Reviewer(s)' Comments to Author:  
  
Reviewer: 1  
  
Comments to Authors and Editors  
I reviewed the original manuscript so I focused my current review on the revisions and your responses to those original comments. The revised manuscript addresses the minor technical aspects of the reviewer comments. However, I'm still not convinced that this manuscript provides substantial new data  or interpretations from the previously published articles on this topic and study area to justify this submission as a new Contributed Paper. In fact, your response to my primary comment #1 (i.e., "<i>2. Building off 1, our goal here is to provide spark for action and a bit of a blueprint on what next steps would be. That is why a portion of the discussion strays from the strict data presented here and expands into our collective experience working on grizzly bear demography and human-wildlife conflict to provide actionable solutions</i>") would actually argue for a "Perspectives" article, rather than a Contributed Paper.

1. EIC suggested no response required as novelty not a requirement for CSP

Several of the more involved technical aspects of the comments were only peripherally addressed. For example, your response to my original comment #4 was that transient behavior is not typical for grizzly bear populations. This is true of course, but it was not the point of the comment; the point was that the study area is relatively small for grizzly bear standards (3,210 km2 for the demographic analyses), and thus the possibility of animals simply passing through and being detected (which does not require transient behavior) may be quite high, and could easily be misinterpreted as immigration. Similarly, in my original comment 3 the idea was that you can estimate immigration and emigration <i>directly </i> using a robust-design through the parameterization of γ<sub>i</sub>' (i.e., the probability that a bear is not in the study area in period i, given that it was not present in the study area during the previous sampling period) and γ<sub>i</sub>'' (i.e., the probability that a bear moves outside the study area in period i given that it was present during the previous sampling period). That would be a more powerful and elegant way to assess whether immigration is permanent or temporary.

1. We now better understand the reviewers’ concerns. Given that the reviewer agrees transient behaviour is not typical for grizzly bear populations, the primary concern is animals with home ranges that straddle the study area boundary, that may perhaps only be detected in a single year if their home range overlap is low. The reviewer is concerned that this could be misinterpreted in the model as immigration when really, it’s just that the bear happened to wander into the edge of its home range and get caught at our traps in a given year. This study area edge issue (which the reviewer is correct is worse for smaller study areas with large edge:area ratios) was a focal concern in non-spatial capture recapture (CR) models (Boulanger & McLellan, 2001). Since the advent of spatial capture recapture (SCR) this issues has been largely resolved, and the model is able to estimate (although roughly when there are few detections) where animals’ home range centers are, allowing for animals to be detected that do not have home ranges inside the study area, without biasing resulting parameters (Efford & Fewster, 2013; Efford & Schofield, 2020).
2. IF we’ve misunderstood the reviewers concerns and they are not talking about transient behaviour or resident edge issues, but rather about dispersal, then we have the following thoughts:
   1. We defer to the collared animals known to be detected in the area, none of which have ever dispersed out after capture. This suggests either dispersing through is too rare for us to detect even though we keep ~20% of the population collared annually, or the Elk Valley sink is attractive enough that few animals who disperse into it end up dispersing through it given that there is attractive habitat and vacancies from high mortality (Lamb, Mowat, McLellan, Nielsen, & Boutin, 2017)
3. In any case, the models the reviewer is referring to are non-spatial models and we are now using spatial models that account for much of the edge concerns highlighted in (a). We investigated the parameters the reviewer suggested and they do not seem available in OpenCR (<https://cran.r-project.org/web/packages/openCR/vignettes/openCR-vignette.pdf>), likely due to the incorporation of space accounting for this already. Our primary goal was to estimate the observed growth of the population. The DNA detections provide means to do that and provide evidence that the population is stable through time. This can occur through many pathways, which typically is from high survival or recruitment of the resident population. In our case, we provide compelling collar-based evidence the resident population should be declining, so the stable DNA SCR results suggest that some of the elevated growth rates observed are due to immigration. All available evidence suggests these immigrants stay (Figure 6A), but even if they didn’t, the fact remains that annually there about the same # of bears in the Elk Valley, and the resident population from the year before would be declining without immigration. Some animals must stay to allow the abundance of bears to be stable through time. Additional analyses are unlikely to provide additional ecological insights and given the coarseness of DNA SCR data we suspect the models would have substantial challenges resolving passing through behaviour from death (in both cases the animal is never caught again), and we strongly advise against doing any non-spatial modelling on these data given the restricted study area size and changes in annual sampling distribution (Lamb et al., 2019).

Reviewer: 2  
  
Comments to Authors and Editors  
I appreciate the authors’ detailed responses to reviewer and editor feedback. I think the manuscript is improved and will make an important contribution to the literature and grizzly bear conservation. My comments are only minor suggestions.  
  
Minor comments: line #’s refer to the track changes copy:  
  
Line 73: “our” here could mean the authors or humans; suggest clarifying.

1. Agreed, changed sentence to “In these emerging landscapes of coexistence, the viability of coexistence depends in part on people having the necessary tools to keep themselves and their property safe while allowing bears to move across landscapes, survive, and reproduce at rates that support stable populations.”

Line 386: how did the recaptures or DNA detections align with the timing of the study? I.e., how do you know for sure that these animals remained alive the full study timeline if the last data point was sometime before the end of your study period? Maybe clarify this assumption?

1. All detections were within the timeframe of the study. Once a collar failed, ee didn’t need to confirm that the animal was necessarily alive for the remainder of the study, we just needed to confirm that the animal did not die while the collar was on, and that the collar didn’t fail because of a mortality event (like getting hit by a train which might wreck the collar). So, if we could confirm that the animal was censored and not dead at the end of its collar period (via live capture, find out that it died later, or via DNA detection) then we could confidently censor the animal at the point of collar failure. In most collar survival studies, people just assume that the failed collar is not related to mortality and just censor the animal. We tried to go the extra mile here and confirm this was true in as many cases as possible, so we had maximal certainty in fates.

Line 397: “confirmed to be” is written twice.

1. Removed the duplicate

Line 470: It might be interesting to include estimated # of bears killed but unreported, alongside the rates you provide, to give this even more context?

1. Added details on reporting rate: “The management of bear collisions is further complicated by only one in four bears killed in collisions being reported to authorities because animals are often able to move hundreds of meters off the transportation corridor after being struck and before dying.”

Line 596: this rather depends on what self-sustaining means (is immigration to offset mortalities self-sustaining, if those animals wouldn’t have been successful in their natal populations?). Perhaps change this to include “a self-sustaining bear population that doesn’t rely on immigration”.

1. Agreed, added the text as suggested by the reviewer: “Creating a self-sustaining population of bears in the Elk Valley that does not rely on immigration will require targeted efforts to reduce or secure attractants on private property and strategies to minimize collisions with trains and vehicles.”

Figure 2: if you need to reduce length further, perhaps the info in panels c and d (weight and fat) could be omitted or moved to the appendix (this info isn't important to estimating population size, right?). Same for the info in your methods and results on these topics.

1. Thanks, good ideas. Length seems to be OK but will do this if we run into issues in production.

Figure 5: it would look better if you could get the label for panel a, y axis, to be next to the axis values.

1. Yes, we’ve fixed. This was not possible in R but we’ve moved it using PowerPoint now.

References

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Lamb, C. T., Ford, A. T., Proctor, M. F., Royle, J. A., Mowat, G., & Boutin, S. (2019). Genetic tagging in the Anthropocene: Scaling ecology from alleles to ecosystems. *Ecological Applications*, *29*, e01876.

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