

The Role of Vegetation in Sequestration of *E. coli* in the Scantic River (CT)



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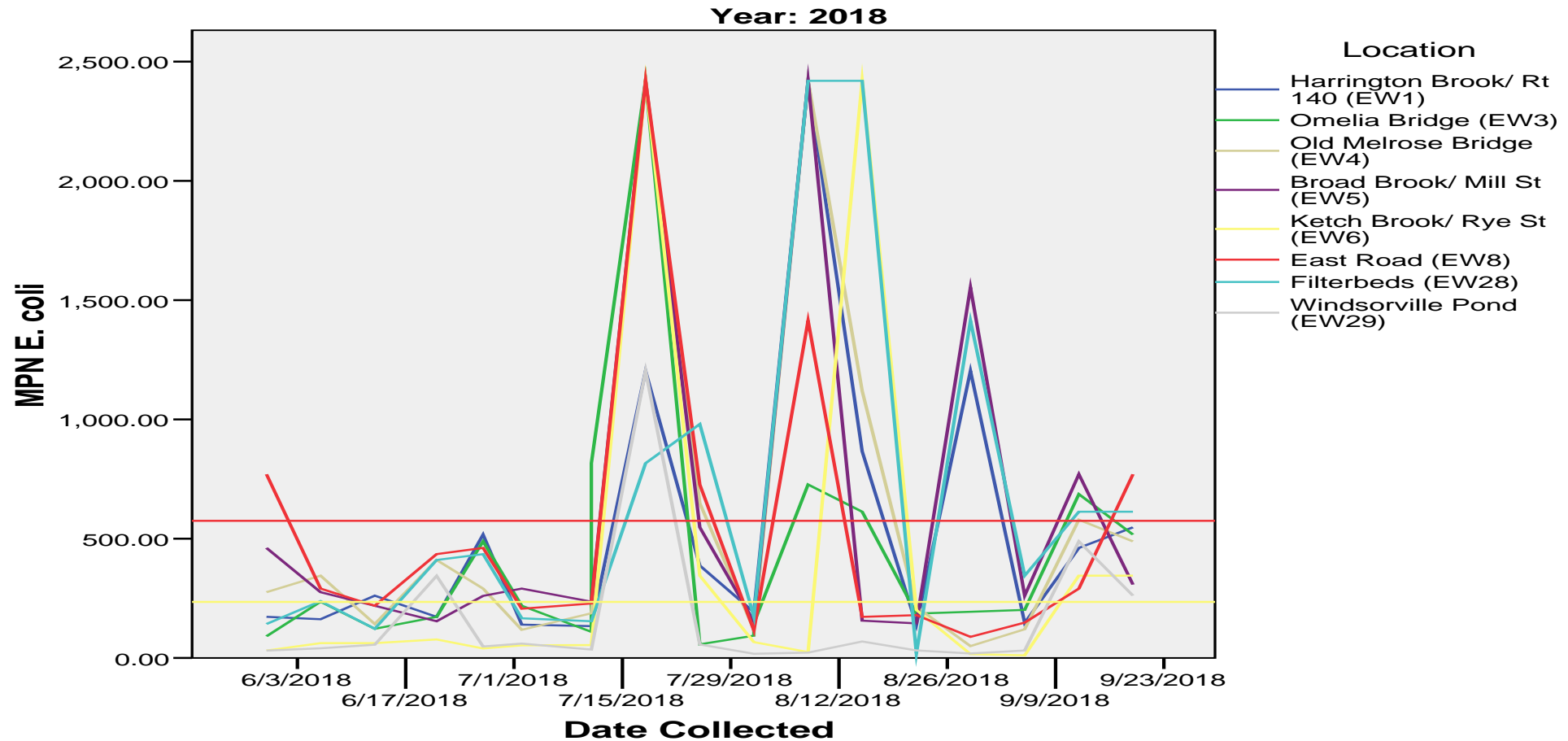
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The Scantic River

- The Scantic River Watershed encompasses around 90,000 acres in the towns of Hampden (MA), Stafford, Somers, Enfield, Ellington, East Windsor and South Windsor (CT)
- Listed on DEEP impaired waterways list for high bacterial levels.



E. coli levels In the Scantic River



Part One: Survey of Ketch Brook (Rye St. East Windsor, CT)

- Fall 2017
- Environmental survey of the Ketch Brook site:
 - sediment size (river substrate)
 - soil classification
 - analysis of *E. coli* levels in the soil (soil sequestration)
 - vegetational diversity analysis
 - analysis of *E. coli* levels in the vegetation (plant sequestration)



Crystal Deleon, Biology '19

Part One: Results

- *E. coli* levels were high in all soil samples, so the bacteria is present in the environment
- Vegetations samples from the Upper river outer left riparian zone had the highest TFC and *E. coli* levels.
- The main plant species in this area was lawn grass
- These plants serve as living buffers, and may help limit the amount of *E. coli* entering the river.



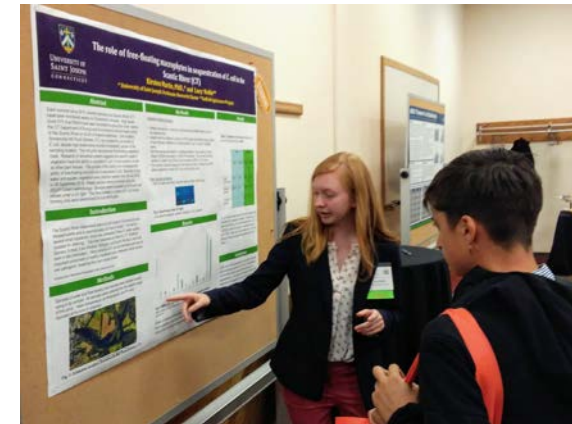
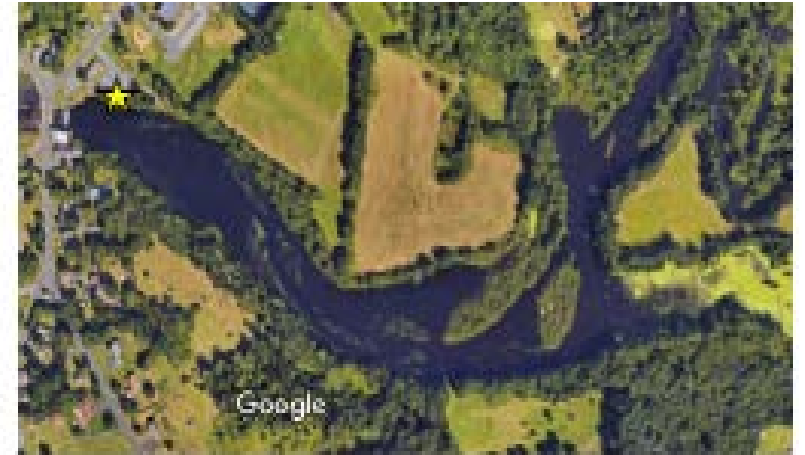
Part Two: Analysis of ability of groundcover to sequester *E. coli*

- Spring 2018
 - 25g of wheat, rye, and lawn grass were grown on sterilized topsoil
 - Following germination, plants were inoculated with *E.coli* (5%, 30%)
 - Vegetation was harvested, processed, filtered, then the filtrate was analyzed
 - All three types of ground cover were able to sequester *E.coli*
 - Rye and the lawn grass blend had the highest amounts of *E.coli* in their tissues.



Part Three: Analysis of ability of free-floating vegetation to sequester *E. coli* (Somerville Mill Pond)

- Summer 2018
- Water samples, and vegetational samples (*Lemna spp.* (duckweed) and *Utricularia spp.* (bladderwort)) were collected weekly (7/25-9/12).
- The surface of the vegetation was sterilized using a dilute bleach solution, then samples were processed and analyzed.



Worked with Suffield Agriscience High School student Lucy Noble

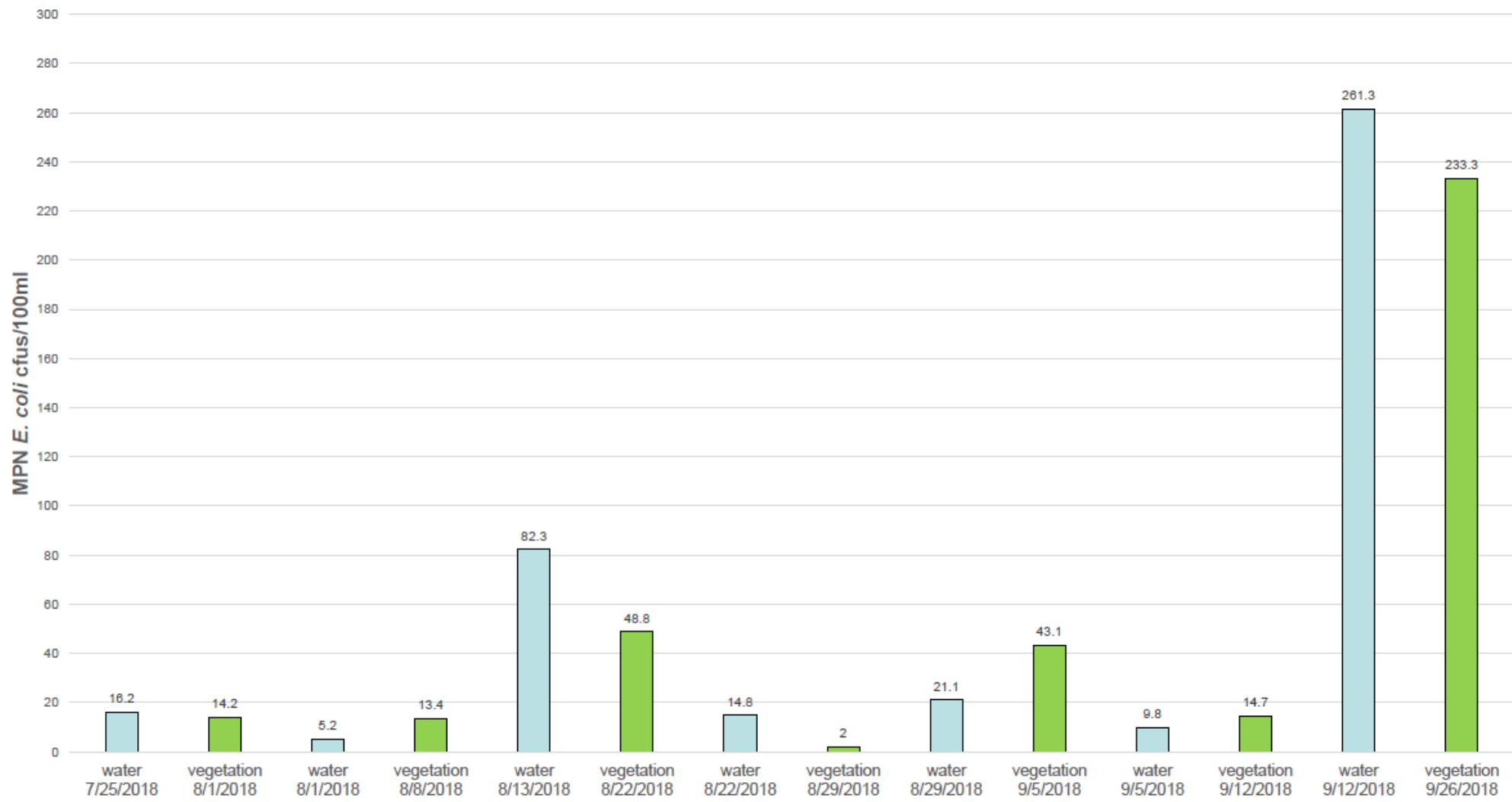
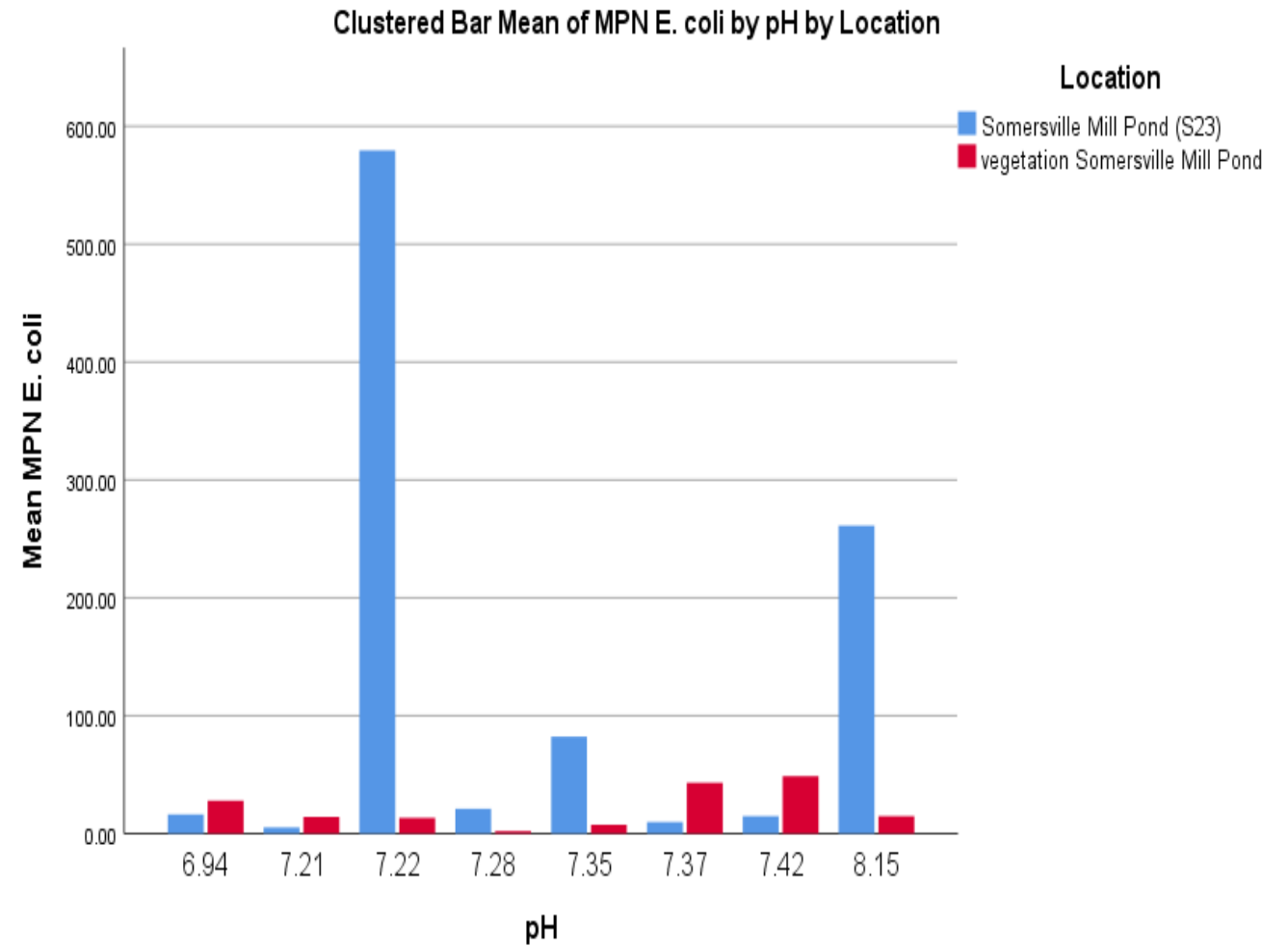


Table 1: Comparison of the impact of rain (within 24 hours of sampling) on *E. coli* levels.

	Water		Vegetation	
	Rain	No Rain	Rain	No Rain
Mean (cfus/100ml)	170.8	12.03	63.52	19.77
Standard deviation	239.38	8.18	98.29	21.11
Number of samples	5	3	5	3



Next Steps: Further analysis of ability of free-floating vegetation to sequester *E. coli* (Somersville Mill Pond)

- Summer 2019
- Water and vegetation samples will be collected at each location once a week for four weeks.
- Vegetation will be collected in the following categories (riparian groundcover, free-floating macrophytes, attached macrophytes)
- Water samples will also be analyzed for nitrate, phosphorous, pH, temperature, conductivity, and turbidity.
- Vegetation samples will also be analyzed for nitrate, phosphorous, pH and conductivity.



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Questions?

