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Dianchi Lake, Yunnan Province, China

Application date: July 2003

Summary

***Aim**: Application of Phoslock to test site to bind phosphorus in the water column to reduce reoccurring problems with blue-green algal blooms*

***Description**: Portion of Lake*

Size (ha): 0.01
Max. depth (m): 11
Average depth (m): 5
Conductivity (µS/cm): N/A

The Lake

Figure 1: Aerial view of Dianchi Lake, Yunnan Province, China (Google maps)

Dianchi Lake is located in Kunming, in the Yunnan Province, China (Figure 1). It is the largest freshwater lake in the Yunnan Province and the 6th largest lake in China. The Lake is about 300 km^2 in size and has been plagued by blue-green algae outbreaks since the 1970's. Dianchi Lake is the main water source for industry and agriculture in Kunming and prior to the algae blooms, it made up 40% of Kunming's drinking water supply. Most of the nutrient entering the lake is from industrial sewerage discharged by more than 250 factories on the shore and from domestic sewage with fertilizers and pesticides flowing into the lake via 16 rivers.

The Treatment

A trial application of Phoslock was applied to a sectioned off area of Dianchi Lake in July 2003 (Figure 2). The Phoslock was applied as a slurry, combining powdered Phoslock and water from the lake. The slurry was applied to the lake with the use of a shore based applicator comprising of a hose, a mixer and pumps.

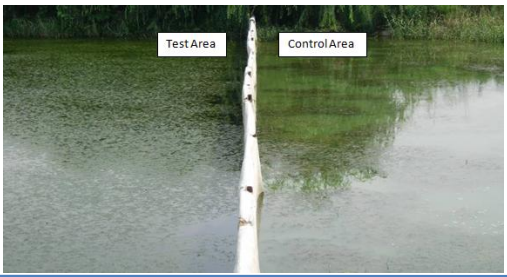

Figure 2: Separation of the Phoslock application and Control areas prior to the application of Phoslock.

Results

Monitoring was carried out prior to the application (19/3/2003), on 31/7/2003 and 16 months after the application in June 2004. Figure 3 shows the marked difference between the Phoslock application water, the control site and Lake Dianchi.

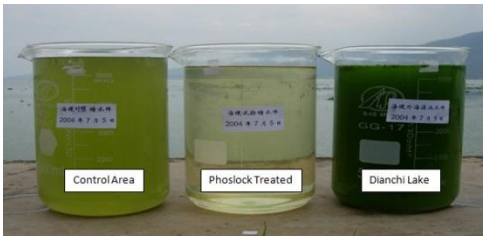

Figure 3: Beakers containing water from the 3 sites taken 16 months after the application of Phoslock.

Table 1: Phosphorus data from the Phoslock application and the control areas.

Units: mg/l	Area Treated with Phoslock		Control area	
	Total phosphorus	Phosphate	Total phosphorus	Phosphate
Prior to application	0.310	0.008	0.286	0.080
Directly after Phoslock	0.470	0.006	1.007	0.360
16 months after Phoslock	0.055	0.014	0.286	0.085

At the time of the Phoslock application, the Total Phosphorus (TP) concentration in the treatment area was 0.47 mg/L however 16 months later the concentration decreased by 88% to 0.055 mg/L. By comparing the TP of the control and the application areas we can see that the TP was 0.281 mg/L higher in the control area. The phosphate (PO_4) data shows that there was a slight reduction of PO_4 directly after the application of Phoslock, however there was an increase after 16 months. This is due to a constant inflow of PO_4 into the water body. However even with the constant flow, the TP was significantly lower. This shows that the product had a long term effect in reducing P in the water body.

Conclusion

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The Phoslock trial application to a sectioned off area of Lake Dianchi was successful in significantly reducing the phosphorus concentration in the test area by 88% 16 months after the application of Phoslock. The water quality also significantly improved (as highlighted in Figure 3). The colour and clarity of the Phoslock treated water was markedly different to the water that was collected from the control areas and the lake itself. The blue-green algae concentration was significantly reduced in the area treated with Phoslock and this was sustained over time.

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