

**CITY OF BOULDER, COLORADO**  
**REQUEST FOR PROPOSAL**

**Wonderland Lake Diagnostic Study**



**ISSUE DATE: November 17, 2021**

**DUE DATE: December 7, 2021**

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## **PART I: General RFP Information**

The City of Boulder's Open Space and Mountain Parks Department (OSMP) is seeking a highly qualified limnological or ecological consulting firm to evaluate the current physical, chemical, and biological condition of Wonderland Lake and develop recommendations to protect and restore the lake's ecological integrity. Specific emphasis of the study should be on diagnosing the underlying causes of and proposing recommendations to slow, reverse, or otherwise manage the observed eutrophication of Wonderland Lake, in Boulder, Colorado.

### ***BACKGROUND***

Wonderland Lake is an 18-acre artificial impoundment, located in the northwest portion of the city of Boulder west of Broadway between Utica and Quince Avenues (Figure 1). The lake is immediately surrounded by land managed by OSMP according to OSMP's charter purposes (<https://bouldercolorado.gov/government/departments/open-space-mountain-parks/about#main-content>). Although the area around Wonderland Lake was historically grazed, it has not been grazed for decades. Other land uses in the lake's immediate watershed include urban park land (portions of which are irrigated and receive fertilizer treatment) and residential areas. (Note: Because Wonderland Lake receives some water via ditch diversion, the area of land likely to have some influence on the lake's water quality extends beyond the waterbody's catchment.)

The Wonderland Lake area is a very popular spot for passive recreation. Visitation rates at the trailhead are considered "medium" for the OSMP system, meaning the trailhead sees 70-200 visits per day. However, many visitors access the Wonderland Lake area from points other than the trailhead, so true visitation rates are estimated to be closer to 1,350 visits per day. Most visitors are hiking, dog walking, biking, and/or angling. Swimming, wading, and boating are not permitted on Wonderland Lake. Dogs must be leashed on OSMP-managed land in the Wonderland Lake area. Dogs may enter Wonderland Lake, provided they remain on leash. More information on recreation opportunities, as well as the rules and regulations, at Wonderland Lake can be found at: <https://bouldercolorado.gov/trailhead/wonderland-lake>.

Wonderland Lake itself has a maximum depth of approximately 16 feet but is generally very shallow; two thirds of the lake has a depth of 6 feet or less. The deepest portion of the lake lies immediately west of the outlet structure in dam in the east central section of the lake. Sources of water to the lake include direct runoff, stormwater, precipitation, and groundwater. Wonderland Lake also receives ditch water from Boulder Creek via the

Silver Lake Ditch annually, usually early in the irrigation season (i.e. early May). Ditch diversion depends on water availability and priority of water rights.

Colorado Parks and Wildlife (CPW) fish survey data from 1986, 1995, and 2011 indicate Wonderland Lake supports black crappie, bluegill, sunfish hybrids, largemouth bass, and yellow perch. CPW has also stocked Wonderland Lake in 1986 and 1987 (largemouth bass) and 2012 (bluegill, channel catfish, hybrid grass carp, and tiger muskie).

Wonderland Lake has been showing signs of eutrophication over the past several years. There have been late summer fish kills over the last several years, which CPW staff have attributed to low dissolved oxygens levels. Additionally, local residents have reported an increase in the abundance of algae in the lake over the past several years. OSMP staff have observed thick stands of algae as well. Based on observation and limited testing, the algal community appears to be dominated by green algae species, although cyanobacteria is also present.

In response to the observed abundance of algae in the lake over the past several years, OSMP funded two research studies: one, in 2020, examining the historical presence of algal blooms in waterbodies across Boulder County using satellite imagery and a second, more focused study, in 2021, of the algal communities in four specific waterbodies, including Wonderland Lake. The second study involved using Flow Cam technology to track the algal community in Wonderland Lake over the course of a summer. The study also included some limited water quality sampling (pH, temperature, dissolved oxygen, and chlorophyll a).

OSMP is seeking to build on this work by conducting a third study, the lake diagnostic study proposed in this RFP, that will include additional water quality sampling of the lake, its sediments, and various inlets to the lake. From this work, a set of actionable recommendations to slow, reverse, or otherwise manage the observed eutrophication of Wonderland Lake should be developed.

## ***PROJECT SCOPE***

The overall goal of the project is to develop a set of actionable recommendations to slow, reverse, or otherwise manage the observed eutrophication of Wonderland Lake. This goal will be achieved by accomplishing the following Tasks:

1. Project coordination with City of Boulder Open Space and Mountain Parks Department staff. OSMP expects the selected contractor will work closely with OSMP staff to ensure the project goal is being met. Contractor should include time for meetings and to coordinate with OSMP throughout the project. At a minimum, contractor should expect at least two meetings (project kickoff and one towards the end of the project) and regular progress communication (e.g. monthly email or phone call) to update OSMP project manager.

2. At least three (3), wet weather samplings of the four (4) stormwater inlets and the Silver Lake Ditch inlet to Wonderland Lake. Sampling should ideally be conducted with an autosampler, with samples collected throughout the storm event composited into a single sample for analysis. Physical and chemical water quality information collected at each inlet should include: pH, nitrate + nitrite, organic nitrogen (Total Kjeldahl Nitrogen), ammonia nitrogen, total and dissolved phosphorus, conductivity, and total suspended solids (TSS). Table 1 provides the minimum detection limits for water quality (inlet and lake) parameters. Additional sampling events may be proposed by the consultant to strengthen the proposal, improve development of nutrient budgets (see below), and improve recommendations (see below).

**Table 1. Minimum detection limits for water quality (inlet and lake) parameters**

Parameter	Limits (mg/l)
Total Phosphorus	0.01
Total Orthophosphorus (Dissolved Phosphorus)	0.01
Ammonia Nitrogen	0.03
Nitrate + Nitrite Nitrogen	0.01
Total Kjeldahl Nitrogen	0.1
Total Suspended Solids	4

3. At least three (3), mid-late summer (i.e July-early September) samplings of the lake water at the lake's deepest point. Sampling parameters should include: Secchi depth, conductivity, pH, temperature, dissolved oxygen, nitrate + nitrite, organic nitrogen (TKN), ammonia nitrogen, total and dissolved phosphorus, turbidity, and chlorophyll-a. A vertical profile of temperature and dissolved oxygen at one-foot intervals should be taken at the deepest point in the lake. If the lake is stratified at the time of sampling, water samples should be collected from both the epilimnion and hypolimnion. Epilimnion samples should be collected from approximately three feet below the water's surface. Hypolimnion samples should be collected from the middle of the hypolimnion. If the lake is not stratified at the time of sampling, only a single sample collected from approximately three feet below the water's surface is necessary. Additional sampling events at different locations in the lake may be proposed by the consultant to strengthen the proposal, improve development of nutrient budgets (see below), and improve recommendations (see below).
4. Evaluation of the lake's potential to release phosphorus to the lake's water column from the sediment. Lake sediment samples should be collected for this evaluation.
5. Development of a water budget for the lake to better quantify the inputs from various sources. An estimation of lake residence time is included in this task.
6. Development of nutrient budgets for the lake using an appropriate model.
7. Collection of any other supplemental data the bidder deems necessary to fulfill Task 8 below.

8. Development of actionable recommendations to slow or reverse eutrophication of Wonderland Lake, based on the data collected in Tasks 1-7.

### ***Existing Information Sources***

The city has the following data and information sources that can be made available to the selected consultant:

- Current and historic aerial photographs
- Vegetation community map
- Approximate depth data collected via the use of a fish finder
- Technical Report: Tracking the Historical Prevalence of Algal Blooms in Boulder Waterbodies Using Satellite Imagery
- Technical Report: Spatiotemporal Patterns of Algae and Cyanobacteria in OSMP Waterbodies (currently in draft; anticipated final in late December 2021)

## ***PROJECT DELIVERABLES***

The following deliverables will be provided to the City of Boulder Open Space and Mountain Parks Department at the completion of the project:

1. Digital copy of the final report detailing the results of the study and final recommendations.
2. Digital copy of all field data sheets.
3. Digital copy of all laboratory data sheets and QA/QC documentation

## ***PROJECT SCHEDULE***

Proposals are due 4:00 PM December 7, 2021.

Proposals due to OSMP	4:00 PM December 7, 2021
Tentative award date <sup>1</sup>	December 10, 2021
Draft Report due	October 15, 2022
OSMP comments on Draft Report	November 15, 2022
Final Report due	December 1, 2022

1. If the project is awarded to a new City of Boulder vendor, the vendor will need to submit a completed W-9 Form and vendor information form to the city Accounts Payable department prior to being awarded the project. **Bidders are strongly encouraged to have this completed prior to submittal of their proposal to ensure timely award of the project.**

## ***PROJECT CONTACT INFORMATION***

Upon release of this RFP, all consultant communications concerning the overall RFP should be directed to the Project Coordinator listed below. Unauthorized contact regarding this RFP with other city employees may result in disqualification. Any oral communications will be considered unofficial and non-binding on the city. Consultants should rely only on written statements issued by the Project Coordinator.

Name: Marianne Giolitto  
Address: City of Boulder  
Open Space and Mountain Parks Department  
Telephone: 303.906.7317  
E-mail: [giolittom@bouldercolorado.gov](mailto:giolittom@bouldercolorado.gov)

## **PART II: Required Proposal Response**

Proposals should clearly demonstrate that the consultant has the experience, expertise, staff capacity, etc. to meet the project goals and successfully complete the project. The proposal must contain all of the following information, in the same sequence as presented below. Each proposal should provide a straightforward and concise presentation adequate to satisfy the requirements of this RFP.

## **PROPOSAL CONTENT**

### **1. Cover Letter**

Provide a cover letter explaining the design team and the project contact person(s) plus relevant phone numbers.

### **2. Key Staff**

Provide a list of the principal individuals who will work on this project along with brief description/resume of relevant experience, specific to this project. ***The consultant team must have a minimum of five (5) years of experience conducting urban or suburban lake diagnostic studies to be considered for the award.*** This experience must be clearly demonstrated in the proposal submission. Additionally, provide a list of the sub-consultants, including contract laboratories, intended to be hired for the project and relevant background experience/resume.

### **3. Project Approach**

Provide a concise explanation of the team's approach to the project. Please include the following:

- a. Description of the project team including any subconsultants or laboratory services being utilized.
- b. Description of the team's approach for each of the eight (8) major tasks listed under the Project Scope section of this document, with particular emphasis on the methods that will be used to accomplish Tasks 2-6. For example, with respect to Task 4, include information on the proposed number of sediment samples that will be collected, the collection methodology, and parameters proposed for analysis. Similarly, for Tasks 5 and 6, describe the modelling proposed and what elements of the model will be estimated and what elements will be measured (e.g. evaporation rates might be estimated for the water budget). Included in this section should be a brief list/description of additional data that will be collected to develop the restoration plan. Proposal must demonstrate that the team, including the laboratory, follows standard methods and QAQC for sampling and is familiar with these protocols.
- c. Timeline/ schedule of work
- d. Itemized budget for each of the eight major tasks listed in the Project Scope section of this document plus fees for additional services if needed.

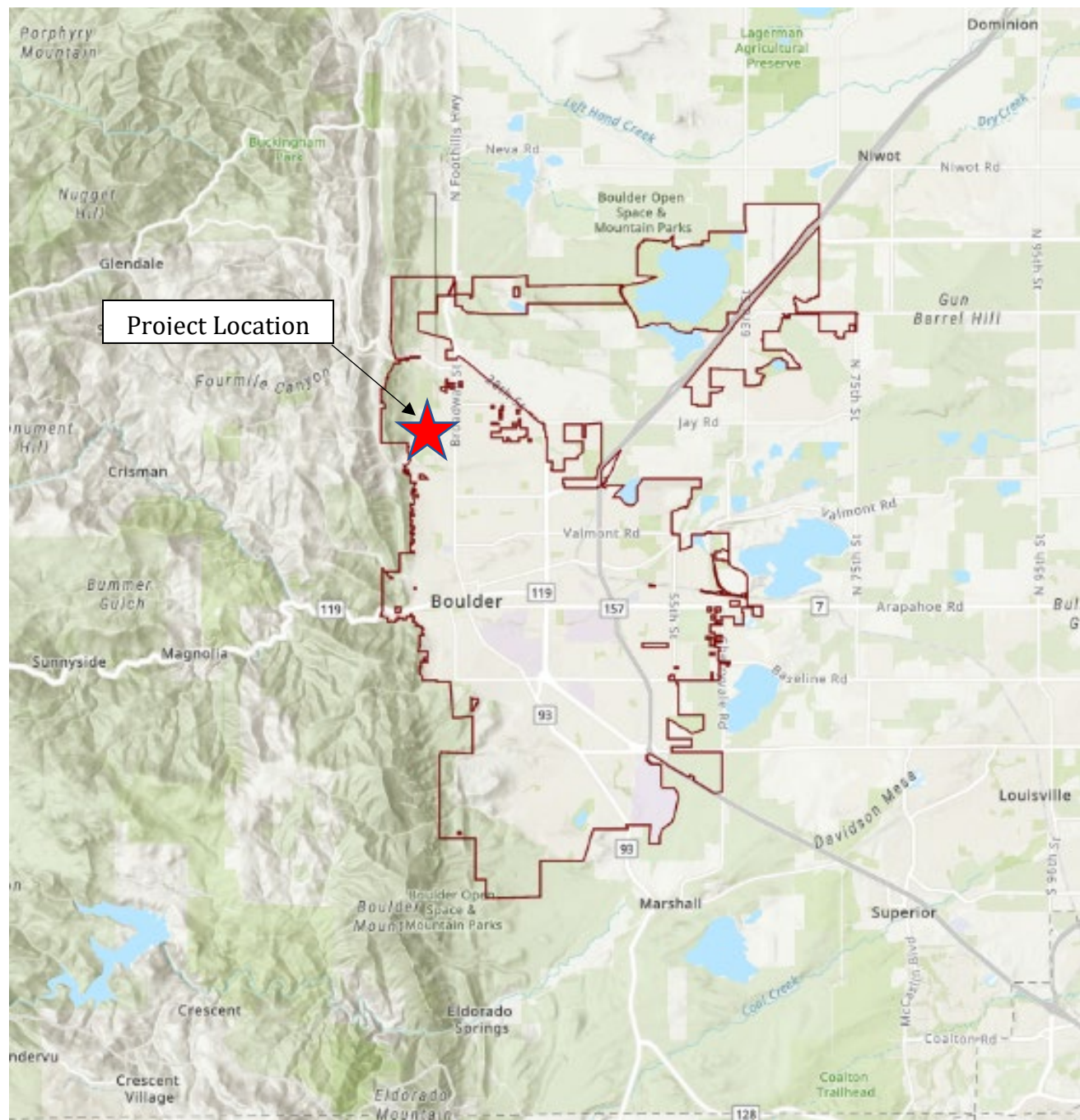


Figure 1. Wonderland Lake Diagnostic Study Project Site