Dear Editor / Reviewer

We thank you for your comments. We have carefully gone through all the comments. Your comments have revealed a number of shortcomings and come up with good ideas that have helped us to improve the quality of the article.

Manuscript Number: FORECO-D-22-00992    
  
Bird response to small- and large-scale natural disturbances in mountain spruce forests in Central Europe  
  
Dear Mr. Kebrle,  
  
Thank you for submitting your manuscript to Forest Ecology and Management. I have completed my evaluation of your manuscript, and invite you to make major revisions and resubmit the paper by Aug 21, 2022. When revising your manuscript, please consider all issues mentioned in the reviewers' comments, and in the Reply to Reviewers note your changes and any disagreements with the reviewers.  
  
To submit your revised manuscript, please log in as an author at [https://www.editorialmanager.com/…co/](https://www.editorialmanager.com/foreco/), and navigate to the "Submissions Needing Revision" folder.    
  
Forest Ecology and Management values your contribution and I look forward to receiving your revised manuscript.  
  
Kind regards,      
  
Dan Binkley    
  
Editor-in-Chief    
  
Forest Ecology and Management  
  
Editor and Reviewer comments:  
  
  
  
Reviewer #1: The manuscript entitled "Bird response to small- and large-scale natural disturbances in  
mountain spruce forests in Central Europe" assessed bird community response to disturbance size. I like the study design, and I acknowledge that the authors have put much effort into running this experiment. I also agree that it is essential to understand the effect of disturbance size on bird communities in the context of climate change.  
On the other hand, I had some critical comments on the manuscript.  
  
The title of the manuscript is accurate to the content of the manuscript. I suggest to edit the title to "Bird response to forest disturbance size in mountain spruce forests in Central Europe". – ok, we have no objection to that  
  
The introduction gives interesting information on the relationship between bird diversity and disturbance regimes, but its structure makes it difficult to follow. It is important to state at the beginning of the introduction the different types of forest disturbances, how they differ in affecting bird communities and which one you are interested in studying. It looks like cumulative effect of disturbances was considered in this study (windstorm+insect outbreak+salvage logging). After that, you should define the disturbance regimes (size, frequency and intensity) of your interested disturbance and which variable (size, frequency and intensity) you are interested in studying. It looks like disturbance size and intensity were considered in this study. How does the size of the studied disturbance affect forest stand structure? It is crucial to clarify these aspects because the effect of wildfire on forest structure differs from the effect of insect outbreaks or windstorms.

The research questions (or specific objectives) were not clearly outlined. I suggest including research questions (or specific objectives) that correspond to your results' three parts. - We have better elaborated the research objectives in the last paragraph of the introduction.  
  
In the methods, the subject selection process is transparent, and there is enough detail to replicate the study. However, the classification of bird species is not appropriate. I suggest splitting the first classification into Nest guilds (cavity nesters vs non-cavity nesters) - The cavity nesters make up only app. 30 % of the total number of species (12 from 42 in total). In our opinion, the non-cavity nesters will show similar response as total richnes/abundance, which is also interesting value. Moreover, the cavity nesters are usually used in other studies together with other nest location guilds (for example: (Felton et al., 2021; Przepióra et al., 2020)). For this reason, we would prefer to keep our species classification.

and nest location (ground, shrub and tree). - We recorded only 4 species nesting in shrub layer and therefore we grouped these species together with species nesting close to the ground (8 species). We add this information to Methods section. Moreover, these 2 groups generally represent species associated with open stands with a well-developed understory as same as open canopy species. For this reason, we would prefer to keep our classification „groud/shrub nesters“.

For bird habitat specialization, I will suggest habitat affinity (open canopy vs closed canopy).

- We choose habitat specialization due to more negative population trends of specialized birds in Europe and higher susceptibility to habitat fragmentation and disturbances. The response of open/closed canopy species to disturbance is, in our opinion, more predictable and less important from a conservation point of view. We have added the reason for choosing this species classification to the text and we would prefer to keep classification habitat specialist/generalist rather that open/closed canopy.

In the description of the spatial and environmental variables, there is evident confusion between disturbance size and intensity (severity). As I mentioned in the introduction, there is a need to be consistent in distinguishing these two variables of disturbance regimes.

- Thank you. We have modified the graphical representation of the classification.

I am concerned about the statistical analysis, but I will go straight to suggestions. About the structure, I will suggest going from the general (random forest and PCA) to specific (effect of disturbance) trends. The random forest will show where the disturbance size of intensity is ranked as an influential factor among the environmental variables in bird diversity. After this analysis, you will show how disturbance size or intensity influences bird diversity. You also need to provide in supplementary material diagnostics plots of your models.

The structure of the results and discussion should change accordingly to the different changes in the introduction and the results.  
  
  
  
  
Reviewer #2: The authors studied the effect of disturbance severity on birds in Sumava national park, Czech Republic. The authors have designed good study and have used proper statistical methods.  
My main critique circles around the following. First, the authors have to revise the usage of some terms. For instance, the term "disturbance type" is not correct (see Line 202) as the authors study the effects of disturbance severity. This needs to be change in the whole manuscript. Throughout the paper, the authors use the term "habitat type" for the four classes of sampling points they sampled (SSD, LSD, ELT, NDF). However, the term is misleading because they do not study difference habitat types (such as broadleaved, coniferous and mixed forests) but rather different disturbance severity in the same forest types. So I would suggest to use the term "severity class" or something similar.

- Thank you, you are right. We change the used term to „Disturbance class“, because the four classes of sampling point represent various disturbance sizes and also severities.

The variable "biological legacy" is also a bit confusing. The authors use this term to describe the proportion of the stands disturbed by bark beetle or wind. However, biological legacies is a broader term including all structures left after the disturbance, not only dead/damaged trees.  
So I would suggest to change the term to something like "total disturbed area" (TDA)

- Thank you, we change the term to „total natural disturbance area“.

Second, some more details about the statistical analysis need to be added to the method section. See my specific comments below.

Third, the conclusion is currently a bit weak as it simple restates the results. The authors have to make an effort to put their findings in broader perspective. They need to focus on the gradient of disturbance severity, which is the central topic of the paper. In addition, in order to match the requirements of the journal, the authors also have to make an effort to state some management implication resulting from their study.

- Thank you, we rewrite the conclusion and added some management implications.

I would also recommend a native speaker to check the text because some sentences are difficult to read and some sentences are difficult to understand.

- Thank you for this assesment. We have modifications according to your comments. Moreover, a linguistic correction of the whole article was made by a professional scientific editor who is a native speaker of English at English Editorial Services, s.r.o.

I would recommend publishing the paper after addressing my comments.  
Specific comments  
In Highlights: probably change "Rest of mature trees" to "legacies" or "survival trees" - done

Line 22: change "aimed to compare" with "aimed at comparing" - done

Line 25: I think the correct term should be "enclaves of living trees", please consult a native speaker and change accordingly throughout the paper if need  
Line 31: use past tense, change "increase" to "increased" - done  
Line 32: use past tense, change "have" to "had" - done  
Line 44: use past tense, change "increase" to "increased". - done  
Lines 44-45: the sentence is too long, I suggest to finish it after (Senf et al. 2021); then start a new sentence with and apply the following corrections: "Wind and insect disturbances are the main factors responsible for damaging forests in Central Europe…" - done  
Line 53: disturbances are not a source but they create legacies; change the beginning of the sentence to "Natural disturbances create biological legacies…"- done  
Line 63: use present tense, you speak about general findings by others; change "increase" to "increased" and "decrease" to "decreased"- done  
Line 65-66: The sentence is unclear to me! What do you mean with distributed and aggregated disturbances? The sentence also has some grammatical problems, for example "twice as high", not "twice higher". Please rewrite it! - done  
Lines 86-87: the sentence would sound better if you change it to: "Generally, early succession stages host most habitat specialized and threatened bird species…" - done  
Line 94: The statement "…there is a growing need to understand the ecological processes of these  
events" is correct but far too vague. Could you be more specific? - done  
Lines 102-103: change "aimed to identify" to "aimed at identifying" - done  
Line 104: use past tense, change " we use" to "we used" - done  
Lines 105-106: The last sentence is too specific for the introduction. Such information generally goes to the methods but you start the methods describing the study area, so I would completely remove the sentence from the introduction. - asi má pravdu done  
Line 126: change the sentence to: "The damaged forest area is located along 25 km of the state border between 888 and 1 373 m a. s. l. (Fig. 1)." - done ale s výhradou (ale poničené jsou i oblasti jinde, nejsou však tak velké a kontinuální (tedy spíše ostrůvkovité...)  
Lines 128-139: The whole paragraph needs to be rewritten because it is unclear. Change "located" to "selected" for the sampling points. Introducing abbreviations "non-disturbed forest = NDF" is a bit unusual, so I would suggest to use "non-disturbed forest (NDF)" and change it accordingly for all other plots SSD, LSD, ELT. Also add "ranging from XXX to XXX m. a. s. l." when you describe the elevation range of the points. When you describe the disturbed area proportion use something like "…the proportion of disturbed area within a 300 m buffer around the NDF points did not exceed 30%." - done  
Lines 150-155: The last 4 sentences are more general. I suggest moving the sentences up in the method section, probably directly before the paragraph at line 128. - done  
Line 159: change "twice the year" to "twice per year" - done  
Lines 175-177: again, change the abbreviations of the points from "1. NDF = non-disturbed forest" to non-disturbed forest (NDF) or use directly NDF because you introduced the abbreviation before - done  
Line 177: change the sentence to "to assess the effects of different disturbance severities" - done  
Lines 177-178: change the sentence "To describe the characteristics, we used digitized forest cover layer (current as of autumn 2020) to analyse..." to "We used digitized forest cover layer (autumn 2020) to analyse…" - done  
Line 182: change to "…ITD layer was from 2017, therefore newly dead trees from 2020 were updated…" - done  
Line 185: change to "… surrounding the survey…" - done  
Line 188: change to "…understory cover (%) which represents rejuvenation…" - done  
Line 201: In the section "Statistical analysis" you have to add any explanation/details about: 1) the usage of quadratic terms, which was obviously used in Fig. 5 and Fig. 6; 2) post-hoc pairwise comparison used in Tab. S3. - Vojta  
Line 202: Here you study a gradient of severity, ranging from intact forests to large-scale disturbance, not different disturbance types such as windthrow, bark-beetle infestation or wildfire. Thus, the term "disturbance type" is not correct and needs to be changed! - done  
Line 204: Same here, the term "habitat type" needs to be adapted, as you do not study different habitat type (for instance different forest types). Please change the term in the whole manuscript! - done (ještě závěr diskuze a abstrakt (případně highlights)  
Line 216: add "described" after "previously" - done  
Line 227: remove or close the open bracket "…(package ranger in R…" - done  
Line 249: change to "… (ELT) had less species and less abundant…" - done  
Line 260-263: add details in the caption about letter below the confidence intervals. I guess these are the multiple comparisons that you show on Table S3? If yes, please state it in the caption so that readers can go directly there and check it. Also add information about the multiple comparison in the methods (see comment for Line 201). - Vojta  
Line 278: Fig. 5 and Fig. 6 are basically the same plot, hence I would suggest to combine them. In case effect line overlap too much, consider removing the non-significant effect. Also, add information in the methods about the usage of quadratic relationships. - Vojta  
Line 287: A discussion has to go from general to specific topics. I would suggest adding a short paragraph in the beginning, where you shortly restate your research questions and shortly summarize the most important findings. Just few sentences to set the bigger picture. - done  
Line 289: change to "…we documented positive effects of…" - done  
Line 294: remove "quite" - done  
Lines 295-296: change to "…indicated that in large-scale disturbances, generalist species, although hosting higher species numbers…" - done, přepsal jsem celou větu  
Line 299: consider removing "surprisingly" - done  
Line 308: change to "…decrease one again with the dessication of trees…" - done  
Line 310: change "…nesting if are…" to "…nesting if they are…" - done  
Line 312: Please add a reference to a figure/table where the results for this statement are to be found. - done  
Line 315: something is missing "…he negative effect of large-scale disturbance…" on what? species richness or abundance? Please add this information to the sentence to make it more complete. - done  
Line 316: change "closely coincided" with "were associated" - done  
Line 346: change to "…to become generalists over time,…" - done  
Lines 350-351: consider changing to "… large-scale disturbed areas are quite similar to the numbers found in the non-disturbed forests." - done  
Line 353: in Section 4.2 you need to discuss your results about the elevation covariate and its effects on richness and abundance. Start by restating what you found and then go further with the discussion.  
Lines 355-356: rewrite the second sentence in this paragraph. I do not understand it. What is rate of total damage? - done  
Line 362-366: I don't understand why you need this paragraph. You said it yourself, this is not the topic of the paper, so why wasting a paragraph on it? - we deleted this paragraph  
Line 371: change "reach" to "reaches" - done  
Line 376: change "damaged" to "disturbed" - done  
In addition, you need to mention in the methods how many years after the disturbance your sampling was! - The study area was disturbed mainly by storm Kyrill in 2007. However, many disturbances affected this area after this event to recent days. So we add information about age structure of disturbances in surrounding of survey points (Line cf cf).  
Line 383: The conclusion is currently a bit weak as it simple restates the results once again. It needs to be rewritten also to match the journals' requirements! - done