

HOW USEFUL ARE TRANSECT SURVEYS FOR STUDYING CARNIVORES IN THE TROPICAL RAINFORESTS OF BORNEO?

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ABSTRACT. — Transect surveys are a widely used tool in the study of wildlife populations. Here, we review different forms and objectives of transect surveys, discuss the need for and briefly describe principles of good study design, and discuss various biological measurements employed in the study of carnivores in the rainforests of Borneo. We discuss the conservation value of these measurements, underlying assumptions in using different approaches, and why these assumptions cannot often be met in the study of Bornean carnivores. We argue that transect surveys are of little use as a stand-alone technique for carnivore studies in Borneo; numbers of encounters from genuinely random transects are too low to be amenable to quantitative analysis, whereas observations from non-random transects are biased and cannot be used for drawing any sort of wider inference. We consider approaches in which transect surveys could be implemented in conjunction with other techniques. In general, limited conservation resources could be better spent on other techniques and other measures that can usefully inform conservation.

KEY WORDS. — transects, carnivores, Borneo, study design, distance sampling, occupancy

INTRODUCTION

Assessing the conservation status of mammalian carnivores is challenging as they are often cryptic and usually occur at naturally low densities (Linkie et al., 2007; Balme et al., 2009). In Borneo's forests, the challenge is even greater due to difficult terrain, dense vegetation, and poor accessibility (Mohd-Azlan, 2009). Nonetheless, as carnivores in Borneo are threatened by deforestation, degradation and fragmentation of natural habitats (Curran et al., 2004; Poffenberger, 2009; Mathai et al., 2010), and indiscriminate hunting, it is important to generate relevant and sound information on carnivore distribution, abundance, population trends, habitat use, and other ecological measures. The identification and application of appropriate data collection and analytical techniques is therefore crucial, as techniques vary in advantages and limitations (e.g., Wilson & Delahay, 2001; Davison et al., 2002).

One of the most commonly used approaches in the study of forest mammals, including Bornean carnivores, is to conduct transect surveys to address a variety of questions. Unfortunately, much time, effort, and resources are invested in such surveys, with little increase in our understanding of the distribution, status, and biology of these species. In this paper, we discuss the suitability of transects for the study of carnivores in Borneo. We describe different types of transect surveys as well as analytical techniques for data from these surveys. Assumptions to be met while collecting and analysing data are presented, as are the consequences of violating these assumptions. Since Bornean carnivores are essentially unstudied in this depth, the issues are discussed with reference to general survey principles with examples from a wide variety of mammals. It is hoped that this paper will help future researchers make informed decisions about what parameters to estimate, data collection and analytical techniques for transect data, and to avoid common pitfalls. While we focus on the study of carnivores in the rainforests