Dear Dr Gimenez,  
  
I have now received the reports from two referees on the paper you submitted to Aquatic Conservation (Manuscript ID AQC-24-0259 entitled "Spatial occupancy models for data collected on stream networks"). I am pleased to tell you that we can accept your paper for publication in AQC, provided that a range of amendments are completed satisfactorily.

>> Thank you very much, that’s great news!

The referee reports can be found at the bottom of this mail. You will see that both referees are broadly positive about the paper, but provide a range of useful suggestions for improvement that I encourage you to fully address.

>> I have addressed all comments. Thanks to the referees for their time and commitment.

Prior to resubmission, please also cross-check against our formatting guidelines, which can be found on the [AQC Author Guidelines webpage](https://onlinelibrary.wiley.com/page/journal/10990755/homepage/forauthors.html).

>> Done.

Before the references please also ensure you include:

* **Data Availability Statement:** we encourage all authors to make their data publicly available upon publication, preferably via deposition in a public data repository – which can then be cited with a DOI in the Data Availability Statement. Data may also be provided as supplementary files with the manuscript if a data repository is not available to the authors. If data cannot be made publicly available, for example due to ethical or security concerns, this should be justified in the Data Availability Statement. Please note, that "Data are available on request" or similar is not sufficient without justification for why the data cannot be made publicly available.
* **Ethics and permit approval statement:** all ethical and permit approvals required and attained for the research should be stated here. If no approvals were required, this should be explicitly stated.
* **Funding statement:** Please acknowledge all funding sources.
* **Conflict of interest disclosure:** please declare all potential conflicts of interest. If there are none, please explicitly state this.
* **Permission to reproduce material from other sources:** if applicable, please provide details on the permissions attained for reproducing material from other sources.

>> Done.  
  
I look forward to receiving your revision in due course.  
  
Yours sincerely,  
  
Dr Heidi Burdett  
Associate Professor  
Umeå University, Sweden  
  
Referee(s)&apos; Comments to Author:  
  
Reviewing: 1  
  
Comments to the Author  
The author proposes an extension of spatial occupancy models designed for streams and rivers. The model could improve the monitoring of biodiversity in freshwater ecosystems. However, it&apos;s hard to determine if the model is effective. While the results section includes parameter estimates and commentary, the manuscript lacks an evaluation of the model&apos;s predictive performance. To strengthen the manuscript, the author should consider including an analysis of the model&apos;s predictive accuracy, such as through cross-validation, model comparison, or other relevant performance metrics.

>> Thank you for your feedback. I fully agree with your suggestion. To evaluate the model predictive performance, I have now included a simulation study to assess parameter bias and model prediction error. The simulations are explained in a new subsection *Simulation study* in the section *Methods*, and the results are discussed in a paragraph in the *Results and discussion* section.  
  
Reviewing: 2  
  
Comments to the Author  
Review of " Spatial occupancy models for data collected on stream networks " by Prof Olivier Gimenez:  
  
This short communication presents a new occupancy model for stream networks that accounts for spatial dependence. The concept and case study are highly relevant and hold potential for application among both researchers and practitioners. However, there are several areas where clarity and completeness could be improved.

>> Thank you for your feedback.

Major Comments:  
1. Model Formulation and Notation:  
o The model description could be more precise, particularly in terms of notation. For example, numbering equations would improve readability. On Page 3, Line 62, the symbol i is introduced to represent the number of sites. This should be consistently used in the equation on Page 4, Line 40, or at least clarified that matrix X has i rows corresponding to spatial locations (if that’s the case). Furthermore, it should be mentioned that the length of the vector β and the number of columns in X correspond to the number of covariates plus an intercept.

>> I have followed all your suggestions, including numbering equations and making clear the dimensions and structure of mathematical objects. Thanks.

o On Page 6, Line 19, there is a missing epsilon ε term in the equation. This should be corrected for consistency.

>> Thanks for spotting that. I actually did not allow for more spatial variation than that captured by the tail-down model, so there is no need for an epsilon term here.

2. Inclusion of Priors in Bayesian Model:  
o Since the model is Bayesian, it would benefit from a clearer depiction of the priors used. Including a directed acyclic graph (DAG) or detailing the model components with their associated prior distributions would help readers better understand the assumptions behind the model.

>> I agree. I have detailed the priors I used in the *Bayesian implementation* section.

3. Bayesian Model Summary:  
o In the case study, I suggest including summary statistics of the estimated parameters in the appendix. Additionally, it would be helpful to present posterior densities and convergence diagnostics (such as trace plots) to provide insights into model performance and stability.

>> Good point. I have added a new figure with posterior densities and trace plots – see Figure 2. Summary statistics of the estimated parameters are provided in the text.

4. Acknowledgment of Computational Tools: It&apos;s generally good practice to acknowledge any external computational tools or code used in your analysis, such as R packages or code from GitHub repositories or CRAN, within the manuscript.

>> I agree of course. I did cite the most important packages I used in the *Bayesian implementation* section. I have added a few additional citations that were only referenced in the code, to properly acknowledge the contributions of the package developers and maintainers. Now that I have added some simulations to evaluate model performance, I’ve also extended that list.

Minor Comments:  
• P4, L15: The statement regarding the need for at least two independent visits to estimate occupancy and detection probabilities assumes that the species remain static. Please clarify.

>> This sentence was unclear, I agree, and it did not add much. Therefore I deleted it.

• P4, L34: It would be clearer to specify that β is a vector of regression parameters.

>> Done.

• P7, L19: This sentence is unclear—detection probabilities are generally expected to be less than 1. Please clarify.

>> I agree. In situation where detectability is high, close to 1, ecologists are reluctant to use occupancy models, which I perfectly understand as this will make little difference. I see why the sentence is unclear, thanks. I have added at the end of the sentence “which justified the use of occupancy models” to make my point clearer.

• Figure 1: The figure presents the number of detections, but the model and likelihood deal with presence-absence data. Please clarify. Additionally, in the legend of part (c), certain intervals (e.g., 90 to 150) are missing.

>> Thank you for pointing that out. You are correct that the model and likelihood address binary outcomes (0s and 1s), so the presence of 2s and 3s in panel b) could be confusing. To clarify, panel b) represents the sum of detections across the three repeated visits, which can range from 0 (if the species was not detected at any visit) to 3 (if the species was detected at all three visits). In panel c), the missing intervals (90,120) and (120,150) are due to the absence of sites with human population densities within these ranges. I have added further explanation to clarify these points.