

Remediation of Lake Suwa—Japan Project Overview

Lake Suwa has a long history of being polluted, mainly because its water arrives from many different sources, from the highly populated and industrial local area. It has been the focus of water pollution/remediation analysis for over a hundred years, with much of the data remaining on public record.



Location: Nagano prefecture, Japan
Coordinates: 36° 02' 54" N 138° 05' 03" E
Primary inflows: 31 small rivers of the Kiso Mountains
Primary outflows: Tenryū River
Surface area: 13.3 km² (5.1 sq mi)
Averaged depth: 4.7 m (15 ft)
Max. depth: 7.2 m (24 ft)
Shore length: 15.9 km (9.9 mi)
Surface elevation: 759 m (2,490 ft)

In order to improve sludge reduction and poor Oxygen conditions at the bottom of the lake, during the summer of 2017, The Club Suwa, a NPO environmental organisation responsible for improving conditions, started a trial using Anzai's technology to create air Nanobubbles.

Anzai set up a floating platform on the lake to hold a single in-line Nanobubble unit. This was moved to several locations to evaluate how the dissolved oxygen count changed location by location.



Floating platform holding Nanobubble unit

A specially designed water robot drone was placed on the bed of the lake to monitor the impact of the Nanobubbles on the sludge and data was sent back to computers and projected onto a large LED display panel, all housed on a floating observation barge. A dissolved oxygen instrument was installed below the barge.

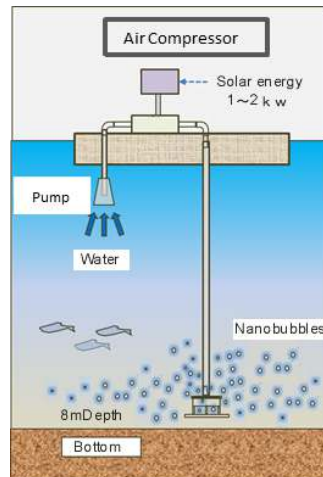


Observation barge being set upon the lake

The team regularly measured changes in DO levels and temperatures. Most of the trial used air to make the Nanobubbles, but for the final week of the trial, this was changed to Oxygen Nanobubbles generated by a PSA generator.

The initial measurement results showed an increase in the dissolved oxygen rate per litre, regardless of the depth of water. Professor Tokio Okino of Shinshu University said, "...I can say that there is certain effect in improving the state of oxygenation by sending even Air Nanobubble into the water."

A value five times higher was recorded after the compressed air was replaced with Oxygen and Professor Okino said that the effect could be clearly observed.



Equipment set up plan

The Shinano Times in August 2017, reported that 'Nanobubbles send oxygen to the bottom of the lake and promotes microorganisms to decompose organic matter in the sludge. It is said that it will create an environment where the water creatures find it easy to live, by suppressing hydrogen sulfide which is likely to be generated when oxygen levels are low...

...with this technology it is possible to make Nanobubbles very effectively and at a relatively low cost because it utilises ceramics. This system (Anzai) has the best track record in Japan for Government Assignments and is known for such projects as the cleaning of Tokyo Bay'.



Lake Suwa



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