BlueInGreen®
solutions for water quality

Technology
SDOX ®

Application
Lake Oxygenation

Location
Lake Thunderbird
Norman, OK

Project Goals
Reduce taste and odor issues associated with anaerobic activity on the lake bottom.

Improve overall water quality and enhance environmental conditions for aquatic life.

overview

Enhancing Lake Thunderbird through Hypolimnetic Oxygenation

Constructed in 1965 by the Bureau of Reclamation, Lake Thunderbird is a 6,070-acre raw water supply with a volumetric capacity of approximately 119,600-acre-feet. Lake Thunderbird is the drinking water supply for Del City, Midwest City and Norman, Oklahoma; a total population over 190,000. The reservoir is operated and governed by the Central Oklahoma Masters Conservancy District (COMCD).

During the summer of 2009 American Recovery and Reinvestment Act (ARRA) stimulus funds for ecological/environmental projects became available. At this time, the COMCD, the Oklahoma Water Resources Board (OWRB), Tetra Tech, Inc. consulting/engineering partnered to design, install, and monitor a hypolimnetic oxygenation system. There are several factors that led to the decision for a hypolimnetic oxygenation system – including, but not limited to, Lake Thunderbird is currently listed as Category 5 (303d list) in the Oklahoma 2008 Integrated Report as impaired due to turbidity, low dissolved oxygen (DO) and color; the reservoir is listed as a Sensitive Water Supply (SWS) within Oklahoma Water Quality Standards; and, the reservoir fails to meet the 10-µg/L Chlorophyll-*a* requirement of SWS reservoirs.

After evaluating several alternatives, the group selected BlueInGreen as the chosen technology partner. Specifically, the SDOX technology was the chosen because of its energy efficiency and ability to leave the thermal stratification intact. In 2010, the SDOX was procured, manufactured and installed.

The first season of operation came in 2011. OWRB and COMCD made the decision to only operate the SDOX during the low DO season, which is usually 4-5 months out of the year. Figure 1 illustrates oxidation reduction potential (ORP) values for 2010 and 2011. Figure 2 illustrates vertical distribution of dissolved oxygen concentrations and water temperature within the water column at various distances from the discharge of the SDOX, as measured in 2012. The three figures outline the SDOX's ability to keep the ORP positive therefore encouraging aerobic activity, increasing the DO in the lower reaches of the water column, and oxygenating without thermal destratification.

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Figure 1: Oxidation Reduction Potential Before and After SDOX® Operation

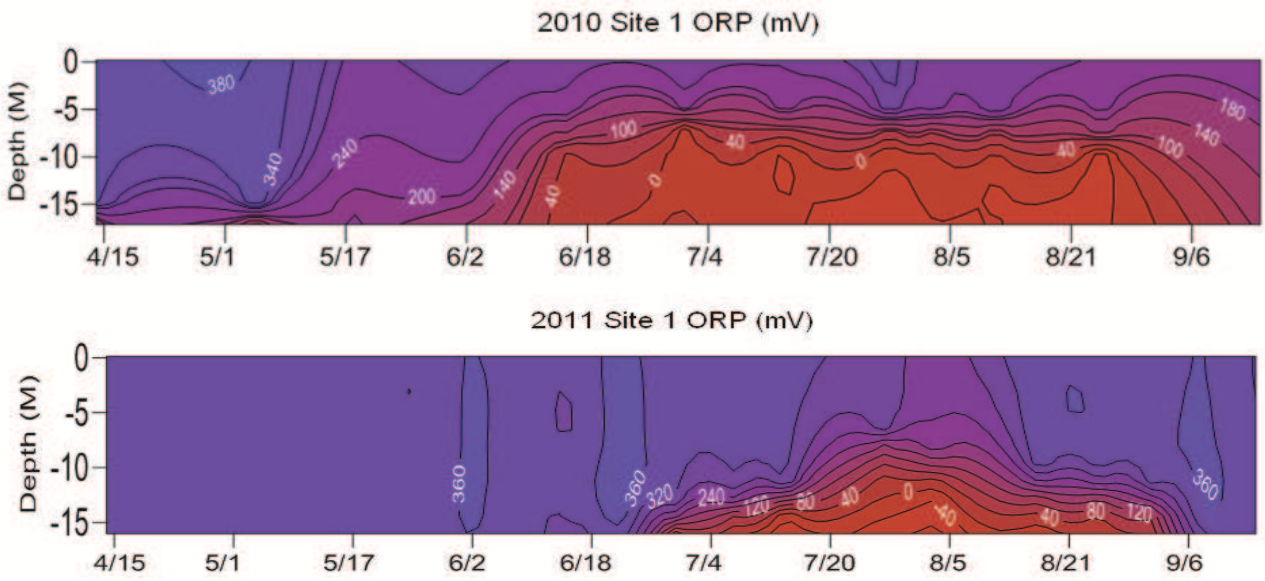

Figure 2: Dissolved Oxygen and Temperature Profiles at Various Distances from SDOX®