 # GENERAL COMMENTS

The original research question was well defined, relevant and meaningful. It is stated how the research fills an identified knowledge gap: the suitable habitats of a small poorly-studied population of bottlenose dolphins in Port Phillip Bay (south-eastern Australia) that has recently been proposed to comprise a unique newly described species that is listed as 'Critically Endangered', the Burrunan dolphin (*Tursiops australis*). This study is therefore important for the effectiveness of conservation management of this species. The English language and grammar rules are used correctly.

However, there are some important issues, particularly in the choices made for modelling, which must be treated carefully and by providing both important details and convincing arguments that are missing at the moment before any potential acceptance for publication. These important issues are:

- The paragraph on lines 102-111 of the introduction should be completely revised so that it is clearer with regard to the possible interactions and or potential spatio-temporal overlaps between the 3 species (*T. truncatus*, *T. aduncus* and *T. australis*) and also between the two populations of *T. australis* (the one in the Port Phillip Bay and the other in the Gippsland Lakes) while re-mentioning the term "cryptic species".
- The sub-section "Environmental variables" on lines 171-216 should be modified by moving the elements coming from the last paragraph into the other paragraphs in order to have a more fluid reading by passing from one variable to another without going back again on a variable already mentioned before. This subsection should be more complete by adding i. some missing information regarding the spatial resolution and/or the source of certain environmental variables, and ii. underlying assumptions of what you might expect before getting your results for each of the seven environmental variables used in the model in order to ensure rigor of your scientific reasoning. You will read my suggestions in more detail below.
- There are missing important details and convincing arguments in the sub-section "Habitat Suitability Modelling" on lines 218-261:

-- In recent years, we have entered the era of ensemble forecasting (or modelling) (Lasram et al. 2020, Schickele et al. 2020, Charbonnel et al. 2022, Navarro et al. 2023 and other references). Indeed, as recommended in the literature, ensemble forecasting was used instead of strict selection of a single statistical technique was used for habitat suitability distribution models because ensemble forecasting allows the variations in the accuracy of predictions produced from several statistical techniques (Araújo and New, 2007, Marmion et al. 2009; Hao et al. 2019) such GLM, GAM, MARS, CTA, FDA, ANN, RF, GBM and MaxEnt from the R package biomod2 (Thuiller et al. 2009). Moreover, statistical techniques other than MaxEnt also allow the inclusion of background points as explained, for instance in Lasram et al. 2020, Schickele et al. 2020, Charbonnel et al. 2022 and Navarro et al. 2023. Indeed, regression techniques based on presence and absence data have been showed to work better than presence-only techniques, stratified pseudo-absence data (i.e., background data) should be generated (Brotons et al. 2004). I would like to point out to you that you have used this regression technique (presence points + background points) and not the presence-only technique. This term "presence-only" should therefore be corrected throughout the manuscript in order to be more precise in terms of the vocabulary associated with habitat suitability distribution modelling.

It is therefore not possible to ignore this ensemble forecasting with biomod2 in your article and to use a single algorithm without providing convincing arguments in order to demonstrate the adequacy of your methodological choice using only a single algorithm (MaxEnt). I recommend that you also consult Guisan et al. (2017).

-- Details are missing regarding the selection of background points and the prevalence of your model. Were these background points extracted only in the area corresponding to the model calibration zone (which is the zone sampled by ecotourism and other vessels of opportunity) or within the projection zone (which is the entire area covering the entire Port Phillip Bay)? Indeed, to avoid any bias linked to the absence of sampling in certain areas of the Port Phillip Bay, the background points must be selected only in the areas which were sampled by ecotourism and other vessels of opportunity. Please read up on this, for example in Lasram et al. (2020), Schickele et al. (2020), Charbonnel et al. (2022), Navarro et al. (2023) and other recent references, to learn more about the rigor of their background (or pseudo-absence) points selection. Moreover, you used n = 534 presence points and 5,000 random background points without providing verification details regarding any bias linked to negative prevalence effects.

-- I highly recommend you read the fairly recent book "*Habitat suitability and distribution models with applications in R*" written by A. Guisan, W. Thuiller and N.E. Zimmermann (2017) and other recent references in distribution modelling because you wrote errors regarding model evaluation and variable importance. You will read my suggestions in more detail below.
- The different information from current figures 1 and 2 should be merged into a single figure (new future figure 1). You will read my suggestions in more detail below.
- There are too many references (sometimes there are more than three references cited to support the same argument) and there are several old references that could be replaced by more recent references that are already cited elsewhere. Most beginners make these faults in writing scientific articles. You will read my suggestions in more detail below.
- It would be desirable to add the mapping of values/categories for each of the environmental variables used in the habitat suitability modelling across the entire study area in supplemental files in order to visualize the coherence of the link between the most suitable habitats, the response curves and the values/categories of the corresponding environmental variables.

 # SPECIFIC COMMENTS
- Please, replace "ecotour" with "ecotourism" throughout the paper.

ABSTRACT
- L23-24 “a presence-only (Maxent) habitat suitability model”:
I do not agree because you used one regression technique based on presence and absence or stratified pseudo-absence data (i.e., background data) (Brotons et al. 2004; Guisan et al. 2017).
- L28: “presence-only data”:
Ditto, I do not agree because you used one regression technique based on presence and absence or stratified pseudo-absence data (i.e., background data) (Brotons et al. 2004; Guisan et al. 2017).

INTRODUCTION
- L51: At least one reference is missing.
- L54-55: the term “especially for cryptic species” comes totally out of left field. You can rephrase this sentence by providing a little more detail and flow in the logic of your reasoning.
- L55-56: Ditto, you can rephrase this sentence by providing a little more detail and flow in the logic of your reasoning.
- L61-64: Ditto, you can rephrase this sentence by providing a little more detail and flow in the logic of your reasoning.
- L73-74: There are four references. You can delete one or two of them.
- L84-86: You can add the term “worldwide” so that it is clear that you are talking about the tropical and temperate waters of the world.
- L93: “short-term” and “long-term” instead of “short term” and “long term”, respectively.
- L95-97 “Anthropogenic influences on dolphin distribution include commercial and recreational activities, such as fishing trawlers driving bottlenose dolphin foraging to coastal waters of a small embayment (Chilvers et al. 2003).”:
What impacts does this have on dolphins? Are they negative or positive for dolphins? Be more specific.
- L97-99 “In addition, there are numerous sub-species and populations of bottlenose dolphins that display different movement patterns and home-range sizes in relation to environmental influences (Paschoalini & Santos 2020).”: this sentence comes totally out of left field. You can rephrase this sentence by using the one before and the one after in order to bring more fluidity to your reasoning, and you can insert the link in relation to the term “cryptic species”.
- L102-106: You can specify, if this is the case and I am not mistaken, that these two *T. australis* populations (the one in the Port Phillip Bay and the other in the Gippsland Lakes) are indeed two distinct, resident populations that do not mix (?). You can also specify if there is a spatio-temporal overlap and/or interactions of *T. australis* with the other two species (*T. truncatus* and *T. aduncus*) or not at all? Or is *T. australis* the only species of the genus *Tursiops* inhabiting in the Port Phillip Bay and the Gippsland Lakes?

- L107: Can you specify by whom the species was classified as 'Critically Endangered' and justify it with a reference?
- L112-113: Can you put a reference more recent than 2014...?
- L114-115: Ditto, can you put references more recent than 2013...?
- L115-117: It seems that you are implying the negative impact of urbanization on the presence of dolphins.
- L118-119: Can you specify what species is it? *T. australis*?
- L121: Ditto, can you specify what species is it? *T. australis*?

MATERIALS AND METHODS

- L147: "the spring-autumn period (September to April)":

Since you wrote to the lines 126-129 "In southern Port Phillip Bay, there are a variety of "swim-with-dolphin" and ecotourism boat charters that have operated daily throughout the summer months for numerous decades and opportunistically recorded dolphin sightings for over a decade (Howes et al. 2012; Scarpaci et al. 2003).", you should reverse the terms "September" and "April" on the line 147.

- L151-153 "Where multiple sightings were recorded on the same day, only those sightings with a minimum time interval of > 15 min or distance > 500 m were considered unique presence records.":

It comes totally out of left field. Can you say why you did this and cite at least one reference? And also argue about the choice of the values of 15 minutes and 500 m?

- L163: You can delete the term "(Victorian Government)" because it has already been mentioned above (lines 149-150).
- L169 "presence-only analyses":

I do not agree because you used one regression technique based on presence and absence or stratified pseudo-absence data (i.e., background data) (Brotons et al. 2004; Guisan et al. 2017).

- L176-178 ". Dynamic environmental variables such as sea surface temperature and sea surface chlorophyll-a are available only at low spatial resolution across Port Phillip Bay.":

You should specify the spatial resolution of these two dynamic environmental variables and the corresponding references, please.

- L181: "are" instead of "is".
- L187: you can delete the comma after "(TPI)".
- L204-216: I suggest replacing and dispersing the different information from this paragraph in the previous paragraphs (L183-203) for each of the variables in order to avoid going back and forth between the different paragraphs.

You should systematically put the spatial resolution and the source/reference for each of the environmental variables used in the model: the spatial resolution for the bathymetry and the benthic habitat, and the source/reference for the slope, aspect and TPI are missing.

It would also be great if you added a one-sentence hypothesis of what you might expect before getting your results for each of the seven environmental variables used in the model in the lines 180-203 in order to ensure rigor of scientific reasoning by exposing the underlying assumptions of your scientific question.

- L220-221 "A presence-only habitat suitability model":

I do not agree because you used one regression technique based on presence and absence or stratified pseudo-absence data (i.e., background data) (Brotons et al. 2004; Guisan et al. 2017).

- L222-224 "Prior to modelling, individual environmental raster layers were stacked into a single R object before a data frame containing extracted environmental values at presence-only data points was produced.":

Ditto, I do not agree because you used one regression technique based on presence and absence or stratified pseudo-absence data (i.e., background data) (Brotons et al. 2004; Guisan et al. 2017). Moreover, you probably used the environmental variables also associated with the background points. Please reorganize and respect the rigor of your modelling approach.

- L231 "with benthic habitat specified as a fixed factor (categorical variable) prior to modelling.": you can delete this since it has already been said on the lines 194-195.
- L232 "A presence-only habitat suitability model":

I do not agree because you used one regression technique based on presence and absence or stratified pseudo-absence data (i.e., background data) (Brotons et al. 2004; Guisan et al. 2017).

- L236-237 “This approach was selected as it performs well in its predictive accuracy when true absences and search effort information are lacking (Elith et al. 2006; Phillips et al. 2004).”:
As explained and justified in the general comments, I disagree.
- L237-239 “To reduce the effect of sampling bias, background points were extracted from areas near to dolphin presences.”:
What do you mean by “areas near to dolphin presences”? Were these background points extracted only in the area corresponding to the model calibration zone (which is the zone sampled by ecotourism and other vessels of opportunity) or within the entire area covering the entire Port Phillip Bay? Indeed, to avoid any bias linked to the absence of sampling in certain areas of the Port Phillip Bay, the background points must be selected only in the areas which were sampled by ecotourism and other vessels of opportunity. Please read up on this, for example in Lasram et al. (2020), Schickele et al. (2020), Charbonnel et al. (2022), Navarro et al. (2023) and other references, to learn more about the rigor of their background (or pseudo-absence) points selection. And, please, specify the model calibration area and model projection area in the text.
- L239-240 “and 5,000 random background points were sampled.”:
-- You have n = 534 presence points. And did you use 5,000 points random background points? Charbonnel et al. (2022) explained “the much larger number of pseudo-absences compared to presences generates a very low prevalence. In order to avoid negative prevalence effects, the prevalence was then set to 0.5 to give equal weights to presence and pseudo-absence cells”. Indeed, the prevalence is equal to the proportion of presences in the dataset. Did you check the prevalence of your model? Can you precise how much it was set?
-- I suggest you also add these background points on the new future Figure 1 like Figure 1 of Navarro et al. (2023) in slightly transparent color and smaller in size compared to the presence points and behind the presence points so that these presence points are visible.
- L245-246 “and 10 Maxent models were fitted and evaluated using the random training and testing data”:
I highly recommend you read the fairly recent book "*Habitat suitability and distribution models with applications in R*" written by A. Guisan, W. Thuiller and N.E. Zimmermann (2017) in order to better understand how a model with your choice of partition into calibration (75%) and evaluation (25%) datasets is evaluated. Indeed, “Each single model is run on the training partition and evaluated on the test partition using the area under the ROC curve (AUC; see Part IV)” (Guisan et al. 2017), could you explain why you evaluated the model with AUC on the training (or calibration) dataset???
- L246-248 “As Maxent interprets ‘1’ as presence and ‘0’ as pseudo-absence a value of ‘1’ was assigned to presence datasets and a value of ‘0’ to background datasets.”:
I wonder if this sentence should be written since it seems logical?
- L254-257 “Diagnostic plots of commission rates and the AUC metric were used to assess model performance. An AUC score > 0.5 suggests that a model performs better than random. Model performance was determined following Hosmer at al. (1989): < 0.5 = none; 0.5-0.7 = poor; 0.7-0.8 = acceptable; 0.8-0.9 = excellent; > 0.9 = outstanding.”:
In the book "*Habitat suitability and distribution models with applications in R*" written by A. Guisan, W. Thuiller and N.E. Zimmermann (2017), it is mentioned that: “A curve that goes below the 1:1 line means that the model yields predictions that are worse than random, i.e. counter-predictions (similar to negative correlation coefficients), with values between 0 and 0.5. […]. Araújo et al. (2005a) proposed a refined AUC scale, with AUC > 0.90 being “excellent”; 0.80 < AUC < 0.90 being “good”; 0.70 < AUC < 0.80 “fair”; 0.60 < AUC < 0.70 “poor”; 0.50 < AUC < 0.60 “fail”, and AUC < 0.5 being “counter-predictions”.” You can use criteria from a source newer than 1989.
- L257-259 “The importance of environmental variables was determined by percentage of contribution and a jack-knife analysis of the training and testing AUC”:
-- “jackknife” instead of “jack-knife”
-- I strongly recommend researching how a jackknife test actually works for variable importance (it's not using the training and testing AUC): https://consbiol-unibern.github.io/SDMtune/articles/variable-importance.html and other references you can find, and then please correct this sentence.

RESULTS

- L264-268: It should be mentioned in one sentence that there is no data for the years 2018 and 2020 and explain the reasons for this.
- L268: You can add "(n=118)" after "2022".
- L275-276 “Nonetheless, the averaged Maxent model had an acceptable performance for **both training (AUC = 0.8 (± 0.007))** and testing (AUC = 0.79 (± 0.01)) datasets.”:
-- I highly recommend you read the fairly recent book "*Habitat suitability and distribution models with applications in R*" written by A. Guisan, W. Thuiller and N.E. Zimmermann (2017) in order to better understand how a model with your choice of partition into calibration (75%) and evaluation (25%) datasets is evaluated. Indeed, “Each single model is run on the training partition and evaluated on the test partition using the area under the ROC curve (AUC; see Part IV)” (Guisan et al. 2017), could you explain why you evaluated the model with AUC on the training (or calibration) dataset???
-- Depending on the criteria you have chosen to qualify the AUC score, please use the correct term using one of those used in these criteria.
- L289-292 “Response curves present **consistent** negative relationships between the likelihood of dolphin occurrence, and distance to shipping channels (m) and coastline (m), with probability decreasing with increasing distance (Fig. 3 a,b). This indicates that bottlenose dolphins in Port Phillip Bay were more likely to be present in waters either closer to shipping channels or the coastline.”:
I find it difficult to follow you because you wrote “Human activities occurring in Port Phillip Bay have been suggested to influence bottlenose dolphin behavior and habitat relationships (Filby et al. 2017; Hewitt et al. 2004; Scarpaci et al. 2003). Hence, two variables reflecting the environment in relation to urbanization and vessel (commercial and recreational) activity were included as predictor variables in the model as Euclidean distance to coastline (m) and Euclidean distance to shipping channels (m), respectively.” (L196-201) and “In addition, continued coastal urban growth and industrialization in the region could have detrimental effects on large marine predators such as bottlenose dolphins (Marley et al. 2017; Zanardo et al. 2017) in Port Phillip Bay.” (L115-117), and I would have tended to think that anthropogenic activities such as urbanization and the proximity of ships would have had a negative impact on the presence of dolphins. However, here, it would seem to be the opposite since we have a negative relationship between the probability of bottlenose dolphin presence and distances to shipping channels or to coastlines (new future Figure 2). This point merits i. to have a hypothesis upstream (positive or negative impact according to the literature?) which could be added to lines 196-201 and ii. to be discussed and criticized further in discussion. In addition, you are taking the liberty of putting "**consistent**" on line 289 whereas you have not made an assumption about what might be expected.
- L301: you can “(Table 2)” after “dolphin presence”.
- L313-315 “The predicted areas of high suitability were in coastal waters close to Hobsons Bay (Melbourne), Sorrento and Corio Bay/Geelong.”:
You should add also “Queenscliff”.
- L315-316 “In contrast, deeper waters in the center, and shallow coastal waters in the eastern extent, of Port Phillip Bay were predicted to be of lowest habitat suitability.”:
You should also add the coast which is south of Werribee. And if it has a name, you can specify it in the text and add it to the figures (new future Figures 1 and 4).
- Table 2:
-- “Environmental variables and their contribution (mean ± SD)” instead of “Environmental variable contribution (+/- SD)”.
- Figures 1 and 2:
-- You can merge the different information from figures 1 and 2 into a single figure (new future figure 1).
-- You can add labels to the figure to make the link with the text of the article such as "Port Phillip Bay", “Bass Strait”, “Port Phillip Heads”, and add the location of shipping channels.
-- Does the pink zone “Vessel operational areas” only represent ecotourism vessel operational areas? If yes, another area should be added representing other vessels of opportunity in another color and thus modify the title of the figure.
-- I suggest you also add these background points on the new future Figure 1 like Figure 1 of Navarro et al. (2023) in slightly transparent color and smaller in size compared to the presence points and behind the presence points so that these presence points are visible.

-- You should remove “n = 534” from the figure and rephrase "n = number of sightings used in habitat suitability model" into a grammatically correct phrase in the figure title, please.
- Figure 3 (new future figure 2)
- Figure 4 (new future figure 3)
- Figure 5 (new future figure 4):
-- You can add labels to the figure to make the link with the text of the article such as "Port Phillip Bay", “Bass Strait”, “Port Phillip Heads”, and add the location of shipping channels.
-- To understand that Bass Strait is not included in the projection area, you should put this area in white to avoid any confusion given that the blue color is used for the habitat suitability index and predictions SD index.
-- You can enlarge the legends of these two indexes and add for example “0.25”, “0.50” and “0.75” in addition to the “0” and “1” for the habitat suitability index and other values for the predictions SD index.
-- Why are there very light blue holes in the same locations on both maps?

DISCUSSION
- L330: “presence-only habitat suitability model”:
I do not agree because you used one regression technique based on presence and absence or stratified pseudo-absence data (i.e., background data) (Brotons et al. 2004; Guisan et al. 2017).
- L344: “presence-only models”:
Ditto, I do not agree because you used one regression technique based on presence and absence or stratified pseudo-absence data (i.e., background data) (Brotons et al. 2004; Guisan et al. 2017).
- L348-349: there are too many references.
- L351: “presence-only models”:
Ditto, I do not agree because you used one regression technique based on presence and absence or stratified pseudo-absence data (i.e., background data) (Brotons et al. 2004; Guisan et al. 2017).
- L358-359: there are too many references.
- L361-362:
I do not agree because you used one regression technique based on presence and absence or stratified pseudo-absence data (i.e., background data) (Brotons et al. 2004; Guisan et al. 2017).
- L362-365: “Indeed, previous research modelling habitat suitability for Siberian Jays (Perisoreus infaustusin) in the boreal forests of Sweden found no difference in model performance predictions generated with opportunistically collected citizen science data (presence-only) and systematic surveys (presence-absence) (Bradter et al. 2021).”:
Certainly, but there are articles that proved the opposite. Please don't ignore them and discuss more on this point.
Moreover, I do not agree with you since reading the abstract of the article of Bradter et al. (2021), this is not what you mention in your text... Please pay more attention to the content of the references you mention in a research paper.
- L370-373: Could you better explain why the anthropogenic activities studied (proximity to the shipping channels and the urban areas) offer favourable foraging conditions for dolphins? We might have thought the opposite.
- L373: At least one reference is missing after “in other studies”.
- L395-396 “Interestingly, the results of the present study indicated that the deeper, central areas of Port Phillip Bay were not of high habitat suitability.”:
I suggest you rephrase this sentence since it is not possible to confirm this because ecotourism and other vessels of opportunity did not sample these areas.
- L422: Similar to what you have just written for chlorophyll-a concentration, you can add one sentence with associated reference(s) regarding what is known about the influence(s) of water temperature.

CONCLUSIONS
- L434: Change section title to “Conclusions”.
- You could mention also the possibility of studying the influence of other anthropogenic factors on the distribution of bottlenose dolphins, such as climate change. With associated references from studies that have proved this on dolphins in other places around the world.

ACKNOWLEDGMENTS

- L460-461: And the vessels of opportunity and researcher?

REFERENCES

- Indeed, 107 references in total is quite a lot for a rather short article, quite concise and whose problem is not very complex. You can cut the total number of references almost in half and favour references that are more recent.

SUPPLEMENTAL FILES

- It would be desirable to add the mapping of values/categories for each of the environmental variables used in the habitat suitability modelling across the entire study area in order to visualize the coherence of the link between the most suitable habitats, the response curves and the values/categories of the corresponding environmental variables.