

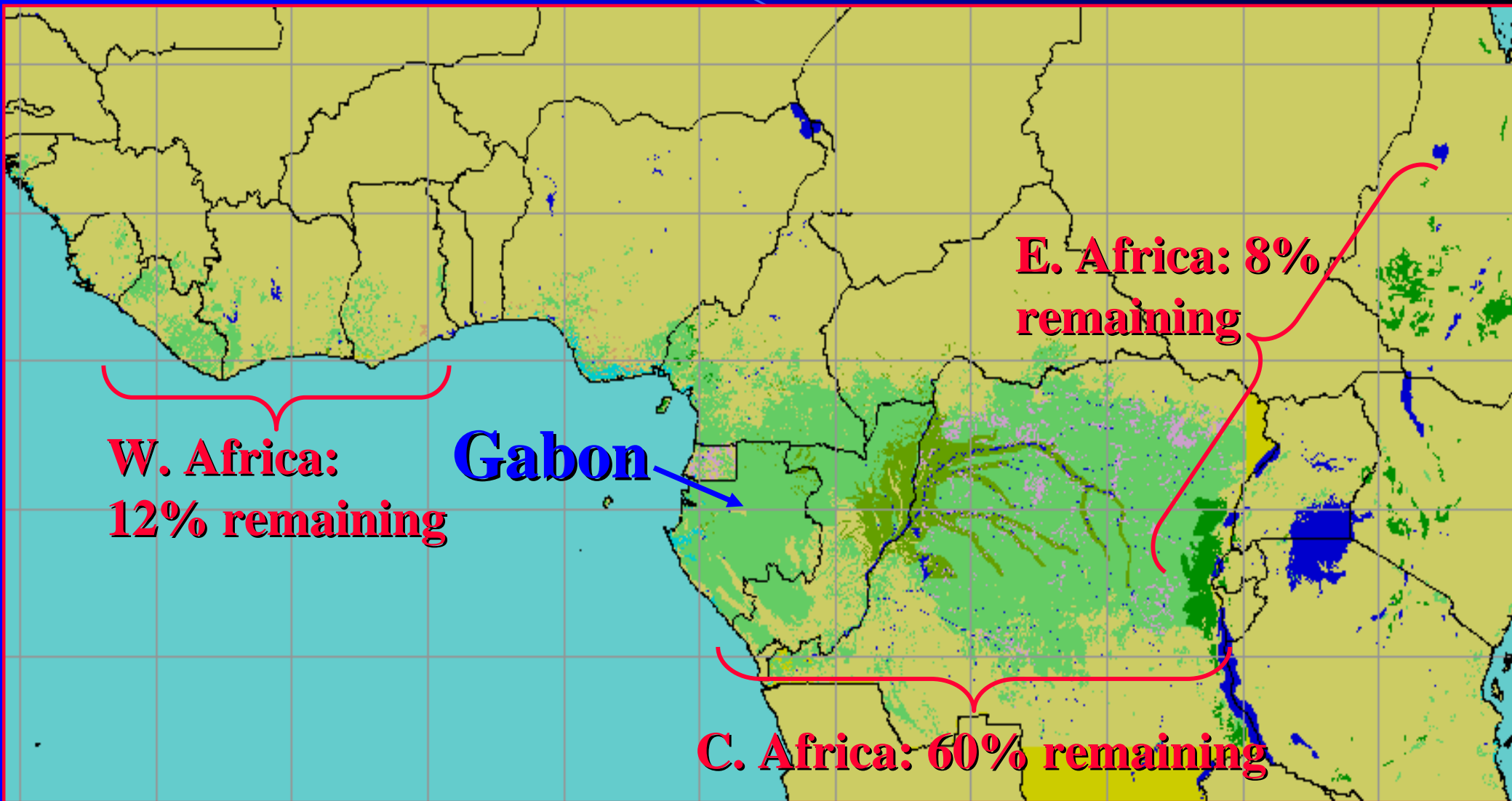
Impacts of Roads and Hunting on Central-African Mammals

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Africa's Vanishing Rainforests



Imagery: University of Maryland
Deforestation data: Weber *et al.* (2001)

Slash-and-Burn Farming



Commercial & Subsistence Hunting



“The most intensively
hunted tropical region
in the world”

Fa et al. (2002)

Road and Infrastructure Projects

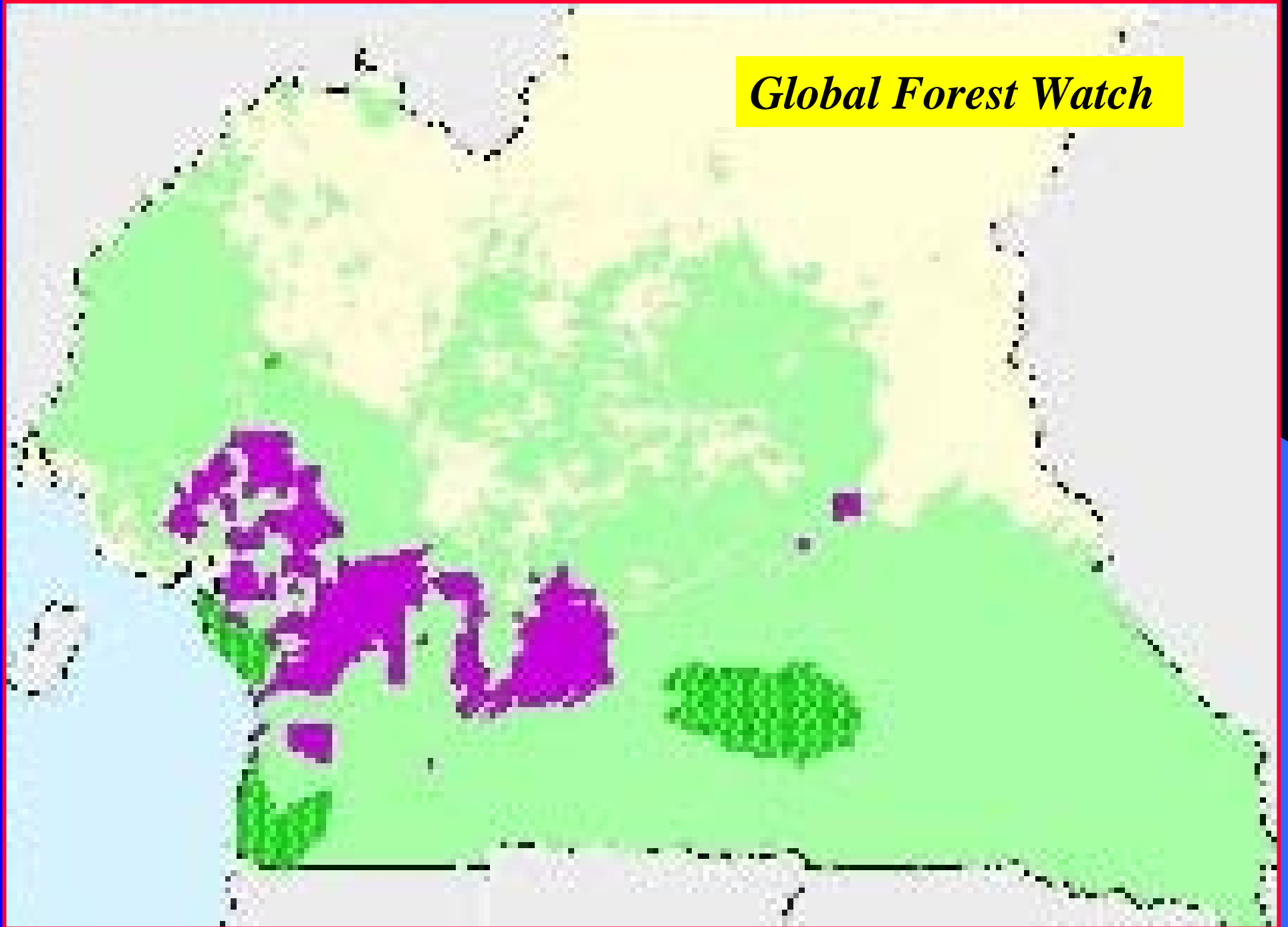


Industrial Logging



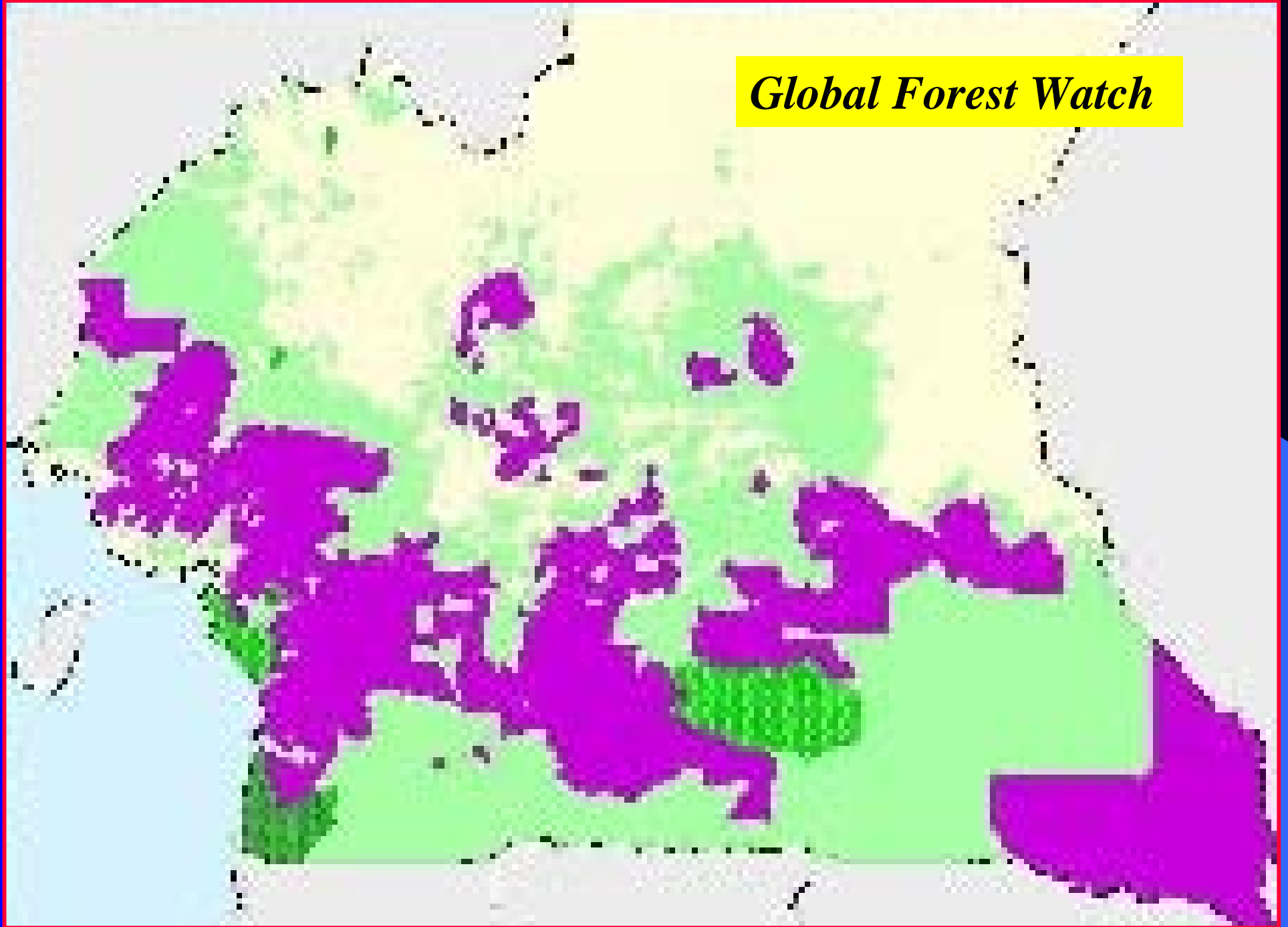
Cameroon in 1959

Global Forest Watch



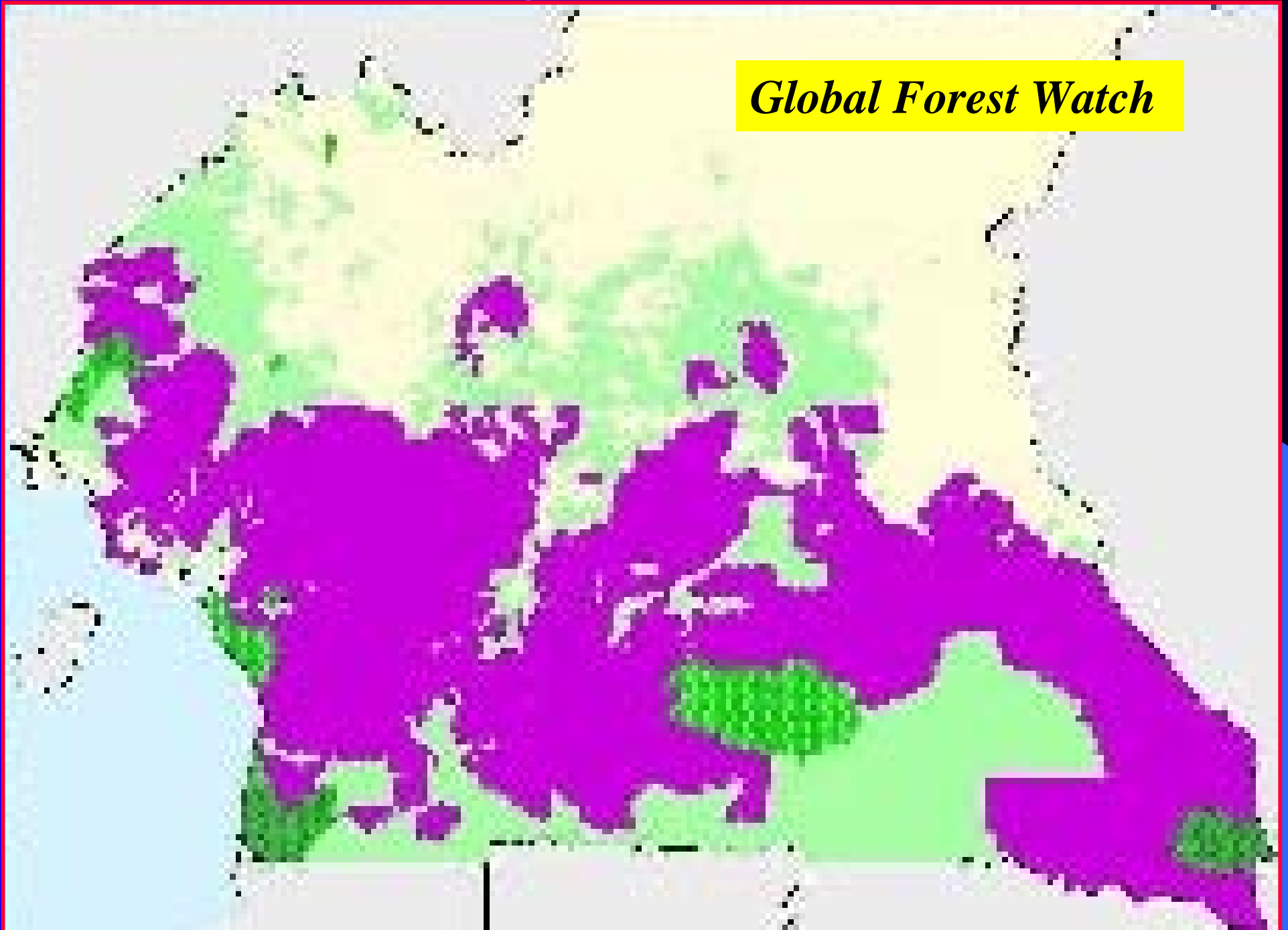
Cameroon in 1971

Global Forest Watch



Cameroon in 1995

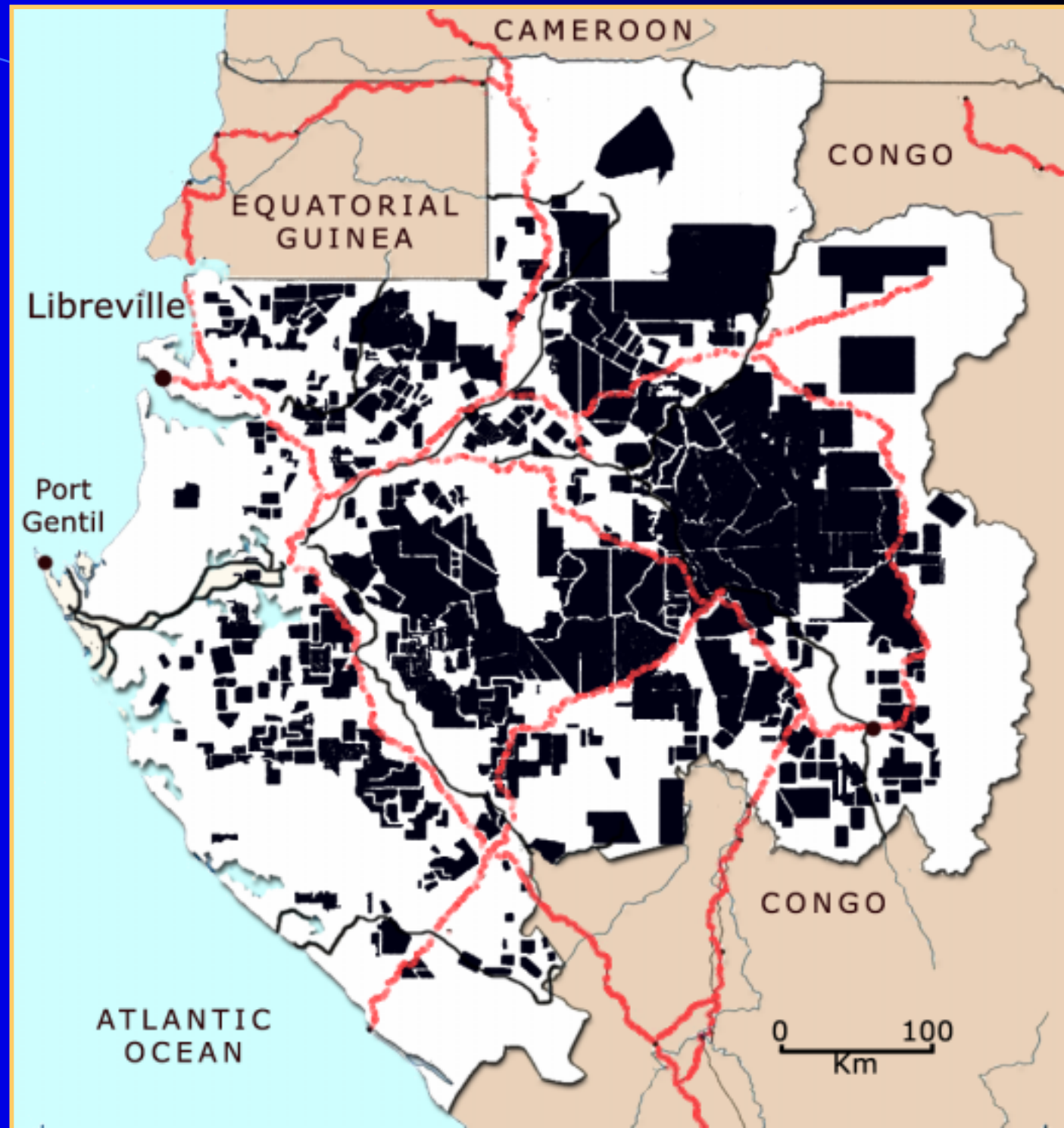
Global Forest Watch



Logging in Gabon

- Doubled over the last decade
- >75% of forests now slated for logging

Laurance et al. (2006)
Futures **38**:454-470

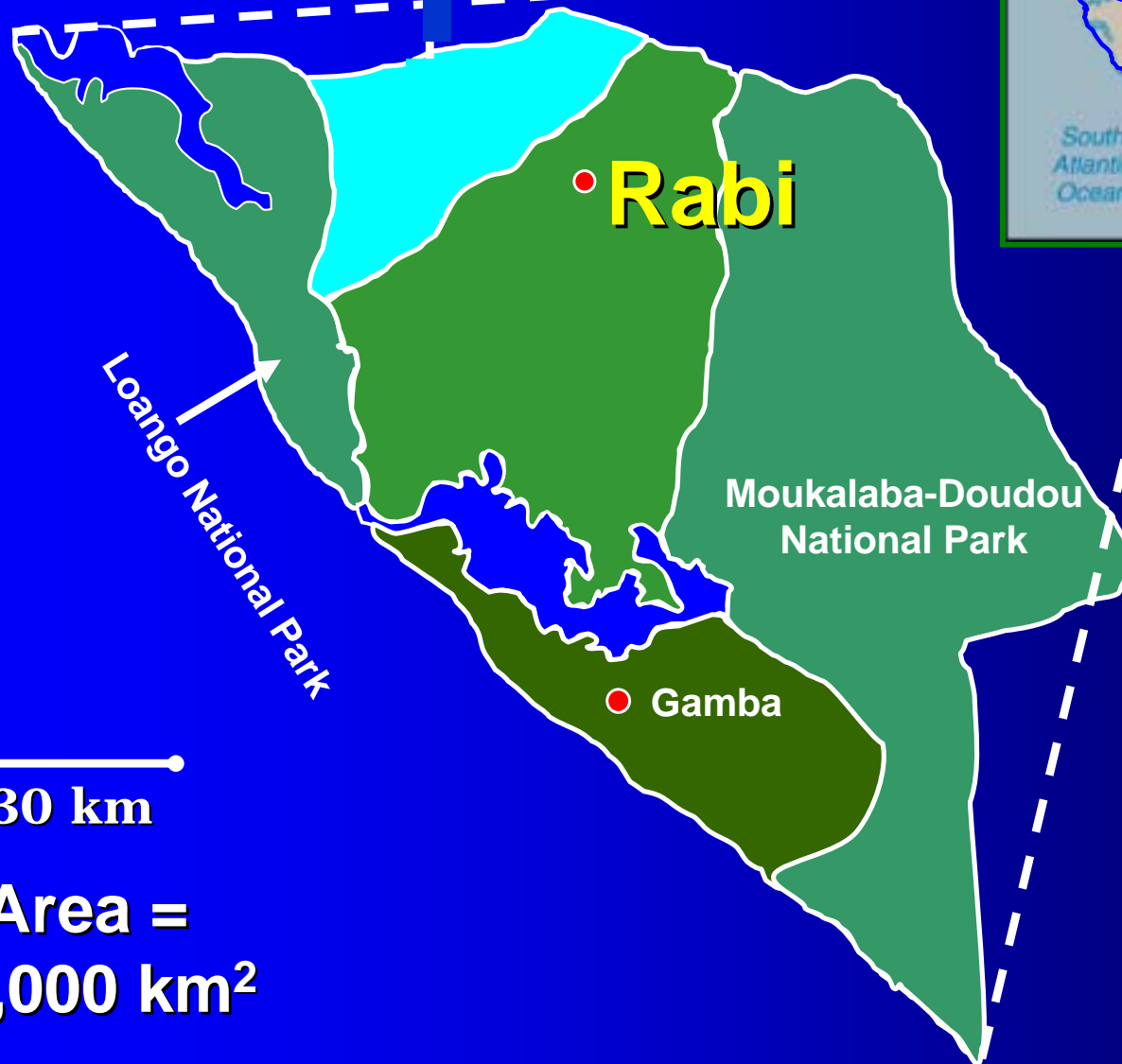


Study of Road and Hunting Impacts

Goal: To assess impacts of roads, hunting, and their interaction on an entire community of rainforest mammals, in an area where the fauna is still largely intact



The Gamba Complex



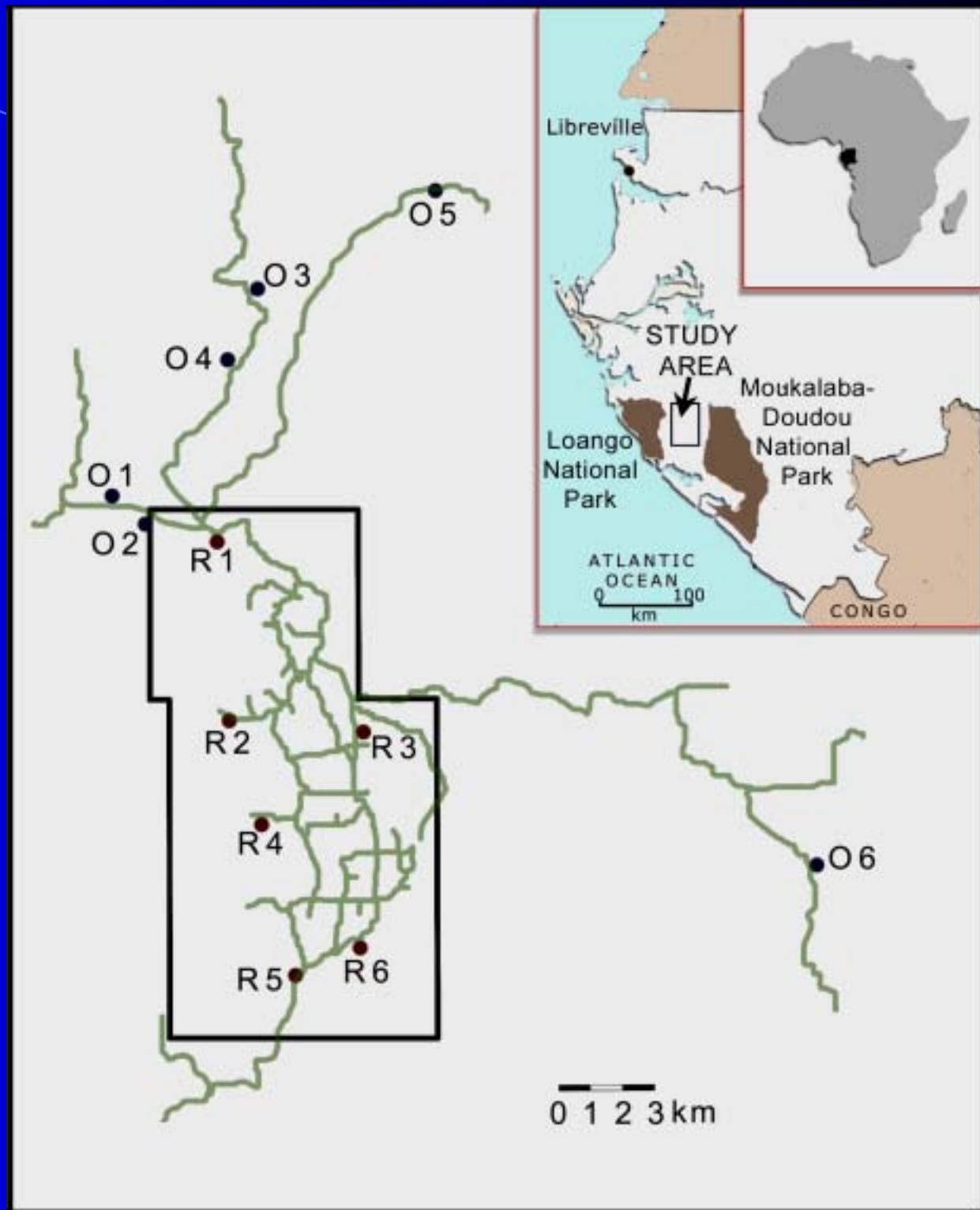
Rabi: highest-producing oilfield in Sub-Saharan Africa

Rabi-area Rainforests



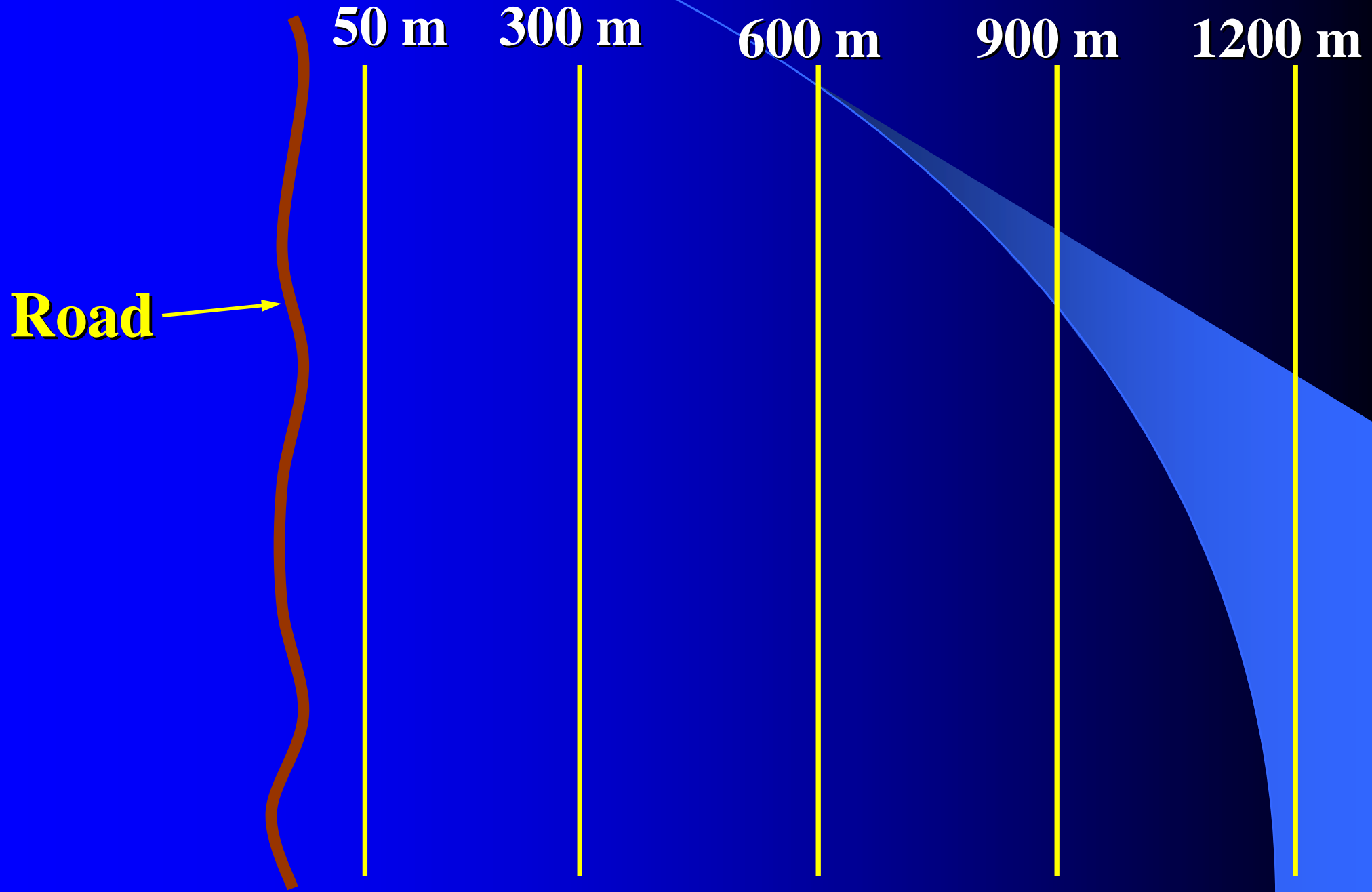
Study Area

- 400 km² total, with 130 km² inside Rabi Oil Concession
- Sparsely populated (<1 inhabitant km⁻²)
- Balanced factorial design:
 - 6 sites inside
 - 6 sites outside

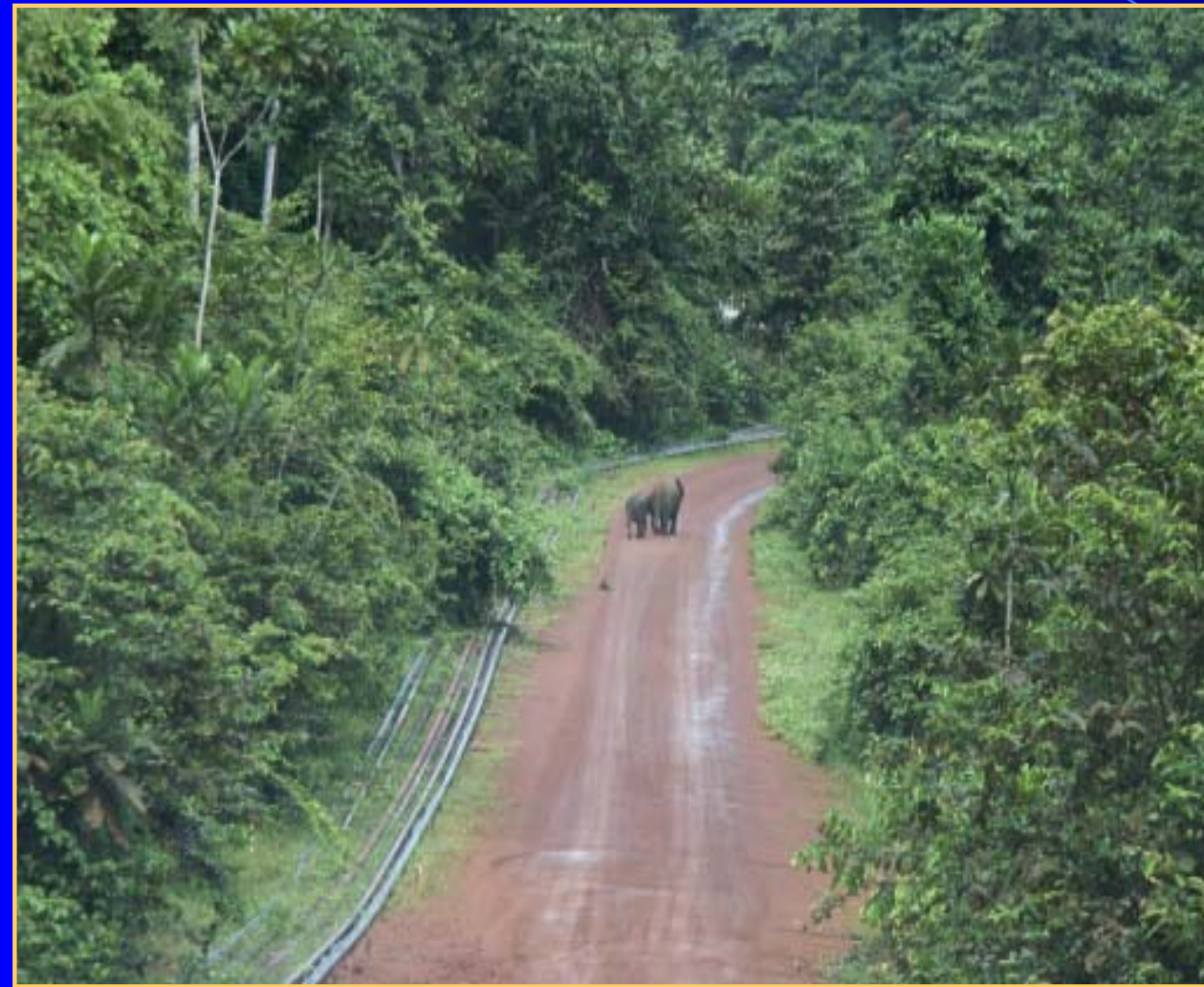


Sampling Design

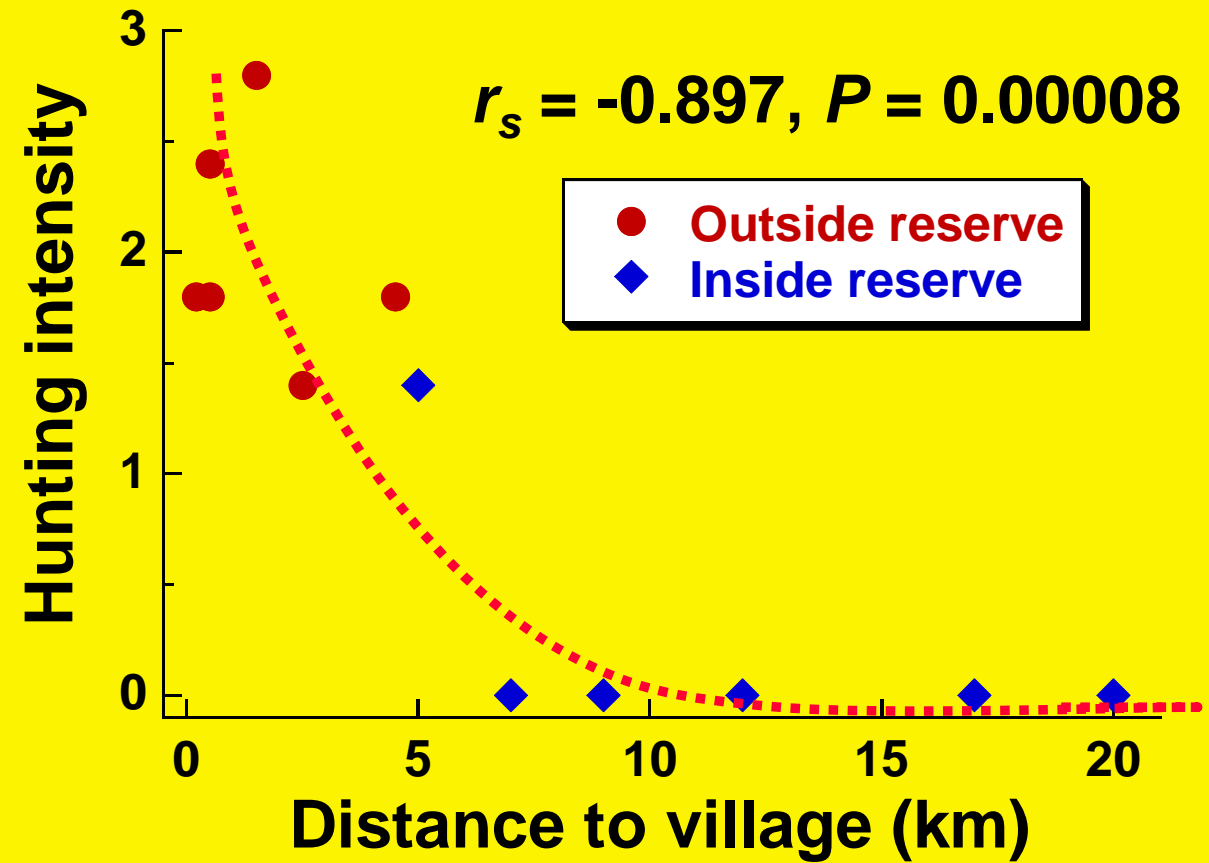
Five 1-km transects, each marked at 50-m increments



Rabi has roads and small clearings but hunting is strictly prohibited

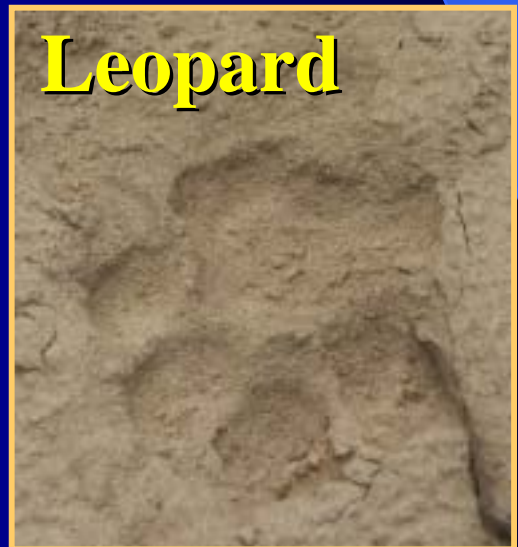


Outside reserve, hunting is light to moderate, peaks near villages and logging camps





Gorilla



Leopard

Diurnal surveys: Species identified using acoustical, visual, and odor cues, and via signs such as footprints, diggings, dung, rubbing posts, disturbed vegetation, and ape nests

**Nocturnal surveys:
Species identified via
spotlighting censuses**



Diverse Mammal Community

1) SMALL UNGULATES

Water chevrotain
Blue duiker
Bay duiker
Black-fronted duiker
Ogilby's duiker
Peter's duiker
White-bellied duiker
Yellow-backed duiker

2) LARGE UNGULATES

Sitatunga
African forest buffalo
Red river hog
African forest elephant

3) CARNIVORES

Marsh mongoose
Servaline genet
Central African linsang
Palm civet
African civet
Leopard

4) APES

Chimpanzee
Western lowland gorilla

5) MONKEYS

Grey-cheeked mangabey
Red-capped mangabey
Crowned monkey
Moustached monkey
Putty-nosed monkey

6) NOCTURNAL PRIMATES

Allen's squirrel galago
Demidoff's galago
Elegant needle-clawed galago
Thomas' galago
Potto

7) PANGOLINS

Giant pangolin
Long-tailed pangolin
Tree pangolin

8) RODENTS

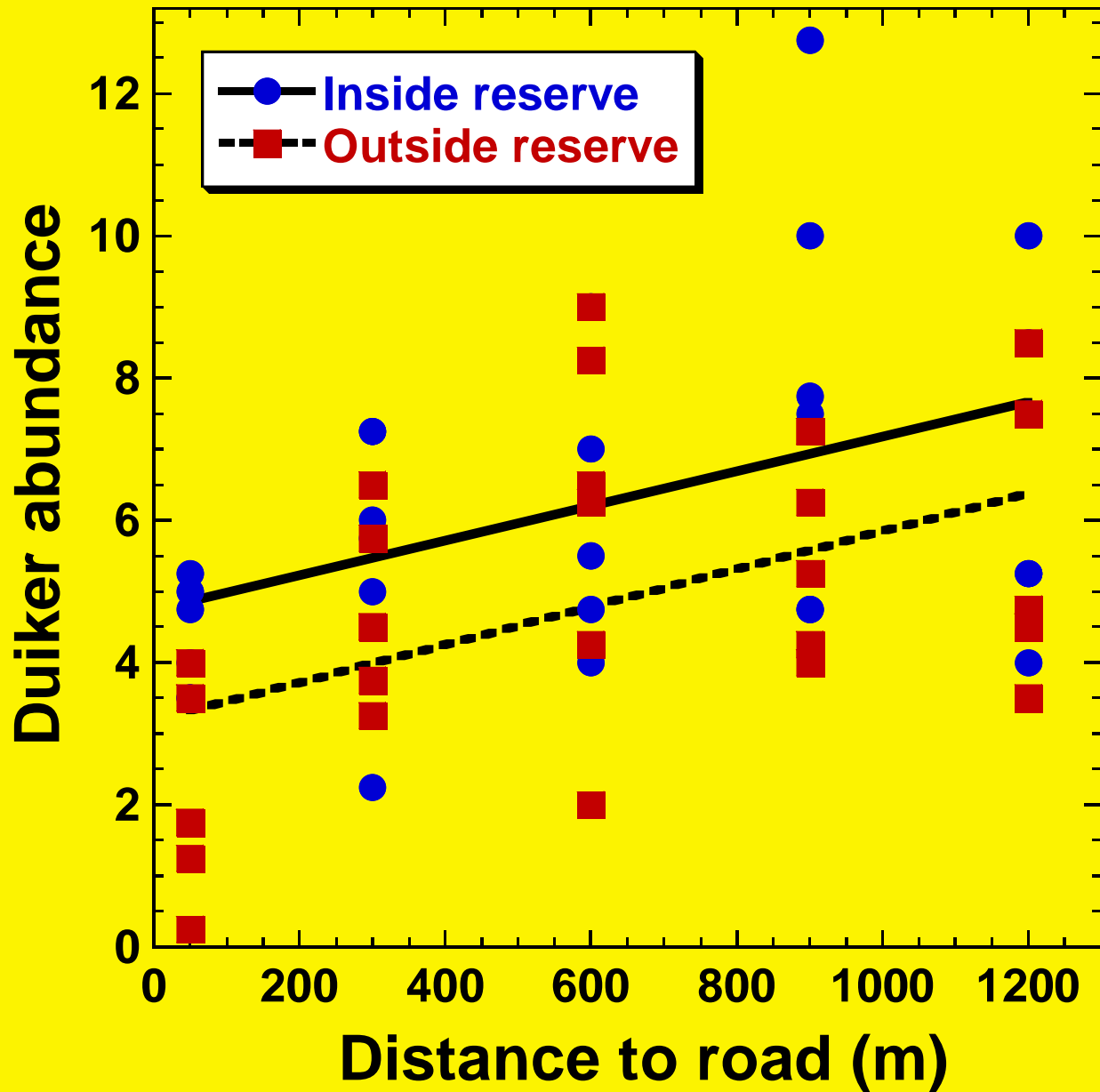
Brush-tailed porcupine
Giant pouched rat
Marsh cane-rat
Beecroft's anomalure
Lesser anomalure
Lord Derby's anomalure
Cameroon scaly-tail

9) HYRAX

Tree hyrax

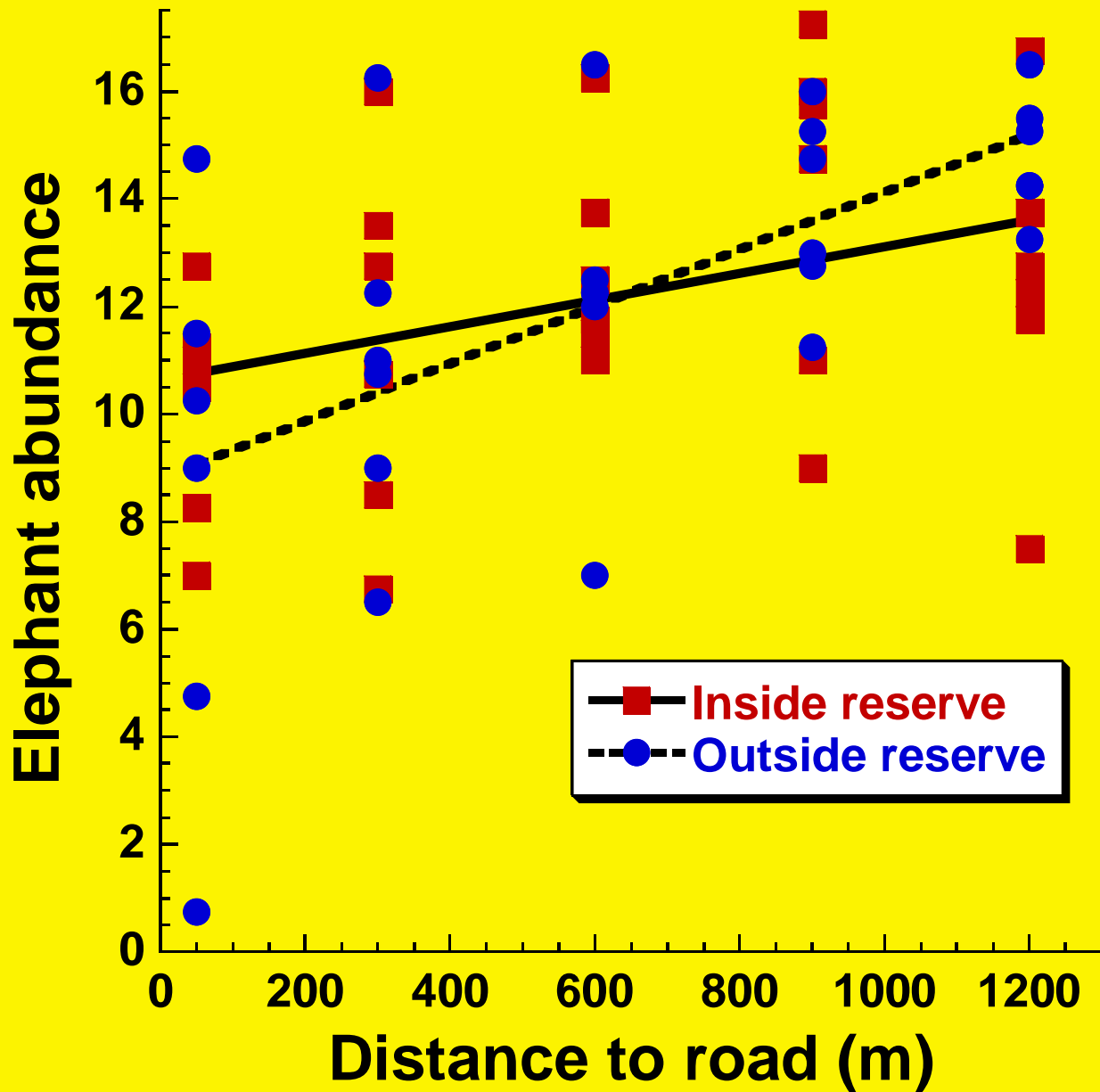


Smaller Ungulates



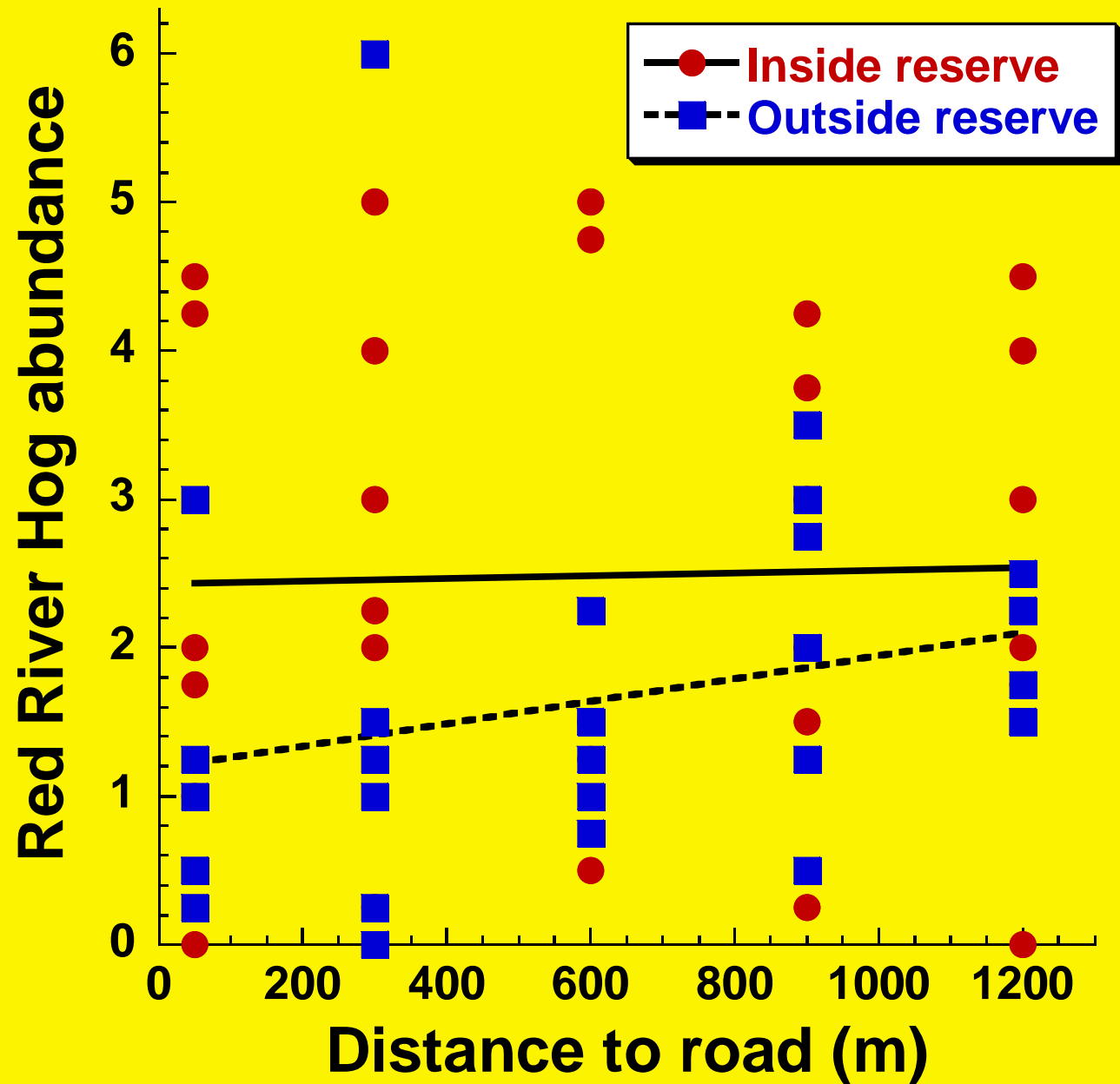
Laurance *et al.* (2006) *Conserv. Biology* 20:1251-1261

Forest Elephants



Laurance *et al.* (2006) *Conserv. Biology* **20**:1251-1261

Red River Hogs

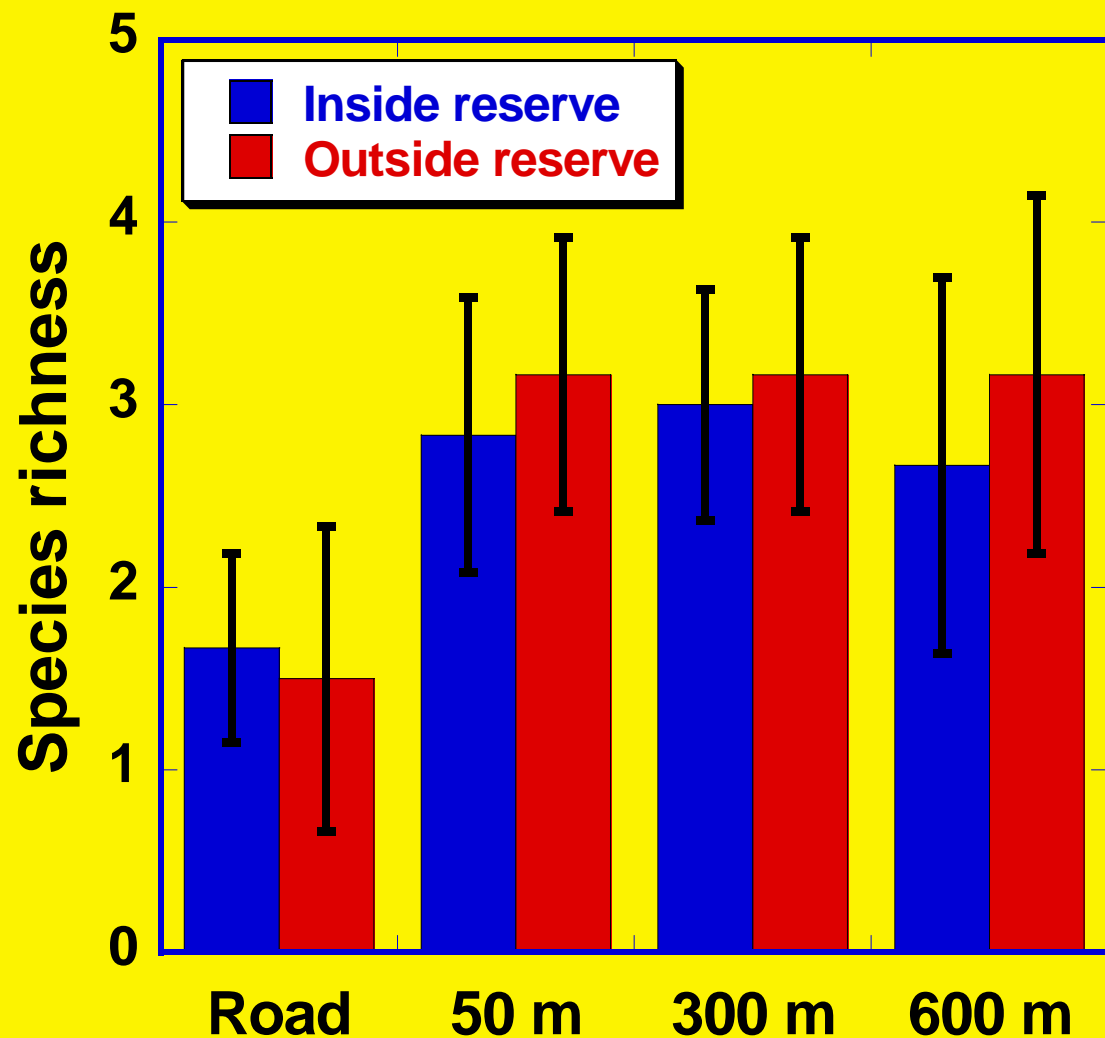


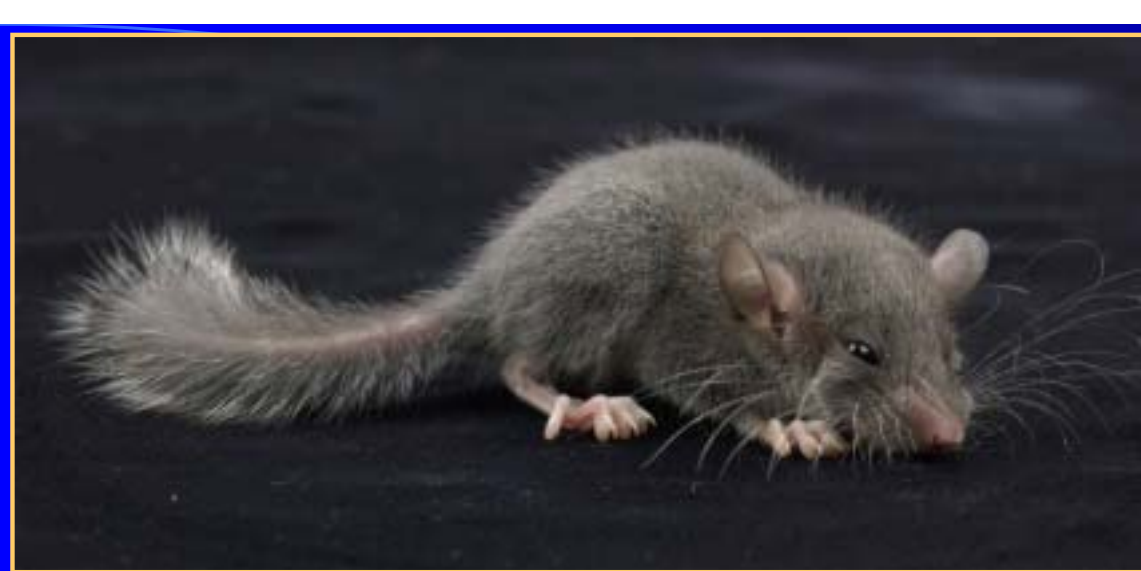
Nocturnal Primates

(4 galagos & potto)



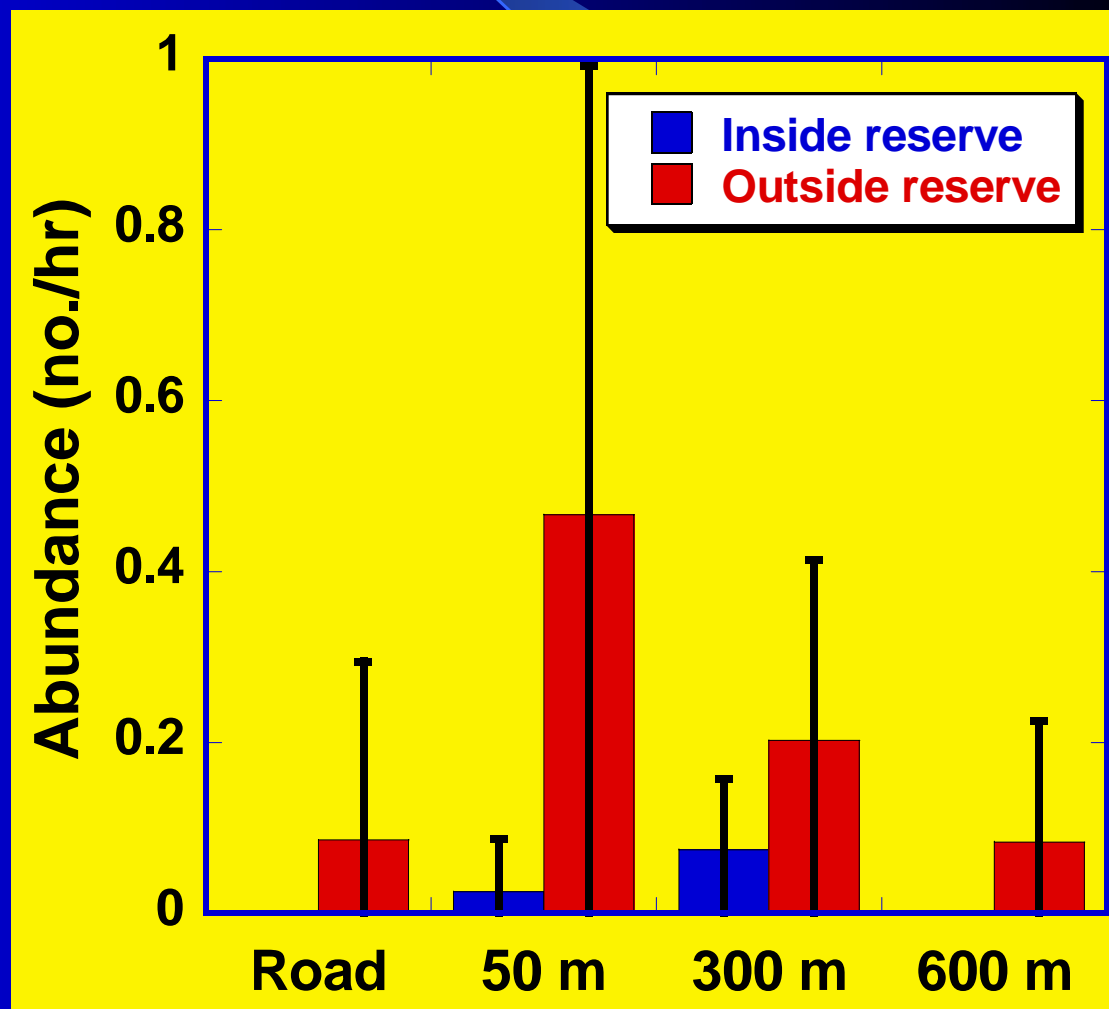
Laurance *et al.* (In prep.)





Scansorial Rodents

(Larger murids, porcupines, giant pouched rat)



Marked Behavioral Effects of Hunting

Monkeys

- Fewer alarm calls
- No approach behavior

Croes, Laurance *et al.* (2007)
Biotropica **39**:257-263



Duikers

- Less “freezing” behavior
- More fleeing



Elephants

- More secretive
- More nocturnal



Conclusions

- Many species—duikers, red river hogs, sitatungas, bush buffalo, elephants, gorillas, galagos, carnivores—are negatively affected by roads and/or hunting
- Road avoidance increases with even modest hunting pressure
- Scansorial rodents increase in hunted forests
- Many species show strongly altered behavior when hunted
- Even light to moderate hunting markedly alters forest mammal assemblages



Thank you

