Experience with biodiversity assessment of pasture land

Ecologist M. Sc. Elson Fernandes de Lima
Casa da Floresta Assessoria Ambiental Ltda.

ISCC Technical Committee South American Meeting
Buenos Aires, Argentina - October 17, 2013

About us

Casa da Floresta Assessoria Ambiental

Our team

Private Organization

Biologists, Ecologists, Forest Engineers
Support Staff

25 professionals

Our projects

Biodiversity assessment
Forest restoration
Environmental monitoring: biotics and abiotics
Innovative Spatial Prioritization to Conservation

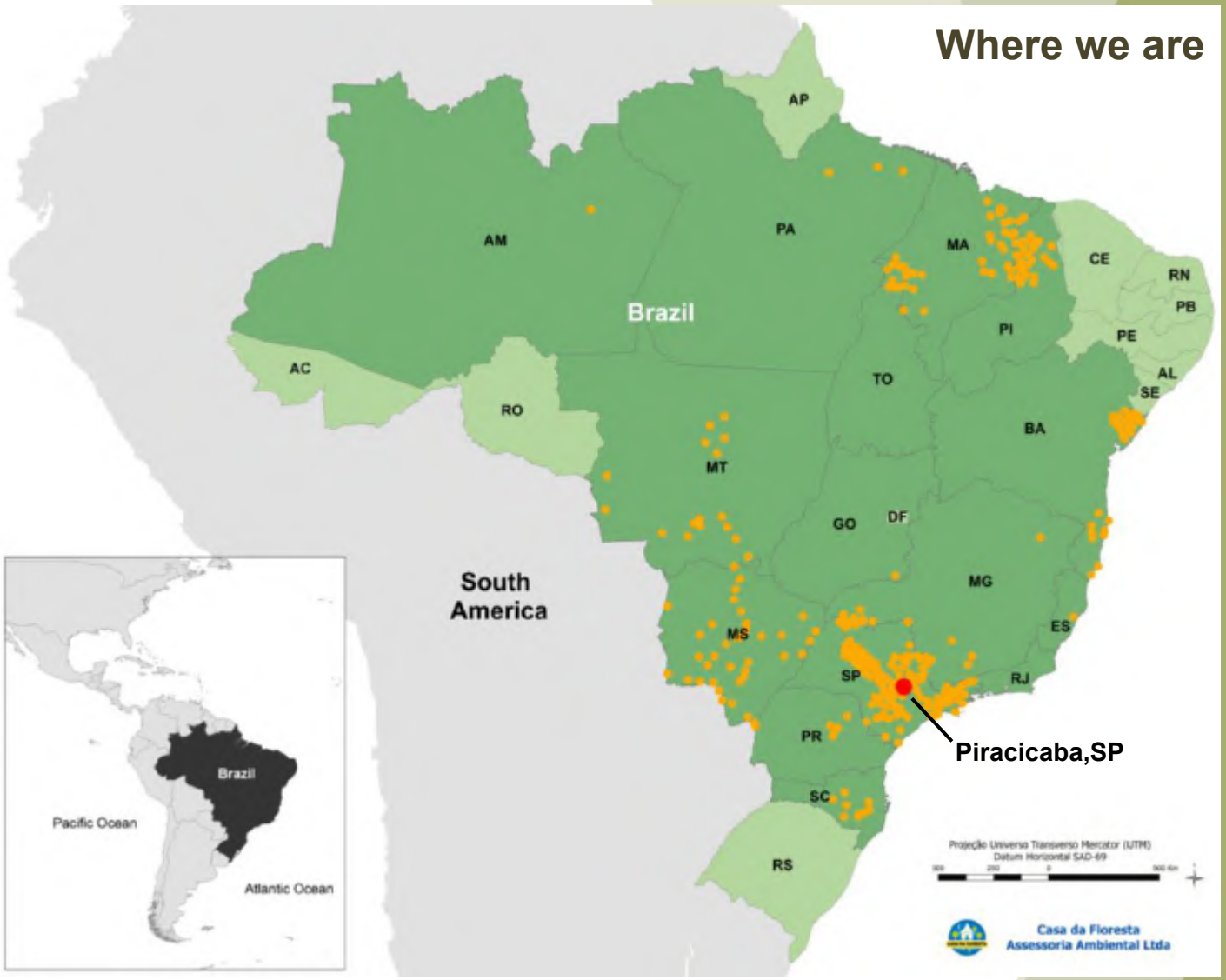
About us

Casa da Floresta Assessoria Ambiental

Our customers

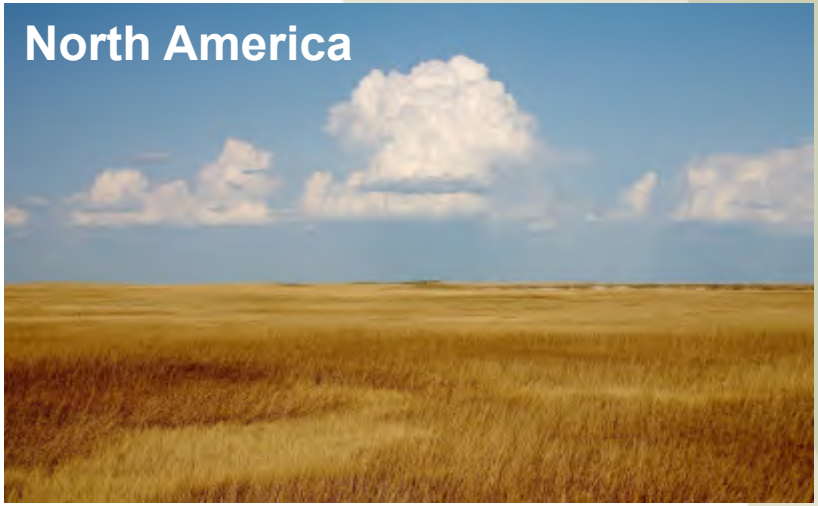
SUZANO PAPEL E CELULOSE
EMBRAER
AES the power of being global
Eldorado Brasil
Fibria
CATERPILLAR
VERACEL
PETROBRAS
Kimberly-Clark
GOVERNO DE SÃO PAULO
Klabin
bsc Bahia Specialty Cellulose
MITSUBISHI MOTORS
WWF
3M

Where we are



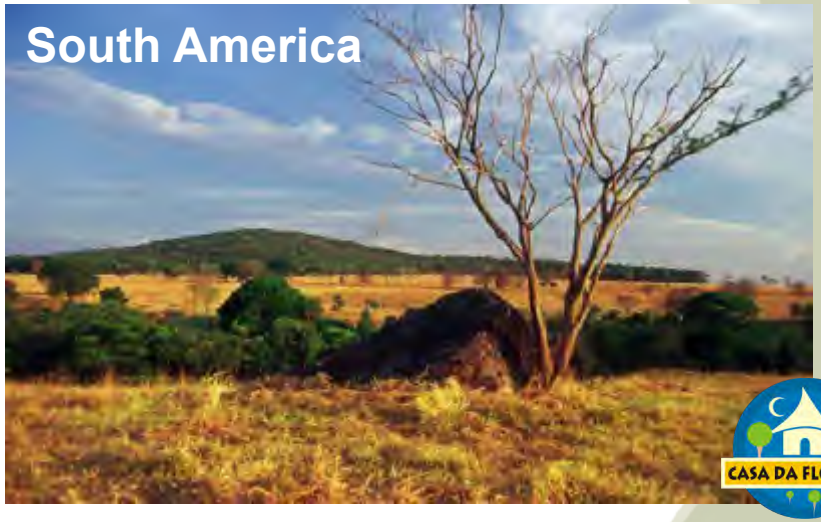
Grasslands

Definition by EU Directive 2009/28/EC



natural

grassland that would remain grassland
in the absence of human intervention and
which maintains the natural
species composition
and ecological characteristics
and processes



Grasslands

Definition by EU Directive 2009/28/EC

non-natural

grassland that would cease to be grassland in the absence of human intervention and which is species-rich and not degraded, unless evidence is provided that the harvesting of the raw material is necessary to preserve its grassland status

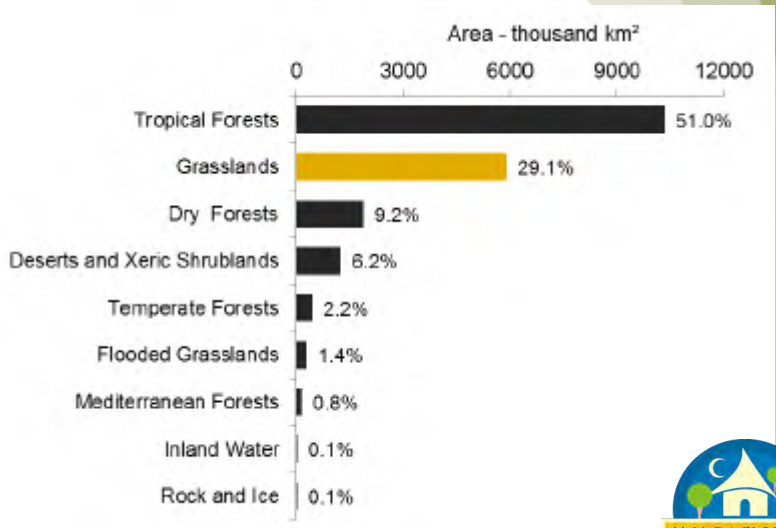
Latin America and Caribe

550 million ha

Grasslands

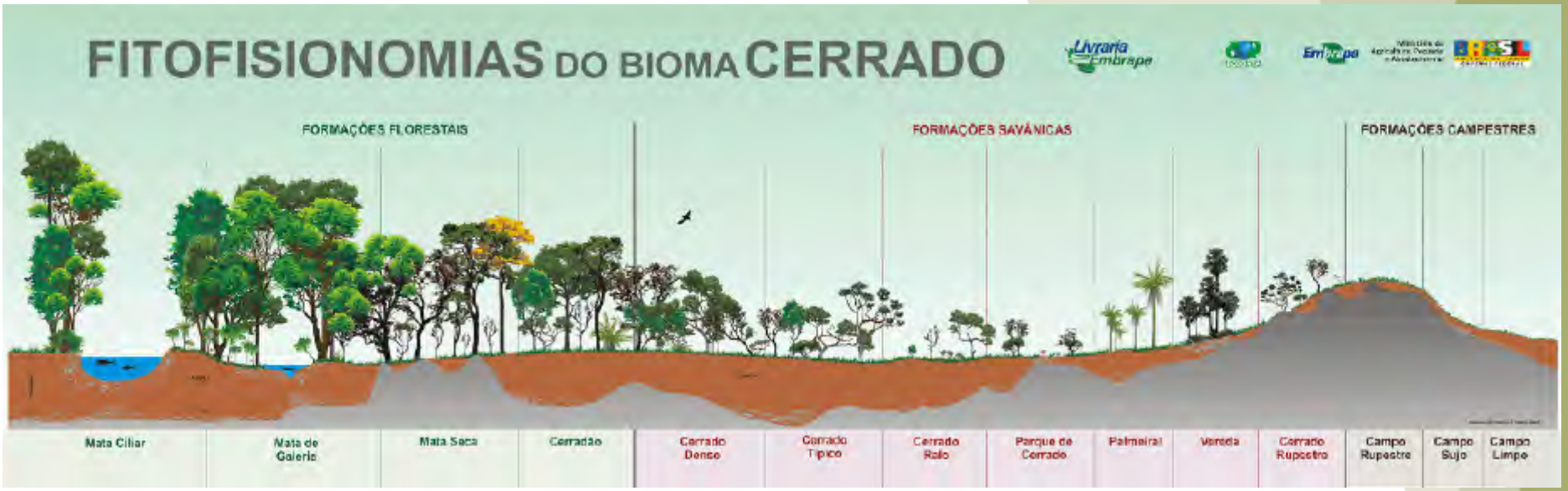
Extent of Occurrence

Ecoregions in South Americas



Types of grasslands

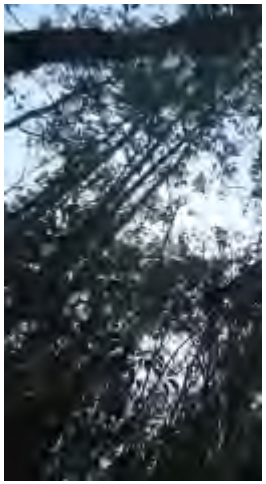
Physiognomies

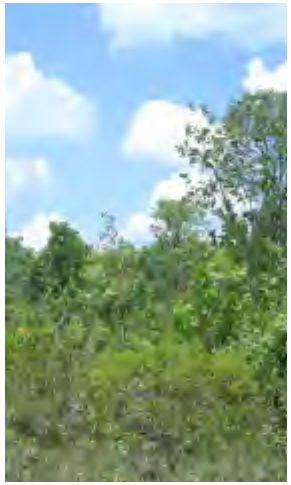
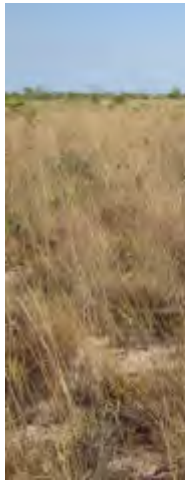


Types of grasslands

Physiognomies

Woody ← → **Field**



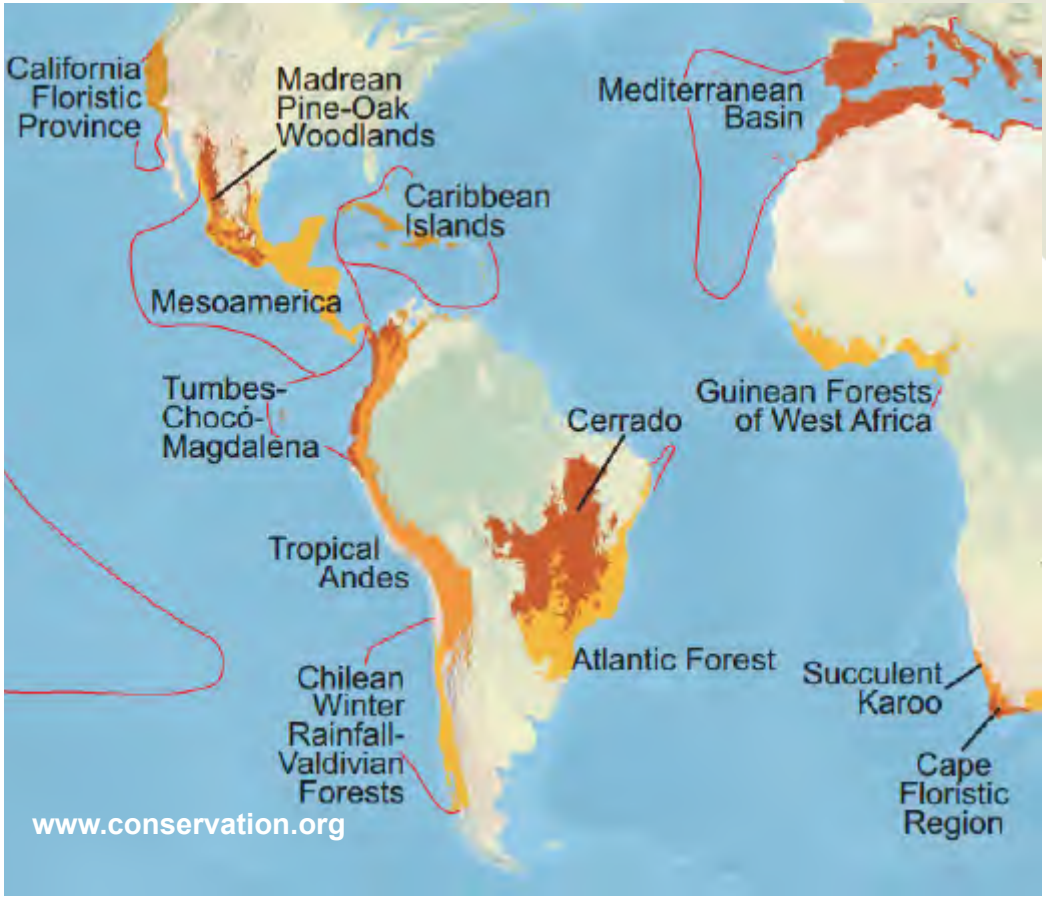





SA Hotspots

Grasslands and Forests Biomes

Characteristics

Endemic species
Vulnerable



Threats

Habitat Loss
Fragmentation

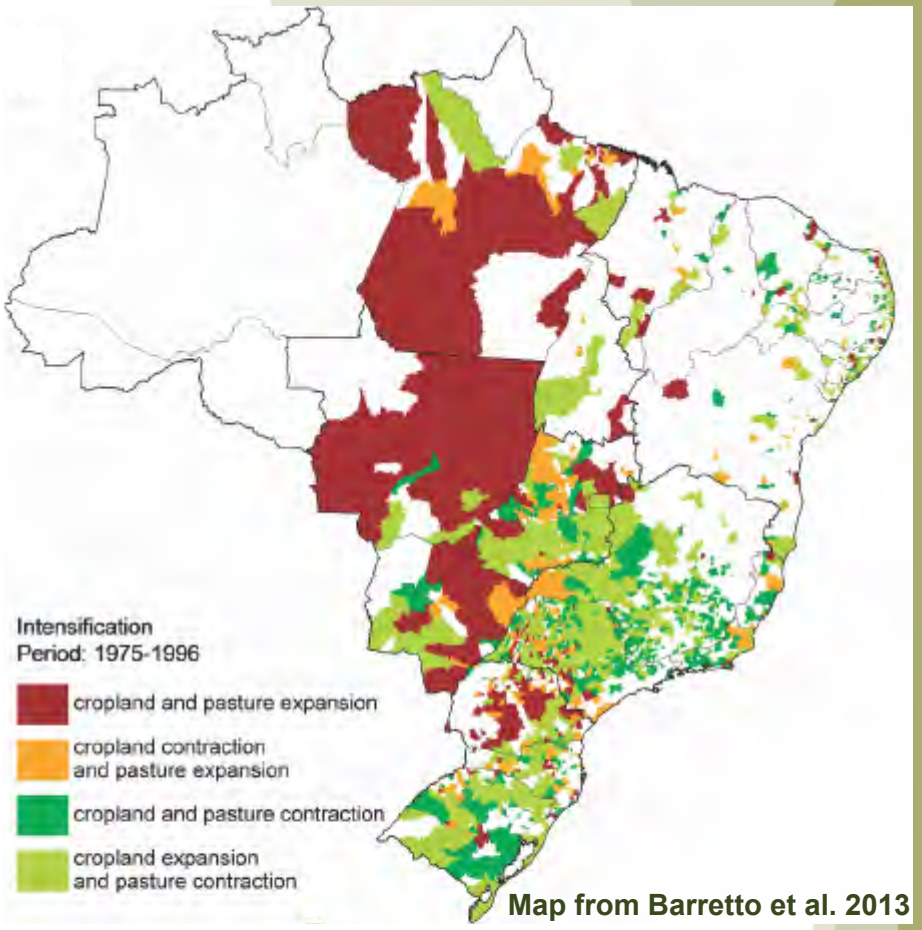
Pastures

A Brazil's case

Arc of deforestation

agriculture frontier

There is a pattern in changing of the land use cover



Map from Barretto et al. 2013

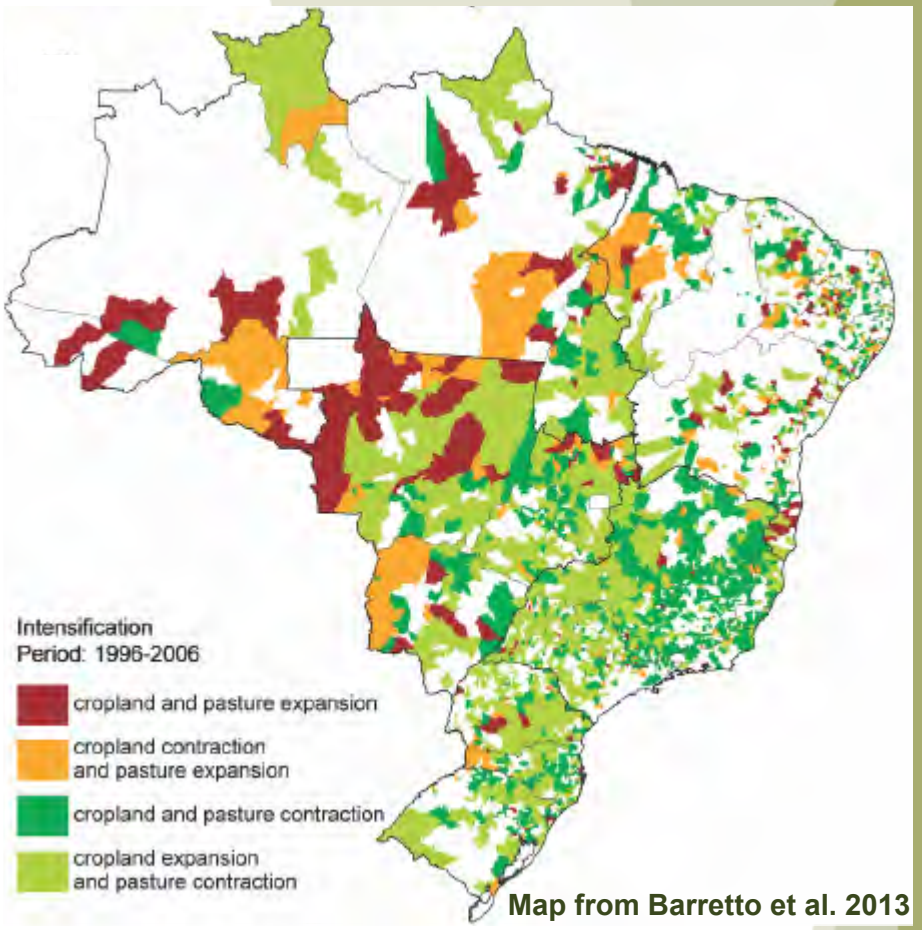
Pastures

A Brazil's case

The pattern

- Logging
- Burning
- Livestock
- Agriculture

- Forestry



Map from Barretto et al. 2013

“Open areas”

The result of agriculture expansion on forest biomes

‘Fishbone’ colonization in the Amazonia

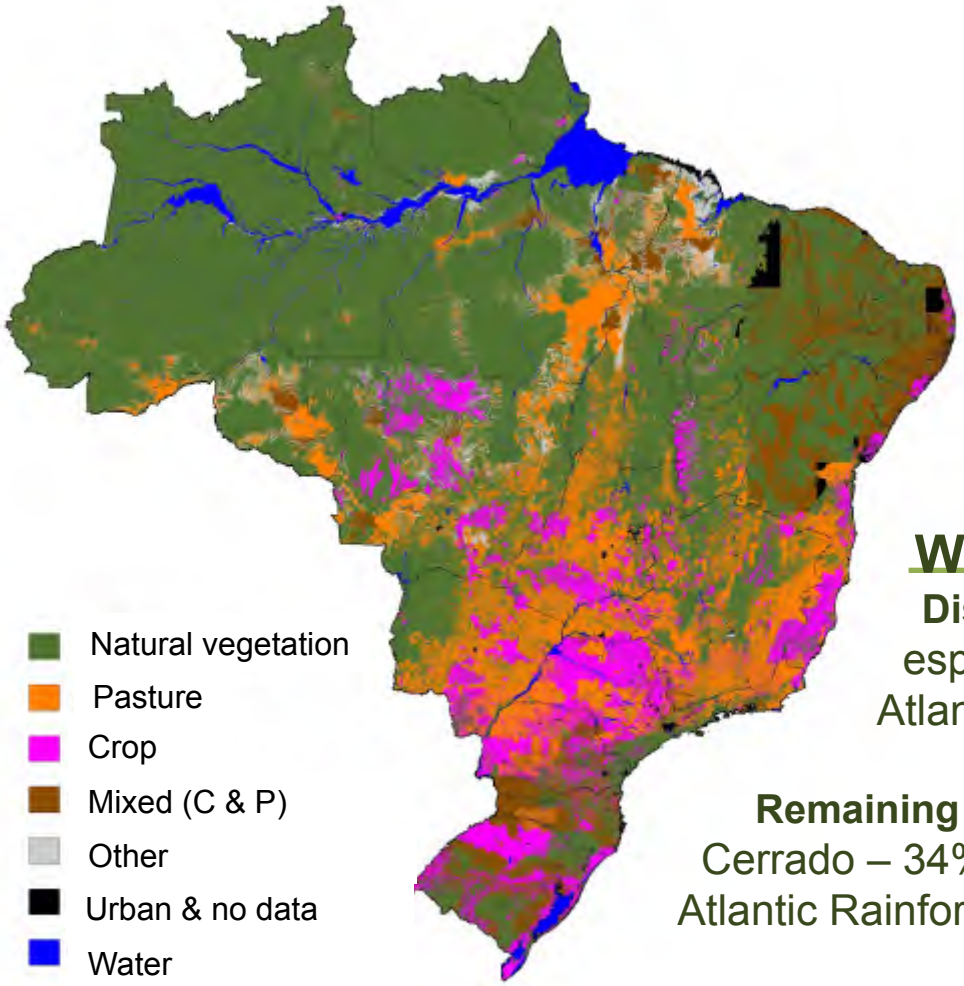
Fragmentation in the Atlantic Rainforest

“Open areas”

The result of agriculture expansion on forest biomes

Pastures

A Brazil's case



Where it is

Distribution of anthropogenic pastures

especially in the Cerrado and in the Atlantic Rainforest

Remaining areas

Cerrado – 34%

Atlantic Rainforest – 11%

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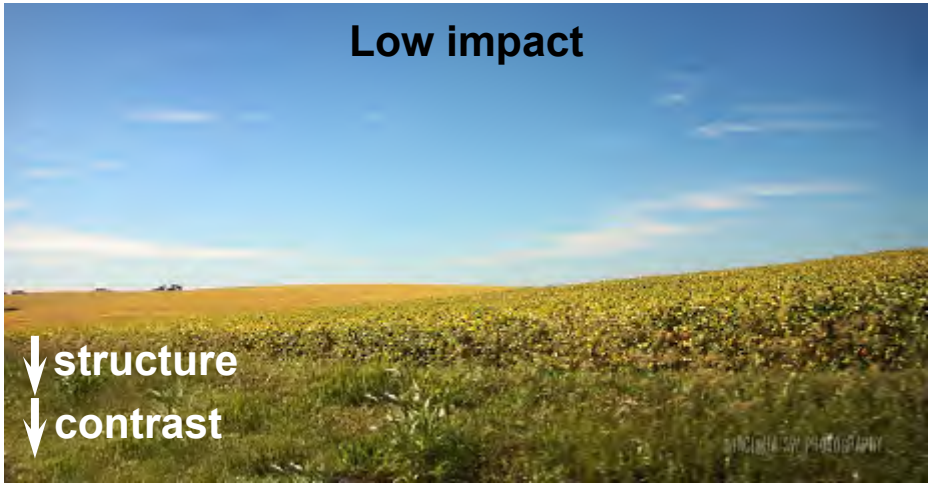
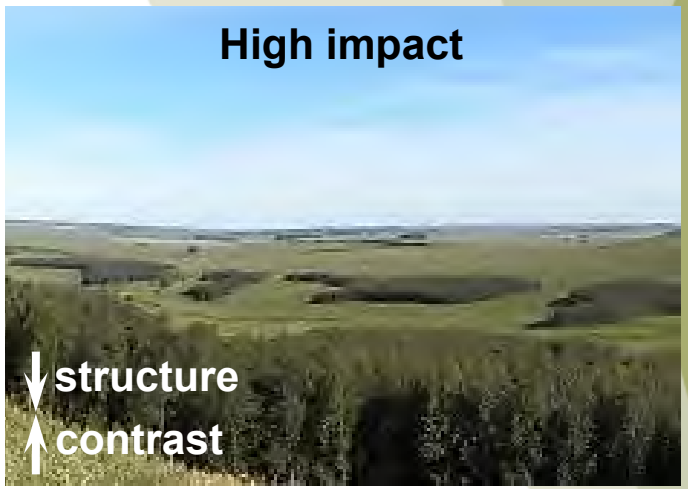
Impacts of deforestation

Threats to biodiversity





Impacts of deforestation

Threats to biodiversity

OPEN ACCESS Freely available online

PLOS | ONE

Pervasive Defaunation of Forest Remnants in a Tropical Biodiversity Hotspot

Gustavo R. Canale[1,2*], Carlos A. Peres[3], Carlos E. Guidorizzi[4], Cassiano A. Ferreira Gatto[5], Maria Cecilia M. Kierulff[6]

1 Wildlife Research Group, Anatomy School, University of Cambridge, Cambridge, Unite
(UNEMAT), Tangará da Serra, Mato Grosso, Brazil, 3 Centre for Biodiversity Research, Schoo
4 Instituto Chico Mendes, Brazilian Ministry of Environment (ICMBIO), Brasília DF, Brazil, 5
Manaus, Amazonas, Brazil, 6 Instituto Pri-Matas para a Conservação da Biodiversidade, B

Abstract

Tropical deforestation and forest fragmentation are among the m
yet local extinctions of millions of animal and plant populations
explained. Here, we report unprecedented rates of local extincti
world's most important tropical biodiversity hotspots. We scrutini
occupancy data for 18 mammal species within 196 forest patches
Forest. We uncovered a staggering rate of local extinctions in t
populations still persisting. On average, forest patches retained 3.
ranges had contracted to 0–14.4% of their former distributions, in
at a regional scale. Forest fragments were highly accessible to
severely diminishing the predictive power of species-area relation
variation in species richness per patch. Hence, conventional sp
species persistence in that most forest fragments had lost species

Functional Extinction of Birds Drives Rapid Evolutionary Changes in Seed Size

Mauro Galetti,[1]* Roger Guevara,[2] Marina C. Côrtes,[1] Rodrigo Fadini,[3] Sandro Von Matter,[4] Abrahão B. Leite,[1] Fábio Labecca,[1] Thiago Ribeiro,[1] Carolina S. Carvalho,[5] Rosane G. Collevatti,[5] Mathias M. Pires,[6] Paulo R. Guimarães Jr.,[6] Pedro H. Brancalion,[7] Milton C. Ribeiro,[1] Pedro Jordano[8]

Local extinctions have cascading effects on ecosystem functions, yet little is known about the potential for the rapid evolutionary change of species in human-modified scenarios. We show that the functional extinction of large-gape seed dispersers in the Brazilian Atlantic forest is associated with the consistent reduction of the seed size of a keystone palm species. Among 22 palm populations, areas deprived of large avian frugivores for several decades present smaller seeds than nondefaunated forests, with negative consequences for palm regeneration. Coalescence and phenotypic selection models indicate that seed size reduction most likely occurred within the past 100 years, associated with human-driven fragmentation. The fast-paced defaunation of large vertebrates is most likely causing unprecedented changes in the evolutionary trajectories and community composition of tropical forests.

High rates of human-driven extinctions, estimated to be 100-fold greater than those of natural extinctions (*1*), have pervasive impacts on the functions and services of ecosystems (*2*, *3*). Despite efforts to understand the immediate and cascading effects of the loss of species on the persistence of other species and biotic interactions (*4*, *5*), little is known about

Pastures

A Brazil's case

pastures

(beef and milk)

croplands

(soybean, corn, sugarcane, others)

Ministry of environment, Brasil

Pastures

A Brazil's case

pastures
(beef and milk)

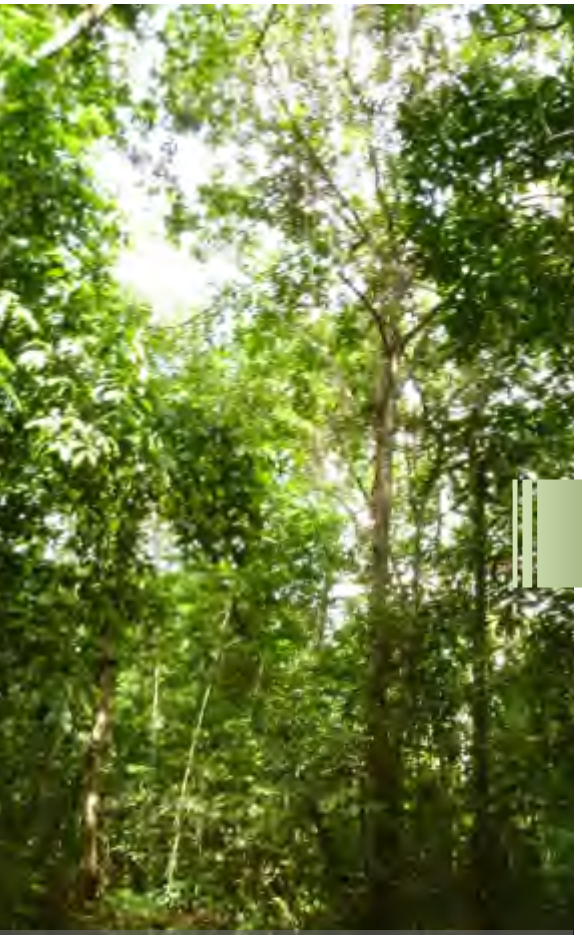
croplands
(soybean, corn, sugarcane, others)

species and landscape

management

Pasture Land

The process – field data



original habitat
(Amazonia biome)

deforestation
(burning)

pasture
(cattle)

Pasture Land

The reverse process – due to low productivity

pasture
(low productivity)

dirty pasture
(recently abandoned)

‘capoeira’
(shrubs and small trees)

dirty pasture
(bushes and shrubs)

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Pasture Land

The reverse process – due to low productivity






increasing biodiversity

How evaluate the biological data?

1. Comparing with original habitat: local resources
2. Regard the landscape caracteristics: matrix and

Pasture Land

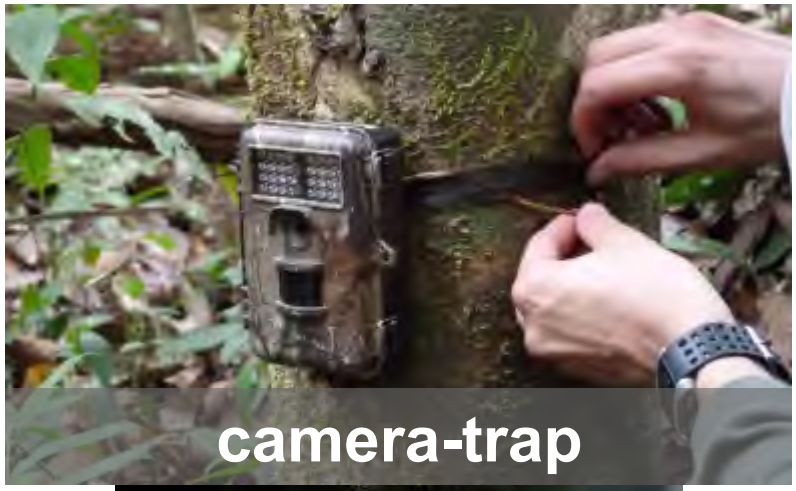
Measuring the biodiversity

Biological indicators or surrogates of habitat quality and ecological process

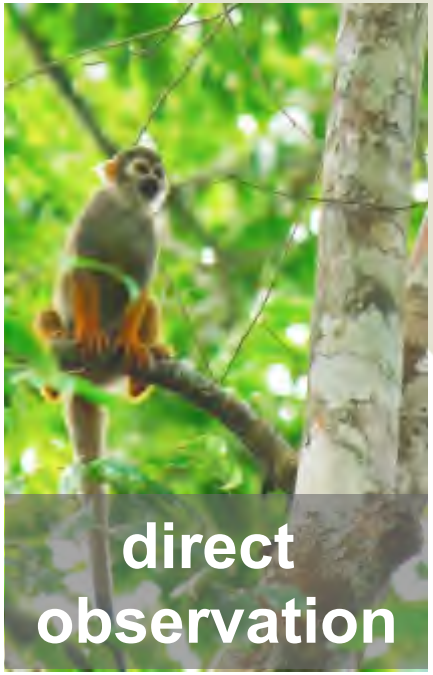
Pasture Land

Measuring the biodiversity

medium to large-sized mammals



camera-trap



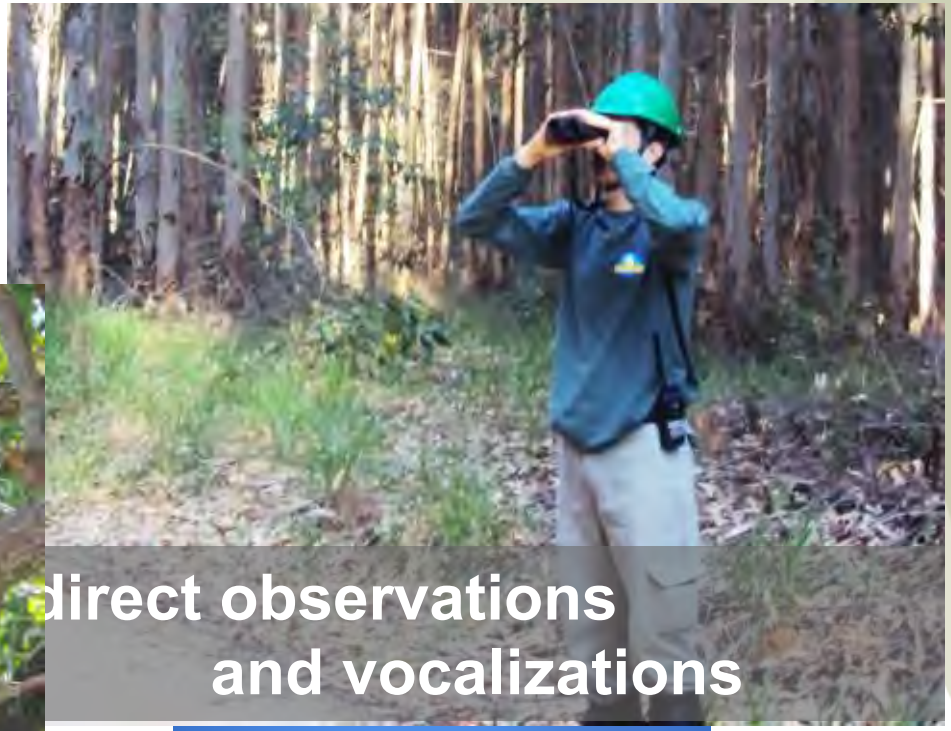
direct observation

track

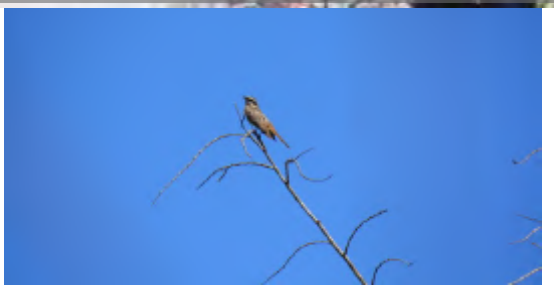
Pasture Land

Measuring the biodiversity

birds

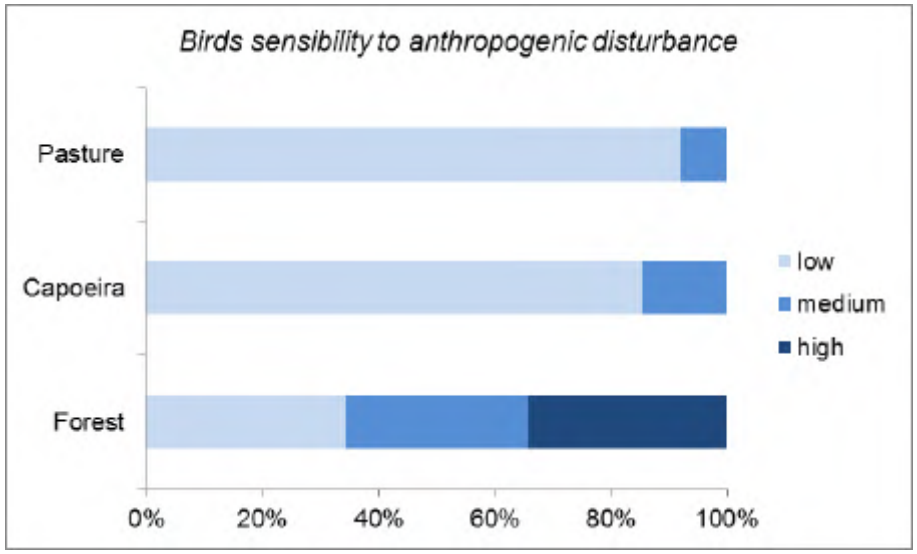


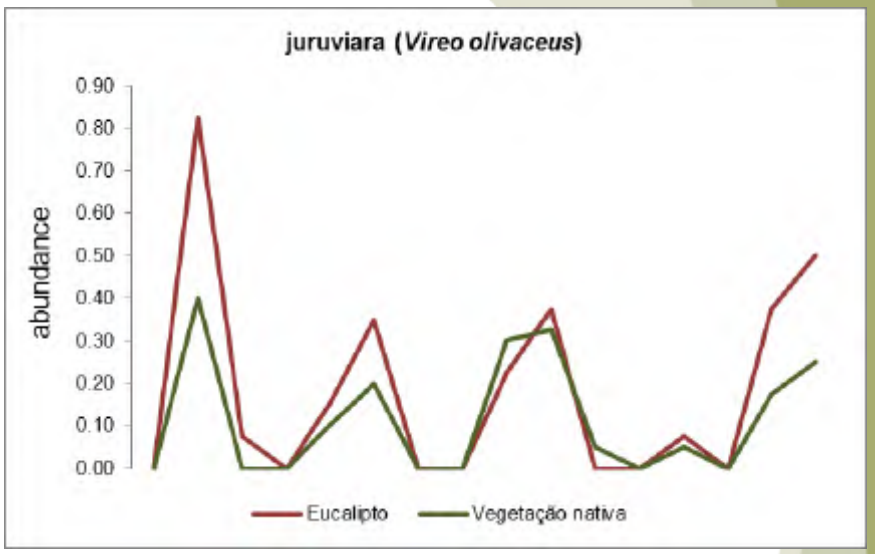
direct observations
and vocalizations



Results

Measuring the biodiversity

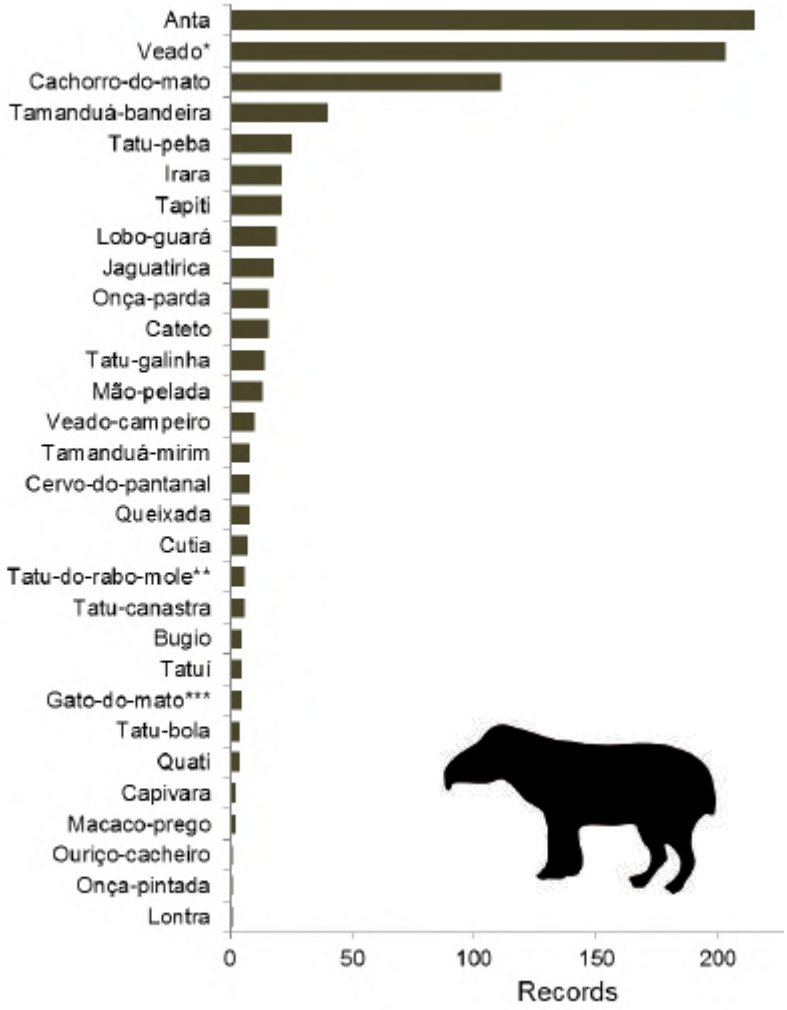


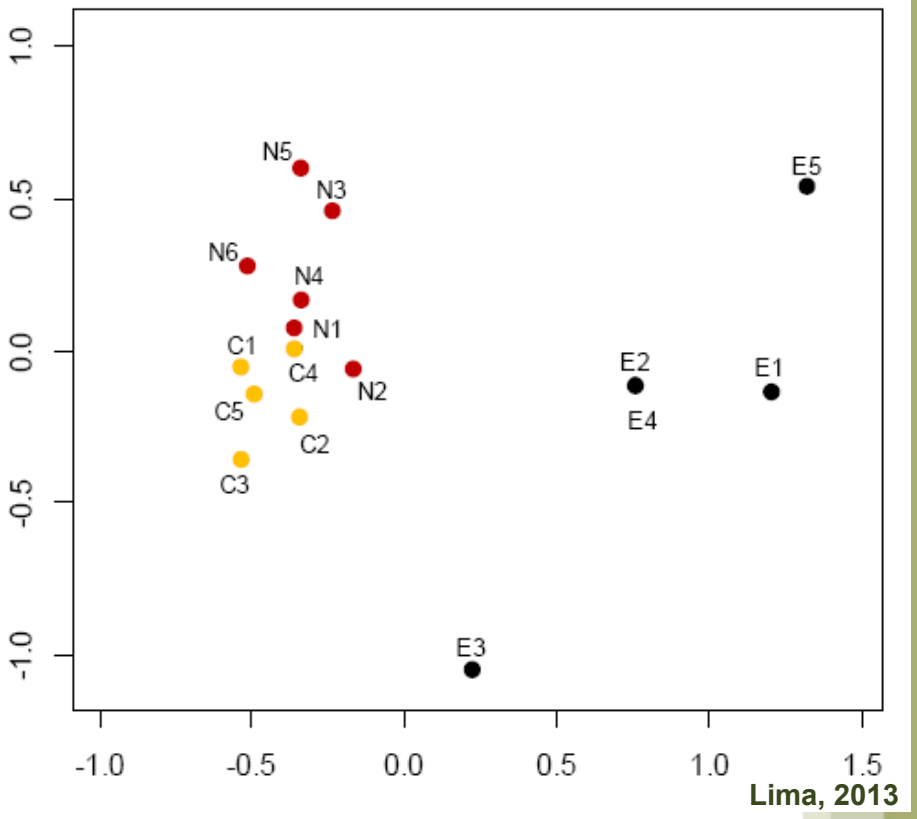


Casa da Floresta, *unpublished data*

Results

Measuring the biodiversity



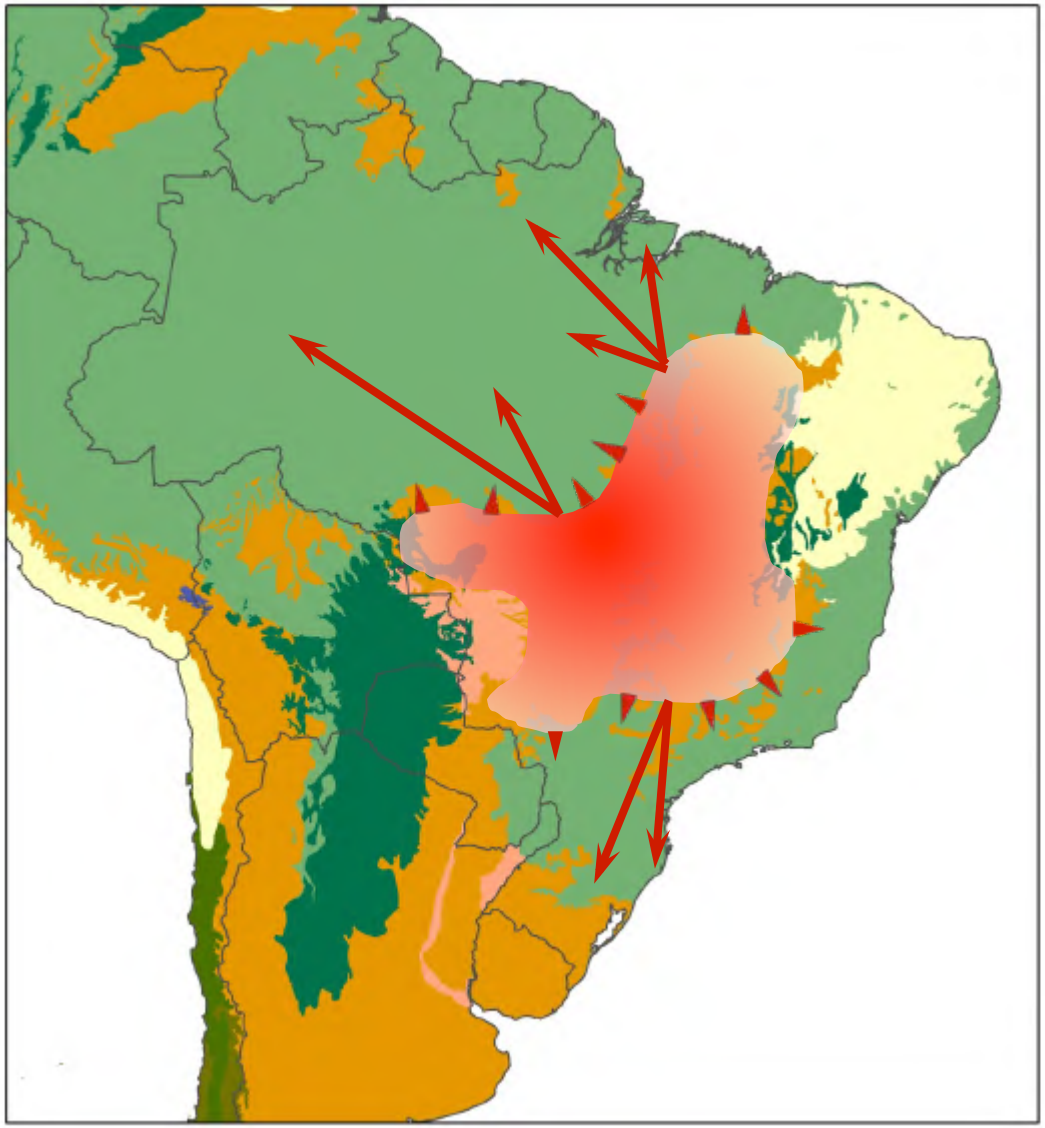


Lima, 2013

Pasture Land

Species ‘invasions’

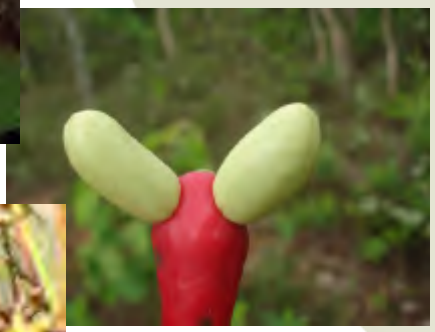
Tipical species from open areas can expand their distribution



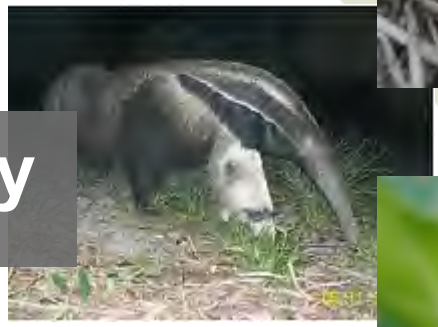
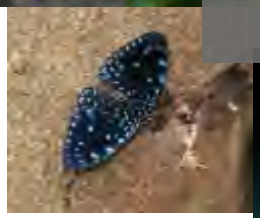
Brazilian savannah

Plants and Animal Diversity

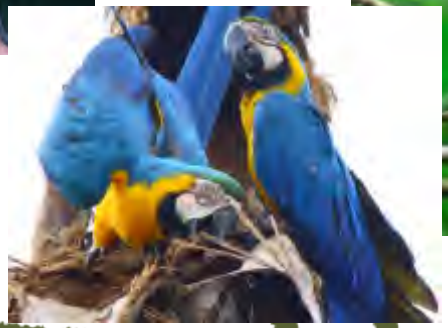






High biodiversity

(tropical biomes)

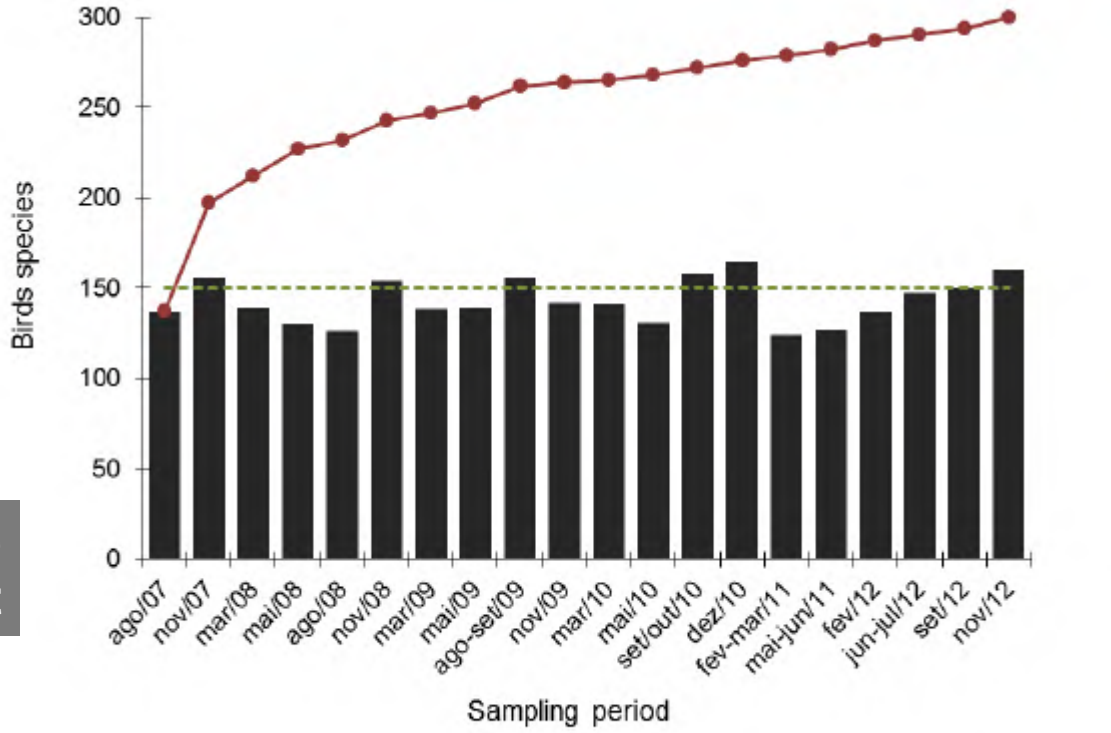
Difficulties in assessments

Limitations

1. conceptual basis
2. technologic innovation
3. governance policies

increase what we know about

Casa da Floresta, *unpublished data*

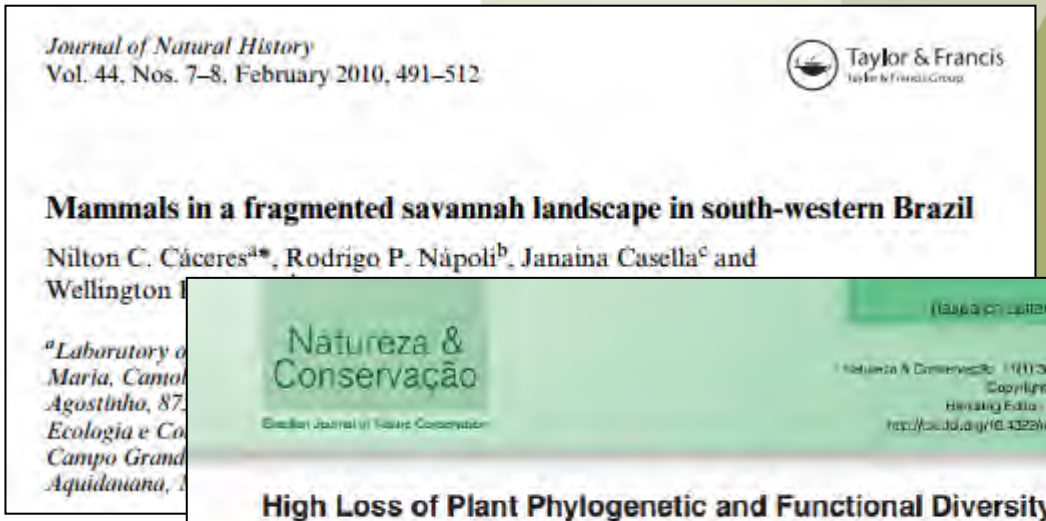


Difficulties in assessments

Limitations

1. conceptual basis
2. technologic innovation
3. governance policies

few number of studies in savannahs and grasslands in South America



Journal of Natural History
Vol. 44, Nos. 7–8, February 2010, 491–512

Taylor & Francis

Mammals in a fragmented savannah landscape in south-western Brazil

Nilton C. Cáceres[a]*, Rodrigo P. Nápoli[b], Janaina Casella[c] and Wellington

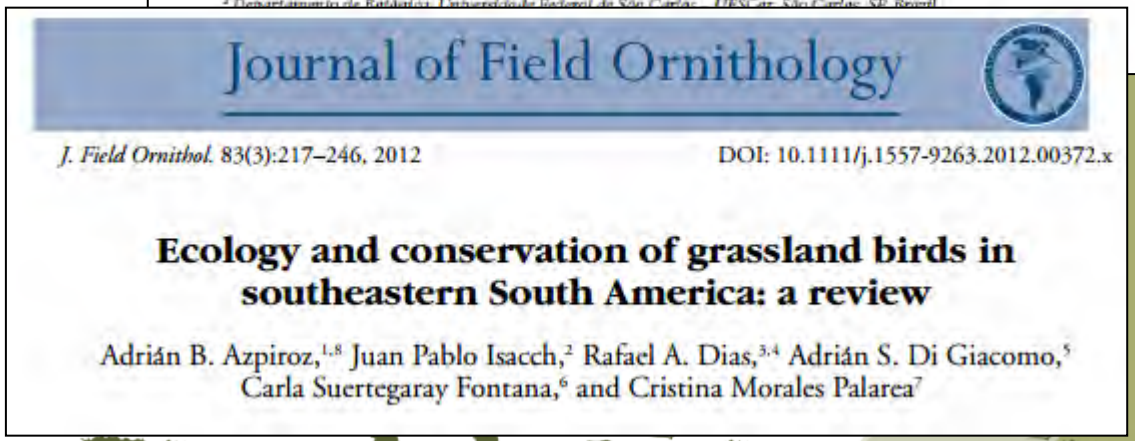
[a]*Laboratory*
Maria, Canto
Agostinho, 87
Ecologia e Co
Campo Grand
Aquidauana,

Natureza & Conservação

High Loss of Plant Phylogenetic and Functional Diversity Due to Simulated Extinctions of Pollinators and Seed Dispersers in a Tropical Savanna

Marcus V. Cianciaruso[1]*, Marco Antônio Batalha[2] & Owen L. Petchey[3]

[1] *Departamento de Ecologia, Instituto de Ciências Biológicas – ICB, Universidade Federal de Goiás – UFG, Goiânia, GO, Brazil*



Journal of Field Ornithology

J. Field Ornithol. 83(3):217–246, 2012 DOI: 10.1111/j.1557-9263.2012.00372.x

Ecology and conservation of grassland birds in southeastern South America: a review

Adrián B. Azpiroz,[1,8] Juan Pablo Isacch,[2] Rafael A. Dias,[3,4] Adrián S. Di Giacomo,[5] Carla Suertegaray Fontana,[6] and Cristina Morales Palarea[7]

Difficulties in assessments

Limitations

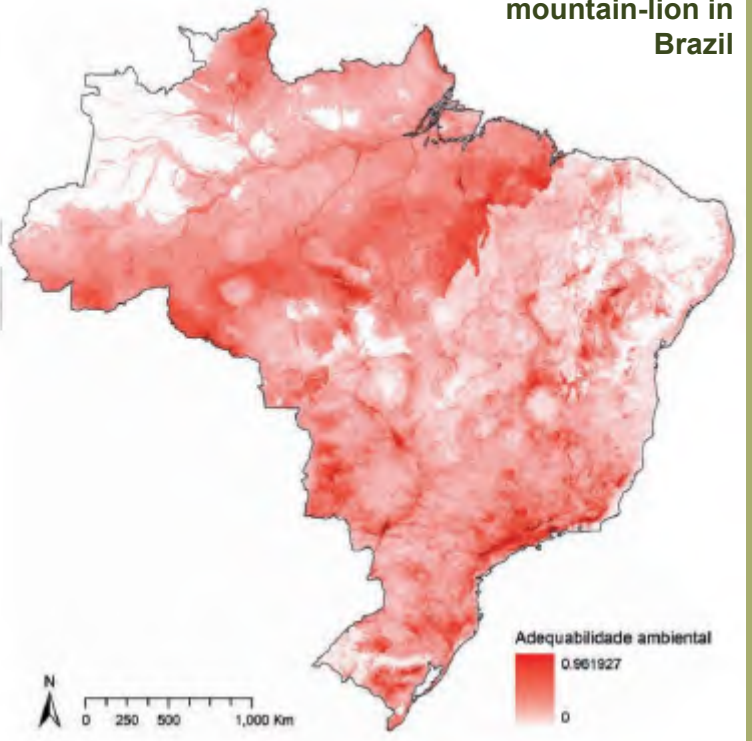
1. conceptual basis

2. technologic innovation

3. governance policies

‘new’ patterns
Species adaptation to anthropogenic areas

Map from National Conservation Plan to mountain-lion in Brazil



Difficulties in assessments

Limitations

1. conceptual basis
2. technologic innovation
3. governance policies

Sampling problems

different methods
abundance estimation

Methods in Ecology and Evolution

Methods in Ecology and Evolution 2012, **3**, 188–194 doi: 10.1111/j.2041-

When can we ignore the problem of imperfect detection in comparative studies?

Frédéric Archaux[1]*, Pierre-Yves Henry[2] and Olivier Gimenez[3]

[1]*Cemagref, Domaine des Barres, F-45290 Nogent sur Vernisson, France;* [2]*UMR 7204 & UMR 7179 Département Ecologie et Gestion de la Biodiversité, Muséum National d'Histoire Naturelle, 1 avenue teau, 91800 Brunoy, France; and* [3]*Centre d'Ecologie Fonctionnelle et Evolutive, UMR 5175, 1919 ro 34293 Montpellier Cedex 5, France*

error 4-8% → **50-90% erroneously concludings**

Analysis improvement

molecular biology
georreference information systems (GIS)

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Difficulties in assessments

Limitations

1. conceptual basis
2. technologic innovation
3. governance policies

control & surveillance

management directives

Concludings

Management priorities

1. Reduce impacts

2. Increase productivity of agricultural areas

Recommendations

Grassland & Forest Restoration

Is it possible?

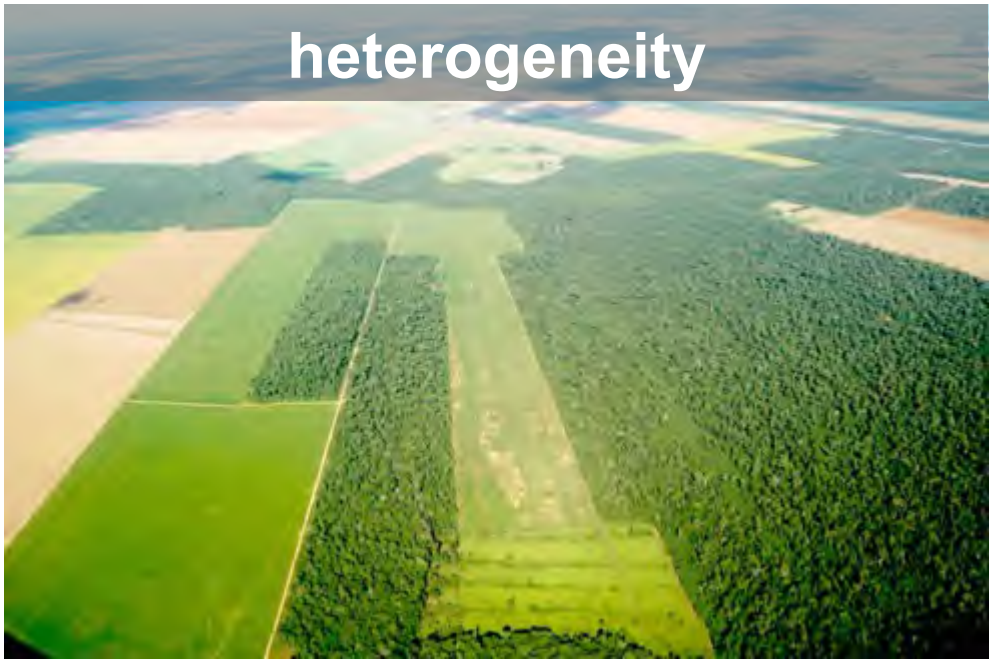
Recommendations

Grassland & Forest Restoration

yes!

Recommendations

Landscape Planning



Recommendations

Landscape Planning

good landscape – habitat > 50%
few fragments

Recommendations

Landscape Planning

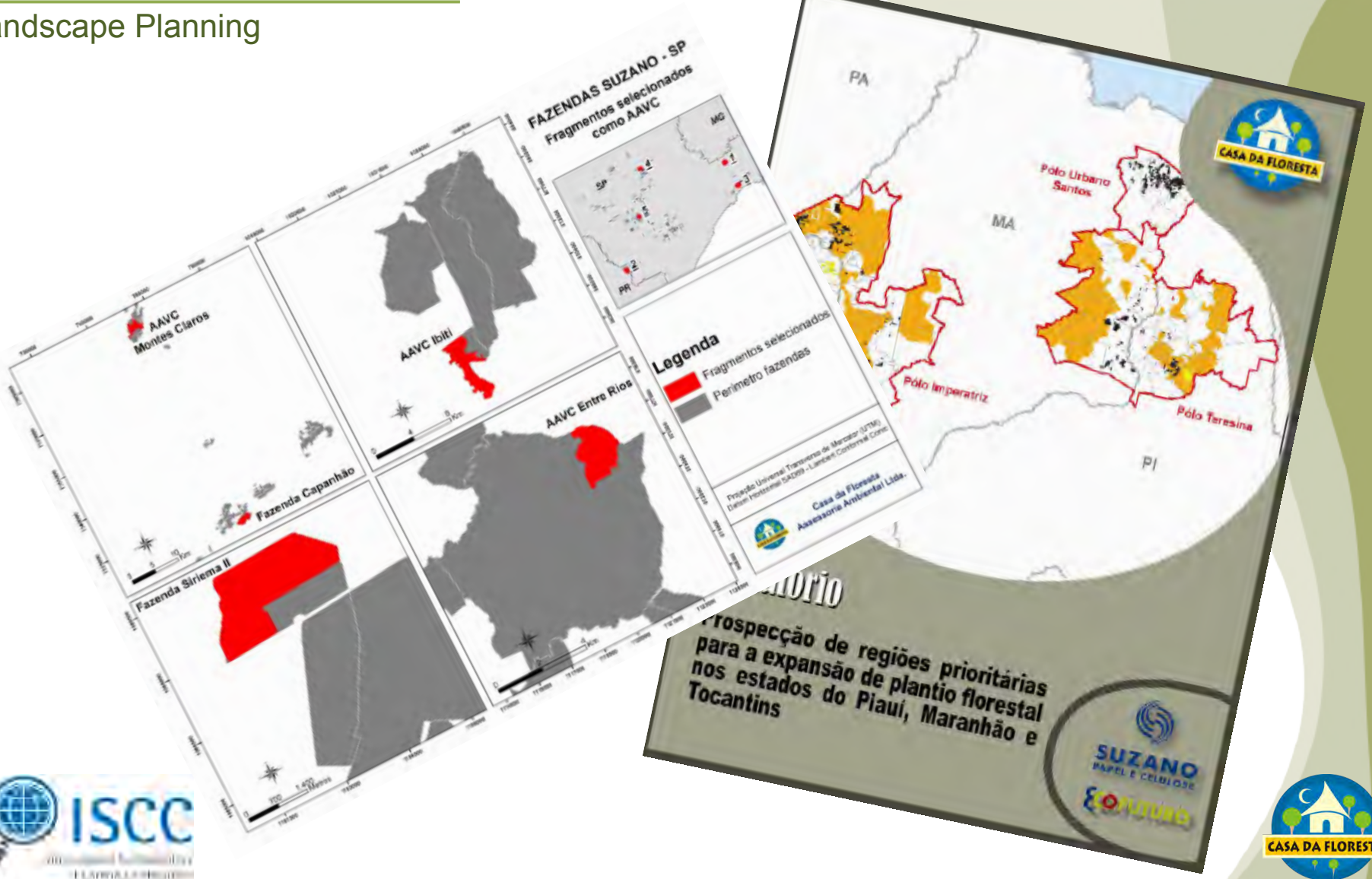
fragmentation

Recommendations

Landscape Planning

Recommendations

Landscape Planning



Thanks to you!

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