The Fate of Microplastics in Tres Rios

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Introduction

- Microplastics, plastics < 5 mm in size, are caused through continual environmental exposure, resulting in their degradation into smaller particles[1]
- This form of pollution is of particular concern in the environment due to the ability to leach toxic byproducts such as phthalates, alter trophic dynamics, and their unknown capability to transform nutrient cycles[2]
- The purpose of this study examines MPs as they enter the system, leave, and their presence throughout the wetland (Fig 1.)
- Using Tres Ríos (TR), a tertiary wastewater treatment wetland, as the study site will help to shed light on the most likely source-occurrences of MPs
- Water, soil, and vegetation (*Typha)* were collected as the abiotic material in which MPs would show distribution in Tres Rios
- Hypothesized that plant material would act as a “sink”, meaning that MPs entering the system would be higher than leaving

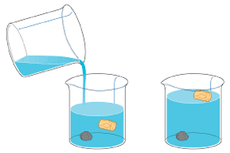
Figure 1. Tres Rios Wetland study site. Red arrows represents inflow (north) and outflow (south) and yellow arrows represents the collection sites for soil and vegetation samples.

Methods

Collection at TR

Dry and Sieve Samples

Weigh samples



Density Separation

Wet Peroxide Oxidation

Optical Microscope Identification

Figure 2. Illustration of methods for water, soil and vegetation samples used

Results

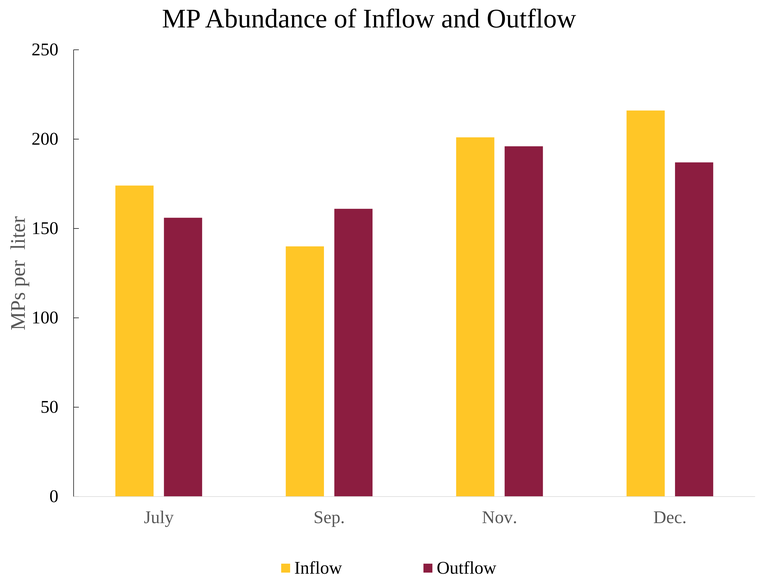


Figure 3. Shows distribution of abundances of MPs for inflow and outflow. Four sample occurrences are included red indicated inflow, yellow indicate outflow.

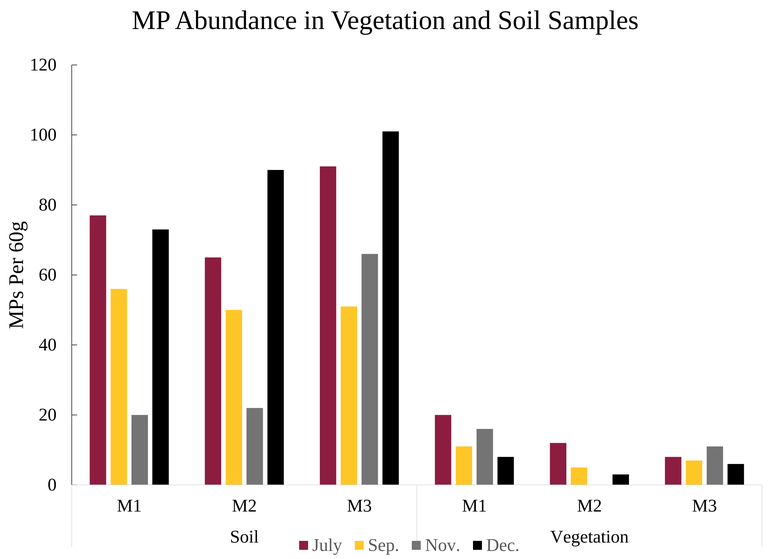


Figure 4. Shows distribution of abundances of MPs for vegetation and soil samples in three testing sites (M1, M2, M3).

Discussion

- The microplastic abundance regarding the inflow and outflow of the four collections showcase similar quantities. Indicating that inflow and outflow MPs are of complementary capacities
- These results show misalignment with the values of the soil and vegetation as they hold a significant proportion of MPs that should be represented by a reduction in outflow.
- As shown in all four collections of vegetation samples, they contain the least amount of plastics
- Soil sample exhibit slight variability within each sampling session and at each site, however, are a site sink.

Future Work

- Additional samples have been collected and are being analyzed. These may help to strengthen the results
- Due to the likelihood of atmospheric pollution playing a role in this system, atmospheric deposition samples will be collected and presented with results.
- This will help to provide a more robust idea of the interactions within the system.
- Further research will investigate the role vegetation plays regarding the movement of water within the system (suction into vegetated areas)

Acknowledgments

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References

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