

# Temporal Trends Reveal an Urban Marine Ecology Research Gap



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## Introduction

Urbanization vastly changes coastal water ways and makes understanding the complexities and challenges of urban water systems all the more important. The goal of this meta-regression was to determine whether the publication rate of urban marine ecology studies has changed over time compared with urban ecology studies in non-marine systems (terrestrial and freshwater). We performed the analysis using articles published in 22 ecology journals, and using human-checked AI designations of whether the articles were marine or non-marine. This allowed us to build a time series to see how the publication rate of urban marine studies compares historically to now.

## Aim

Assemble a dataset that would allow use to get at questions like:

1. Is urban-focused ecology research less extensive in marine systems than in terrestrial and freshwater systems?
2. Has this always been the case?
3. Is urban marine ecology catching up in terms of publication rates?

## Methods

Article abstracts were fed into an AI large language model which sorted them into categories (Marine, Terrestrial, Freshwater, Uncertain). Then researchers were offered the same abstracts and were asked to sort them. This culminated in a misclassification rate of 0.6% for the AI and a 2.3% for student error. To ensure estimates were conservative, we assumed a 5% error margin for analysis. We used keyword searches ("urban", "urbanization", "urbanisation") to designate an abstract as urban-focused.

## Results

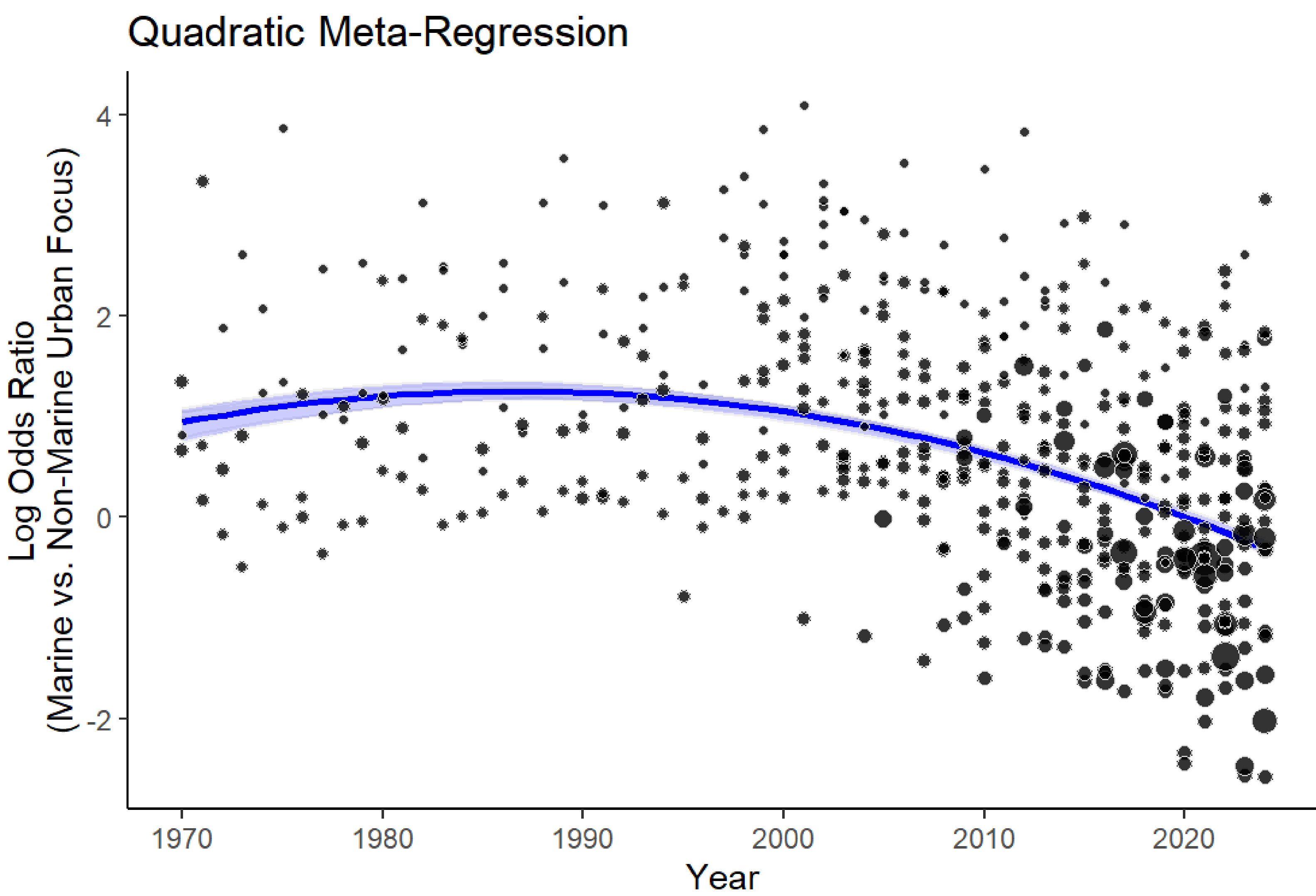


Figure 1. Scatter plot of log-odds ratios vs years. Log-odds ratios were computed for each journal and year. They were used as a measure of how much more or less likely marine studies were to be urban-focused compared to non-marine studies. Values > 0 indicate marine studies were more likely to be urban-focused than non-marine studies in that year. Values < 0 indicate marine studies were less likely to be urban-focused than non-marine studies in that year. The quadratic trend line was derived through meta-regression using the metaphor package in R.

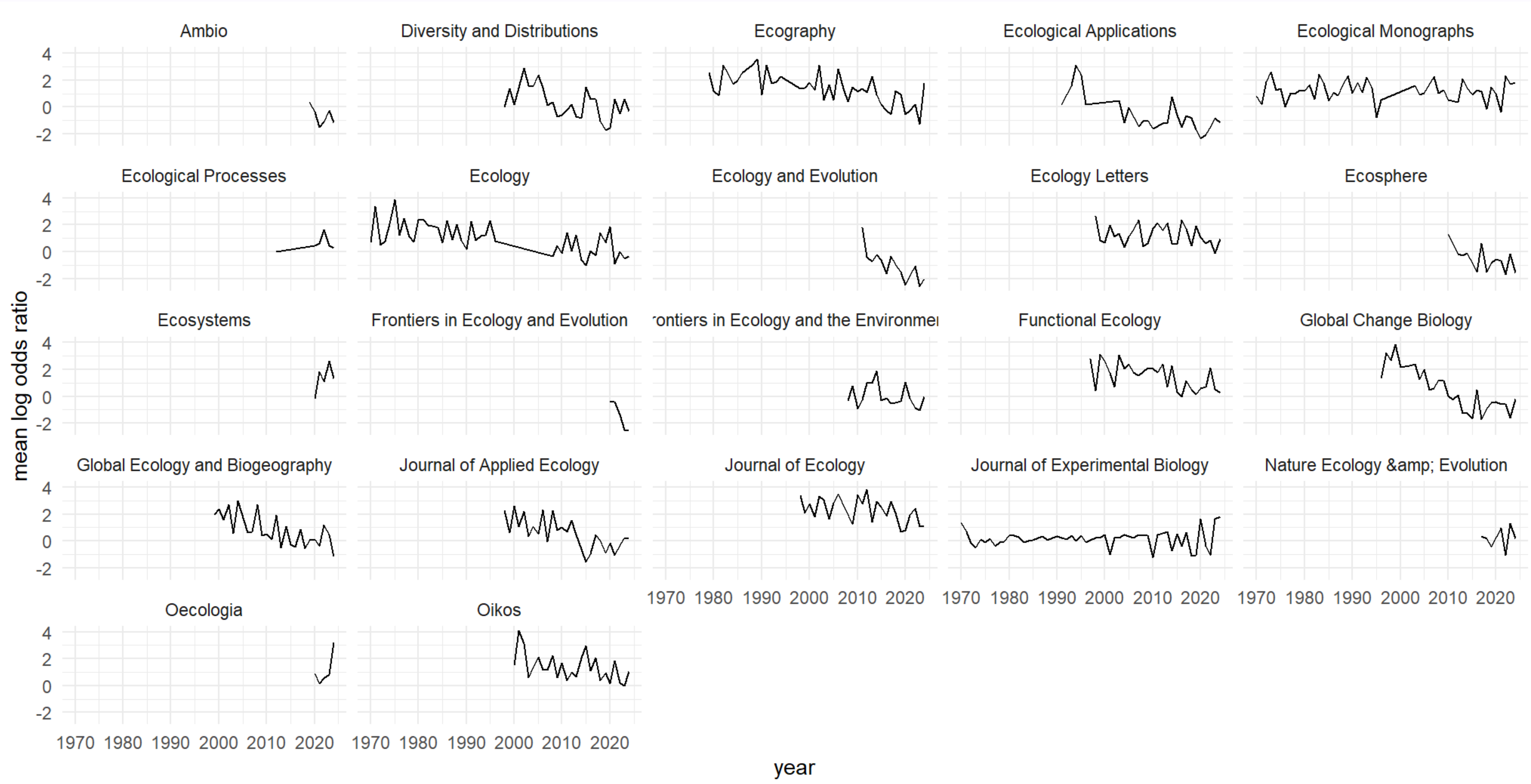


Figure 2. Uses a mean log odds ratio now broken up across specific journals and shows that no particular journal is driving the curve.

## Discussion

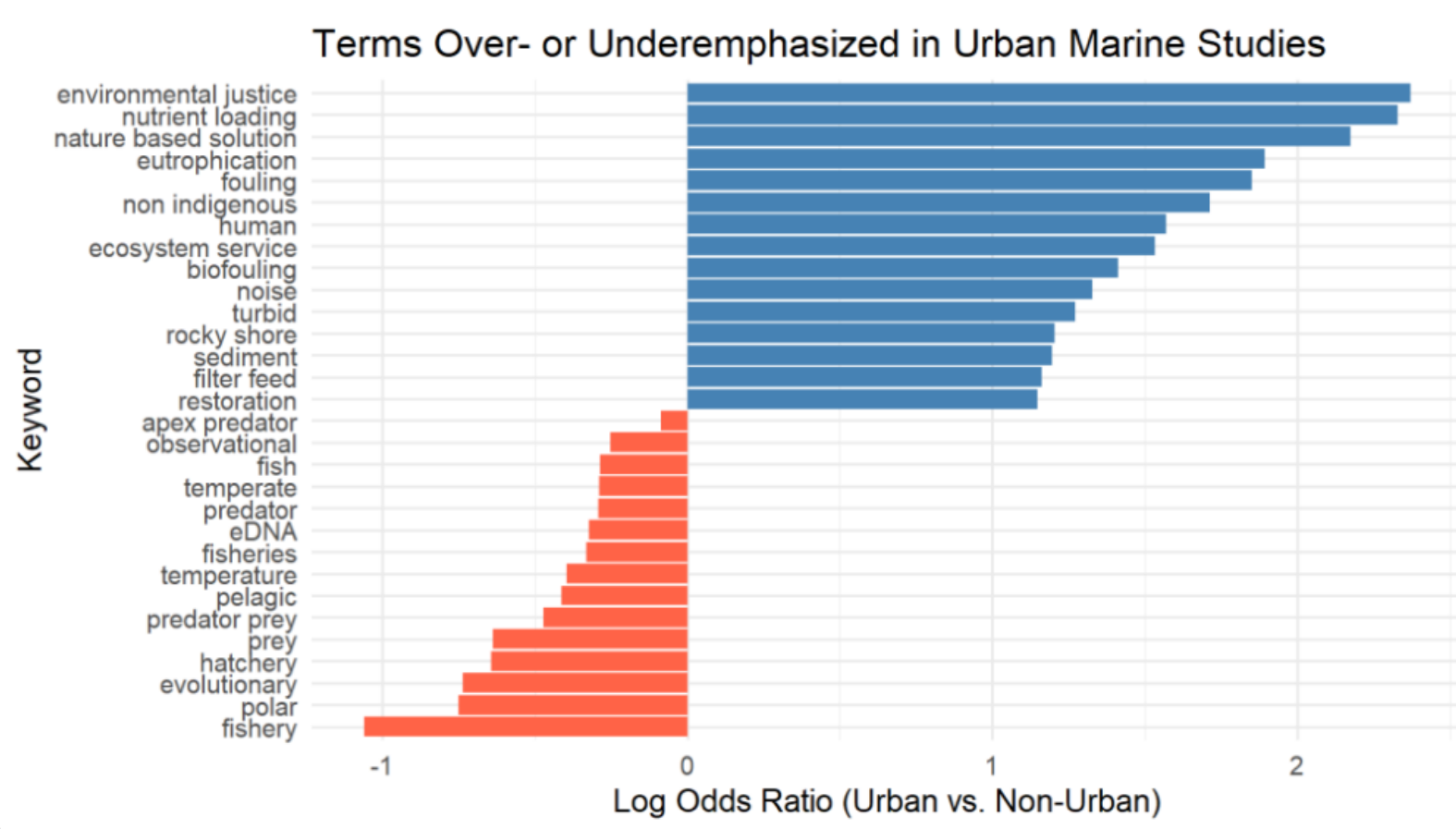


Figure 3. Shows keyword uses between urban and non urban studies

The results showed that marine studies have become less urban-focused over time. Due to time constraints, we were unable to review the complete set of articles, which consisted of 70,286 published works. The data we have reveal that this trend is prevalent across many journals and is not driven by any single one, as indicated by the "leave-one-out" analysis. No specific signifier or element has been identified as driving this trend, but it has revealed a gap in the research—more work in urban marine ecology is needed to keep pace with urban ecology research in terrestrial and freshwater systems.

## References

