Dear Mr. Evans,   
  
Thank you very much for submitting your manuscript "ANNUAL SURVIVAL OF LAND BIRDS ALONG A RURAL-TO-URBAN LAND USE GRADIENT USING CITIZEN AND SCIENTIST GENERATED DATA" (Article) for review by Ecology. The reviewers and I appreciate the work you have accomplished. Based on the reviews, we are willing to consider a revised version for publication in the journal, assuming that you are able to modify the manuscript according to the recommendations.   
  
Your revisions should address the specific points made by each reviewer, particularly noting the organizational and hypotheses concerns noted by reviewer 1, and the "major concern" stated by reviewer 2.   
  
You should also send a cover letter indicating your response to the review comments and the changes you have made in the manuscript. If you disagree with a reviewer's point, please explain why. Log into EcoTrack ([http://esapubs.esapubs.org](http://esapubs.esapubs.org/)) to submit the revised version. Please complete the revision within the next six weeks.   
  
  
Sincerely,   
  
John Sauer   
Subject Matter Editor   
Journals of the Ecological Society of America   
  
  
I have 4 general comments:   
  
1. I agree with reviewer 1 that the manuscript as presently written is not particularly appropriate for Ecology. For it to be relevant to readers of Ecology, the analysis must be more closely connected to ecological theory,   
with a clear statement of a-priori hypotheses associated with survival and urbanization (via the a-priori models). These appear, but only in the discussion (e.g., resource-mediated survival with increasing urbanization). They need to be much more clearly stated up front in the introduction. *Brandt – can we discuss how to lay out these hypotheses?*  
  
2. I think that "urbanization" as you describe it is vague, and the impervious surface metric you use to quantify it does nothing to connect the sample sites to the real factors influencing survival. This study does not touch (except via speculation) the real factors influencing survival, and the high-level nature of the hypotheses needs better rationalization. *This is my primary concern and was my worry while writing it. We are able to identify a trend in survival along the rural-to-urban gradient. To be Ecology worthy (following the points in Sauer’s comment #1) speculation is necessary.*

3. Site selection is problematic. You must specify how they were selected, and tell readers why those sites form the basis of inference for anything other than just those sites. Why should we believe that these sites are representative of the urban-rural continuum? *How do we resolve this? In one of the earlier versions there was mention of site selection. Basically sites were selected haphazardly (with some thought of filling the more urban end of the gradient for later sites). I could offer a histogram (in the supplemental) of impervious surface by site. Sites are very biased towards the rural end of the gradient.*  
  
4. I do not think that the role of citizen-science per se is of great scientific interest, and **this component of the study is not in itself suitable for publication in Ecology**. Many scientists use MAPS, Breeding Bird Survey , Christmas Bird Count, and other datasets routinely in scientific publications, and it is generally accepted that citizens participate and increase sample sizes. I suggest that it be given less of a highlight as a primary result of the manuscript. *I would like to go with Allen’s recommendation here that the effects of citizen scientists be included as a supplemental. He (and I) feel that this component of the study muddies the overall message.* The interesting part of your analysis is the methodological implications, and I do not think that you provide a clear explanation for your results. *I’m not sure what he means by methodological implications. How might I adjust the results or discussion to make my explanation more clear?*  It is not clear (to me) why survival rates are changing due to increased observer participation. Is it because you are actually estimating "apparent" survival, and the increased range of observations is finding birds that have moved out of the more limited resighting area available to your "professionals?" *I do believe that this explanation is correct (and certainly, simply, more time observing the birds – to be honest, some of this effect is likely because of limited resighting done by the technicians).* This needs clarification, and I do not think that the present explanation for the results is convincing. *I think I did include this at one point and may have removed it.*  
  
Other specific comments:   
  
l. 184-193. This seems to me to be a major issue, as 2000-2012 were extremely variable in the DC area. Unmodeled yearly variation in survival would at the least lead to heterogeneity and overdispersion. I would also expect a strong interaction of survival and winter severity for species such as CARW. Could the patterns you show in Figure 3 be an artifact of year to year variation in survival along your urban gradient?*This comment makes little sense to me. First, there is no explicit time covariate in the model. Next, if the observed patterns along the rural-to-urban gradient were due to winter severity, would it not be an urbanization effect? Perhaps it could be included in an explanation of what could drive avian response along the gradient, but it would be super speculative and, to the best of my knowledge, we have no evidence of the urban heat island effect (though I guess I could explore that).*  
  
l. 219. This is unclear. Are you saying that participation would have an effect on the actual survival? Are you saying that estimates are biased by the omission of those data? Or just that precision of estimates is affected? I can see detectability varying, but not survival. The whole issue of apparent survival and sampled populations is not mentioned, but is likely the explanation. *Perhaps by making clear that this is apparent survival this could be addressed. Apparent survival, however, is equally likely to be affected by participation as detectability.*  
  
l 258-269. This needs a better explanation. The only reason for survival estimates to change is due to a change in the sampled population or a change in bias of estimates? *This is as above. One reason why they might change is because technician-only sites are undersampled – with less effort going in, I believe both detectability and survival estimates would be decreased. Another reason could be very short distance dispersal of summer breeding territories – with broader winter home ranges birds that moved breeding territories outside of the 200 m resight radius may return to the site in the winter. If participants have a feeder (and most of our active participants do), this effect would be enhanced (because of potential reliance on feeders during the winter, but not the summer, for some of our species).*  
  
Table 3. I reluctantly agree that this Table is worth the space in the Journal. The caption needs better explanations of the variables and other items, and the format is distorted in the pdf I reviewed. The format varies among species, and that should be made consistent. Fixed   
  
Figure 2 caption, and elsewhere. What do you mean by "model instability?" You should explain that at some point. *I honestly don’t know how to explain this, it was something that I’d read and I don’t understand enough about the underlying math to fully comprehend what’s going on. Basically, something I read suggested to look through the standard errors and that if your standard errors are abnormally high (e.g., as much as 50-100 x the parameter being estimated) then your sample size is too low and the model is unstable. I worry about this with the amount of categorical variables in the model – with each slice the sample size decreases and thus the standard error increases.*  
  
Figure 3 Possibly irrelevant comment: Looking at the patterns, I was reminded of Reis' and Sisk's work on edge effects (Ries, L. and T.D. Sisk. 2004. A predictive model of edge effects. Ecology 85 (11): 2917-2926). *I checked out this reference. The article is very cool and it would be interesting to look at the potential of edge effects along the r2u gradient. I don’t think Figure 3 is related to that, however.*  
  
Appendices should be formatted for online presentation. *I’m unsure as to what that format is.*  
  
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Reviewer #1 (Comments to Author):   
  
General comments:   
I think that this is an interesting study of avian survival in response to urbanization. As the authors point out, little is known about the demographic consequences of urbanization on species that are able to persist in developed areas. I believe that this paper represents an important first step in addressing this knowledge gap. The authors should be commended on their novel sampling design and the study is clearly strengthened with the incorporation of citizen science data. Additionally, the long-term and landscape-scale data set is very impressive and represents an extraordinary amount of work. Overall, I think that it would be of interest to many of the journal's readers.   
  
In my opinion, the weakest aspects of the manuscript were the framing of the study and the lack of hypotheses and predictions. It seems to me that the main findings were: 1) that urbanization influences common urban-adapted bird species differently, and 2) that the inclusion of citizen science data improves estimates of avian survival. I don't know how novel these findings are and I would like to have seen predictions made about how certain species (or at least guilds) would respond to urbanization. I think that framing the study in this regard would really strengthen the story and make it a lot more compelling, even for non-ornithologists. Some life-history traits of particular species are touched upon in the Discussion, but I think it could be taken further. I think these issues can mostly be addressed by re-writing parts of the Introduction and Discussion, although I do also have some important questions related to the Methods as well.   
  
Specific comments:   
Abstract   
It would be useful to include information on where and when the study took place here. Fixed  
  
Introduction   
The Introduction is rather long and should be condensed.   
  
Lines 35-37: I found this sentence a little hard to follow. From what point in time is this projected change in developed land cover being compared to? Also, there appears to be a typo, the Alig et al. study was published in 2004. Fixed  
  
Lines 41-45: I think it's important to point out that the few species that generally dominate urban environments tend to be exotic. It would also be appropriate to cite some of Michael McKinney's work here (e.g. McKinney and Lockwood 1999, McKinney 2006).*I don’t think I agree here. It really depends on how you define an urban environment. Certainly core urban habitats are dominated by exotics (HOSP, EUST, ROPI), but I think urban environments per se are not. I initially included reference to both of the McKinney works in this section, but I must have removed them. While I like the ideas surrounding biotic homogenization (what those papers are on), I find supports for this to be relatively weak. That might have been why I’d pulled it.*  
  
Line 69: Make sure citations are in correct chronological order, here and throughout. Fixed  
  
Line 97: Be consistent with your use of hyphens when you refer to the "rural-to-urban gradient" and "re-encounter" (line 255) throughout. Fixed  
  
Line 102: I think you meant to say seven urban-adapted bird species here, not six. Fixed  
  
Lines 102-106: Be consistent with tense usage here.  Fixed  
  
Lines 108-109: The part about assessing citizen science data seemed to come out of nowhere. Since this is a main part of the study, I suggest introducing citizen science data and its importance earlier in this section. Fixed?  
  
Methods   
Somewhere in the second or third paragraph of this section you should mention how many of the 324 NN sites were used in this project. It's unclear to the reader until the Results.   
  
Lines 125-128: Can you provide more information about the private properties here? Are the private properties mostly single-family homes? Some sites weren't on private property, so what were these sites like? Presumably, some of these sites had bird feeders, was that quantified? Supplemental food could influence adult survival in the area, particularly for species that utilize feeders like the cardinal and chickadee. Seems like that should be taken into account. *Bob is getting me feeder info. I changed the description of the sites in these lines to:*

The Neighborhood Nestwatch Program (hereafter referred to as “NN”) is a citizen science project run by the Smithsonian Migratory Bird Center that uses a network of 240 study sites composed predominantly of single-family homes but also includes multi-family dwellings, open and forested public parks and multi-family dwellings.  
  
Line 138: How many technicians usually participated in the resighting efforts? Clarified at the head of the paragraph by stating that sights are predominantly visited by one technician.  
  
Lines 139-142: It seems like the amount of searchable land within 200 m of each site would vary considerably between sites. Also, how confident are you that the participants were able to detect sex differences among focal species? *The first part of the comment is totally legitimate. Searchable land does vary between sites, if this varies along the r2u gradient, which I expect that it does, this could be a major problem. I would assume that core-urban is the most searchable, and that the area covered would depend on the site for rural and suburban habitats. I certainly recall some rural sites that were not searchable at all (only one road running through with private property on both sides. The second part of the comment doesn’t make much sense because participants are only identifying the individual, not the sexes. Perhaps this wasn’t made clear though.*  
  
Line 144: Were these species the most abundant, or just the most common along the development gradient? I could envision house sparrow or finches being more abundant but only present in the more developed sites. Clarified that these were the most common birds across the development gradient  
  
Lines 153-155: This was hard to follow because you introduce variables that haven't been explained yet (e.g. degree of urbanization and body condition). These should be introduced prior to the model development section. *Brandt – suggestion?*  
  
Lines 195-205: I applaud the use of the gradient approach in this study, and the use of impervious surface and the 500 m scale seems appropriate. Since the entire paper hinges on this gradient, it would be nice to be able to visualize these data. While Appendix II is nice because it provides information on how the distribution of the different birds respond to impervious surface, are there few birds in the 40-90% impervious surface sites because these species avoid these areas or because there are few sites that fall into those categories? *As I suggested above, perhaps a new histogram would do the trick.*  
  
Discussion   
Lines 282-284: Needs to be clear that the pace of urbanization is increasing. Fixed  
  
Lines 309-323: This read more like it belonged in the Results since the findings are not placed in context and discussed until the following paragraphs. Since the Discussion is rather long as well, I suggest deleting this paragraph. Some of the information could be delegated to other paragraphs. To further condense the Discussion, I'd also recommend deleting suggestions of further studies which come up on at least four different occasions on pages 17-20. *What to do? Move to results?*  
  
Lines 325-338: Here you provide expectations for survivorship if avian survival was determined by top-down vs bottom-up controls. I think the manuscript would be greatly improved if it was framed in this regard. This could be set up in the Introduction and you could potentially make predictions for different species or guilds. *I thought I had framed it as such in the intro, but I guess I needed to do that more explicitly. I think I certainly need to come up with clear predictions for each species and frame those predictions based on guild and potential effects of habitat along the r2u gradient.*  
  
Lines 331-336: Unclear why invertebrates would reach higher densities in urban landscapes. Is there a citation that could be included to support this assertion? You mention that this might be particularly true for ground-foraging birds, which makes me think that you're referring to earthworms and robins, but I'm not sure there is evidence to support this claim. *There’s actually several good citations regarding earthworm abundance increasing with increased urbanization – one of which comes from our study area (the Baltimore LTER). I will include these citations. The cited McIntyre review gives plenty of reasons why some arthropods would experience higher abundances in urban environments.*   
  
Lines 346-348: If you included these species, why not also include species that were limited to the other end of the gradient? Were exotics that typically dominate urban landscapes not encountered much in this study? If not, why? *Both are a limitation. We can explain that the sample size requirements of CJS models meant that estimating the survival or birds not encountered very frequently would not be feasible. A shame we didn’t also monitor house sparrows, because we certainly encountered a lot of them.*  
  
Lines 351-352: Be consistent with bird names. Here you don't capitalize the second word in the common name (e.g. "starling" or "sparrow") yet you did for previously mentioned species. It's also distracting to go back and forth between common names and alpha codes. Fixed  
  
Line 374: I'm still unclear about the landscape in this study. Is "undeveloped" mostly agricultural or forested or some other land use type? You say rural, so I'm assuming some sort of agriculture. Perhaps more information could be provided in the Methods*. I haven’t included this yet, but I could make a table or figure that shows the proportional land cover classes at different portions of the r2u gradient.*  
  
Lines 369-380: Tying your findings into source-sinks dynamics makes for a strong paragraph. I think that you should specify which species this is true for. You say "some species", but which ones? Four of the seven? Also, the Ryder paper was published in 2010 (double-check citations throughout). Fixed  
  
Tables and Figures   
Table 3. Delete horizontal lines for Gray catbird. Fixed  
  
Figure 1. The figure legend could be improved. Include the number of study sites (n = 240). In the figure, perhaps include a north symbol and label the city centers of Washington D.C. and Baltimore. Including sites (black dots) within the inset would also be helpful. Lastly, international readers might be confused as to the location of this area in the United States. *Maybe I should move this figure to the appendix and use full color to display impervious surface.*  
  
Appendix II. Strange that some counts exceed scale on y-axis. Extend y-axis so readers can have a better idea of the species counts. *Will fix when I redo the histograms.*  
  
References:   
McKinney, M. L. 2006. Urbanization as a major cause of biotic homogenization. Biological Conservation 127: 247-260.   
  
McKinney, M. L., and J. L. Lockwood. 1999. Biotic homogenization: a few winners replacing many losers in the next mass extinction. Trends in Ecology and Evolution 14: 450-453.   
  
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Reviewer #2 (Comments to Author):   
  
General Comments:   
This ms presents novel and timely research on the effects of the urban matrix on the survival of five bird species. The effects of urbanization are becoming more and more important from ecological and conservation perspectives and this research adds to our understanding of how urban environments influence different bird species in different ways. What is most exciting about this work is the time frame of the data (>10 yrs) and the sampling that occurred within the urban / suburban matrix rather than simply in habitat islands (i.e. patches) that are located within the matrix. Many of these data were collected in backyards and much of the data were collected by citizen scientists. I found the paper to be clearly written, the analyses appropriate and well justified with limitations included and accounted for.

My **major concern** is that the species in this analysis are all associated with human dominated habitats, by design. But this limits the interpretation of how the urban – rural gradient is influencing species differently. The analysis also lumps resident bird and migrants and the more urban avoider species are cavity nesters (*There was no lumping in the analyses, though it is the case that the more urban avoiders were cavity nesters*). I realize that you are not going to sample urban avoider species like wood thrush in peoples backyards but I think the authors need to be more clear about the limitations of what they can say about the patterns of urbanization on avian survival given the suite of species they have to work with. *This is doable* Their suite of study species are the ones that are left after the last 200+ years of urbanization so the analysis is lacking a true urban avoider species. *This is a very fair comment has been a major concern of mine. Because of this, I don’t quite know how to address this. The study is undoubtedly on birds that are common across large portions of the r2u gradient. Because of this the inference is limited to such species.*  
  
Specific Comments:   
Top down vs. bottom up control - there are two well-argued paragraphs related to top-down vs. bottom up control that may be driving the demographic (adult survival) patterns observed for the focal species but I do not think the authors have tied these ideas together with their findings in the results and discussion as directly as they could. *Brandt – ideas? Can we talk through this?*  
I would remove the Alpha codes (NOCA, GRCA, etc) and use the common name for each species as not all the readers of ecology speak AOU Alpha Code. *I completed this for all except the tables. May adjust the tables as well for more clarity, but it seems they would get awfully big if so.*  
Line 339 - Change this topic sentence "Higher apparent survivorship for the AMRO, GRCA, NOCA, and SOSP fits the pattern expected of resource-mediated survival with increasing urbanization."   
to increase the clarity of how you think the patterns you observed for the differences in apparent adult survival. It may be as easy as using more direct language.....why say "resource-mediated" when you are talking about "bottom-up factors".  Fixed  
  
Line 359 - Potential influence of urbanization on avian fitness   
This paragraph is very vague. I was expecting to see some summaries of breeding bird survey data within the study region to at least link the authors claims that adult survival may be influencing population growth rates. It would be correlative but compelling if the urban adapter species breeding trend estimates followed this prediction and I have a hunch they would. *That’s fair. I have looked at the population trends using BBS data. Should I include those here?*  
  
Line 369 - This paragraph raises concern about natural habitats within the urban / suburban matrix being sinks for these urban adapting species but does not mention anything about the natural habitat patches providing habitat for species of conservation concern (i.e. urban avoiders). I think the authors should re-write this section of the discussion to be more forthcoming with the limitations of their study to bird species that will nest in people's back-yards. This is where my "major concern" with the interpretation of their results is strongest and it is here where rather than referencing habitat patches in an urban matrix as population sinks, I think the authors should indicate to the reader that their suite of breeding bird species do not include a true urban avoid because their study design does not include sampling within the habitats in the urban matrix (i.e. forest parks). There may also be competition issues for species of high conservation concern if the populations of  
these urban adapters are increasing and spilling into natural areas within the matrix this could be a potential negative for more habitat sensitive species. *This is obviously the biggest issue to tackle. The reviewer points out ways in which careful wording and listing the limitations of the species set could be used to get around some of the problem. We do, however, have some (but not enough) sites in forested parks (the lab being one of them). I think the effects of competition in the forested parks between “avoiders” and “adapters” would be super interesting, but unobtainable in the NN study design (as it stands at least). I do bridle though at the consideration of forested parks as “habitats in the urban matrix” (as the matrix itself is a habitat), the linking of forested patches as “natural habitat patches” (as the forests themselves are anthropogenic in origin due predominantly to the alteration of the disturbance regime but also the modification of the hydrologic cycle, other stuff). Also, if the “species of high conservation concern” is equated with birds that occupy forested habitats, it doesn’t quite jive with the overall population trends of the region as exhibited by BBS trend estimates. Regardless of my caveats, this comment is a huge issue to deal with and I can’t quite wrap my head around how.*