

Appendix A. Citizen Science Training Guide

Collection of Lake Water and Tap Water Samples for Tenmile Lakes HABS Project

Thank you for participation in this project! **Our aim is to collect samples to test for a range of algal toxins both during times of no visible blooms and during visible blooms to understand better the risk to your household and the larger community. We also hope to ascertain how well treatment systems are currently functioning to remove any present algal toxins from tap water.** *We do recommend that you use an alternate source of water (bottled) during the time any blooms are present for drinking, especially if you have not tested your tap water for HABS toxins, previously.*

Supplies needed/provided:

- Two 5- gallon mixing buckets for duration of project, pre-labelled “lake water” and “tap water”
- 50 mL conical tubes, 8 for each sampling event (4 for lake water, 4 for tap water)
- 250 mL collection bottles for back up samples (2 for each sampling event, 1 lake, 1 tap)
- Sharpies, Parafilm, 1-gallon Ziplock Bags for delivering pooled samples to Mader
- 50 mL conical tube stand for freezing purposes, cooler bag for sample delivery.
- Reusable rubber gloves
- Note pad, pen
- Means to take photos (not provided)

Prior to collecting samples:

- Determine approximately how long it takes water to move through your treatment system from entrance point to spigot/tap. If your system has a manual, it may give an estimate based on usage.
- Need to know tank size and approximate water usage per day or flow rate.

Sampling Frequency :

- Monthly for the weeks of March 27th, April 24th, May 22nd
- Every 2 weeks thereafter, week of June 5th, June 19th, July 3rd, July 17th, July 31st, August 14th, August 28th, September 11th, September 25th, October 9th, October 23rd, then Nov 6th ; then December 4th
- Outside these dates, sample if you notice a particularly concerning bloom at your intake and would like lake and household water tested. Please note duration of blooms and document with any photos. Be sure to include location ID and date.

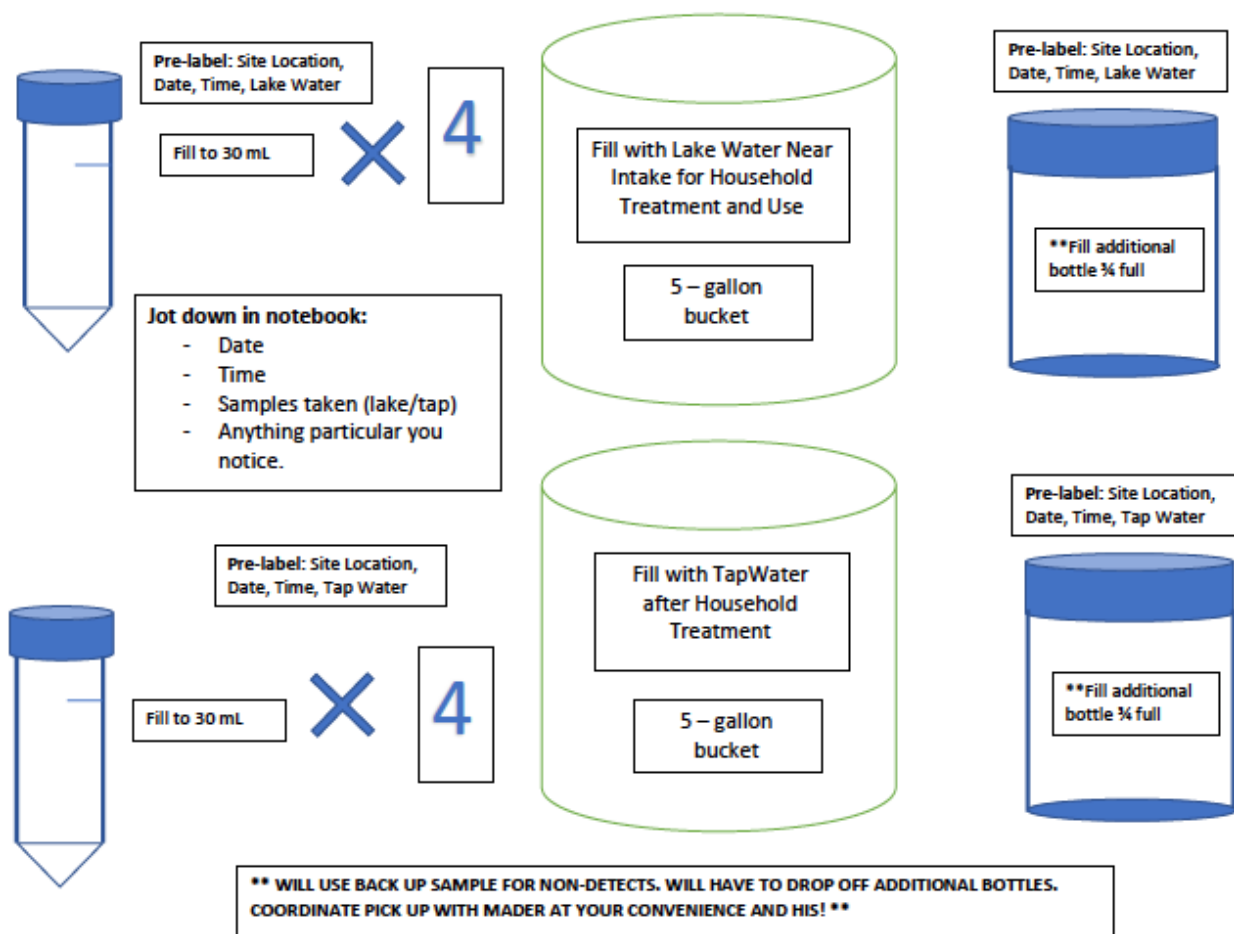
For Sampling Event:

- Note date and time of sampling in the notebook. Please make any other additional comments you would like to add about appearance, odor, taste of water or general lake water quality in general.
- Take a photo of intake site and water, at least once initially, and then for subsequent dates where you are concerned. E-mail or text the photo to tenmile.wsc@gmail.com or algaeamber@gmail.com or 202-744-8580, with the date, time, and location ID.
- Collect “lake water” 5-gallon bucket full of water from where your systems pulls water from the lake.
- Label 4 conical tubes with the following: location ID, date and time collected, and “lake water.”
- Label 125 mL bottle with following: location ID, date and time collected, and “lake water.”

- Fill each of the labeled conical tubes to 30 mL mark with mixed water in bucket; Fill bottle $\frac{3}{4}$ full.
NOTE: do not overfill conical tubes or bottle as will break during freezing !
- Firmly close conical tubes and wrap with parafilm to seal closed, and freeze standing up in conical tray.
- **WAIT DESIGNATED TIME PERIOD FOR YOUR SYSTEM BASED ON MANUFACTURER SPECIFICATIONS**
- Repeat process for tap water as for lake water: 1) Collect “household water” in 5- gallon buck from tap. 2) Label 4 conical tubes and 1 bottle with the following: location ID, date and time collected, and “household water.” 3) Fill each of the labeled conical tubes to 30 mL mark with mixed water in bucket, and fill 1 bottle $\frac{3}{4}$ full. 4) Firmly close conical tubes and wrap to seal closed, and freeze standing up in conical tray.
- **Deliver conical tubes and bottles to TBLP (attn: Mike Mader) for temporary storage on a monthly basis.** Team project members will pick up divide portion for shipment to analytical lab in Milwaukee by HPLC-Mass Spec. and back up samples to remain in Oregon for ELISA- based methods.

Figure A1. Flow Chart Provided to Citizen Science Trainees

Collection during week of: March 27th, April 24th, May 22nd, June 5th, June 19th, July 3rd, July 17th, July 31st, August 14th, August 28th, September 11th, September 25th, October 9th, October 23rd, Nov 6th, December 4th



Appendix B.
Citizen Scientist Household Water Treatment Systems and Lake Water Uses

Table B1. March 2023 Citizen Scientist Household Information: Private Water Treatment Systems and Lake Water Uses

Site #	Household Treatment System	Does the household utilize lake water for the following purposes:				
		Drinking?	Bathing?	Garden?	Pets?	Livestock?
1	Sand filter to a carbon filter to a ultraviolet treatment to a carbon filter ^a	Yes	Yes	Yes	Yes	Yes
2	Well water, 140 ft deep, no treatment	No (uses well)	No (uses well)	No (uses well)	No (uses well)	No (uses well)
3	50 um sediment filter	No	Yes	Yes	No	No
6	Chlorine to sand to carbon to particulate filter	No	Yes	Yes	No	No
7	Particulate filter then through ultraviolet system	Yes	Yes	No	Yes	No
9	Sediment filter to carbon filter to ultraviolet ^b	Yes	Yes	Yes	Yes	No
10	Chlorine (Chem-Feed injector), holding tank, sand, carbon charcoal filter, another tank, ceramic candle	Yes	Yes	Yes	Yes	Yes
11	Gravel/zeolite filtration then gravel/carbon filtration, then 1-micron filter, holding tank, then ultraviolet ^c	No	Yes	Yes	Yes	No

Note. Eight of 11 households who agreed to participate in citizen scientist program attended the March 2023 training. Household sites numbers 4, 5, and 8 were unable to participate in the training and so did not provide information about their treatment systems or lake water uses. Household intake systems draw water from the top 1-3 feet of the lake. ^a During visible cyanoHABs, this household employs a second carbon filter. ^b During visible cyanoHABs, this household adds bromine tablets at filtration steps. ^c During visible cyanoHABs, this household adds chlorine to holding tank prior to ultraviolet system.

Appendix C.
Survey Questionnaire for Harmful Algal Blooms at Tenmile Lakes, Oregon

Demographic Information

1. How many years have you lived on the lake?

- 1 – 5
- 6 – 10
- 11 – 15
- more than 16 years

2. Are you a full time or part time resident?

- full time
- part time

3. Do you have road access at your lake residence?

- Yes
- No

4. Do you have pets?

- Dogs
- Cats
- Livestock (*please circle one: small or large*)

Please elaborate as you see fit:

5. Are you or anyone in your household on the lake either of the following?

- Veteran
- Tribal member

6. What is the age range of your household?

_____ years to _____ years.

Water Treatment and Use

7. What is your source of water for your house?

- Lake water
- Surface water (spring, stream)
- Well water
- Rain
- Bottle
- City water

8. Do you use lake water for any of the following?

- Drinking
- Bathing
- Garden
- Pets
- Livestock

9. Is the lake tap filtered or treated?

- Yes
- No

10. If you know what type of filtration or treatment, you have, please check all of the following that apply:

- Particulate
- Carbon
- Resin
- Ultra Violet
- Reverse Osmosis
- Ozone
- Chlorine
- Bromide
- Sand
- Other _____

11. How concerned are you about drinking water from the lake?

- Overly
- Very much
- Fairly
- Not really

12. How concerned are you about the lake water quality for your outdoor activities?

- Overly
- Very much
- Fairly
- Not really

13. Lake activities that your household participates in include (check all that apply):

- Boating
- Water Sports
- Fishing
- Swimming
- Hunting
- Other _____

Lake Health and Notices

14. Have you noticed signs posted around the lake regarding health advisories?

- Yes
- No

15. Are you aware when algae blooms occur in the lake?

- Yes
- No

16. Is there adequate information through the local media, radio and signage regarding potentially dangerous algae blooms on the lake?

- Yes
- No

Please elaborate as you see fit:

If there is anything you would like to add regarding the lakes and water quality, please do so:

Impact on Local Economy

17. Did water quality or the harmful algae blooms affect your decision to come to the Tenmile Lakes area?

Yes

No Please elaborate as you see fit: _____

18. If you have a business in the area, do the harmful algae blooms have an effect on your business client traffic?

Yes

No Please elaborate as you see fit: _____

19. Do harmful algae blooms cause increased costs for your ability to stay or reside in the area?

Yes

No Please elaborate as you see fit: _____

20. Do harmful algae blooms affect your view of area benefits and recreation?

Yes

No Please elaborate as you see fit: _____

21. Do you have concerns about risks to pets/ livestock due to harmful algae?

Yes

No Please elaborate as you see fit: _____

If you would care to participate in the *Water simple collections* and/or the *Focus group discussions* please contact Mike Mader (Watershed Coordinator) @ 1-541-260-0914 or e-mail Tenmile.wsc@gmail.com or AmberAlgae@gmail.com