

Analysis of Microplastics in Inflows and Outflow of Kandy Lake in Sri Lanka

S. Mayandi^{1,2*}, S.S.R.M.D.H.R. Wijesekara², and L. Jayarathne¹

¹National Institute of Fundamental Studies, Hanthana Road, Kandy, Sri Lanka.

²Department of Natural Resources, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka.

*mayandi1995shavini@gmail.com

This study presents the results of the first investigation into microplastics in the water of Sri Lanka's Kandy Lake. Microplastics (MPs) pose a growing environmental threat due to their small size (less than 5 mm). Plastic granules can be manufactured or degraded from larger plastic trash. Microplastic concentrations in freshwater sediments are like those in the most polluted sea sediments, and are produced by a special biogeochemical cycle that affects ecosystem health, productivity, and biodiversity. The concentration of this particle component is important for ecological processes in inland water bodies. Near the Joy boats service, Hillwood Stream, Near the Malwatta Viharaya, Near the Mahamaya School, Near the wetland bridge, Near the Buddhist Publication Society and Outflow of the Kandy Lake and processed for microplastics to assess the presence of MPs in the Kandy Lake. 21 samples were taken three times, 3 each from one location and 1L for each sample. Plastic separation was accomplished by density separation using NaCl followed by wet peroxide digestion, and identified by micro-Raman spectroscopy. MPs were found in every water sample, and they are widely distributed in the lake. The main type of polymer found to be low-density polyethylene (41.78 %) and other microplastic types are Polypropylene, Polyvinyl Chloride, Polystyrene, Polycarbonate and Polybutylene. The mean microplastic abundance was 3.096 mg/L, ranging from 1.10 – 5.55 mg/L from 136 different polymers. Near the Joy boat service site (5.55 mg/L) had the highest microplastic because it is in the town and crowded area and Near the Buddhist Publication Society site had the lowest microplastic abundance because that place is not a crowded area as other sites. Commonly present microplastic shape was fragment (69.23 %) because fragmentation causes the particles to break down into ever smaller pieces. The microplastic's most prominent color was Black in all the samplings. Black particles dominate due to styrene-isoprene rubber, PE, and PVC. This study shows how microplastics are distributed spatially in Kandy Lake.

Keywords: Fragment, Kandy Lake, Microplastics, Polyethylene, Raman Spectroscopy