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Title: Plant Community Structure, Fire Disturbance, and Recovery in Mangrove Swamps of the Waini Peninsula, Guyana

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ABSTRACT

Soil fires during the 1997 to 1998 El Niño caused high mortality among mangroves of Waini Peninsula, a potential protected area. Impacts and early recovery were investigated, with baseline floristic and ecological analyses.

Plant species and communities were surveyed. 118 plant species were documented, and photo-illustrated in an appendix. Approximately 64.6 km² were burned, 26.6 km² classified as mangrove, the largest reported mangrove fire. Regional, continental, and global floral affinities are explored. Of 240 species in five Waini and two inland communities, 79% occurred in only one; coastal vegetation exhibited high beta diversity. The Waini held many species with Neotropical (33%) and Pantropical (27%) distributions but few Guiana Shield endemics (1.6%). The presence of the Asian mangrove palm, *Nypa fruticans*, in the study area is examined, including extent, possible sources, potential spread, and reported dispersal to Trinidad.

Six 0.1-hectare *Avicennia* swamp vegetation plots were sampled over four years. Unburned swamp basal area was 21.25 m²/ha, increasing 2.5% to 3.5% annually. Burned

swamp basal area was at least 20.43 m²/ha before fires, with estimated biomass greater than unburned swamp. Sapling, seedling, and herbaceous cover in the unburned swamp was low, and variable in the burned swamp, with probable hydrology links. Spatial patterns of *Avicennia* trees were generally overdispersed. Waini mangrove basal area and height approached worldwide medians; stem density was much lower. Unburned swamps near Waini Point are apparently younger than to the southeast, with irregular seedling recruitment.

Burned swamp regeneration was investigated. Establishment distances of seedlings from parents had means of 24.2 meters for *Laguncularia*, 4.8 meters for *Avicennia*, and 8.9 meters for *Rhizophora*. Mangrove plantings explored restoration possibilities. *Rhizophora* was successful in burned swamp, given sufficient elevation. After 10.5 months, *Rhizophora racemosa* in unburned swamp was about half the height of those in burned swamp (56 cm vs 129 cm); wet condition plantings outsurvived and outgrew drought plantings. No *Laguncularia* or *Avicennia* plantings survived, suggesting narrow hydrological requirements.

Geomorphology influences mangrove dispersal, establishment, population structure, and disturbance on the Waini. Its mangroves are unique in the Neotropics and valuable biologically and culturally.