Dear Camila dos Santos de Barros, PhD

Deputy editor-in-chief of Oecologia Australis

Re: Manuscript reference No. #28497

We are submitting the revised version of our manuscript entitled “Seeing is not the only thing it needs: how limnological variables influence a visual predator in an invaded driver-floodplain system”. We tried to attend all criticism pointed by the reviewers as you will see in details below. Below are our detailed responses to each of the comments made.

We hope that the revisions in the manuscript and our accompanying responses will be sufficient to make our manuscript suitable for the standards of Oecologia Australis.

We are looking forward to hearing from you at your earliest convenience.

Your sincerely,

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**Reviewers Comments**

# Reviewer B

1) Does the title adequately reflect the content of the manuscript?:
yes but the title is a little romanticized showing obvious information

**Authors’ response:** Thank you for the comment. We tried to improve the title in this new version of the manuscript.

2) Is the manuscript a relevant scientific contribution to ecology?:
the question is pertinent but has not been properly analyzed and the results provide little information

**Authors’ response:** Thank you for the comment. We tried to improve our text to better explain our analyses and results. We specified in the questions below.

3) Does the summary present the main idea of the manuscript and its objectives and main results and conclusions?:
yes

**Authors’ response:** Thank you

4) Are the keywords pertinent and different from the words used in the manuscript title?:
could be better

**Authors’ response:** We tried to improve the keywords in this new version.

5) Does the introduction present the theoretical/empirical content in which the manuscript topic is inserted?:
yes

**Authors’ response:** Thank you

6) Are the methods adequate and clearly presented? :
No. Authors do not adequately explain the sampling or the models (factors and how they were determined, which criteria). Even if they did, they don't exploit the 18 years of data properly. 18 years could be analyzed as in time series, but the authors combined years into a simple dataset and used linear regression models. Therefore, the results do not show elegantly or convincingly the relationship between abundance (or other variables that indicate the presence of fish) and the analyzed limnological variables.

**Authors’ response:** Thank you for the comment. The study area text were improved, with a better explanation of the sampled sites (lines 112-126). In relation to the utilized models, we tried to improve the text with a better explanation of the focus of our work and the choice of the models (lines 159-185). We recognize the relevance of the data set and the importance of time series analyses, but a temporal analyses here would require different questions and objectives in the work. Our interest was to simply determine the drivers (limnological variables) that favored the establishment and population growth of *C. kelberi* species (analyzing if it occurs or not and if this occurrence is low or high in different values of limnological variables). The several years and sites help us sustain our results, since almost 700 samples were used. Considering a temporal analysis here would add other causes to the variation of the species (e.g. environmental changes, patterns of pluviosity which reflects in recruitment patterns, human impacts, drought and high water events, etc.) and that is why we choose to use Mixed Effects Models, so that we could exclude a possible effect of the time in our analyses.

7) Are the results, discussion and conclusion clearly presented and do they correctly address the objectives of the study?:
As explained in the previous box, the models are unconvincing. They do not show the relationship between limnological variables. Further discussion is very limited.

**Authors’ response:** We believe that perhaps the purpose of the work is not clear. Although we are working with a large temporal scale, the objective was not to analyze the temporal dynamics of *Cichla kelberi* in the floodplain. The main objective was to determine the drivers that favored the process of establishment and population growth of the species, and we believe our database is a great opportunity to test these relationships. Thus, in the analysis, we use time as a random factor, since we have great temporal dependence on the data.

8) Are all the figures and tables essential and self-explanatory?:
Yes, but they are not properly used.

**Authors’ response:** Thank you for the comment. We tried to better explain the focus and objectives of our work in the manuscript. Therefore, we hope that now the figures and tables are essentials and self-explanatories.

9)  Are the references pertinent and up-to-date?:
Yes

**Authors’ response:** Thank you

10) Final Considerations::
The work investigates which limnological variables determine the success of the invasive species C. kelberi in the Paraná River. The question is interesting, pertinent, which allows a deep analysis of ecological theories and application. Moreover, the large amount of data due to 18-year monitoring allows a temporal approach that could elucidate the issue. Although the introduction shows all these qualities of the work, subsequent sessions are less mature. The methods are not clear, the results are unconvincing and the discussion is limited. For example, no time series analysis was used, although the author makes it clear that the flood pulse is determinant for limnological variables and the presence of fish. The authors do not show how limnological variables relate to each other or to fish. The criteria for using factors in the models are not explained, as well as the choice of models, which opens the question whether the models could have been conducted with categorical factors. Besides, the data dispersion in relation to linear models requires a residual analysis. There is no allusion to the population dynamics and the discussion needs to be deeper in relation to the theory of exogenous species, impact of dams, and application of biomonitoring.

**Authors’ response:** Thank you for recognizing our investigation as an important step towards understanding the invasion process of this species. Here we provide some clarifications on the criticized points. First, the use of time-series models was already implemented for interpreting community- and population-level responses in this floodplain (for example, see Piana et al., 2017 – Neotropical Ichthyology; Baumgartner et al., 2018 – Ecology of Freshwater Fish and Oliveira et al., 2018 – Freshwater Biology). Although these models may provide robust answers, they can be sometimes too difficult to interpret and may be very conservative on some statistical assumptions. Besides, the use of time as a random effect controls for most of this temporal non-independence among samples (please see the revised version for details). Second, we disagree that the relationship between variables and fish was not shown. These results are clearly expressed in Figures 2 and 3 and are also described and discussed in the text. Finally, we concur that the description of the model choice and its structure was poorly described in the submitted version. We improved it substantially in this revised version; and also included a residual analysis for the abundance model, as well as the comparisons of the models without random effects.

# Reviewer D

1) Does the title adequately reflect the content of the manuscript?:
Sim

**Authors’ response:** Thank you

2) Is the manuscript a relevant scientific contribution to ecology?:
Sim

**Authors’ response:** Thank you

3) Does the summary present the main idea of the manuscript and its objectives and main results and conclusions?:
Sim

**Authors’ response:** Thank you

4) Are the keywords pertinent and different from the words used in the manuscript title?:
sim

**Authors’ response:** Thank you

5) Does the introduction present the theoretical/empirical content in which the manuscript topic is inserted?:
necessita de pequenas modificações

**Authors’ response:** Thank you for the comment. We tried to improve our introduction.

6) Are the methods adequate and clearly presented? :
sim

**Authors’ response:** Thank you

7) Are the results, discussion and conclusion clearly presented and do they correctly address the objectives of the study?:
necessidade de modificações

**Authors’ response:** Thank you for the comment. We improved the text.

8) Are all the figures and tables essential and self-explanatory?:
sim

**Authors’ response:** Thank you

9)  Are the references pertinent and up-to-date?:
sim

**Authors’ response:** Thank you

10) Final Considerations::
O manuscrito apresenta importantes informações a cerca da predação de espécie invasoras, que contribui para o entendimento das relações ecológicas  com as nativas. O manuscrito está bem desenvolvido e escrito, carecendo apenas das correções solicitadas para a sua publicação

**Authors’ response:** We thank you very much for the considerations. We hope that the corrections helped to improve our paper.

**Text Comments**

Line 82 – Corrigido

**Authors’ response:** Thank you for the correction.

Line 115 – Somente devido as barragens? Quais impactos?

**Authors’ response:** Corrected accordingly. The text was improved in lines 122-126.

Lines 131-133 – Houveram diferenças entre esses ambientes?

**Authors’ response:** We didn’t search for differences between sites, since local characteristics and biotic interactions may also influence the occurrence and abundance of fish. For this reason, we also added the sites as a random variable in our analyses (as we did with the time), with the goal to only consider the differences in the interest limnological variables and not in the different sites.

Line 139 – Não está descrito como foi coletado e como as variáveis foram obtidas

**Authors’ response:** Corrected accordingly. We added information about the sampling of the variables in the “Limnological variables” section.

Lines 144-152 – Mover para discussão

**Authors’ response:** Corrected accordingly. The sentences were moved to the discussion in lines 224-233.

Line 199 – Discutir as diferenças entre lagoas conectadas e isoladas e o ambiente lótico

**Authors’ response:** Our results don’t include the differences between the environments. In our analyses, we used sites as random variables, in order to exclude a possible effect that each site could have over the species. Our objective was to look for variables that could explain the occurrence and abundance of *C. kelberi*, independently of the environment.

Lines 206-207 – Verificar se não há mesmo dados publicados a respeito

**Authors’ response:** We searched again for publications with this information (the Parana River as the first occurrence site of *Cichla kelberi*) and we still did not found it. We only have this information in the data set.

Lines 278-279 – Não consta no texto

**Authors’ response:** The complete reference is “Agostinho, A. A., Gomes, L. C., Thomaz, S. M., Hahn, N. S. 2004b. The upper Paraná River and its floodplain: main characteristics and perspectives for management and conservation. In: S. M. Thomaz, A. A., Agostinho & N. S. Hahn (Eds.), The upper Paraná River and its floodplain: physical aspects, ecology and conservation. pp. 381--393. Leiden: Backhuys Publishers” and it is cited in line 74.

Appendix 1 – Table A1 – Poderia apresentar melhor esses pontos na descrição da área de estudo

**Authors’ response:** Corrected accordingly. A better description of the study area was added in lines 116-126.

Appendix 1 – Table A2 – Apresentar as diferenças entre esses ambientes

**Authors’ response:** Corrected accordingly. A better description of the study area was added in lines 116-122.