

Abstract

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Title

A persistent smell, where is the geosmin coming from in Hope Valley Reservoir?

Description

Hope Valley Reservoir has been inundated with persistent extracellular geosmin compounds with no discernible planktonic cyanobacterial source. To maintain aesthetic water quality Hope Valley water treatment plant needed to utilise PAC dosing continuously for a 12-month period to mitigate the geosmin compounds. The aim of this study was to determine if persistent taste and odour issues at Hope Valley were benthic cyanobacterial related and if fluorescence could be used as a method to monitor the activity of the benthic cyanobacteria in the catchment and plant inlet of Hope Valley. This study incorporated 1) geosmin, algal, fluorescence, metagenomics, and basic water quality monitoring at 27 sampling locations, 2) installation of coupons at 3 sites, 3) sediment and substrate sampling throughout the reservoir, and 4) in situ fluorescence monitoring in the reservoir and at the inlet of the water treatment plant in an intensive 6-month study.

Geosmin compounds were found at all 27 locations in Hope Valley. Geosmin concentrations ranged from 5 – 22 ng/L and were mainly extracellular throughout all locations of the reservoir. Planktonic cyanobacteria were not detected during the 6-month study. Intensive sampling identified 2 key areas with relatively higher geosmin concentration; these locations represented the shallower and more protected areas of the reservoir. A modest correlation ($R^2 = 0.7$) was found between fluorescent dissolved organic matter and geosmin concentration at the inlet of the water treatment plant. Samples taken from coupons showed a range of benthic cyanobacteria beginning to accumulate and produce geosmin and MIB. Sediment core and substrate sampling showed that certain locations contained large geosmin concentrations, with the maximum concentration found to be over 4000 ng/L. This study provided SA Water with a better understanding on the impact of benthic cyanobacteria can on managed catchments and treatment processes.