

Final Report on VTDEC Lab Services Grant Project Curtis Pond *E. Coli* Monitoring 2005

Introduction and Purpose of Study

The purpose of this study was to determine if swimming and water recreation on Curtis Pond is safe. To do this the presence, if any, of fecal contamination of the pond was assessed by collecting samples of pond water and analyzing them for the presence of the indicator bacterium, *Escherichia coli* (*E. coli*).

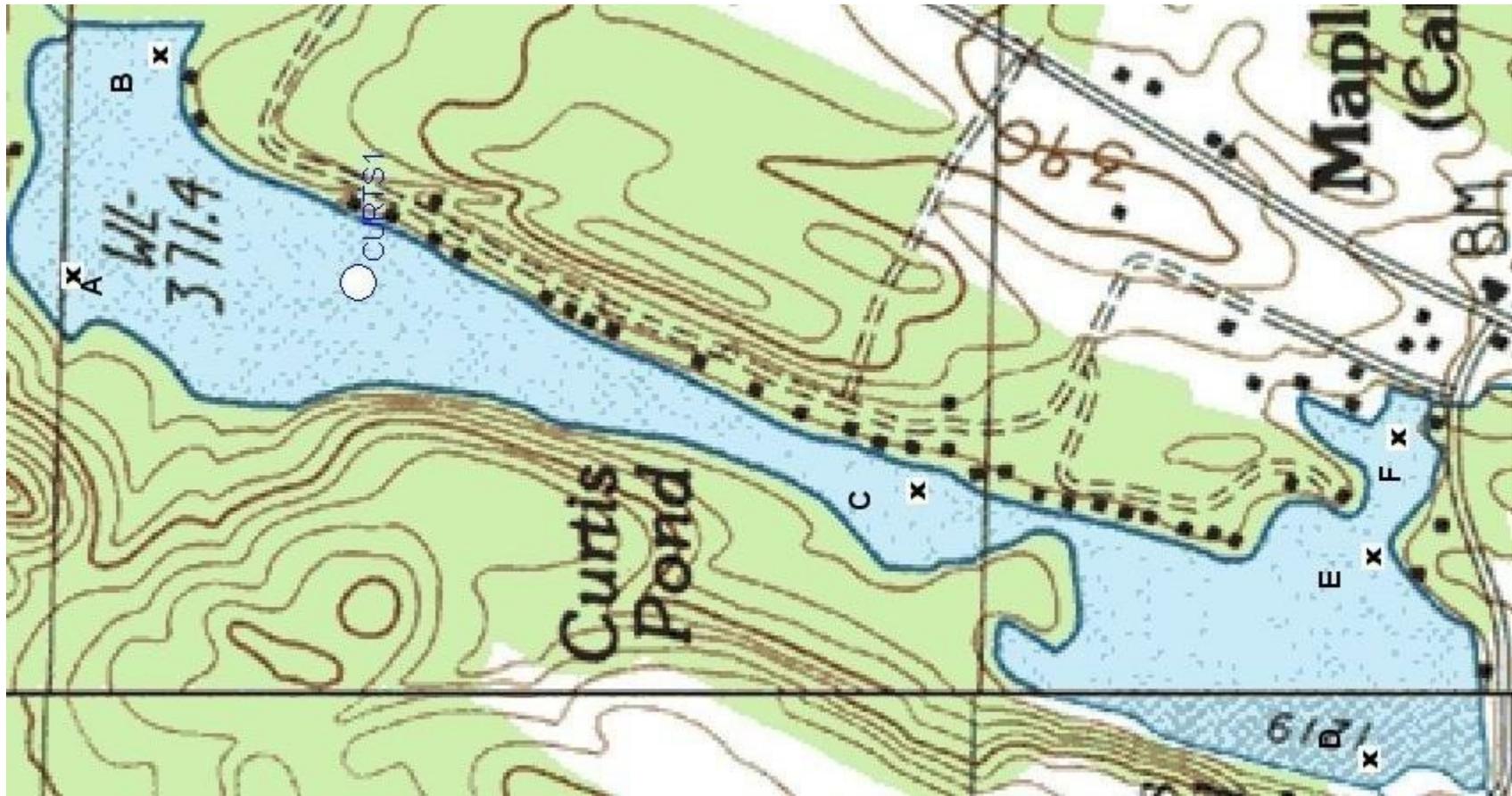
Sampling Methods and Locations

Sampling was designed to provide data that is representative of the whole pond. Six sampling sites were selected. They are shown on the map below. The latitude/longitude of each site is provided in the table which follows the map. Three of the sampling sites are located at inlets (see points A, B and D on the map). One site is at the Town Beach (see point E). One site is mid-pond (see point C). The last is located in the cove near the outlet (see point F).

Samples were collected following the procedures of the Curtis Pond 2005 QAPP. Bi-weekly, volunteers collected samples in the morning, kept them iced in coolers and brought them to the state laboratory in Waterbury before noon of the same day.

A description of the physical habitat and the land use around each site follows:

- Site A (NW Inlet): shallow water bordered by marsh and wetlands including a large beaver dam
- Site B (NE Inlet): shallow water surrounded by marsh
- Site C (Mid-Pond): camps located on eastern shore, undeveloped land on western shore
- Site D (SW Inlet): marsh edged shoreline
- Site E (Town Beach): undeveloped woodlands with small, granite faced entry for swimmers
- Site F (Outlet): cove near dam. Shoreline is populated with residences.



Site	LatDD	LonDD	Site	LatDD	LonDD
A	44.3897	72.493	D	44.3772	72.5003
B	44.389	72.4916	E	44.3771	72.498
C	44.3816	72.4917	F	44.3768	72.4964

Presentation of Data Results

Date Site	#A NW Inlet	#B NE Inlet	#C Mid-Pond	#D SW Inlet	#E Town Beach	#F Outlet	Weather
7-Jun-05	4		1	12	6	4	2
21-Jun-05	8		6	9	2	6	12 clear, dry
28-Jun-05						13	dry, hot & humid
5-Jul-05	7		12	34	6	1	13 clear, dry
12-Jul-05						1	
21-Jul-05	1		2	7	5	12	21 dry, warm, no rain for 10 days
26-Jul-05						6	
2-Aug-05	1		6	1	5	3	25 clear-1/2 inch rain on prior nite
17-Aug-05	1		1	3	8	7	20 dry-heavy thunderstorm on prior nite
30-Aug-05	1		3	10	1	4	27 dry, cool
13-Sep-05	1		8	10	3	1	4 dry, hot & humid
Average	3.0		4.9	10.8	4.5	5.3	15.5
Geometric Mean	2.0		3.5	7.3	3.8	3.7	11.7
Pond Average	7.2						
Pond Geometric Mean	4.4						
Pond Avg w/o cove	5.7						
Pond GM w/o cove	3.7						

All of the data is well below the state standard of 77 mpn/100 ml. The data for the outlet, Site F, which is taken in the cove near the dam, shows levels of *E. coli* that are somewhat higher than the rest of the pond. The geometric mean at Site F is 11.7 mpn/100ml, while the whole pond excluding Site F is 3.7 mpn/100ml.

Results of QA Sampling

QA Sampling	Town Beach	Site E
Date	Sample	Field Duplicate
7-Jun-05	4	3
21-Jun-05	6	6
28-Jun-05	13	not collected
5-Jul-05	1	3
12-Jul-05	1	not collected
21-Jul-05	12	9
26-Jul-05	6	not collected
2-Aug-05	3	5
17-Aug	7	10
30-Aug-05	4	10
13-Sep-05	1	1

Field duplicates were collected for eight of the eleven sampling dates. The field duplicates were always collected at the Town Beach, site E. The results of collecting and testing field duplicates validate the quality of the tests.

Conclusion and Recommendations

In conclusion, monitoring Curtis Pond for the presence of *E. coli* has shown that it has been safe for swimming and other forms of water recreation throughout the summer of 2005. The geometric mean for the whole pond was 4.4 mpn/100ml. It is interesting to compare these results with previous years. The geometric mean for the total pond during 2001-2003 was 2.7mpn/100ml. In 2004 the geometric mean increased to 6.9 mpn/100ml. While all of these results are very low, the 2004 results raised the question of whether a trend of increased levels of *E. coli* was being initiated. The results for 2005 indicate that such a trend is unlikely or if it exists it is a very slow rate of increase.

For 2004 Site F, Outlet, had levels of *E. coli* which were significantly higher than the rest of the pond. Site F had a geometric mean of 29.7 mpn/100ml compared to 5.1 mpn/100ml for the total pond without Site F. In 2005 Site F continues to have higher *E. coli* levels than the rest of the pond, but the discrepancy is smaller. Site F had a geometric mean of 11.7 mpn/100ml compared to 3.7 mpn/100ml for the rest of the pond.

Curtis Pond is used and loved by residents and visitors. To assure that the swimming continues to be safe, it is recommended the sampling be continued in 2006.