# Lake Lawrence Lake Management District Virtual Meeting

16 July 2026

6:30-8:30 p.m.

# AGENDA for 16 July 2026 LMD Meeting

- **Call to Order**
  - Introductions
  - Approval of Agenda
- Approval of  14 May 2026 Meeting Minutes
- **Public Communications**
- **Recuring/Continued Business: -** Janice
  - 2026 Budget as of July 2026
  - 2027 Budget Amendment/Modifications
  - Work Orders/Purchases/Invoices
- **Old Business:**
- Lake Water Level & Floating Island Issue update – Frank
- Senate Bill S-3518.1 update – Barry
- Cyanobacteria Mgmt. Plan (CMP) update – Barry
- LMD Renewal 2027 Subcommittee Update – Barry/Janice
- 2026 LMD Invasive/Nuisance Aquatic Weed/FWL/YFI Treatment Plan update – Barry
- 2026 Yellow Flag Iris Treatment Plan update – Barry
- 2026 Fragrant Water Lily Treatment Plan update/Recommendation – Barry
- 2026 Meetings & Survey Dates
- GRANT Funding update – Kim Farnes
- **New Business:**
  - June & July Lake Survey Details
  - Phosphorus RFP – For SC Approval
  - 2027-2028 LMD Annual Work Plan & Budget – For SC Approval
- **Other Business:**
- **Good of the Order**
- **Adjourn**

# Call to Order

- Introductions/Roll Call/Attendance
- Approval of 16 July 2026 Agenda
  - MOTION:
- Approval of 14 May 2026 Meeting Minutes
  - MOTION:

# Public Communications

- Please mute yourself until you are recognized to speak.
- Please Choose the “raise your hand” option to address the committee. You will be promoted to a panelist when it is your turn to speak and be seen. To be seen, please turn on your camera. If you are dialing in, press *9 to “raise your hand.” Make sure you also choose *6 to unmute yourself.
- After you have made your comments please mute yourself.

# Recurring/Continued Business

- Budget – Janice Leitzke
  - 2026 Budget as of end of July 2026
  - 2027 Budget Amendment
  - Work Orders/Purchases/Invoices

# Lake Lawrence Management District
## Financial Report

| | | Year Ending 12/31/2025 | 2026 Budget | YTD 7/11/2026 | 2026 Variance | 2026 Actual Notes |
|---|---|---|---|---|---|---|
| **REVENUE** | | | | | | |
| Penalties - Operating Assessment | | 423 | | 74 | 74 | Per Thurston County thru 3/31/2026 |
| Investment Earnings | | | | 4,033 | 4,033 | Per Thurston County thru 3/31/2026 |
| Other Interest - Operating Assess. | | 13,526 | | | - | Per Thurston County thru 3/31/2026 |
| Operating Assessment Charges | | 115,648 | 118,000 | 7,433 | (110,567) | Per Thurston County thru 3/31/2026 |
| Miscellaneous | | 26 | | | - | |
| O/T - General Fund | | 6,200 | | | - | |
| Algae Grant | | 8,983 | 25,000 | 35,084 | 10,084 | $5,933 owed from Grant |
| | **TOTAL REVENUE** | **144,806** | **143,000** | **46,625** | **(96,375)** | |
| **EXPENSES** | | | | | | |
| **Administrative Rate at 5%** | | **8,043** | **5,900** | **561** | **5,339** | Per Thurston County thru 3/31/2026 |
| | Nuisance Weed Program | 62,959 | 80,000 | 68,347 | 11,653 | 34 acres treated for $63,346, APAM permit $136.74 |
| | Algae Mitigation | | 210,000 | | 210,000 | No expenditures expected in 2026 |
| | Cyanobacteria Mgmt Plan (CMP) | 28,949 | 60,000 | 22,102 | 37,898 | Herrera Contract of $93,287 pd in full |
| | Yellow Flag Iris | 1,500 | 1,500 | | 1,500 | Awaiting bill |
| | Lily Treatment | 1,875 | 3,500 | | 3,500 | Will check in June/July if need treatment in Aug/Sept |
| | Nutrient Testing | | 15,000 | | 15,000 | No expenditures expected in 2026 |
| | Prof Svcs - Advertising | | 1,100 | (144) | 1,244 | $144 reimbursement from 2023 to be corrected in 2026 |
| **Total Professional Services** | | **95,283** | **371,100** | **90,305** | **280,795** | |
| | Supplies | | 125 | 1,046 | (921) | Shallow water signs $1,046 |
| | Annual Meeting and Picnic | 323 | 500 | | 500 | |
| | Small Tools & Minor Equip | | 300 | | 300 | CMP testing equip to be purchased $10-20k |
| | Communications (Mailers) | 961 | 1,290 | 272 | 1,018 | $272 Treatment notice |
| | Operating Leases/Rentals (LLCC) | 60 | 60 | | 60 | |
| | Website & admin technology | | 400 | | 400 | |
| | Misc. | 875 | 5,000 | 2,063 | 2,937 | Renewal Expenses: Public hearing ads-$317, Ballot mailing-$1,073, Stamps-$55 |
| **Total Supplies & Operating Expenses** | | **2,218** | **7,675** | **3,381** | **4,294** | |
| | **TOTAL EXPENSES** | **105,544** | **384,675** | **94,247** | **290,428** | |
| ***NET (Revenue-Expenses)*** | | ***39,262*** | ***(241,675)*** | ***(47,622)*** | ***194,053*** | |
| Beginning Fund Balance | | 391,985 | | 431,246 | | 13th month adjustments of $2,529 to YE 2025 & Beg Fund Bal |
| **Ending Fund Balance** | | **431,246** | | **383,624** | | |

Lake Lawrence Management District
Details of Financial Report

**Expense Detail** 07/11/26

| Date | Amount | Account | Payee | Notes |
|---|---|---|---|---|
| Prior Year | $ (143.52) | Advertising | Correction for 2024 | 50% RFP ad in Dec 2023 s/b coded to Lc |
| 12/5/2025 | $ 55.52 | Renewal | Barry Halverson | 2 books of stamps and 4 certified Letters |
| 1/5/2026 | $ 317.20 | Renewal | CR Publishing #307914 | AD#136069 for Jan 8 and 15th |
| 2/13/2026 | $ 6,091.33 | CMP C-02 | Herrera #61460 | Jan 1-30 2026 |
| 2/13/2026 | $ 191.99 | CMP D-03 | Herrera #61460 | Jan 1-30 2026 |
| 3/4/2026 | $ 1,072.82 | Mailing ballots | Nisqually Print, #NPNP3080 | Postage $305.55, Labor $126, Envelopes $393.82, Paper $156.17, Tax 91.28 |
| 3/1/2026 | $ 136.74 | Permits | Dept of Ecology | APAM Fee $136.74 (1/4 of $500 permit+16.96 Processing fee for 2026 |
| 3/20/2026 | $ 4,930.30 | CMP C-01 | Herrera #61780 | Jan 31,-Feb 27, 2026 |
| 3/20/2026 | $ 250.92 | CMP D-03 | Herrera #61780 | Jan 31,-Feb 27, 2026 |
| 3/31/2026 | $ 560.81 | TC Admin | | Q1 2026 |
| 4/14/2026 | $ 271.99 | Treatment notice | Nisqually Print, #NPNP3491 | 165 - stamps $128.70, handouts 89.10, Labor 42, tax 12.19 |
| 4/16/2026 | $ 11,564.63 | CMP C-02 | Herrera #62017 | Feb 28-Mar 27, 2026 |
| 4/16/2026 | $ 117.85 | CMP C-03 | Herrera #62017 | Feb 28-Mar 27, 2026 |
| 4/16/2026 | $ 368.77 | CMP D-03 | Herrera #62017 | Feb 28-Mar 27, 2026 |
| 6/25/2026 | $ (12,051.25) | Invoice refused | Herrera #62017 | |
| 4/22/2026 | $ 1,046.00 | Supplies | Barry Halvorson | Concrete Mix $36.69, 3 shallow water Signs $49.24, 6 mill 4x8 signs $961.07 |
| 4/20/2026 | $ 164.45 | Renewal | Nisqually News, #137016 | Notice of Public Hearing |
| 5/6/2026 | $ 30,888.31 | Aquatic Vegetation | AquaTechnex #21130 | #1 SonarONE |
| 5/1/2026 | $ 344.50 | Renewal | C T Publishing, Inv 310012 | 2 public notices re rate hearing |
| 4/9/2026 | $ 108.55 | Renewal | C T Publishing, Inv 309440 | Notice of Adoption 4/9 |
| 6/15/2026 | $ 37,321.79 | Aquatic Vegetation | AquaTechnex #21343 | #2 & 3 SonarONE |
| 6/25/2026 | $ 10,150.43 | CMP C-02 | Herrera #62017R | Final Invoice |
| 6/25/2026 | $ 117.85 | CMP C-03 | Herrera #62017R | Final Invoice |
| 6/25/2026 | $ 368.77 | CMP D-03 | Herrera #62017R | Final Invoice |
| | **$ 94,246.75** | **Total Expenses per LLMD Financial report** | | |
| | $ 80,639.12 | Less items submitted but not confirmed by Thurston County | | |
| | $ 13,607.63 | **Total Expenses confirmed by Thurston County Q1 $13,607.63** | | |

Lake Lawrence Management District

2027 Proposed Budget Modifications

| | Original 2026 Budget | Original 2027 Budget | Proposed 2027 changes | Revised 2027 Budget | 2027 Revision Notes |
|---|---|---|---|---|---|
| **REVENUE** | | | | | |
| Operating Assessment Charges | 118,000 | 195,200 | (3,700) | $ 191,500 | Revised discounts and parcels |
| Other - Interest, penalties, etc. | | | 8,500 | 8,500 | Conservative estimate |
| Algae Grant, Dept of Ecology | 25,000 | - | | - | |
| **TOTAL REVENUE** | **143,000** | **195,200** | **4,800** | **200,000** | |
| **EXPENSES** | | | | | |
| **Professional Services** | | | | | |
| Aquatic Weed Treatment | 86,100 | 93,600 | (17,600) | $ 76,000 | No Curly Leaf treatment |
| Cyanobacteria Management Plan Study | 60,000 | - | | - | |
| Cyanobacteria/Algae Treatment | *210,000* | 184,000 | 166,000 | 350,000 | 2026 treatment deferred to 2027 |
| Nutrient Testing | 15,000 | 15,000 | (10,000) | 5,000 | Testing equipment purchases moved to 2026 |
| Advertising | | | 300 | 300 | RFPs |
| **Total Professional Services** | **371,100** | **292,600** | **138,700** | **431,300** | |
| **County Administrative Rate at 5%** | **5,900** | **9,760** | **240** | **10,000** | |
| **Miscellaneous** | | | | | |
| Annual Member Meeting | 500 | 500 | | 500 | |
| Website | 400 | 180 | | 180 | |
| **Total Miscellaneous** | **900** | **680** | **-** | **680** | |
| **Supplies and Operating Expenses** | | | | | |
| Office Supplies | 125 | 950 | (825) | 125 | Revised estimate |
| Lake Survey Costs | | 575 | (575) | - | Estimated $575 donated |
| Tools & Equipment | 300 | 2,000 | (1,000) | 1,000 | Estimated testing supplies |
| **Total Supplies & Operating Expenses** | **425** | **3,525** | **(2,400)** | **1,125** | |
| **Communication Expense** | | | | | |
| Annual Education Postcards | 690 | 710 | | 710 | |
| Weed Treatment Notifications Cards | 600 | 600 | | 600 | |
| Meeting Room Rental (Community Club) | 60 | 60 | | 60 | |
| **Total Communication Expense** | **1,350** | **1,370** | **-** | **1,370** | |
| **TOTAL EXPENSES** | **384,675** | **307,935** | **136,540** | **444,475** | |
| **NET (Revenue-Expenses)** | ***(241,675)*** | ***(112,735)*** | ***(131,740)*** | ***$ (244,475)*** | |
| Beginning Fund Balance | 431,246 | 475,000 | | 475,000 | |
| Changes for 2026 Algae Treatment & study costs | *248,000* | | | | |
| Add'l grant funds | *16,000* | | | | |
| Interest revenue | *10,000* | | | | |
| No WFL treatment & Reduced Nutrient Testing | *11,500* | | | | |
| Other | *(71)* | | | | |
| **Estimated Ending Fund Balance** | **475,000** | **362,265** | **(131,740)** | **$ 230,525** | |

# Work Orders/Invoices

1. Notice of LMD Establishment published in Local Paper within 10 days of Ordinance creating LMD – Notice published by BoCC Clerk of the Board. Estimated cost is $320.00.  Actual cost was $108.55
2. Notice of RFP in local Paper. Estimated cost is $300. Actual cost was $_____. This will go out soon.
3. Item 1 is update from May 2026 meeting.

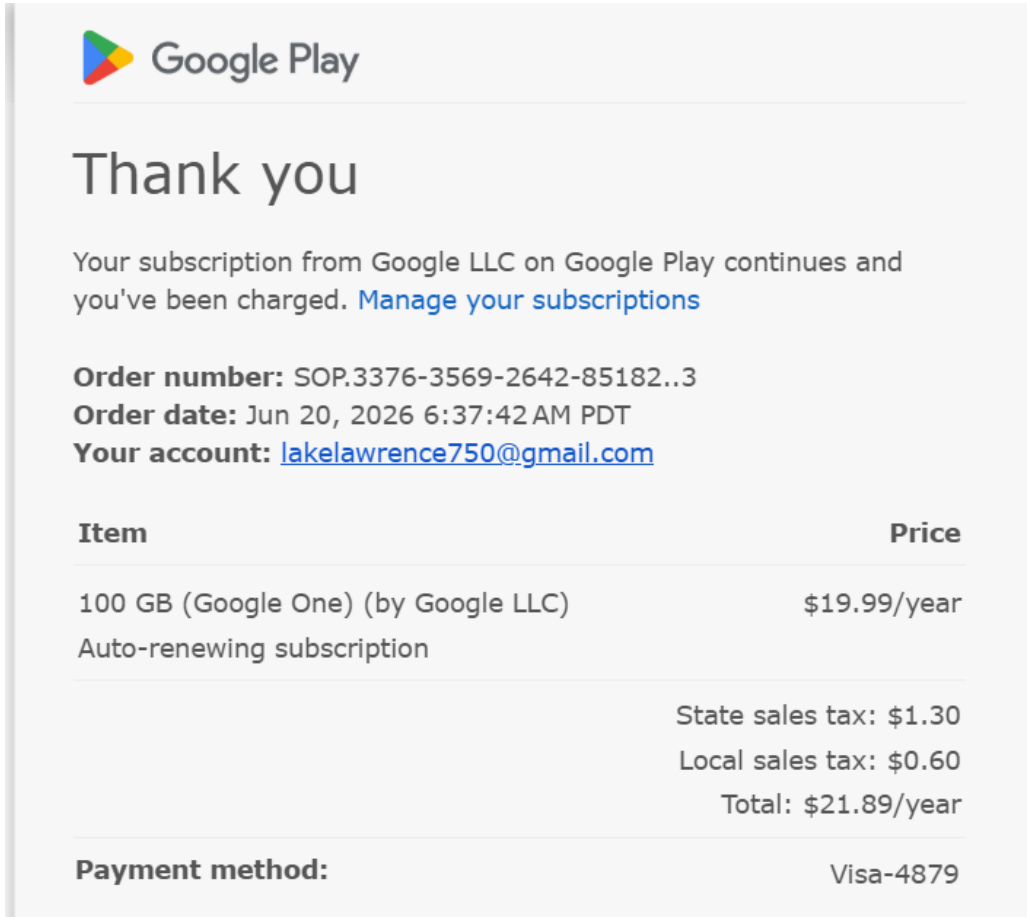
**New items to approve will be discussed individually in following slides.**

# Computer Charges

- Google Play (100GB (Google One) – Storage Subscription - $21.89/Year
- Microsoft Software - $14.38/Month x 12 = $172.56
- Website – Renewal Cost $740.77 for 3 years - past 3 years it was $369.70 – May be able to get costs cut, but don’t know until we get ready to renew?
- Domain Name – $64.05 (3 years)

**SEE COST DETAILS ON FOLLOWING SLIDES**

# Google Play – LMD Storage (100 GB)



Google Play

Thank you

Your subscription from Google LLC on Google Play continues and you've been charged. Manage your subscriptions

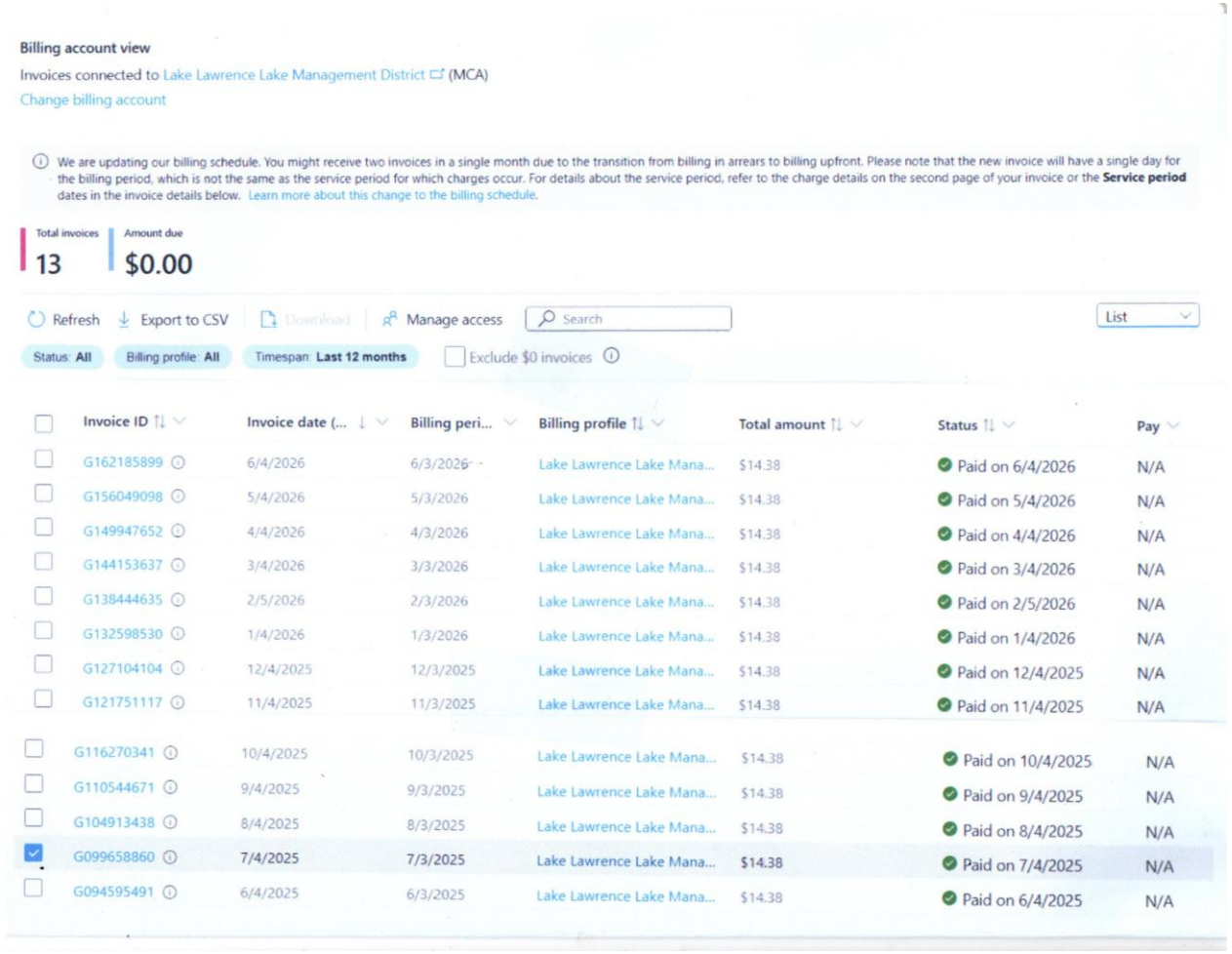
**Order number:** SOP.3376-3569-2642-85182..3
**Order date:** Jun 20, 2026 6:37:42 AM PDT
**Your account:** lakelawrence750@gmail.com

| Item | Price |
|---|---|
| 100 GB (Google One) (by Google LLC)<br>Auto-renewing subscription | $19.99/year |
| | State sales tax: $1.30<br>Local sales tax: $0.60<br>Total: $21.89/year |
| **Payment method:** | Visa-4879 |

**$21.89 per year for additional computer storage and backup of LMD information.**
**Barry has been paying this cost for the past three years as he said he would until 2027.**
**Barry is requesting reimbursement for 2027 and beyond.**

**Motion:**
**Approve:_____**
**Disapprove:_____**

# Microsoft Business Standard Billing Costs (required to operate website)



Billing account view

Invoices connected to Lake Lawrence Lake Management District (MCA)

Change billing account

We are updating our billing schedule. You might receive two invoices in a single month due to the transition from billing in arrears to billing upfront. Please note that the new invoice will have a single day for the billing period, which is not the same as the service period for which charges occur. For details about the service period, refer to the charge details on the second page of your invoice or the **Service period** dates in the invoice details below. Learn more about this change to the billing schedule.

| Total invoices | Amount due |
|---|---|
| 13 | $0.00 |

Refresh | Export to CSV | Download | Manage access | Search | List

Status: All | Billing profile: All | Timespan: Last 12 months | Exclude $0 invoices

| Invoice ID | Invoice date (... | Billing peri... | Billing profile | Total amount | Status | Pay |
|---|---|---|---|---|---|---|
| G162185899 | 6/4/2026 | 6/3/2026 | Lake Lawrence Lake Mana... | $14.38 | Paid on 6/4/2026 | N/A |
| G156049098 | 5/4/2026 | 5/3/2026 | Lake Lawrence Lake Mana... | $14.38 | Paid on 5/4/2026 | N/A |
| G149947652 | 4/4/2026 | 4/3/2026 | Lake Lawrence Lake Mana... | $14.38 | Paid on 4/4/2026 | N/A |
| G144153637 | 3/4/2026 | 3/3/2026 | Lake Lawrence Lake Mana... | $14.38 | Paid on 3/4/2026 | N/A |
| G138444635 | 2/5/2026 | 2/3/2026 | Lake Lawrence Lake Mana... | $14.38 | Paid on 2/5/2026 | N/A |
| G132598530 | 1/4/2026 | 1/3/2026 | Lake Lawrence Lake Mana... | $14.38 | Paid on 1/4/2026 | N/A |
| G127104104 | 12/4/2025 | 12/3/2025 | Lake Lawrence Lake Mana... | $14.38 | Paid on 12/4/2025 | N/A |
| G121751117 | 11/4/2025 | 11/3/2025 | Lake Lawrence Lake Mana... | $14.38 | Paid on 11/4/2025 | N/A |
| G116270341 | 10/4/2025 | 10/3/2025 | Lake Lawrence Lake Mana... | $14.38 | Paid on 10/4/2025 | N/A |
| G110544671 | 9/4/2025 | 9/3/2025 | Lake Lawrence Lake Mana... | $14.38 | Paid on 9/4/2025 | N/A |
| G104913438 | 8/4/2025 | 8/3/2025 | Lake Lawrence Lake Mana... | $14.38 | Paid on 8/4/2025 | N/A |
| G099658860 | 7/4/2025 | 7/3/2025 | Lake Lawrence Lake Mana... | $14.38 | Paid on 7/4/2025 | N/A |
| G094595491 | 6/4/2025 | 6/3/2025 | Lake Lawrence Lake Mana... | $14.38 | Paid on 6/4/2025 | N/A |

**$14.38 per month x 12 = $172.56**
**Barry has been paying this cost for the past three years as he said he would until 2027.**
**Barry is requesting reimbursement for 2027 and beyond.**

**Motion:**
**Approve:_____**
**Disapprove:_____**

# WIX.COM LMD Website Plan & Costs

## Your Core plan's features & vouchers

**Key features**

- ✓ Accept payments
- ✓ Customer accounts
- ✓ Connect a custom domain
- ✓ Free domain for 1 year
- ✓ Remove Wix branding from you…
- ✓ Storage space - 50 GB
- ✓ Lead-capture forms - 10
- ✓ Fields per form - 50
- ✓ Customer care - 24/7 customer …
- ✓ Pricing Plans
- ✓ Pricing Plans transaction fee - 4%

## Payment details

Premium plan: Core

Site: Lake Lawrence Lake M

Next payment: Dec 1, 2026 / $740.77

Billing cycle: 3 Year cycle

* Additional taxes may apply

WIX.com

Wix.com LTD
Yunitsman 5 Tel Aviv
Israel

**Issued to:**
Barry Halverson
P.O. Box 297 YELM
Washington United States
Lake Lawrence Lake Management District

**Invoice #1091231899 | Dec 20, 2023 | Paid**

| Description | Site | Billing Period | Quantity | Amount |
|---|---|---|---|---|
| Premium plan<br>Core | Lake Lawrence Lake M | 3 Year<br>Dec 20, 2023 - Dec 20, 2026 | 1 | $684.00 |

**ment Method: Visa ••••3490**

| | |
|---|---|
| Coupon discount | - $342.00 |
| Subtotal | $342.00 |
| TAX (8.1%) | $27.70 |
| **Total** | **$369.70** |

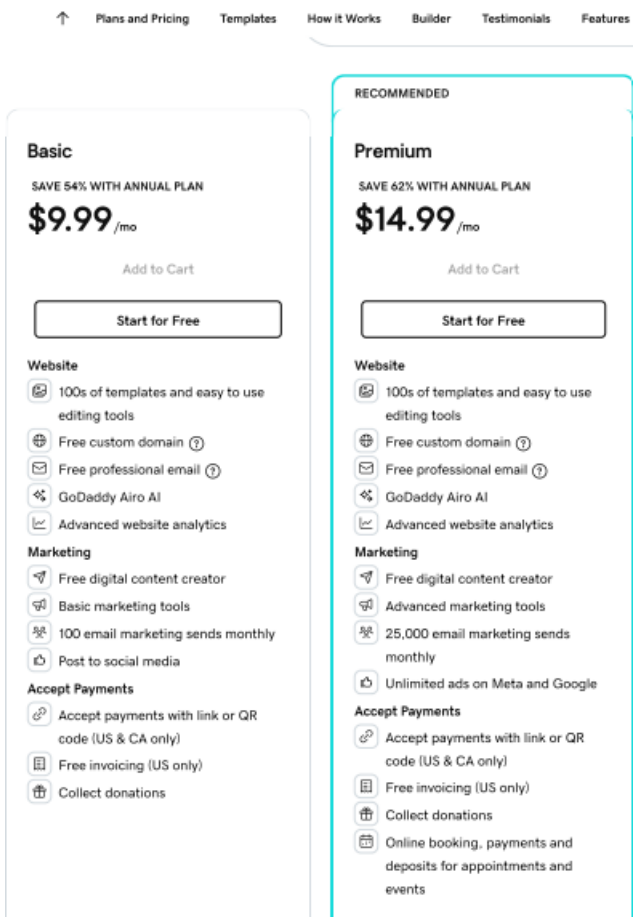
Renewal nearly 2x original cost

Motion to approve renewal of Website
Approve _____
Disapprove_____

# Website Domain Name Costs


**Recommend extending for 3 years - $21.35 x 3 = $64.05 to match up with our website duration.**
**Motion:**
**Approve:_____ Disapprove:_____**

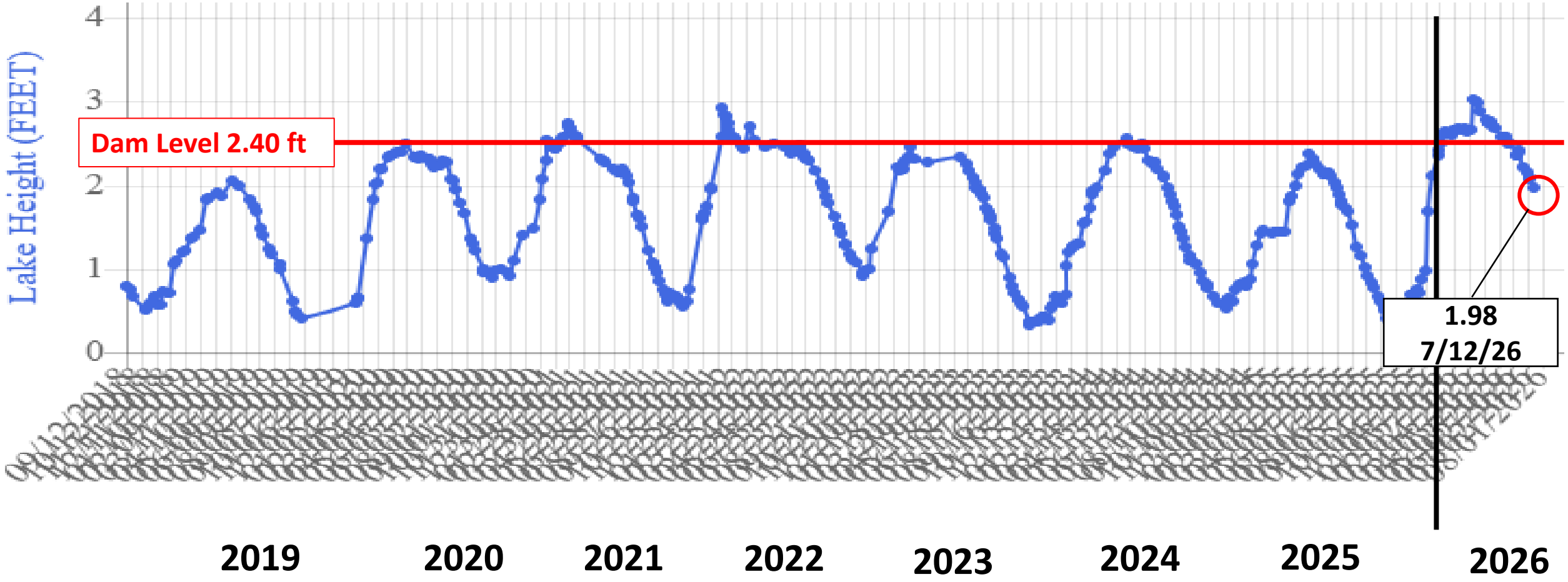
# GoDaddy Website Plans & Cost



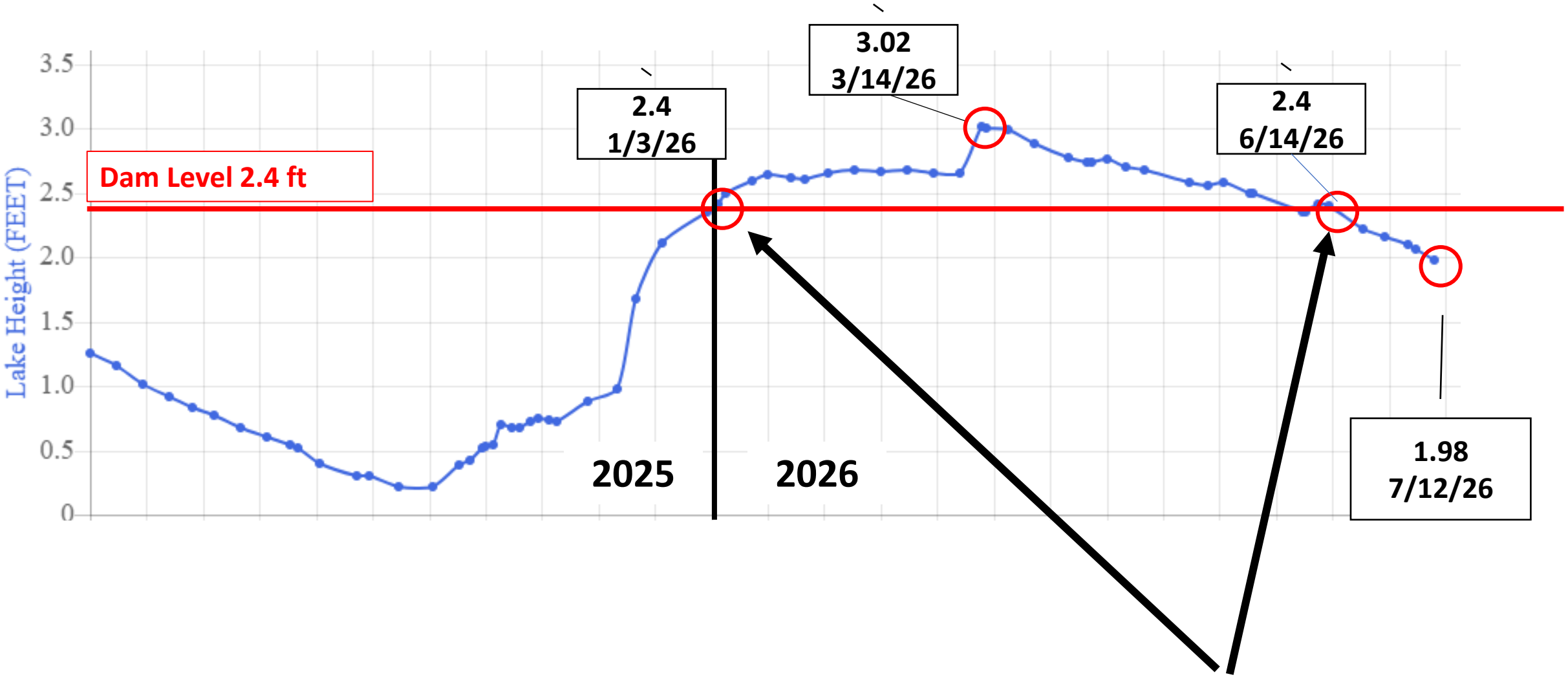

- We can transfer our Domain Name from Wix to GoDaddy - $12.99
- Cost for Domain Name = $24 a year
- Cost for Basic Plan - $323 for 3 years
- Info from WIX cannot be transferred to GoDaddy. Must reinput all data.
- No Storage limit

# OLD BUSINESS

# Lawrence Lake Water Surface Level
# ref: https://liquidearthlake.website/gauge/scaleddetailsall/47

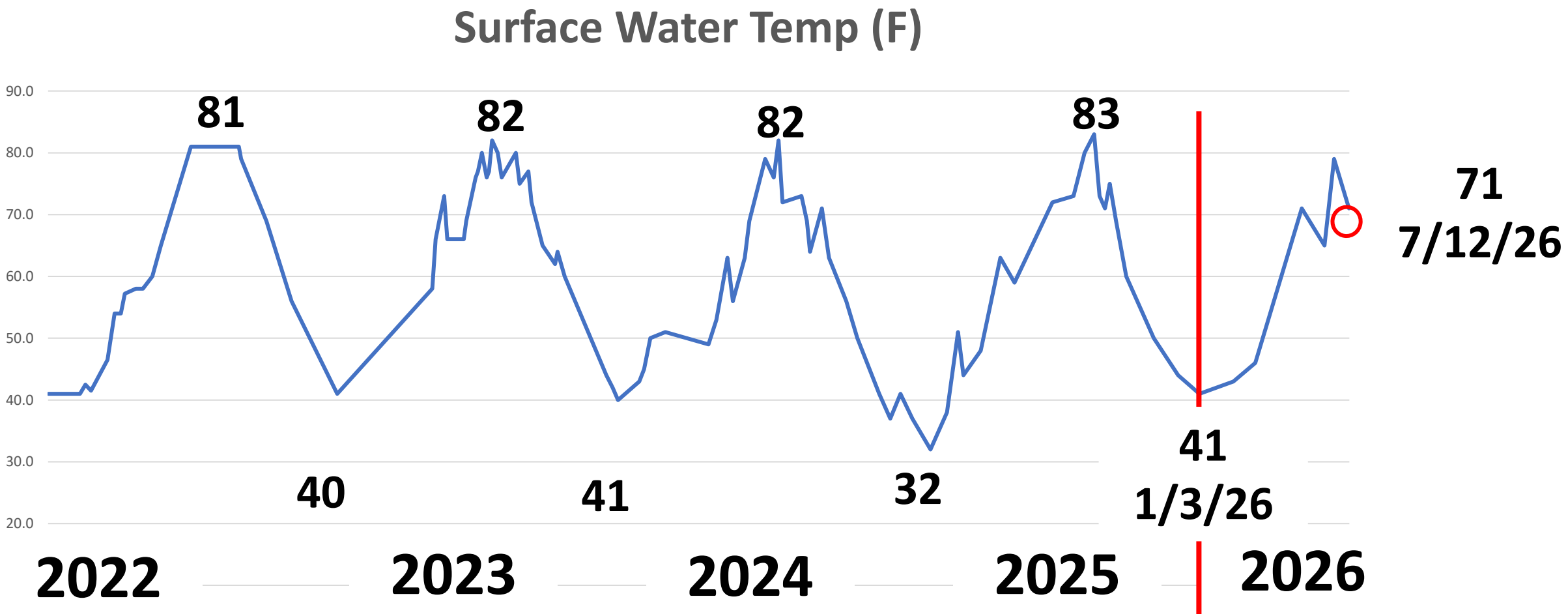


# Lawrence Lake Water Surface Level LAW 2
# ref: https://liquidearthlake.website/gauge/scaleddetailsoney/47




**Dam level exceeded: 1/3 – 6/14 2026 (record 6+ months of steady overflow)**

# Lawrence Lake Surface Water Temperatures
## (LAW 2: West Basin near HOA Park)



# Floating Mat Issue: status

- 2022-2023 Numerous communications LMD/T-County/WA DNR/WA FW
- Oct 23 Site survey by boat: LMD/FW/DNR
- Dec 23 DRAFT Presentation vetted through Lawrence Lake LMD Steering Committee
- Dec 23 Presentation sent to State Representative Abbarno's Office
- 26 January 2024 Presentation to Rep Abbarno, FW/DNR
- April 24 Lawrence Lake's State Voting District change: Reps Wilcox, Barkis; Sen McCune
- 4 April 24 New floating mat discovered, towed and secured in protected cove
- 13 May 24 LMD Floating Mat Presentation to Rep Wilcox
  - Staff directed to contact State DNR leadership for follow-up action
- 1 July 24 Follow up action: Presentation to WA State Agencies:
  - Presentation Major Point: State Constitution: DNR has Jurisdictional Authority for lake bottom beyond High Water Mark
  - Attended: Departments of Ecology, Fish and Wildlife representatives
  - Did not attend: DNR, Hilary Franz – Commissioner of Public Lands (elected official)
- 3 Sep 24 ECY/DNR/FW meeting with Rep Wilcox staff
  - *Lake Lawrence eutrophication is a "natural process"*
  - "*Human influence might be a beneficial premise for a study*"
  - *Sediment removal is LMD responsibility*

# Floating Mat Issue: status/update

- 28 Oct 24 LMD presented the Floating Island Issue to Army Corp of Engineers (ACE) federal regulatory representative Alexandra Hammond, Seattle District Office
  - Summary: *ACE is at the tail end of any process or planning for dredging etc but can assist with any required federal permits including EPA*

**Current Status: May 2025**

- Floating Island issue remains a safety issue for Lawrence Lake
  - New reported incident September 2025 "mudberg" lodged on western side of Western Basin (picture)
    - Mudberg disintegrated on its own
  - New floating mat May 2026 north shore of East Basin
- Presentations to Representatives Orcutt, Abarno negated by redistricting (20>2) Apr 2024
- Presentation to Representative Wilcox negated by Nov 2024 election/retirement
- State ECY/DNR/FW representatives assume no responsibility for the Floating Island Issue
- Federal ACE will only assist with federal "tail end" permitting (e.g., EPA)

**Proposed actions for Steering Committee consideration**

1. Tour Representative Marshall and ACE representative Hammond
2. Incorporate current Cyanobacteria lake study (contractor) findings/recommendations into presentation
3. Steering Cmte letter To: Commissioner of Public Lands, cc: BoCC, State Representatives: Barkis, Marshall

# Senate Bill S-3518.1 Update

- 30 May DFW sent us a letter outlining their concerns
- 4 June sent email to WA LMDs to update their contact information
- 6 June sent DFW ltr and other info to WA State LMDs for their input by 14 Jun
- 14 June sent email to WA State LMDs with 2 dates for virtual mtg 19 & 20 Jun
- 19 & 20 June met virtually with WA State LMDs
- 24 June sent email with ltr to DFW addressing their concerns
- 30 Aug WALPA sent email – would like to be involved and support revision of RCW 36.61. Want to work with LMDs on changes. Waiting for date/time to set up mtg to discuss.
- 2 Sep sent email to DFW asking for a response – Responded that they will have an answer by mid-September.
- 18 Oct 2024 rec'd letter from DFW reiterating their position that the bill must include a change to the RCW regarding restructuring of public entity assessment fees in paragraph 36.61.160.
- 4 Nov 24 – Email to our legislative sponsors of the bill and WDFW representatives letting them know where the LMDs stood, asking for their input on the LMD Assessment Table and discontinuing any effort to pursue this legislation this coming session until we have had time to further discuss the bill with all City/County LMD managers and other stake holders.
- 21 Nov 24 – Email to all LMD Leadership, WALPA, and LMD City/County managers requesting their review/discussion of proposed changes to RCW 36.61 and WDFW's concerns.
- 16 Jan 25 – Virtual meeting with LMDs, WALPA and City/County LMD Representatives to discuss bill, identify any changes desired, confirm support for bill and existing changes and identify next steps. WALPA agreed to moderate discussion with DFW – Clark to reach out to them. WALPA agreed to reach out to all city/county LMD representatives to get them involved (ongoing).

# Senate Bill S-3518.1 Update (Continued)

- 2 Apr 26 – Rec'd email from WALPA - DRAFT Bill perspective paper/review sent to all parties (City/Counties; DFW; LMDs) with 5 May suspense. WALPA to coordinate actions with city/counties and DFW. Barry to coordinate with LMDs.
- 3 Apr 26 – Barry sent email/information to all State LMDs with recommended changes to perspective paper.
- 5 May 26 – Rec'd responses from LMDs and forwarded to WALPA.
- 28 May 26 – Sent follow-up email to all State LMDs requesting any final recommendations & requesting they talk with their county/city LMD leads.
- 16 July 26 – Just finished this JOINT MEETING with all concerned earlier today:
    - WALPA/LMD/LMD County/City Managers/WDFW

# Cyanobacteria Management Plan (CMP) Timeline (continued)

- G 25 Sep 24 – Lake Sediment Sampling (Completed)
- G Oct 24-Oct 25 – LMD responsibility. Weekly water level monitoring/reporting (On track)
- G 5 May 2025 – Mtg #2 1 hr. w/SC to discuss monitoring update.
- G May 2025 – Rec'd $8,982.83 in Grant Funding. Additional funding expected Oct 25.
- G 11 Dec 2025 – Mtg #3 2 hrs. w/SC to discuss Phosphorus Budget & Mgmt. Alternatives.
- G 16 Apr 2026 – Mtg #4 2 hrs. Public Mtg to go review/discuss DRAFT CMP.
- G 11 Jun 2026 – MTG #5 2 hrs. w/SC to discuss final CMP.
- Jun/Jul (Changed from April) 2026 – RFP issued for contractor to implement plan (21 July)
- Aug/Sep (Changed from May) 2026 – Contractor identified
- Mar/Apr 2027 (Changed from Jun-Oct 2026) – Plan/contract/treatment executed.


**G = Green = Completed On Time**


**Y = Yellow = Late – Program Jeopardized**


**R = Red = Mission Fail**

# Cyanobacteria Management Plan (CMP) Timeline (continued)

- 16 Apr 2026 – Mtg #4 2 hrs. Public Mtg to go review/discuss DRAFT CMP.
  - Presentation posted to website and YouTube Channel
  - Emailed link information to everyone on LMD contact list.
  - 5 May 2026 - Suspense for review/comment on DRAFT CMP
    - All SC Board Members notified.
    - April 2026 Barry and Janice provided Comments.
- 14 May 2026 LMD Meeting
  - CMP DRAFT Plan with changes was approved by SC
- 5 June 2026 – Final CMP Plan provided
- 11 Jun 2026 – Mtg #5 CMP Final Plan


**G = Green = Completed On Time**


**Y = Yellow = Late – Program Jeopardized**


**R = Red = Mission Fail**

# What are we attempting to control/Improve?

- Toxic Algae Blooms - prevent
  - Total Phosphorus “P”
  - PHOSPHORUS SEQUESTRATION METHODS & COSTS Total “P” estimated at 6,717 – 7,709 lbs.
- Improved Dissolved Oxygen Levels at deeper depths.

**NOTE: Lake management should focus on achieving the appropriate ecological balance between algae and plants, since too much of either can be problematic.**

# What's feasible & what isn't

**Table 1 Cyanobacteria Management Feasibility Screening for Lake Lawrence.**

| Method | Effectiveness | Cost | Impact Risk | Feasibility | Suitability |
|---|---|---|---|---|---|
| **Watershed (External Nutrient Loading Control) Methods** | | | | | |
| Septic System Management | Low | High | Low | Moderate | Yes, but not expected to meaningfully improve lake water quality |
| Stormwater Management | Low | Moderate | Low | Moderate | Yes, but not expected to meaningfully improve lake water quality |
| Stream Phosphorus Inactivation | Low-Moderate | Moderate | Moderate | Low | No, there is no major surface phosphorus loading source. |
| **Waterfowl Management** | Low-Moderate | Moderate | Low | Moderate | Yes |
| **Shoreline Management** | Low-Moderate | Moderate | Low | Moderate | Yes |
| **Lake Physical Methods** | | | | | |
| Lake Mixing | Low | Moderate | Low | Moderate | No – uncertain effectiveness |
| Sonication | Low | Moderate | Low-Moderate | Low | No – uncertain effectiveness |
| Lake dilution | Moderate | High | Low | Low | No – high cost |
| **Hypolimnetic Oxygenation/ Aeration** | High | Moderate-High | Low- -Would Benefit Fish | Moderate | Yes |
| Ozone/ Microbubbles/ Nanobubbles | Low | Moderate | Low | Low | No – not effective, experimental |
| Hypolimnetic Withdrawal | Low | Moderate | High | Low | No – insufficient inflow, downstream impacts |
| Dredging | Low-Moderate | Very High | Moderate | Low | No – high cost/benefit |
| Shading (Dyes) | Moderate | Moderate | High | Low | No – not feasible |
| **Lake Chemical Methods** | | | | | |
| Algaecide treatment | Moderate | Low-Moderate | Low-Moderate | Moderate | No –not a long-term solution |
| **Chemical Phosphorus Inactivation ("lake reset" or multiple lower doses)** | High | Moderate-High | Low-Moderate | High | Yes – effectiveness will depend on timing of treatment and the product used. |
| **Alum** | High | Moderate | Low-Moderate | High | Yes |
| **Lanthanum** | High | Moderate-High | Low | High | Yes |
| **ZVI** | Uncertain | Low | Low | High | Maybe – could be explored as an experimental treatment. Uncertain effectiveness and longevity |
| **Proprietary Chemicals** | Uncertain | High | Unknown | Moderate | No – higher cost and requires experiment permit |
| **Calcium** | Low | Moderate | Low | High | No – uncertain effectiveness |
| **Lake Biological Methods** | | | | | |
| Carp removal | Low | Moderate-High | Low-Moderate | Low | No – high cost/ benefit |
| Biomanipulation (Zooplankton planting; Piscivore stocking) | Low | Low-Moderate | Low-Moderate | Low | No – not feasible, low effectiveness |
| Aquatic Weed Harvesting | Low-Moderate | Moderate | Low | Moderate | No – high cost/benefit |
| Macrophyte plantings | Low | Moderate | Low | Low | No – high cost/benefit |
| Barley Straw | Low | Low | Low-Moderate | Low | No – uncertain benefit |

Waterfowl/Shoreline/OST

ALUM/Lanthanum/Iron(ZVI)

# In Lake Management Techniques (Cont)

(DRAFT Herrera CMP Study 2026)

## Hypolimnetic Oxygenation and Aeration

- Hypolimnetic oxygenation or aeration techniques are implemented to combat hypolimnetic anoxia by maintaining or increasing DO levels in the hypolimnion while preserving thermal stratification.

Long Term, Mechanical (no chemicals),
Expensive Option - $2.7 Million

How? Legislative Appropriation of funds
and/or Lawrence Lake Association (501C3)

# Hypolimnetic Oxygenation System (Mechanical System) Update (Info provided during work session with Clarity Resources Group 22 January 2026 – Video posted)

- **Oxygenation System** (info provided by Sandy Williamson, Spanaway Lake & Herrera Inc.)
  - Currently being studied by Pierce County for use in Spanaway Lake.
  - Air injection system pumped into deepest parts of lake to pump oxygen into lake.
  - Multiple basins/deep areas may require multiple pumping stations.
  - Requires land to install generators, tubes from generators into water at deepest points.
  - 24/7 electricity to run system. ~ $25,000 a year.
  - Frequent maintenance. Requires maintenance contract.
- Cost – Very expensive, but exact costs dependent on lake. Costs are "forever costs". Initial costs for two systems at Lake Lawrence about $2.7 Million.

# POSSIBLE LOCATIONS OF OST SYSTEM

- West Lake Location
- Will also discuss location at LLCC Small Park on northwest end of West Lake.


East Lake Location: Wildaire HOA Property Have discussed with them – Willing to do this. 25 Feb Mtg with HOA Board to discuss further. I will be attending to answer HOA Board questions. Attend their 6 June Annual Meeting and discussed with membership.

# Concerns

- **Risk of shock** – GFCI breakers on all 3-Phase pumps. A 3-phase Ground Fault Circuit Interrupter (GFCI) prevents electric shock in water by constantly monitoring the current balance among all three phases. If a leakage current occurs (e.g., electricity traveling through water to ground), it detects a tiny imbalance – typically 20 mA or less – and cuts power within 1/40$^{th}$ of a second.
- **Noise** –
  - The Compressor has a noise rating of 67 dba.
  - The Generator has a noise rating of 72 dba.
  - For comparison, a 3 Hp exhaust fan has a noise rating of 80-90 dba.
  - Further noise dampening by insulating the exhaust hood and creating a 90-degree turn.
- **How do we ensure it does not sink into bottom of lake?**
- **Excess condensation from compressor/equipment (up to2 gals an hr) requires drainage to septic/sewer due to concerns over National Pollution Discharge Elimination System (NPDES).**

# OST Meetings & Updates

- 4 Mar 26 – Met with Brianne Blackburn, Pierce County Water Resources LMD Program Manager and Program Lead for the OST System they are planning on deploying in Spanaway Lake. They are at 90% design.
  - They decided to do a 200-foot setback for the building to preempt problems with  A SEPA and Conditional Use Permit Process. They are digging a ditch from the bldg. to the water and burying the cables for the system.
  - DNR is requiring a lease agreement for the part of the system that enters the water (that they own).
  - No Issues with WDFW.
  - No issues with Army Corps of Engineers (Only required a letter) Approved within 24 hrs.
  - They are bldg. a concrete block maintenance bldg. , concrete floor, metal insulated roof, Roll-Up Garage Door on one end with a wide steel door on the other. Small electric heater inside. Exterior lights, Warning System for malfunctions.
  - She will notify me when they start construction so I can visit and take YOUTUBE Videos throughout the process. Commented that their entire department was following our Phosphorus Briefings on our YOUTUBE Channel.
  - They have identified no issues with noise, electricity, etc.

# OST Meetings & Updates (continued)

- 11 June 26 – Virtual meeting with Brianne Blackburn, Pierce County Water Resources LMD Program Manager and Program Lead for the OST System they are planning on deploying in Spanaway Lake. They are at 90% design.
  - During their final design review they identified a problem with condensation in the compressor building resulting in 1-2 gallons of water an hour. This water is contaminated because it goes through a filtration system. It must be removed and cannot just go into a drain field. It must go into a septic system.
  - Pierce County is relooking design to hook up to a nearby sewer system.
  - Lake Lawrence would be required to install a septic system.

# STEP 7 - Courses of Action Considered by SC

1. Lanthanum - tried and true chemical – adds product to water and lakebed that is not naturally occurring in water or sediment
2. Iron (ZVI) – not well known/used - a natural mineral already present in all lakes, but a higher percentage of Iron to phosphorus ratio is required to sequester the high phosphorus content in the lake sediment
3. Oxygen Saturation Technology (OST) – Mechanical Method – High Cost - No Chemicals
4. Iron (ZVI) to mitigate near term Harmful Algae Blooms (HABs) and work to secure funding for OST over next 5 years
5. If COA 4 does not prove successful (either through sequestering blooms using ZVI or securing funding for OST) move to COA 1

COA# 4 approved at 14 May SC Mtg

# How To Proceed?

- COA #4 Selected by SC on 14 May 2026 LMD Mtg with COA #5 to be considered if COA #4 does not work out
  - COA #4 - Use Iron (ZVI) – a natural mineral to mitigate near term Harmful Algae Blooms (HABs) and work to secure funding for OST over next 5 years
  - COA #5 - If COA 4 does not prove successful (either through sequestering blooms using ZVI or securing funding) move to COA 1
  - First application Feb/Mar 2027 (~$300k)
- Secure OST funding through:
  - Ecology Grants – LMD submits for these
  - State Legislative Appropriation – Will BoCC support LMD initiative to petition State Legislature for $2.7 M appropriation to fund this option over a three-year period?
    - Year One ($220k) Study, Design, and Permitting
    - Year Two ($280k) Construction of infrastructure and Procurement
    - Year Three ($2.2m) Purchase and installation of equipment
  - Lake Association (501C3) – Donations from large corporate donors – need lead (Four members have stood up and volunteered for this board – would like a fifth)

**MOVE FORWARD NOW WITH ZVI TO GET HABs UNDER CONTROL AND SIMULTANEOUSLY STUDY OST OVER NEXT 5 YEARS TO ENSURE OPERATIONAL FEASIBILITY, RELIABILITY, AND EFFICACY.**

# ZVI Water Testing Requirements/Cost

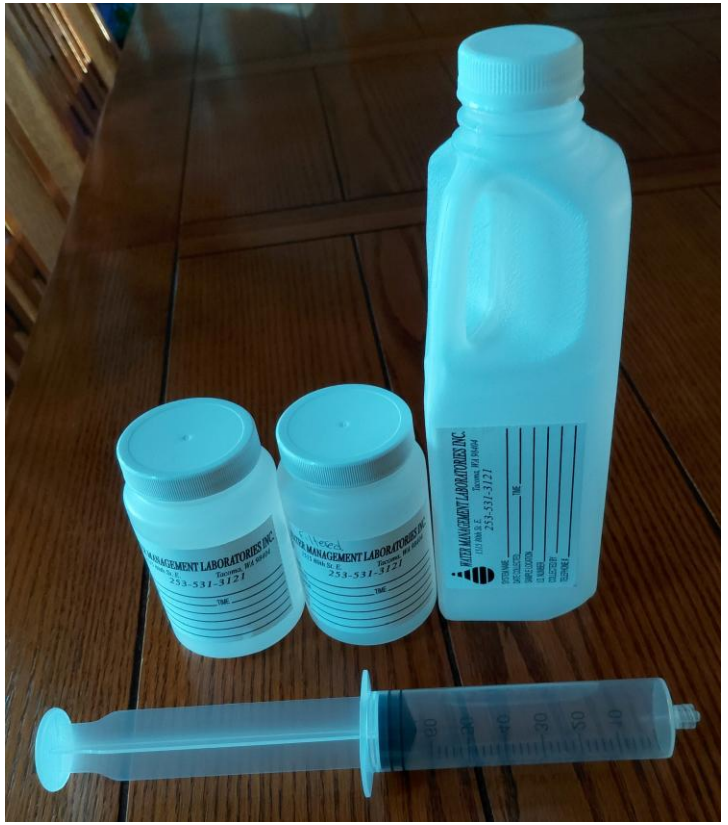
a. Parameters measured in the water column (in situ) i. pH, Temperature(°C), Dissolved Oxygen (DO; mg/L), % DO saturation. ii. As a water column vertical profile, measured at each meter to within 0.5 m above the bottom sediment. For lakes over 10 meters in depth, measurements can be conducted at 2 meter intervals.

b. Parameters measured in samples collected for laboratory analysis i. Sample for nitrate and total iron, following protocols for sample preservation. ii. Sample in a mixed water column (unstratified) at mid depth. If the waterbody is stratified, collect 1 sample in the middle of the epilimnion layer and 1 in the middle of the hypolimnion layer.

**Table 7: Monitoring Schedule Summary for Iron Products**

| Frequency | pH, Temperature, Dissolved Oxygen, % Saturation | Nitrate (mg/L) | Total Iron (µg/L) |
|---|---|---|---|
| Pre-treatment | ✓ | ✓ | ✓ |
| Day after treatment | ✓ | ✓ | ✓ |
| 1 month | ✓ | ✓ | ✓ |
| 2 months | ✓ | ✓ | ✓ |
| 3 months | ✓ | ✓ | ✓ |

Pre-treatment must include a minimum of 3 samples within 3 months of treatment.



# ZVI Water Testing Requirements/Cost (continued)

**Table 7: Monitoring Schedule Summary for Iron Products**

| Frequency | pH, Temperature, Dissolved Oxygen, % Saturation | Nitrate (mg/L) | Total Iron (µg/L) |
|---|---|---|---|
| Pre-treatment | ✓ | ✓ | ✓ |
| Day after treatment | ✓ | ✓ | ✓ |
| 1 month | ✓ | ✓ | ✓ |
| 2 months | ✓ | ✓ | ✓ |
| 3 months | ✓ | ✓ | ✓ |

Pre-treatment must include a minimum of 3 samples within 3 months of treatment.

Tests Required:
3 Within 3 months prior to application = $1,816.56
1 Day after application = $605.52
1 Month after application = $605.52
2 Months after application = $605.52
3 Months after application = $605.52

TOTAL: **$4,238.64**

| Analyte | pH | Temp | DO | %DO Sat | Nitratae as | Total Iron | SRP as "P" | 0.45 Micron Filter For SRP | Tax |
|---|---|---|---|---|---|---|---|---|---|
| **Location** | | | | | | | | | |
| East Basin Middle of Epilimnion | | | | | $36.00 | $30.00 | $67.00 | $10.00 | $13.60 |
| East Basin Middle of Hypolimnion | | | | | $36.00 | $30.00 | $67.00 | | $12.64 |
| West Basin Middle of Epilimnion | | | | | $36.00 | $36.00 | $67.00 | | $12.64 |
| West Basin Middle of Hypolimnion | | | | | $36.00 | $36.00 | $67.00 | | $12.64 |
| **East Basin** | | | | | | | | | |
| 1 meter | x | x | x | x | | | | | |
| 2 meters | x | x | x | x | | | | | |
| 3 meters | x | x | x | x | | | | | |
| 4 meters | x | x | x | x | | | | | |
| 5 meters | x | x | x | x | | | | | |
| 6 meters | x | x | x | x | | | | | |
| 7 meters | x | x | x | x | | | | | |
| 8 meters | x | x | x | x | | | | | |
| **West Basin** | | | | | | | | | |
| 1 meter | x | x | x | x | | | | | |
| 2 meters | x | x | x | x | | | | | |
| 3 meters | x | x | x | x | | | | | |
| 4 meters | x | x | x | x | | | | | |
| 5 meters | x | x | x | x | | | | | |
| 6 meters | x | x | x | x | | | | | |
| 7 meters | x | x | x | x | | | | | |
| 8 meters | x | x | x | x | | | | | |
| Cost Per Analyte: | | | | | $144.00 | $132.00 | $268.00 | $10.00 | $51.52 |
| Total Cost: | | | | | | | | | $605.52 |

Represents Stratified testing requirements

SRP Testing not a requirement of APAM, but recommended

If lake is not stratified samples only need to be taken at mid depth

**TOTAL: $605.52**

**It is recommended to conduct SRP testing throughout the year – additional 4 times - $2,000 + Tax**

Long Lake Phosphorus Contract 2023 showed contractor costs to take samples = $18,000

**MOTION:** Approve testing for analytes not to exceed $7,000 + taxes for 2027

# Water Sample Shipping Costs

| | UPS Store Yelm 1201 E. Yelm Ave., Ste 400 Phone: 360-400-6245 | | | FEDEX Auth Shipper 1010 E. Yelm Ave. Ste C Phone: 360-960-8740 | | | | |
|---|---|---|---|---|---|---|---|---|
| Lab/Shipping Costs | Size | | Weight | Size | | | | Weight |
| | 9x6x6" | 10x10x10" | 5.5-9.5 lbs. | 9x6x6" | | 10x10x10" | | 5.5-9.5 lbs. |
| | | | | FEDEX Ground Next Day | 5pm Standard Overnight Next Day | FEDEX Ground Next Day | 5 pm Standard Overnight Next Day | |
| Water Management Laboratories, Tacoma, WA 98404 | | | | $18.50 | $87.76 | $18.50 | $87.76 | |
| AM Test Inc., Kirkland, WA 98034 | $122 | $122 | | $18.50 | $87.76 | $18.50 | $87.76 | |
| ALS Environmental - Kelso Laboratory, Kelso, WA 98626 | $138 | $138 | | $18.50 | $92.30 | $18.50 | $92.30 | |
| IEH, Lake Forest Park, WA 98155 | | | | $18.50 | $87.76 | $18.50 | $87.76 | |
| Tshimakain Creek Laboratories, Spokane, WA 99212 | | | | $22.10 | $123.62 | $22.10 | $123.62 | |

Expect to ship 7-10 samples a year $124 x 10 = $1,240 Motion to approve shipping costs at $1,500 for 2027

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$56.95 Tax $5.47 = $62.42

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**BETTER** **BEST** **GOOD**

**TESTING EQUIPMENT/COSTS FOR ZVI**

If we do our own testing it will save us approximately $8-10,000 per phosphorus application.

Would need this equipment by December 2026 to start testing January 2027. Some equipment requires lengthy lead times to obtain so would need to place order in July 2026. Looking at placing order next week to have equipment ready for 18 Aug Lake Survey if possible.

| YSI xylem 1700/1725 Brannum Lane, Yellow Springs, OH 45387-1107 Email: ysi.info@xylem.com Phone: 1-877-726-0975 | | |
|---|---|---|
| **Part #** | **Test Equipment** | **Cost** |
| 626870-2 | ProDSS Handheld with GPS | $2,982 |
| 626910 | ProDSS 4-Port Cable w/ shallow sensor 10 meter length | $3,700 |
| 626900 | ODO with pre-installed sensor cap | $1,269 |
| 626902 | Conductivity and temperature | $893.10 |
| 626903 | pH with pre-installed sensor module | $570 |
| 626946 | Large, hard-sided carrying case | $521 |
| **TOTAL:** | | **$9,935** |
| | **Calibration Requirements** | |
| 060907 | Conductivity calibrator , 1000 umhos/cm (8ea, pint) | $184 |
| 603824 | 2 pints each of 4, 7, and 10 pH buffers | $107 |
| | | |
| | | |
| **TOTAL:** | | **$291** |
| | **Other Testing Equipment** | |
| Wildco Instruments Wildlive Supply Company 86475 Gene Lasserne Blvd, Yulee, FL 32097 Website: www.wildco.com Phone: 800-799-8301 | | |
| UX-05486-00 | Wildco 1510-C20 Kemmerer Water Sampler, 3 to 600' depth, Acrylic, 1.2L | **$778** |
| | **AMAZON.COM** | |
| BUWUSMU | 7.87 Inch Plastic Secchi Disk Set - With black and white quadrants, steel cone, holding line, and 30 meter tape measure for clarity measurements | **$26.99** |
| | Honda 9.9hp Portable 4-Stroke Outboard Motor with fuel tank and fuel line | $3,000 |
| | **Hanna Instruments (https://hannainst.com/) Tech Support: tech@hannaist.com** | |
| HI97717C | Phosphate Photometer Kit (includes the CAL Check Standards) for the most economical option for testing | $599.99 |
| HI93717-01 | Phosphate HR Reagents (100 Tests) | $38.99 |
| **TOTALS (tax not included):** | | **$14,670.00** |
| | tax | $1,394.00 |
| **Totals including Tax** | | **$16,064.00** |

| Fondriest Environmental, Inc., Website: www.fondriest.com/ysi-exo1 ; phone: 888-426-2151 | | |
|---|---|---|
| **Part #** | **Test Equipment** | **Cost** |
| 599960 | EXO handheld display | $3,300 |
| 599501-01 | EX01 multi-paramenter quality sonde with 4 sensor ports, 10 m depth sensor | $5,900 |
| 599100-01 | EXO optical dissolved oxygen sensor | $2,300.00 |
| 599870 | EXO conductivity & temperature sensor | $1,150 |
| 577601 | EXO guarded pH sensor | $785 |
| 599020-01 | Case | $680 |
| | | **$14,115** |
| | **Calibration Requirements** | |
| 060907 | Conductivity calibrator , 1000 umhos/cm | $184 |
| 603824 | 2 pints each of 4, 7, and 10 pH buffers | $107 |
| | | |
| | | |
| **TOTAL:** | | **$291** |
| | **Other Testing Equipment** | |
| Wildco Instruments Wildlive Supply Company 86475 Gene Lasserne Blvd, Yulee, FL 32097 Website: www.wildco.com Phone: 800-799-8301 | | |
| UX-05486-00 | Wildco 1510-C20 Kemmerer Water Sampler, 3 to 600' depth, Acrylic, 1.2L | **$778** |
| | **AMAZON.COM** | |
| BUWUSMU | 7.87 Inch Plastic Secchi Disk Set - With black and white quadrants, steel cone, holding line, and 30 meter tape measure for clarity measurements | **$26.99** |
| | Honda 9.9hp Portable 4-Stroke Outboard Motor with fuel tank and fuel line | $3,000 |
| | **Hanna Instruments (https://hannainst.com/) Tech Support: tech@hannaist.com** | |
| HI97717C | Phosphate Photometer Kit (includes the CAL Check Standards) for the most economical option for testing | $599.99 |
| HI93717-01 | Phosphate HR Reagents (100 Tests) | $38.99 |
| | **OR** | **$19,140.97** |
| | tax | $1,819.00 |
| | | **$20,959.97** |

| Hanna Instruments (https://hannainst.com/) Tech Support: tech@hannaist.com | | |
|---|---|---|
| **Part #** | **Test Equipment** | **Cost** |
| HI98494 | Portable Multiparameter pH/EC/OPDO Meter with Bluetooth, Hardcase Field Kit and Calibration equipment and 10 Meter Cable | $3,449.99 |
| | GPS | $500.00 |
| | | |
| | | |
| | | |
| | | |
| | **Calibration Requirements** | |
| HI7004C | pH 4 Calibration | $18.99 |
| HI7007C | pH 7 Calibration | $18.99 |
| HI7010C | pH 10 Calibration | $18.99 |
| HI9828-25 | Quick Calibration Standard 500 mL Bottle | $57.99 |
| | | **$114.96** |
| | **Other Testing Equipment** | |
| Wildco Instruments Wildlive Supply Company 86475 Gene Lasserne Blvd, Yulee, FL 32097 Website: www.wildco.com Phone: 800-799-8301 | | |
| UX-05486-00 | Wildco 1510-C20 Kemmerer Water Sampler, 3 to 600' depth, Acrylic, 1.2L | **$778** |
| | **AMAZON.COM** | |
| BUWUSMU | 7.87 Inch Plastic Secchi Disk Set - With black and white quadrants, steel cone, holding line, and 30 meter tape measure for clarity measurements | **$26.99** |
| | Honda 9.9hp Portable 4-Stroke Outboard Motor with fuel tank and fuel line | $3,000 |
| | **Hanna Instruments (https://hannainst.com/) Tech Support: tech@hannaist.com** | |
| HI97717C | Phosphate Photometer Kit (includes the CAL Check Standards) for the most economical option for testing | $599.99 |
| HI93717-01 | Phosphate HR Reagents (100 Tests) | $38.99 |
| | | **$8,623.88** |
| | Tax | $810.00 |
| | | **$9,433.88** |

Not recommended

**Requested donations from our members:**
**To date we have received pledges of $12,000**

Low End = **$9,500** High End = **$21,000**

FYI Only

# ZVI Costs (per mail Pat Randall 29 June 2026)

Cost per pound based on 20,000 lbs. minimum order

- Ferox PRB - $0.65 per lb.
- Ferox Flow - $0.65 per lb.
- Ferox Target - $0.95 per lb.

- RFP that goes out next week will tell us the cost for 2027 applications.

# LMD RENEWAL 2027

**PUBLISHED IN THE NISQUALLY VALLEY NEWS 28 MAY 2026**

## LETTERS TO THE EDITO

**LETTERS POLICY:** *Submit letters to the editor typed or legibly handwritten. Generally, letters Include name, address and a daytime telephone number for verification purposes. No unsigned letters will grammar and length. Mail letters to the Nisqually Valley News, P.O. Box 597, Yelm, WA*

### *Lake Lawrence LMD marks 40 years of community leadership and renewal*

This year, Lake Lawrence celebrates a milestone — the 40th anniversary of the Lake Lawrence Lake Management District (LMD), the oldest and longest-running LMD in Washington state. What began in 1985 as a community-driven effort to protect the lake has grown into a model of long-term stewardship and partnership.

The March 12, 2026, vote by LMD rate payers, with 89% voting in favor, overwhelmingly supported the renewal of the LMD for another 35 years and ensures that this work will continue through our 75th anniversary in 2061. This renewal reflects a shared commitment — from lake residents to county and state partners — to safeguard one of Thurston County's most valued natural resources.

Our history is rooted in leadership and vision. Former county commissioner Karen Frazier recognized the need for lake management districts in 1984 and championed the concept both locally and later as a state senator. Community leaders Tom Fischer, Skip Meredith, Dave Olson and John Gray played essential roles in forming the Lake Lawrence LMD in 1986 and stewarding it for years, setting a solid foundation for decades of progress.

The LMD has evolved through several county departments over the years, finding its best fit under Environmental Health, thanks to the efforts of Commissioners Carolina Mejia and former Commissioner Gary Edwards. This transition has strengthened the LMDs by giving lake residents greater responsibility and direct involvement in management decisions — resulting in more responsive, effective lake protection.

Today, the Lake Lawrence LMD continues to thrive because of dedicated volunteers, an active steering committee, and strong partnerships with Thurston County. Each week, volunteers — including a core group of ten who maintain the county park — put in countless hours to keep the lake clean, healthy and safe.

As we celebrate four decades of progress, we extend our appreciation to the Thurston County Board of County Commissioners for their ongoing support. With this renewed commitment, we look forward to protecting Lake Lawrence for generations to come.

**Barry Halverson, co-Chair,**
**Lake Lawrence Lake Management District**

### *Celebrating Out Back Ceramics & Art Studio*

When a local treasure closes, some business closures are transactions.

# 2026 Toxic Algae Report

4 Feb 2026 – Wildaire Community Park – reported to EH

2 Mar 2026 – Wildaire Community Park – Reported to EH

Test Taken at WDFW Boat Launch – Below threshold

5 Apr 2026 – Lake Point Dr & Wildaire Community Park – Reported to EH

Testing showed only 0.8 ug/L well below warning requirement.

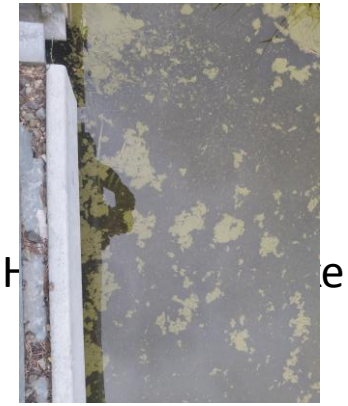
20 Apr 2026 – Wildaire Community Park – Reported to EH

21 Apr 26 - Test Taken at Wildaire Park. Tests showed toxic algae below state guidelines.

5 April 2026 – Wildaire Community Park

# 2026 Toxic Algae Report (cont.)

28 Apr 2026 – WDFW Boat Launch –Reported to EH



5 May 2026 – Samples taken by EH – Results 1.8 ug/L

12 May 2026 – WARNING IMPOSED - Samples taken by EH e
Lawrence near LLCC Little Park – Results 45.9 ug/L
29 May 2026 – WARNING lifted
15 Jun 2026 – WARNING IMPOSED – 16.5 ug/L
13 July 2026 – WARNING lifted

# 2026 LMD Invasive/Nuisance Aquatic Weed Treatment Plan

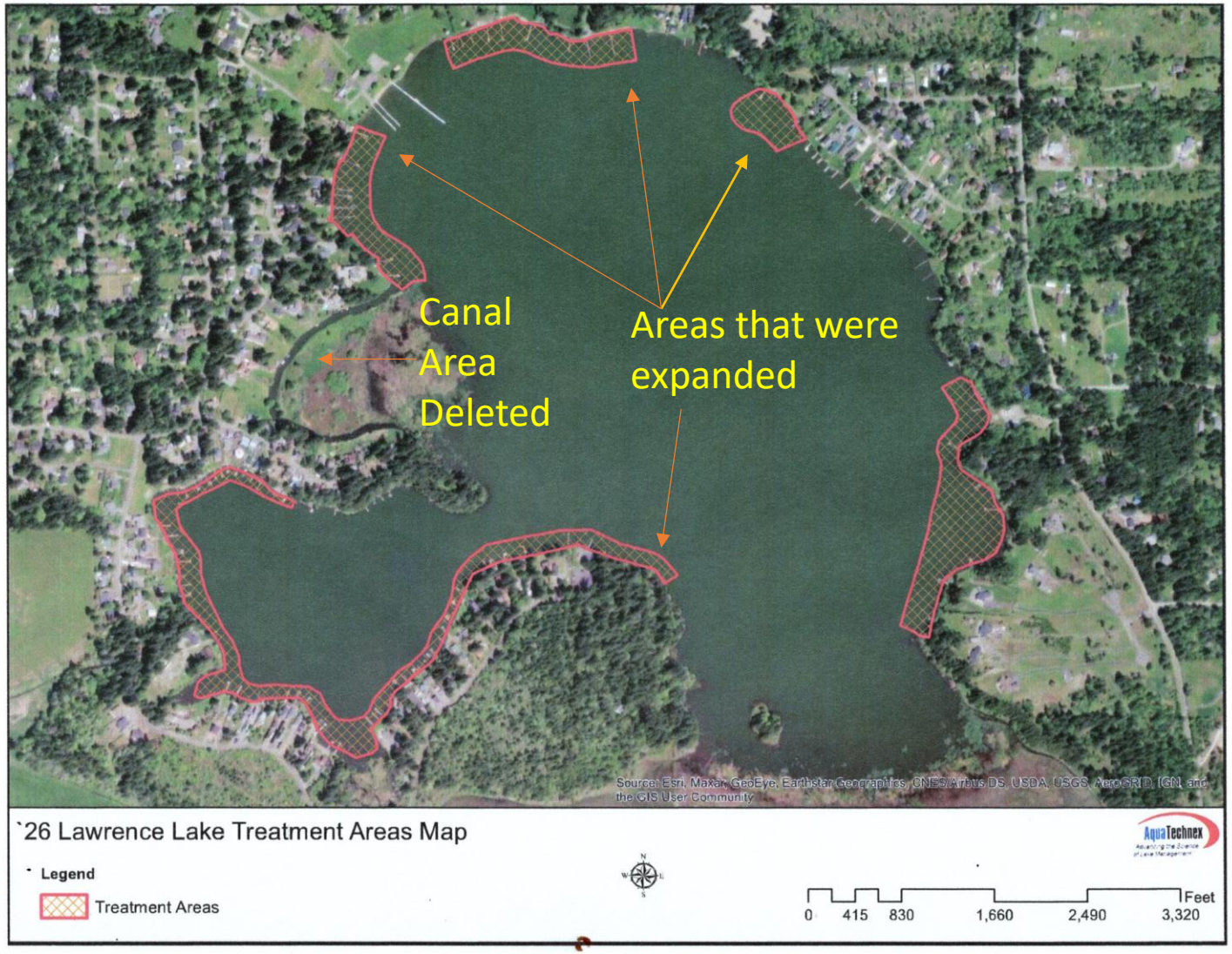
- G • July 2025 – LMD budget $80,000 for 2026 for Invasive/Nuisance Aquatic Weed Control.
- G • 19 August 2025 – Survey Committee & ARS conduct end of year survey to assess type of weeds and density.
- G • October 2025 – Virtual meeting with contractor to discuss 2026 treatment plan – Met with contractor 2 Oct 25. Contractor working on est. for 2026 treatment for weeds and Algae Treatment.
- G • Prior to Feb 2026 - Contractor to provide cost/application recommendations for Spring 2026 treatment of Curly Pondweed. Total area to be treated = ~34 acres. Cost est. = $71,308 includes additional 3 acres.
- G • 31 March 2026 - APAM Notice mailed to lake front residents 10 days prior to any treatment. APAM Notice Cost $271.99. Will be Mailed 31 March 2026/
- G • April – August 2026 - Survey Committee – monthly lake surveys.
- G • Mid-April/May/June (a few weeks earlier than last year) – Treatment of invasive/nuisance aquatic weeds using Sonar One. Recommended by contractor.
  - First Treatment 30 April.
  - Second Treatment 20 May.
  - Third Treatment - 15 June.

G **G = Green = Completed On Time**

Y **Y = Yellow = Late – Program Jeopardized**

R **R = Red = Mission Fail**

# 2026 CURLY PONDWEED TREATMENT MAP




Sonar One 2026
34 Acres
3 applications – three-four weeks apart
First Treatment: 30 April 2026
Second Treatment: 20 May 2026
Third Treatment: 15 June 2026
Cost: ~$71,308 or $2097.29 per acre ($65 per acre more than 2025)

Previous Treatments:
2021 – Sonar One – 25 Acres
2022 – Aquathol K – 33.5 Acres
2023 – No treatment
2024 – Galleon SC – 26 Acres
2025 – Sonar One – 31 Acres red outlined areas
2026 – Sonar One – 34 Acres (Blue = add areas)

# 2026 LMD Yellow Flag Iris Treatment Plan

- G • Oct 2025 – County Noxious Weed confirms treatment ($1,500 cost to LMD & $2,000 cost to County via Grant Funds)
- Jan/Mar – Send out and Receive permission letters for treatment:
  - G • Jan 2, 2026 – Sent out first email to capture permission letters from 24 private parcels
  - G • Jan 26, 2026 – Sent out second email.
  - G • Feb 16, 2026 – Sent out third email.
  - G • Feb 23-27, 2026 – Sent permission letters to PW Noxious Weed
- G • 31 March 2026 – Send out treatment notification cards.
- Y • 12-13 or 19-20 May 2026 NOW 26-27 May – PW Noxious Weed treats YFI. Email from Mike Murphy, Noxious Weed Mgr.
- Cost to LMD $1,500 Approved at 19 Feb 2026 Mtg

G **G = Green = Completed On Time**

Y **Y = Yellow = Late – Program Jeopardized**

R **R = Red = Mission Fail**

# 2026 LMD Fragrant Water Lily Treatment Plan

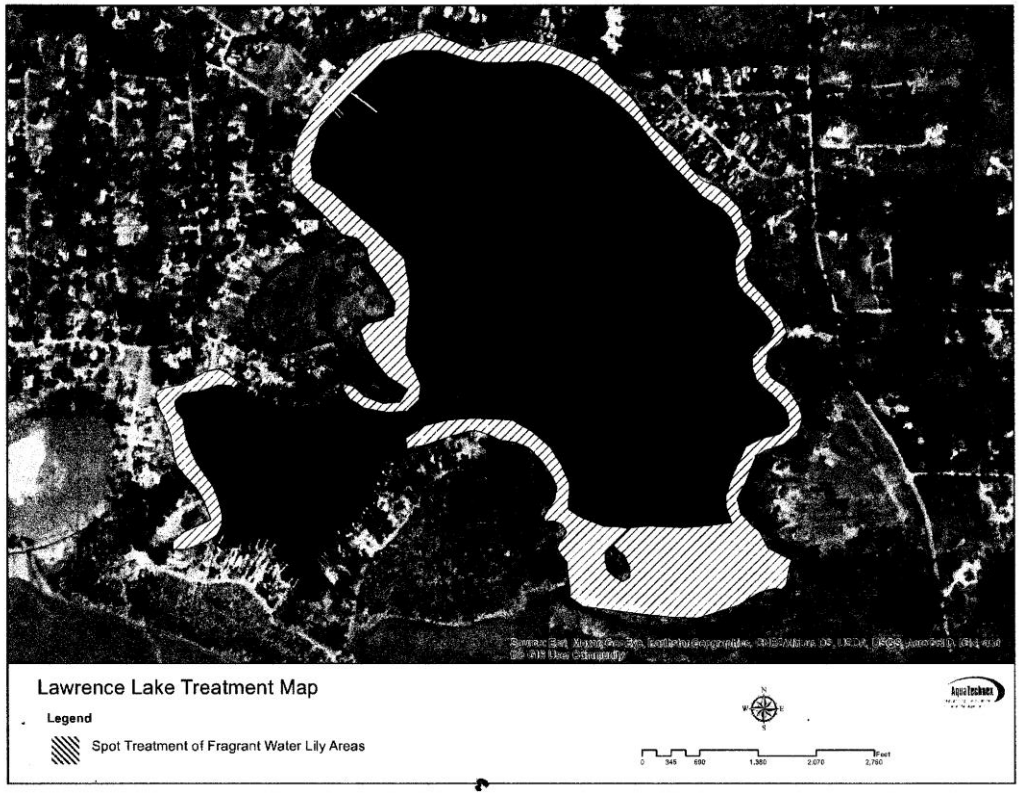
- 15 Jul – 15 Aug – Treatment of Fragrant Water Lily, if required (to be determined in June or July 2026 following lake survey).

2024 Treatment –
2.5 Acres

2025 Treated
Approx 3 Acres

**Treatment Costs:**
**Jul 19 - $1,540**
**Jul 20 - $1,517**
**Jul 22 - $2,373**
**Sep 24 - $2,500**
**Aug 25 –$1,875**

**NO LILY TREATMENT RECOMMENDED FOR 2026**

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Y = Yellow = Late – Program Jeopardized

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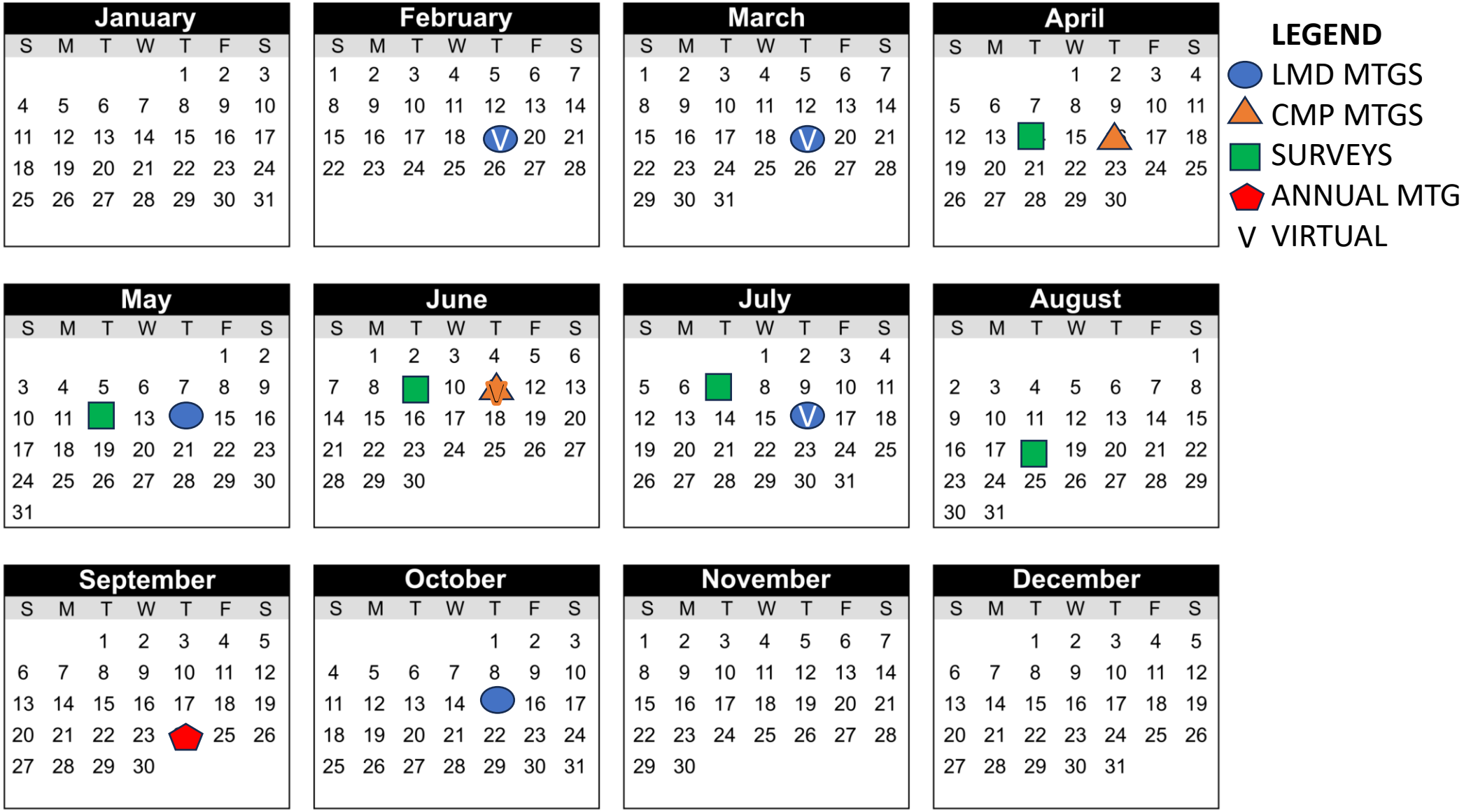
# 2026


January
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February
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March
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13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 31
LEGEND
LMD MTGS
CMP MTGS
SURVEYS
ANNUAL MTG
V VIRTUAL

## 2026 SC Meeting Schedule (6:30-8:30 p.m.):

- Thursday 19 February (Virtual)
- Thursday 19 Mar (Virtual)
- Thursday 14 May (In Person)
- Thursday 16 July (Virtual)
- Thursday 15 Oct (In Person)

## 2026 CMP Meeting Schedule:

- Mtg#4 – Thursday 16 Apr 2026 2 hours Virtual w/All LMD 6:30-8:30 p.m.
- Mtg#5 – Thursday 11 Jun 2026 2 hours virtual w/SC 6:30-8:30 p.m.

## 2026 Survey Schedule – 9 a.m. (3 hours):

- Tuesday 14 Apr
- Tuesday 12 May
- Tuesday 9 June
- Tuesday 7 July
- Tuesday 18 August

## Annual Meeting – 6:30-8:30 p.m.

- Thursday 24 September

# FUNDING FOR LAKE LAWRENCE

Registered for HAB grant webinar - 3/26 -

Registered for SAW - Secure Access Website

Continue working on grant application due Nov 2026

Other Funding Ideas

Non Profit - Individuals and businesses can donate.

Need their own structure - Board of Directors - Bank Acct - Meetings

Letter of Interest Drafted - Vote on distributing?

501c4

Non Profit - Not Tax Deductible Donations (Pattison Lake Association)

501c3

Non Profit - Tax Deductible Donations i.e: Friends of Lake Lawrence

# GRANT FUNDING UPDATE

- Kim Farnes
- Objective – to obtain one grant a year beginning in 2027.
- Grant Opportunities:
  - 1 Oct 2026 - $50,000 Grant for Freshwater Algae Control Grant Program for Fiscal Year 2028. Fund Manager: Joseph Teresi, Aquatic Invasive & Algae Control Grants Manager, Dept of Ecology, joseph.teresi@ecy.wa.gov
    - Cyanobacteria control and management
  - Storm Water Drainage & Erosion Control (LLCC HOA Park/Wildaire HOA Park & Drainage)
  - Habitat Restoration Goat Island/County Park/HOA Parks
  - Water quality monitoring equipment (Secchi Disk/Kemmerer Gauge/Water Quality Sonde w/4 Probes & 50FT Cable – same one as used by Thurston County Environmental Health) – John Haberline john.haberline@co.Thurston.wa.us
  - Water quality testing equipment
  - Locating and capturing phosphorus output at lake vents (springs) to determine actual amount of "P" coming into lake through these springs.
  - Federal Grants EPA Grants under Clean Water Act – to fund OST Costs

# September 24, 2026, Annual Meeting

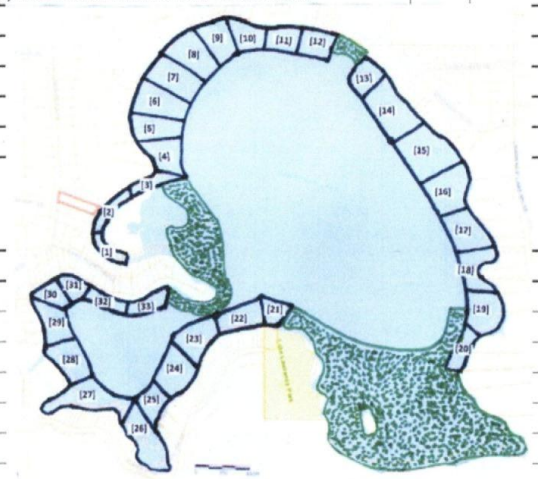
- Guest Speaker: Kevin Hansen, Thurston County Hydrologist
- Talking Points:
  - Hydrology of Lake Lawrence and surrounding area
  - Aquifers in and around area and how they impact our lake
  - Soil composition around Lake Lawrence and how that impacts septic system flow into the lake
  - Test results from local wells/public wells/water systems, what those tests show (Phosphates, etc.) in the water that may impact water quality at the lake
  - Recycle time for lake water

# NEW BUSINESS

# 11 June 2026 - SURVEY RESULTS

**LAKE LAWRENCE SURVEY SHEET**

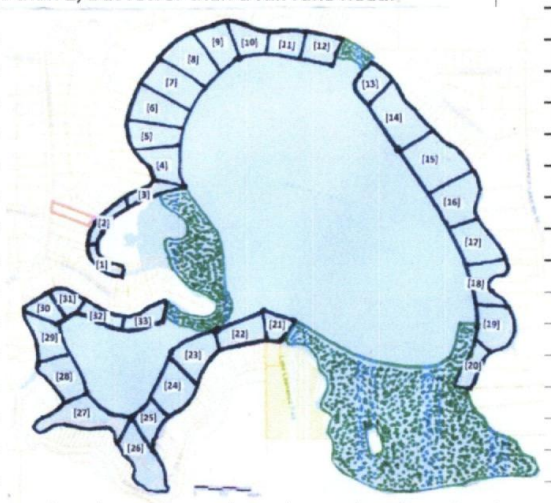
| DATE: | 11-Jun-26 | | | | | | COLLECTOR(S): | | Barry, Jim, Ken, Terry, and Janice | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Air Temp: 60-70 | Water Surface Temp: | | 65 | | Weather: | | Sunny | | | | | | | | | |
| AVAS | Rake Pull | Geographic Location | Lat/Long | Depth (ft) | Water-Nymph | Nitella | Common Elodea | Narrow-Leaf | Curly | Big Leaf | Floating Leaf | Tape Grass | Coontail | Sago | Eel Grass | FWL | YFI | Geese A/G |
| | | A summary of the survey is provided below. Detailed survey results by AVAS are shown on subsequent pages. | | | | | | | | | | | | | | | | |
| RATINGS: | | | | | | | | | | | | | | | | | | |
| | 1 | Few plants in only 1 or a few locations - used to record the fact that a plant or specific species was found. | | | | | | | | | | | | | | | | |
| | 2 | Few plants, but with a wide patchy distribution. Small number of plants on rake head. | | | | | | | | | | | | | | | | |
| | 3 | Plants growing in large patches, codominant with other plants. More plants than 2, but fewer than a full rake head. | | | | | | | | | | | | | | | | |
| | 4 | Plants in nearly monospecific patches, dominate. Full rake head. | | | | | | | | | | | | | | | | |
| | 5 | Thick growth covering area. Plants falling off rake head. | | | | | | | | | | | | | | | | |
| NOTES: | | | | | | | | | | | | | | | | | | |
| 1 | 72 Adult and 14 Juvinile Geese | | | | | | | | | | | | | | | | | |
| 2 | YFI - Many parcels around the lake that are not scheduled for treatment have active YFI. Homeowners are responsible for ensuring the YFI stems/seed pods are cut off and/or the plant is removed. | | | | | | | | | | | | | | | | | |
| 3 | Water Nymph levels 1-4 in AVAS areas 1-6, 8-10, 12-13, 15-18,20-25, and 28-33 | | | | | | | | | | | | | | | | | |
| 4 | Common Elodea level 1 in AVAS areas 17 and 33 | | | | | | | | | | | | | | | | | |
| 5 | Narrow-Leaf levels 1-4 in AVAS areas 1-8, 10, 14, 16-20, 22-24, and 29 | | | | | | | | | | | | | | | | | |
| 6 | Big Leaf levels 1-4 in AVAS areas 17-22, 32-33 | | | | | | | | | | | | | | | | | |
| 7 | Tape Grass 1-2 in AVAS areas 5, 8, 17, 19, 22-23 | | | | | | | | | | | | | | | | | |
| 8 | Eel Grass 1-3 in AVAS areas 17, 19-20, 22, 24-24-25, 28, and 32 | | | | | | | | | | | | | | | | | |
| 9 | Frangrant Water Lily 1-3 in AVAS areas 5-6, 8-22, and 27 | | | | | | | | | | | | | | | | | |
| 1 | 1 | Magnuson House | | 3 | | | | 3 | | | | | | | 3 | | | |
| | 2 | Light Blue Austin House | | 3 | 3 | | | | | | | | | | 2 | | | |



# 7 July 2026 - SURVEY RESULTS

**LAKE LAWRENCE SURVEY SHEET**

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DATE:** | **7-Jul-26** | | | | | **COLLECTOR(S):** | | **Barry, Frank, Ken, Terry, Jim, Steven** | | | | | | | | | | |
| | | **Air Temp: 65-70** | **Water Surface Temp:** | | **68** | **Weather:** | | **Sunny** | | | | | | | | | | |
| **AVAS** | **Rake Pull** | **Geographic Location** | **Lat/Long** | **Depth (ft)** | **Water- Nymph ; Nitella; Stonewort, Microalgae** | **Common Elodea** | **Narrow - Leaf** | **Curly** | **Big Leaf** | **Floating Leaf** | **Tape Grass** | **Coontail** | **Sago** | **Eel Grass** | **FWL** | **YFI** | **Geese A/G** | |
| | | **A summary of the survey is provided below. Detailed survey results by AVAS are shown on subsequent pages.** | | | | | | | | | | | | | | | | |
| **RATINGS:** | | | | | | | | | | | | | | | | | | |
| | 1 | Few plants in only 1 or a few locations - used to record the fact that a plant or specific species was found. | | | | | | | | | | | | | | | | |
| | 2 | Few plants, but with a wide patchy distribution. Small number of plants on rake head. | | | | | | | | | | | | | | | | |
| | 3 | Plants growing in large patches, codominant with other plants. More plants than 2, but fewer than a full rake head. | | | | | | | | | | | | | | | | |
| | 4 | Plants in nearly monospecific patches, dominate. Full rake head. | | | | | | | | | | | | | | | | |
| | 5 | Thick growth covering area. Plants falling off rake head. | | | | | | | | | | | | | | | | |
| **NOTES:** | | Water Clarity was good - no algae - some filamental - Water depths were not taken | | | | | | | | | | | | | | | | |
| **1** | | 89 Geese counted - mitgrating geese are starting to show up | | | | | | | | | | | | | | | | |
| **2** | | Microalgae;Nitella; Water Nymph.Stonewart levels 1-5 in AVAS areas 1-6, 8-10, | | | | | | | | | | | | | | | | |
| | | 12-13, 15-18, 20-25, and 28-31 | | | | | | | | | | | | | | | | |
| **3** | | Common Elodea levels 1 in AVAS areas 17, 23, and 33 | | | | | | | | | | | | | | | | |
| **4** | | Narrow-Leaf levels 1-5 in AVAS areas 1-10, 13-14, 16-20, 22-25, 28-30 | | | | | | | | | | | | | | | | |
| | | Plants were dying (turning brown) in all areas treated with Sonar | | | | | | | | | | | | | | | | |
| **5** | | Curly Pondweed level 2 in AVAS area 2 | | | | | | | | | | | | | | | | |
| **6** | | Big Leaf levels 1-5 in AVAS areas 17-22, 28, 32-33 | | | | | | | | | | | | | | | | |
| **7** | | Tape Grass levels 1-4 in AVAS areas 1-11, 13, 16-17, 19-20, 22-25, 28, and 33 | | | | | | | | | | | | | | | | |
| **8** | | Eel Grass levels 1-4 in AVAS areas 1-2, 17-20, 22, 26-28, and 32 | | | | | | | | | | | | | | | | |
| **9** | | Frangrant Water Lily levels 1-4 in AVAS areas 1, 3-5, 8-9, 11-13, 15,19, 21-22,24-25, | | | | | | | | | | | | | | | | |
| | | 27, and 32 Fragrant Water Lily was showing signs of stress in areas treated w/Sonar | | | | | | | | | | | | | | | | |



# Phosphorus RFP

- At County for review.
- LMD SC approval 16 July 2026:
  - Approved____
  - Disapprove____

- BoCC Approval 21 July 2026
- Notice published in paper
- Bid solicitation (6 weeks)
- Bid Review by SC Committee (Kim Nelson, Frank Hudik, Janice Leitzke)?
- Bid Review sent to County for review
- Contractor selected
- Negotiation with contractor
- Contract signed
- Contract goes into effect 1 January 2027


**G = Green = Completed On Time**


**Y = Yellow = Late – Program Jeopardized**


**R = Red = Mission Fail**

**Enclosure 1 – Proposed 2027 & 2028 Budgets**

| | 2027 | 2028 |
|---|---|---|
| **REVENUE** | | |
| Operating Assessment Charges | $ 191,500 | $ 191,500 |
| Other - Interest, penalties, etc. | 8,500 | 8,500 |
| **TOTAL REVENUE** | **200,000** | **200,000** |
| **EXPENSES** | | |
| **Professional Services** | | |
| Aquatic Weed Treatment | $ 70,000 | $ 70,000 |
| White Fragrant Water Lily Treatment | 4,500 | 4,500 |
| Yellow Flag Iris Treatment | 1,500 | 1,500 |
| Cyanobacteria/Algae Treatment | 350,000 | 120,000 |
| Nutrient Testing | 5,000 | 5,000 |
| Advertising | 300 | 300 |
| **Total Professional Services** | **431,300** | **201,300** |
| **County Administrative Rate at 5%** | **10,000** | **10,000** |
| **Miscellaneous** | | |
| Annual Member Meeting | 500 | 500 |
| Website | 180 | 180 |
| **Total Miscellaneous** | **680** | **680** |
| **Supplies and Operating Expenses** | | |
| Office Supplies | 125 | 125 |
| Lake Survey Costs | - | - |
| Tools & Equipment | 1,000 | 1,000 |
| **Total Supplies & Operating Expenses** | **1,125** | **1,125** |
| **Communication Expense** | | |
| Annual Education Postcards | 710 | 710 |
| Weed Treatment Notifications Cards | 600 | 600 |
| Meeting Room Rental (Community Club) | 60 | 60 |
| **Total Communication Expense** | **1,370** | **1,370** |
| **TOTAL EXPENSES** | **444,475** | **214,475** |
| **NET (Revenue-Expenses)** | ***$ (244,475)*** | ***$ (14,475)*** |
| | | |
| Estimated Beginning Fund Balance | 475,000 | 230,525 |
| **Estimated Ending Fund Balance** | **$ 230,525** | **$ 216,050** |

# 2027-2028 Bi-Annual Budget

- G • Draft Budget compiled by SC Budget & SC Chair
- G • 6 July 2026 Draft Budget emailed to all SC members for review
- Draft Budget approved by SC 16 July 2026
  - Approve:_____
  - Disapprove:___
- Bi-Annual Budget submitted to County EH 30 July 2026
- County EH/Budget Lead review/approve budget
- County EH/Budget Lead submit bi-annual budget to County for approval.
- Nov/Dec 2026 – BoCC approves bi-annual budget_

G = Green = Completed On Time

Y = Yellow = Late – Program Jeopardized

R = Red = Mission Fail

# Other Business

- Good of the Order
  - 27 May 2026 – **5,000 Rainbow** stocked in lake.
  - 1 June 2026 – Briefed Commissioner Grant on our CMP Plan and Senate Bill S3518.1.
  - 6 June 2026 – Updated Wildaire HOA members on LMD activities at Annual Mtg. (18 present).
  - 10 June 2026 – Briefed Commissioner Fournier on CMP Plan and Senate Bill.
  - 20 June 2026 – Updated LLCC HOA members on LMD activities at Annual Mtg.
  - 29 June 2026 – Briefed Commissioner Mejia on CMP Plan and Senate Bill.

# Other Business

- Meeting has been scheduled for 20 July, 10 a.m. with Commissioner Clouse to brief her on CMP & RCW36.61 Bill
- Meeting has been requested with Commissioner Menser
- Seminars/Webinars

# BACKUP SLIDES

# Volunteer Hour Calculations

This website provides a calculator to figure the worth of volunteers in all 50 states.  In 2026 Washington States hourly rate for a volunteer was $41.70.

- https://www.serve.love/blog/calculate-volunteer-value-grant-applications/

# In Lake Management Techniques

(DRAFT Herrera CMP Study 2026)

It is important to recognize that any lake management technique aimed at controlling algae, if successful, is likely to impact aquatic macrophyte populations. The clearer water means more sunlight for plant growth. Since most plants obtain their nutrients from the sediments rather than the water, lake nutrient reduction techniques typically do not impact them. Although phosphorus inactivation methods reduce nutrient availability in sediments where most aquatic macrophytes obtain nutrients, macrophyte roots typically penetrate below the inactivation zone (upper 10 centimeters) and are not affected by inactivation treatments. **Lake management should focus on achieving the appropriate ecological balance between algae and plants, since too much of either can be problematic.**

# In Lake Management Techniques (Cont)

(DRAFT Herrera CMP Study 2026)

- **Iron Application**
  - Iron (Fe) amendments are used to reduce internal phosphorus (P) loading by increasing the capacity of sediments (and, in some cases, the water column) to bind phosphate. Iron can be applied as iron salts (e.g., ferric chloride, ferrous chloride, ferric/ferrous sulfate) or as iron-bearing solids (including iron oxyhydroxides and zero-valent iron [ZVI]). **Following application, phosphate can be removed from the water column through adsorption and co-precipitation with iron (oxyhydr)oxides and subsequently retained in surface sediments**, where iron can function as a dynamic P "trap" under appropriate geochemical conditions. Under anoxic, low sulfur conditions, phosphorus can be retained in association with ferrous iron as vivianite, which can act as a longer-term P sink. These processes are highly sensitive to sulfur cycling and redox dynamics.
  - A synthesis of iron-addition restoration studies in shallow lakes found that most evaluated applications increased P retention, and field studies commonly reported reduced water column chlorophyll responses without observed toxic effects, while emphasizing that outcomes depend strongly on lake-specific conditions (Bakker et al. 2016). Across systems, iron addition was most successful when external P loading was low and when sediment organic matter, sulfate, and sediment disturbance by fish/crayfish were also relatively low.
  - Field evidence indicates that sulfate reduction can divert added iron away from phosphate binding by promoting Fe-sulfide formation, reducing the iron available for P retention. In a comparative field study of two urban lakes (Heinrich et al. 2022), added iron was preserved in sediments in both systems, but phosphorus retention improved in one lake while sulfur was retained by excess iron in the other; the authors attributed the contrast to differing sulfate reduction rates and concluded that planning for iron amendments should explicitly consider the competing process of iron sulfide formation and may require additional iron to account for it.
  - ZVI is a form of iron typically used in soil and groundwater remediation efforts to bind chemical contaminants by transferring an electron to a contaminant compound. Contaminants in groundwater that have been inactivated by ZVI include petroleum hydrocarbons, pesticides, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and nitrates. These results support ZVI's capacity to bind phosphate under controlled conditions, but translating engineered-system performance to open-water lake settings requires site-specific testing and monitoring.

# In Lake Management Techniques (Cont)

(DRAFT Herrera CMP Study 2026)

## Iron (ZVI) Treatment

- ***Advantages***
  - Can enhance retention of dissolved phosphate and reduce internal P loading when lake chemistry supports durable Fe–P retention pathways.
  - Potential for formation of redox-stable Fe(II)–P minerals (e.g., vivianite) under favorable (low sulfur) conditions.
  - Not expected to have environmental impacts at anticipated dosage
- ***Disadvantages***
  - Phosphorus bound to iron in lakes and reservoirs can be resuspended due to dissolution in anoxic conditions
  - Effectiveness can be reduced where sulfate reduction drives Fe-sulfide formation, diverting iron from phosphate binding.
  - In organic matter-rich, frequently mixed, and intermittently anoxic systems, iron addition can yield only short-term improvements and may be followed by intensified seasonal P release
  - Limited effectiveness when watershed load is dominant. Not applicable in our case.

# In Lake Management Techniques (Cont)

(DRAFT Herrera CMP Study 2026)

## Iron (ZVI) Treatment

- ***Suitability for Lake Lawrence***
  - Iron/ZVI is not rejected for Lake Lawrence but, at this time, is best suited for pilot-scale testing. The lake develops low-oxygen/anoxic conditions at the sediment–water interface during summer, which is a critical constraint for iron-based sequestration strategies. In such settings, the long-term success of iron (including ZVI) depends on whether the system favors durable Fe–P retention (including vivianite formation) without substantial diversion of iron into sulfide phases. Given these uncertainties, iron/**ZVI is best characterized as an experimental or pilot-scale option for Lake Lawrence unless additional site-specific sediment and sediment-water-interface chemistry and bench/pilot testing indicate favorable sulfur and organic matter controls and a practical pathway to sustain iron-mediated P retention.**
- ***Planning Level Costs***
  - $12k+ Testing Costs – fewer tests required.
  - $875k for full reset or $190-225k partial reset treatment.
  - Partial reset may require additional treatments over time to reach management goals.

# In Lake Management Techniques (Cont)

(DRAFT Herrera CMP Study 2026)

**Hypolimnetic Oxygenation and Aeration**

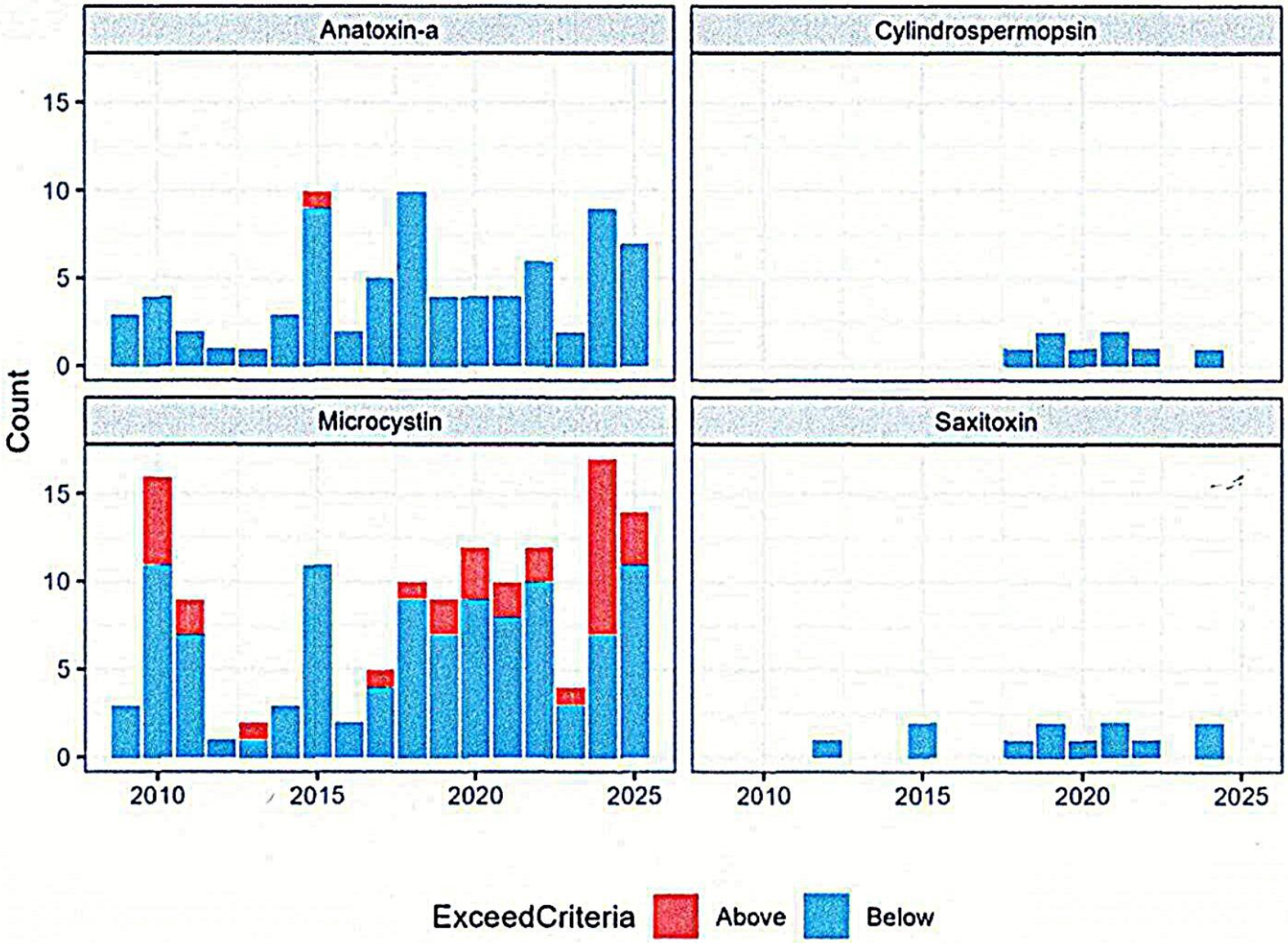
- **Advantages**
  - Reduces phosphorus release from anoxic sediments
  - Increases deep water oxygen, improves fish habitat and aquatic life uses
  - Degrades organic matter and cyanotoxins faster by using aerobic microbes
  - Is a non-chemical alternative
  - In addition to these advantages, new oxygen saturation technology (OST) pumping oxygenated water to and from hypolimnion is very promising for small lakes and is cheaper than traditional oxygenation systems.
- **Disadvantages**
  - May potentially resuspend sediment layer nutrients/ions in the water column
  - Causes sedimentation of organic matter
  - Requires installation and operational cost (electricity/regular maintenance) ~$85k a year
  - May require continuous operation
  - Can be ineffective when external nutrients are not controlled

# In Lake Management Techniques (Cont)

(DRAFT Herrera CMP Study 2026)

**Hypolimnetic Oxygenation and Aeration**

- **Suitability for Lake Lawrence**
  - Hypolimnetic oxygenation is a suitable management technique for Lake Lawrence. The lake maintains seasonal stratification despite its relatively shallow depth (~6 m), allowing hypolimnetic anoxia to develop and drive internal phosphorus loading. Because external nutrient inputs are minimal, addressing internal loading is critical for improving water quality. Oxygenation directly targets this mechanism by maintaining oxic conditions at the sediment–water interface, thereby limiting phosphorus release. As a result, it has strong potential to reduce nutrient availability in the water column and mitigate cyanobacteria blooms. Given the lake's size and depth, OST may be particularly well suited, as it can efficiently deliver oxygen to the hypolimnion without disrupting stratification.
  - While effective, this approach requires significant upfront investment for design, permitting, and construction. HOS systems also require continuous power and maintenance, and may require one-time or ongoing treatments of supplemental iron to the lake to sustain phosphorus binding. Land may need to be acquired for placement and construction of the onshore facility, plus addition of a three-phase electrical supply to sufficiently power the facility and device.
- **Planning Level Costs**
  - Planning level costs for implementation of an HOS device in Lake Lawrence are based on the ongoing installation of an OST device in Spanaway Lake since the lake size is similar to Lake Lawrence (hypolimnetic volumes of ~ 2,500 and 2,700 acre-feet, respectively). Installing an HOS device in Lake Lawrence is expected to cost approximately $220,000 to design and $2.2 million to construct (including taxes and contingency costs). We recommend two manufacturer maintenance visits per year: one pre-season in April and one mid-season in August. This maintenance plan and annual operation costs are estimated at approximately $22,000 per year. Altogether, HOS in Lake Lawrence will cost approximately $2.6 million over 10 years, not including permitting costs to be completed by the contractor and Thurston County. Replacement parts range up to $1,800 and emergency repairs outside of warranty service are billed at $250 per hour; these incidental costs are not included in the above estimate.




| Year | Days with Warning or Danger |
|---|---|
| 2010 | 59 |
| 2011 | 35 |
| 2012 | 0 |
| 2013 | 16 |
| 2014 | 0 |
| 2015 | 35 |
| 2016 | 0 |
| 2017 | 13 |
| 2018 | 13 |
| 2019 | 19 |
| 2020 | 35 |
| 2021 | 29 |
| 2022 | 19 |
| 2023 | 13 |
| 2024 | **147** (includes blooms going through Feb 2025) |
| 2025 | 28 |