



ENVIRONMENTAL CONSULTANTS

Sound Science. Creative Solutions.®

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December 3, 2018

Ms. Pamela Monn  
University of Massachusetts at Amherst  
UMass Facilities  
Amherst, MA  
Via email: [psmonn@facil.umass.edu](mailto:psmonn@facil.umass.edu)

RE: 2018 UMass Campus Pond Water Quality Report  
University of Massachusetts at Amherst  
SWCA File #: 43345.01

Dear Ms. Monn,

**SWCA Environmental Consultants** (SWCA) collected water quality samples within the UMass Campus Pond at the beginning and end of 2018 to document changes in water chemistry across the growing season. Grab samples were collected prior treatment on May 8, 2018 and during the October 8, 2018 follow up visit. All analytical results are summarized below in **Table 1**, and the laboratory results are attached to this document. In addition, the data collected in 2018 is compared against the data collected in 2017 and 2016 to assess trends in water quality.

If you have any questions at all regarding any of the information presented in this document, feel free to contact me at our office at any time.

Sincerely,

A handwritten signature in black ink, appearing to read "Scott Fisher".

Scott Fisher  
Team Lead – Ecological Restoration  
[sfisher@swca.com](mailto:sfisher@swca.com)  
413-658-2056

A handwritten signature in black ink, appearing to read "Matt Lewis".

Matt Lewis  
Restoration Specialist  
[mlewis@swca.com](mailto:mlewis@swca.com)

## WATER QUALITY ANALYSIS

In 2018, the Campus Pond held an almost constant neutral pH ranging from 7.2 – 7.4 and moderate dissolved oxygen levels acceptable for fish and other aquatic life (7.6 – 8.6 mg/L). The buffering capacity of the pond has fluctuated considerably across the sampling period shifting from low buffered to moderately buffered. Typically, waters with lower levels are more susceptible to pH shifts, however that has not occurred in the Campus Pond. The conductivity has also shifted across the sampling period. On average the pond has had a healthy level of ionic concentrations, conductivity greater than 1500 uS/cm can potentially be stressful to freshwater organisms (although not uncommon to water bodies of New England). The water was recorded as moderately hard and has maintained a relatively clear water column (Turbidity = 1.3 – 4.9 NTU). The nutrient chemistries suggest that the Campus Pond remains in a moderate eutrophic state as it contained moderate levels of Total phosphorus (29.7 – 30.9 ug/L) and Total nitrogen (2.0) during the 2018 growing season, however the Total phosphorus levels dropped considerably from 2017. The water chemistry values are within ranges that are considered normal for natural water bodies. Please note that the recorded Total Phosphorus levels (that suggest that the Campus Pond is in a moderate eutrophic state) may continue to be the main contributor of seasonal excessive plant and algal blooms.

**Table 1– Water Quality Data Comparison (2017 & 2018)**

Parameter	Sample Date: 5/26/17	Sample Date: 5/8/18	Sample Date: 8/29/17	Sample Date: 10/8/18
Alkalinity (mg/L as CaCO <sub>3</sub> )	10.2	72.8	32.5	82.7
Chlorophyll a (ug/L)	<10	10.1	19.4	15.9
Conductivity (uS/cm)	271	2020	852	1103
Dissolved Oxygen (mg/L)	8.4	7.6	8.3	8.6
Total Hardness (mg/L as CaCO <sub>3</sub> )	35.8	210.15	109.68	191.2
Total Nitrogen (mg/L)	1.3	2.0	n/a	2.0
Total Kjeldahl Nitrogen (mg/L)	1.1	1.0	n/a	0.9
Total Nitrate & Nitrite (mg/L)	0.2	1.0	0.3	1.1
pH	7.4	7.2	7.4	7.2
Free Reactive Phosphorus (ug/L)	25	<5	29	13
Total Phosphorus (ug/L)	81.7	29.7	110.6	30.9
Turbidity (NTU)	1.3	4.9	3.0	4.7

## PLANT COMMUNITY

Algae species were kept at bay this season. This was most likely due to elevated rainfall levels in 2018, a reduction in available nitrogen and chlorophyll as well as successfully timed monthly algaecide treatments. SWCA observed small patches of curly leaf pondweed (*Potamogeton crispus*), a non-native invasive submerged aquatic plant within the pond. This species was found in previous years in much larger denser patches throughout the pond. Management efforts (both mechanical and chemical) have assisted in reducing the presence of this plant in the pond. Cattail (*Typha latifolia*) continues to be the dominant emergent plant present along the entire shoreline of the pond. The university installed a diverse array of native emergent plant material around the entire emergent shelf of the Campus Pond. Cattail, if left untreated, poses a threat to the installed material and native plant diversity. Cattail is a difficult to manage species, especially as it is found within the vicinity of desirable emergent species. SWCA has been performing late season foliar herbicide applications to all cattail within the emergent shelf of the pond. This timing was chosen to allow the native, desirable species to complete their growth cycle before herbicides were applied. Herbicides should not have any impact on the desirable species if applied late in the season. Cattail control should continue as a focus in the emergent shelf in 2019.

## RECOMMENDATIONS

SWCA recommends continuing spot herbicide/algaecide treatments and nutrient management in 2019, on an as needed basis. As stated in previous reports, the shallow depth of the water column and level of accumulated soft sediments on the pond floor, will likely result in the need for ongoing maintenance in order to manage/balance the aquatic life and water quality. In 2019, SWCA will continue to monitor and control the presence of algae, curly leaf pondweed, and cattail within the Campus Pond.



16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC3149 **LABORATORY REPORT**

**Customer Company Customer Contact**

Company Name: New England Environmental Inc	Contact Person: Matt Lewis
Address: 15 Research Drive, Amherst, MA 01002	E-mail Address: mlewis@neeinc.com
	Phone:

**Waterbody Information**

Waterbody:	UMASS Pond - MA
Waterbody size:	2.9
Depth Average:	3

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM9698-1		Turbidity (NTU)	EPA 180.1	4.9	05/08/2018
		Conductivity (uS/cm)	EPA 120.1	2020	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	<5	
		Dissolved Oxygen (mg/L)	EPA 360.1	7.6	
		Chlorophyll a (ug/L)	EPA 445	10.1	
		Total Phosphorus (ug/L)	EPA 365.3	29.7	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	72.8	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	210.1503	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	1	
		Nitrite (mg/L)	Campbell et al 2004	<0.02	
		Nitrate (mg/L)	calculated	1	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	1	
		Total Nitrogen (mg/L)	calculated	2	
		pH	EPA 150.1	7.2	

**ANALYSIS STATEMENTS:**

**SAMPLE RECEIPT /HOLDING TIMES:** All samples arrived in an acceptable condition and were analyzed within prescribed holding times in accordance with the SRTC Laboratory Sample Receipt Policy unless otherwise noted in the report.

**PRESERVATION:** Samples requiring preservation were verified prior to sample analysis and any qualifiers will be noted in the report.

**QA/QC CRITERIA:** All analyses met method criteria, except as noted in the report with data qualifiers.

COMMENTS: No significant observations were made unless noted in the report.

MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

**Laboratory Information**

Date / Time Received: 05/30/18 11:00 AM

Date Results Sent: Monday, June 4, 2018

*Disclaimer: The results listed within this Laboratory Report relate only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a dry weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the exclusive use of SRTC Laboratory and its client. This report shall not be reproduced, except in full, without written permission from SRTC Laboratory. The Chain of Custody is included and is an essential component of this report.*

*This entire report was reviewed and approved for release.*



*Reviewed By: Laboratory Supervisor*

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16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC4300 **LABORATORY REPORT**

**Customer Company Customer Contact**

Company Name: New England Environmental Inc	Contact Person: Matt Lewis
Address: 15 Research Drive, Amherst, MA 01002	E-mail Address: mlewis@neeinc.com
	Phone:

**Waterbody Information**

Waterbody:	UMASS Pond - MA
Waterbody size:	2.9
Depth Average:	3

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM13362-1		Turbidity (NTU)	EPA 180.1	4.7	10/08/2018
		Conductivity (uS/cm)	EPA 120.1	1103.0	
		Free Reactive Phosphorus (ug/L)	EPA 365.3	13	
		Dissolved Oxygen (mg/L)	EPA 360.1	8.6	
		Chlorophyll a (ug/L)	EPA 445	15.9	
		Total Phosphorus (ug/L)	EPA 365.3	30.9	
		Alkalinity (mg/L as CaCO3)	EPA 310.2	82.7	
		Total Hardness (mg/L as CaCO3)	EPA 130.2	191.2	
		Total Nitrate (mg/L) and Nitrite (mg/L)	Campbell et al 2004	1.1	
		Nitrite (mg/L)	Campbell et al 2004	0.1	
		Nitrate (mg/L)	calculated	1	
		Total Kjeldahl Nitrogen (mg/L)	EPA 351.2	0.9	
		Total Nitrogen (mg/L)	calculated	2	
		pH	EPA 150.1	7.2	

**ANALYSIS STATEMENTS:**

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**QA/QC CRITERIA:** All analyses met method criteria, except as noted in the report with data qualifiers.

COMMENTS: No significant observations were made unless noted in the report.

MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

**Laboratory Information**

Date / Time Received: 10/12/18 11:00 AM

Date Results Sent: Friday, October 19, 2018

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*This entire report was reviewed and approved for release.*



*Reviewed By: Laboratory Supervisor*

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