



Ultrasonic Control of Algae

We were contacted by the Zoological Society of London to investigate a problem with marine picoplankton in the sea lion pool at Whipsnade Zoo. The Pool had been installed with a complex water treatment system using ozone and sand filtration, but there was still a problem with the water colour, which had taken on a slightly cloudy fluorescent green tinge. This was not causing a problem for the sea lions, but some of the visitors thought it did not look quite right. Various sensible steps were taken to improve the filtration system but the colour stubbornly remained.

The pool is a seawater system so we were not dealing with the normal algal targets. We analysed the water sample using light microscopy and flow cytometry and found that the cause of the problem was a very small marine alga, belonging to a group called picoplankton. They were small enough to pass through the sand filter and remained unaffected by the ozone treatment system.

We installed an ultrasound transducer in the pipework of the recirculating system to generate sound waves in the section of the system after all the pumps and filters, before re-entry to the tank. This placement meant that all the anti-algal activity at the transducer face would be released into the pool before being potentially destroyed by sand filtration and passing through pumps, with carbon dioxide management systems.

We had to wait about 4 – 6 weeks before the results became obvious. The water started to become clearer, although the green tinge remained, it was less intense. Chlorophyll levels dropped by about a half and visitor complaints dropped too. We achieved a reduction in picoplankton that resulted in clearer water and better viewing conditions.

This case study shows we can achieve significant reductions of marine phytoplankton, and we have also cleaned up algal fouling of salmon cages in trials in Scotland.