

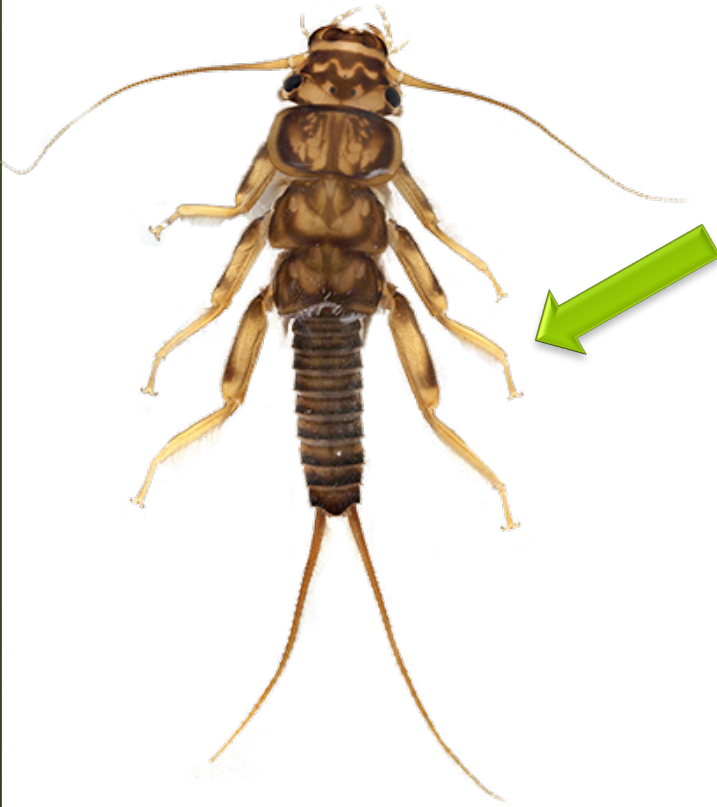


Testing Whether Benthic Macroinvertebrates are Bioindicators of Microplastics

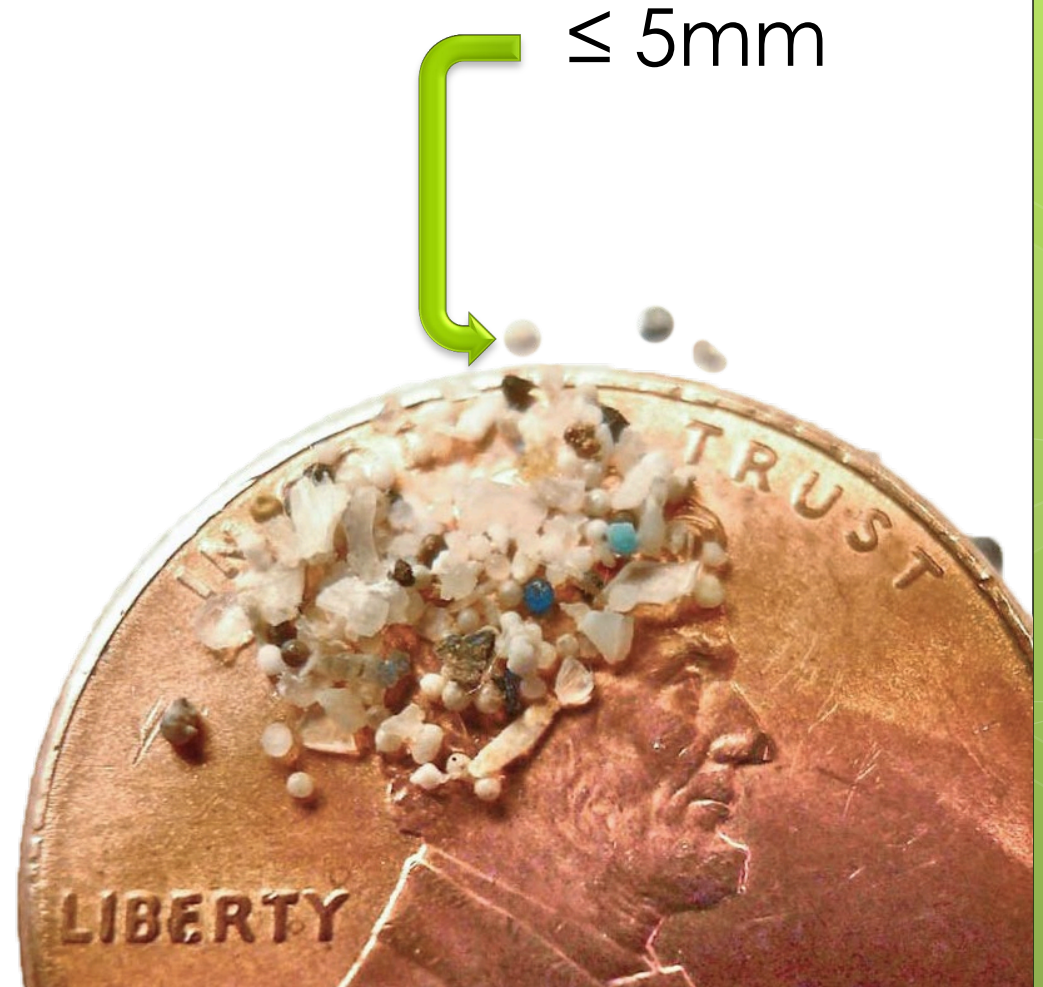
Alana Rabinowitz

Mahopac High School, 12th Grade

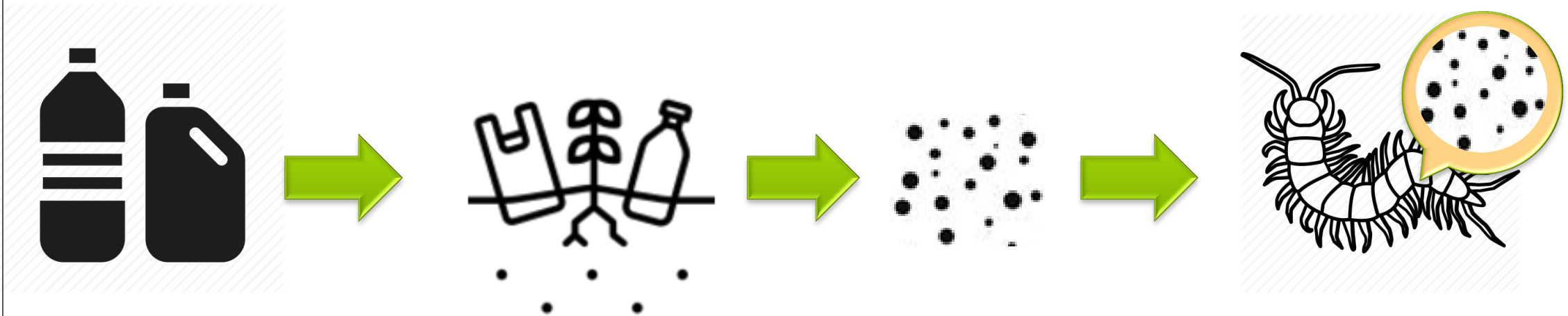
What are benthic freshwater macroinvertebrates & microplastics?

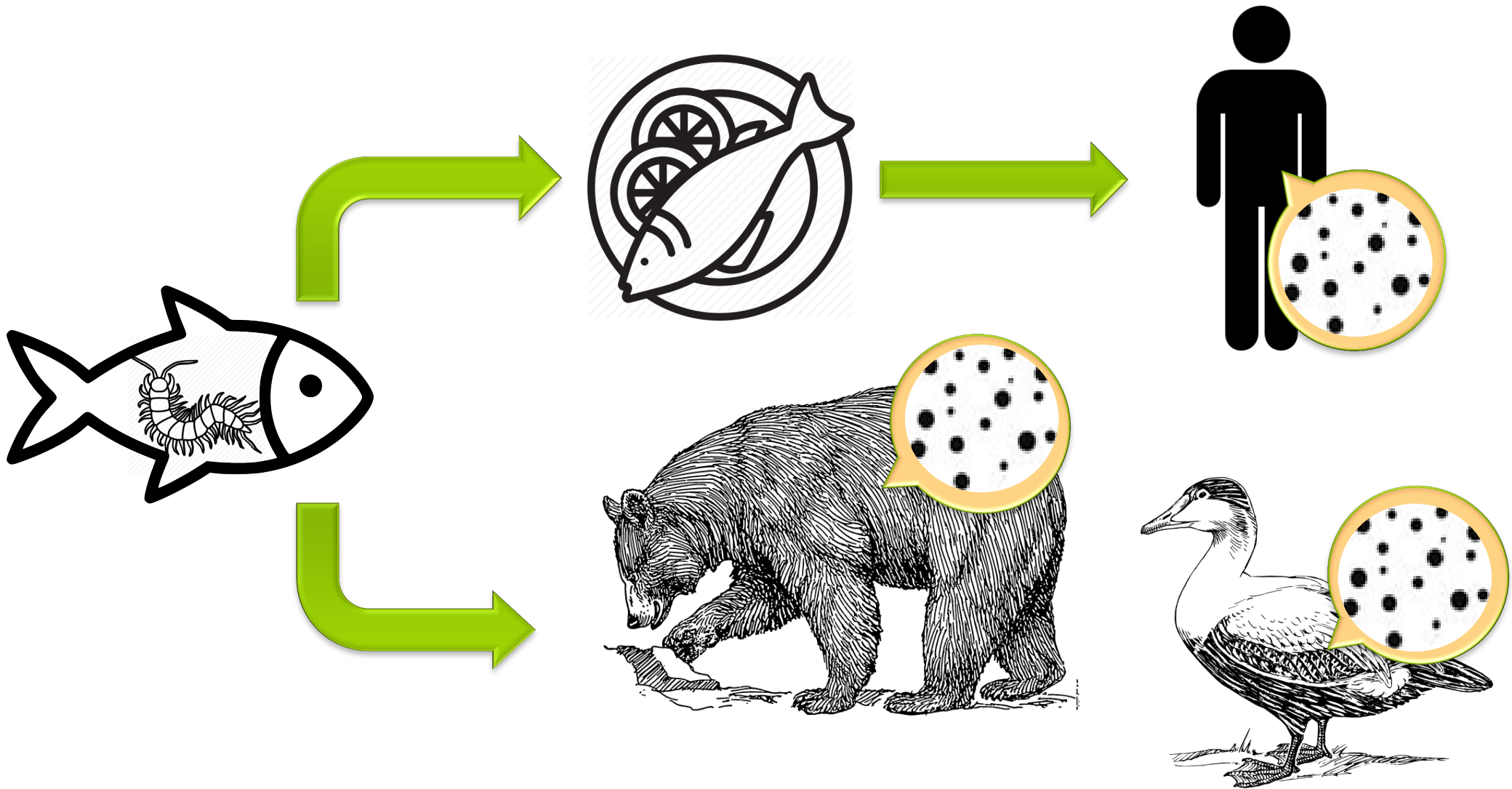
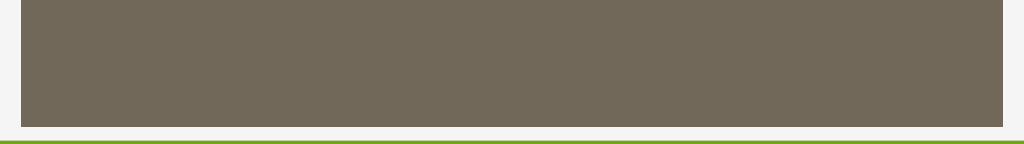


Spineless &
able to see
with the
naked eye



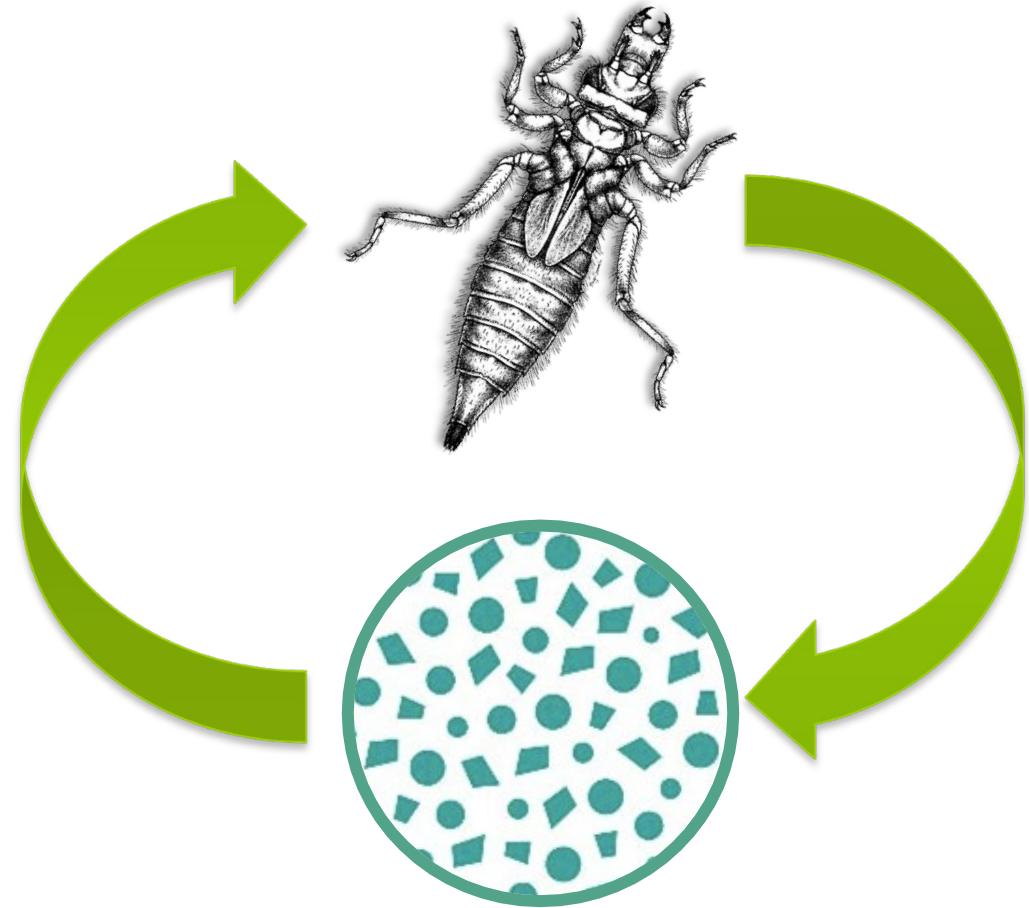
Why does this matter?





Hypothesis:

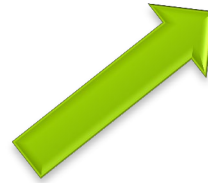
If macroinvertebrates ingest or respond to the microplastics then they would be a bioindicator of microplastics



Methodology

Selected 2 sites
(upper & lower) from
Bailey-Brook River,
TeaTown Reservation

Collected 36 liters of
water from upper site
Collected
macroinvertebrates &
sediments at both
sites



Methodology

Identified species of macroinvertebrates & separated the macros into levels of sensitivity to pollution



Each level repeated 2x



Aquatic Worm
(tolerant)



Dragonfly Nymph
(semi-tolerant)



Hellgrammite
(sensitive)



Methodology

Add plastic pellets to each container (amount based off past studies): Low= 30x2, Medium= 143x2, High= 255x2



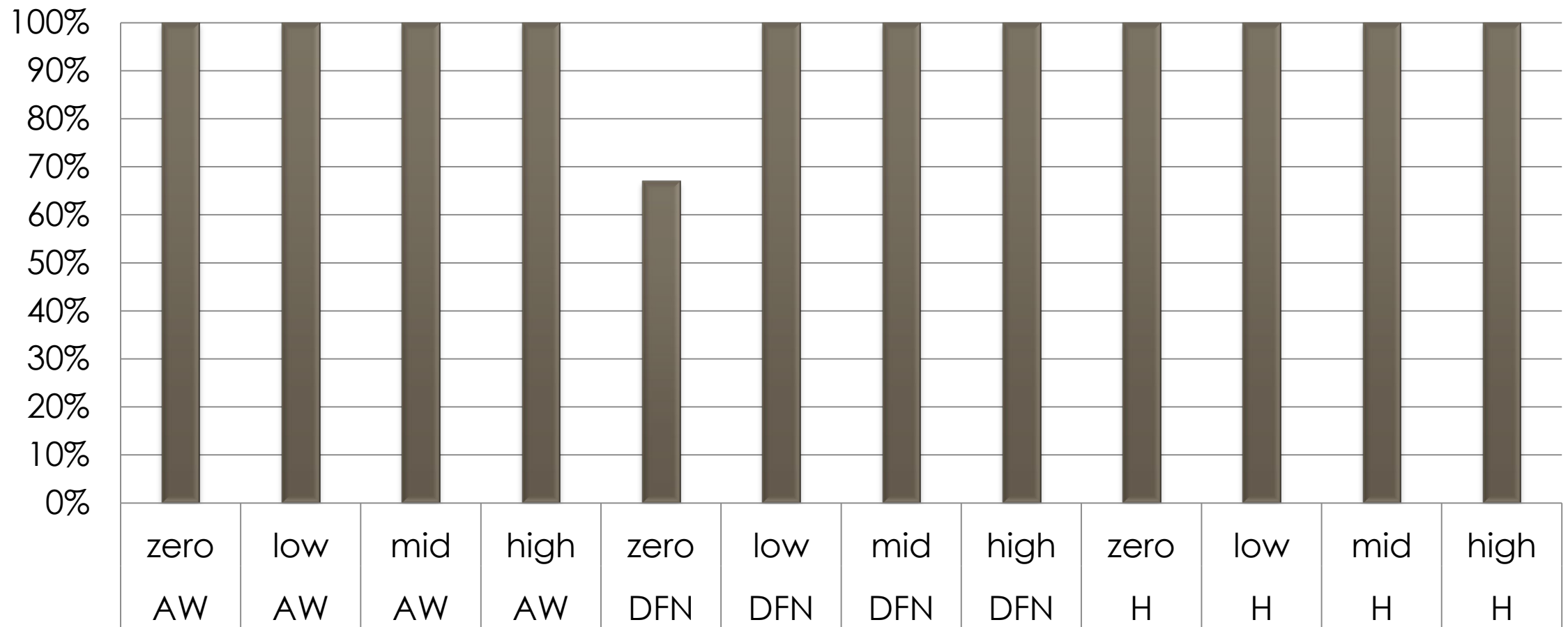
Transferred each species into a container

- Aerated the containers and rotated filters every few hours
- Record DO (Dissolved Oxygen), PH, and temperature every day
- Record the visible health signs of macros



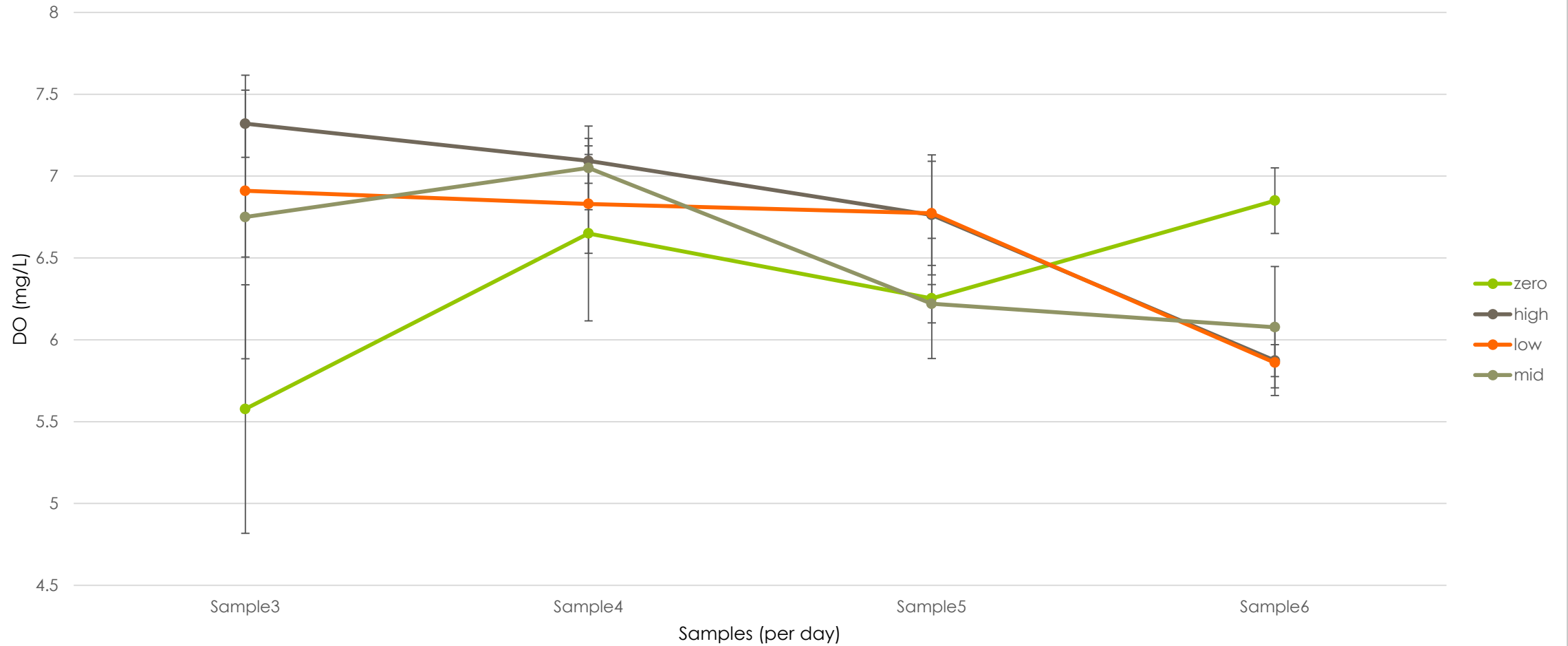
Results

Figure 1. Survival Rate of Macros



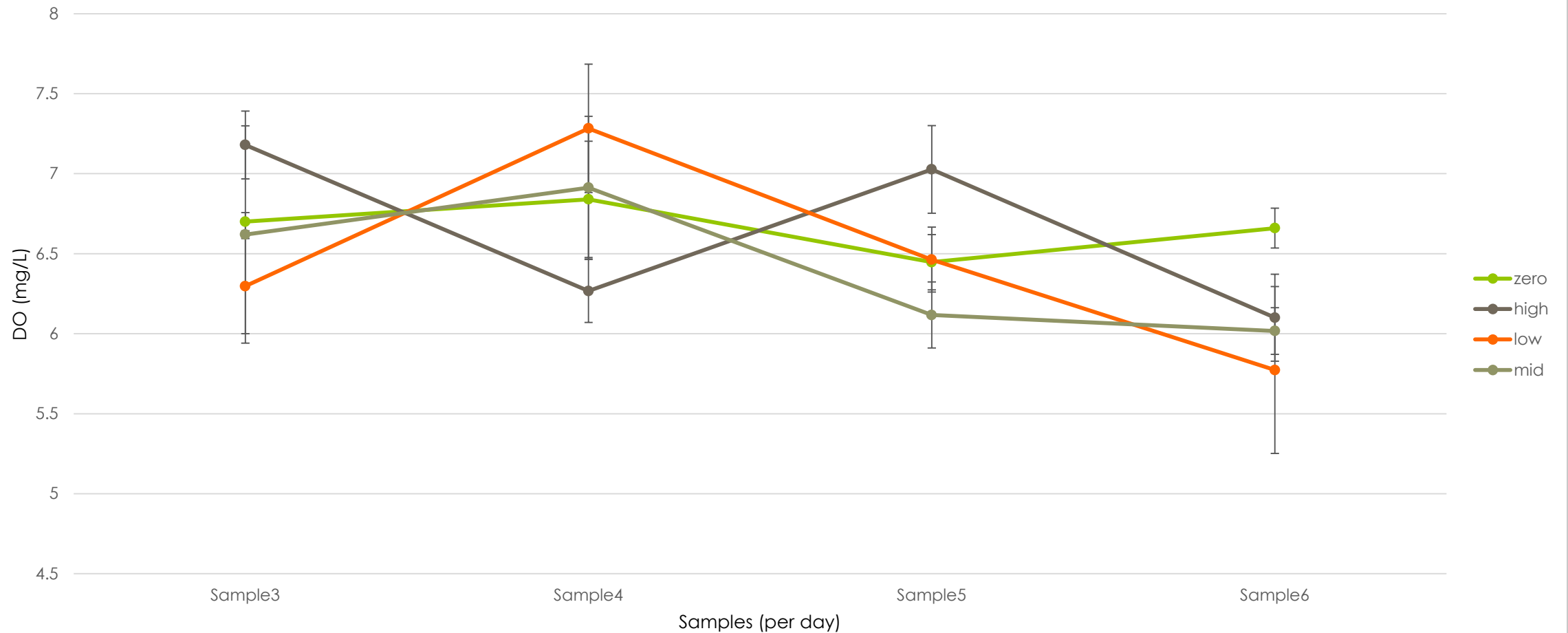
Results

Figure 2. DO per Treatment for Aquatic Worm



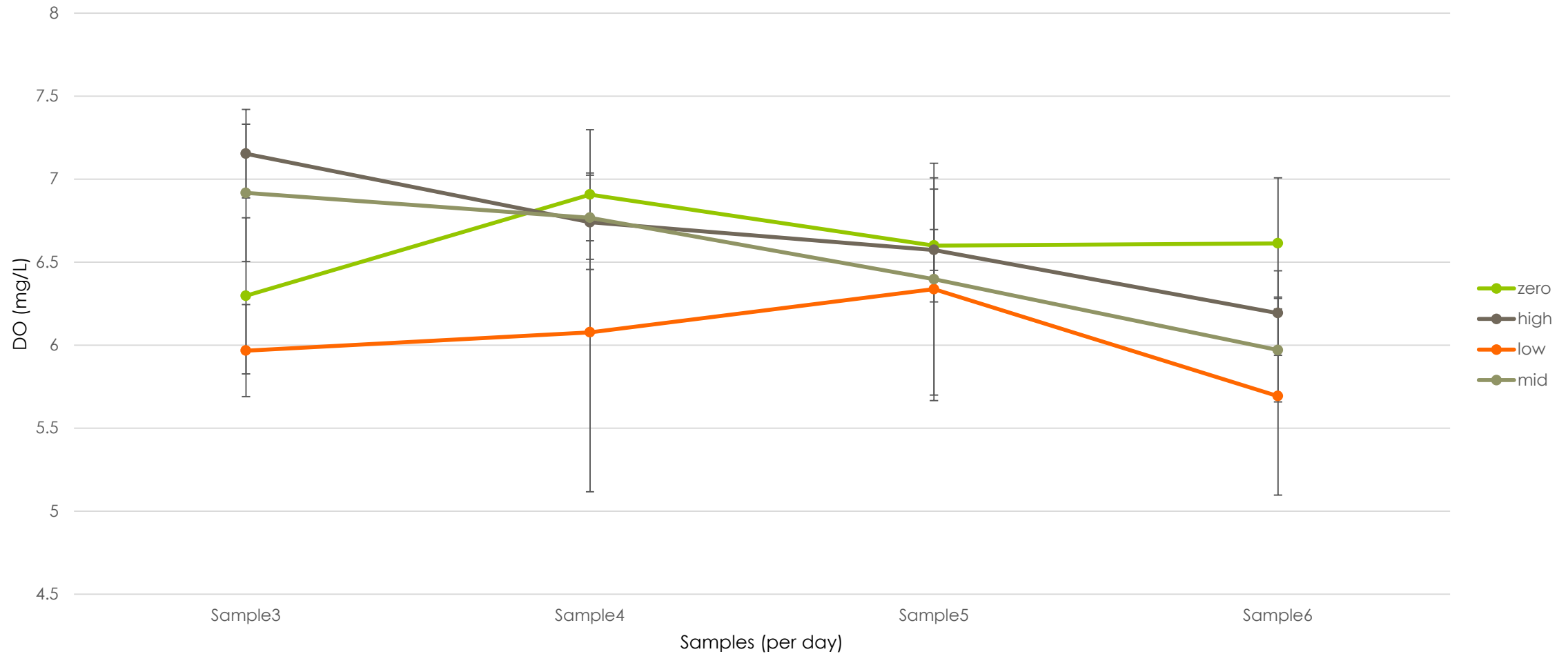
Results

Figure 3. DO per Treatment for Dragonfly Nymphs

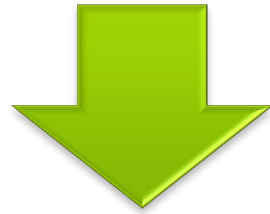


Results

Figure 4. DO per Treatment for Hellgrammites



Discussion



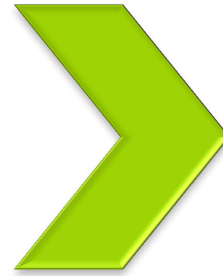
Insufficient evidence of macros
becoming bioindicators of
microplastics:

What Happened?



Limitations:

Duration of time



Lack of equipment: Aquatic filters

Figure 3. DO per Treatment for Dragonfly Nymphs

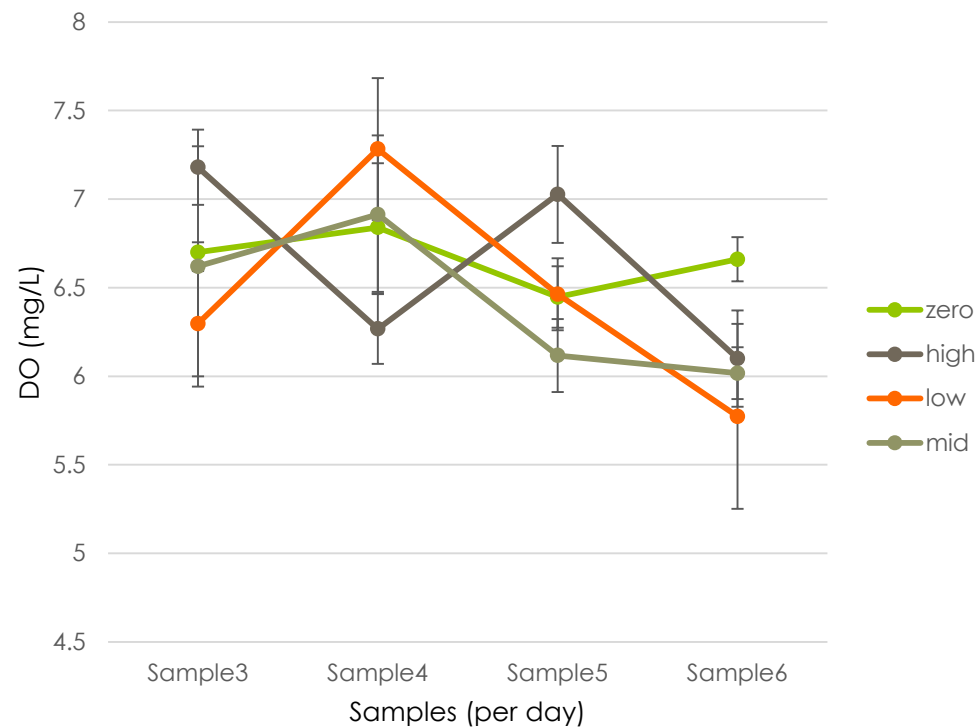
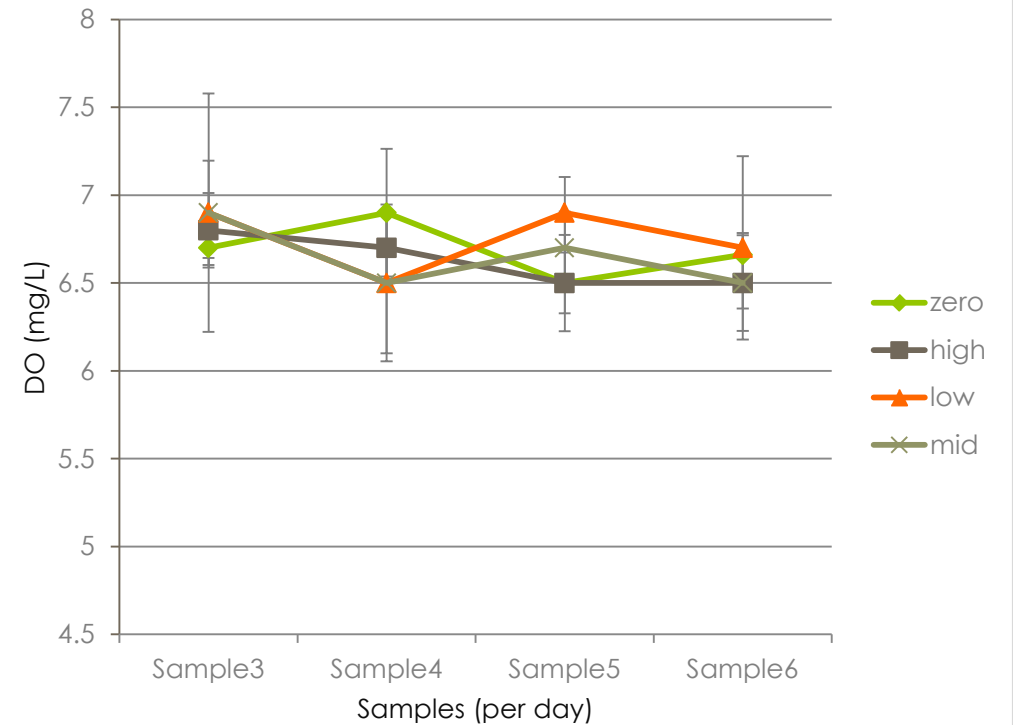


Figure 5. *IDEAL* DO per Treatment for Dragonfly Nymphs



Expected Results

After continuation of the experiment for the next 3-4 months:

I should be able to see if the benthic freshwater macroinvertebrate is a good indicator of microplastics in the environment. Whether that would show positive, negative, or no correlation at all.

A photograph of two young women in a stream. They are both wearing light blue shirts and tan waders. The woman in the foreground is smiling and holding a small clear plastic cup. The woman behind her is also smiling. They are surrounded by mossy rocks and flowing water.

Acknowledgements

I'd like to thank Dr. Rubbo and Dr. Begley-Miller as my mentors, Mrs. Stephens as my science research teacher, TESA students (special thanks to: Saya, Olivia, & Christian) as my friends and helpers along the way, and my mom for semi-supporting me.