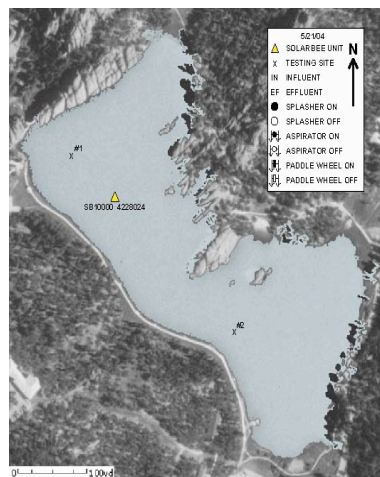
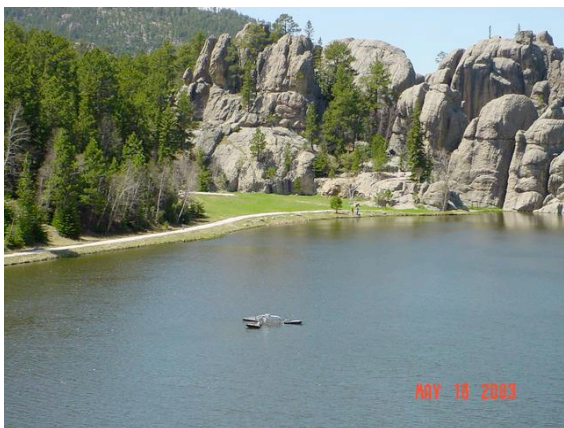


**Key words:** recreational lake, blue-green algae, dissolved oxygen, hypolimnetic oxygenation, water clarity



**Photos:** The lake with Granite Rock Wall; aerial photo shows placement of unit.

**Reservoir or Lake Use:** Sylvan Lake, located in the heart of the scenic Black Hills, is a high-value freshwater reservoir formed by a dam, and is used exclusively for recreational swimming, paddle boating, and fishing.

**System Overview and Reservoir Data:** The lake has a surface area of 17.3 acres and an estimated volume of 222 acre-feet. Maximum depth is 30 ft near the face of the dam; average depth is about 13 feet.

**Reported Problem Before SolarBee Installation:** The lake, supplied by high nutrient water from natural drainage, has a long history of algae blooms. Consequently, lake sediments have a high dissolved oxygen (DO) demand that causes bottom waters to become anoxic almost immediately after the thermocline forms in April. The anoxic condition moves upward in the water column and reaches to within 5-9 feet of the surface by late summer during most years. By August, poor water quality would negatively impact recreational use of the lake.

**SolarBee Installation:** Date: November 2000, installed a circulator equal to the SB2500. It proved to be undersized for this lake, and was replaced with a solar-only SB10000 in Sept. 2002. Deployed in 20 feet of water with the intake set at 16 feet deep, the unit circulated the upper 70% of the lake volume.

**Results:** Results from 2003 were very positive. SolarBee-induced mixing maintained consistently high DOs from the surface down to near the 16 ft intake depth. At 16 feet deep, DOs usually ranged from about 1 - 4 mg/L until fall turnover. Based on the lake's bathymetric map, about 75% of the lake bottom was kept oxic during the summer, presumably preventing the release of soluble phosphorus, H<sub>2</sub>S, and other inorganic chemicals. Furthermore, green algae predominated rather than blue-green algae. In June 2004 the SolarBee was moved to a point in lake with water depth of 24 ft and the hose repositioned to 18 ft. The unit continues to maintain control of deep-water anoxia, prevent blue-green algae blooms, and provide good water clarity. Many long-time visitors to the lake have remarked that the lake had never looked better before the SolarBee, and greatly appreciate the improved water quality for swimming and other recreational activities.

*Last updated: 4-20-07*