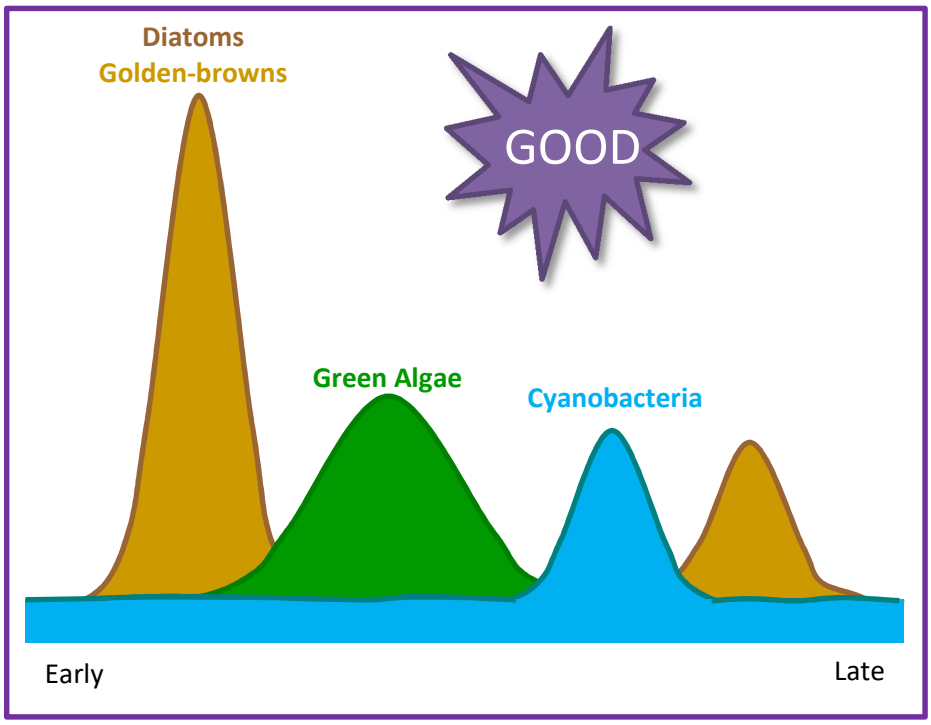
In The Swim with Gregg Lake

Seasonal Succession of Algae

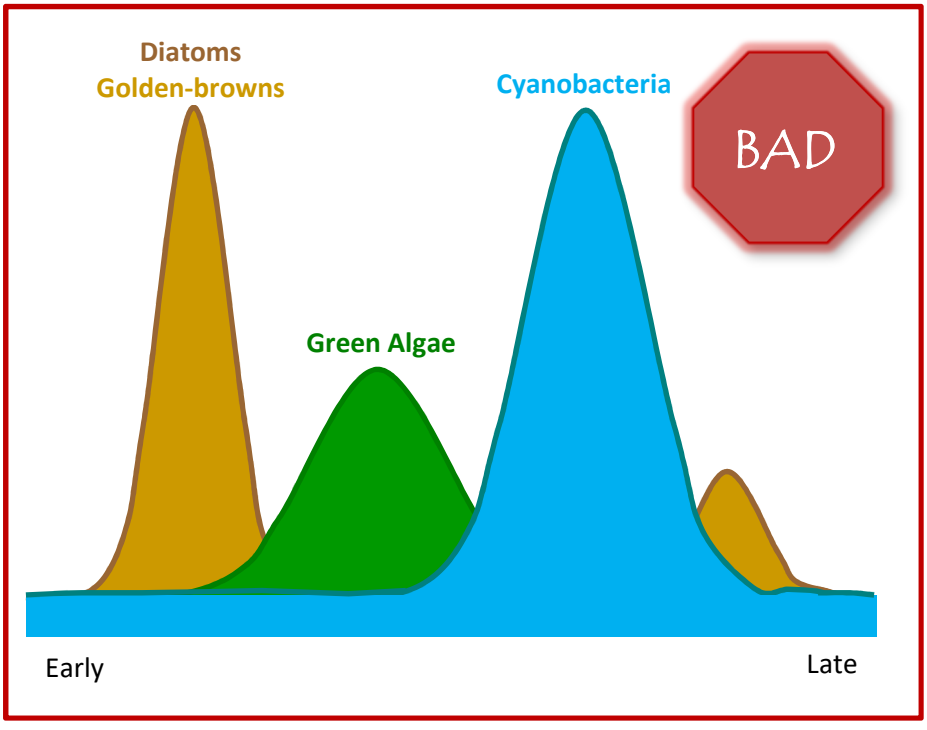
Prepared by the GLWMPC

Summary: Blooms of **green algae** in Gregg Lake in recent years suggest the release of the nutrient phosphorus from lake-bottom sediments or an influx of phosphorus into the lake water as the summer progresses. Algal blooms are likely aggravated by warmer and drier than normal conditions. Worsening conditions may lead to **cyanobacteria** (blue-green algae) blooms, although we have not yet experienced excessive levels of cyanobacteria in Gregg Lake.

Seasonal Succession: Algal populations in lakes change with the seasons. When the lake water "turns over," or mixes, at ice-out, plant nutrients, especially phosphorus and silica, are brought up from the bottom and light levels increase. **Diatoms**, which are encased in glass-like shells made of silica, and **golden-brown algae** thrive in these conditions and "bloom" until the silica is used up. They then die or "crash" and fall to the bottom, carrying silica and some phosphorus to the bottom. In lakes with low nutrient levels, the early **diatom/ golden-brown/cryptomonad** bloom is the period of lowest water clarity, and there are few nutrients left for successive waves of **green algae**, **cyanobacteria** and **diatoms**.

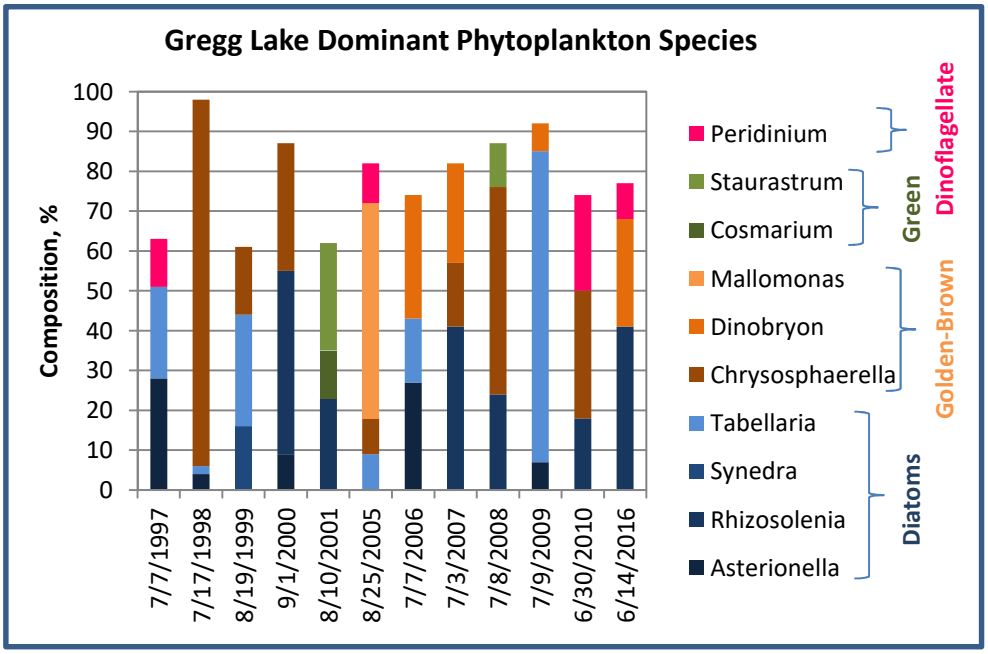


In lakes with higher nutrient loads or continuous sources of nutrients, phosphorus can be released from decaying **diatoms** and **algae** or enter the lake from other sources and lead to substantial successive blooms of **green algae** and **cyanobacteria**. Green algal blooms are both a nuisance and an indication of increased nutrient availability in the lake water. Cyanobacteria can release toxins hazardous to humans, domestic and wild animals and aquatic animals. Swimming beaches are closed if cyanobacteria blooms are detected or if cyanobacteria



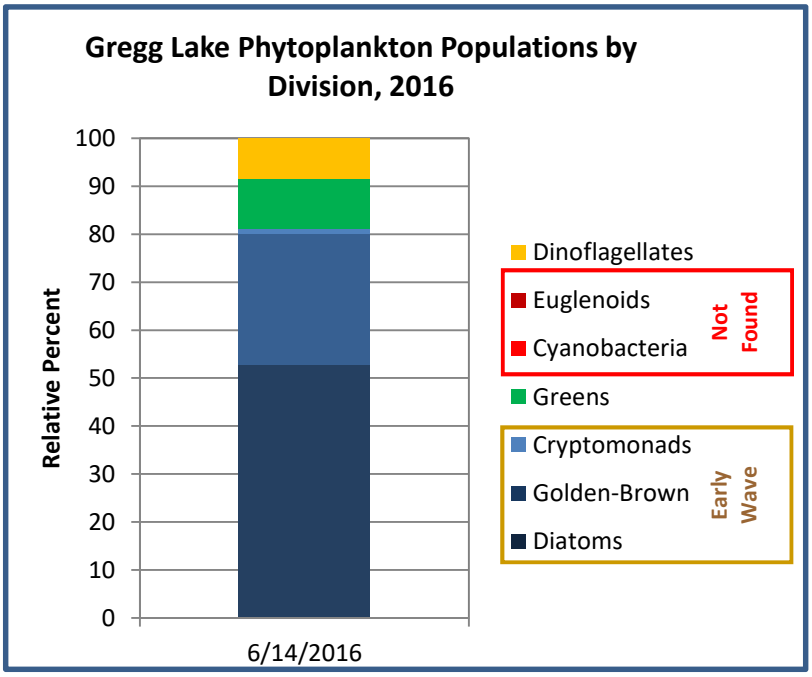
counts reach unsafe levels specified by the New Hampshire Department of Environmental Services. Warm, dry summers and increasing nutrient loads lead to increases in populations of green algae, and, if conditions further allow, cyanobacteria. A late bloom of diatoms is frequently seen in New Hampshire lakes.

Gregg Lake Data: Gregg Lake has experienced blooms of green algae in mid to late summer in the last several years. Analysis of microscopic algae and cyanobacteria (collectively called **phytoplankton**) annually from 1997–2001 and 2005–2010 sampled between late June and early September identified the dominant phytoplankton as primarily **diatoms** and **golden-brown algae**, with some **green algae** and **dinoflagellates**. Cyanobacteria have not been found to be a major phytoplankton component at Gregg Lake.



Phytoplankton analysis was again performed for Gregg Lake in mid-June, 2016. The predominant phytoplankton were found to be **diatoms**, **golden-browns** and **dinoflagellates**.

The Gregg Lake phytoplankton data for 2016 also included less dominant forms of phytoplankton. More than 80% of the phytoplankton divisions identified represented those in the early "diatom" wave of succession, which includes **golden-brown algae** and **cryptomonads**. Approximately 10% were **green algae** and 10% were **dinoflagellates**. **Cyanobacteria** and **euglenoids** both comprised less than 0.0% of the phytoplankton in the sample. Euglenoids, like cyanobacteria, can produce toxins harmful to humans and animals. Phytoplankton analysis for Gregg Lake will be performed again in 2018 as part of VLAP testing.



Prepared by the Gregg Lake Watershed Management Plan Committee. *These conclusions are drawn from a preliminary summary of the data available for Gregg Lake in May 2018, and may change as more data is collected and analysis is completed.*

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Funding for this project was provided in part by a Watershed Assistance Grant from the NH Department of Environmental Services with Clean Water Act Section 319 funds from the U.S. Environmental Protection Agency.