



**PARKS AND RECREATION ADVISORY BOARD**  
**Tuesday, March 20, 2018 – 5:30 p.m.**  
**Lakewood City Hall, American Lake Room**  
**6000 Main St SW**  
**Lakewood, WA 98499**

**PRAB MEMBERS**

**Jason Gerwen, Chair**  
**Vito Iacobazzi, Vice Chair**  
**Sylvia Allen**  
**J. Alan Billingsley**  
**Susan Dellinger**  
**Anessa McClendon**  
**Michael Lacadie**

**Dorien Simon, Youth Council**  
**Jefferson Magayanes, Youth Council**

**Don Anderson, Council Liaison**

**STAFF**

**Mary Dodsworth, Director**  
**Nikki York, Office Assistant**

**Persons requesting special accommodations contact Nikki at 253-589-2489 as soon as possible in advance of this meeting so that an attempt to meet a special accommodation need can be made.**

**CALL TO ORDER**

**ATTENDANCE/ROLL CALL**

**APPROVAL of February 27, 2018 MINUTES**

**PUBLIC COMMENT**

**UNFINISHED BUSINESS**

**NEW BUSINESS**

Waughop Lake Management Plan Update (Greg Vigoren)  
Chambers Creek Canyon Trail Update  
Prepare for Joint Meeting with Council

**DIRECTORS REPORT**

**BOARD MEMBER COMMENTS**

**NEXT PRAB MEETING**

Monday April 23, 2018 at 6:30 p.m. –  
Please note the date and time change-this is a  
Monday for our Joint Council Meeting

**ADJOURN**





**LAKWOOD PARKS & RECREATION ADVISORY BOARD  
REGULAR MEETING MINUTES  
Tuesday, February 27, 2018 – 5:30 PM  
LAKWOOD CITY HALL ROOM 1E  
6000 MAIN ST SW  
LAKWOOD, WA 98499**

**CALL TO ORDER**

Jason Gerwen called the meeting to order at 5:27 p.m.

**ATTENDANCE**

**PRAB Members Present:** Jason Gerwen, Vito Iacobazzi, Alan Billingsley, Michael Lacadie

**PRAB Members Excused:** Sylvia Allen, Anessa McClendon, Susan Dellinger

**Guest:** Sally Martinez, Jon Howe, Andy Gildehaus

**Staff Present:** Mary Dodsworth - Director; Nikki York – Office Assistant

**Council Liaison:** Don Anderson, Excused

**Youth Council Liaison:** Jefferson Magayanes, Youth Council- Present  
Dorien Simon, Youth Council- Present

**APPROVAL OF MINUTES:** Michael Lacadie moved and Vito Iacobazzi seconded the motion to approve the minutes of the January 23, 2018 meeting as presented. MPU.

**PUBLIC COMMENT:** None

**UNFINISHED BUSINESS:** None

**NEW BUSINESS:**

Special Event Update:

Sally Martinez, Recreation Coordinator, gave a presentation about the many special programs and events presented by the City throughout the year. Highlights were on SummerFEST diversity and the Triathlon being a life changing event.

Train Update:

Andy Gildehaus and John Howe gave updates about the City's preparation for a high speed train coming through Lakewood. They also discussed additional safety features to include: signage, timing of lights, extended striping, and additional fencing. Amtrak will not run high speed trains through Lakewood until the positive train control system is installed. The police department will work with the traffic safety team to educate, warn, and enforce train safety.

Special Use Update:

Mary Dodsworth reviewed how special use applications are handled. The Parks, Recreation, and Community Services department looks at overall safety of the site and for participants. When someone calls to reserve the park we ask many questions about the event to determine all needs and possible logistic and safety concerns. The City helps prepare people for how to manage a special event and create emergency plans. The City has seen increases in the number of special events each year. Discussed adding a post event survey to user groups to find out what and how we could do better.

**DIRECTORS REPORT:** Mary Dodsworth reviewed the director's report with the board. The report included capital project updates, legislative update, snow and ice removal, pavilion in the park project, lotus blossom artwork update, Arts and Heritage Day, and community outreach.

**BOARD COMMENTS:**

Michael Lacadie asked about the 2019 Cyclocross event.

Dorien Simon expressed interest in participating in Relay for Life.

**NEXT MEETING:** The next PRAB meeting is tentatively scheduled for Tuesday, March 20<sup>th</sup> at 5:30pm at the Lakewood City Hall.

**ADJOURNMENT:** Vito Iacobazzi motioned to adjourn the meeting at 6:57 p.m. Alan Billingsley seconded the motion. MPU

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Jason Gerwen, Chairman

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Nikki York, Office Assistant



To: Parks and Recreation Advisory Board  
From: Greg Vigoren, Engineering Services Manager  
Date: March 20, 2018  
Subject: Waughop Lake Management Plan – Update

The attachments include an executive summary from the Waughop Lake Management Plan along with a copy of the final plan.

As noted in the executive summary, the recommendations from the plan include a first phase consisting of a whole-lake alum treatment to temporarily control the excess phosphorus in the lake, which is the cause of the algae blooms. The second phase calls for dredging the lake bottom to remove the phosphorus-rich sediment. If funding for dredging cannot be secured, then a few other scenarios are suggested.

The City is currently looking closer at the feasibility of dredging the lake. We are in the process of hiring a consultant, Tetra Tech, to assist with the feasibility study. The Tetra Tech team, led by Dr. Harry Gibbons, has expertise in lake dredging as a water quality improvement measure.

We plan to prepare an alum treatment project later this year with the goal of treating the lake in the first half of 2019.



# Executive Summary

Waughop Lake is the centerpiece of the popular Fort Steilacoom Park in the city of Lakewood, Washington (City). The park is on state-owned land that is leased to the City. Waughop Lake has a long history of cyanobacteria (blue-green algae) blooms that severely limits use of the lake. The City has made the protection and restoration of Waughop Lake a high priority.

In 2014, the City received a grant from the Washington State Department of Ecology (Ecology) to develop a lake management plan (LMP) for Waughop Lake. The overall goal of the LMP is to develop strategies to improve and protect the lake uses impaired by excess nutrients. The City retained Brown and Caldwell (BC) and the University of Washington Tacoma (UWT) to help develop the LMP.

BC and UWT prepared a Quality Assurance Project Plan (QAPP) to guide data collection in support of the Waughop LMP. The QAPP included monitoring the quality of the lake water, lake bottom sediment, stormwater, and groundwater to identify and quantify sources of phosphorus loading and support the evaluation of management measures.

The City provided opportunities for public stakeholder input during LMP development. The following bullets summarize the stakeholder outreach activities.

- Participated in an open house and farmer's market to inform stakeholders about the LMP and learn about potential concerns (July and September 2014).
- Distributed questionnaires to solicit stakeholder input on concerns and potential management objectives for Waughop Lake (summer-fall 2014).
- Provided input to UWT's study to assess the public's willingness to pay for improvements to Waughop Lake water quality.
- Periodically posted Waughop LMP information on the City website and provided LMP information to local newspapers.
- Briefed the City Council on the lake monitoring results and LMP recommendations during two public meetings (February and September 2016).
- Briefed the City Parks and Recreation Advisory Board on the monitoring results and potential measures (September 2016).
- Presented the lake characterization results and draft LMP recommendations to the Chambers-Clover Watershed Council (November 2016).
- Solicited stakeholder comments on the draft LMP. (Appendix E summarizes the comments and responses.)

The monitoring program was conducted from October 2014 to October 2015. The monitoring found that phosphorus is the limiting nutrient for cyanobacteria blooms and that the internal cycling of phosphorus from the lake bottom sediment to the water column is the largest source. Based on the monitoring results and stakeholder input, the City confirmed that the primary objective for the Waughop LMP should be to minimize the frequency of cyanobacteria blooms.

The project team evaluated a wide range of potential lake management measures and identified several that appear suitable for Waughop Lake. Table ES-1 summarizes the estimated costs and potential benefits of these measures.

As noted in Table ES-1, dredging of lake bottom sediment would provide the greatest long-term benefit but would also have a high initial cost and extensive permitting requirements. Sediment cores would need to be collected throughout the lake and analyzed to develop a more accurate estimate of the volume to be dredged, determine sediment dewatering and disposal requirements, and refine the construction cost estimate. Dredging could take 6-8 months and have temporary impacts on park visitors and wildlife. Securing the funds needed for dredging may be difficult, especially if costs are closer to the high end of the range shown in Table ES-1. It could take several years or more to complete additional sediment characterization, secure funding, obtain permits, perform dredging, and properly dispose of the sediments.

Sediment phosphorus inactivation using whole-lake alum treatment would quickly reduce phosphorus concentrations in the lake, reduce the release of phosphorus from the sediment, and reduce cyanobacteria blooms. Compared to dredging, alum treatment has a much lower initial cost, less intensive data collection and permitting requirements, and less disruption for park visitors and wildlife (see Table ES-1). However, the benefits of alum treatment decline over time, so treatments would need to be periodically repeated. In addition, alum treatment could increase macrophyte growth by allowing sunlight to reach deeper into the lake.

Aeration of the lake bottom would help decrease the anoxic conditions that enable phosphorus release from sediments, while vertical mixing would disrupt cyanobacteria and favor benign algal species.

A pump and treat system could be installed to remove phosphorus from lake water using a coagulation facility or a constructed wetland treatment system. The estimated cost for this measure assumes 3 to 10 acres of upland area would be made available for the treatment system at no cost. Due to treatment capacity limitations, pump and treat systems are expected to be less effective than the other measures listed in Table ES-1, so they are not recommended at this time.

**Table ES-1. Management Measures to Minimize Cyanobacteria Blooms in Waughop Lake**

| Option   | Planning-level cost estimates   |         | 20-year costs (capital+ongoing)                                  | Water quality benefit   | How soon will water quality benefits occur? | How long will water quality benefits last? | Other potential benefits?   | Other potential impacts/costs?  |
|--|---|---------|--|---|---|--|---|---|
|  | Initial   | Ongoing |  |   |   |  |   |   |
| Dredging: (hydraulic, "wet" excavation, or "dry" excavation) | Costs could vary based on dredging and disposal methods.<br><br>Onsite disposal ranges from \$2.7M-\$12.0M.<br><br>Offsite disposal ranges from \$8.5M-\$15.0M. | None    | \$2.7M-\$15.0M, depending on disposal and treatment requirements | Highest. Would remove ~100 years of phosphorus enriched sediment. | <1 year                                     | Long-term                                  | Increased lake depth, more groundwater inflow, more fish habitat. | Permitting challenges.<br>Habitat disturbance during dredging.<br>Equipment staging on shoreline.<br>Odor from dredge spoils.<br>Onsite dewatering/disposal would require large area.<br>Truck traffic (if off-site disposal is necessary.) |



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|---|--|--------------------------|--|--|---|--|---|---|
|   | Initial                                | Ongoing                  |  |  |   |  |   |   |
| Phosphorus inactivation with whole-lake treatment | \$210k for prep and initial treatment. | \$120k every 3-10 years. | \$0.7M (assumes follow-up treatment every 5 years) | High initially, slow decline over time.  | Immediate                                   | 3-10 years                                 | Minimal infrastructure, no conflicts with other lake uses.  | Could increase macrophyte growth. Would need to be repeated every 3-10 yrs. |
| Lake bottom water aeration and mixing             | \$1.9M                                 | \$20k/year               | \$2.3M   | Medium to high. Would increase DO, reduce phosphorus release from sediment, disrupt cyanobacteria blooms. Could be configured to include alum emitter. | 2 years                                     | Long-term                                  | Few conflicts with other uses. Increased DO should improve fish habitat.  | Blower building would be required. Energy use.                              |
| Pump and treat: chemical treatment                | \$1.5M                                 | \$80k/year               | \$3.1M   | Medium   | 1 year                                      | Long-term                                  | Flexible operation. Higher treatment capacity than wetland treatment system. Learning opportunity for college students. | Would require ~3 acres of land. Temporary impacts during construction.      |
| Pump and treat: constructed wetlands              | \$3.1M                                 | \$100k/year              | \$5.1M   | Medium (less than chemical treatment)  | 1 year                                      | Long-term                                  | Flexible operation. Increased habitat for birds and other wildlife. Learning opportunity for college students.          | Would require ~9 acres of land. Temporary impacts during construction.      |

The City does not currently have any funds to implement this LMP. Implementation of this LMP will depend on the City’s ability to secure funding from other sources such as state budget allocations and grants (see Section 6).

**Therefore,** the City proposes a phased approach for implementing this LMP, as described below.

**Phase 1** would consist of a whole-lake alum treatment to remove phosphorus from the water column and inactivate phosphorus in the sediment, thereby reducing the potential for cyanobacteria blooms. The City (or partners) would monitor the lake to estimate the effectiveness and longevity of the alum treatment. During this phase, the City would collect the additional sediment data needed to refine

the construction cost estimates and support permit applications for dredging. The City would also identify and pursue potential funding sources for long-term implementation.

**Phase 2** would involve dredging to remove phosphorus-rich sediment from the lake bottom, provided that the City can secure the necessary funds and permits. The lake monitoring study found that bottom sediment is by far the largest source of phosphorus for cyanobacteria blooms. Dredging is expected to be the most effective long-term measure for reducing cyanobacteria blooms because it would remove sediments that have been contaminated by farming and other human activities over the past 100 years or so. Funding for dredging would be pursued along with collection of information regarding public support for improved lake use.

If the City cannot secure the funds needed for dredging and the Phase 1 monitoring indicates that alum treatment is likely to last at least several years, Phase 2 may consist of a follow-up whole-lake alum treatment. Conversely, if the City cannot secure sufficient funds for dredging and Phase 1 monitoring suggests that alum treatment benefits are short-lived, Phase 2 could include a pilot study to evaluate whether a bottom aeration and vertical mixing system would significantly reduce phosphorus release from bottom sediments and disrupt cyanobacteria in the water column. If the pilot results are promising and the necessary capital and operating funds can be obtained, Phase 2 could include installation of a full-scale bottom aeration and mixing system.