

**COLORADO SPRINGS PARKS, RECREATION AND CULTURAL SERVICES DEPARTMENT**  
**PARKS, RECREATION AND CULTURAL SERVICES ADVISORY BOARD**

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**Date:** March 9, 2023

**Item Number:** Staff Update

**Item Name:** Prospect Lake Aeration Project Update

**BACKGROUND:** Prospect Lake is located in the southeast corner of Memorial Park. The land where the Lake is located was deeded by General William Jackson Palmer in 1890. It served as the reservoir to irrigate Evergreen Cemetery until a non-potable irrigation system was installed in 1950. Since that time, Prospect Lake has served as a recreational amenity for both residents and visitors alike. Considered a regional amenity, Memorial Park including Prospect Lake, hosts hundreds of thousands of visitors annually. From Labor Day Liftoff to Get Outdoors Day as well as sports tournaments and leagues, there is something for everyone at Memorial Park. Perhaps even more important though are the neighbors and residents of Colorado Springs who use the park on a regular basis for exercise as they walk around the lake or float their canoe or paddleboard across the lake. On motorized days, boats are on the lake towing water skiers and wake boarders around the perimeter. Regardless of the access schedule, fishermen can be seen year-round.

Recently, in 2019 and 2020, toxic algae blooms resulted in significant fish kills as well as closures of the lake to all contact. Through research by staff, a company was hired in 2021 to provide periodic enzyme treatments to help control algae blooms. While these treatments proved effective, a long-term sustainable alternative was desired to continuously improve water quality at Prospect Lake. With funding in place through the American Recovery Plan Act (ARPA), a consultant was hired to develop aeration system alternatives to improve water quality. The resulting designs are being put forward for a recommended course of action. This will include selection of an installation contractor to complete construction and installation of the selected design during 2023.

**CURRENT STATUS:**

As one of two public lakes within City limits, Prospect Lake is very popular for both motorized and non-motorized uses. With a surface area of approximately 48-acre feet and an average depth of 9 feet, the lake has experienced several challenging environmental situations over the past two decades. In 2004/2005, the lake was drained, dredged, and lined due to continuous leaking. As a manmade lake filled with potable water, it was critical at the time to address the leaking issue to conserve water and reduce costs. As noted above, recent toxic algae blooms resulted in significant fish kills as well as full closures of the lake. Since 2021, periodic enzyme treatments have helped control algae blooms. These treatments continued in 2022 and resulted in a relatively healthy lake open for recreational activities. However, as a long-term solution, this treatment philosophy was less desirable. Instead, it was determined a sustainable system using aeration to improve lake health would be an optimal long-term solution.

Lake aeration is a process of introducing oxygen into a body of water to improve its water quality. Aeration is usually done using an aerator which is an apparatus that uses air, water, and other substances, such as oxygen or carbon dioxide, to oxygenate the water. The aerator works by forcing air bubbles through the lake water. The oxygen in the air bubbles then diffuses into the lake, which helps reduce the levels of pollutants in the water and increase the number of beneficial bacteria in the lake among other water quality improvements.

With an award of funding of approximately \$450,000 from the American Rescue Plan Act (ARPA), the possibility of designing and installing permanent infrastructure to address lake health issues became a reality in 2022. After a competitive bid process for the design of an aeration system, the bid award was given to EcoResource Solutions. Their objective was to design an aeration system for Prospect Lake. The main objective of the system is to implement a continuous aeration system and an as-needed injection system capable of distributing liquid treatment to the lake to combat blue green algae blooms and fish kills. Two alternative designs have been submitted through that process and are summarized below:

Design 1 consists of one (1) compressor with eight (8) double-disk membrane diffusers. The aeration lines and diffusers are situated on the lakebed and are placed to target the deepest parts of the lake while maintaining full lake coverage. Injection lines are coupled with the aeration lines to allow for the dispersal of enzymes into the water body on an as-needed basis. Such treatments will be much more even in coverage throughout the lake as opposed to what has previously been done only from the shoreline. The estimated cost for equipment only for Design 1 is \$23,000.

Design 2 consists of two (2) compressors with fifteen (15) double-disk membrane diffusers. Once again, the aeration lines and diffusers are situated on the lakebed and are placed to target the deepest parts of the lake. However, due to the greater number of diffusers within the plan, lines do project into shallower areas of the lake as well. Injection lines are included in this design to disperse enzymes on an as-needed basis. Additionally, Design 2 includes two (2) in-lake LG Sonic Ultrasonic algae control units. Each unit is anchored to the lake bottom and float at the water's surface. These sonic buoys work by emitting ultrasonic wavelengths that target algae in the water. The ultrasonic wavelengths "trap" and suspend the algae in the water below their comfortable habitat range in which the algae is unable to survive. These systems do not harm or interact with other wildlife or humans and only impact algae. The estimated cost for equipment only for Design 2 is \$153,500.

Both designs include a structure, built on the north side of the lake, to house the compressors and injection system tank. Cost estimates for this structure are currently being developed but will be the same for either design.

In terms of effectiveness, both designs will increase the oxygen levels within the lake thus improving water quality. Design 1 will turn over the water in the lake at a 0.45 rate per day which results in the lake turning over about every two (2) days. This level of effort will reduce the excess nutrient content within the lake. Due to its focus on treating the deepest parts of the lake, Design 1 supports continued motorized activity on Prospect Lake.

In comparison, Design 2 will turn over the water at a 0.84 rate per day which results in the lake turning over in just over one (1) day. This is considered the optimal level to ensure oxygen is circulating through the lake and conditions that promote fish kills are avoided. With the additional aeration lines distributed in shallower areas of the lake as well as the installation of two (2) surface structures, this alternative will not support motorized activity on the lake.

With design alternatives in hand, a communication plan has been implemented to share the alternatives and next steps with as much of the community as possible. This includes a community meeting on March 6, 2023. Residents within a 1/2-mile radius of the park received notification via mail of the community-wide meeting. Notifications were also sent out via the City's website and social media outlets. Held at the Regional Building Center, which is within a mile of Memorial Park, an overview of the project and the design options were presented. The Parks, Recreation and Cultural Services Advisory Board meeting on March 9 serves as another opportunity to share the designs and receive any feedback from the community regarding the proposed improvements to the lake. An informational item presented at City Council on March 27 will serve as a final opportunity for feedback. Following that session, a final summary of the

design alternatives will be presented to City Administration for a decision on which alternative to move forward with for installation.

**RECOMMENDATION:**

While a formal recommendation is not required, any feedback the Advisory Board has will be noted and shared with City Council as well as City Administration.

**PROPOSED MOTION:**

N/A

**PARTIES NOTIFIED OF THIS MEETING:**

- Neighbors within ½-mile of Memorial Park
- Boating Permit Holders
- Special Event Organizations who use Memorial Park
- Boating Permit Holders
- Interested Parties