Identifying Knowledge Gaps of the Spatial Ecology of Male Sea Turtles Through a Systematic Review

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Introduction

- Data on spatial distribution are fundamental to identify key areas of aggregation and inform conservation management.
- Most research available on the spatial ecology of sea turtles excludes mature males.
- Female sea turtles make up most of the research due to easier access when they come ashore for nesting.
- Males spend no time on land and are difficult to identify in in-water studies.
- Analyzing all life stages of sea turtles provides a comprehensive understanding of behaviors and habitats.

Methods

To identify our current knowledge basis on the spatial ecology of male sea turtles, a meta-analysis was conducted to synthesize existent literature published between 1974-2017 and obtain information on various data sources, such as satellite telemetry, GPS tracking, and flipper tags (Fig. 1).
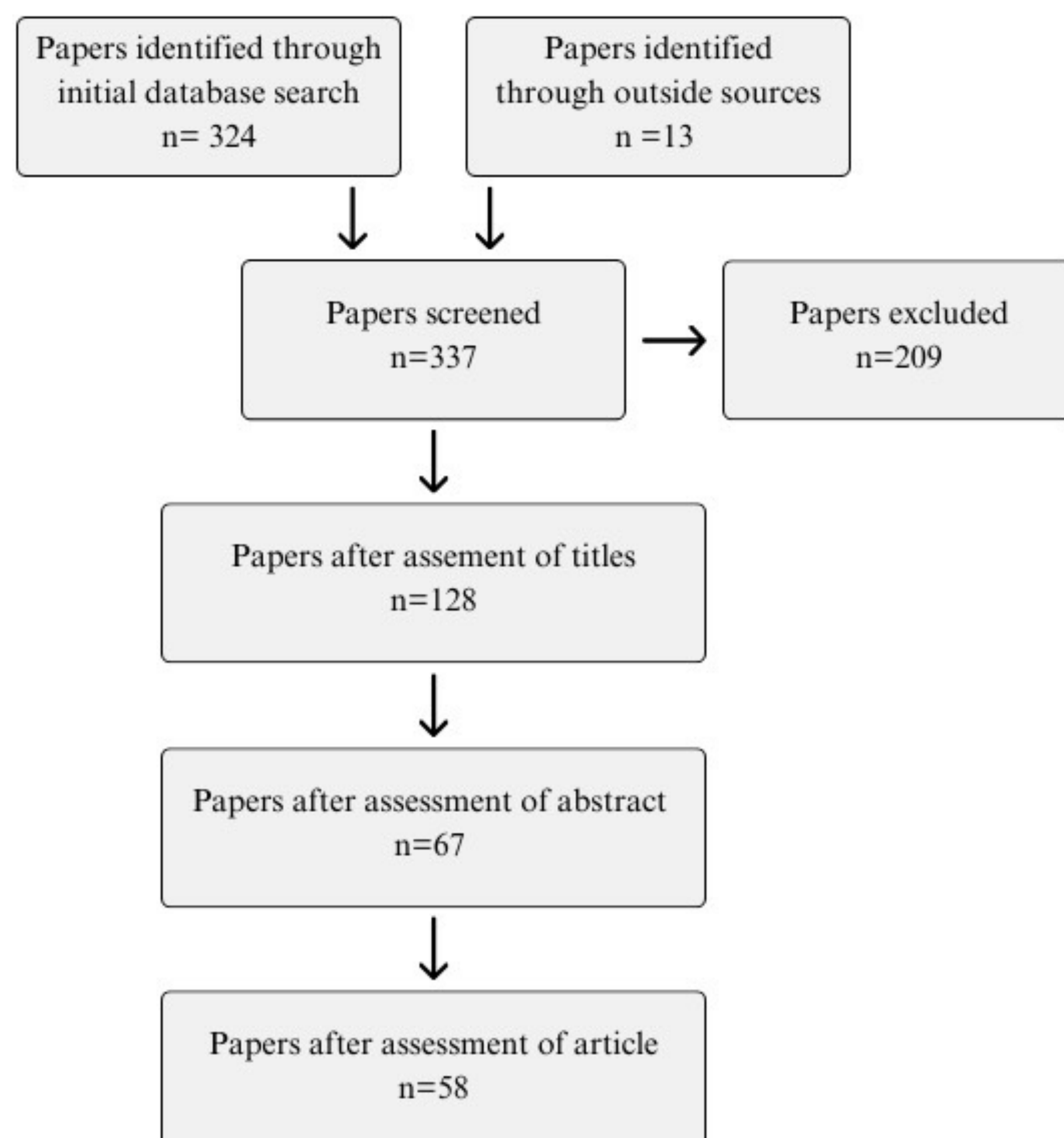

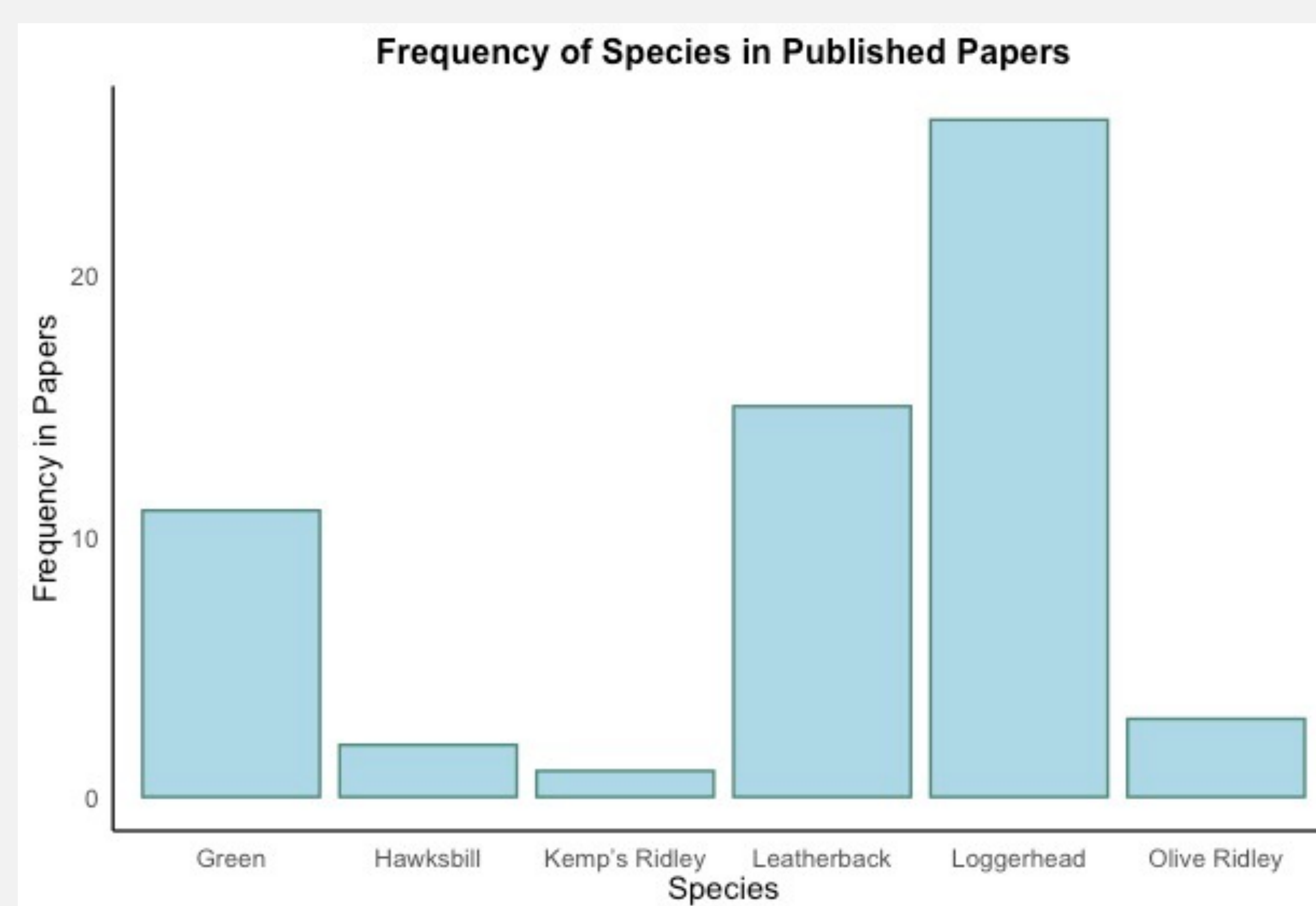Figure. 1: PRISMA flow diagram of meta-analysis review procedure.

Results

- The initial search yielded 324 papers published from 1974-2017, which were narrowed down to 58 papers based on relevance (Fig. 1).
- There was a visible disparity in the species represented in studies, with Loggerhead turtles comprising 44.8% of the studies, whereas Flatbacks had no data (Fig. 2).
- Spatial ecology research was most prominent in the North Atlantic, accounting for 40% of the papers (Fig. 3).
- Migration was the most frequent topic (33%), while distribution and breeding were least covered (10% each) (Fig. 4).

Figure. 2: Frequency of species in published studies of the spatial ecology of male sea turtles.
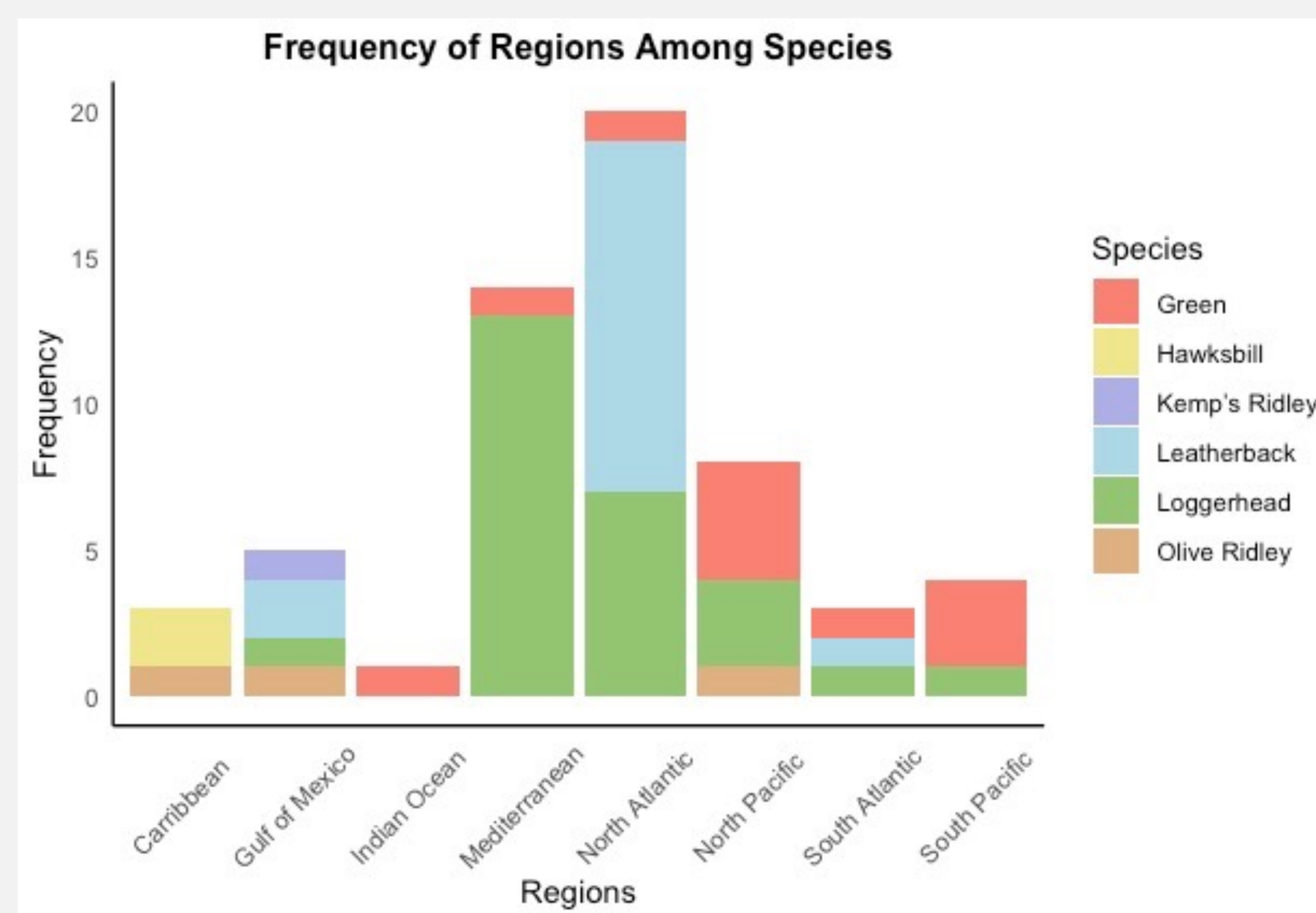

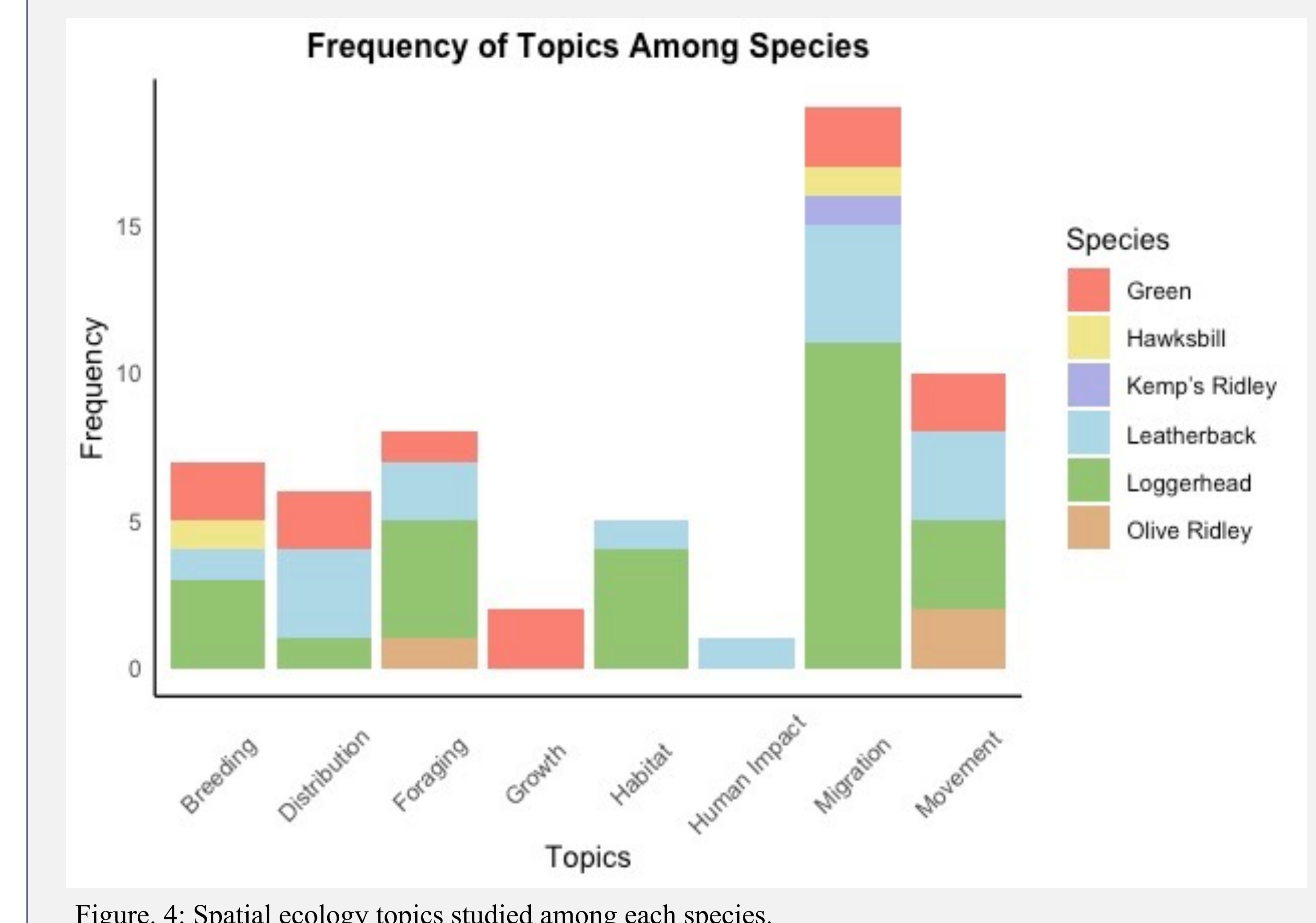Figure. 3: Frequency of species studied in ocean regions.

Figure. 4: Spatial ecology topics studied among each species.

Discussion

- This meta-analysis identifies knowledge gaps in our understanding of male sea turtles, as the results highlight the lack of comprehensive data on several sea turtle species and regions.

- Flatback sea turtles were classified as data deficient by the International Union for Conservation of Nature (IUCN) in 1996 due to insufficient information to assess their extension risk. Hawksbill and Kemp's Ridley were classified as critically endangered, hindering research efforts due to their scarcity.

- Our meta-analysis findings reflect the need for further research incorporating underrepresented species across regions globally. Understanding spatial ecology of all species is vital for determining conservation status, informing management areas, and designing effective conservation strategies.

References

Wildermann, N.E., et al. (2018) Informing research priorities for immature sea turtles through expert elicitation. *Endang Species Res37*: 55–76.
Gurevitch, J., et al. (2018) Meta-analysis and the science of research synthesis. *Nature*555(7695):175-182. doi: 10.1038/nature25753
Red List Standards & Petitions Subcommittee. 1996. Natator depressus. The IUCN Red List of Threatened Species 1996: e.T14363A4435952. http://dx.doi.org/10.2305/IUCN.UK.1996.RLTS.T14363A4435952.en

Acknowledgements