

# Infrastructure Tsunami and the Fate of Nature

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International Energy Agency (2013)

**25 million km new roads by 2050**





# Nine-tenths of new infrastructure in developing nations

Laurance *et al.* (2009) *Trends in Ecology & Evolution*

Laurance (2012) *Yale Environment 360*

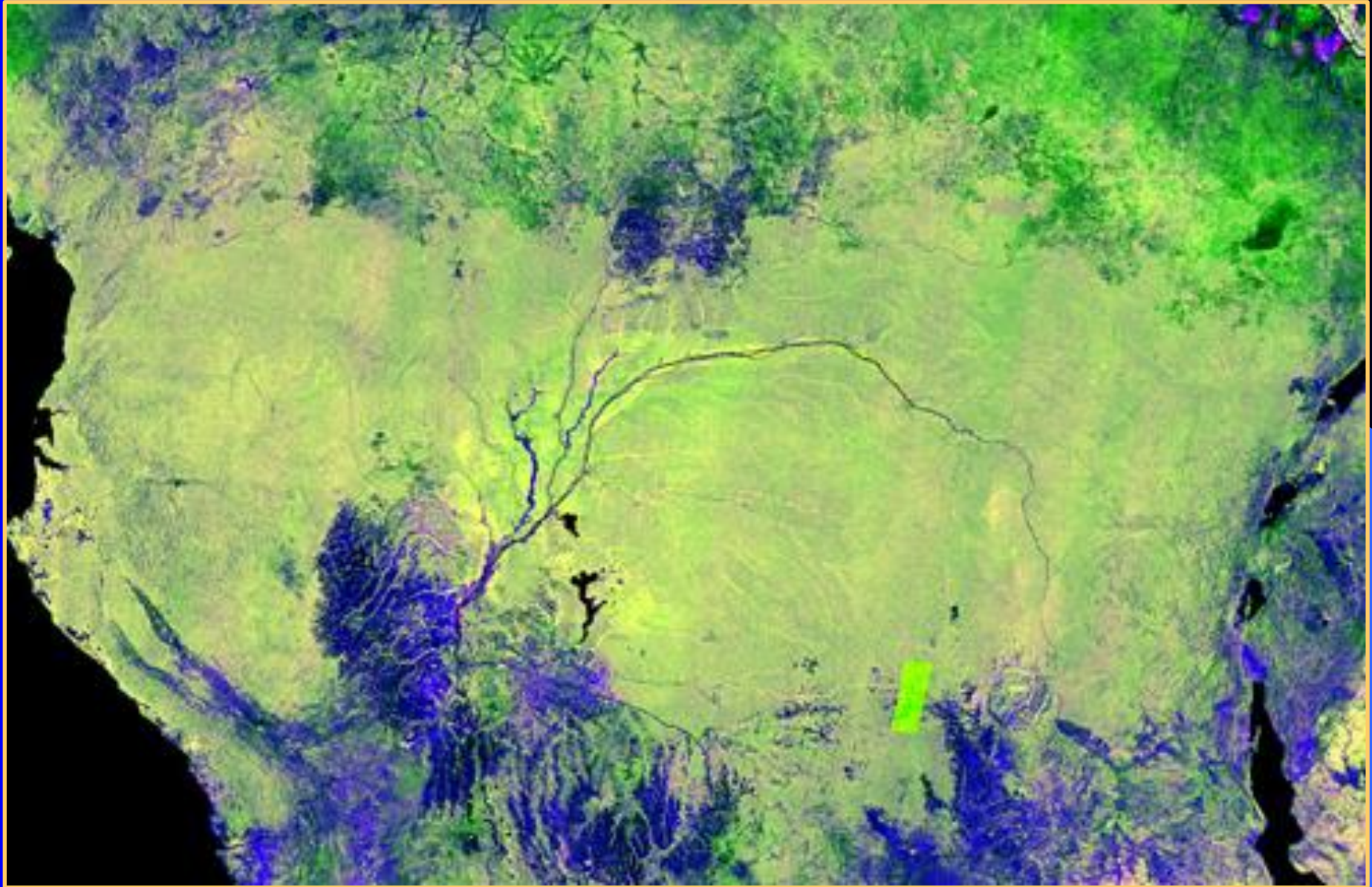
Laurance *et al.* (2014) *Nature*

Laurance & Burgues (2017) *Science*

- 7,500 km of new highways in Brazilian Amazon
- Triad of highways from Amazon to Pacific Ocean
- >100,000 km of new logging roads in Congo Basin
- New roads opening up last intact forests in Sumatra
- Panama-Colombia Highway would threaten Darién wilderness
- Many roads bisecting protected areas



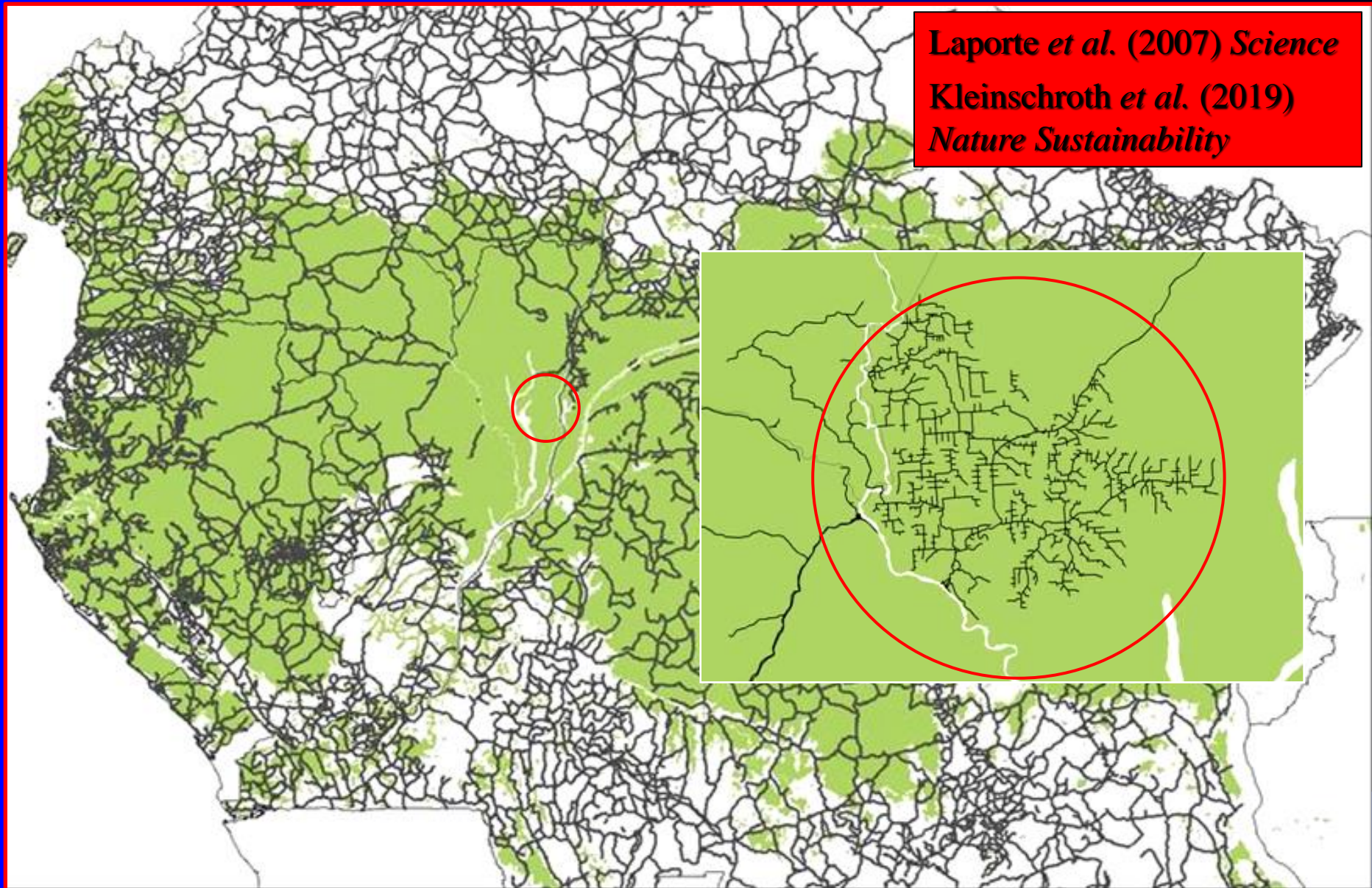
# Greater Congo Basin





# Major Roads Today

Laporte *et al.* (2007) *Science*  
Kleinschroth *et al.* (2019)  
*Nature Sustainability*



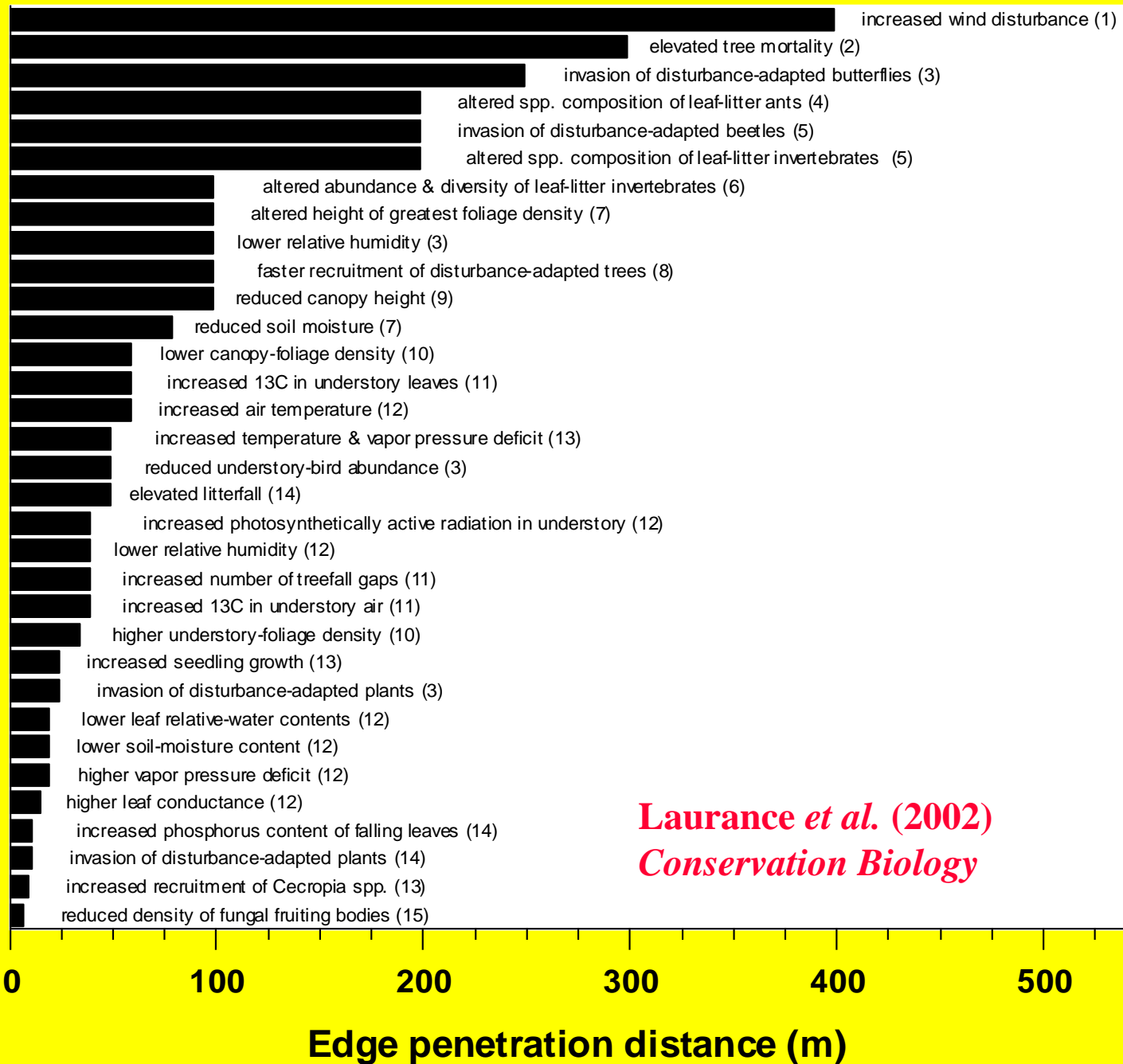




**Direct Environmental  
Effects**

**Habitat Loss**

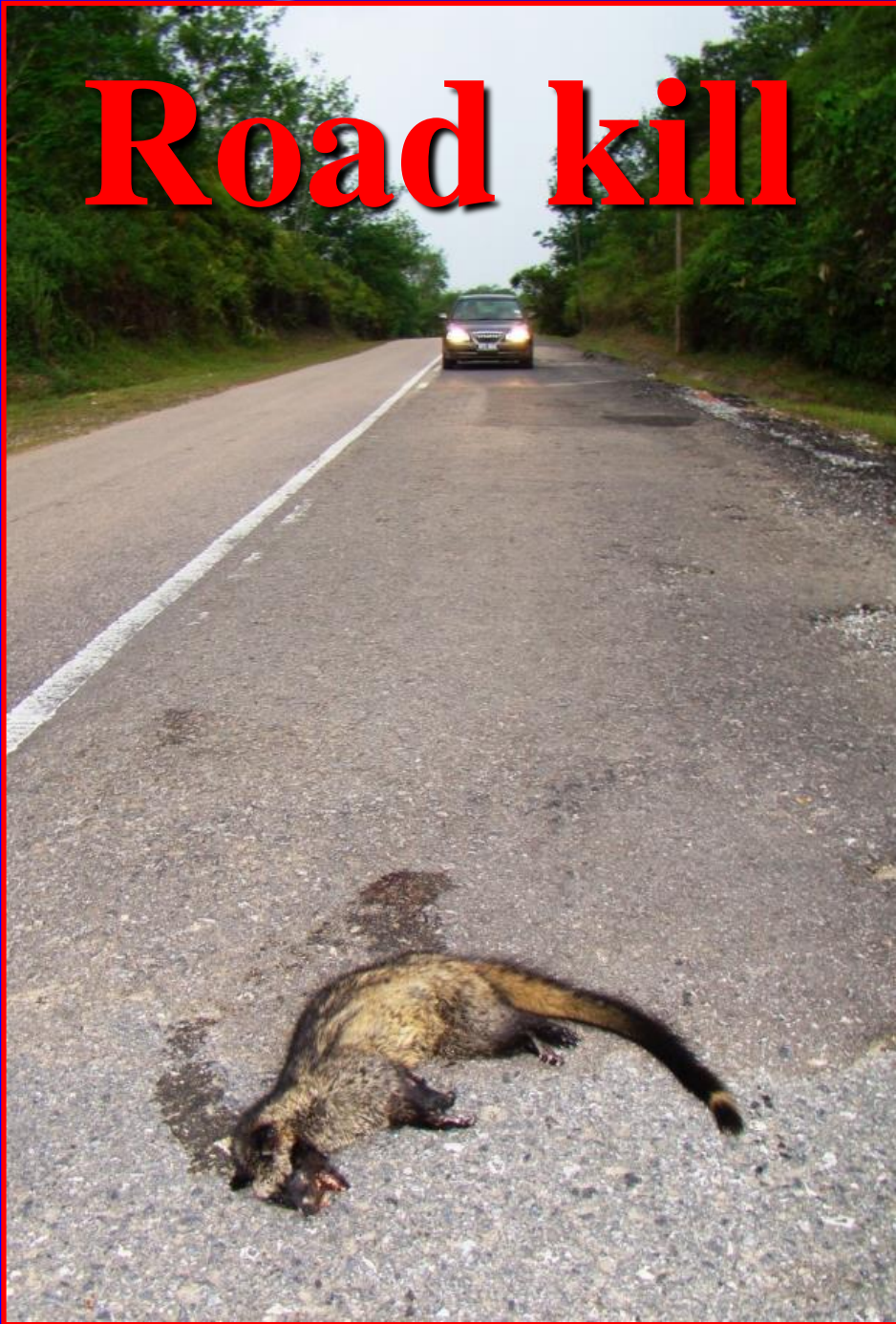
Edge parameter



**Laurance *et al.* (2002)**  
***Conservation Biology***



# Road kill



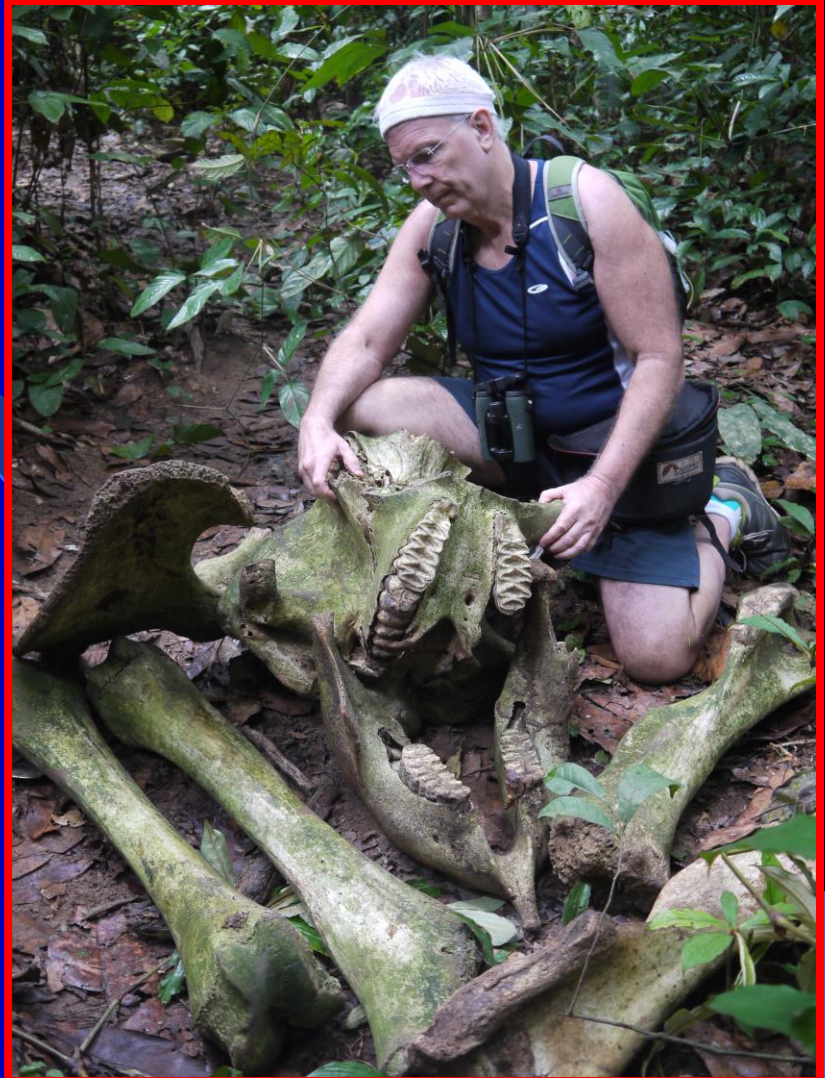
## Vulnerable species

- slow-moving
- poor eyesight
- freeze response
- forage along roads
- basking species
- mass migrators



# Secondary Effects

## Incursions of hunters



Laurance *et al.* (2006)  
*Conservation Biology*

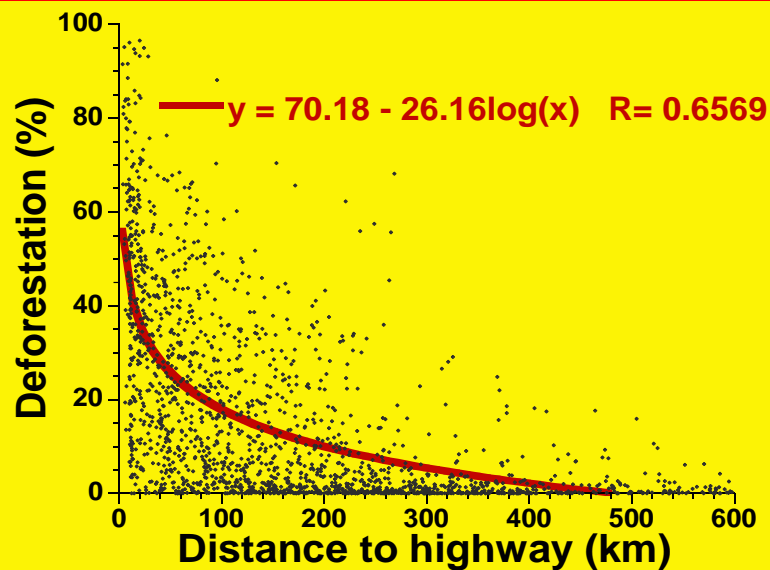
Laurance *et al.* (2008)  
*Conservation Biology*

Laurance (2010) *Africa*  
*Geographic Magazine*

Mahmoud *et al.* (2018)  
*Tropical Conservation*  
*Science*



# Deforestation



Laurance *et al.* (2002)  
*Journal of Biogeography*

Barber *et al.* (2014)  
*Biological Conservation*



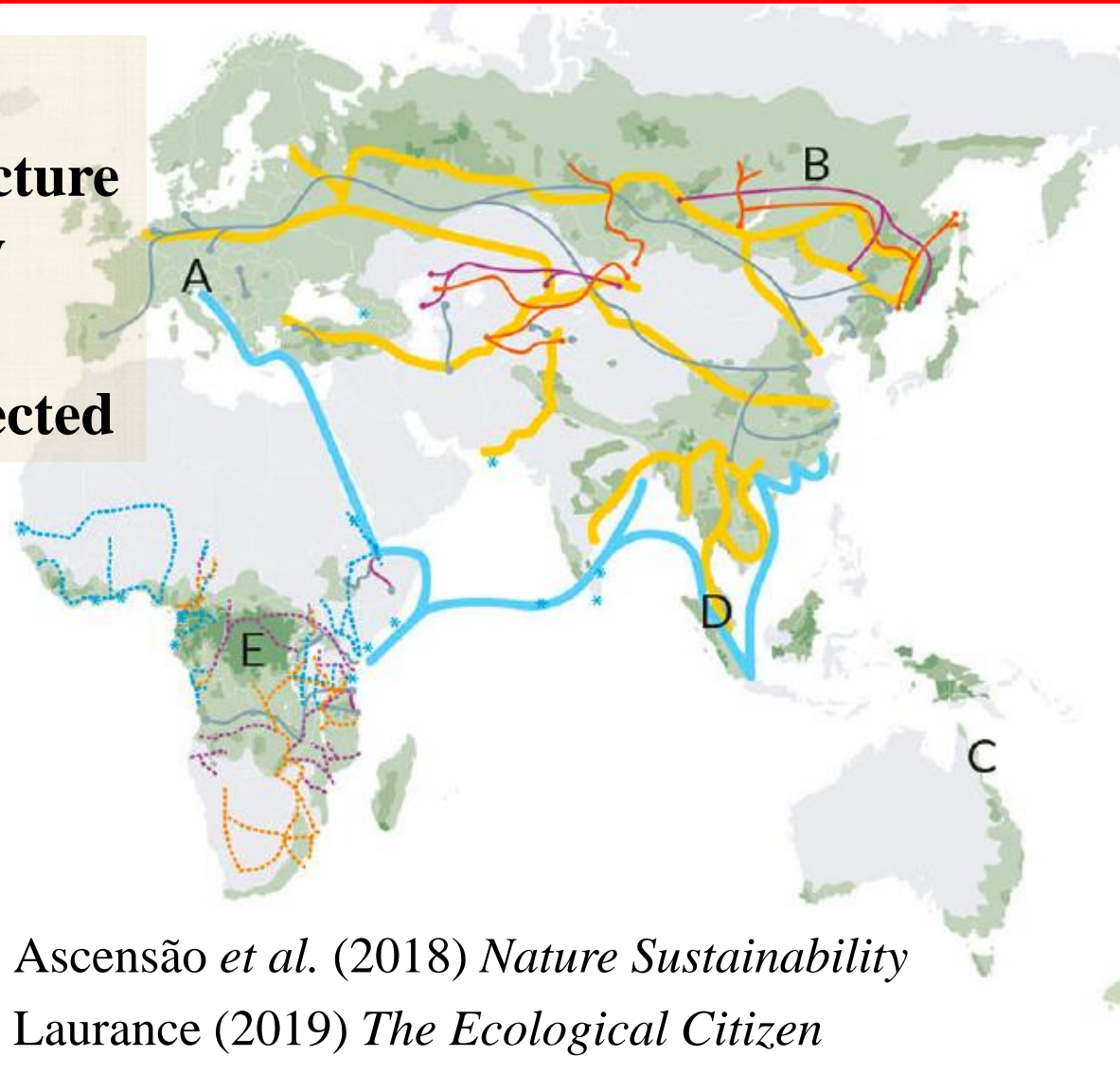
# Fires & Greenhouse Gas Emissions





# China's Belt & Road Initiative

- Spanning 138 nations
- Some 7,000 infrastructure & extractive-industry projects
- Up to \$8 trillion projected



Ascensão *et al.* (2018) *Nature Sustainability*  
Laurance (2019) *The Ecological Citizen*





**GLOBAL  
INFRASTRUCTURE  
TSUNAMI:  
WHAT CAN WE  
DO?**



# Target a broad audience

Alamgir *et al.* (2017) *Current Biology*

Laurance & Burgues (2017) *Science*

Laurance (2018) *Trends in Ecology & Evolution*

Laurance (2018) *Yale Environment 360*





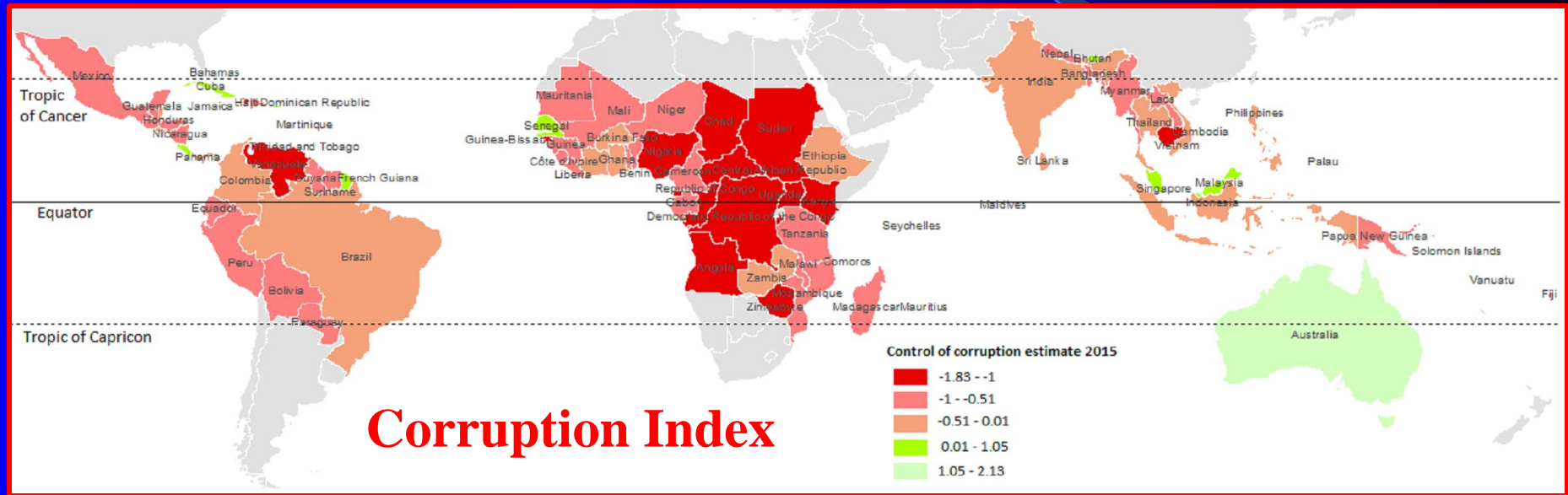


# Highlight exaggerated economic benefits

- Project benefits are *highly variable and context-dependent*
- Many projects have *highly inequitable benefits*



# Decry heavy toll of corruption...



- *Many* ill-advised projects approved
- 15-60% of project funding lost to corruption (World Bank 2011)



# And massive maintenance costs...



Pot-holes

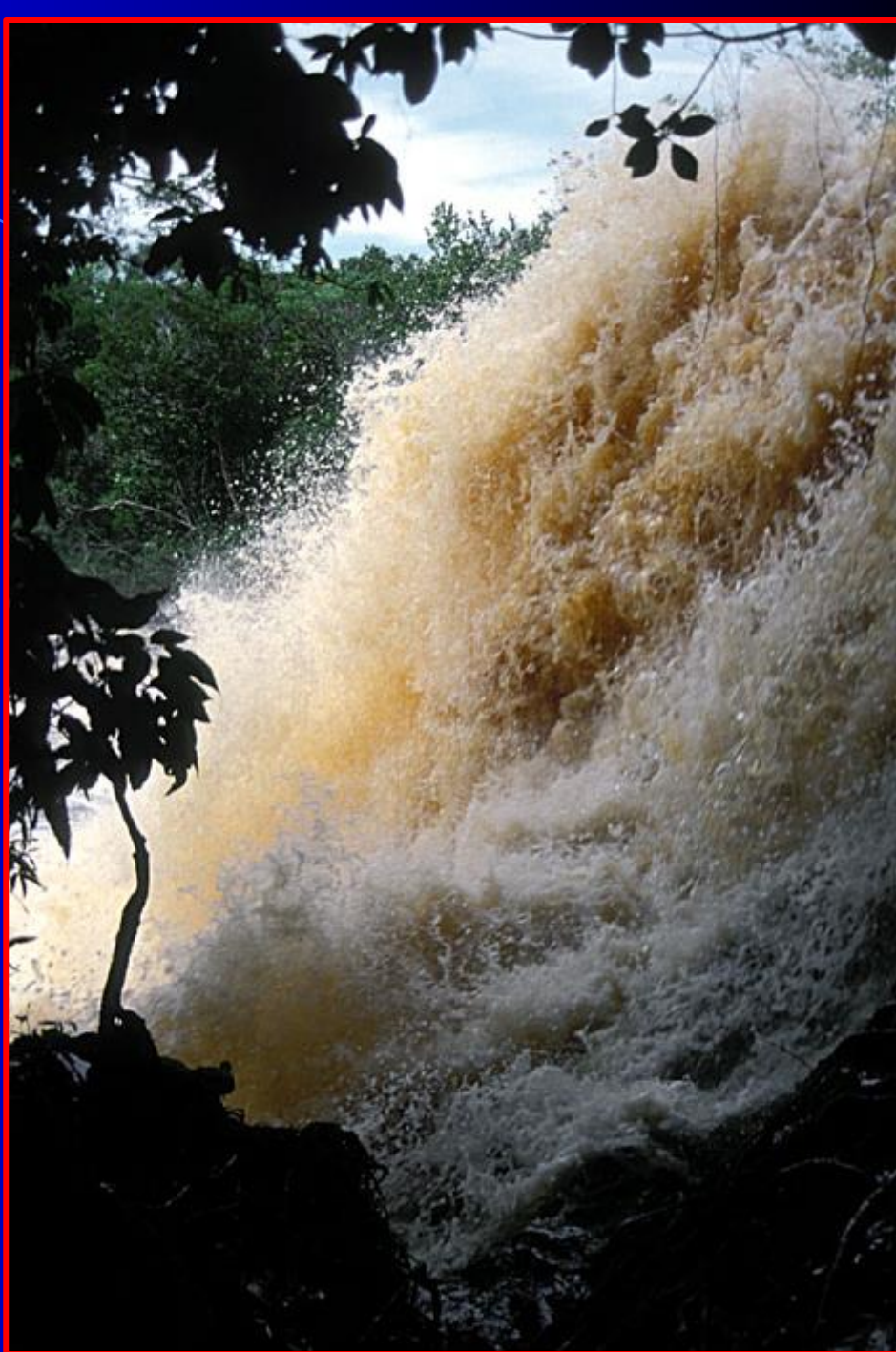


Slumping

*It is extremely expensive to engineer and maintain roads in high-rainfall environments*



**...and serious  
impacts of  
pollution on  
people**





# Conserving ecosystems





# A Few Things I've Noticed

- Once completed, Chalumbin windfarm could be sold to 'anyone', including China
- Roadworks could be up to 75 metres wide
- Roads and wind-tower clearings would predispose ecosystems to invasions of cane toads, feral cats, exotic insects, many weeds, myriad edge effects, and sharp spikes in fire intensity
- Project area contains many patches of wet sclerophyll (rose gum) forest
- EIA or quick surveys are unlikely to provide anything close to a full list of rare or endangered species in area







**Thank you**

**[alert-conservation.org](http://alert-conservation.org)  
[global-roadmap.org](http://global-roadmap.org)**