



OARS Bacteria Monitoring Results—2020

Updated October 19, 2020

Following is a brief summary of OARS' monitoring results for *E. coli* bacteria at 10 locations in the Sudbury, Assabet, and Concord rivers, plus River Meadow Brook. *E. coli* is used as an indicator of fecal contamination in water bodies, and the EPA has defined safety threshold values for recreational swimming and boating. The swimming threshold for single samples is 235 CFU/100 ml. The swimming threshold for the geometric mean of all samples for the season is 126 CFU/100 ml. Bacteria data is normally analyzed on a logarithmic scale because bacteria multiply exponentially.

2020 Results (June 8, 2020–September 14, 2020)

Site #	Description	River	Samples	Exceed- ences	% Exceeded	Geo- Mean	2019 % Exceed.	2019 Geo- Mean
ABT-077	USGS gage, Maynard	Assabet	15	10	67%	289	7%	121
ABT-162	Cox Street, Hudson	Assabet	15	5	33%	203	13%	161
SUD-096	Route 20, Wayland	Sudbury	15	2	13%	113	7%	51
SUD-236	Rte 135, Ashland	Sudbury	15	8	53%	348	27%	151
CND-110	Rte 225 boat ramp, Bedford	Concord	15	0	0%	27	0%	40
CND-009	Rogers St. Bridge, Lowell	Concord	15	5	33%	216	13%	147
RVM-001	Lawrence St., Lowell	River Mea	15	14	93%	427		
RVM-005	Gorham St., Lowell	River Mea	15	8	53%	304		
CND-012	Centennial Island E, Lowell	Concord	6	1	17%	172		
CND-017	Muldoon Park, Lowell	Concord	6	1	17%	104		
RVM-012	Lincoln St., Lowell	River Mea	6	3	50%	231		
RVM-018	Behind Marshalls, Lowell	River Mea	6	2	33%	207		
RVM-022	Crosspoint Tower, Lowell	River Mea	3	2	67%	339		
RME-003	Industrial Ave., Chelmsford	River Mea	3	3	100%	462		

Fewer
samples

*(Pink shading designates > 25% exceedance of single-sample threshold or geo-mean exceedance.)
(Lowell special study shaded gray.)
(See graphs of data below)*

Bacteria levels have generally been higher this year than last year because more sampling events have closely followed rain, and at the same time we have been in drought conditions for most of the season, which enhanced the surface runoff when rain did happen. Four of the original six sites exceeded the swimming threshold at least 25% of the time and also exceeded the geometric mean threshold for the season. CND-110 and SUD-096 have stayed within limits. The Maynard site has been completely different than last year, with 67% exceedances in 2020. The Route 225 site is proving to be very clean over both years.

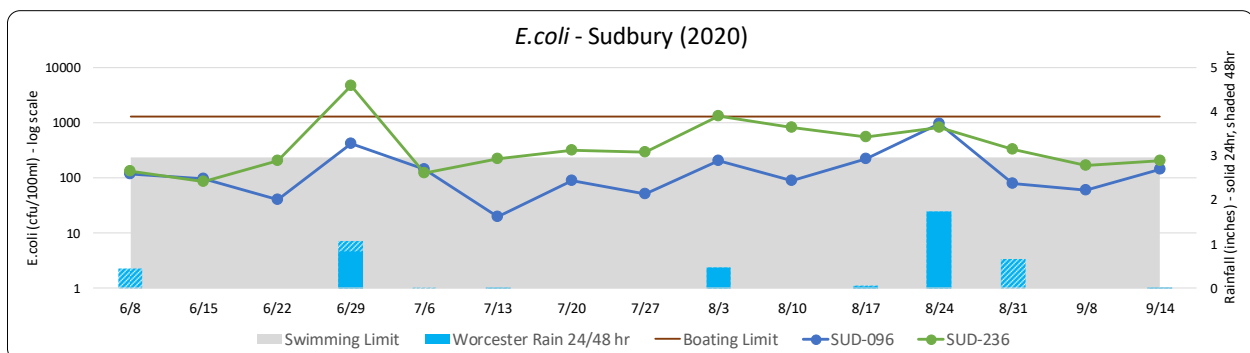
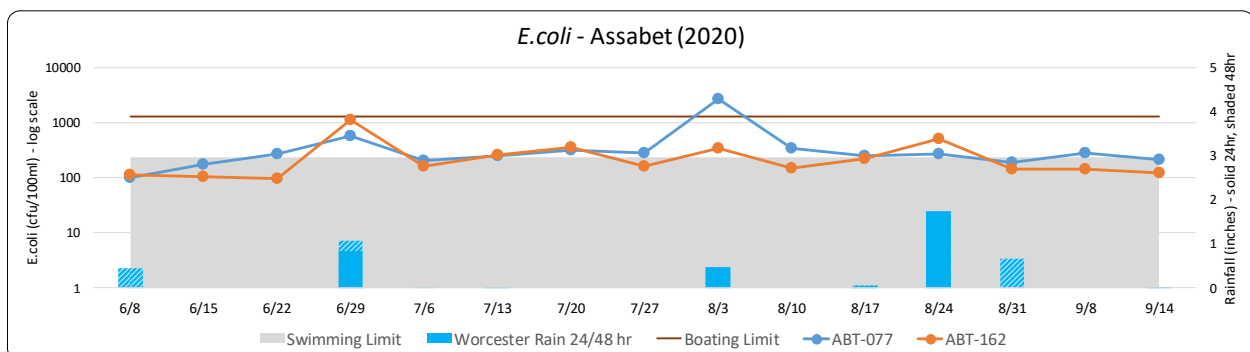
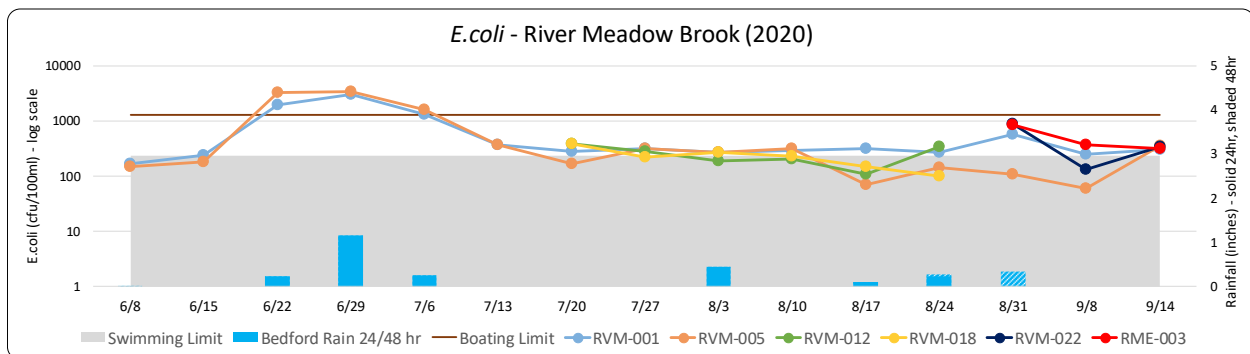
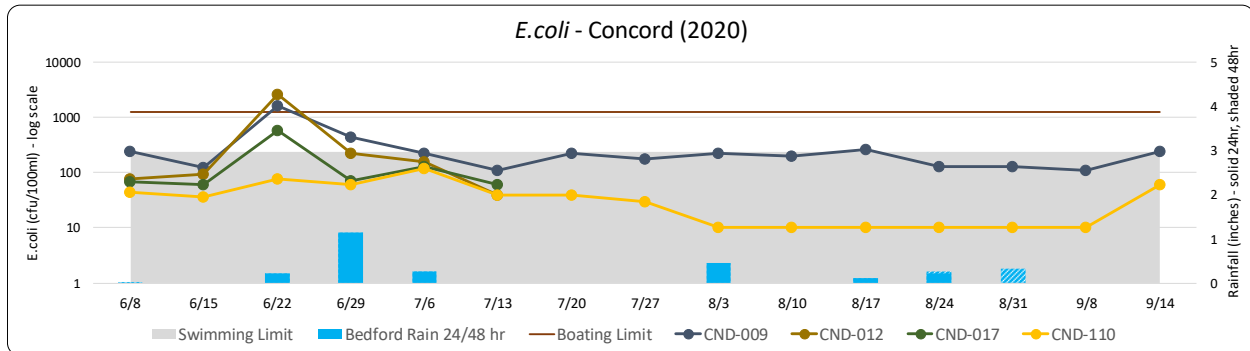
The effects of rainfall have been interesting to observe this year. On June 22nd, there was a major bacteria spike in Lowell, even though Bedford rainfall was quite small. It turned out that there were some very localized storms on the previous day that seem to have skipped Bedford and hit Lowell (see Jun. 22nd map below). On August 3rd and 24th, the majority of the rain was in the upper watershed only (see Aug. 3rd map below). September 14th was interesting because there were clear jumps in bacteria in the Concord and Lower Sudbury but no rainfall in the previous 48 hours. It turned out that there was a

major rain event 4 days prior. It seems to have already washed out of the Assabet and Upper Sudbury, but was still registering in the lower watershed.

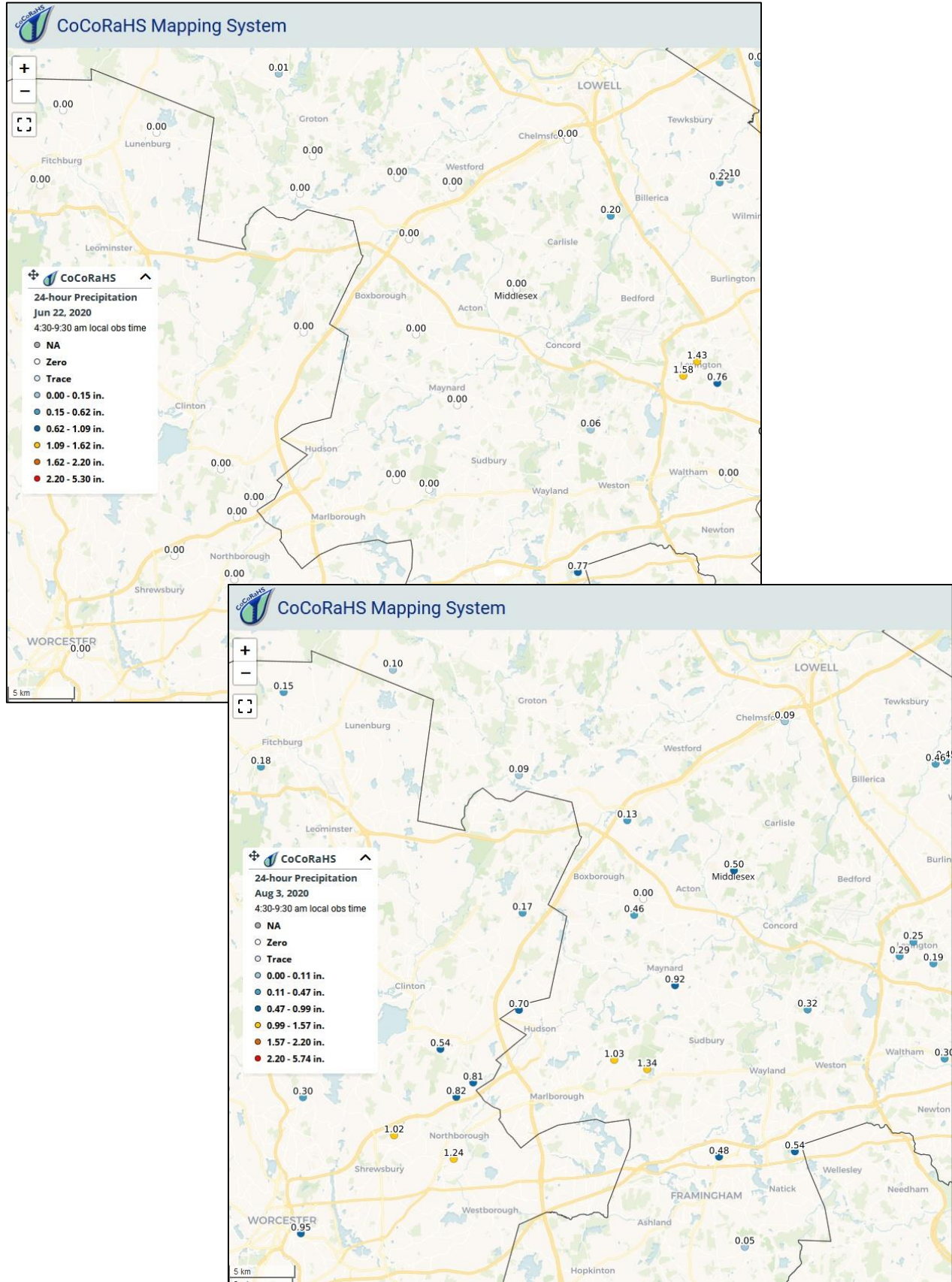
Special Lowell Study

Our Lowell study (see map of sites below) has provided interesting results. We identified that River Meadow Brook is a clear source of bacterial contamination, but finding the point source along the brook has proven elusive. Bacteria levels seem to be relatively stable all the way up to the furthest upstream sampling points RVM-022 and RME-003 (which are on separate branches of the brook), meaning that there is a source farther upstream in the suburban headwaters of both branches. However, the fact that levels at RVM-001 were consistently higher than levels at RVM-005 indicates that there is another source between these two points. We will need to walk the river in this section to see what we can find. We ruled out the Concord as the source of bacteria early on in the study, but the event on June 22nd does indicate that it is a source during high flow periods. It would be interesting to do more sampling farther upstream on the Concord in early summer flows.

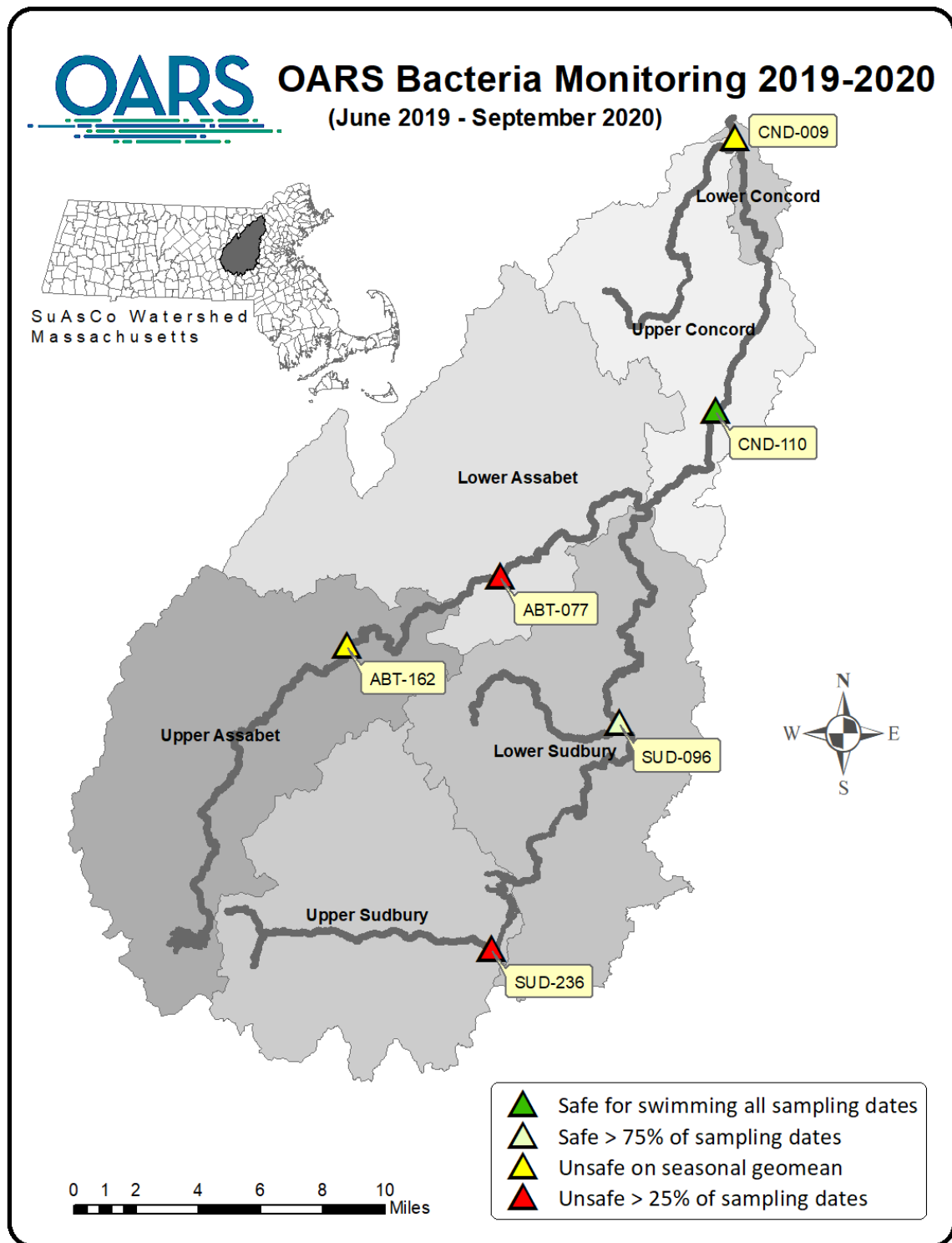
Appendix 1: Graphs of data by river



Appendix 2: Rainfall maps for 24 hours prior to June 22nd and August 3rd sampling. Note the large differences in rainfall across the watershed.



Appendix 3: Map of core monitoring stations with consolidated results for two-year period



Appendix 4: Map of Lowell study sites

