Dear Editors,

Thank you for allowing us to resubmit our manuscript entitled “*Measuring the effects of road proximity on the distribution of commercially valuable bird species in an Indonesian protected area*” for your consideration as an Original Article in the journal *Biotropica*. We apologize for the delay in completing this revision. We gratefully acknowledge the editors and reviewers for providing constructive and rigorous feedback that directed our revision process. We include point-by-point responses to all feedback below.

We believe our manuscript is much improved as a direct result of this second round of reviews. Some of the major improvements to our manuscript include:

1. We

In conclusion, we are proud to submit a manuscript that more rigorously supports our hypothesis that commercially valuable birds are less likely to live near roads than other primary forest birds. Thank you for the opportunity to resubmit.

This paper has not been published elsewhere, is not being considered for publication elsewhere, and has not been reviewed by anyone else. All authors approve the manuscript.

Sincerely,

Katherine S. Lauck and co-authors

Department of Wildlife, Fish, and Conservation Biology

University of California, Davis

Response to reviews:

Subject Editor's Comments to Author:  
  
Subject Editor: McConkey, Kim  
Comments to the Author:  
Yours is an interesting and potentially important paper addressing bird conservation in Indonesia. While both the reviewers who read your manuscript consider the work interesting and important, they both raise major, but somewhat different concerns. I am most concerned about the potentially fatal flaws in the methods identified by Reviewer 1. Reviewer 2 also raises important issues, but these can be solved in a careful revision. Because the second reviewer is positive about the work, I believe it is worthwhile giving you the opportunity to respond to the serious concerns of Reviewer 1. Please go through all the comments of both reviewers carefully.

**Thank you for allowing us to revise this manuscript. Despite the pitfalls and limitations, we share the conviction that these data need to be published given how little data is available from these locations.**  
  
Reviewers' Comments to Author:  
  
Reviewer: 1  
  
Comments to the Author:  Do not include your recommendation to accept or reject the paper in these comments.  
This manuscript covers an important topic and analyses that use data from the field to study the effects of the bird trade on wild populations are rare. Unfortunately, however, the manuscript suffers from some serious issues with the methods and presentation.   
  
The most serious problem is that Team 1 was led by an inexperienced observer. Therefore, the data collected by the two teams are not comparable and I have low confidence in the identifications made by Team 1. The best solution would be to delete all data collected by Team 1. But if the authors do that they are left with a small sample. Perhaps you could reduce Team 2’s dataset to the small pool of easily identifiable species? Lines 262-263, which state that Team 1 missed a lot of common species, makes it sound like this would be tough to do. I would recommend sending Team 2 back into the field to collect the data from Team 1’s area (difficult I know).

**Thank you for this suggestion. Unfortunately, we are unable to collect more data, and it is likely that even if we did return to the field, that new data would no longer be comparable to previous data. The pace of land cover change and road development in this area of Indonesia is very fast and we were working across the rapidly evolving border between agriculture and primary forest. I agree that this issue is difficult to work around. We addressed this problem by using an occupancy model in which the detection probability of each species depended partially on the team making the detection.**

**Possible thing to try: sensitivity test? Idk if I can even get these models running again lol.**  
  
A second and probably related issue is that the authors appear to have a limited understanding of bird distribution and abundance in Indonesia. They repeatedly cite abundance characterizations made in the Birds of the Indonesian Archipelago. This is a field guide, the purpose of which is to give a very general description of bird distributions in a huge region. The authors should be telling us about the abundance of different species in this little studied part of Borneo, not relying on this field guide. It’s not that big of a deal, but it doesn’t inspire confidence in their abilities to identify Bornean birds, which is key for this paper. At a minimum I would recommend that an expert on Southeast Asian birds review the paper and double check the data.

**Not sure how to respond to this – maybe Adam has ideas?**  
  
Related to the above, it appears that the authors have an incomplete understanding of Bornean bird habitat requirements, but maybe some of this comes from how things are worded. See lines 254-255—what about early successional species?

**Thank you for this feedback. I certainly think that my understanding of Bornean bird habitat requirements is incomplete; but I also don’t think that that invalidates our findings. We were not trying to describe habitat preferences across the wildly diverse community of birds with our very limited dataset – only to compare the effect of roads on birds threatened by the domestic bird market and other species.**

And lines 277-278: If the roads go through good forest, then particular species being more abundant away from roads doesn’t mean there’s a relationship between habitat disturbance and primary forest bird abundance. And more importantly the idea of there being an average bird species in Bornean forest isn’t very informative (different forest types. different guilds, etc.).

**Thank you for this feedback. I am not sure how to interpret or respond to this comment. We found that two types of disturbance (% intact forest and nearness to roads) decreased the occupancy of species across the community. The roads we used to quantify distance to roads encircled but did not go through the forested areas we studied. We did not study abundance. We have removed the idea of an “average” species, as we agree that this is not a helpful way to describe the community parameters.**  
  
-Lines 301-302: this is also suggestive of a lack of understanding of birds. Some of these species (e.g. shama) are abundant in other parts of the world where they are not trapped. So, you don’t need a population estimate from IUCN to make this judgement.

**Thank you for this feedback. We were not sure how to back up our personal observations of this fact that you point out, and fell back on the IUCN to do so. [need to update the manuscript, not sure how]**  
  
-Line 189: Only six species (or 9 species, line 287) are commercially valuable??? This is incorrect—just about every species of bird is sold in the markets. Instead of using a binary variable, why not use the price from a Bornean, Javan, or Sumatran market?

**Thank you for this comment. Perhaps we need to change what we call commercially valuable species. As we describe, we used the 2015 Asian Songbird Crisis Summit’s findings to guide our classification of which species were commercially valuable. But perhaps it is more accurate to say that those species are threatened by trade, rather than commercially valuable. We are aware that a huge variety of wild bird species are sold in markets. However, a very small subset of those species command high prices, and those species are accordingly specifically and extensively targeted by trappers. So we wanted to capture that distinction: birds that command high prices in markets and are therefore more likely to be targeted by trappers. The publication we primarily consulted was created based on data from Javan and Sumatran bird markets, and considered both abundance and price to determine which species to highlight. The fact that we found a difference in remote Kalimantan between birds considered commercially valuable by scientists studying Javan and Sumatran bird markets feels important to me.**

**[need to update manuscript with this info].**  
  
-Also, while the paper is well written, it appears to have been prepared hastily (need to fill in “[cite]” in two places, also "XXX" (lines 304 and 369), Figure 1 wasn’t translated, etc.).

**I apologize for the oversight and appreciate your feedback regarding these typos! [need to address them]**  
  
Other comments   
Introduction  
Lines 106-108: need to cite a reference for this

**Thank you for catching this – we have added the relevant citation.**

Line 117: cite Eaton et al. 2015, Forktail, Trade-driven extinctions and near-extinctions of avian taxa in Sundaic Indonesia.

**Thank you for this additional citation. We have added it to this line.**

Introduction: delete last sentence of introduction

**Thank you for this feedback – we have done so.**

Lines 120-121: It would be really helpful if you could somehow score how remote your site is so that the reader can judge the threat to other sites in Indonesia. For example, how many hours does it take to drive there, how bad are the roads, etc.

**Thank you for this feedback – I hope that we are able to provide valuable information to other people! We have added this information to the study area description in the methods.**  
  
Methods  
-Please explain why percent cover of water is important. I have my doubts.

**We visually estimated percent water cover for inclusion in estimation of occupancy models because some species of birds are tightly associated with streams (e.g. forktails). In light of the statistical knowledge that I have gained since this study, I don’t think it was important to include after all. But I also can’t think of a reason why including it in the covariates would bias our results regarding proximity to roads. Please let me know if you can think of such a reason! Perhaps it appears more important because we listed it first? I have moved it to later in the list of covariates to de-emphasize it.**

-You say that each transect had approx. 8 points but at what hours did you do surveys? Surveys after 10:30 AM don’t yield much useful data in the lowland Greater Sundas.

**Thank you for catching this oversight! We conducted point counts between the beginning of the dawn chorus and 10am only. We have added this information to the methods.**

-The transect method sounds great. But the map needs work. It’s a poor quality figure that hasn’t been translated. I can’t see the roads nor can I read the label for camp 2. A good map is essential so that we can see if your sampling was sufficient to detect a distance from road effect.

**Thank you for this feedback. [need to fix the map oops]**

-It looks like only two roads are relevant for your analysis. Is that correct? Does Open Street Map do a good job of showing the correct location? Would it not be better to walk the road with a GPS?

-A lot of your transects go down steep slopes into a creek valley. Is the bird community different down there? Should you control for elevation or slope in you models?

-I can’t comment on the occupancy statistics.  
  
Results  
Lines 292-293: Are the authors aware of any studies showing general avoidance by tropical passerines of human activity (e.g. cars driving by)? I am skeptical this is happening. On the other hand, it’s definitely possible that the smarter species have learned to be shy of trappers.   
Line 296-298: This seems even more unlikely. Again are there similar studies from elsewhere in the world that would support this? If not, I recommend deleting this.   
Line 333-335: The last part of this sentence is incorrect. You list a few different examples of government-led conservation schemes that impact birds. I am doubtful about the first part (lack of a plan). The Indonesian government’s conservation actions fall way short of what’s needed but there are some people there trying to do the right thing. I don’t think it’s helpful to make blanket generalizations like “no one has a plan”. In contrast your specific example from lines 358-360 is excellent.   
Line 384: This acronym was not defined.   
  
  
Reviewer: 2  
  
Comments to the Author:  Do not include your recommendation to accept or reject the paper in these comments.  
I read this paper with interest. There is certainly value in it but also some things that I think need fixing before it joins other precious literature concerning Asian songbird declines. I must say that as I started reading, two things started to trouble me. The first is whether or not we should be expecting/relying on such a clean relationship between distance/access and bird occupancy. The second concerns how we define what a ‘heavily-traded’ species is and isn’t (geographically, temporally, economically). In my opinion, both of these aspects and others need much more careful definition and discussion in this paper. This is especially true as Figure 3 throws some complexity into the equation. I urge the authors to revisit some of these issues – I believe they are fixable but need some careful consideration. I have made some general and specific comments/suggestions below that I hope will help with this editing.  
  
Best wishes, Stuart Marsden  
  
73 – These statements are true of course but it is also true that proximity to roads have wide-ranging and deep effects on wildlife on top of any habitat change or exploitation. There are tens of papers that have found this – in fact a recently published book deals entirely with this phenomenon (‘Traffication’ by Paul F Donald). The author posits that the roads themselves are to blame for huge damage to our biodiversity. Now, I am not suggesting that this is the case in your Bornean system – but you really do have to acknowledge this potentially confounding effect and convince us that it is not an issue.  
121 – related to the above, I have read several papers that use distance to road/access point to show that there are gaps in bird ranges due to trapping. But what I haven’t read so much about, in fact almost nothing, is our knowledge of how trappers operate that confirms this accessibility metric. It might be assumed that ease of entry would be a good surrogate for trapping pressure differences – but is there any evidence for that? Since this underpins the whole rationale for the study, I think you need to discuss this more and reassure us that it is actually true enough to provide the basis for your analysis. This relationship is bound to be complex, variable, and non-linear – and to be honest I am not sure it is even practically true. I have seen systems in Indonesia where songbirds are safer close to people than away from them. Even badgers in my city were safer from persecution close to paths than away from them – simply because of the protection the ‘public’ afforded them. I am not saying that this much-used/misused metric of distance to road isn’t valid – I am simply saying that you need to convince us with some discussion and evidence – both here in the Introduction and revisited in the Discussion.  
125 – this hypothesis is sound but is it only half the story? Do you mean that heavily trapped species should show this pattern but that other species should not?   
146 – citation needed  
188 – I think these species (only six) should be named here. It doesn’t sound many at all. The 2015 list has now been added to quite extensively and perhaps this should be noted. Is it a little awkward that your fieldwork took place actually after that assessment was made? It is difficult to judge given the information you give – but you are assuming several things: that the list was correct (!), pertinent to Bornean populations rather than those in Java or Sumatra, and also that the trade presumably in the period 2005-2015 that prompted concern in 2015, still had a signature in your area three years later. Again, more information is needed I think.  
226 – Is this correct? Is it not Beta 5-7? Also each covariate, not covariates.  
237 – I am getting confused here. There was reference to species on the priority list (4-6) in Methods – but now we are talking about nine species sold at ‘high price’. Needs to be clearer I think unless I’ve misunderstood something. What is high price and what is the evidence for it? You give some references but it is so fundamental to this analysis that we need to be spoon-fed it.  
252 – Is this information in Table 1? It doesn’t appear to be related to it. I see the results in Figure 2 which is nice. On the way past I looked at Figure 1 – which doesn’t actually appear to show any roads on it – surely they should be on this map – apologies if I missed them.  
Figure 2 – this looks good. I would say that this relationship really hangs on how you define commercially valuable species (say rather than just about not commercially important). We need more information on this – maybe it even needs assessing more robustly? Or at least triangulating.  
256 – I’m not sure about the strength of your interpretation here. Ok it may not be as striking or ‘significant’ as the distance relationship, but there is something going on here isn’t there?  
258 – this is an odd narrative to find in a Results section. Might it not be better in the Discussion? Might it not have been better to exclude a number of species for which there may have been a problem? Such a purge would still leave you with enough species?  
304 – author XXX  
311 – This statement should appear earlier, in the Introduction perhaps. I’m not sure it’s always true but it’s evidence.  
324 – this is a good point but also makes me wonder if trappers might be going further into forest than ‘we’ might think for these valuable species. You make some good points about cost-benefits. That for me would be a very valuable study.  
369 – author XXX again