

2018 Lake Stewardship Program

APRIL 14TH, 2018

Beaver Lake Lodge



King County

Department of
Natural Resources and Parks
Water and Land Resources Division



The King County
Lake Stewardship Program



Agenda

Time	Activity	Staff
9:40-10:05	Introduction, logistics and program overview	Chris
10:05-10:20	2017 data	Daniel
10:20-10:30	Harmful algal blooms	Rachael
10:30-11:00	Q&A and equipment distribution	All

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2018 MONITORING SCHEDULE



2018 Sampling Schedule	
6-May-18	
20-May-18	Profile
3-Jun-18	
17-Jun-18	
1-Jul-18	
15-Jul-18	
5-Aug-18	
19-Aug-18	Profile
9-Sep-18	
23-Sep-18	
7-Oct-18	
21-Oct-18	

Benefits of the Program

- Volunteers receive information on water quality and watershed management
- Volunteers serve as stewards in outreach to other interested citizens
- More eyes and ears on a lake means changes can be detected more rapidly
- King county provides training, sampling equipment, and technical assistance



Program Overview

- **Level I – Year-round**

- Send in data monthly or quarterly
 - Lake level, precipitation- daily
 - Upgrading to automated lake level and temperature loggers
 - Temperature, clarity, lake usage-weekly

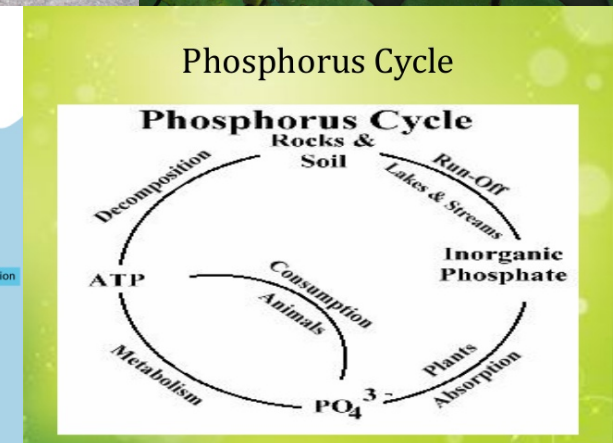
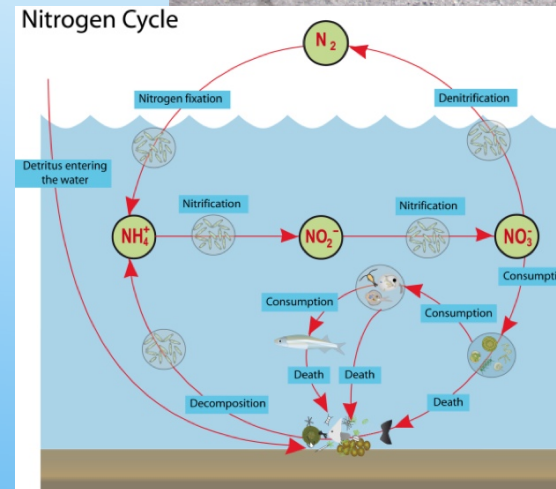
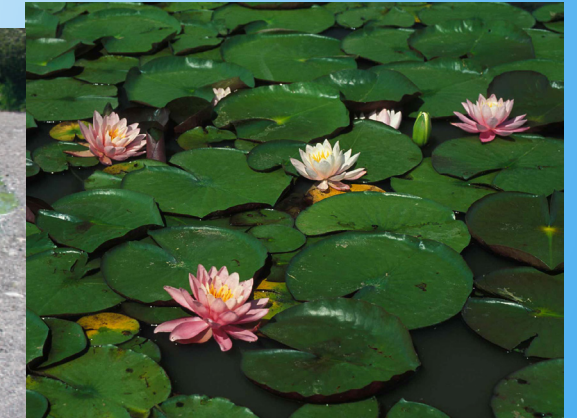
- **Level II – May through October**

- Every other week(ish)
- Volunteers collect samples on Sunday, we pick up and deliver to the lab on Monday
- Lab results ~ 30 days



Level II What We Measure

- **Total Phosphorus (TP):** Essential nutrient for plants and algae; availability can limit growth of algae.
- **Total Nitrogen (TN):** the ratio of TN to TP affects competition among species of algae. When phosphorus concentrations are high, nitrogen may limit algae growth.
- **Chlorophyll a :** estimate of algae biovolume in the water.
- **Phytoplankton:** identifications are made when chlorophyll values are high (only during profiles).



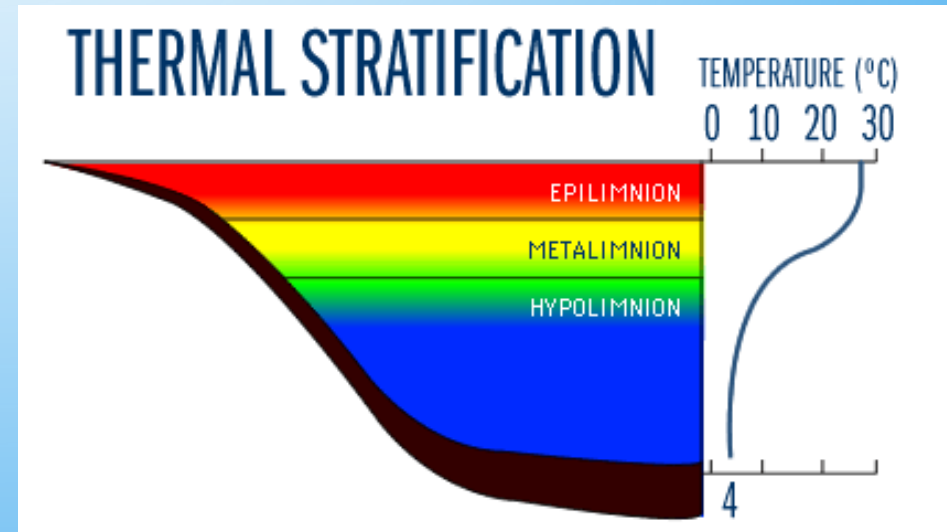
Level II Profile Samples (May 20, Aug 19)

Vertical profiles

Twice a season volunteers collect water samples at 1 meter depth, at 1 meter above the bottom, and for lakes deep enough, midway between the two (regular parameters at each depth.)

Other tests made on profile samples

- Color (1 m only, by UV254 method)
- Orthophosphate
- Nitrite, nitrate
- Ammonia
- Alkalinity (1 m only)



Level II Sampling Equipment

- Secchi simulator website
- [Http://www.MaineLakedata.Org/recertify/disk.php](http://www.MaineLakedata.Org/recertify/disk.php)
- Don't forget to triple rinse bottles(except cyanobacteria bottles).
- Check thermometer for separation
- Let us know if you have any equipment problems
- Please be sure to put bottles in fridge and then on ice for pickup the next day!



2018 Level II Monitoring Data Sheet

PLEASE FILL IN ALL INFORMATION

Volunteer Monitor: _____ Phone: _____

Sample Collected: Sunday / Monday _____ at _____ Lake: Alice
(Circle day) (Date) (24hr Time)

TEMPERATURE 

At one meter: _____ °C (to the nearest 0.5°C)

Profile Sample Events (May 20 and Aug. 19):

at _____ m depth: _____ °C (mid depth)

at _____ m depth: _____ °C (near-bottom depth)

SECCHI DEPTH 

Secchi Depth: _____ m (to nearest 0.10m)

Notes: _____

WEATHER 

- ☐ Sunny ☐ No wind (glassy water)
☐ Partly cloudy ☐ Slight wind (small ripples)
☐ Overcast ☐ Breezy (small wavelets)
☐ Dark clouds ☐ Stormy (waves/whitecaps)
☐ Raining ☐ Rain last 24hr (mm): _____

OPTIONAL GOOSE COUNT 

Greatest number of Canada geese on your lake
at any one time in the last week? _____

Other geese observations? _____

LAKE USE 

Number of boats on lake: _____
 Number of swimmers at lake: _____
 Number of people on shoreline: _____
 Number of people fishing: _____
 Number of dogs in/ around lake: _____

Questions? Please contact
Chris Knutson at 206-477-4739 or
chris.knutson@kingcounty.gov

ALGAE PARTICLE COUNT

Algae at your sampling location: (Circle one)

P1 0-10 particles P2 11-100 particles P3 >100 particles

Notes: _____

Is there algae scum present?

☐ Yes ☐ No

(If yes, mark location on map)

Algae color: _____

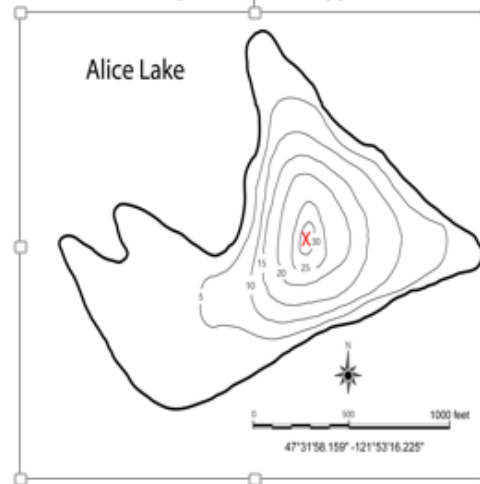
Algal form (scum, clumps, particulate): _____

Algae sample provided?

☐ Yes ☐ No

(If yes, mark location on map)

Wind direction (indicate on map)



Please provide any other information on
the back of this sheet. THANK YOU!

Sample at One Meter

Mid-depth Sample (or 1m Duplicate)

*Do not take a mid-depth sample unless a label
is affixed here. (Profiles: May 20 and Aug. 19)*

Near-bottom Sample

*Do not take a near-bottom sample unless a label
is affixed here. (Profiles: May 20 and Aug. 19)*

SAMPLE NUMBER : P69828-4
 LOCATOR : A764 - EcoProfile
 LOC. DESC. : ECHO LAKE (SHORELINE) MIDLAKE PROFILE
 SITE : MINOR LAKES
 SAMPLE DATE : 07-MAY-2018
 PROJECT : 421195-130
 MATRIX : LK - FRESH WTR
 DEPARTMENT : 3 - Conventinals
 DEPTH-METERS :
 PARAMETERS : CHLA; PHEO; TOTN; TOTP
 PRESRVD WITH : _____

Aquatic Vegetation Concerns

- Some lakes may have robust aquatic plant communities
 - Dependent on many conditions
 - Nutrients
 - Water clarity
 - Bathymetry
 - Species present
 - History of plant control at the lake
- Both native species and invasives can become a “nuisance”
- Several “tools” available to help with control



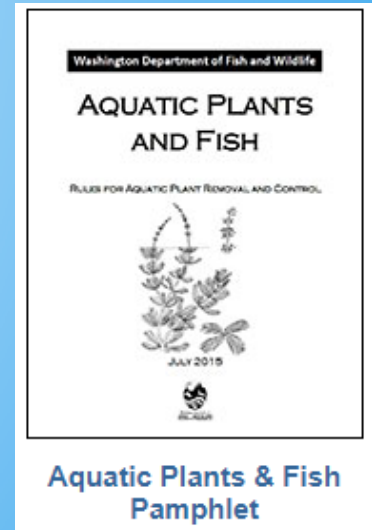
Aquatic Vegetation

- Determine species of concern
 - Online resources
 - Provide a sample for us to identify (if too deep borrow a weed rake)
 - Take photos
 - In and out of water
- Determine extent of vegetation
- Assess appropriate control options



Control Options

- WDFW pamphlet permit
 - Allows some small scale vegetation control
 - Bottom barriers, cutting, pulling, weed rollers etc.
 - Must know species targeted
 - Need to have a hard copy of permit and follow exactly
- Herbicide treatments
 - Require ecology permit
 - Require a sponsor
 - Expensive
 - Can become a contentious issue
 - Must be done by licensed applicator
- Mechanical removal
- Develop an IAVMP
 - Defines a lake wide approach to managing vegetation
 - Become eligible for grants



Miscellaneous Information

- Waiver forms (and the small print)

What to do if ...

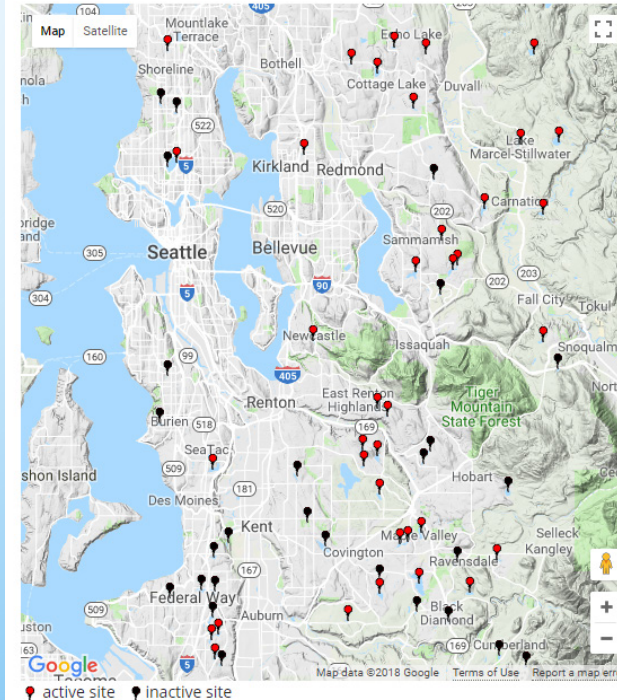
- You can't take a sample on Sunday
- You need to change a pickup time
- Your equipment is broken
- You see something strange or unusual around the lake
- You want to report a problem
- Current contact method and info
- Upcoming lake level logger installation



ONLINE RESOURCES

- Volunteer information and opportunities
 - [Http://www.Kingcounty.Gov/services/environment/water-and-land/lakes/lake-stewardship/volunteer.aspx](http://www.Kingcounty.Gov/services/environment/water-and-land/lakes/lake-stewardship/volunteer.aspx)
 - Or just google “king county lake stewardship volunteer information and opportunities”
 - Volunteer manual
 - These presentations
 - Sampling schedule
- Data
 - [Http://green2.Kingcounty.Gov/smalllakes/default.aspx](http://green2.Kingcounty.Gov/smalllakes/default.aspx)
 - Google “king county small lakes”
- Harmful algal blooms
 - [Www.Nwtoxicalgae.Org](http://www.Nwtoxicalgae.Org)

Welcome to the Lakes Data and Descriptions application! Use this application to search, view, and download water quality data resulting from volunteer monitoring efforts at more than 50 lakes in western King County. Choose a lake by location on the map below or by name on the list next to the map. For a synopsis of data and a discussion of long term trends among all small lakes of western King County, view the current regional assessment on the [reports page](#).



Alice	Leota
Allen	Lucerne
Ames	Marcel
Angle	Margaret
Beaver-1	McDonald
Beaver-2	Meridian
Bitter	Mirror
Boren	Morton
Burien	Neilson (Holm)
Clark	North
Cottage	Panther
Deep	Paradise
Desire	Peterson Pond
Dolloff	Pine
Echo-Shoreline	Pipe
Echo-Snoqualmie	Ravensdale
Fenwick	Retreat
Fivemile	Sawyer
Forbes	Shadow
Francis	Shady
Geneva	Spring
Grass	Star
Green-1	Steel
Green-2	Trout
Haller	Tuck
Hicklin (Hicks/Garrett)	Twelve
Horseshoe	Walker
Jones	Walsh
Joy	Webster
Kathleen	Welcome
Killarney	Wilderness
Langlois	Yellow

If you have question on this site, please contact [Chris Knutson](#) (206) 477-4739 or [Rachael Gravon](#) (206) 477-4845

Washington State Toxic Algae

Freshwater algae bloom monitoring program