

Floating Algal Mat Analysis

In Residential Retention Ponds

**Grand Haven Community Development District
Palm Coast, Florida**

For the Operations Manager

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By the Consultant

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A. Scope of Work

On August 28, 2007 samples were collected from 4 retention ponds exhibiting floating masses of algae at the Grand Haven Development in Palm Coast, Florida. The samples were transported to the lab and examined microscopically in an effort to identify the algae, and to determine methods for treatment and removal of the algal mats from the ponds. Recommendations for long-term maintenance of the ponds were also considered.

A. Algae ID

Lake 18 - The floating masses in this pond were comprised mainly of blue-green algae in the genera *Lyngbya* and *Anabaena*. Other green algae found were *Oscillatoria* and *Ulothrix*.

Lake 25 - Samples from this pond were very similar to Lake 18, but also included the green algae genus *Zygnema*.

Lake 11 - Genera found in this sample included *Anabaena*, *Lyngbya*, *Nodularia*, *Staurastrum*, and *Navicula*.

Lake 19 - This pond sample contained the blue-greens described above, as well as *Cladophora*, *Ulothrix*, *Spyrogyra*, and *Zygnema*.

A. Discussion

The algae identified in the samples from the Grand Haven ponds are natural fresh water algae that are normally found in lakes and ponds in Florida. The general aquatic ecology of the ponds appears to be reasonably healthy, with some submergent vegetation, minnows and fish. Based on these observations, it can be concluded that the retention ponds have been well maintained and properly treated with algaecides and chemicals. The problem algal mats and blooms observed are due to an unnaturally high nutrient load. High levels of phosphorous and nitrogen compounds enter the water bodies as runoff, and provide a food source for the algae. These high nutrient levels help create the large, benthic, blue green algae mats that rise to the surface and create an odorous and unsightly problem for waterfront homeowners. The main cause of this problem is the spraying of fertilizers on lakefront lawns, especially near the water's edge, grass clippings from mowing that enter the ponds and denuded shorelines. It should be noted that these algae are not considered toxic to humans or animals.

A. Conclusions / Recommendations

Many formulations of algaecides designed to treat surface water are available. The currently contracted aquatic treatment company at Grand Haven has been using formulations that have been successful at controlling aquatic vegetation and algae while maintaining the ecological viability of the ponds. The current algae bloom situation is a naturally occurring summertime event that has been exacerbated by lower than normal rainfall, high temperatures, and the nutrient loading described previously. Two chemical treatments that are commercially available should work to break up the algal mats. **Algimycin** and **Phycomycin** are two formulations designed to kill blue-green algae (see attached). Other options are mechanical disruption and mechanical removal of the floating algae.

The most effective and long-term method for controlling algae bloom problems is to lessen the amounts of nitrogen and phosphorous entering the ponds. Planting of native shoreline and emergent vegetation will allow for uptake and removal of nutrients before they enter the water. Careful mowing that doesn't allow clippings to enter the water will be effective. Natural lake and pond systems develop an ecological balance, allowing nutrients to cycle naturally reducing algae blooms. The Grand Haven retention ponds are faced with a difficult problem; how to limit nutrient loading and allow the lakes to naturally cycle nutrients and avoid future problems with algae. I've included a list of goals that should be considered for implementation by management as well as waterfront homeowners.

The anticipated result of developing an ecologically balanced aquatic system is much more than simply avoiding future algae blooms. The lakes will be visually appealing and will attract birds and other wildlife to the area. Fish populations will increase and the water will be clear with less chemical treatment necessary. Ultimately the residents of Grand Haven will enjoy higher property values, and an aesthetically pleasing and ecologically sound environment.

GOALS FOR CONTROLLING NUTRIENT LOADING IN URBAN RETENTION PONDS
Grand Haven Development in Palm Coast, Florida

1. Yard Spraying – this is the number one cause of nitrogen and phosphorous laden runoff entering water bodies. Management should create a contact list of vendors currently servicing lakefront homeowners. These vendors should be contacted and apprised of the situation. Homeowners should observe spraying events and ask the technician not to spray within 15 feet of the water.
1. Grass Clippings – Grass clippings contain high levels of nutrients and can significantly increase these levels in the water column. Maintenance staff and homeowners should be advised to use care when mowing to avoid deposition of grass clippings into the ponds.
1. Shoreline Planting – A naturally vegetated shoreline is an important aspect in the maintenance of an ecologically sound water body. Shoreline plants absorb nutrients, and provide shelter and forage for a host of aquatic and terrestrial species. Plantings are attractive, and provide a natural buffer between the homeowners yard and the natural aquatic environment. Species recommended for planting include: Pickerell Weed (*Pontederia spp.*), Arrowhead (*Saggitaria folcata*), and Spikerush (*Eleocharis spp.*). *Spartina* can be planted just above the shoreline to create a natural shoreline ecology.

References

1. Standard Methods for the Examination of Water and Wastewater. 18th edition
2. Microscopic Examination of Blue-Green Algae. Evans, 1986.
3. Applied Biochemists. 2007
4. Algae Color Plates. Standard Methods 18th Edition