

REVIEW

Best practices and software for the management and sharing of camera trap data for small and large scales studies

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Abstract

Camera traps typically generate large amounts of bycatch data of non-target species that are secondary to the study's objectives. Bycatch data pooled from multiple studies can answer secondary research questions; however, variation in field and data management techniques creates problems when pooling data from multiple sources. Multi-collaborator projects that use standardized methods to answer broad-scale research questions are rare and limited in geographical scope. Many small, fixed-term independent camera trap studies operate in poorly represented regions, often using field and data management methods tailored to their own objectives. Inconsistent data management practices lead to loss of bycatch data, or an inability to share it easily. As a case study to illustrate common problems that limit use of bycatch data, we discuss our experiences processing bycatch data obtained by multiple research groups during a range-wide assessment of sun bears *Helarctos malayanus* in Southeast Asia. We found that the most significant barrier to using bycatch data for secondary research was the time required, by the owners of the data and by the secondary researchers (us), to retrieve, interpret and process data into a form suitable for secondary analyses. Furthermore, large quantities of data were lost due to incompleteness and ambiguities in data entry. From our experiences, and from a review of the published literature and online resources, we generated nine recommendations on data management best practices for field site metadata, camera trap deployment metadata, image classification data and derived data products. We cover simple techniques that can be employed without training, special software and Internet access, as well as options for more advanced users, including a review of data management software and platforms. From the range of solutions provided here, researchers can employ those that best suit their needs and capacity. Doing so will enhance the usefulness of their camera trap bycatch data by improving the ease of data sharing, enabling collaborations and expanding the scope of research.