column and causes the bottom growths to expand quickly. During the summer, when temperatures and light intensity are greatest, the bottom growths will produce large amounts of oxygen. Oxygen bubbles get caught in the mesh work of the filaments and cause the algal mass to become buoyant. The result is a bunch of unsightly chunks of algae, usually with some of the lake sediment attached, floating on the water surface.

How do we manage algae growths?

Suspended algae is usually managed by addition of copper-based algaecides. These products, when used properly, cause little harm to other aquatic organisms including fish. Macroscopic growths of algae can be partially controlled by herbivorous fishes. The grass carp (or white Amur) has been stocked in the lakes for this purpose. Larger growths of filamentous algae and submerged weeds can be managed using algaecides and specialty aquatic herbicides. Some of the products are available in granular form for direct use on bottom growths. Lake dyes are also used to simply reduce the amount of light that reaches the algae and aquatic weeds, especially those growing in deep water or on the lake bottom.