

Overall

Thank you for the opportunity to review this Masters thesis, which looks at herbivore occurrence at waterholes of different types. As stated, the work provides information on a managed, fenced population of animals, a situation that is likely to become increasingly prevalent and so the resulting ecology should be studied and understood. Below are some general comments followed by more specific comments for each section.

General comments

Throughout the thesis, the sometimes poor English makes it difficult to understand exactly what the author is trying to say and it is therefore hard to work out whether the statement is incorrect, or whether the phrasing is incorrect. Improving the writing could be done fairly easily with ChatGPT or similar AI software, which can be used to clean up the grammar without altering the content.

The term 'activity' needs to be defined exactly early on. This is the biggest source of confusion in the thesis. Activity can be defined in several different ways and they are not interchangeable. This term is used throughout the thesis so it needs to be defined, including what the term represents and exactly how it was measured. There must be a clear distinction between methods used to detect animals and those used to document activity/behaviour.

The flow of the thesis needs to be consistent: Temporal or spatial activity should be first in each section, rather than jumping around between the two. I am not convinced that 'spatial activity' is the correct term, as it refers to the type of water resources rather than any spatial elements. Selection of a particular type of waterhole is not necessarily linked to competition.

A lot of the cited literature is fairly old and some new information has been generated more recently. However, the author has clearly read fairly widely and has gone beyond their study area.

All common species names must be followed with their Latin names at first mention.

Alteration and alternation are not the same thing. In this case, alteration is the correct term.

Abstract

It would be good to highlight why it is important to look at fenced reserves without a complete mammal community. For example that such reserves are increasing as a means of conserving land and species while recognizing that not all species can survive in those conditions.

Activity should be better explained.

The reason for differences is the presence of predators? But not in your study system and literature shows that in the absence of predators prey species can behave differently.

Visited the river more than expected? Does that mean river rather than waterholes? Or that they drank more often than you thought?

The last couple of sentences could be made clearer. *E.g. species with different diets (grazers and browsers) overlap*

The abstract should give some indication of the hypotheses being tested.

Introduction

Very few citations in the first 2 paragraphs.

Water dependency is a gradient, rather than just being water dependent or independent. More work has been done on this since 1975.

GPS data being combined with fine-scale accelerometry data are increasingly being used to study behaviour, but there is not reference to this here.

For the camera trap section, there is information on the benefits, but not a balanced argument presenting the flaws of the method. Oddly, this is presented in the discussion but should appear here.

The research questions should be linked to directional hypotheses that are based on the literature review. There should already be some thoughts as to which season will see the highest visitation, how species might be segregated, etc.

Methods

A large amount of detail given over to presenting information about all the ungulate species. You could probably summarise the key points in a table. E.g. body mass, diet, level of water-dependency, possibly habitat preferences. These are what are relevant to the study.

Based on the photographs, the camera traps were positioned fairly far from the water sources. Could they detect movement on the other side? Was there any difference in detection between day and night?

How were the river spots selected? Do they offer better access than other points? If not, the concept of competition to exclude animals from particular sites is rather tenuous. If animals can drink anywhere along the river, competition would not be a problem.

More information could be given about the study design: what happened if multiple species occurred in one photo? There is reference to “presence of juveniles” as a predictor, but the analysis that relates to is unclear. The response and predictor variables for each analysis should be presented more clearly.

Nowhere is ‘activity’ defined. Is it the number of images of a species per hour? Per 15 minutes? Is it the proportion of images per hour that contains a given species? This lack of information makes it very difficult to assess whether the models are appropriate.

Results

Spatial occupancy

This section is misnamed. It appears to relate more closely to water source preference, rather than spatial distribution. It is unclear what the difference is between preference and occurrence – what is meant by “absolutely more”? Why is there only one statistical result? Should there not be one per species? There appear to be two sets of analysis to look at preference for water type – why use two analyses for the same purpose?

Temporal activity

The explanation of the parameters being tested should be in the methods, not the results. The term “activity”, having never been defined, here appears to relate to presence at the waterhole, not behaviour. The explanation of the model parameters is not clear. Was the response variable

hour of the day? Day/night? This needs much more clarity. Figs 7 & 8 are only shown much further down, when they should be included close to their first mention.

It is unclear how proportion of activity was calculated. Is that the hours of the day in which images of that species was captured on a camera trap? And when you talk about the animal being active at waterholes, does that mean that any animals resting there were not included in this?

What is included in the “other” category for a feeding guild?

Discussion

The first section is a summary of the findings. It would be useful to relate these back to hypotheses and make sure that the order of research questions (which should be developed with hypotheses) be followed here.

The spatial aspect is really about the type of water source being selected, so extrapolating to habitat selection is dangerous. For that to be a valid discussion point, the habitat type should be considered rather than the water source type. The artificial waterholes are also unevenly distributed, with clusters in some small areas, so habitat preference cannot be extrapolated from those. The discussion should focus on the types of water source with some acknowledgement of the differences in habitat, rather than dismissing the type of water source when habitat was not actually considered in the analyses.

The assumption of predation risk without any supporting evidence is taking the conclusions far beyond the results from these data.

The section on camera traps and AI is odd. Some of this information should have come much earlier, in the introduction, and other sections on limitation should be in the next section. It would be more interesting to have assessed the detection capacity of the cameras at different points of the waterholes, in the day and night, and to really work out the error rate of the AI, rather than just choosing to trust it.

Evaluation

- goals and hypothesis are clearly stated

Hypotheses were not presented but the research questions were clear.

- methods are appropriate for reaching the goals

The level of English writing sometimes makes it difficult to understand whether the methods were appropriate, but for the most part the study appears to have been well designed.

- results are clear and understandable

The results are somewhat confusing, in part because of the grammar, but also because of the inconsistency in the flow.

- results are discussed in broader context and questions are answered

The results are indeed discussed in a broader context and the questions are answered, but the discussion goes beyond the information provided in the results so should be adjusted.

Recommendation: Pass, suggested grade level 2

Review compiled by

A handwritten signature in blue ink, appearing to read "Bennett", is centered on the page. The signature is fluid and cursive.

Dr Emily Bennett

15th May 2024