

welcome

Weston & SampsonSM

transform your environment

LAKE ELLIS WATERSHED SURVEY



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ATHOL
MASSACHUSETTS

EPA/DEP FUNDED
604b GRANT

2020

LAKE ELLIS LOCUS ATHOL, MASSACHUSETTS

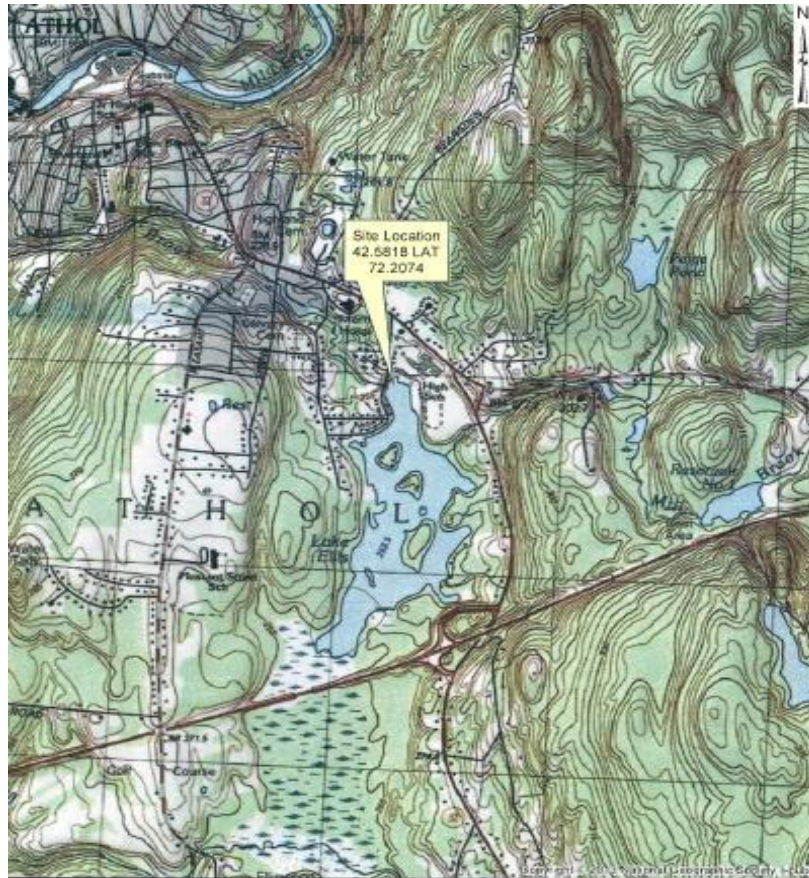


FIGURE 1
Lake Ellis
Athol, Massachusetts

Locus Map



Weston & Sampson

Lake Ellis Watershed Survey

Project Administrator – Eric Smith, Director, Athol Department of Planning & Community Development

Consultant Project Manager – Joe McGinn, Senior Project Manager, Weston & Sampson

QAPP/Evaluations of Alternative Control Measures – Sam Bade, PE, SSV Engineering, Certified MBE

Community Involvement/Coordination – Katherine Robertson, Certified WBE

The Athol/Lake Ellis Community and Stakeholders

Lake Ellis Watershed Survey

Purposes:

- Update the Characterization of the Lake Ellis Watershed
 - Confirm the Watershed Boundary Delineation
 - Update Land Use within the Drainage Area
- Assess Current Water Quality Conditions
- Confirm and Assess Water Quality Impairments
 - Aquatic Weeds
 - Phosphorus levels
 - Other Issues
- Evaluate Measures to Reduce/Eliminate Impairments and Achieve Use Objectives for Lake Ellis

LAKE ELLIS WATERSHED SURVEY SAMPLING PLAN

SAMPLING STATION LOCATIONS

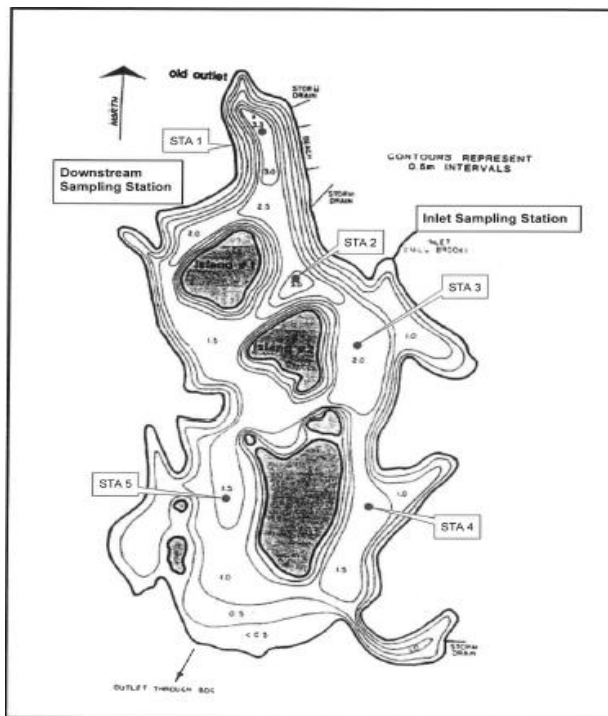


FIGURE 2
Lake Ellis Sampling Plan
Athol, Massachusetts

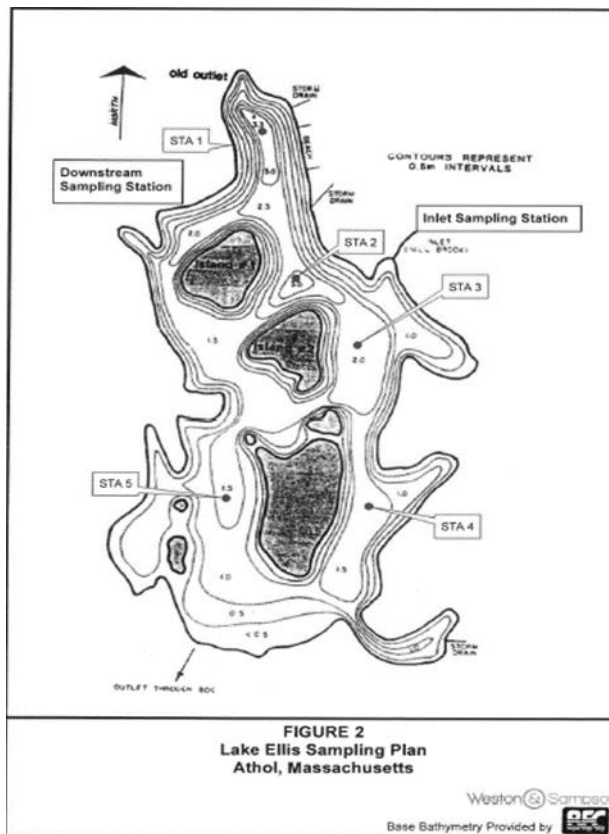
Weston & Sampson
Base Bathymetry Provided by

WATER QUALITY SURVEY PARAMETERS

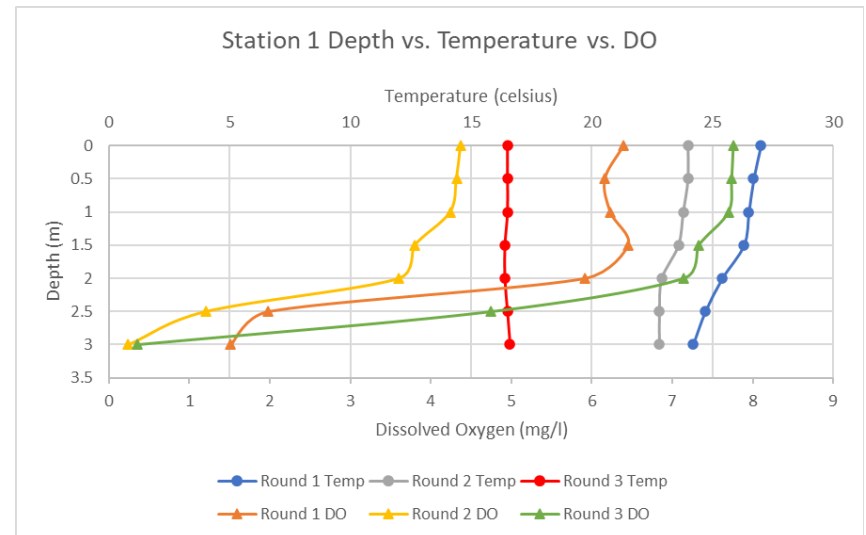
- SECCHI DEPTH
- TEMPERATURE
- pH
- CONDUCTIVITY
- DISSOLVED OXYGEN
- TOTAL PHOSPHORUS
- ORTHOPHOSPHORUS
- TOTAL SUSPENDED SOLIDS
- TOTAL DISSOLVED SOLIDS
- CHLOROPHYLL a
- FECAL COLIFORM
- E. COLI.

Lake Ellis Watershed Survey Water Quality Sampling Results

SAMPLING STATION LOCATIONS

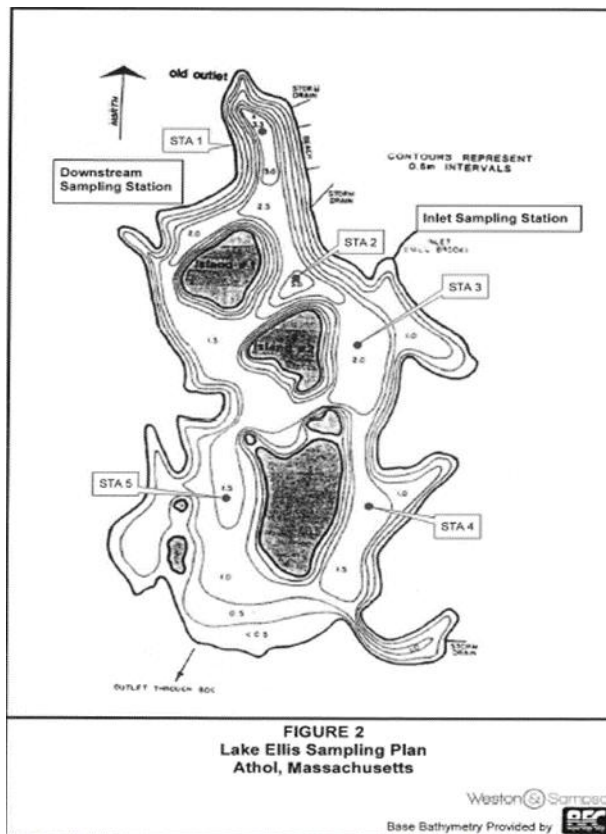


Sampling Results Station 1 – Depth vs Temperature & DO

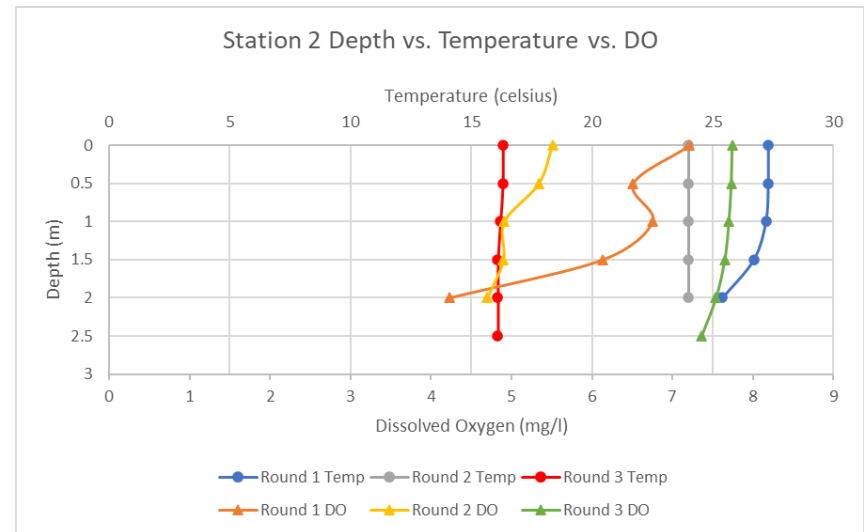


Lake Ellis Watershed Survey Water Quality Sampling Results

SAMPLING STATION LOCATIONS



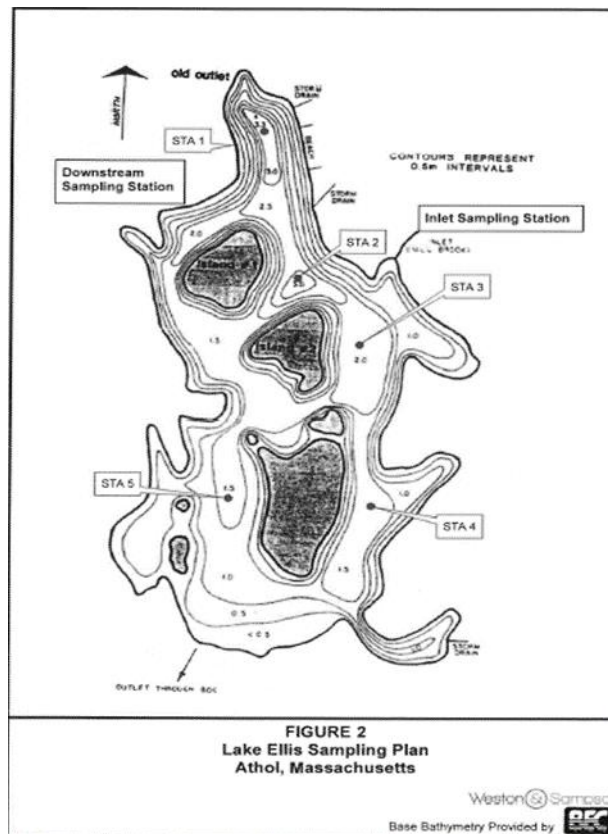
Sampling Results Station 2 – Depth vs Temperature & DO



Lake Ellis Watershed Survey

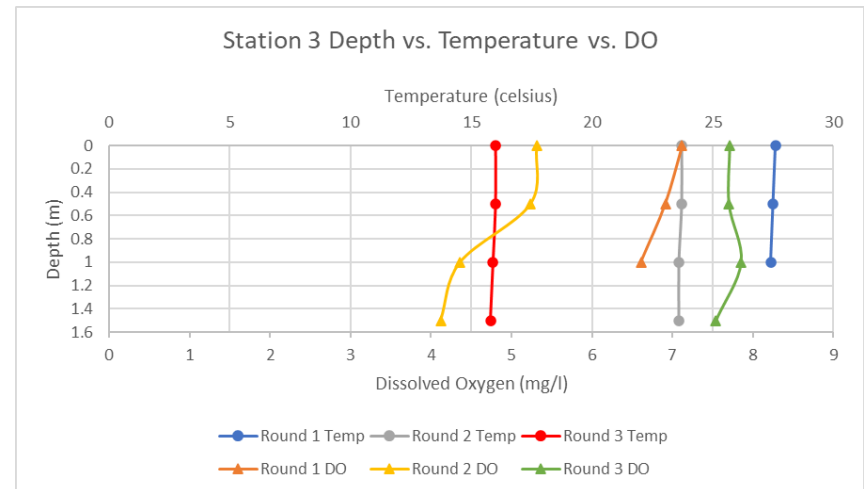
Water Quality Sampling Results

SAMPLING STATION LOCATIONS



Sampling Results

Station 3 – Depth vs Temperature & DO



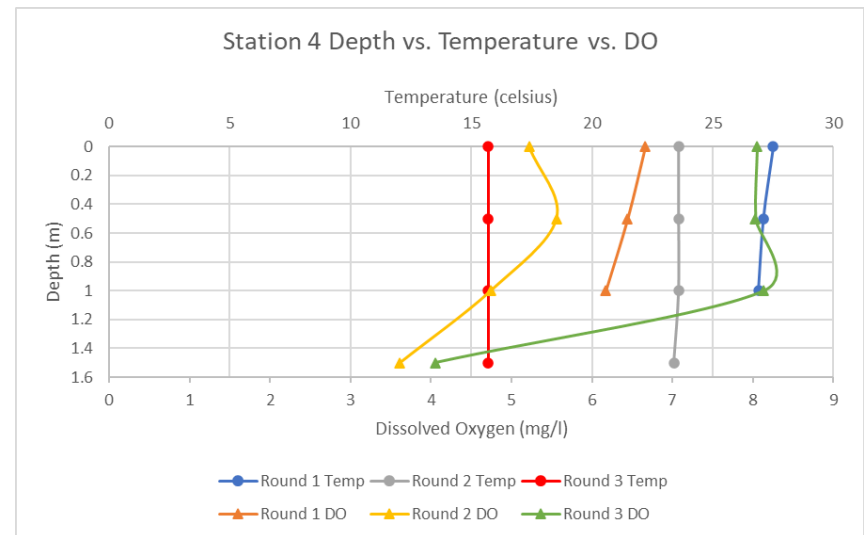
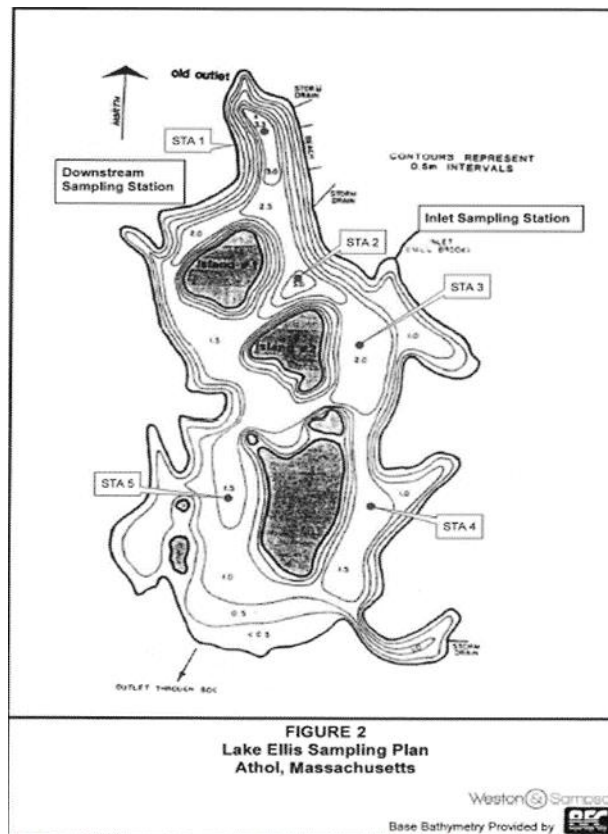
Lake Ellis Watershed Survey

Water Quality Sampling Results

Sampling Results

SAMPLING STATION LOCATIONS

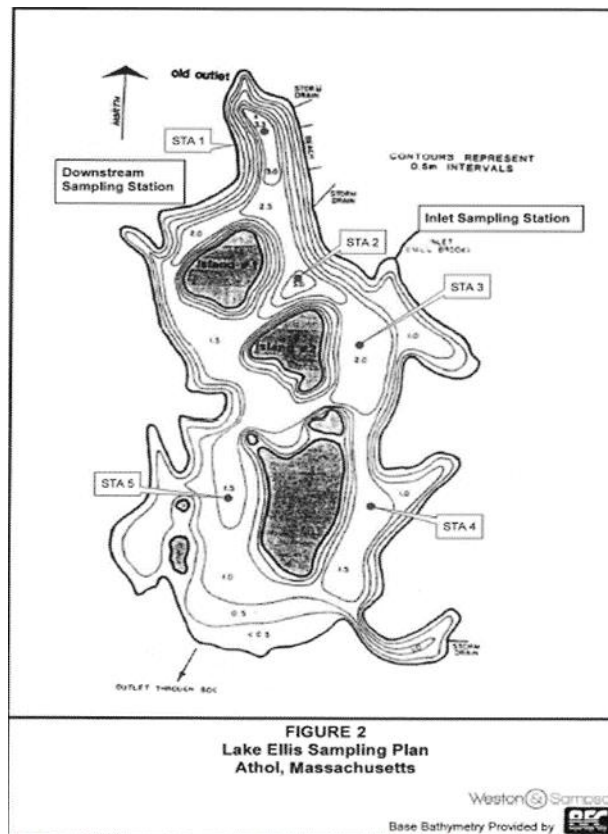
Station 4 – Depth vs Temperature & DO



Lake Ellis Watershed Survey

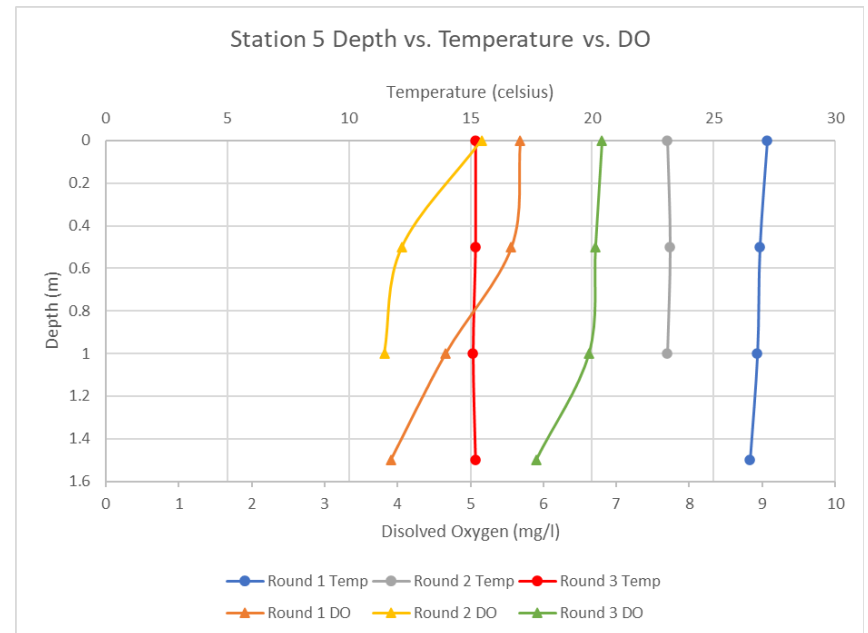
Water Quality Sampling Results

SAMPLING STATION LOCATIONS



Sampling Results

Station 5 – Depth vs Temperature & DO



LAKE ELLIS WATERSHED PROJECT

WATER QUALITY DATA SUMMARY

Lake Ellis Sampling - Round 1 - July 21, 2020							
PARAMETER	STA 1	STA 2	STA 3	STA 4	STA 5	Mill Brook Upstream Trib	Mill Brook Downstream
Total Suspended Solids (TSS) (mg/L)	3.7	<2.0	2.5	2.5	2.7	<2.0	24
Total Dissolved Solids (TDS)(mg/L)	230	220	220	210	240	230	430
Total Phosphorus (TP)(mg/L)	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.06
Orthophosphate (OP)(mg/L)	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02
Chlorophyll a (mg/m3)	0.5	0.5	0.5				
Secchi Depth (m)	2.5	2	1	1	1.5		
Total Coliform	1045.2	1723	409.2	1297.6	2827.2	8164	8164
Fecal Coliform	8	20	<2	2	4	110	356
E. Coli.	12.4	<10	2	<2	8.2	96.2	235.6

LAKE ELLIS WATERSHED SURVEY

WATER QUALITY DATA SUMMARY

Lake Ellis Sampling - Round 2 - August 26, 2020							
PARAMETER	STA 1	STA 2	STA 3	STA 4	STA 5	Mill Brook Upstream Trib	Mill Brook Downstream
Total Suspended Solids (TSS) (mg/L)	<2.0	<2.0	<2.0	NS	NS	<2.0	<2.0
Total Dissolved Solids (TDS)(mg/L)	240	220	220	NS	NS	350	450
Total Phosphorus (TP)(mg/L)	<0.02	<0.02	<0.02	NS	NS	<0.02	0.02
Orthophosphate (OP)(mg/L)	<0.02	<0.02	<0.02	NS	NS	<0.02	<0.02
Chlorophyll a (mg/m3)		3					
Secchi Depth (m)	2.25	1.75	1.5	1.25	1.25		
Total Coliform	1297.6	3465.8	>4839.2	NS	NS	4839.2	>4839.2
Fecal Coliform	10	2	<2	NS	NS	406	14
E. Coli.	14.8	8.2	4	NS	NS	27	870.4

LAKE ELLIS WATERSHED SURVEY

WATER QUALITY DATA SUMMARY

Lake Ellis Sampling - Round 3 - October 7, 2020							
PARAMETER	STA 1	STA 2	STA 3	STA 4	STA 5	Mill Brook Upstream Trib	Mill Brook Downstream
Total Suspended Solids (TSS) (mg/L)	<2.0	<2.0	<2.0	NS	NS	<2.0	<2.0
Total Dissolved Solids (TDS)(mg/L)	220	260	230	NS	NS	350	390
Total Phosphorus (TP)(mg/L)	<0.02	<0.02	<0.02	NS	NS	<0.02	<0.02
Orthophosphate (OP)(mg/L)	<0.02	<0.02	<0.02	NS	NS	<0.02	<0.02
Chlorophyll a (mg/m3)		1.9					
Secchi Depth (m)	3	2	1.5	1	1		
Total Coliform	307.8	109.2	121.8	NS	NS	957.2	2599.4
Fecal Coliform	8	4	10	NS	NS	28	76
E. Coli.	8.2	<2.0	<2.0	NS	NS	12.6	61

LAKE ELLIS WATERSHED SURVEY WATER QUALITY DATA SUMMARY

MILL BROOK UPSTREAM AND DOWNSTREAM IN SITU RESULTS

Mill Brook Upstream & Downstream						
In Situ WQ Parameter Instrument Results						
<u>Mill Brook - Upstream</u>				<u>Round 1</u>	<u>Round 2</u>	<u>Round 3</u>
Parameter	Parameter (Units)					
pH (Std. Units)				6.53	6.78	6.93
Temperature (C)				21.7	17.2	13
Dissolved Oxygen (mg/L)				7.78	6.95	9.53
Specific Conductance (uomos/cm)				0.455	0.443	0.561
<u>Mill Brook - Downstream</u>						
pH (Std. Units)				6.71	6.67	7.12
Temperature (C)				12.9	16.7	13
Dissolved Oxygen (mg/L)				12.68	6.75	7.7
Specific Conductance (uomos/cm)				0.071	0.67	0.653

LAKE ELLIS WATERSHED SURVEY

Next Steps: Consider Improvement Measures:

- Aquatic Weed Control Options:
 - Weed Harvesting
 - Herbicide Applications
 - Lake Level Drawdown
- Watershed Stormwater Best Management Practices (BMP's)
 - Structural BMP's
 - Non-Structural BMP's
- Restoration of Lake Outlet to Mill Brook
 - Relation to Lake Level Drawdown

LAKE ELLIS WATERSHED SURVEY PUBLIC INVOLVEMENT PROGRAM

- WE WANT TO HEAR FROM YOU!
 - WHAT'S IMPORTANT TO YOU?
 - HAVE WE CAPTURED THE MOST CRITICAL ISSUES FACING LAKE ELLIS?
 - HOW CAN YOU CONTACT THE PROJECT TEAM?

Joe McGinn, Weston & Sampson,
mcginnj@wseinc.com

Katherine Robertson, Robertson Associates,
krobertsconsulting@hotmail.com

Eric Smith, Athol Planning & Community Development,
planning@townofathol.org

LAKE ELLIS WATERSHED SURVEY

Questions?

Comments?

Thank you for your participation!

thank you
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