

The implications of self-interpretation in wildlife conservation concerning animal welfare

The use of evidence-based research in wildlife conservation is imperative to its success. The unprecedented rates with which habitat loss and degradation occur has irreversible consequences on biodiversity, demanding the need for time and cost-efficient solutions to conservation issues (Legge, 2015). The need for evidence-based research within wildlife conservation further extends to other domains within this discipline, specifically conservation measures concerned with the monitoring and handling of wild animals (Hampton & Hyndman, 2019). This is of particular importance as the broader community of wildlife conservationists often neglect to consider the well-being of those individuals making up a species (Sekar & Shiller, 2020; Fraser-Celin & Hovorka, 2019; Ramp & Bekoff, 2015; Dubois et al., 2017). Unfortunately, the bulk of the animal welfare studies published address only a handful of conservation practices, predominantly culling (Hampton & Hyndman, 2019). In the following paragraphs, I aim to support why there is a need for increased evidence-based animal welfare studies in conservation practices concerning wild animals. To illustrate this point, I will focus on the conservation practice employed to extract genetic material from amphibians, a technique I learnt during my internship in Ecuador.

Toe-clipping is an invasive technique used to mark and/or obtain genetic material from amphibians and involves cutting-off of the smallest toe of the right-hind leg damaging part of the bone in the process (Gallardo et al., 2012). The evidence of this on the posterior survival of amphibians varies among species and so its applicability should be evaluated accordingly (Funk et al., 2005; Perry et al., 2011). Despite the emergence of non-invasive techniques to obtain DNA from amphibians, such as through buccal swabs, toe-clipping is the best technique thus far to obtain genetic material from amphibians for analysis using miniaturized laboratory equipment (Pomerantz et al., 2022) i.e., equipment that is mobile and inexpensive.

The data obtained through toe-clipping has been instrumental in the field of wildlife conservation, such as in the identification of the fatal amphibian disease called Chytridiomycosis (Funk et al., 2005; Gabor et al., 2017), which is the worst contagious disease ever to have been documented in vertebrates with respect to the number of species it has infected and the potential of it to drive species to extinction (van Rooij

et al., 2015). Despite the drawbacks of toe clipping, the authors Funk et al., (2005) believe that “it is less ethical to sit back and watch species slip into extinction than it is to use the best available methods to help conserve them”, a viewpoint I share too. More often than not, however, the notion of protecting species transcends into a lack of effort and concern shown by wildlife conservationists for the well-being of the animals involved. This shines through in the comments they express, such as “storing amphibians in an enclosure has no impact on them” or “storing amphibians in a plastic bag for two days will not impact them”, comments which lacks evidence-based animal welfare studies to back them up, leaving ethical debates up to personal interpretation (Jewell, 2013; Martin, 2009).

The number of studies looking into the effects of conservation practices on the welfare of amphibians, is a fraction of that on mammals and birds, among other taxa (Jewell, 2013; Martin, 2009), with most studies looking into changes in behavioural responses to various stressors (Jewell, 2013; Martin, 2009). Due to the lack of data concerning amphibians, we have limited knowledge with regards to the impact and duration of exposure of different kinds of stressors on amphibian behaviour and the consequences of this to the individual involved. As a result, I believe there is an increased need for evidence-based animal welfare studies in conservation practices, especially pertaining to amphibians, but applicable to all wildlife as a whole. This leads to self-interpretation amongst wildlife conservationists within a discipline that inherently fails to acknowledge the well-being of individual animals (Sekar & Shiller, 2022).

References

1. Dubois, S., Fenwick, N., Ryan, E., Baker, L., Baker, S., & Beausoleil, N. et al. (2017). International consensus principles for ethical wildlife control. *Conservation Biology*, 31(4), 753-760. doi: 10.1111/cobi.12896
2. Fraser-Celin, V., & Hovorka, A. (2019). Compassionate Conservation: Exploring the Lives of African Wild Dogs (*Lycaon pictus*) in Botswana. *Animals*, 9(1), 16. doi: 10.3390/ani9010016
3. Funk, W., Donnelly, M. & Lips, K. Alternative views of amphibian toe-clipping. *Nature* **433**, 193 (2005). <https://doi.org.ep.fjernadgang.kb.dk/10.1038/433193c>
4. Gabor, C., Knutie, S., Roznik, E., & Rohr, J. (2017). Are the adverse effects of stressors on amphibians mediated by their effects on stress hormones?. doi: 10.1101/165282

5. Gallardo, C., Correa, C., Morales, P., Sáez, P., Pastenes, L., & Méndez, M. (2012). Validation of a cheap and simple nondestructive method for obtaining AFLPs and DNA sequences (mitochondrial and nuclear) in amphibians. *Molecular Ecology Resources*, 12(6), 1090-1096. doi: 10.1111/1755-0998.12013
6. Hampton, J., & Hyndman, T. (2019). Underaddressed animal-welfare issues in conservation. *Conservation Biology*, 33(4), 803-811. doi: 10.1111/cobi.13267
- Jewell, Z. (2013). Effect of Monitoring Technique on Quality of Conservation Science. *Conservation Biology*, 27(3), 501-508. doi: 10.1111/cobi.12066
7. Legge, S. (2015). A plea for inserting evidence-based management into conservation practice. *Animal Conservation*, 18(2), 113-116. doi: 10.1111/acv.12195
8. Martin, L. (2009). Stress and immunity in wild vertebrates: Timing is everything. *General And Comparative Endocrinology*, 163(1-2), 70-76. doi: 10.1016/j.ygcen.2009.03.008
9. Perry, G., Wallace, M., Perry, D., Curzer, H., & Muhlberger, P. (2011). Toe Clipping of Amphibians and Reptiles: Science, Ethics and the Law. *Journal of Herpetology*, 45(4), 547-555. <https://about.jstor.org/terms>
10. Pomerantz, A., Sahlin, K., Vasiljevic, N., Seah, A., Lim, M., & Humble, E. et al. (2022). Rapid in situ identification of biological specimens via DNA amplicon sequencing using miniaturized laboratory equipment. *Nature Protocols*, 17(6), 1415-1443. doi: 10.1038/s41596-022-00682-x
11. Ramp, D., & Bekoff, M. (2015). Compassion as a Practical and Evolved Ethic for Conservation. *Bioscience*, 65(3), 323-327. doi: 10.1093/biosci/biu223
12. Sekar, N., & Shiller, D. (2020). Engage with animal welfare in conservation. *Science*, 369(6504), 629-630. doi: 10.1126/science.aba7271
13. Van Rooij, P., Martel, A., Haesebrouck, F., & Pasmans, F. (2015). Amphibian chytridiomycosis: a review with focus on fungus-host interactions. *Veterinary Research*, 46(1). doi: 10.1186/s13567-015-0266-0