TABB LAKES
RETENTION LAKES MAINTENANCE PROGRAM
(PUBLISHED IN SPRING 2005 NEWSLETTER)

This information paper is provided by the Tabb Lakes Board of Directors in order to keep you, our Homeowner Association members, apprised of the status of our retention lakes maintenance analysis.

In October 2004, the current Tabb Lakes Home Owners Association Board of Directors (BOD) began investigating options to the problem of maintaining our storm water retention lakes/ponds. This was discussed during the lake maintenance meeting in December 2004. Dredging was originally an option discussed in previous meetings and address in a previous letter to the HOA members; however, the current BOD began looking for other alternatives to address the problem of our degrading lakes health. The board began by reviewing the results of the lake study conducted in March of 2004 by Earthworks Consulting Engineers, Inc. This was the second study of our lakes; the first which was conducted in 2000. Earthworks drew core samples throughout the bottom of Lake 2. The core samples were sent to a laboratory for analysis of composition, moisture content and gradation. Earthworks surveys indicate that Lake 2 ranges from 3.5 to 8 feet deep. The results of the core samples analysis indicate that the layer of sedimentation at the bottom of Lake 2 ranged from 12 to 24 inches. Greater than 75% of the sedimentation is organic matter (leaves, aquatic plants, grass clippings, etc.); not sand.

The problem we face is not a simple one. First, our retention lakes are shallow in some areas. Second, as the studies indicate, both lakes are filling up with organic mater (leaves, plants, algae, etc). Third, the flow of fresh (oxygenated) water into our retention ponds and through our lakes is governed by rainfall amounts. There is no natural stream inflow to provide fresh water into our retention lakes. This combination has a detrimental effect on the biology of our retention lakes. As an example, the core sample analysis performed by Earthworks indicates that the organic matter is decaying at a very slow rate. This is due to the low oxygen content. Because of the limited depth of some areas of Lake 2, the high biological load currently in our lakes and the possible increase in nutrient load in the summer, algae and other aquatic plant life thrive in excessive amounts. This has the effect of decreasing the oxygen content of the lakes, causing fish to die off at certain points of the year, and more importantly, decreases the rate of organic mater breakdown by zooplanktons. An indication of this lack of oxygen (an anaerobic condition) is the hydrogen sulfide (rotten egg) smell emitted from some areas of the lake. Our only recourse was to contract with a Lake Maintenance company to chemically treat and kill both the algae and plant growth but this did not impact on the biological breakdown of the increasing organic matter.

One of the options the BOD looked at was the installation of aeration equipment to increase the breakdown of the organic matter and increase the biological health of our lakes. Lake maintenance experts have advised us that the fountains currently installed serve an aesthetic function but provide no notable aeration value. Several lake maintenance contractors were asked to prepare proposals to the BOD to install aeration equipment. Proposals ranged from approximately $13,000 for Lake 1 and 2 to over $23,000 for Lake 2 only. On February 20, 2005, the BOD reviewed the proposals and approved the funding to install an underwater aeration system in both storm water retention lakes.

The equipment selected is called the Vertex Lake Aeration System. Aeration will be provided by membrane diffuser systems which pump air to the bottom of the lakes. Six sets of dual diffusers will be installed in each lake. The equipment may be viewed at www.vertexwaterfeatures.com Each aeration system will circulate the lake volume approximately twice per day. Vertex lists the following benefits of using this type aeration equipment as:

- Increase dissolved oxygen
- Stops oxygen related fish kills by raising entire water column oxygen levels
- Reduces nutrient levels and associated algae growth
- Ends thermal stratification
- Improves fisheries by expanding oxygenated habitat
- Reduces aquatic midge and mosquito insect hatches
- Eliminates foul odors from undesirable dissolved gases
- SAFE – no electricity in the water and full GFCI protection on all circuits

As a note to lake side homeowners, the installing contractor has advised us that the initiation of the aeration equipment will likely result in the release of gases currently bound in the organic mass on the lake bottom. The gas release and associated odor should subside after a few weeks of aeration.

The lake and pond experts have advised us that algae growth will be retarded through the use of the lakes/ponds aeration equipment. The experts further advise that aggressive aeration will aide in the decay of the organic matter deposited at the bottom of the lakes/ponds. Aeration should also have the benefit of reducing the amount of herbicide required to control algae and will produce a healthier environment for the aquatic animals in the lakes/ponds.

The existing fountains will be retained until the end of their service life provided existing electrical facilities are capable of supporting the electrical load of the existing fountains and the diffuser systems. Herbicide treatments will continue to retard aquatic weed growth. The aeration equipment will operate 24 hours a day. The electric cost should be approximately 25% of operating the existing fountains. The greatest benefit to our community may be realized in reducing the amount of sedimentation on the bottom of our lakes thereby reducing the cost of future possible dredging efforts. Also notable is the fact that the water exiting our lakes/ponds to the Chesapeake Bay will be cleaner.

WHAT CAN ALL OF US DO TO HELP

Algae and aquatic plant life are present in every lake and represent an important part of the aquatic food web. Thankfully aeration will not get rid of all the algae. The uncontrolled growth of algal population is usually stimulated by nutrients, sun light, and temperature. Sunlight and temperature are obviously beyond our control. What we can control is the amount of nutrients we artificially add into our retention lakes. The amount of fertilizer we use and the amounts of leaves and grass clippings that enter our lakes directly impact that nutrient load. Over fertilization of lawns throughout our community and needlessly depositing grass clippings and leaves into our retention lakes or drainage system is the greatest danger to the health of our lakes/ponds. This excessive nutrient load spurs algae growth which exceeds zooplankton's ability to keep the algae under control. The nutrient usually responsible for algae growth is the phosphorus contained in the fertilizer we apply to our lawns.

We ask that all homeowners apply fertilizers in accordance with the guidance provided by the Virginia Cooperative Extension (VCE) and/or consider using a phosphate free fertilizer. VCE has an extensive amount of information on how to properly fertilize grasses in this locality. Please stop by their office at 100 County Drive (off of Goodwin Neck Road) or go to their web site at http://www.yorkcounty.gov/vce/programareas/hort/hortpubs.htm for further information. In addition, please take care of our lakes by not depositing leaves and grass clippings in our roadside ditches. This organic matter will get flushed into our lakes and add to the already excessive biological load.

The board is continuing to research other options and will advise everyone on our progress through our newsletters, web site and homeowners meeting. At this time, we ask that we all take more control over caring for our stormwater lakes. .