

Original study

Marius Joscha Maiwald, Jayasilan Mohd-Azlan and Jedediah F. Brodie*

Resilience of terrestrial mammals to logging in an active concession in Sarawak, Borneo

<https://doi.org/10.1515/mammalia-2020-0011>

Received February 7, 2020; accepted August 19, 2020;
published online September 21, 2020

Abstract: Selective logging is very widespread across the tropics and can alter the habitat for myriad wildlife species. But while many studies have assessed the impacts of past logging on forest animals, far fewer have investigated how species respond to logging while the timber operations are actually going on. This is an important knowledge gap because, considering the prevalence of logging across the world, numerous areas will be undergoing active extraction at any given time. We compared the occurrence and diel activity patterns of individual species of medium- to large-bodied terrestrial mammals, as well as the richness of the entire assemblage, among sites that were either unlogged, had been logged historically, or had ongoing ‘reduced impact’ timber extraction in the Kapit Region of Sarawak, Malaysian Borneo. We found no significant differences in estimated occupancy or activity patterns of particular species, or in overall species richness, among logging treatments. Across sites, species richness in this area appeared to be as high as or higher than in many other parts of the state, including some protected areas. Though monitoring is needed to assess potential long-term impacts, our results suggest that reduced-impact logging could allow economic development that is sustainable for many wildlife populations.

Keywords: fragmentation; habitat disturbance; matrix habitat; occupancy; species richness; tropical rainforest.

1 Introduction

Logging is rampant across the tropics and can impact many species. Even over a decade ago, only 30% of tropical forests were undisturbed (Potapov et al. 2008). Logging can negatively impact biodiversity through habitat destruction and by increasing access to illegal hunters (Brodie et al. 2015a; Hawthorne et al. 2001). Both logging and hunting are associated with reduced occurrence of wildlife species in some areas (Cheyne et al. 2016), particularly in areas that were recently logged (Brodie et al. 2015a). Other studies have found mixed or no impacts of logging on wildlife (e.g. Granados et al. 2016; Johns 1992). Sometimes certain species, such as larger ungulates, even seem to prefer disturbed forest habitats over primary forest (Brodie et al. 2015b; Wearn et al. 2017).

But nearly all of these studies have looked at the impacts of past logging on wildlife. We have very limited information on how logging affects vertebrates while the timber operations are actually going on – this knowledge gap is important because, given the extent of logging around the world, vast areas are likely to be actively undergoing logging at any given time.

The island of Borneo has some of the most biodiverse ecosystems in the world. Despite only covering ~0.2% of the Earth’s surface, it hosts about 4 and 5% of all known plant and mammal species, respectively (MacKinnon et al. 1996). Its terrestrial mammal fauna alone comprises ~288 species with 63 endemics (Phillipps and Phillipps 2016; Mohd-Azlan et al. 2019). Approximately 17% of Borneo’s land mass is within the Malaysian state of Sarawak, yet ~87% (~215) of Borneo’s mammals can be found in the state (Phillipps and Phillipps 2016). As one of the largest sectors of Sarawak’s economy, timber extraction is widespread, particularly in lowland dipterocarp forests. Although the total terrestrial protected area coverage has increased to ~8500 km² in the state, many of these areas are likely too small to sustain viable populations of larger mammals (Mohd-Azlan et al. 2017; Mohd-Azlan and Lawes 2011). For example, Sunda clouded leopards (*Neofelis diardi*) can have female home ranges of >16 km² (Hearn et al. 2013) and population densities of < 2 per 100 km² (Brodie and

*Corresponding author: Jedediah F. Brodie, Wildlife Biology Program and Division of Biological Sciences, University of Montana, Missoula MT 59812, USA, E-mail: jedediah.brodie@umontana.edu

Marius Joscha Maiwald, Animal Resource Science & Management, Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

Jayasilan Mohd-Azlan, Institute of Biodiversity and Environmental Conservation, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia