MUNICIPALITY of the COUNTY of KINGS

Lagoons 101: Keeping our Wastewater Lagoons Healthy

The wastewater treatment lagoons in the Municipality of the County of Kings are teeming with life. From insect larvae, to algae and plants, to filaments and stalks, to smaller bacteria, each lagoon is a diverse ecosystem of microbiology.

Lagoon-based wastewater treatment is a delicate biological process. At least two ponds are designed in a treatment plant. Wastewater enters the first, and slowly meanders to the second. Ponds are sized to ensure wastewater is retained for a period of time before re-entering our ecosystem. Aeration infrastructure is added to each pond to ensure there is a high level of dissolved oxygen in the water column to sustain aerobic biodiversity.

Lots of microbial activity happens in the first pond. Nutrient-rich wastewater continually enters the pond, and aerobic microbial life abounds. As the microbes grow in population, they accumulate near the bottom of the pond as a thick spongy matte – commonly referred to as sludge. As the sludge accumulates, the deeper sections become starved of oxygen, darken in colour, and stabilize into a distinctly different anaerobic ecosystem.

The ecology in the second pond is very different than the first. Generally free of sludge, it looks and behaves like a water body found in nature. Commonly called the “finishing pond”, aerobic microbes ingest remaining nutrients in the water column, resulting in a clean, clear, polished effluent that can re-enter our environment. The second ponds in our municipality are commonly filled with ducks, geese, turtles, muskrats, and duckweed.

Maintaining aerobic conditions in our lagoons is important. Just like humans, aerobic micro-organisms produce (among other things) carbon dioxide. If aerobic biodiversity is not sustained, anaerobic micro-organisms take over, which produce (among other things) hydrogen sulfide. Hydrogen sulfide has a distinct “rotten egg” smell, and can be quite unpleasant in a community – something the residents of Hants Border and New Minas have regrettably experienced.

A key to sustaining an aerobic environment in the pond relates to the aeration infrastructure. In a “clean” pond containing human waste, toilet paper, and the odd food scrap, the microbes can digest

waste efficiently. Problems arise when inorganic materials, such as disposable wipes and hygiene products, enter the pond.

Disposable wipes and hygiene products are easily transported in flowing water. In a wastewater pond, these products remain suspended in the water column and accumulate on the aeration diffusors. As they accumulate, they impede the supply of fresh dissolved oxygen, which leads to suffocation of the aerobic biodiversity.

As the aerobic biodiversity slowly suffocates, things quickly change in what was once a stable ecosystem. The dark, deeper sections of the sludge now start to grow, and do so quickly. The low oxygen environment creates an environment for the anaerobic microbes to thrive. The anaerobic microbes thrive quickly, as they are fed not only by the residential waste, but also by the abundant supply of dying aerobic microbes. The result is a thick, dark, anaerobic sludge matte. The anaerobic sludge is happy to continue to digest the steady influx of residential waste, but the end result is a foul smell to the neighboring residents.

The best way for you to contribute to the health of the lagoons in your community is to be aware of what you are putting down your drains and toilets. Simply put, if it's not coming from your body, and it's not toilet paper, it shouldn't be entering the wastewater system (an exception to this would be dish and clothing detergents). When disposable wipes and hygiene products go down the drain or toilet, they will inevitably end up on an aeration diffusor in your community lagoon, and will contribute to foul odors.

Over the next several years, we're working hard to install filtration equipment at each wastewater treatment plant. The new equipment will capture inorganic debris before it enters the lagoons. This will be a large upgrade to each community, and will serve to prevent foul odours that can come from our treatment plants. The upgrades will come with a high cost and will take time to install. In the meantime, please be mindful of what is entering the wastewater stream from your residence or place of business.

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