

### **Topic: Dealing with Algae in Waste Water Treatment Plants.**

#### **What is Algae**

Algae organisms are microscopic cells that form colonies of threadlike chains. Like plants they use light energy for photosynthesis producing carbohydrates from solar energy and releasing oxygen into the atmosphere. When Algae blooms they discolour the water a khaki or green colour. In stagnant water the surface may appear to have a green paint or jelly like substance.

#### **Why is Algae a problem to WWTP operators**

1. Algae in effluent ponds are an indication that the WWTP is overloaded and not biologically dealing with the nutrient levels.
2. Algae can produce potent toxins and under certain conditions are a risk to humans, livestock and domestic animals that may drink or swim in any creek or wetland receiving the WWTP waste water. Algae blooms can also kill native birds and upset the ecological balance of the receiving water bodies. Irrigation of algae contaminated water can cause health issues if inhaled as a fine mist

#### **What Causes Algae to develop and bloom.**

Algae's can form in saline and fresh water under the following favourable conditions;

- Lots of organic nutrients commonly found in WWTP effluent water.
- Still and confined waters, with warm surface levels.
- Shallow Stagnant water.
- Excrement from local bird life.
- Algae blooms are common after rainfall in WWTP effluent ponds as bottom sludge is disturbed releasing nutrients and fresh inflow of nutrient will promote Algae growth.



This picture shows the typical conditions that Algae find favourable;

- Shallow warm water
- Stagnant water
- Nutrient supply from nearby fertiliser stack.

## How does For Earth manage Algae in WWTP

For Earth uses Air stone aeration and Pro-biotics to reduce or eliminate Algae in WWTP.

### **Air stone aeration:**

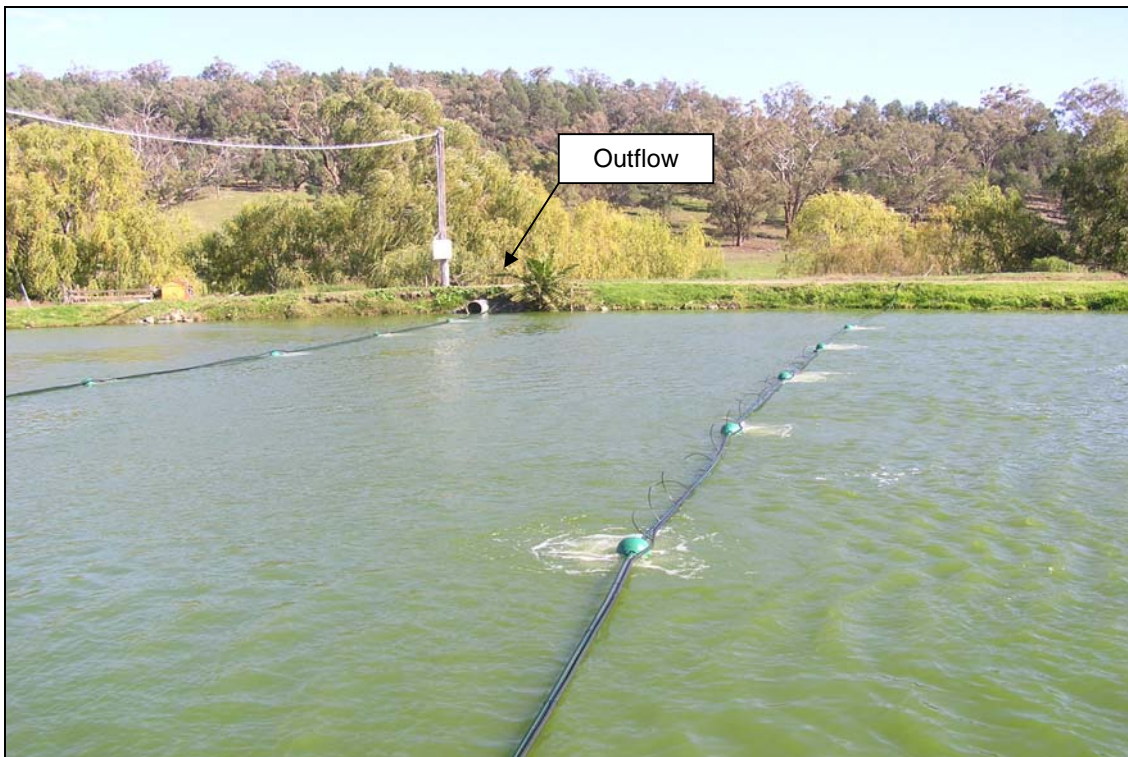
Algae growth will be reduced by oxygenating the ponds with our low energy air stone system. The air stones are placed below the surface level which has two positive effects.

1. Oxygen is increased in the surface levels to promote aerobic bacteria regeneration which inturn accelerates biological nutrient removal. This reduces surface nutrients essential for Algae growth.
2. Oxygenation from sub surface levels brings cooler water to the surface but does not disturb bottom sludge in the effluent ponds. This cooler water is unfavourable for algae growth.

### **Pro-biotics (Beneficial Bacteria)**

Algae is a general indication that there is nutrient overloading in surface levels which is an area difficult for natural biological nutrient digestion as lack of oxygen and UV light are not favourable for biological regeneration.

To lessen nutrient levels in the surface levels (and all levels of ponds) For Earth Pro-biotics are surface sprayed onto the pond. This introduces large volumes of beneficial bacteria to digest the surface nutrients and inturn reducing nutrients for Algae to develop. The introduced beneficial bacteria have both anaerobic and aerobic bacteria so all levels of the pond will benefit from biological nutrient removal. With regular application of our Pro-biotic products pond desludging occurs as an added benefit.



Aeration placed at final outflow to receiving waters (wetlands) to treat prior to release. Pro-biotics applied up stream and around the aeration.

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