

Student 3:

Eutrophication is caused by excessive levels of nitrogen in the water ways which causes plant life (mainly algae) to grow at a very fast rate which is why it is called an "algae bloom". This bloom can spread through the water way very quickly and in small streams it can even slow or stop the natural flow. The algae need oxygen to survive and because there are excessive amounts of algae there is often very little oxygen for left for natural plants, weeds and organisms to live so they die from insufficient oxygen levels (1).

Because of the algae bloom many recreational uses of the river can no longer take place as fish numbers are very low and quite often the water is too polluted to swim safely (Waikato and Manawatu rivers). The eutrophication often causes the river to become a dirty brown or red colour and in some cases where the river levels are low the algae dries out in the sun and starts to rot attracting sand flies and mosquitoes and a bad smell, these often stop people from using the river for recreation.

The main cause of eutrophication is nitrogen is nitrogen in the nitrate form, leeching or running off into a water source. There are two ways nitrogen can enter a waterway from a dairy farm, point and non-point sources.

Point source is where you can actually identify where the nitrogen is entering the water. It could be a runoff pipe from a feed pad, the stock actually defecating into the water or another way but is less common is when effluent is applied to the pasture in excessive levels and then you get heavy rain that washes a lot of the effluent directly into the water.

Non-point sources is things such as nutrient leeching. Nutrient leeching can happen for a number of reasons, it can be when nitrogen (urea) is applied and shortly after you get heavy rain that washes the nitrogen past the root zone of the plant and down into the underground water ways. It can also be when you apply effluent to soil that is already saturated (can't hold any more water) and the nutrients from the effluent is washed down past the root zone and into the underground water ways. Nitrogen leeching is more common in soils with larger pores (sandy soils, gravel and pumice) and can occur very rapidly.

Some new technologies that have been incorporated into pond systems are high tech effluent separators. This machine separates the hard, fibrous effluent from the liquid effluent. All of the effluent goes into a holding pond where it stays until it is pumped into the separator. In the holding pond the effluent gets mixed up so it doesn't separate. Once pumped in to the separator the effluent is separated. The liquid effluent (smaller than 0.5mm) is pumped into a storage pond or oxidation pond. The hard waste is pushed out of machine and is piled up soil can be out back onto the farm as organic matter. Putting this waste back on to the farm is not a bad practice as it only has between 10 – 15% nitrogen compared with oxidised effluent and urea, which are both between 40 and 50%<sup>2</sup> (2). These systems are very effective as they take out the use of a setting pond and reduce waste of useable effluent and organic matter but are very expensive to purchase which is why they are not that common<sup>5</sup>.