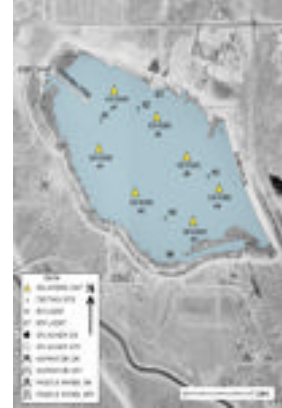


Summarized Case Study (RW)

Key words: RW reservoir, blue-green algae, taste and odor, water clarity, impaired fishery, zooplankton, aquatic weeds, treatment savings



Photos: SB10000 installed in the lake; second photo shows placement of SolarBees in the lake.

Reservoir or Lake Use: The lake is a raw water reservoir that supplies the adjacent Water Treatment Plant. The lake also supports boating, fishing, hunting, and the landing of airplanes, but is designated as a 'no body contact' water body.

System Overview and Reservoir Data: Surface area is 234 acres, maximum depth is 25 ft, average depth is about 18 ft, volume is 4200 acre-feet. The lake regularly experiences high winds.

Reported Problem Before SolarBee Installation: The lake is supplied by high-nutrient aqueduct water and has a history of intense algae blooms. In 2002 the city applied 2,000 lbs of copper sulfate per week for 20 weeks from April through September. Blue-green algae predominated, causing taste and odor problems. Because of water quality problems the city drew only 25% of its 30 MGD needs from the lake in 2002.

SolarBee Installation: Date: November 2002, installed six (6) solar-powered SB10000s, with intake hoses set at an average depth of 20 feet, and buoy marker lights for safety due to boat and airplane traffic. In June 2003 a seventh machine was installed. February 2005, upgraded all units to the newer SB10000v12 model.

Results: In the summer of 2002, Secchi depths averaged 3 ft with a maximum of 4 ft, while chlorophyll *a* concentrations averaged 13.5 ug/L (even with all the copper sulfate added), and zooplankton were virtually absent. In the summer of 2003, green algae predominated with little or no blue-green algae, zooplankton populations took off, Secchi depths averaged 6 ft with a maximum of 14 ft, chlorophyll *a* averaged 6.6 ug/L, dissolved oxygen levels were consistent down to the intake hose depths, and fish vigor and spawning has been unprecedented. Even with improved water clarity, several species of pondweed (submersed macrophytes) have significantly reduced their presence in the lake. Based on trophic state indices, the lake went from eutrophic to mesotrophic without any changes in nutrient inputs. The savings in copper sulfate in 2003 compared to 2002 was \$65,000. In 2003 the city could draw 60% of its water needs from the lake, which took some pressure off the city well fields. The water treatment plant now operates more evenly due to consistently high water quality. Several times the SolarBees survived 100 mph winds with little or no damage. The city continues to be very happy with the water quality and economic benefits the SolarBees have provide.

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