The Burning Issue:
Fire and Conservation in C. Kalimantan

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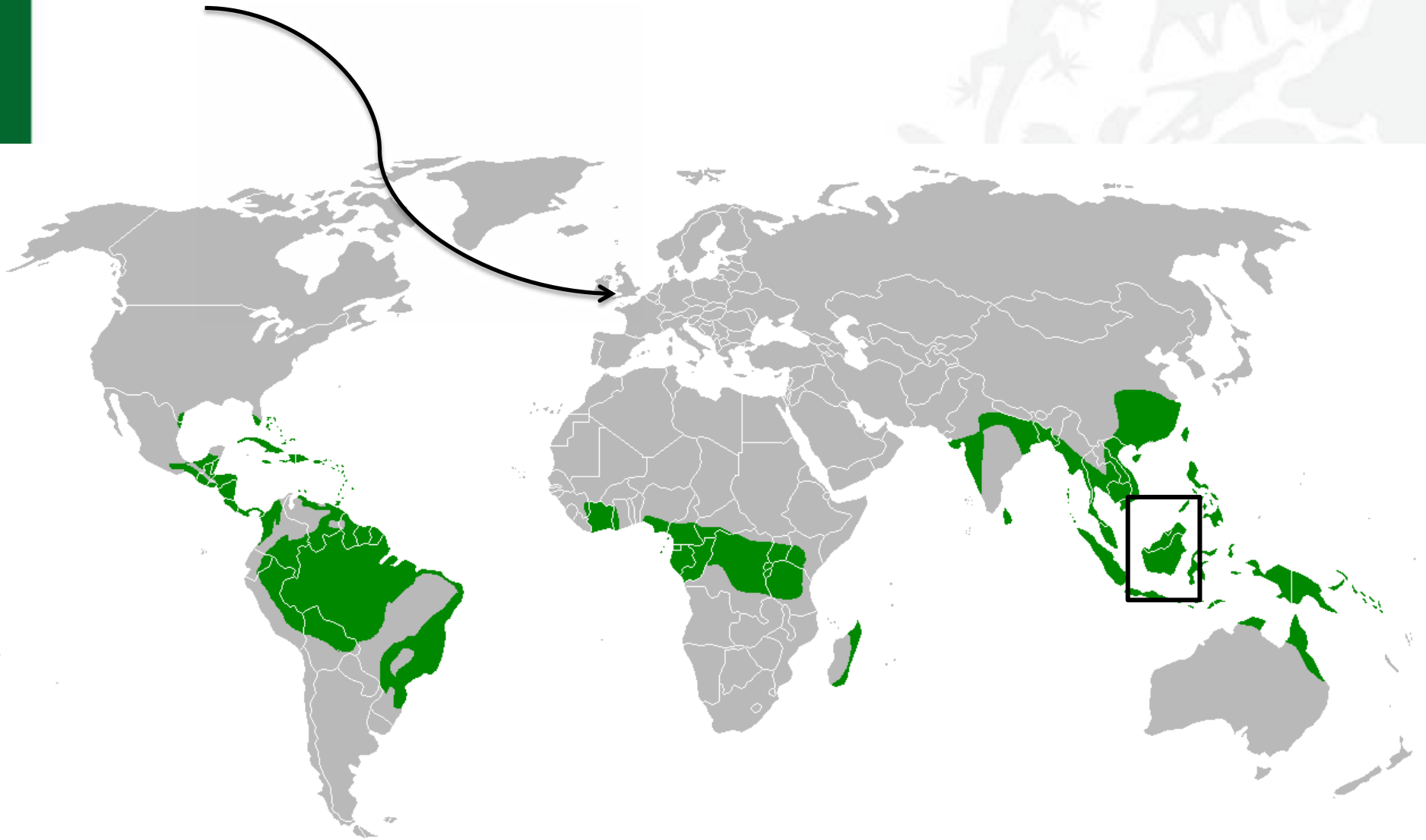
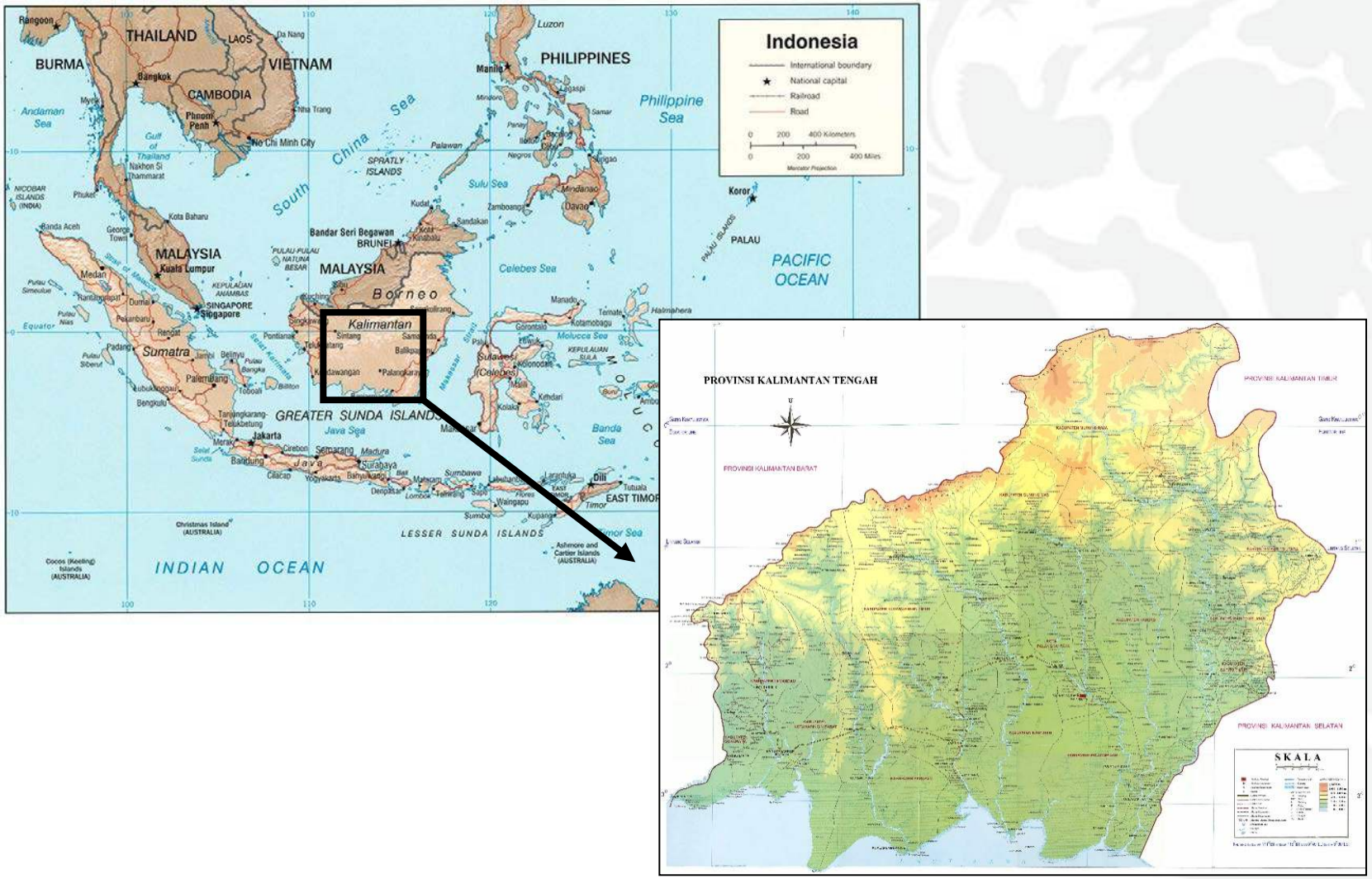
#BNFExeter | #MelawanAsap

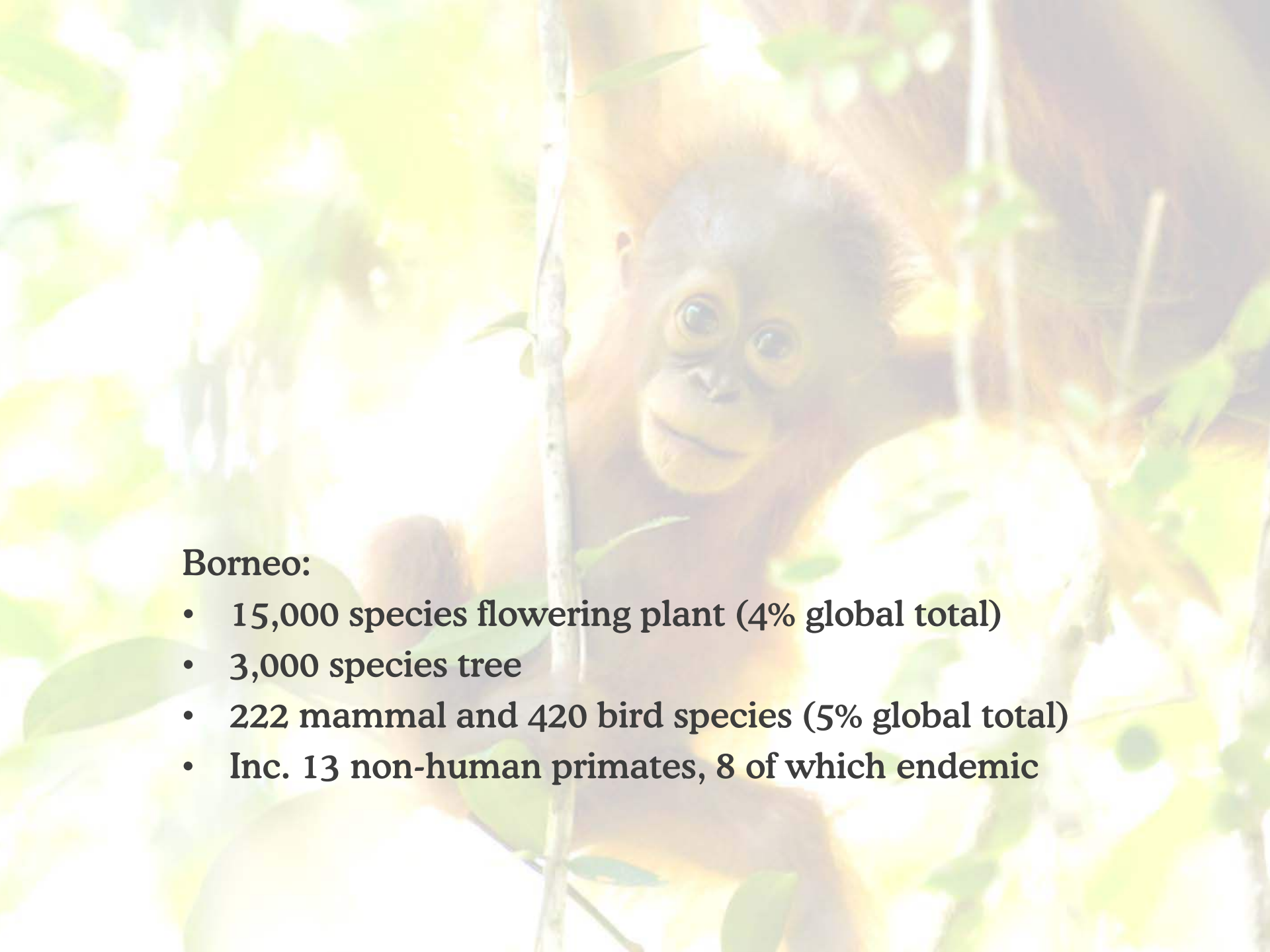
Borneo Nature Foundation

Where are we?



Where in Borneo?





Borneo:

- 15,000 species flowering plant (4% global total)
- 3,000 species tree
- 222 mammal and 420 bird species (5% global total)
- Inc. 13 non-human primates, 8 of which endemic

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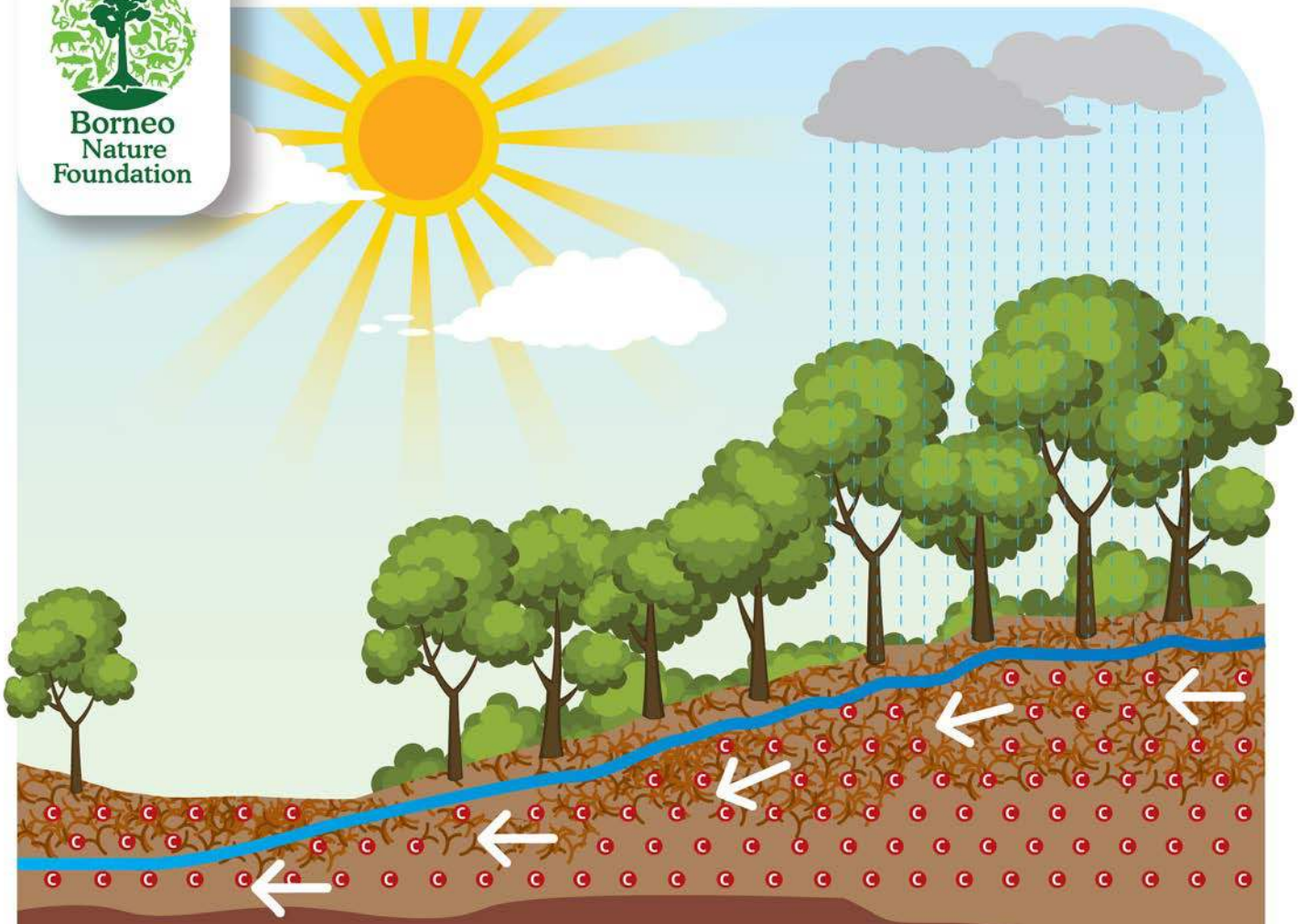

Gambut merupakan tangki penyimpanan air dan menjadi sumber air di Kalimantan. Air menggenangi gambut, menahan karbon tetap berada pada gambut dan tidak terlepas ke atmosfer.


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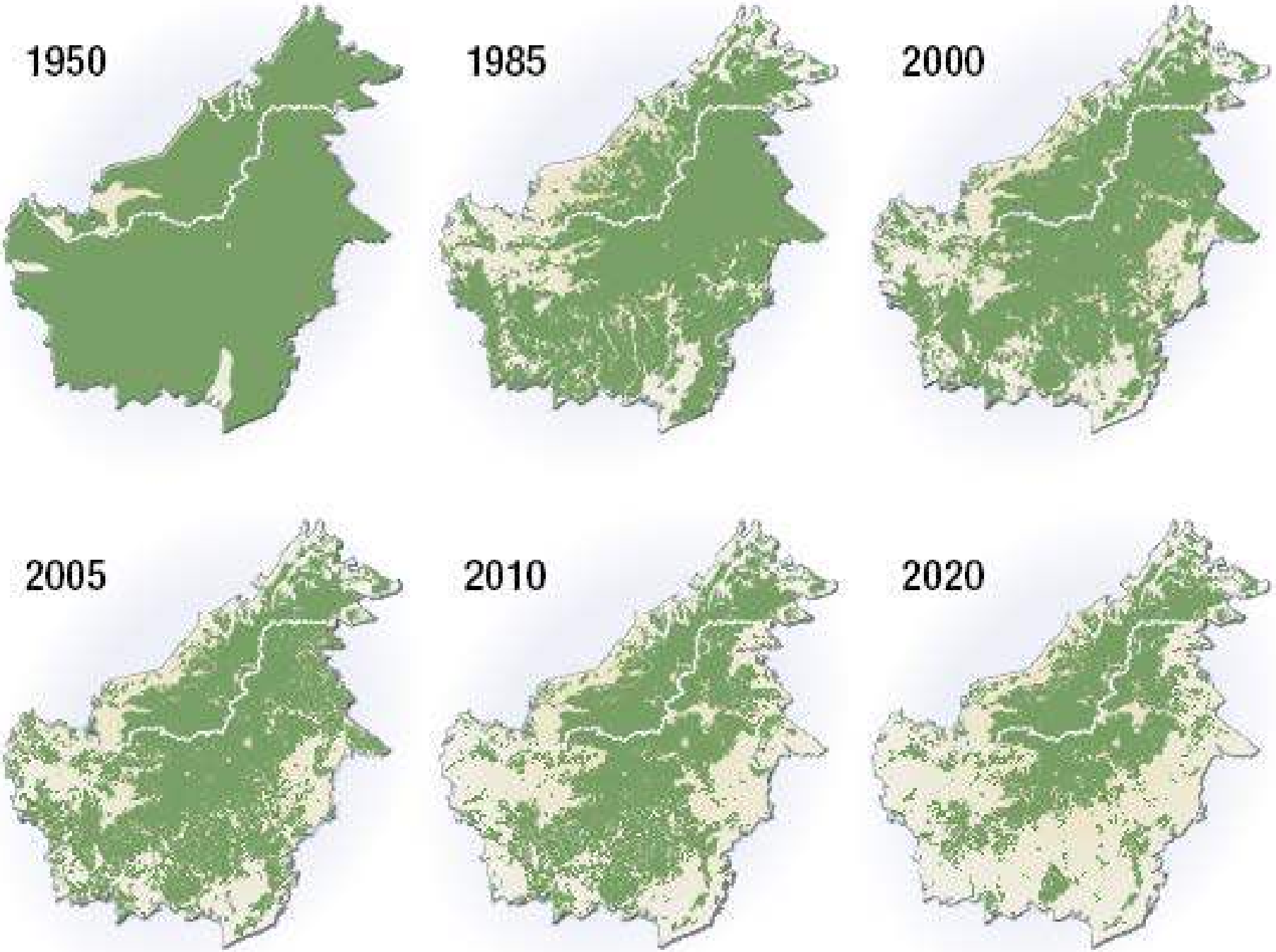

WWF

Struebig *et al.* (2015) *GCB.*

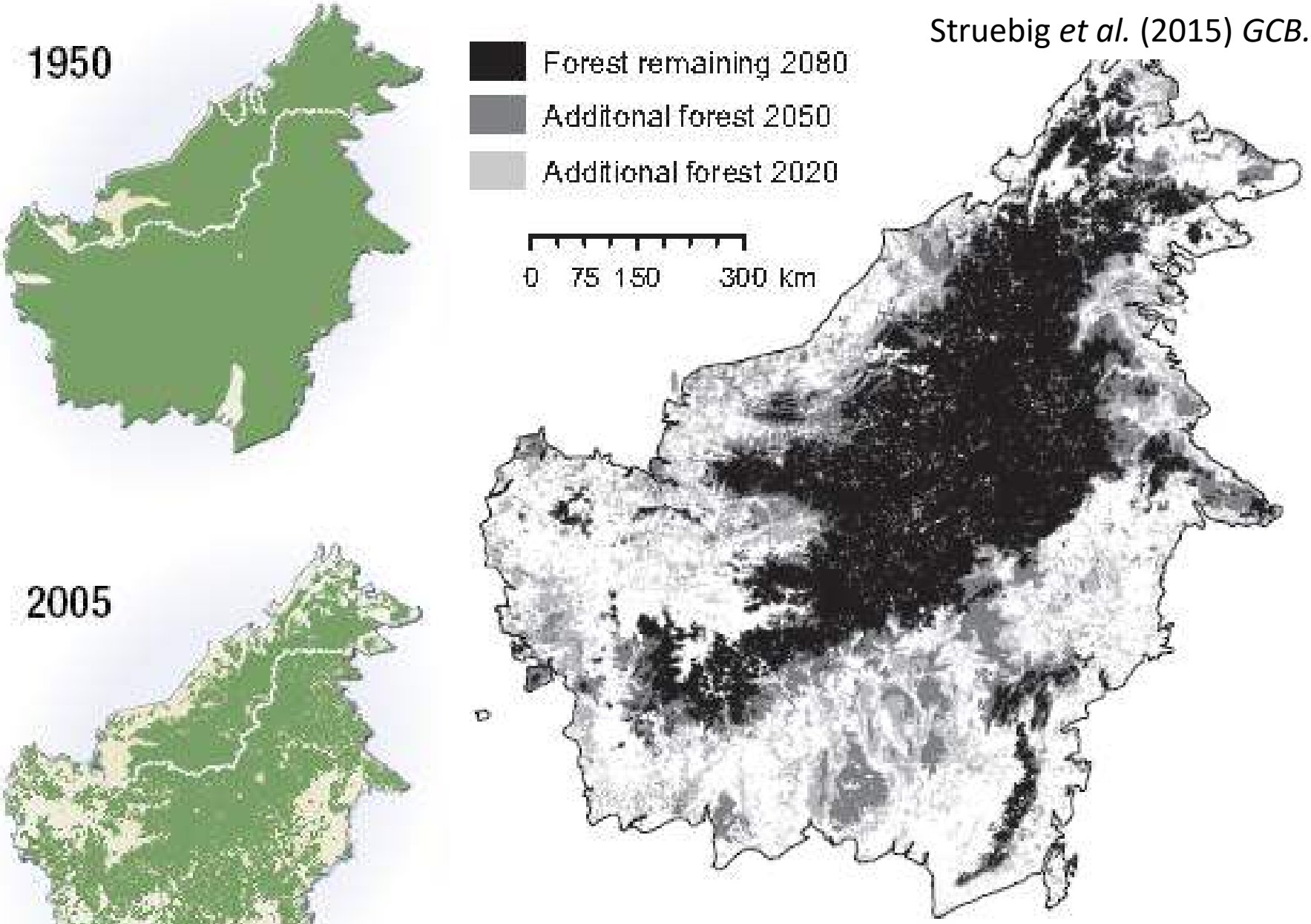

Fig. 2 Trajectory of forest loss for Borneo as predicted by a spatial deforestation model based on 2000–2010 trends.

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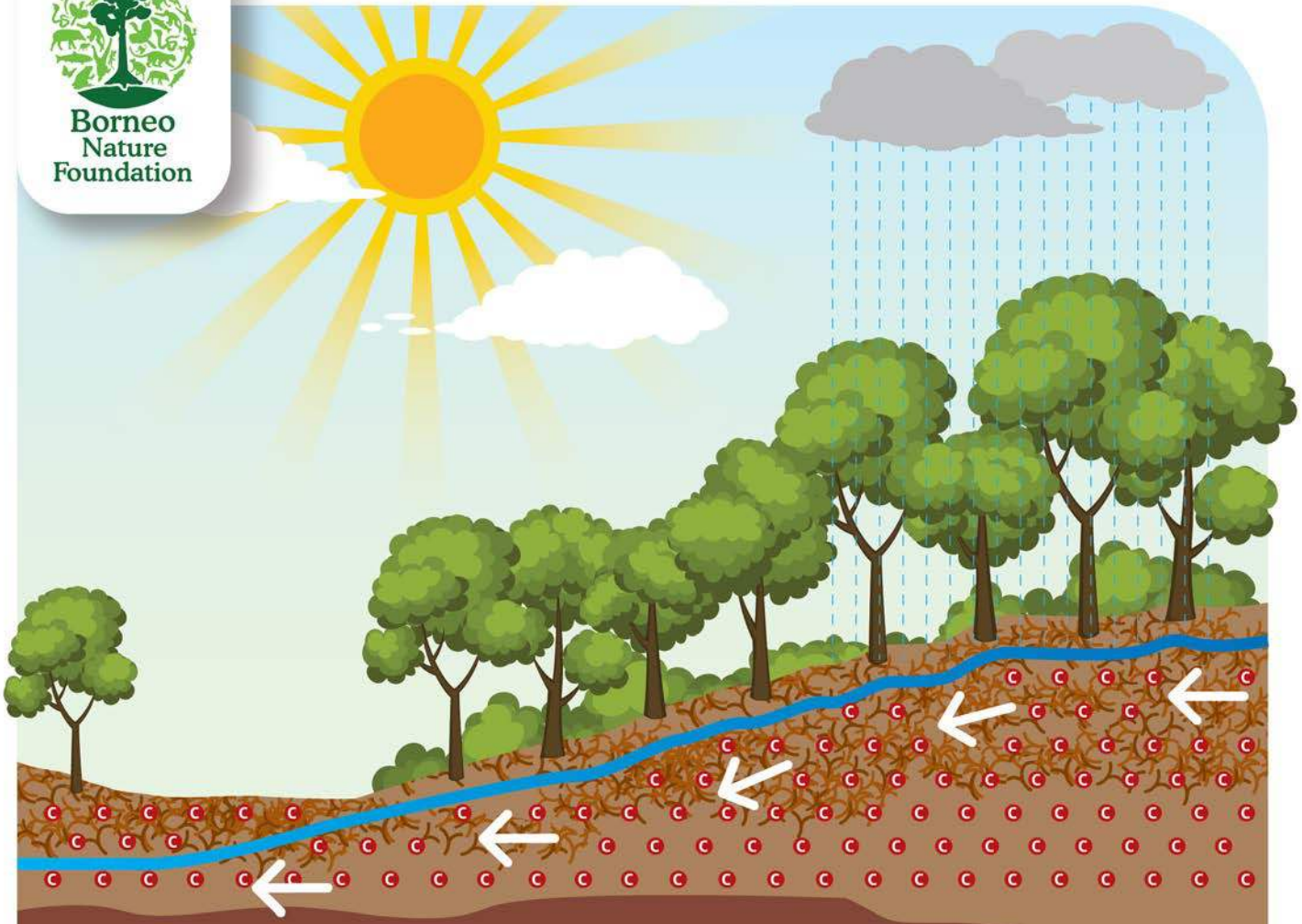

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Penebangan hutan dan drainase (pembuatan kanal) menyebabkan gambut menjadi kering. Gambut yang terpapar langsung oleh sinar matahari menyebabkan pelepasan karbon.

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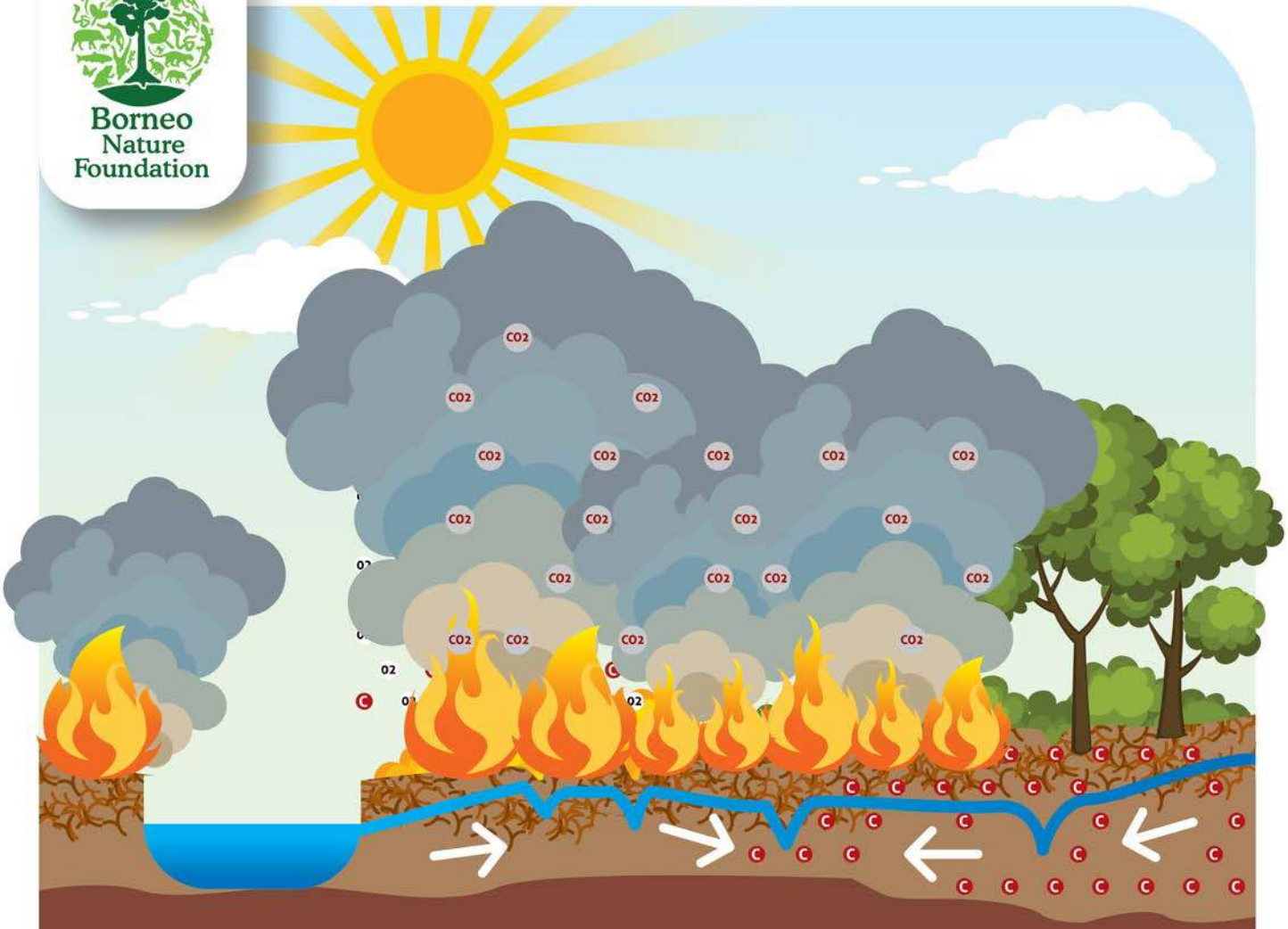


Gambut yang kering sangat rentan terbakar di musim kemarau. Ketika kebakaran terjadi, gambut akan melepaskan karbon dioksida sangat banyak dan menjadi penyebab utama perubahan iklim global.

Borneo's peat fire problem

- Peat fires in Indonesia now an annual event

- Linked to dry weather → worse in El Niño years (e.g. van der Werf *et al.*, 2008)
  - 1997/98, 2002, 2004, 2006, 2009, 2013, 2015
  - 1982/83 – strong El Niño, impacts less severe?

- 2015 – strong El Niño → LOTS of fires!
  - Kalimantan, Jun-Oct: 51,661 hotspots, 53% on peat (GFW)
  - Kal + Sum + Papua (Loberger *et al.*, in press):
    - Est. 46,046 km^2 burned
    - 37% on peat
    - 3.2% land area

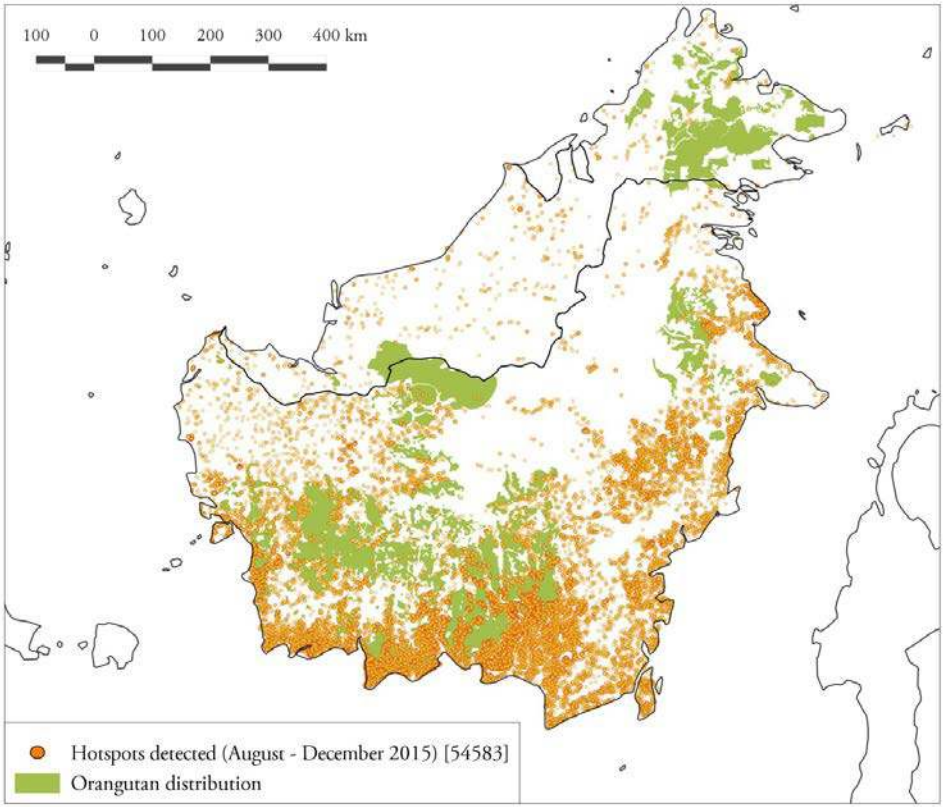
- La Niña this year; El Niño next?

Fire impacts

- Carbon:
  - 1997/98, Indonesia: 810-2,570 Mt C, equiv. 13-40% fossil fuels (Page et al., 2002)
  - Annually, Borneo: 74 ± 33 Mt C (van der Werf et al., 2008)
  - Kal + Sum + Papua: 0.89 Gt CO_2e (Loberger et al., in press)
  - England's peat store ~ 300 Mt C
- Health:
  - 1997/98: 20 million respiratory probs.; 19,800-48,100 premature deaths (Heil, 2007)
  - 2015: 43 million people in "haze zone"; 500,000 reported sick (GoI, 2015)
- Economic losses:
  - 1997/98: USD 20.1 billion (Varma, 2003)
  - 2015: ~USD 30 billion (GoI, 2015; World Bank, 2016)

Fire impacts - biodiversity

- Borneo forests: high biodiversity, many threatened spp.
- Forest loss and fragmentation
- Harrison *et al.* (2016, Proc. 15th IPC)



29.9% hotspots inside orangutan dist. range

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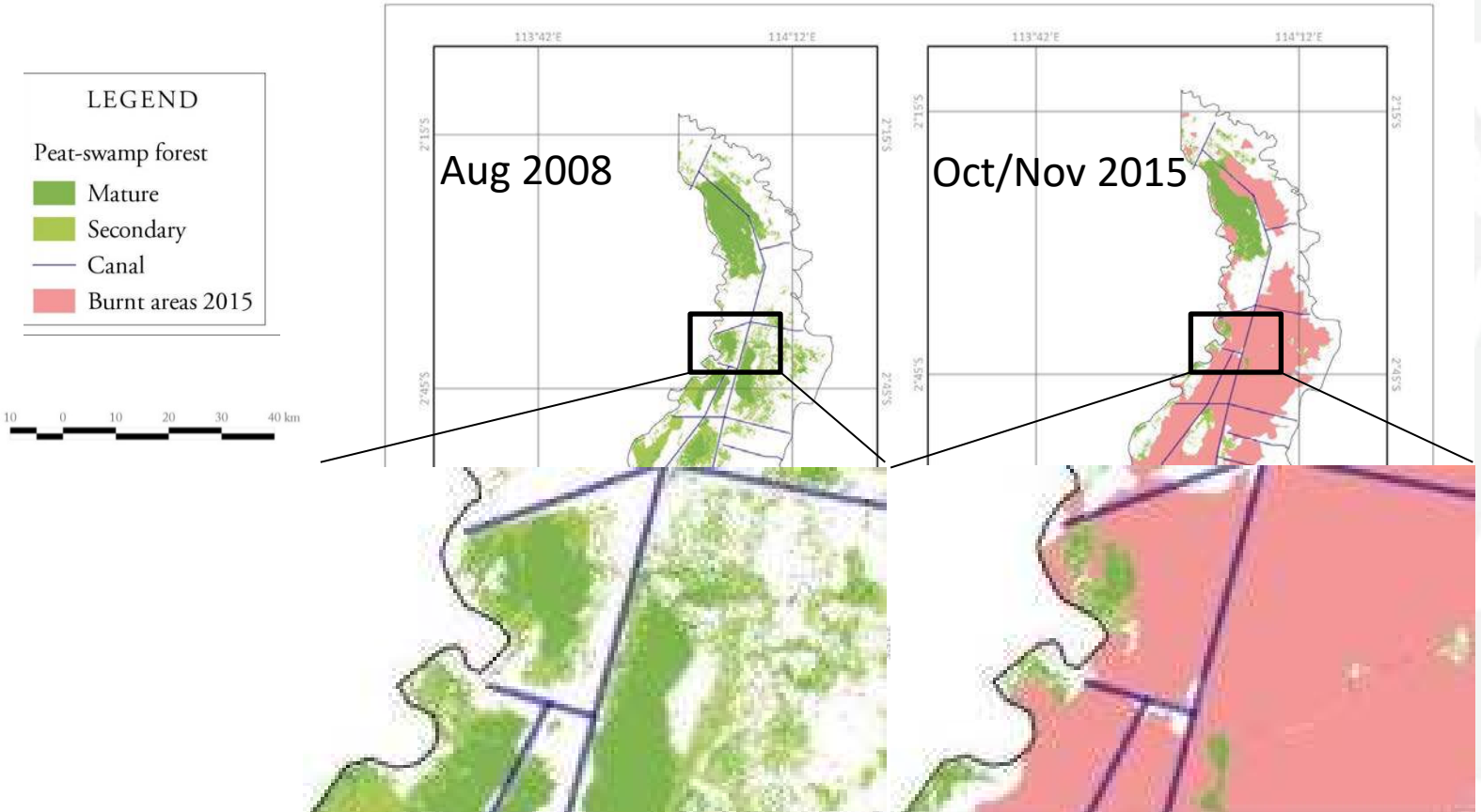


Fire impacts - biodiversity

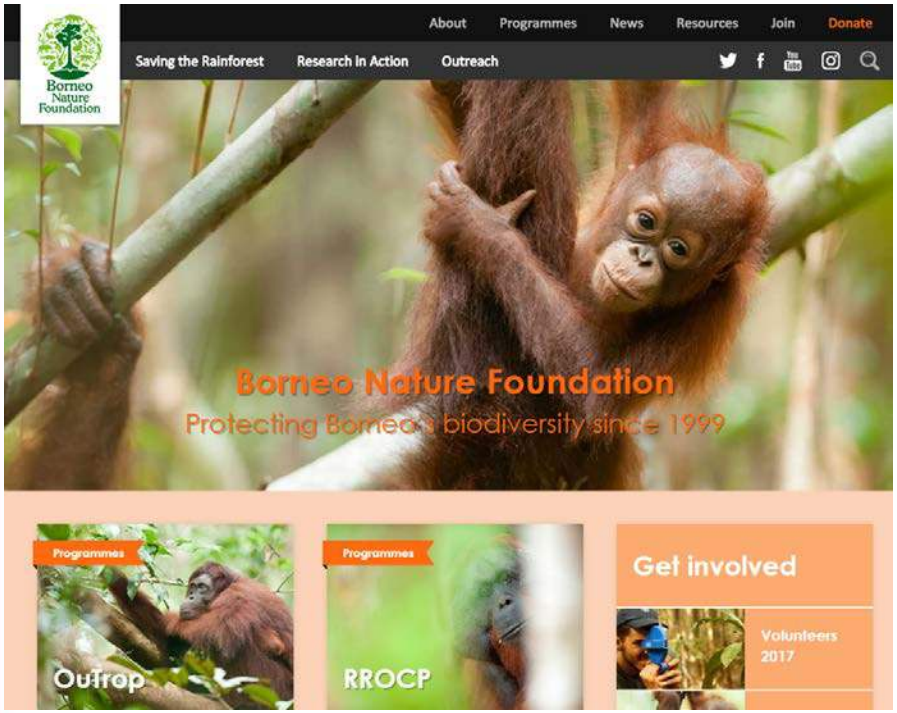
- Borneo forests: high biodiversity, many threatened spp.
- Forest loss and fragmentation
- Haze and carbon leaching:
  - Increased river acidity and lower fish captures (Thornton, 2017)
  - Massive peaks in forest leaf fall (Harrison et al., 2007, 2016)
  - Subsequent peaks in butterfly populations when trees replace leaves?
  - Respiratory ailments in animals, e.g. orangutans (BOSF)
  - Reduced gibbon territorial singing (Cheyne, 2007)
  - Reduced visibility to < 10 m
  - Reduced bioacoustic activity in Singapore (Lee *et al.*, 2017)




Why do we have this problem?

- Weather / rainfall – plays a strong role, but not the underlying cause
- Human use of fire – clearing, disputes and claims, carelessness, etc.

Who are Borneo Nature Foundation?



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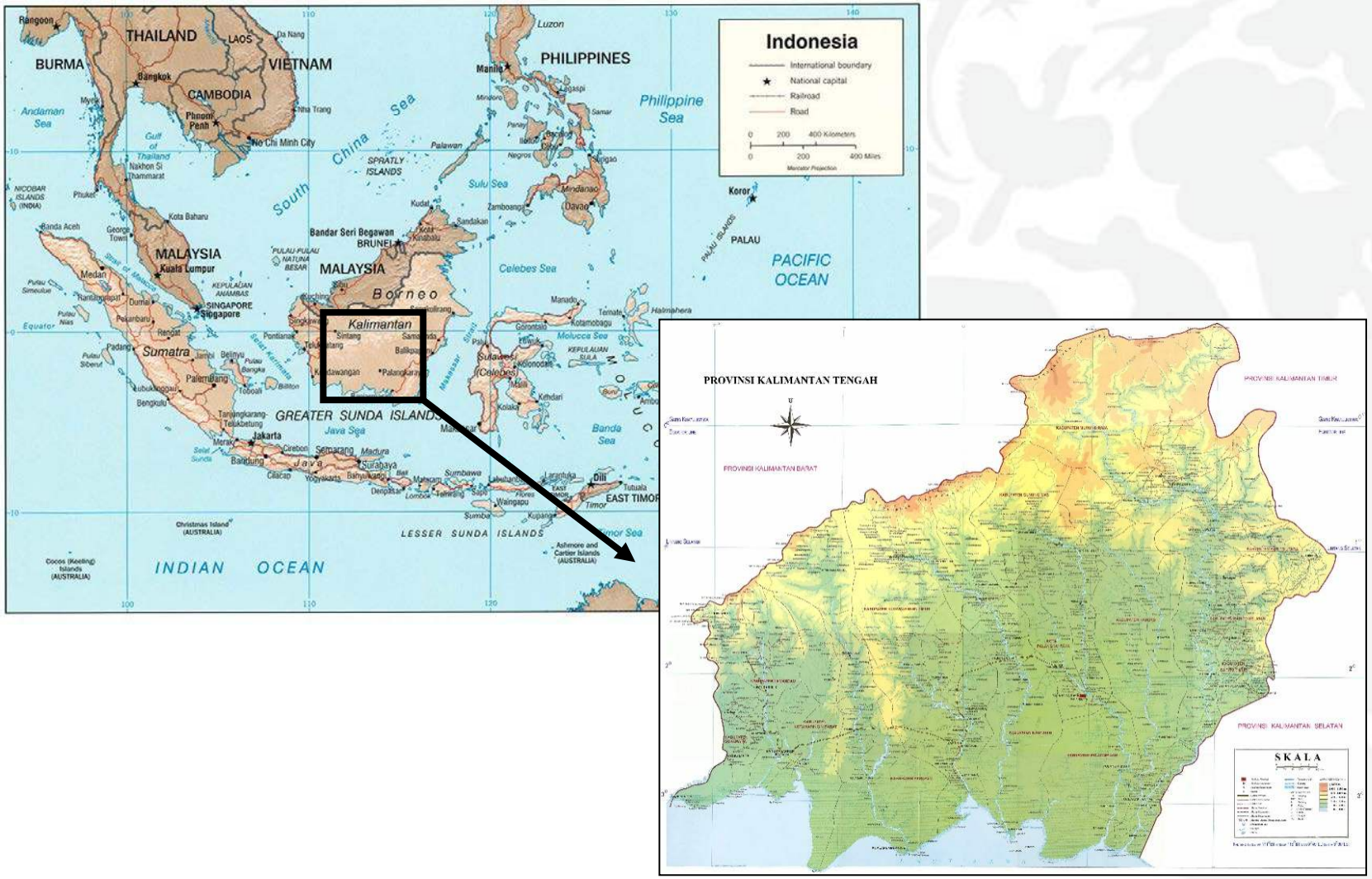
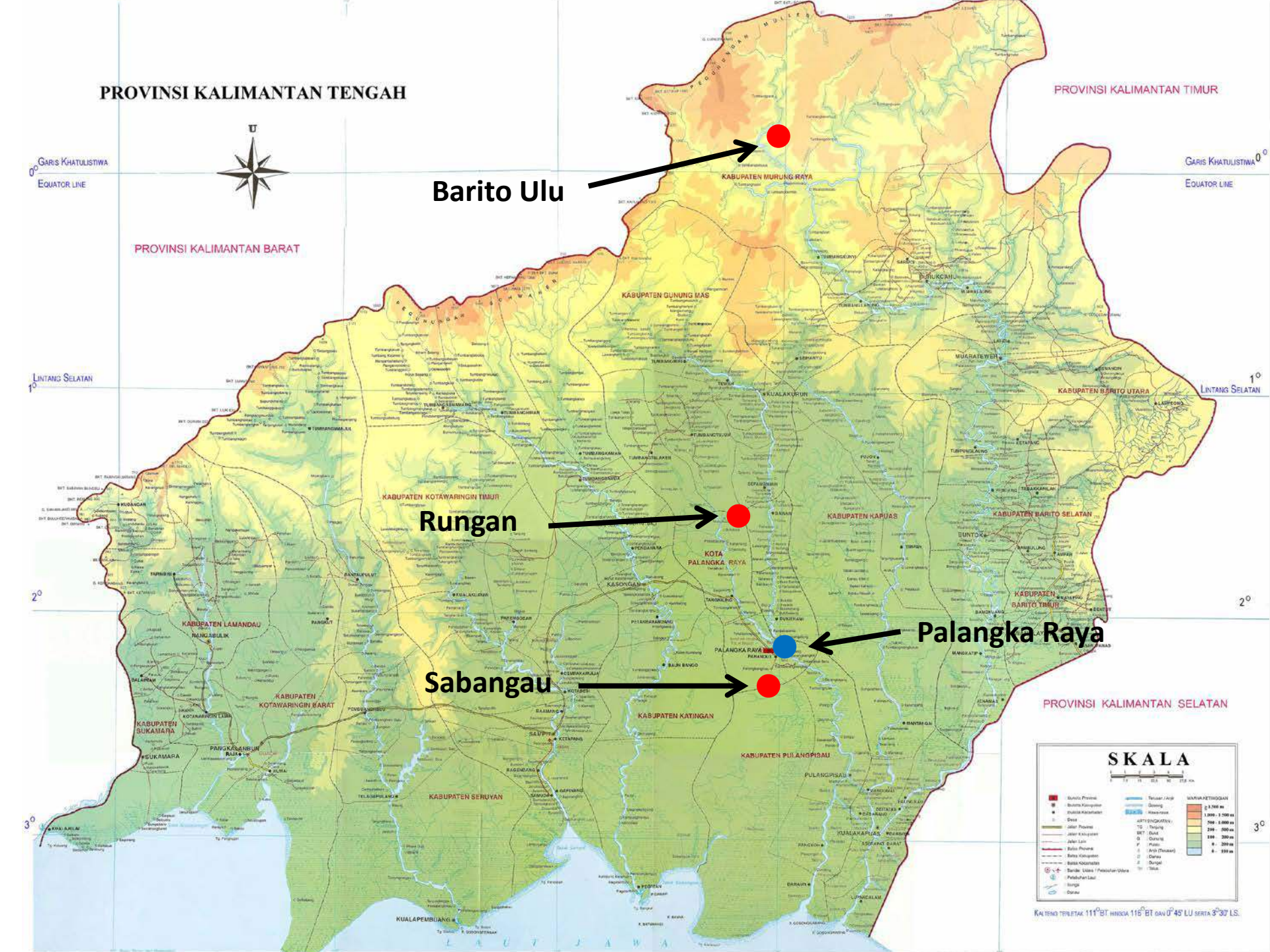
- Est. 1999, aim – maintain and enhance Kalimantan's ecosystems, biodiversity and benefits provided
- Work areas:
  - On-the-ground conservation
  - Conservation-based research
  - Sustainable livelihood development
  - Capacity building
  - Local and international outreach and education
- Partners:
  - Universities Exeter, Leicester, Oxford Brookes, Kent, Palangka Raya, Muhammadiyah
  - Many other organisations worldwide
  - Local government agencies and communities
- ~50 people employed and ~35 community fire patrol members supported

Where does BNF work?



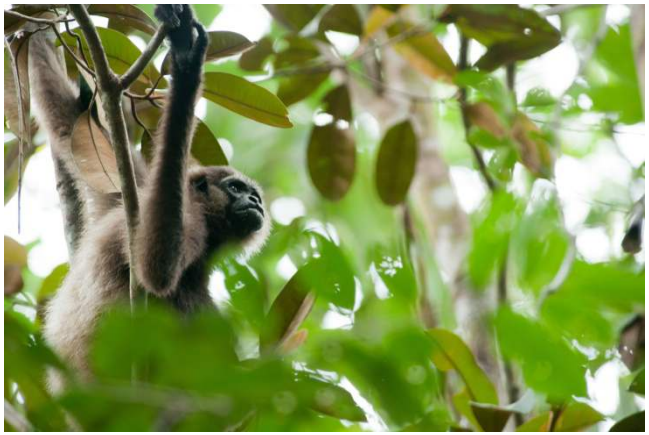

PROVINSI KALIMANTAN TENGAH
PROVINSI KALIMANTAN TIMUR
PROVINSI KALIMANTAN BARAT
PROVINSI KALIMANTAN SELATAN
U
GARIS KHATULISTIWA
EQUATOR LINE
LINTANG SELATAN
Barito Ulu
Rungan
Palangka Raya
Sabangau
KABUPATEN MURUNG RAYA
KABUPATEN GUNUNG MAS
KABUPATEN BARITO UTARA
KABUPATEN KOTAWARINGIN TIMUR
KABUPATEN KAPUAS
KABUPATEN BARITO SELATAN
KOTA PALANGKA RAYA
KABUPATEN BARITO TIMUR
KABUPATEN LAMANDAU
KABUPATEN KOTAWARINGIN BARAT
KABUPATEN SUKAMARA
KABUPATEN KATINGAN
KABUPATEN PULANGPISAU
KABUPATEN SERUYAN
SKALA

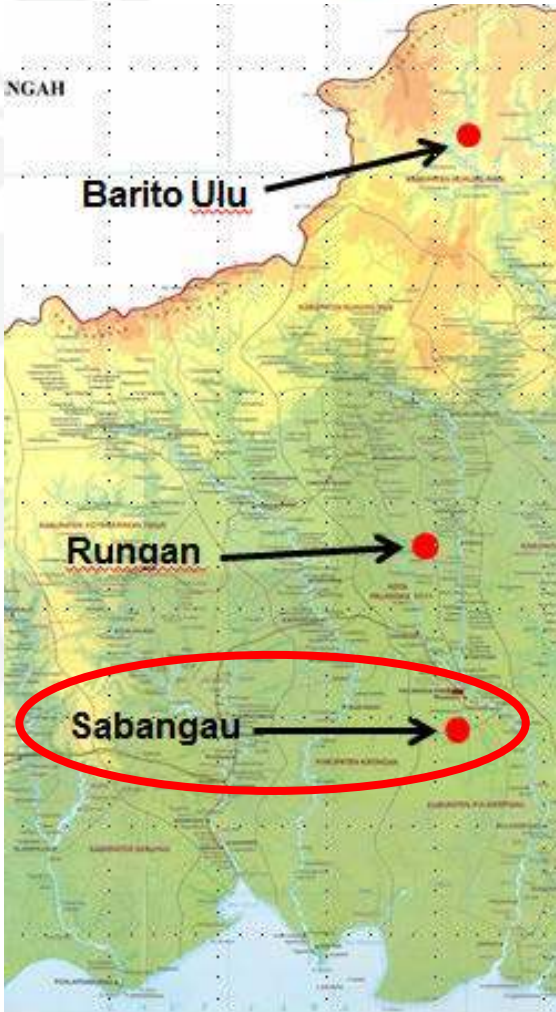

LABORATORIUM ALAM HUTAN GAMBUT (LAHG)
NATURAL LABORATORY OF PEAT FOREST

OuTrop Programme

World's largest protected population…

and…

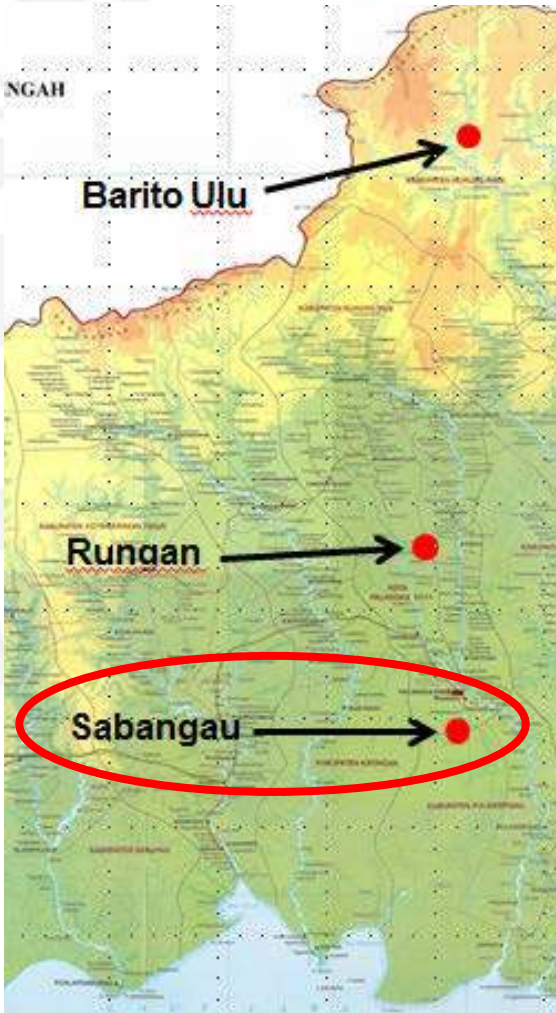




OuTrop Programme

Main threats:

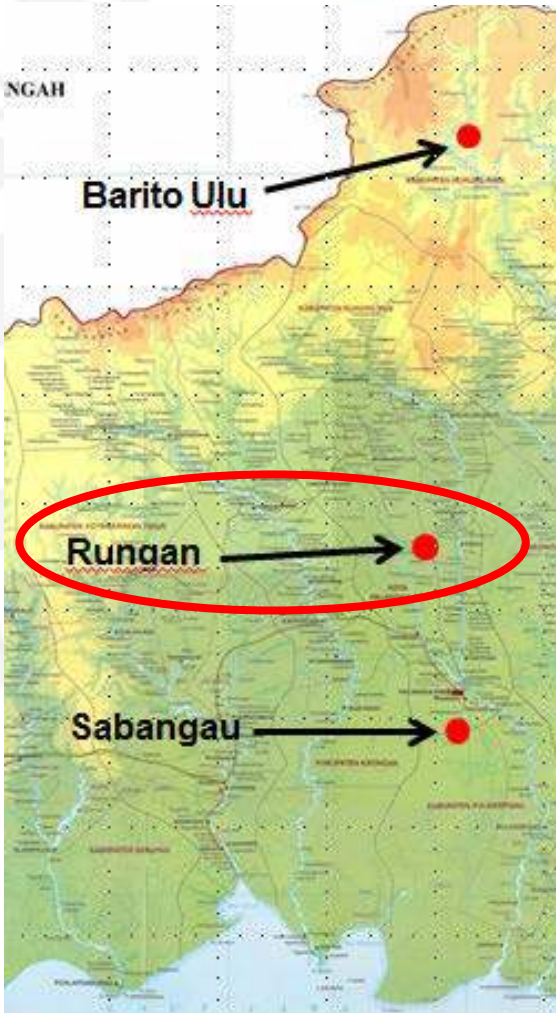
- Illegal logging
- Hunting and pet trade
- Swamp drainage
- FIRE!!



Rungan Conservation Programme

Rungan Forest:

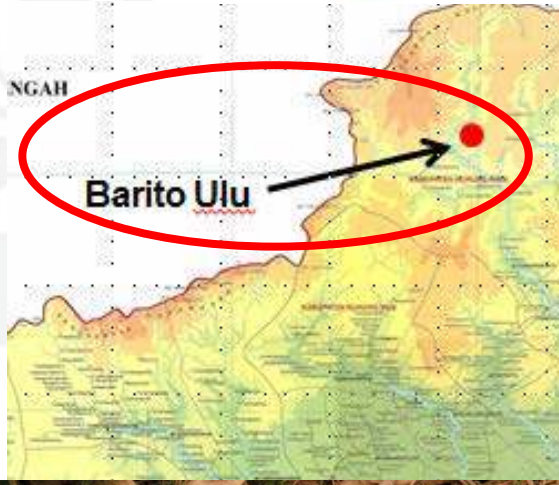
- 1,558 km²
- Mix forest types
- 1,300-2,000 orangutans
- Many other threatened species

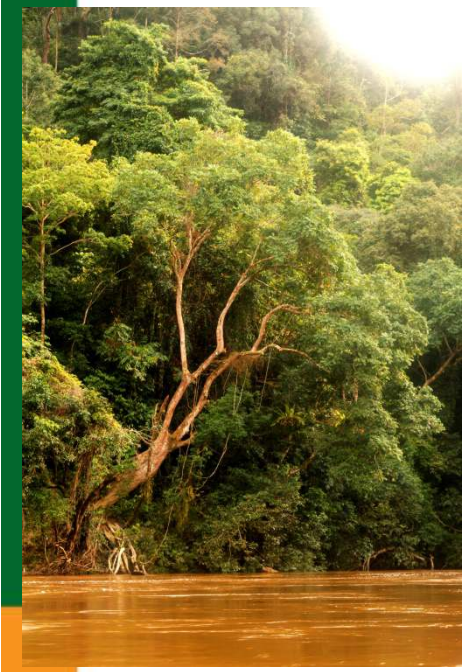


Barito Ulu Programme

Rekut Research Station:

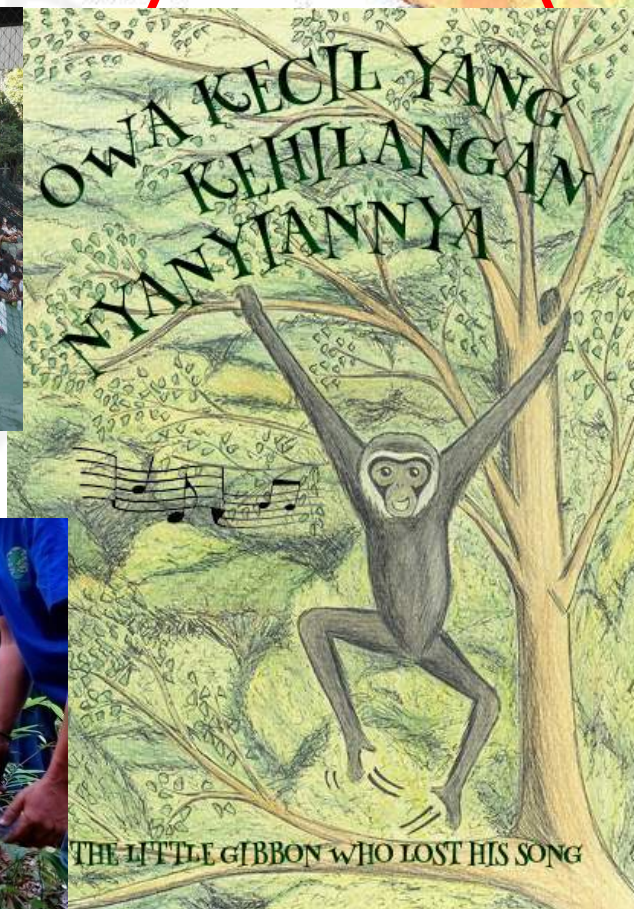
- 1980s – 2010: University of Cambridge
- Relatively pristine lowland hill dipterocarp forest
- Important gibbon and forest ecology research site
- 2007-09: 107 rescued orangutans released by BOSF





Education & Outreach

Awareness → behaviour and policy change



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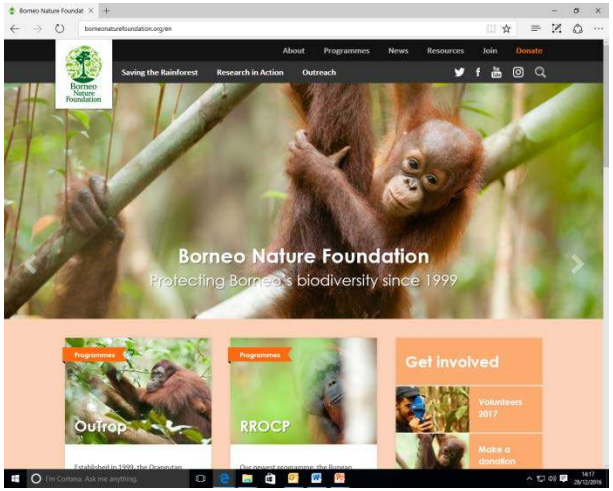

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- Annual Report
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PRESS RELEASE

Embargoed for:
27 August 2014 at 11.00 GMT

OuTrop

Hope remains for Bornean orangutan population reduced by more than half

Kalimantan, Indonesia 27 August 2014 – Despite a Bornean orangutan population being reduced to less than half its original size due to logging and forest fires, conservationists still have hope for its survival.

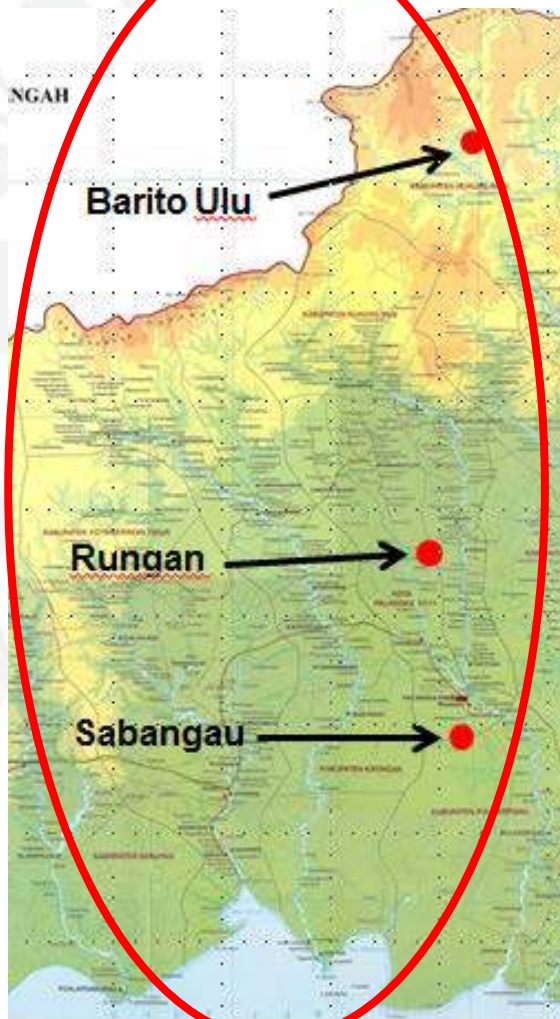
A study published today in the journal Oryx reveals an orangutan population living in highly fragmented and disturbed forest in Indonesian Borneo is likely to have declined from as many as 4,100 individuals in 1995 to between 1,500 – 1,700 in 2009. The population is divided across 29 fragmented forest blocks with the largest subpopulation numbering only 230 individuals.

Led by Megan Cattau from Columbia University, and carried out in collaboration with The Orangutan Tropical Peatland Project (OuTrop) and Centre for International Cooperation in Sustainable Management of Tropical Peatlands (CIMTROP), the study raises concerns about the future of this population. The fragmented population is unlikely to be viable in the long-term if ongoing habitat loss and degradation persists. But, implementation of effective conservation measures to connect forest fragments and prevent further habitat loss could secure its survival and save this population from extinction.

The research took place in the ex-Mega Rice Project area, in which 1 million hectares of peat-swamp forest was set-aside for conversion to rice paddies in the mid-late 1990s. As predicted by experts the project failed. Forest clearance and subsequent illegal logging, drainage and fire have resulted in the loss of over 70% of the original forest cover in "Block C", the core study site area, over the past 20 years. A burnt, deforested landscape has been left in its wake.

Today, the lucky survivors of this disaster are confined to the last remaining forest fragments. The scientists investigated how much suitable habitat remained within "Block C" and whether the remaining forest patches (total size 76,755 ha) still contained orangutans, and if so, how many there were.

Simon Husson, OuTrop Founding Director and study co-author, was surprised at the findings. "We knew that orangutans were still found in the largest block, but didn't think they could persist in the smaller fragments. Yet, it turns out that orangutans here are incredibly resilient. By adding up the individuals in all the blocks, this forest – if reconnected – could be home to one of the ten largest populations of this species. For this many orangutans to have survived twenty years of torment and



Why are we here?

- Learn about new work, findings and ideas from delegates
- Meet other people working and conducting research across disciplines in the region (or with an interest in this)
  - Develop and strengthen UK-Indonesia links
- Identify:
  - Important new work areas/research questions that we may be able to help address
  - Potential (new) collaborations between participants to fulfill this
  - Potential new "projects" and funding streams for these
- Outputs:
  - Book of abstracts
  - Potential article
  - Collaborations!

Some Q's to consider…

- What are the key threats to C. Kal.'s forests and the benefits that they provide?
- What are the drivers of these threats, esp. fire?
- What are the environmental, social and economic impacts of these threats, and how do these interact?
- What don't we know about these threats, drivers and impacts that is currently reducing our ability to mitigate these?
- How can we fill these information gaps? How could people here help me/my group to fill these gaps?

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