

Helldin and Petrovan Review: Effectiveness of small road tunnels and fences in reducing amphibian roadkill and barrier effects; case studies of retrofitted roads in Sweden

The work done by Helldin and Petrovan presents an important contribution to our understanding of the use of tunnels and drift fencing on amphibian roadkill mitigation. I think the study is effective and the conclusions are justly drawn. However, there are several comments that I think would make the paper even more effective and increase its citability. I would be happy to review a revision of this paper in the future.

Brandon Hedrick

Major comments:

- 1) Please include the supplemental information on each site in the main manuscript. Considering the PeerJ has a digital format, I wouldn't want this information to be lost in the supplement. When I read the MS, I wanted a more thorough explanation of the site differences earlier on and I think this would remedy the problem.
- 2) I would strongly consider combining figures 2–4 into a multiple panel figure with the images of the tunnels in the supplement. While table 1 lists the differences between tunnels, a visual would really help show the differences.
- 3) I was a little confused until I looked at Table 2 what you meant by 'before mitigation' and 'after mitigation'. There isn't any mention of the years in the actual text and it reads like the 'before mitigation' and 'after mitigation' were several weeks apart.
- 4) There are a few instances where methods are not adequately described. I am not sure how the data from lines 300–307 was generated. Please add this to the methods. More information on how the Hels and Buchwald equation was applied at each site (what the variables were) could be presented more clearly, perhaps in a table. I was also a little confused as to how the data were standardized. Please add in more details to the methods to remedy this.

Line by Line:

Line 25: Please spell out versus for the abstract

Line 26: consider 'In mitigated road sections, the estimated number..'. I had a little trouble following as written.

Line 37: change to 'by road mortality, barrier effects of roads, and traffic'

Line 42: 'in attempt'

Line 40-42: Is there any evidence of road avoidance in amphibians? I have seen many salamanders and frogs walk across roads blissfully unaware of traffic. Can you add a citation?

Line 47: Please add the recent Hedrick et al. (2019) pub here:

<https://www.biorxiv.org/content/10.1101/569426v1>

Line 65: Change 'where' to 'were'

Line 105: Since there is no standard for monitoring tunnels, I think the supplement would be better moved back into the main paper. I would hate for this important information to be lost in the supplement. The supplement will need to be edited some in order to pull it into the main manuscript.

Line 114: I'm not sure why site 2 was so different having read the supplement. Is it just that there were temporary fences before mitigation?

Line 130: '..information presented by Hels and Buchwald..'

Line 142: For site 3, did you use the same speeds for the two newt species and for the two frog species in the Hels and Buchwald equation? I think more explanation is needed here.

Line 162: What do you mean when you say 'largely following the number that was killed before mitigation'?

Line 179: Roadkill should not be a verb throughout

Line 192: The fence end effects can be curbed by putting a loop at the end of the fences to reorient the amphibians. See page 9 here: https://files.ontario.ca/environment-and-energy/species-at-risk/mnr_sar_tx_rptl_amp_fnc_en.pdf

Line 205–216: Add in the recent Hedrick et al. (2019) paper here as well. That study focused on this issue in particular.

Line 221: Gibbs and Shriver 2005 can also be cited here.
<https://link.springer.com/article/10.1007/s11273-004-7522-9>

Line 241: '...have a significant, but complex..'

Line 244: Longer than at the other sites right?

Line 262: Change 'not unaffected' to 'affected'

Line 283: Change to 'In contrast'

Line 286: I'm not sure what the sentence starting with 'neither' means. Reword.

Line 300–307: I'm not sure how this data was generated. Can you add this to the methods or delete?

Line 308: Gibbs and Shriver (2005) above used the Hels and Buchwald equation for a different species and confirmed its use.

Line 314: I think another very important point here is to identify the hotspot. It is not uncommon for tunnels to be placed near a hotspot, but not on it. In this case, the tunnels are not used at all.

Line 320: See the comment about the fence loop above.

Line 333: I completely agree! Too often tunnels are placed based on scant data and their impact is not assessed.

Line 350: Very good point about the juveniles. I wish they were easier to monitor. I have also always ignored this important factor in tunnel studies.

Table 2 makes it look like some sites were not measured before or after mitigation. Can you add in a row that says something like 'manual monitoring' to show how they were monitored?