Herbicide and Algaecide Use on Lily Lake

Herbicide and algaecide treatments have historically been implemented by the Lily Lake Homeowners through a licensed commercial applicator in efforts to improve aquatic recreation. These treatments required a permit from the DNR and were implemented in 1993, 1995-2011, and in 2016-2017. In 2016, water quality monitoring staff documented a rapid decline in secchi disk readings after applications. While there are many factors that can affect annual secchi disk readings, this observation lead to a closer evaluation of historic monitoring data. The data indicates secchi readings of Lily Lake had an average secchi decrease of 0.5 feet in years when applications occurred. A closer evaluation between the correlation of water quality monitoring data and herbicide and algaecide applications was not possible because documentation of dates and precise volumes of applications are not required to be submitted or identified in the permit application.

Current research provides evidence that algaecide and herbicide use can result in decreased water clarity. Algaecides most commonly contain copper compounds. When the algaecide effective period ends, the dead algae serve as a source of nutrients for the remaining algae which can result in rapid regrowth if not managed properly (Button, K.S. et al, 1977).

A Minnesota lake study found that the suppression of algae was temporary and the population recovered within 7-21 days (Hanson et al, 1984). In addition, copper based treatments can shift the phytoplankton community towards more copper tolerant species (Jacob, A. et al, 2016). The abundance of these species of phytoplankton could contribute to lower Secchi disk readings in ponds treated with copper compounds (Lewtas, Kimberly, et al, 2015). Additionally, algaecides are more deadly to zooplankton which graze on phytoplankton (algae) and balance their population (Cooke, G.D. et al, 2001). Additional research suggests the long-term effect of copper based algaecide treatments can result in accelerated phosphorus recycling from the lake bed (Lewtas, Kimberly, et al, 2015).

Herbicides can also increase algal growth and decrease water clarity (Garling, D. L., 1999). Vegetation that is killed using herbicides may release a pulse of nutrients into the water column immediately upon senescence. These nutrients are then available for algae to use (Wagner et al, 2007). Some vegetation may translocate nutrients to their roots for later access, which may diminish the pulse (J. Bischoff, personal communication, June 14, 2018).

A study of Wisconsin lakes treated with fluridone for Eurasian Watermilfoil also saw a decrease in water clarity directly following treatments (Wagner et al, 2007). Large vegetation decreases led to decreases in Secchi depth and increase in Chl-a measurements (Wagner et al, 2007). Following herbicide treatments, studies found algal density increased, which decreased water clarity and may have inhibited the reestablishment of native macrophyte populations (Chambers and Kalff 1985, Barko et al. 1986, Scheffer et al. 1993, Jeppesen et al. 1997, Hauxwell et al. 2001).

Based on this information, the watershed recommends the suspension of future herbicide and algaecide application on Lily Lake.

APPENDIX A. REFERENCES CITED

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