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Narrows Lakes Interchange, Perth, Western Australia

Application date: Annually since 2009

Summary

Aim: To bind the soluble phosphorus in the Narrows Lakes, reducing the frequency of algal blooms and significantly improve the aesthetics of the water body.

Description: East and West Lakes

Size (m^2): 4,400 & 18,800 respectively

Average depth (m):1.1 & 0.6 respectively

Conductivity (µS/cm): 2,500 & 857 respectively

The Lakes

The Narrows Lakes Interchange is a series of lakes located next to Mitchell Freeway and to the south of the CBD of Perth, WA. The City of Perth manages the Narrows Interchange area as parkland for passive recreation and tourism purposes and water from one of the lakes is used to irrigate the parkland. The Lakes frequently experience algal blooms. The primary cause of these blooms is excessive levels of nutrients, particularly soluble phosphorus.

Figure 1: Aerial photo of the Narrows Lakes , Western Australia (image from Google Earth)

The Treatment

Phoslock has been applied to West and East Lake on an annual basis since 2009. The 2009 – 2010 applications were undertaken as "restoration" doses due to filamentous algae being a big problem at the site (in 2010 approximately 12 cubic meters of the algal biomass was mechanically removed in conjunction with the Phoslock dose). Smaller doses to the lakes post 2010 have been undertaken to maintain good water quality and to manage phosphate that continually flows into the lakes.

All applications are undertaken with the use of a work boat fitted with a hopper, mixer and spray bar. To ensure even cover of the slurry, the site was grid mapped and the placement of the slurry was calculated using visual means.

Figure 2: Phoslock applied to the East lake from a pontoon.

Results

Prior to the Phoslock application in 2009, there were thick algal mats on the surface of the water (Figure 3). Phoslock was applied to the water body and the excess algae mats on the surface were mechanically removed in 2010. Prior to the application of Phoslock the P concentration was 0.1-1.02 mg/L however after the application, P was measured below the MDL <0.05 mg/L.

Figure 3: West lake pre (LHS) and post (RHS) the application of Phoslock

The Eastern Lake had previously experienced blooms of filamentous algae, however due to the decreasing nutrient concentration, the filamentous algal blooms collapsed and enabled the native aquatic plant (Potamogeton) to grow. The Phoslock applications to the Eastern and Western Lakes in have resulted in a reduction of SRP levels to guideline levels. Results showed that Phoslock adsorbed 100% of the SRP within 15 minutes after application in P concentrations of up to 125mg/L.

Conclusion

Publication date: August 2015

The management of the Eastern and Western Lakes of the Narrows interchange with the use of Phoslock has been successful in dramatically reducing the amount of SRP and TP in the lakes. This in turn has caused the transition of the aquatic species in the Eastern Lake from an algae dominated system to an aquatic plant dominated system The applications of Phoslock to the Western Lake have been very effective and the lake is now in good health. Results from these successive annual applications have highlighted the importance in reducing the concentration of phosphorus over time in order to return the lakes health and aesthetic appeal. Phoslock is part of an annual maintenance programme to ensure that the lakes (and gardens) are kept in pristine condition for these high usage and high traffic (walkers, runner and cyclists) gardens that are a key entry point into the CBD of Perth.

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