Phoslock Water Solutions Ltd. www.phoslock.com.au
Phoslock Europe GmbH www.phoslock.eu
Institut Dr. Nowak GmbH www.limnowak.com

Reither See, Reith im Alpbachtal, Austria

First application: May 2013 ; small top up applications during spring 2015, 2016, 2017

Summary

***Aim**: To control the increasing abundance of benthic cyanobacteria/diatom which form floating mats on the water surface.*

***Description**: Natural Lake*

Size (ha): 1.5
Max. depth (m): 7.7
Average depth (m): 4
Conductivity (µS/cm): 394-498

Dosage to date (tonnes): ≈ 11

The Lake

Figure 1: Reither See, Tyrol, Austria (image from Google Earth Pro, 2017)

The Reither See is a small, natural lake situated in the centre of the tourist village Reith im Alpbachtal about 45 km east of Innsbruck (Tyrol, Austria). The lake is a popular recreational destination for residents, tourists and visitors from surrounding areas. Due to the implementation of a hypolimnetic withdrawal system combined with various measures undertaken in the 1970s, good water quality was maintained for many years allowing unrestricted recreational use. Since the early 2000's, the lake has suffered from the growth of benthic algal mats floating on the surface.

Background

A comprehensive analysis of the water chemistry, phytoplankton abundance, sediment chemistry and benthic organisms was undertaken in order to investigate the causes of the occurrence and proliferation of the benthic algal mats. A dynamic chain of physical, chemical and biological interactions between the water column and the sediment was determined to be the reason for the proliferation of the mats. The crucial factor driving this interaction was the large amount of bioavailable phosphorus in the sediment.

Figure 2: Photos of floating algae mats and benthic algae conglomerates prior to the restoration.

The Treatment

Prior to the treatment, the prevalence of the algal mats prevented the use of the lake for several weeks during spring and summer each year and caused a decline in the appeal of the village as a tourist destination. An integrated management approach was developed. The first step involved the application of Phoslock in order to bind the bioavailable phosphorus in the upper sediment layer. This inhibited the formation of benthic mats. The concentration of chlorophyll-*a* in the water column dropped by 30 %. The second step involede the planting of aquatic plants (Charophyte) (by Systema GmbH, Vienna) in the littoral zone to establish native competitors to benthic algae mats.
In May 2013 an initial application of 6 tonnes of Phoslock was undertaken to bind the "easy-releaseable" P fraction in the upper 5 cm of the sediment. To guarantee an unrestricted recreational use of the lake and to stabilise the improved conditions for the planted charophytes, smaller top up applications of 3.78 and 2.1 tonnes were conducted in spring 2015, 2016 and 2017, respectively.

Figure 3: Phoslock application, Charophyte plants, the lake after 3 years of the restoration measures.

Conclusion

The two step restoration concept is a technique that prevents the proliferation of benthic algal mats. By locking the easily releasable phosphorus in the sediment creates the conditions necessary for growth of charophyte species, typical for this type of lake. On-going monitoring indicates that the charophytes that have been planted are growing well. Results from the pilot project will be published in a peer reviewed study in preparation (Epe TS., Finsterle K., Pall K., Yasseri S., in prep.)

Publication date: January 2018

PHOSLOCK®
www.phoslock.eu
www.phoslock.com.au