Tracking Trends in Urban Ecology: A Comparative Review of Marine, Terrestrial, and Freshwater Systems

By Dr Eliza Heery PhD, Tom Nguyen

Marine environments are experiencing rapid and large-scale urbanization, yet ecological research has not consistently reflected this transformation. Urban ecology has historically concentrated on terrestrial and freshwater systems, even though understanding urban marine systems is increasingly critical for effective management of coastal ecosystems. To address this gap, we asked: Are marine studies less likely to be urban-focused than terrestrial and freshwater studies? We assembled a dataset of 70,286 articles published across 22 leading ecology journals that regularly feature terrestrial, freshwater, and marine studies. Articles were classified by system type using a language model (GPT-3.5), with human validation incorporated to estimate misclassification rates. Urban focus was determined via a keyword-based approach inclusive of marine-specific topics such as ocean sprawl and pollution pathways. We applied a mixed-effects logistic regression to test whether study type predicted the likelihood of being urban-focused, with sensitivity analyses confirming model robustness. Our results show that marine studies are significantly less likely to be urban-focused than terrestrial or freshwater studies ($p < 0.0001$). Although urban-focused marine publications have increased over time, this growth has not kept pace with terrestrial and freshwater systems. These findings underscore a disparity in urban ecological research and highlight the need for greater attention to urban marine systems by ecologists, funders, and journals in order to align ecological science with accelerating coastal urbanization.