

Restoration of Lowland Tropical Rainforests in Kalimantan, Indonesia

by Akane Nishimura, Graduate Student, Ecology and Evolutionary Biology and Center for Tropical Research, Institute of the Environment, UCLA

Lowland tropical rainforests are rapidly disappearing due to fire, logging, and agriculture. Research and restoration efforts are urgently needed, especially in understudied and underserved areas like Borneo. Borneo is the world's third largest island and is part of the Sundaland Biodiversity Hotspot. It is also home to many endangered species, including orangutans.



Map of Indonesia. The black circle indicates the location of Tanjung Puting National Park in the province of Central Kalimantan on the island of Borneo.

Natural succession and restoration efforts in Borneo have been affected by the invasive grass *Imperata cylindrica*, which is considered to be one of the ten worst weedy species in the world. *Imperata* is indigenous to Asia, but has recently expanded into disturbed rainforests throughout Southeast Asia, including my study area in Tanjung Puting National Park in Central Kalimantan (Borneo, Indonesia).

The goal of my research is to assess natural and assisted successional patterns in an effort to develop feasible, large-scale restoration of *Imperata* grasslands to secondary forest. As deforestation rates increase and El Niño-related droughts in the area become more frequent and severe, it is essential to predict and prevent further degradation. To these ends, I am using a variety of techniques, including establishing a chronosequence of plots, root exclusion experiments, seed bank experiments, Geographic Information Systems (GIS), and remote sensing.



Palm oil plantations are one of the leading causes of orangutan habitat destruction and lowland forest loss in Indonesia. In the U.S., palm oil can be found in processed foods and health and beauty products.



Siswi, an ex-captive orangutan, resting in Akane Nishimura's hammock.

During the Fall of 2007, I traveled to Indonesia for my second field season. With the aid of a local non-governmental organization (NGO), Friends of the National Park Foundation (FNPF), I established a series of 10x10 m plots in areas with different use and fire histories. Some plots have been planted with native trees to determine what effects restoration has on early post-fire succession. We measured changes in understory plant cover, diversity, and recruitment as indicators of succession.



Fighting an anthropogenic fire in a secondary growth forest during an El Niño-related drought in 2006.



Post-fire Imperata growth.

Since fire has become prevalent in this area, I am field validating the accuracy of several fire products for Central Kalimantan. This involves recording the presence or absence of fires based on field observations and comparing this to remotely sensed data.

During future field seasons, I will continue to monitor my permanent plots and use remote sensing to analyze patterns in fire frequency, climate, and land cover change.