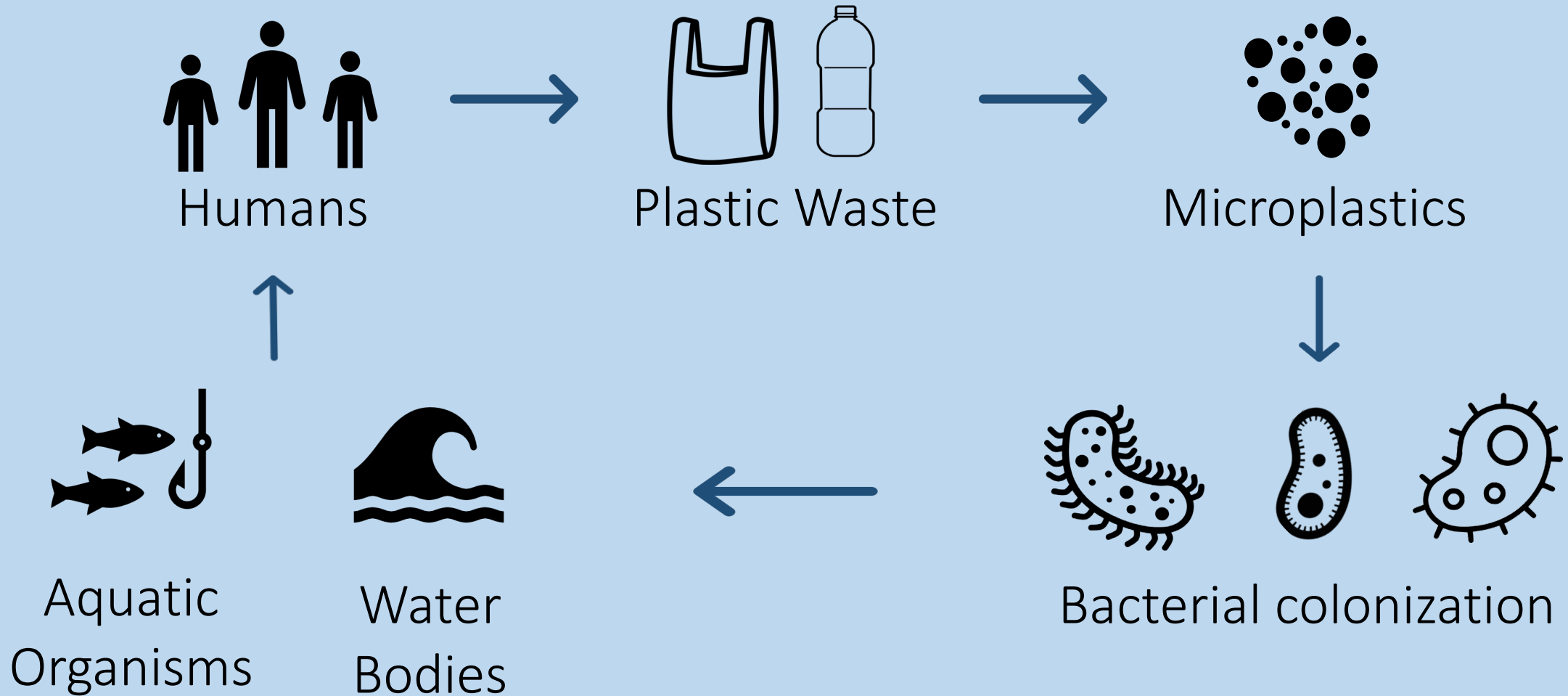


Escherichia coli and Coliform Bacteria Colonization on Microplastics

Sayako Aizeki-Nevins
Sleepy Hollow High School

Microplastics and bacterial assemblages



Hudson River pollutants

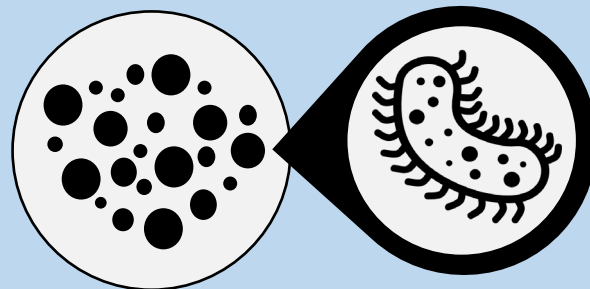




Microplastics and coliform bacteria

Research Question: Can *E. coli* or coliform bacteria colonize microplastics in the Hudson River?

Hypothesis: If microplastics are incubated in Hudson River water containing *E. coli* and coliform bacteria, then the *E. coli* and coliform bacteria will colonize the microplastics.





Effect of incubation time

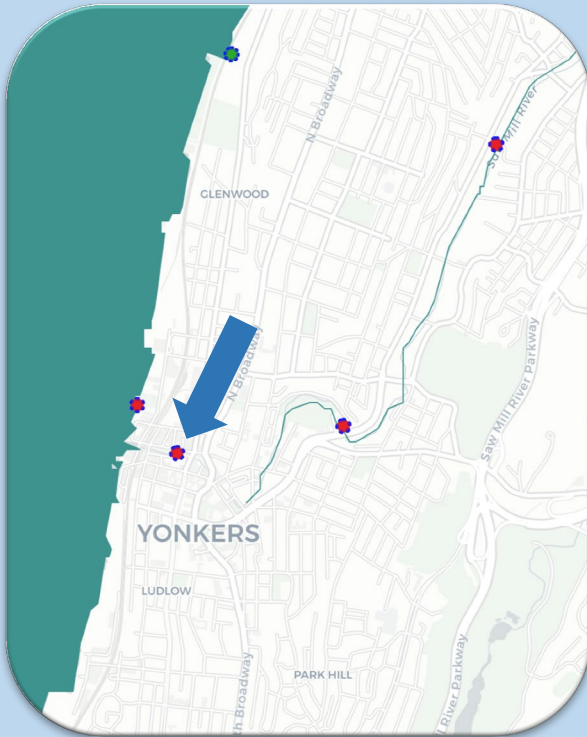
Research Question: Does incubation time affect the number of *E. coli* or coliform bacteria colonizing microplastics?

Hypothesis: If microplastics are incubated in Hudson River water containing *E. coli* and coliform bacteria for two weeks, more colonies will appear than what appeared at one week.

1 week VS. 2 weeks

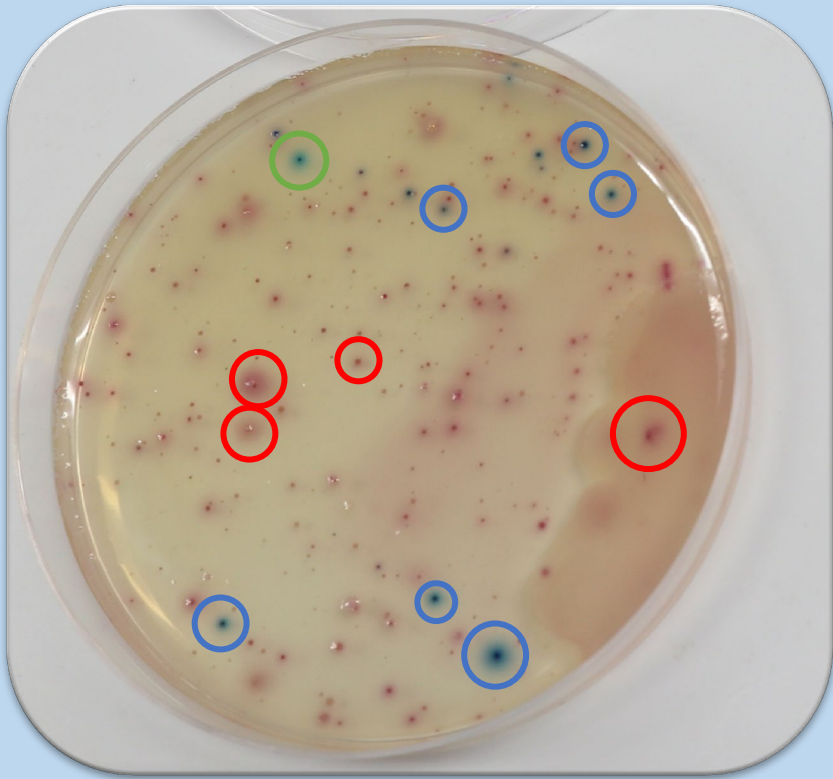


Sample collection



Van der Donck Park, Saw Mill River

Water testing



○ = *E. coli* colonies (Dark blue/ purple)

○ = Other fecal coliforms (pink/ red)

○ = Teal/ green

Sample set-up

All microplastics, jars, and equipment were sterilized before use

(1 Week)



(2 Weeks)



Negative Control: Sterilized water with microplastics

(1 Week)



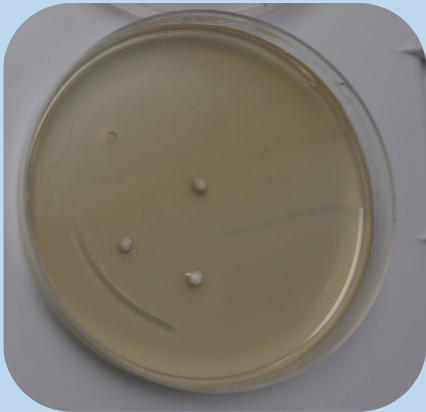
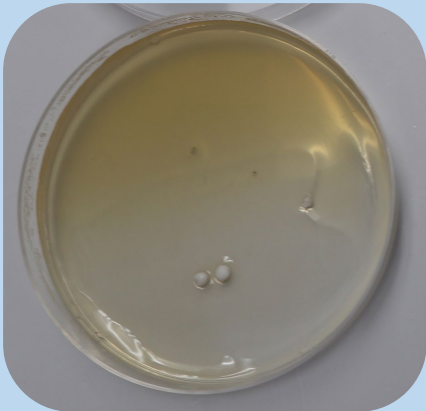
(2 Weeks)



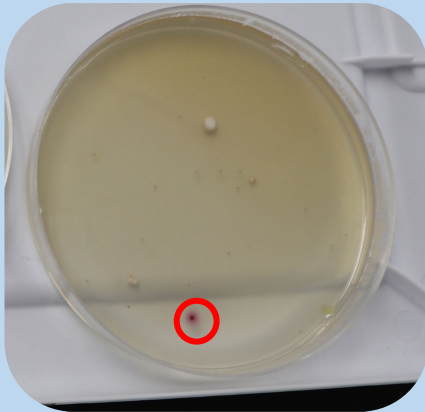
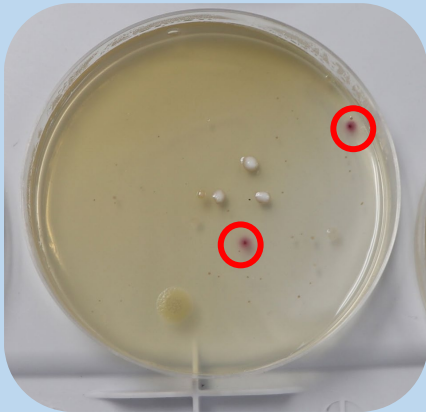
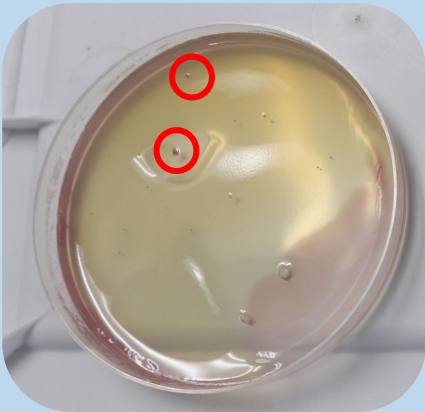
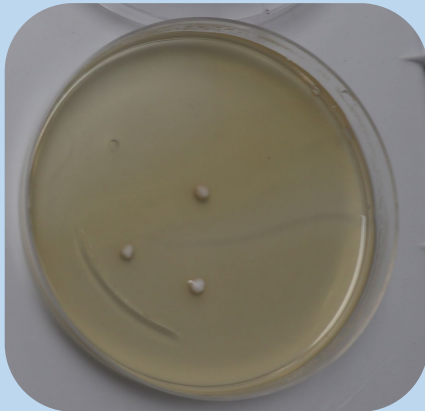
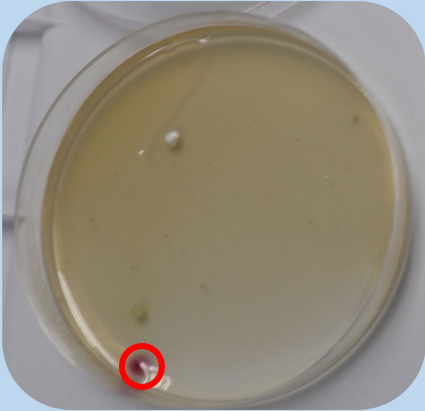
Experimental: Hudson water with microplastics



Microplastics testing



Negative Control



Experimental



Figure 1. Average E. coli and Coliform Concentrations
(Week 1)

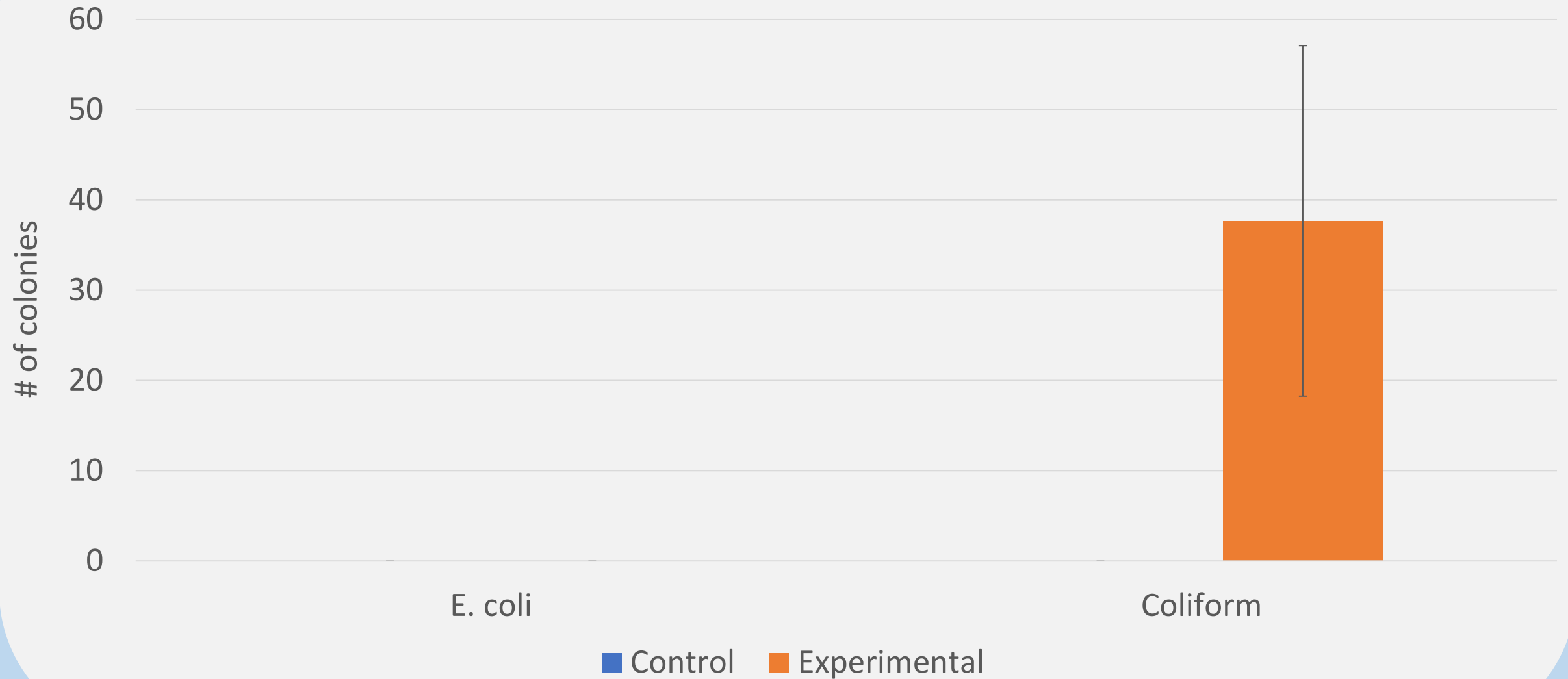
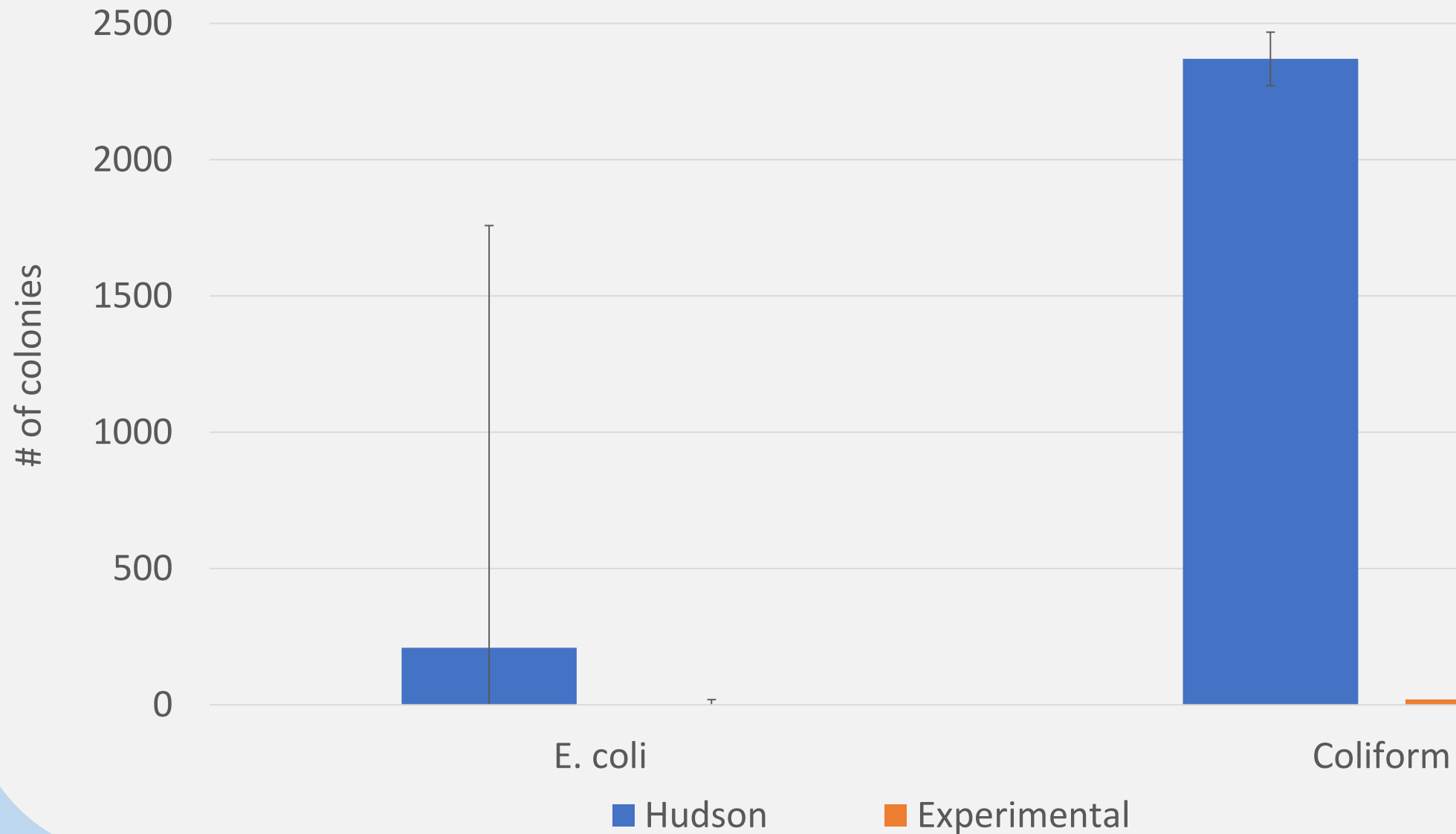




Figure 2. Average E. coli and Coliform Concentrations in Hudson Sample VS. Experimental (Week 1)



Pollution and health concerns



Future research

- Continue research at TESA
 - *E. coli* and coliform bacteria colonization on microplastics
 - Effect of incubation time on *E. coli* and coliform bacteria colonies on microplastics
- Transport of microplastics and coliform bacteria in the Hudson River
- Efficacy of microplastic removal methods from the Hudson

Acknowledgements

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- Dr. Begley-Miller and Dr. Rubbo
 - Ms. Zielinski and Mr. Erenberg
 - All of the TESA students
(especially Olivia, Alana, Alicia,
and David)
 - My family
- ...for their support and guidance!



Any questions?

Image Links

- https://www.pinclipart.com/picdir/big/163-1633734_most-plastic-bags-are-completely-recyclable-clipart.png
- <https://unixtitan.net/images/ketchup-bottle-clipart-black-and-white-5.png>
- <https://unixtitan.net/images/bacteria-vector-icon-4.png>
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- <https://www.riverkeeper.org/water-quality/citizen-data/saw-mill-river/yonkers-saw-mill-river-daylighted-section/>
- <http://file.iocwestpac.org/uploaded%20news%20rev/images/microplastic.jpg>
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