

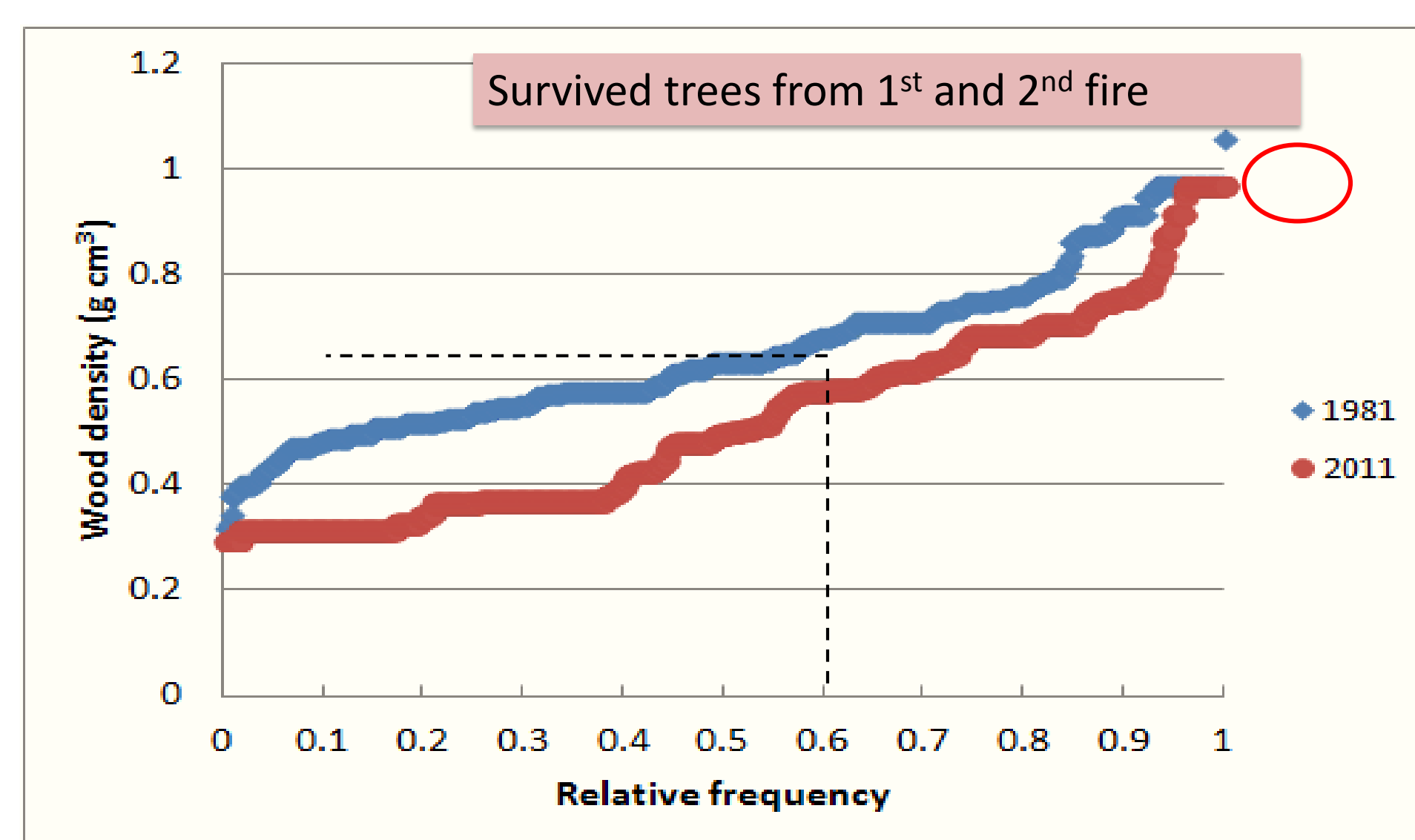
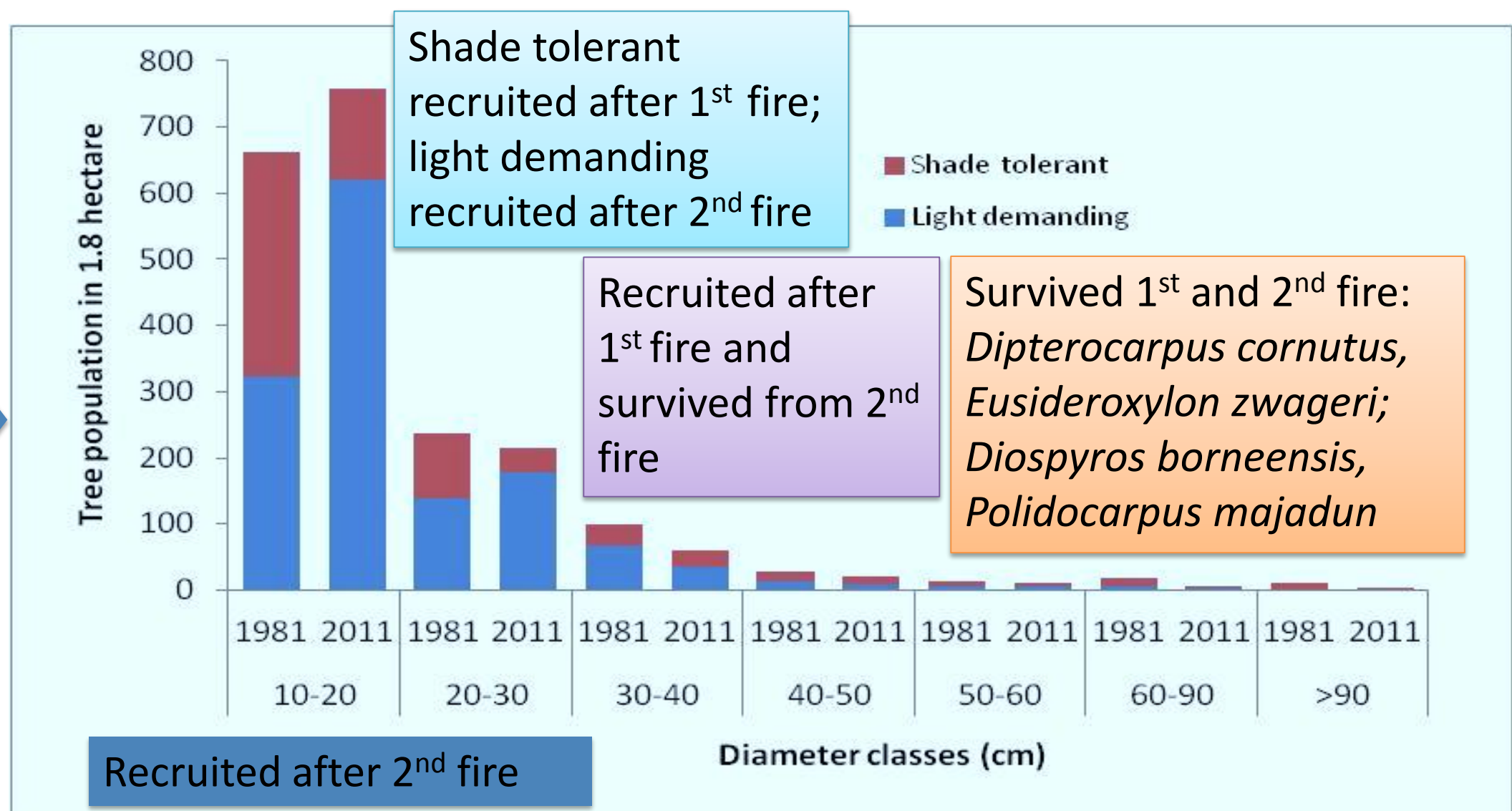
RESTORATION: WHAT CAN WE EXPECT FROM A LEAVE-IT-ALONE RESTORATION STRATEGY?

RECOVERY OF LOWLAND MIXED DIPTEROCARP FOREST OF EAST KALIMANTAN THIRTY YEARS AFTER A MAJOR FIRE EPISODE

Subekti Rahayu, Meine van Noordwijk, Sonya Dewi and Degi Harja

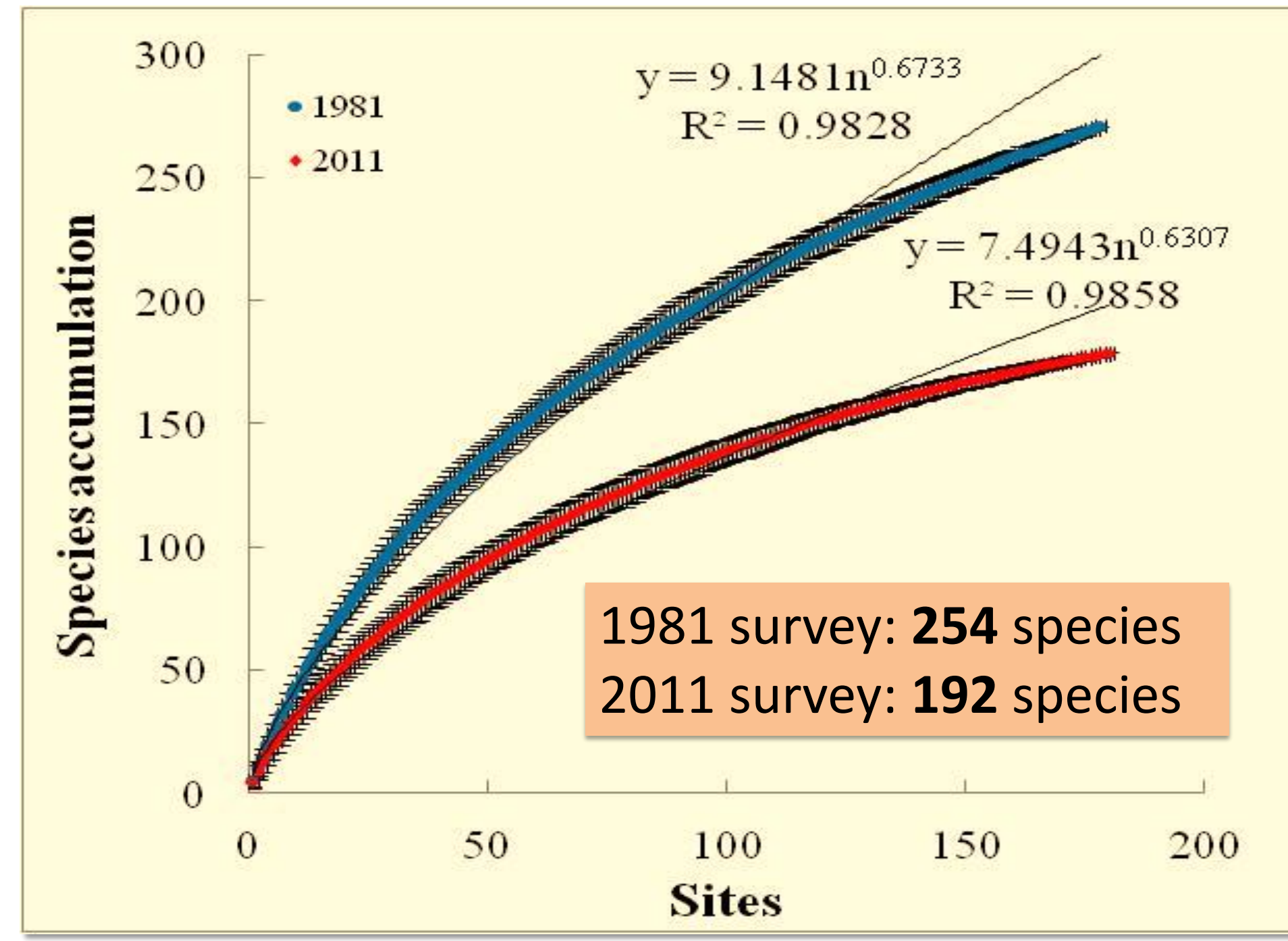
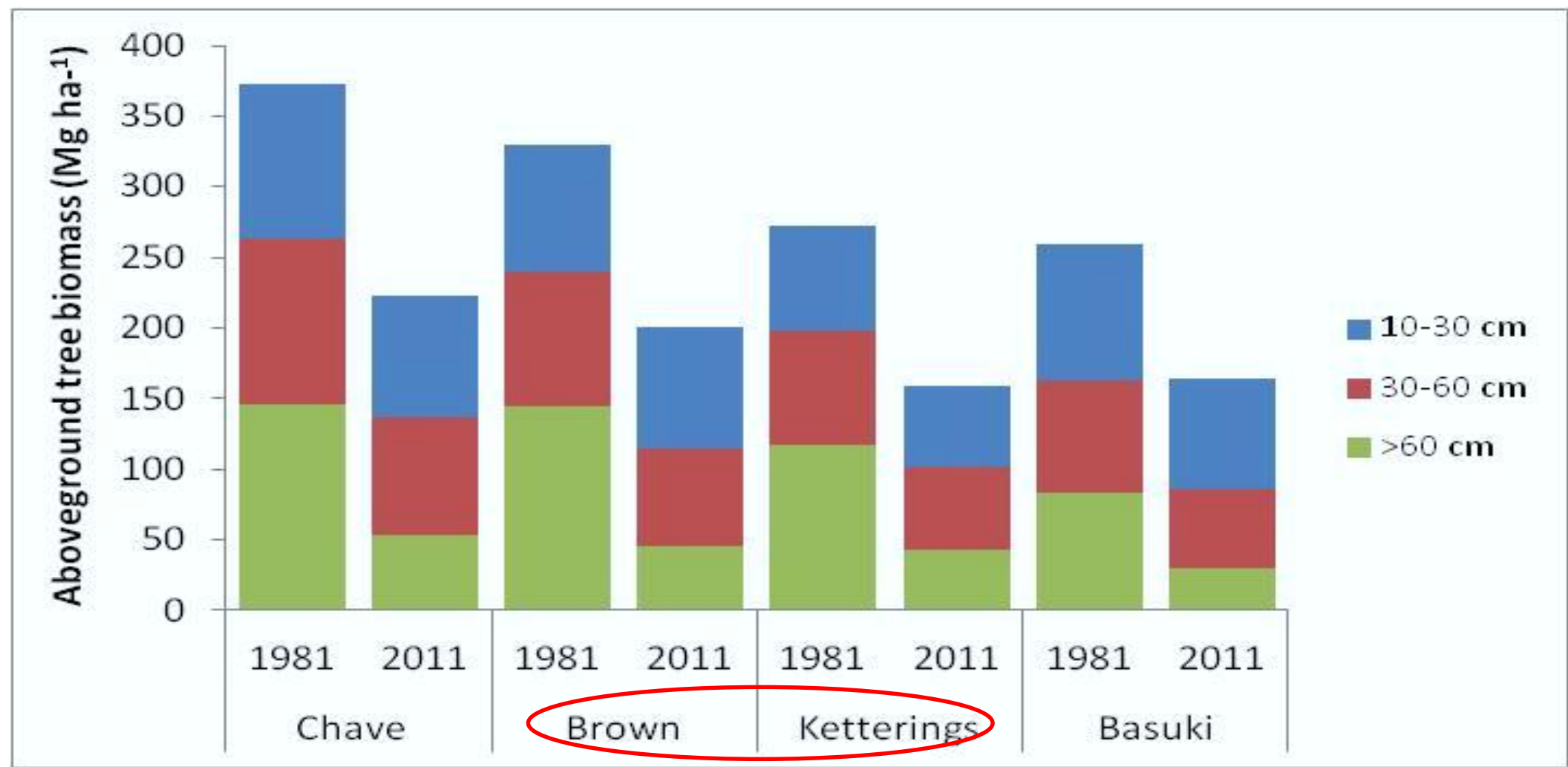


100% recovery of tree population



Shift in species composition; 0.63 → 0.5 median wood density

60% recovery of biomass; tree >60 cm DBH has not yet recovered



75% recovery of tree species

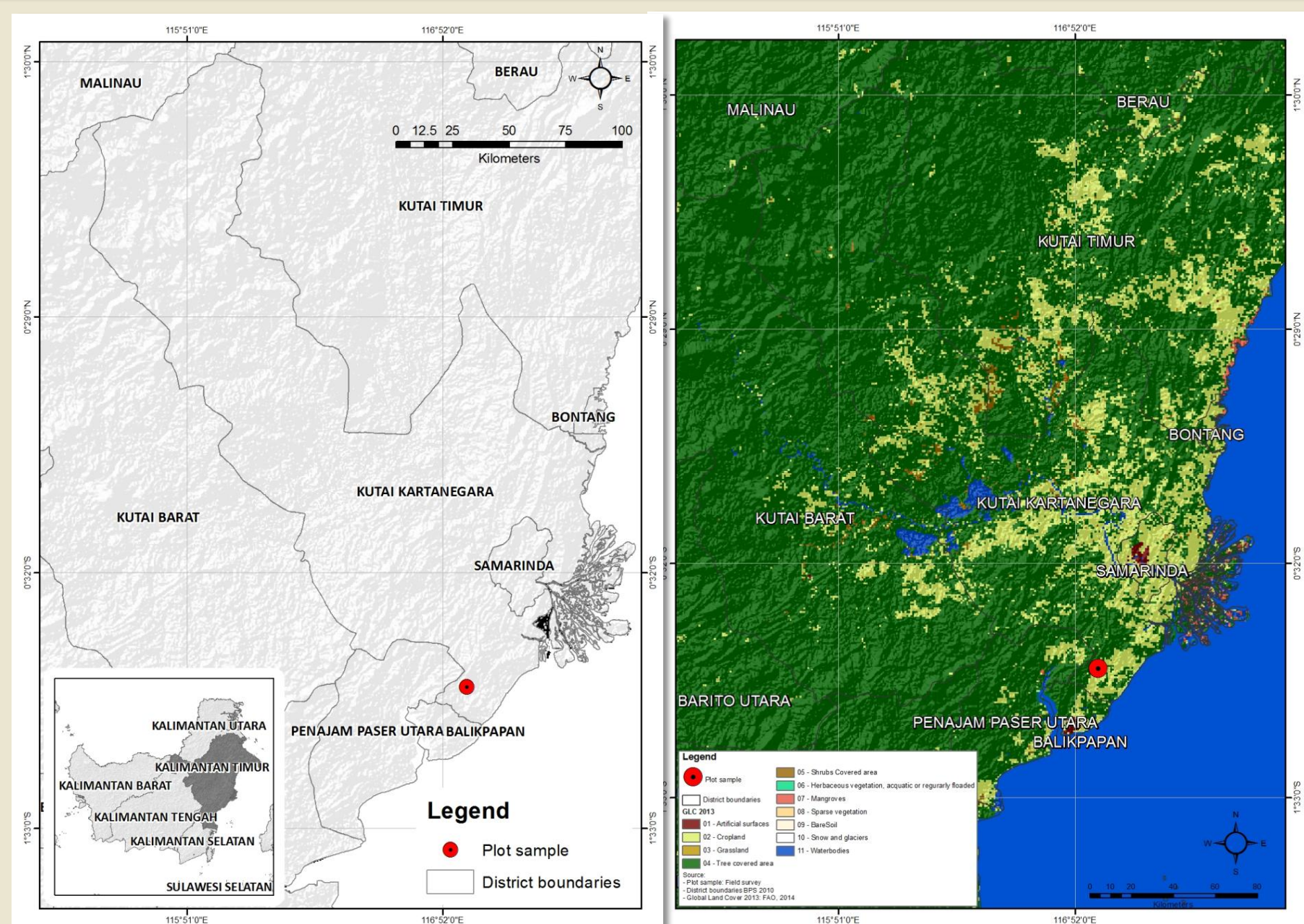
Ketterings and Brown are similar pattern of allometry equations; Ketterings included wood density, resulted 20% lower biomass than Brown

INTRODUCTION

Temporal and spatial aspects of forest recovery after anthropogenic disturbance in Indonesia remain poorly known. Most published work used paired-plot rather than time-series data due to limited long-term permanent plot observation established in mixed Dipterocarp forest of Indonesia; as well as more discussing on impact of fires event to biodiversity (van Nieuwstadt 2001; Slik 2002; Eichhorn 2006). Specific effects of disturbance remain visible in forest structure and species composition long after a closed-canopy status is regained (Newbold *et al.* 2014; Winter 2012). Canopy structure and basal area recover in 56 years after selective logging (Priatna *et al.* 2004). Species richness recover in 150 years after clear felling (Riswan *et al.* 1984). Aboveground biomass recovery was estimated to take 80 years and biodiversity, assessed across plant and faunal groups may take 120-150 years (Martin *et al.* 2013). The objectives of the research are: (1) to understand the recovery process of forest composition structure after repeated fire events, (2) to understand the biomass recovery due to repeated fire event and (3) to get information regarding the restoration implication.

STUDY SITE

Samboja Research Forest (SRF) established 1978 in 504 ha lowland Dipterocarp forest and expanded with another 3000 ha of logged-over forest in 1991. Currently, 504 ha covered by forest (undisturbed and disturbed by fires) and another 3000 ha of shrubs and grasslands. Since 2011, SRF managed by BALITEK KSDA, FORDA, Ministry of Environment and Forestry.



METHODS

1981 and 2011 surveys: 10 m x 10 m sub-plot set up in 1.8 hectare area (150 m x 120 m). All trees above 10 cm DBH enumerated, stem diameter and tree height were measured, tree position mapped, leaves sample collected and identified.

Data analysis: (1) comparing tree population based on diameter classes of 1981 and 2011 survey; (2) aboveground biomass estimation in four allometry equations (Chave *et al.* 2005; Ketterings *et al.* 2001; Brown 2007; Basuki *et al.* 2009); (3) constructed wood density cumulative frequency; (4) constructed species accumulation curve by bootstrapping on the basis of data at the 10 m x 10 m sub-plots.



CONCLUSIONS

- Thirty years after initial major fire: Tree population 100% recovered; aboveground biomass 60% recovered, species richness 75% recovered at 1.8 ha, but for larger area can be lower, but species composition shifted from medium wood species to light wood species
- Implication to conservation measures: Naturally regeneration is possible after fire disturbance, but depends on the source of seed availabilities in the neighborhood, more active ecological restoration is needed to recover species composition especially where whole landscapes are depleted

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