Gregg Lake Water Clarity

Summary: Water clarity in Gregg Lake appears to be declining. Water clarity can be affected by the presence of algae, dissolved colored substances and suspended particulate matter. Loss of water clarity can be harmful to aquatic life and can lead to increased algal blooms. Three measures of water clarity are routinely made:

- Transparency—how far down in the water column objects can be seen
- Turbidity—particles suspended in water scatter light rather than allowing it to pass through
- Color—generally due to compounds dissolved in the water

Transparency. The transparency of a lake's water is measured by lowering a disk with black and white markings into the water with a marked chain until it is just visible. Gregg Lake transparency appears to have decreased between 1997 and 2017 (Fig. 1).

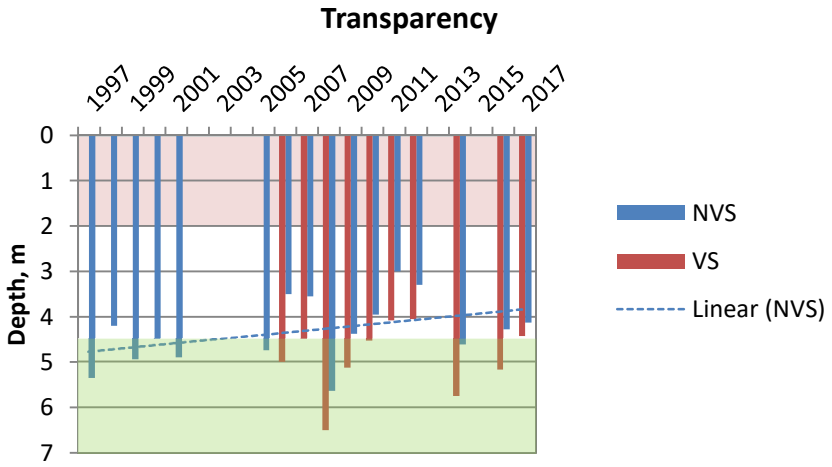

Figure 1. *Gregg Lake water transparency measured at the Deep Spot between 1997 and 2017. A Secchi-disk was lowered to the depth at which it could just be seen either with the naked eye on the shady side of the boat (NVS) or with a viewscope on the sunny side (VS).The dashed line shows the trend in the NVS transparency. Red shading shows the "Poor" range; green shading shows the "Exceptional" range.*

Turbidity. Turbidity in water is caused by suspended particulate matter, such as clay, silt and algae, that causes light to be scattered and absorbed, rather than transmitted in straight lines through the water. Particulate matter can be carried into the lake by stormwater runoff from roads and disturbed land areas, or can be stirred up from shallow bottom areas by motorboats. To assess trends in turbidity in Gregg Lake from 1997 through 2017, the mean was calculated from the values obtained at different depths at the Deep Spot for each year. Yearly means were calculated separately for the Inlet, measured at the Gregg Lake Road bridge, and the Outlet, measured at the dam (Fig. 2). Each set of values shows a clear trend towards increased turbidity.

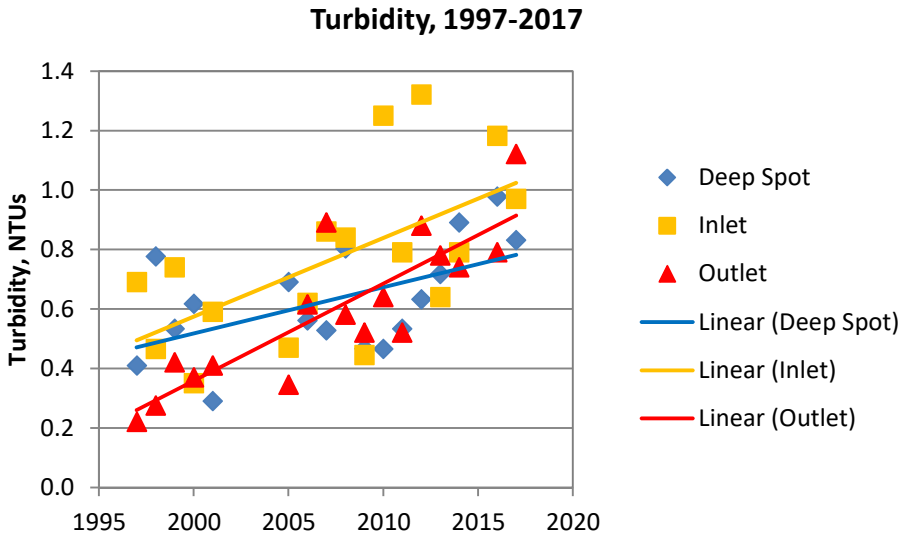

Figure 2. *Turbidity levels measured in Gregg Lake samples collected from 1997–2017. Deep Spot values are the means of values obtained for the upper, middle and lower water layers for each year; mean Inlet and Outlet values for each year were also calculated. Linear trend lines are shown for each location. The median value for NH lakes is 1.0 NTU.*

Color. Apparent color is a visual measure of the color of water. This color is generally caused by decaying organic matter or naturally occurring metals in the soils, such as iron and manganese. A highly colored lake generally has extensive wetlands along the shore or within the watershed, and often has a mucky bottom. Apparent color data for Gregg Lake is scarce. Measurements made in 1978, 1994, 1995 and 1997 ranged from "Clear" to "Light Tea." After noticing color in recent samples, the New Hampshire Department of Environmental Services recommended adding apparent color analyses to Gregg Lake sampling in 2017. Apparent color was measured monthly from spring to fall in 2017, each time in the upper water layer at the Deep Spot (Fig. 3). The color appeared to increase over the season, and the mean for all samples was 45.7 PCU, in the "Tea Color" category. Although there is a large amount of variability in the data, it appears that the overall color has increased in Gregg Lake over the last twenty years.

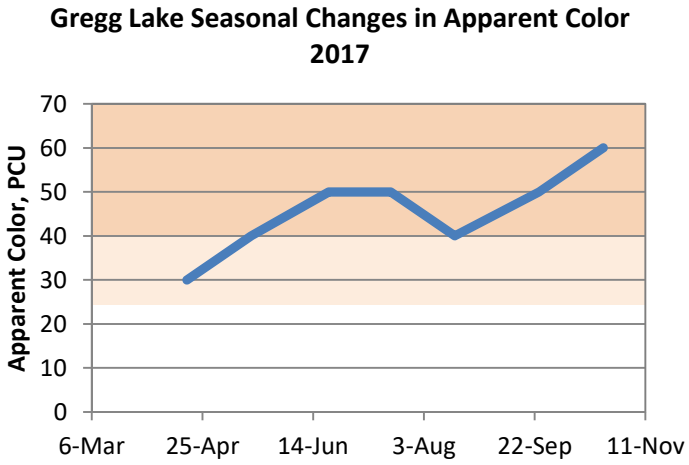

Figure 3. *Changes in the apparent color in epilimnion samples collected at the Deep Spot in Gregg Lake from April through October, 2017. Values below 25 PCU are considered "Clear", values from 25–40 PCU are considered "Light Tea" color, values from 40–80 PCU are "Tea Color" and values above 80 PCU are "Highly Colored."*

Particulate matter can clog gills of fish and other aquatic animals. Turbidity and increased color can block sunlight from aquatic plants, which then die, decay and release phosphorus back into the water, giving rise to algal blooms.

Prepared by the Gregg Lake Watershed Management Plan Committee

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