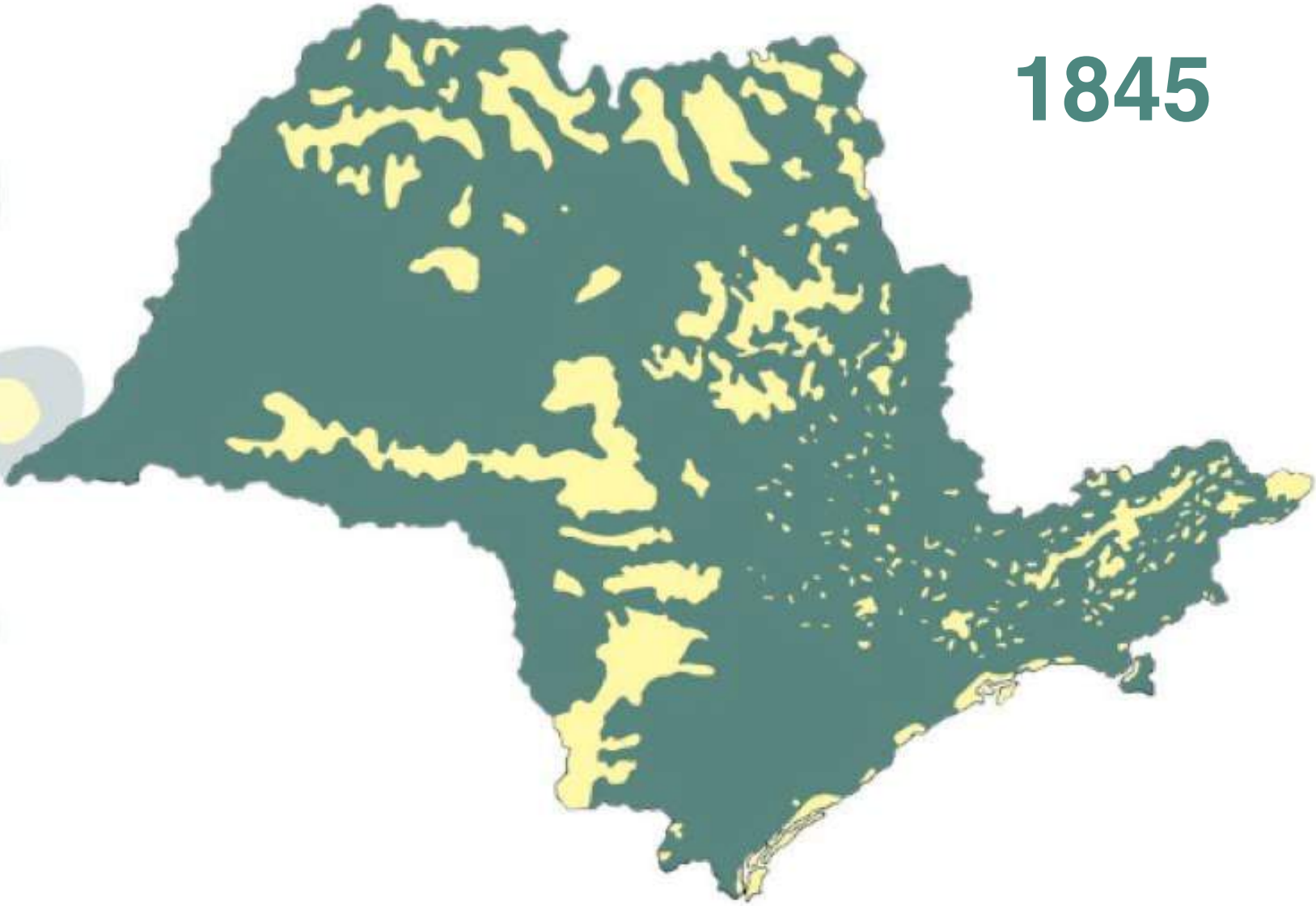
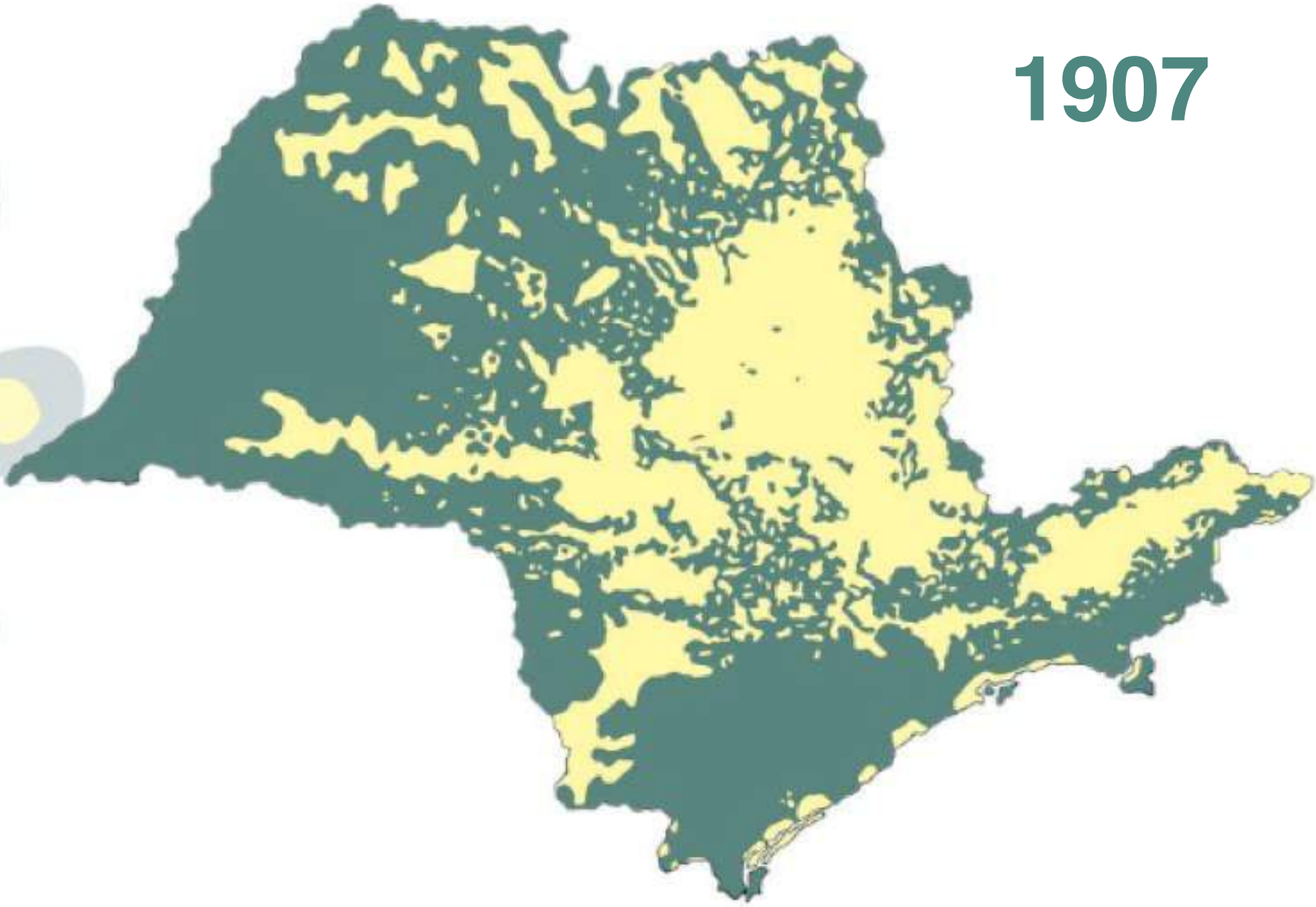
The Atlantic Forest

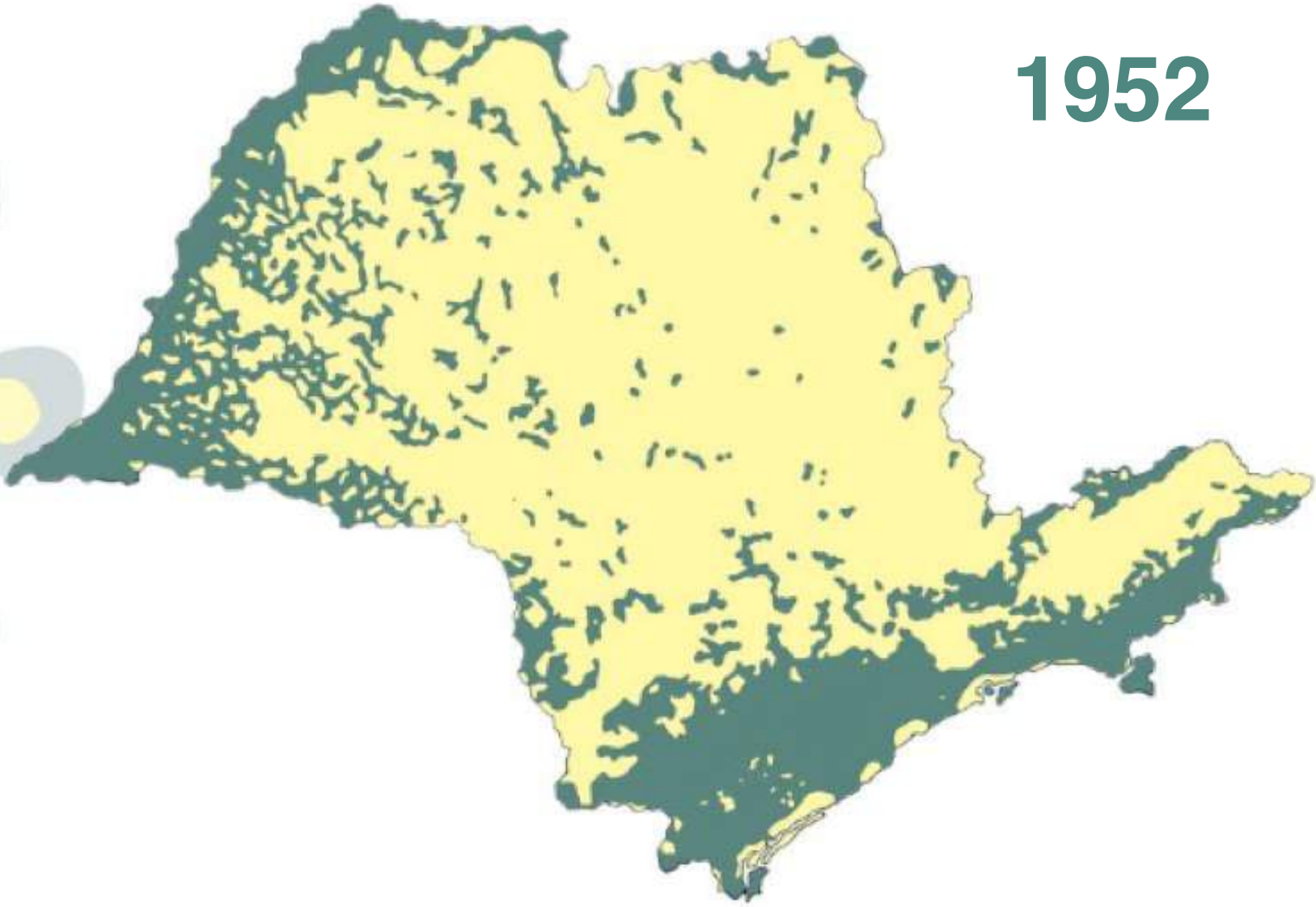
1500

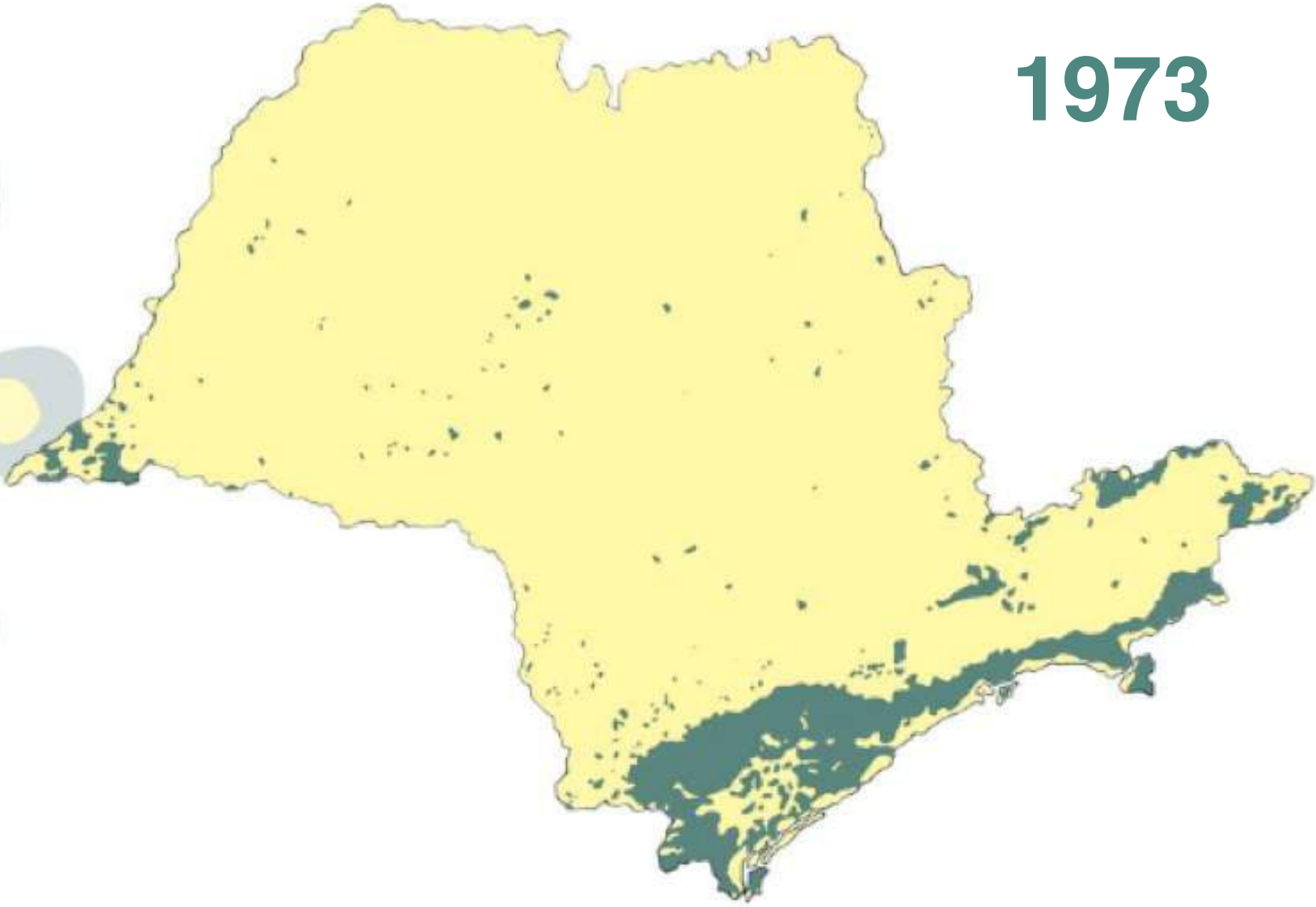


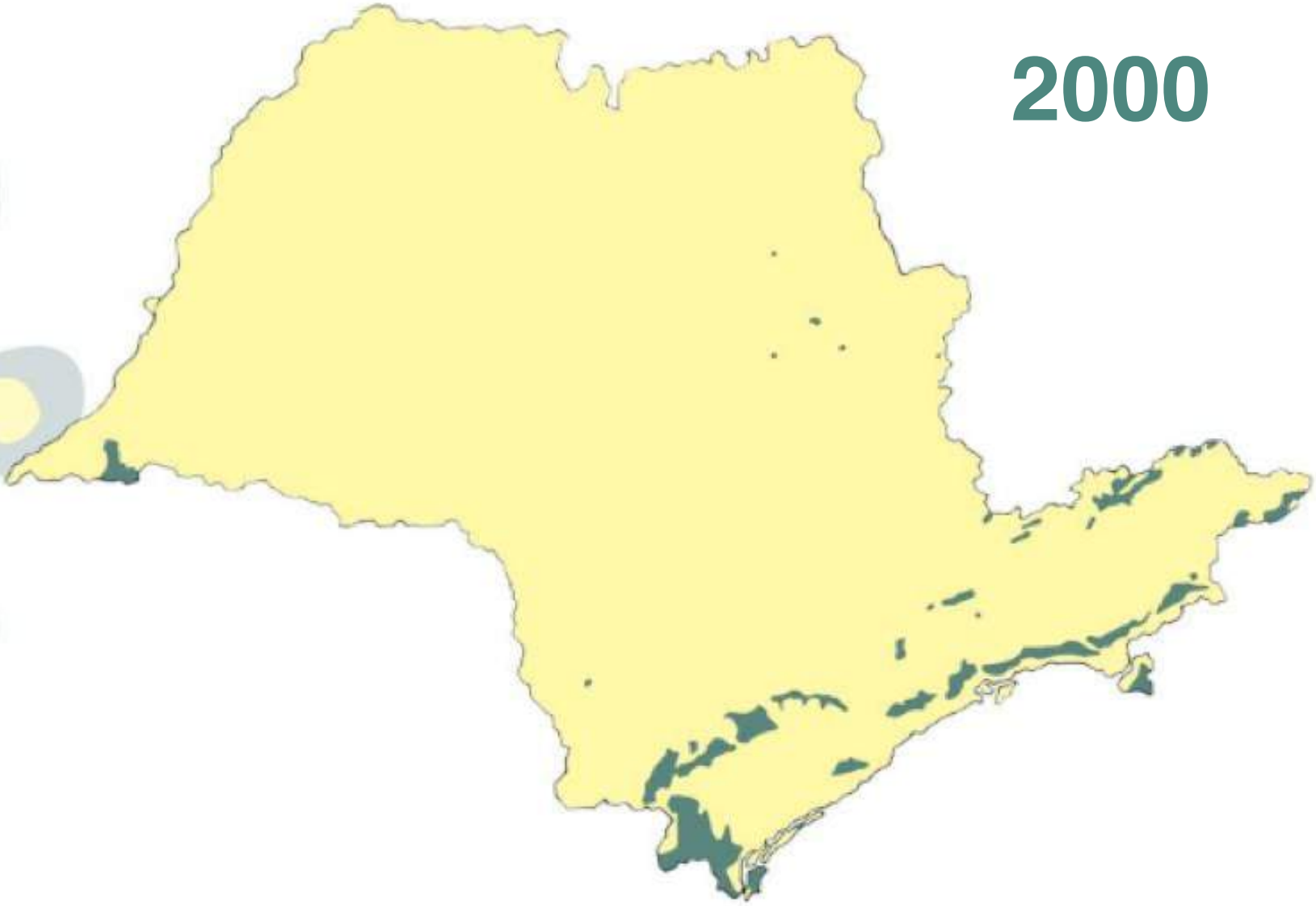
1845



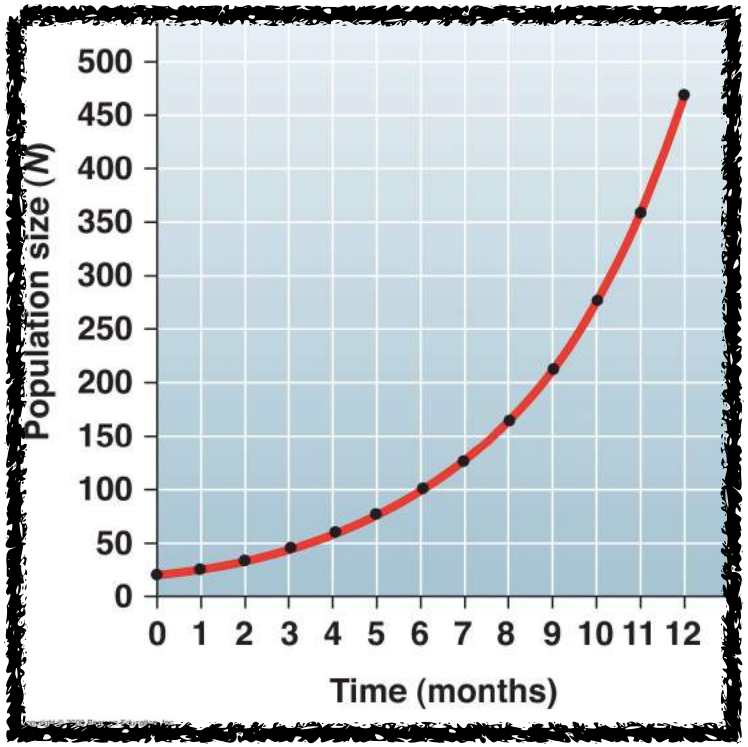
1907


1952

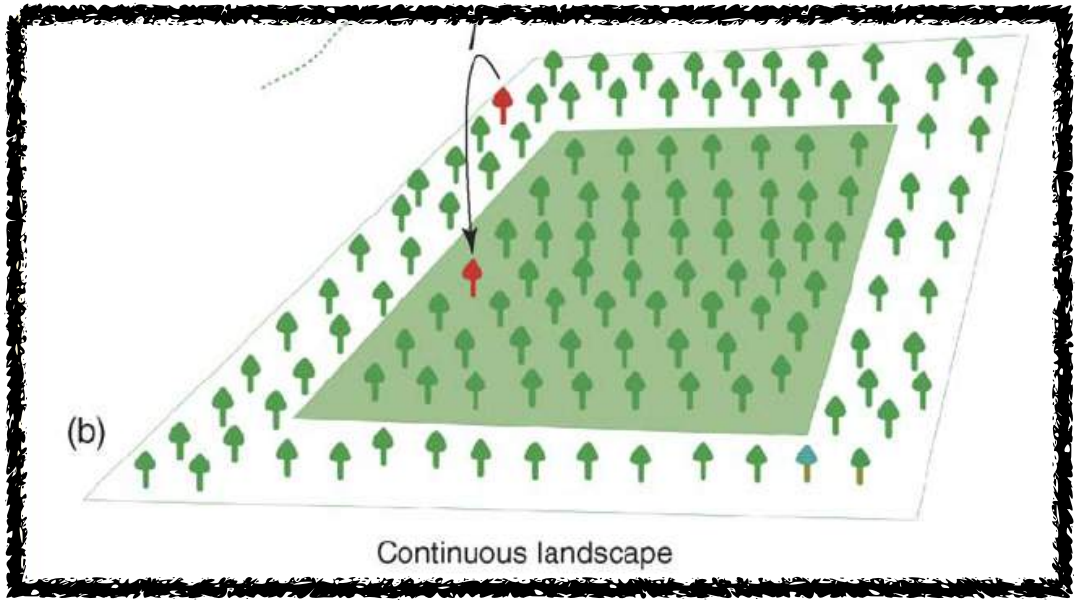

1973


2000


Uberaba
Colômbia
Ribeirão Preto
Barretos
São Sebastião do Paraíso
Andradina
Mirassol
Rio Preto
Ribeirão Preto
Panorama
Araçatuba
Guaiapará
Guaxupé
Presidente Epitácio
Matão
S. Simão
Mococa
Quintana
Araraquara
Casa Branca
Poços de Caldas
Bauru
Jaú
Presidente Prudente
Marília
Brotas
Mogi-Mirim
Assis
Ourinhos
Lençóis
Piracicaba
Americana
Cachoeira
Botucatu
Campinas
Bragança
Cerqueira César
Avaré
Capivari
Jundiaí
Laranjal
Itu
Taubaté
Jacareí
Sorocaba
São Paulo
Mairinque
Itapetininga
Santos
Itararé
Juquiá
São Paulo-Rio
Cia. Mogiana
Sorocabana
São Paulo Railway
Cia. Paulista
Noroeste do Brasil
Araraquara
São Paulo-Minas


Population size (N)
500
450
400
350
300
250
200
150
100
50
0
0 1 2 3 4 5 6 7 8 9 10 11 12
Time (months)


French Roulette
APRIL 2007


(b)
Continuous landscape

Conservação de comunidades

Paulo R. Guimarães Jr (Miúdo)

www.guimaraes.bio.br

Conservação de comunidades ecológicas

1. Definição e motivos
2. A dinâmica da destruição
3. Estados estáveis alternativos
4. Resumo
5. Sugestão de leitura

Ao final da aula, nós deveremos saber:

1. os diferentes motivos para conservar a biodiversidade
2. como comunidades são atingidas pelas ameaças `a diversidade
3. o que são estados estáveis alternativos

Conservação de comunidades ecológicas

1. **Definição e motivos**
2. A dinâmica da destruição
3. Estados estáveis alternativos
4. Resumo
5. Sugestão de leitura

Definição

Conservation biology is defined as a “mission-oriented crisis discipline” studying the nature and status of Earth’s biodiversity, with the aim to understand, protect, and perpetuate biological diversity at all scales and all levels of biological organization.

Definição

Conservation biology is defined as a "**mission-oriented crisis discipline**" studying the nature and status of Earth's biodiversity, with the aim to understand, protect, and perpetuate biological diversity at all scales and all levels of biological organization.


Premissa: a biodiversidade tem
um valor e deve ser protegida

Definição

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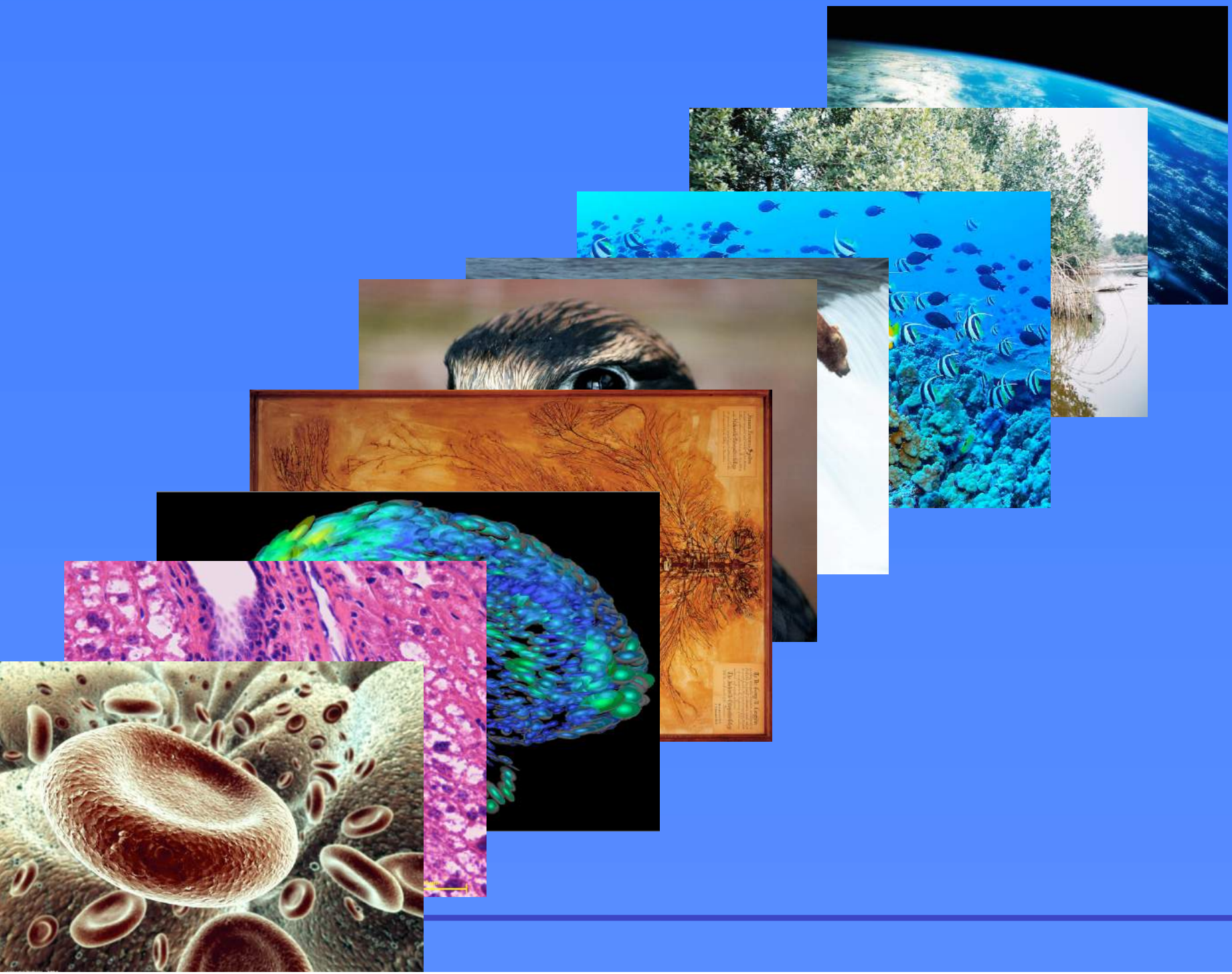
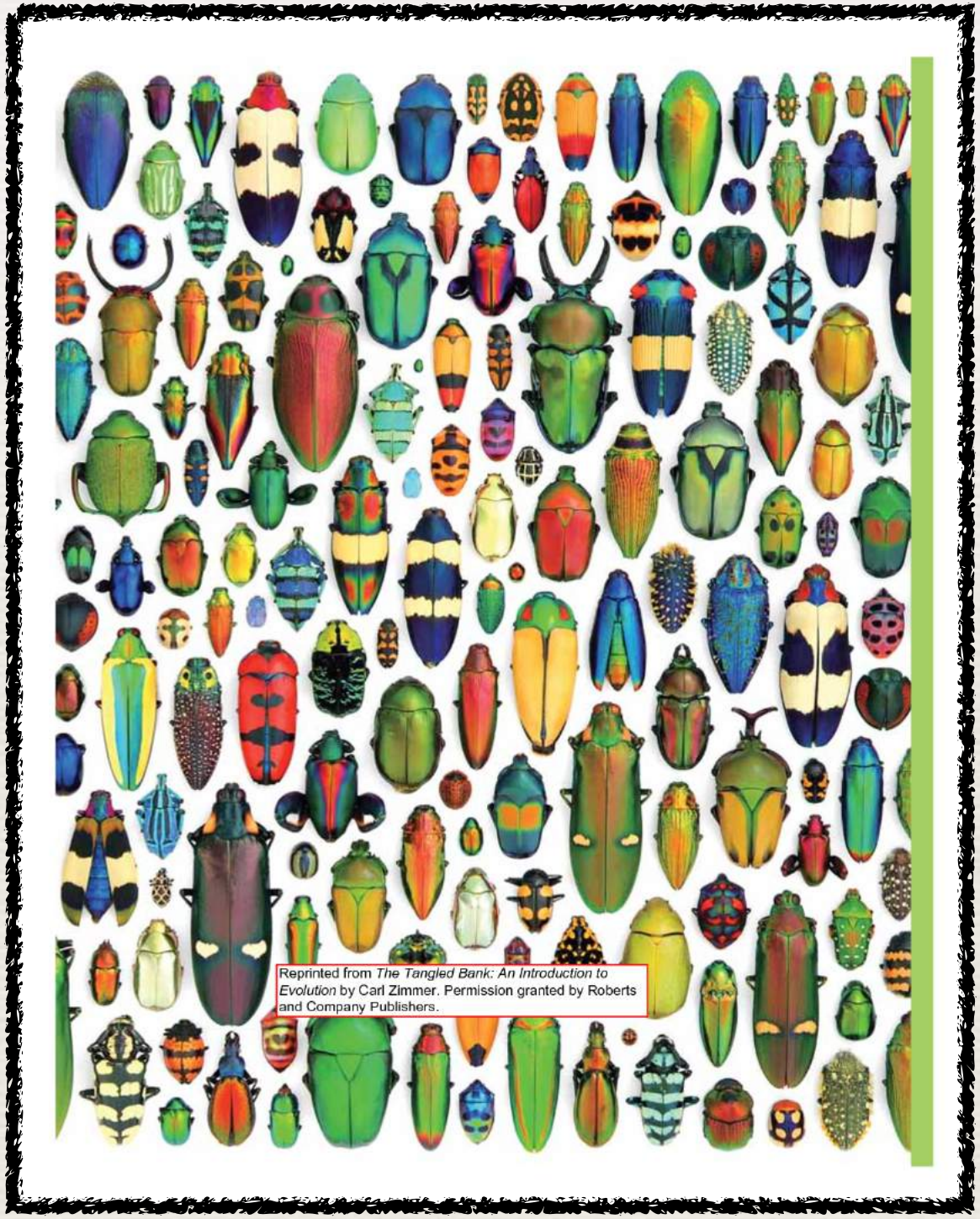
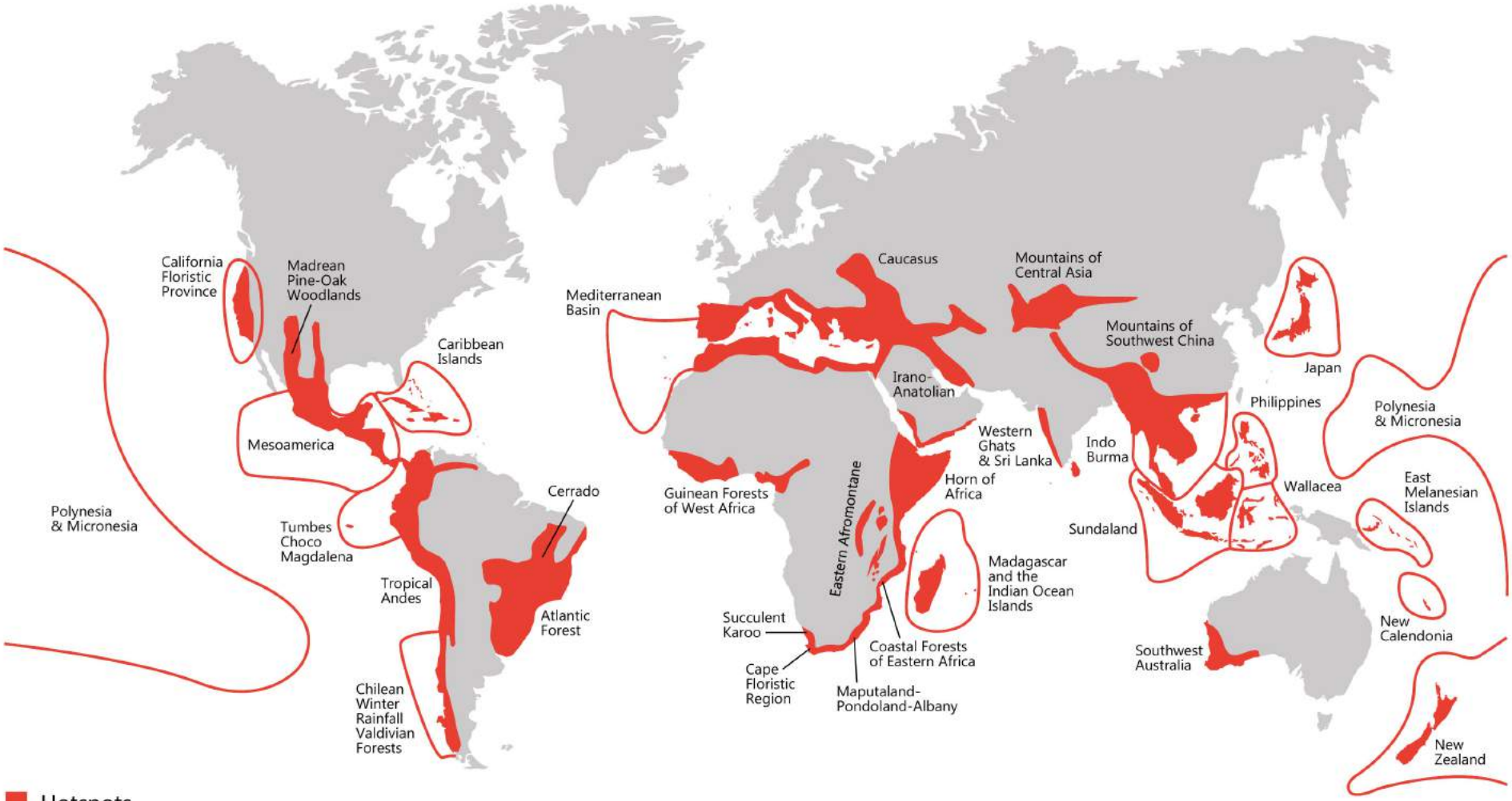



ONE HUNDRED DOLLARS
100


POLITICIAN



CONSERVATION INTERNATIONAL

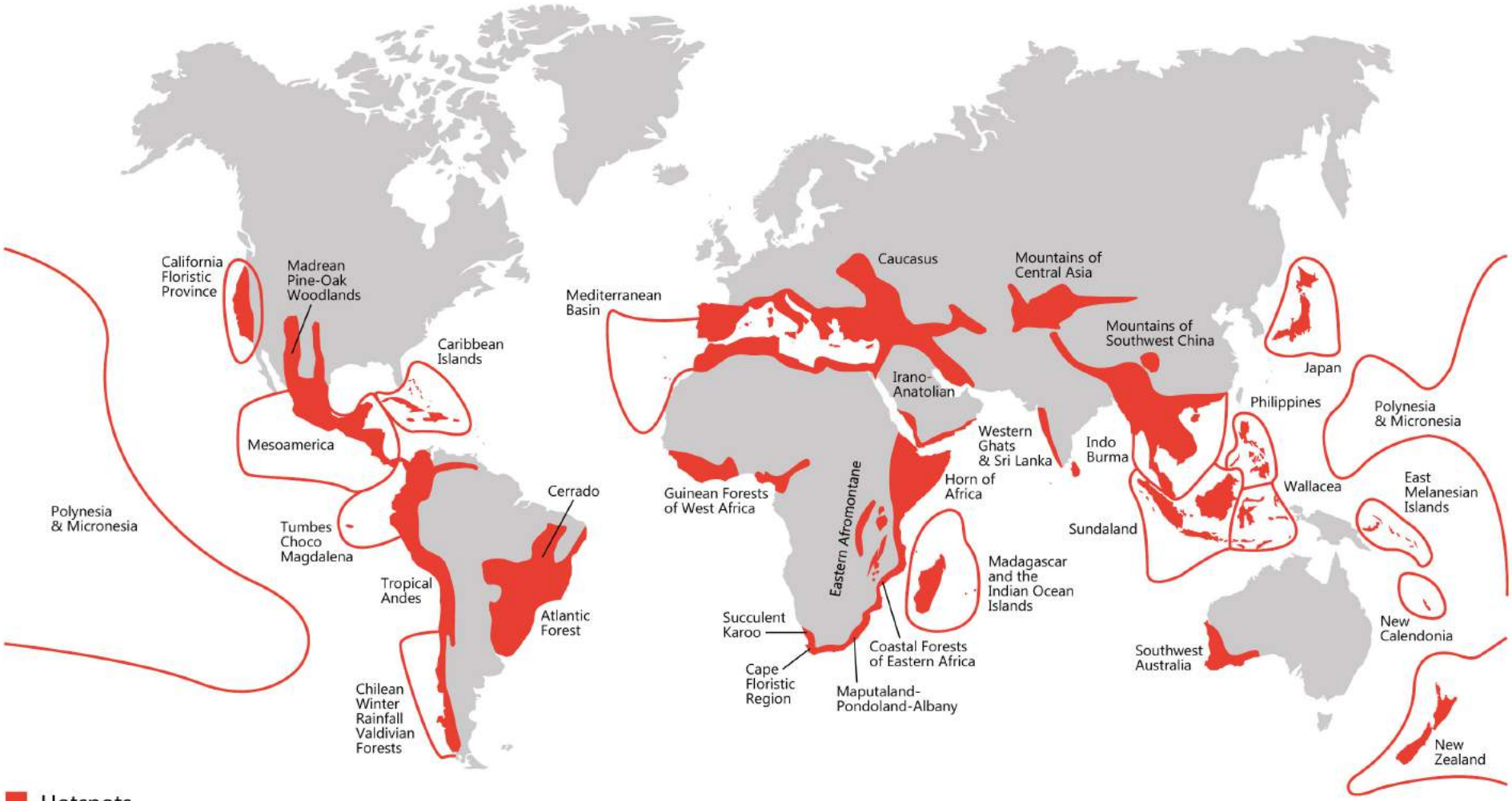


Hotspots

February 2005

CONSERVATION INTERNATIONAL

1,4% da área do planeta



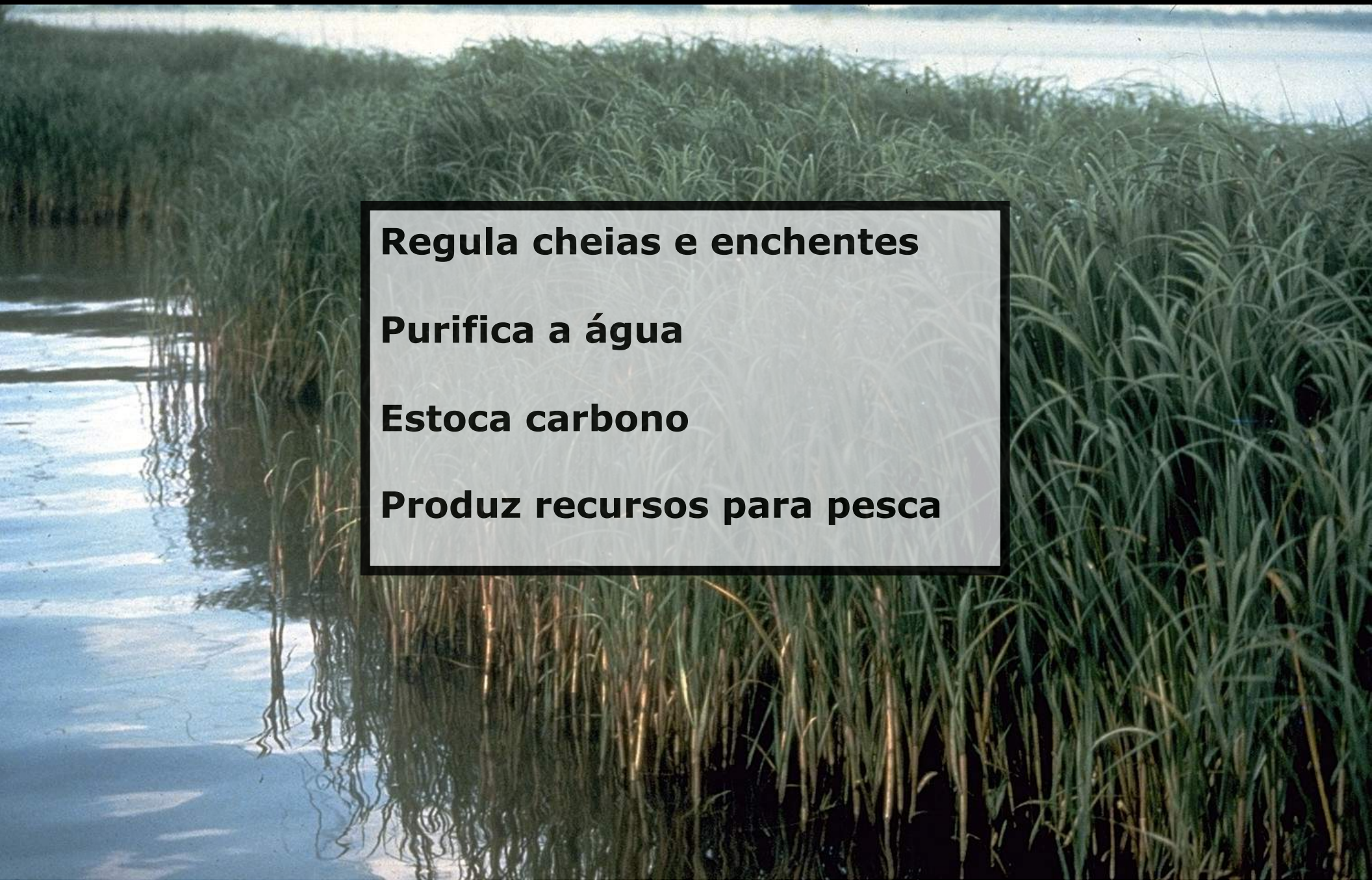
CONSERVATION INTERNATIONAL

1,4% da área do planeta

44% das plantas vasculares

Charcos na costa - sem endemismos - < 30 espécies

Charcos na costa - sem endemismos - < 30 espécies

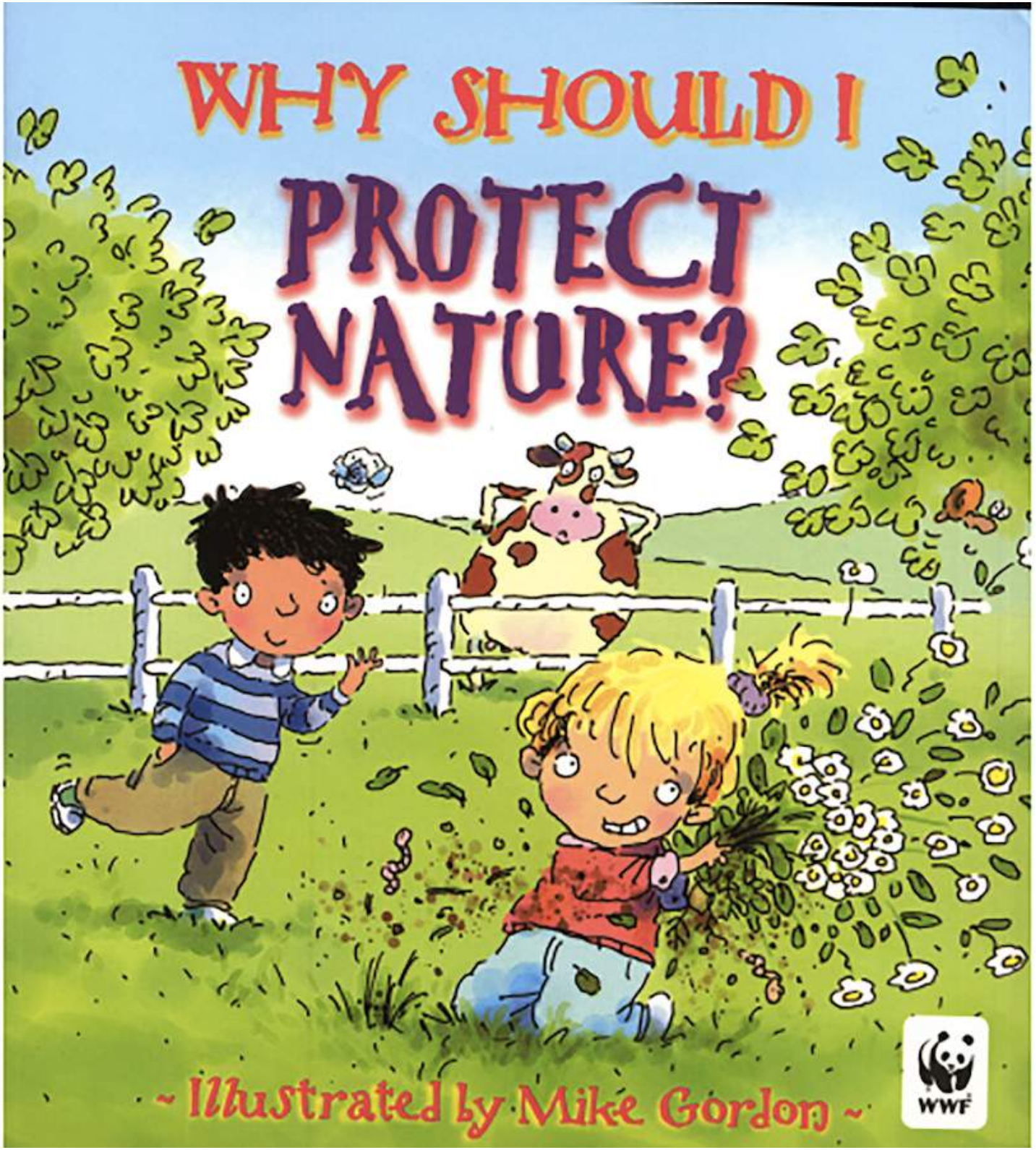


Regula cheias e enchentes

Purifica a água

Estoca carbono

Produz recursos para pesca


WHY SHOULD I
PROTECT
NATURE?
~ Illustrated by Mike Gordon ~
WWF


Premissa: a biodiversidade tem
um valor e deve ser protegida

Serviços ecossistêmicos

The essential goods and services, including food, medicine, building materials, clean water and flood control, that ecosystems provide to humanity (Daily, 1997).

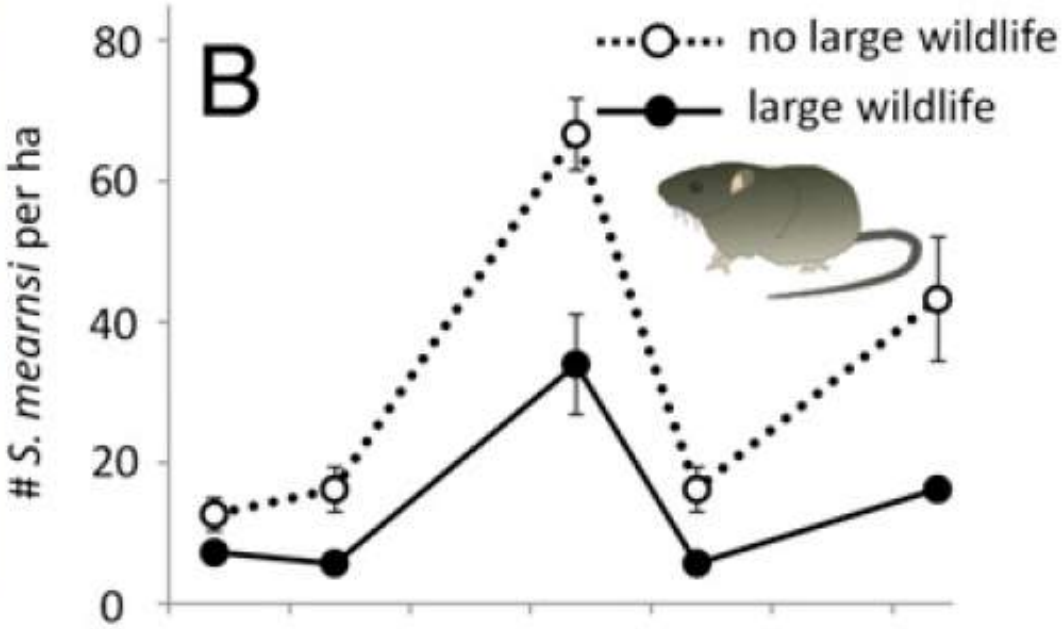
Serviços ecossistêmicos

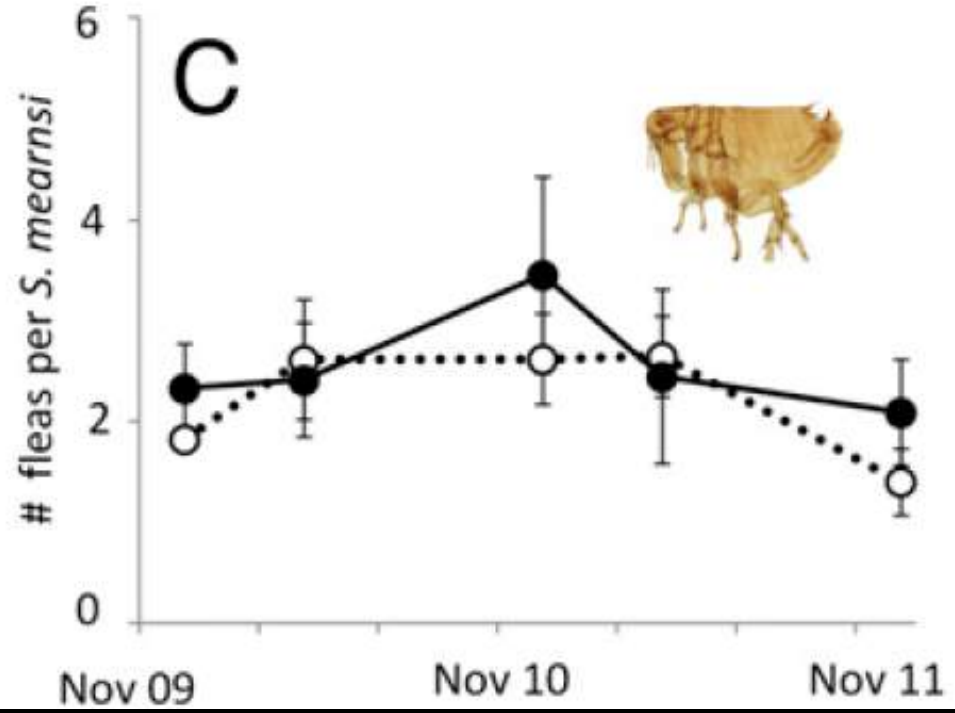
1. **Culturais e religiosos**

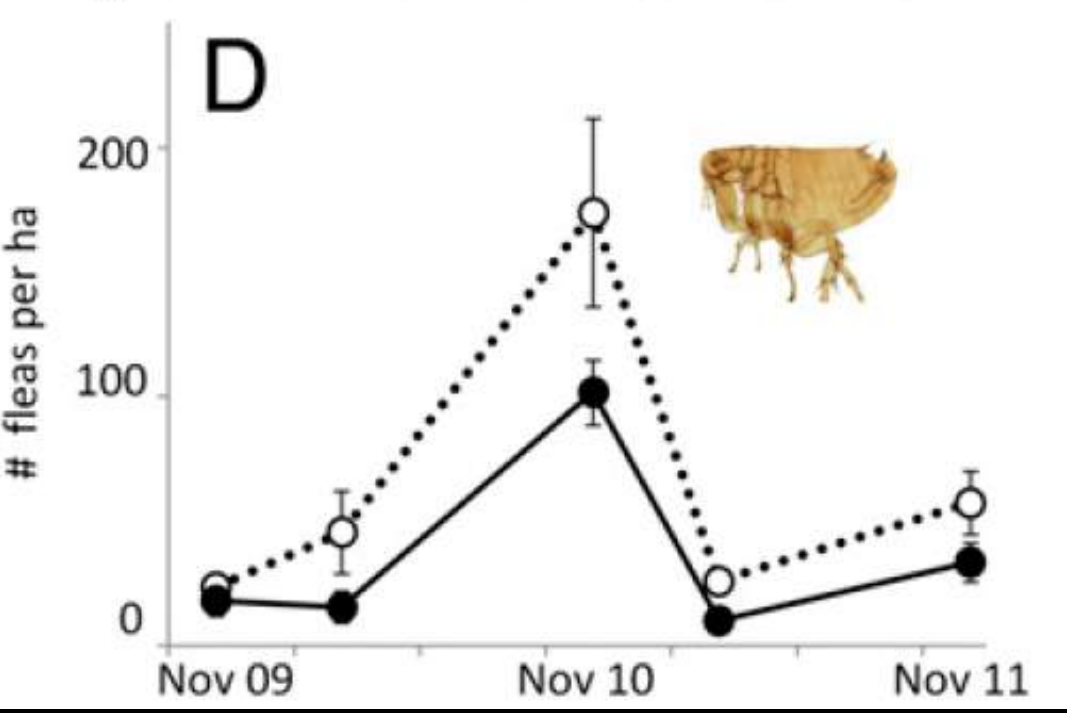
Serviços ecossistêmicos

1. Culturais e religiosos
2. **Reguladores**


A

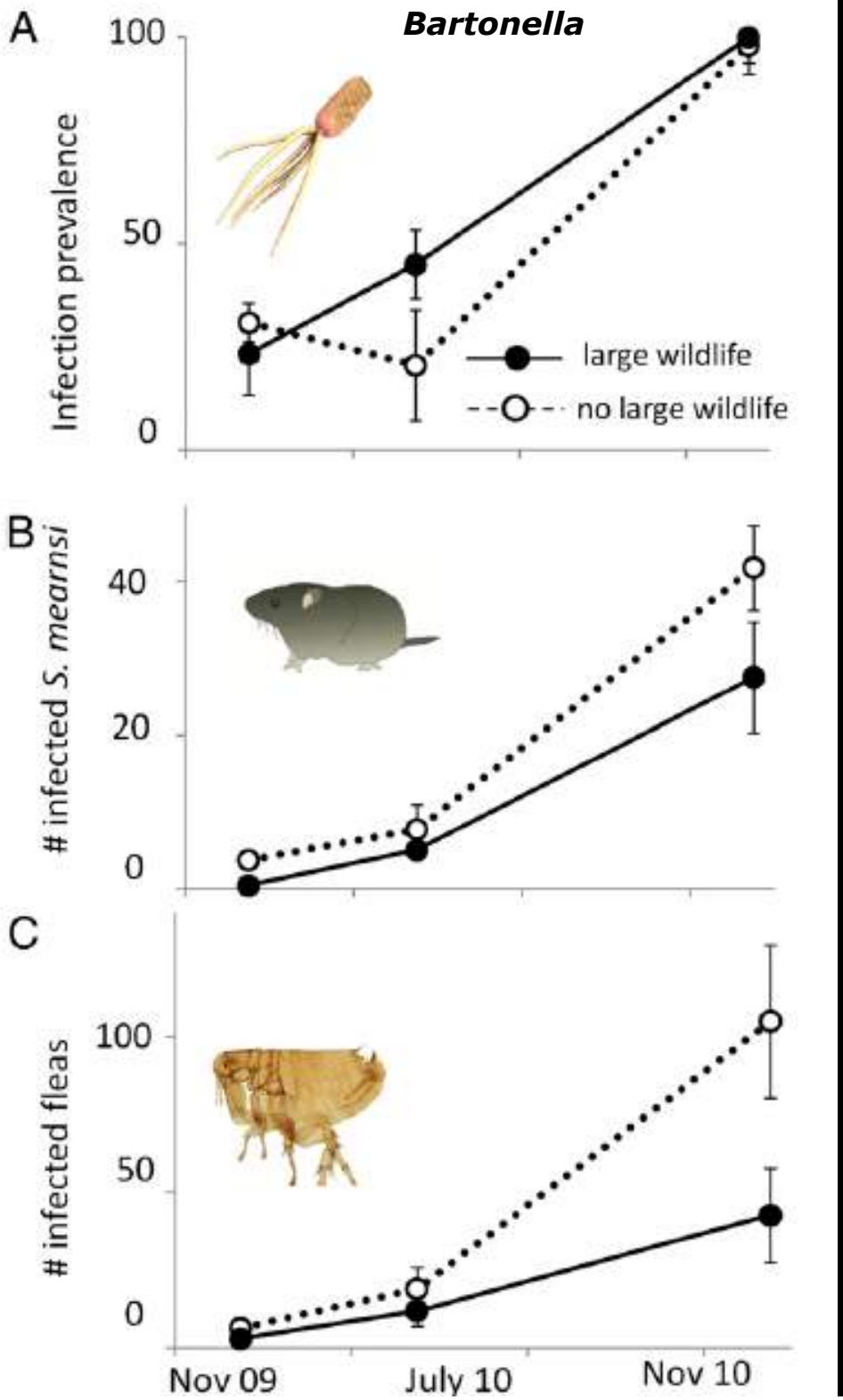

B
no large wildlife
large wildlife
S. mearnsi per ha
80
60
40
20
0


C
fleas per S. mearnsi
6
4
2
0
Nov 09
Nov 10
Nov 11


D
fleas per ha
200
100
0
Nov 09
Nov 10
Nov 11

H. S. Young

Rodolfo Dirzo

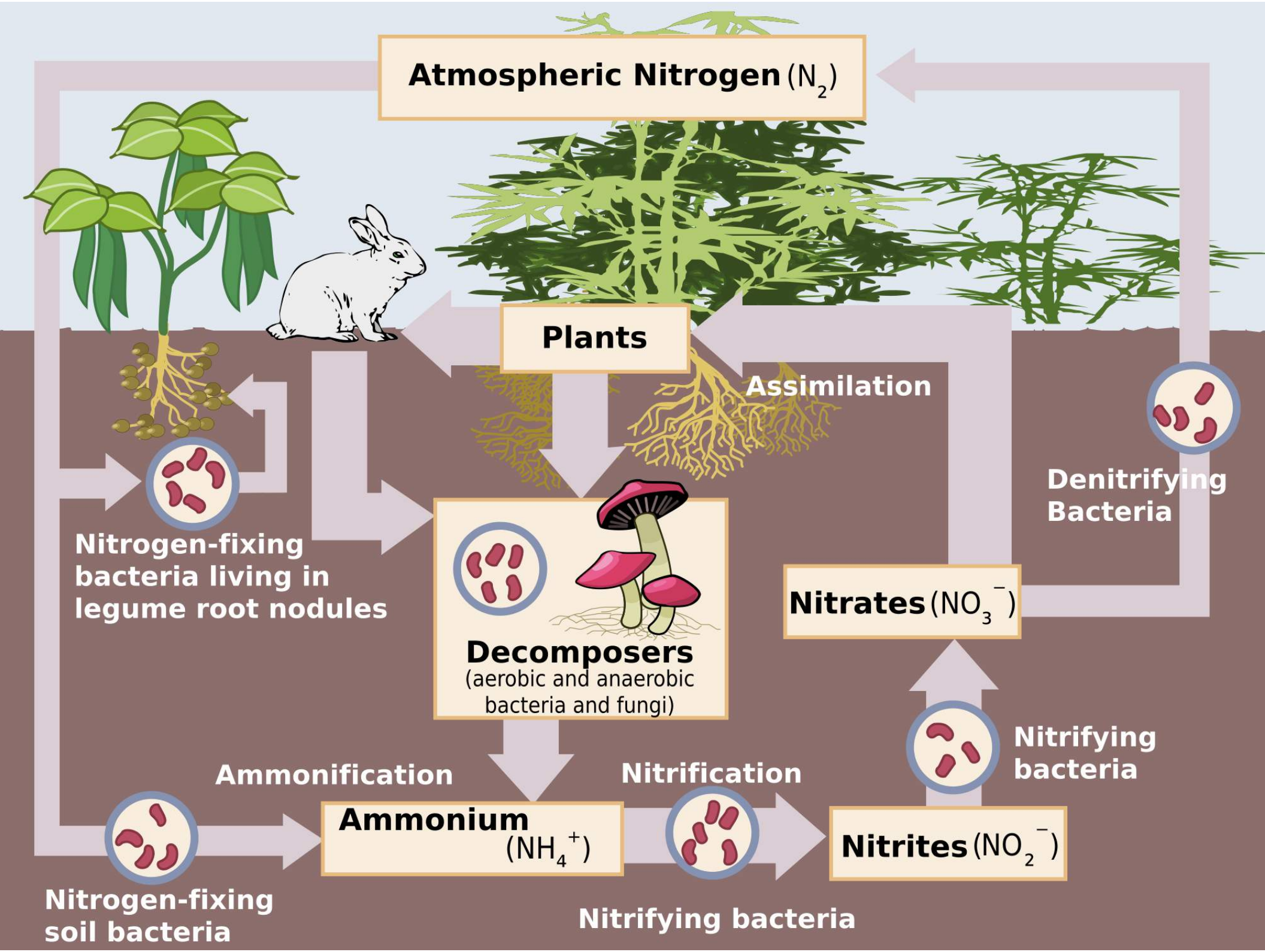


Serviços ecossistêmicos

1. Culturais e religiosos
2. Reguladores
3. **De fornecimento**

Serviços ecossistêmicos

1. Culturais e religiosos
2. Reguladores
3. De fornecimento
4. **De apoio**

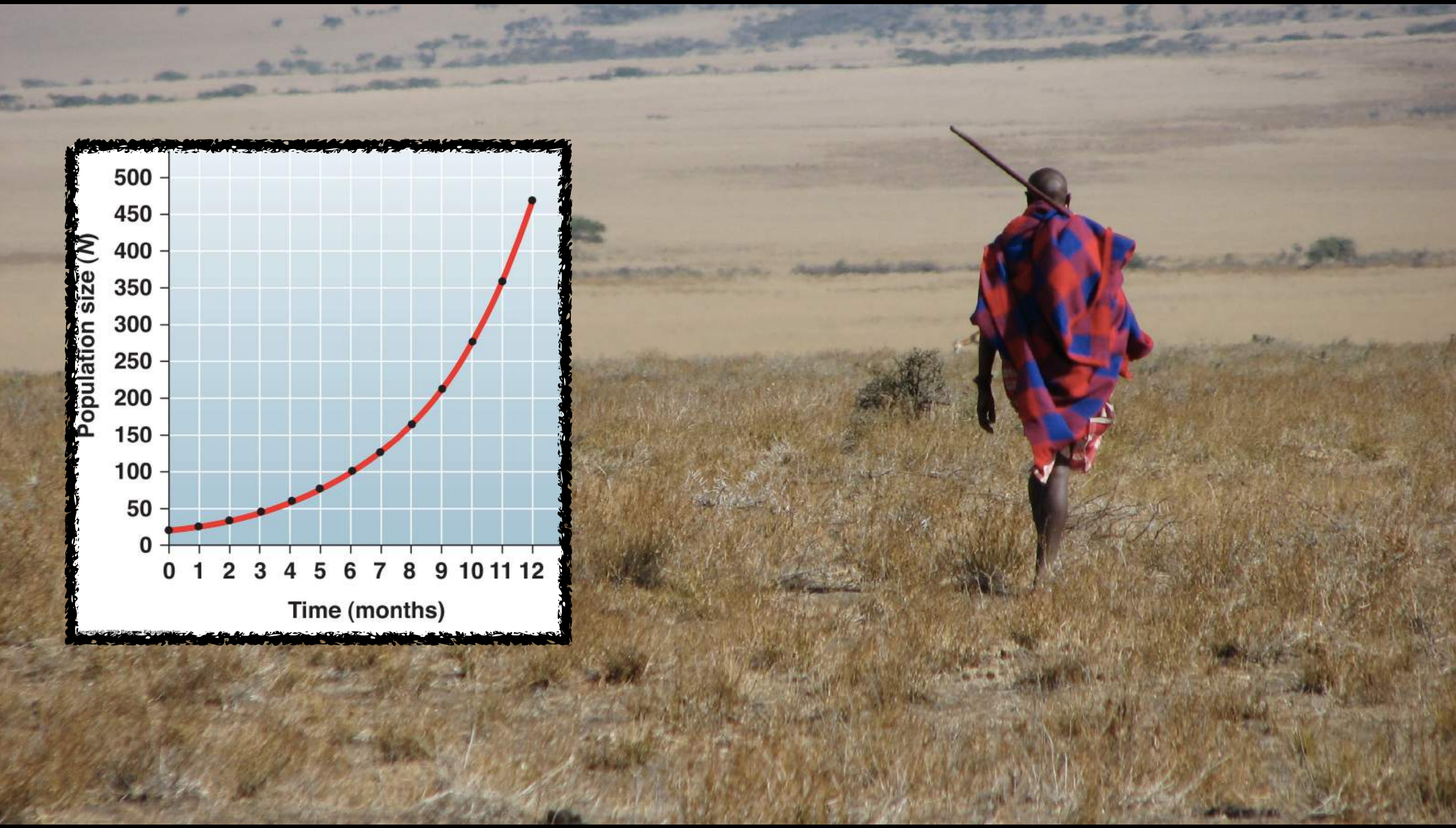

Atmospheric Nitrogen (N_2)
Plants
Assimilation
Denitrifying Bacteria
Nitrogen-fixing bacteria living in legume root nodules
Decomposers
(aerobic and anaerobic bacteria and fungi)
Nitrates (NO_3^-)
Nitrifying bacteria
Ammonification
Nitrification
Ammonium (NH_4^+)
Nitrites (NO_2^-)
Nitrogen-fixing soil bacteria
Nitrifying bacteria

Conservação de comunidades ecológicas

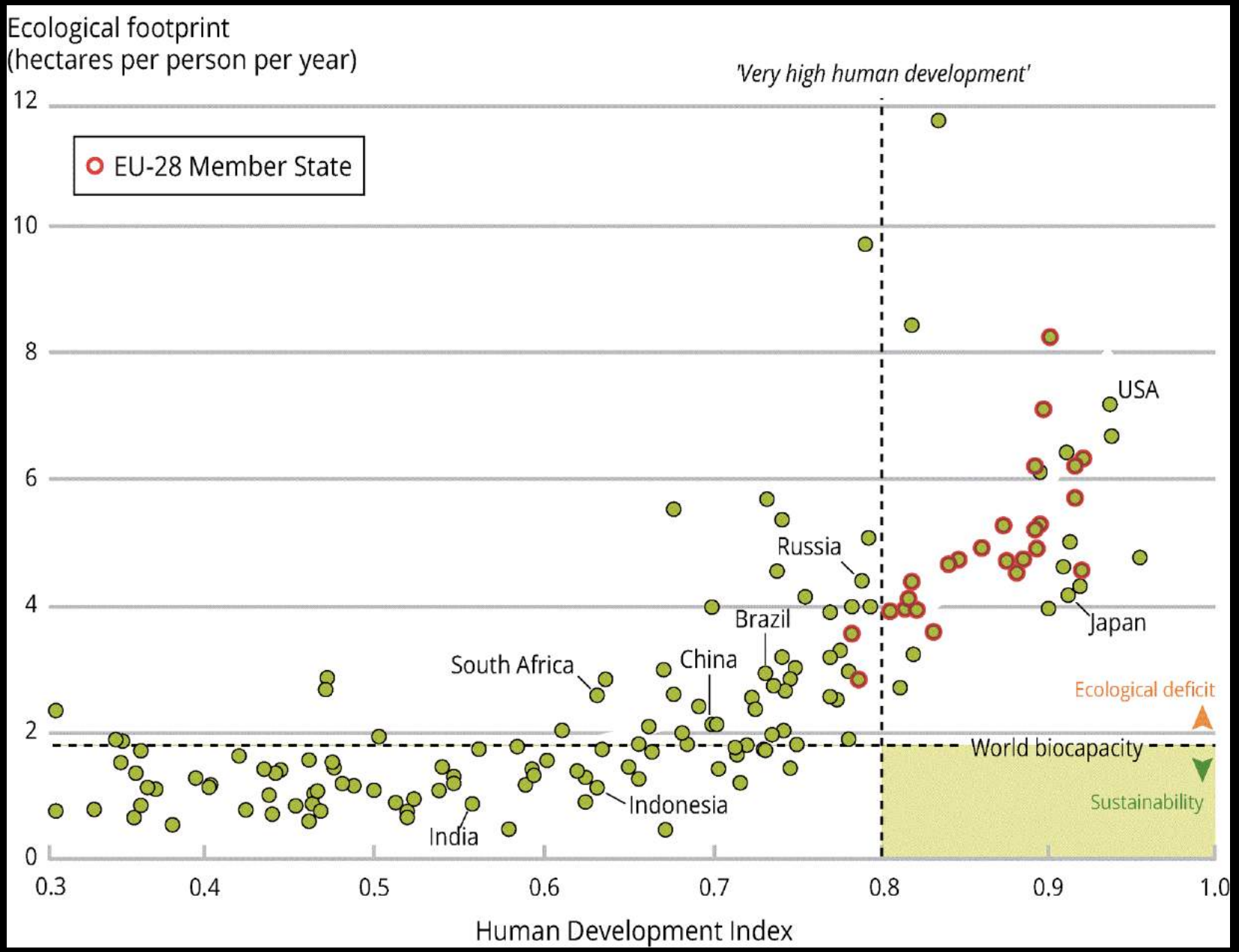
1. Definição, motivos e o que já aprendemos
2. **A dinâmica da destruição**
3. Estados estáveis alternativos
4. Resumo
5. Sugestão de leitura

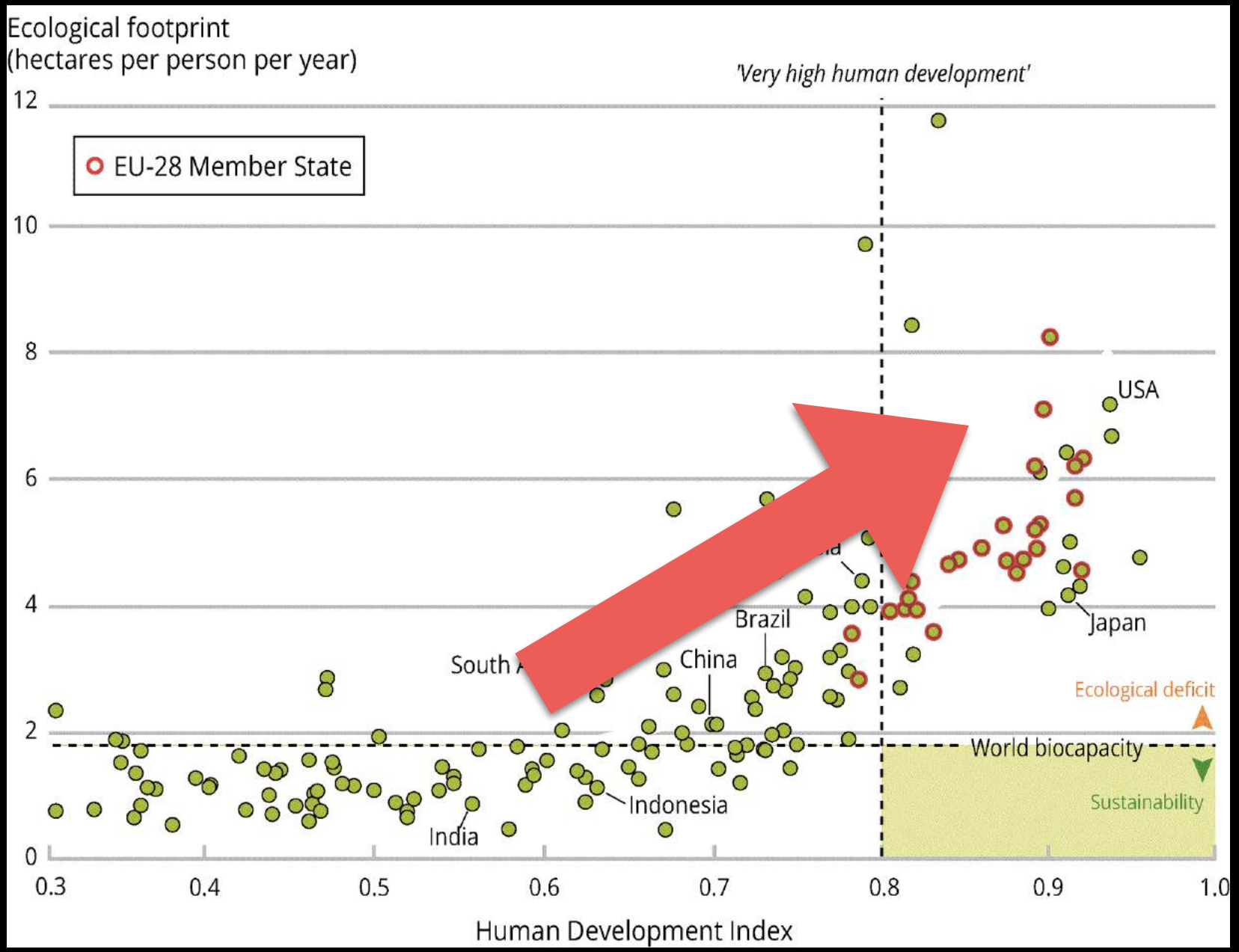
As ameaças à diversidade

1. **Crescimento populacional humano**


Population size (N)
500
450
400
350
300
250
200
150
100
50
0
0 1 2 3 4 5 6 7 8 9 10 11 12
Time (months)


50 million tonnes of carbon dioxide
8 million tonnes of sewage sludge
2 million tonnes of wood products
730,000 tonnes of vegetables
36 million tonnes of building materials
18 million tonnes of waste
London


Ecological footprint
(hectares per person per year)
'Very high human development'
EU-28 Member State
12
10
8
6
4
2
0
USA
Russia
Brazil
Japan
China
South Africa
India
Indonesia
Ecological deficit
World biocapacity
Sustainability
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Human Development Index


Ecological footprint
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Ecological deficit
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0.3
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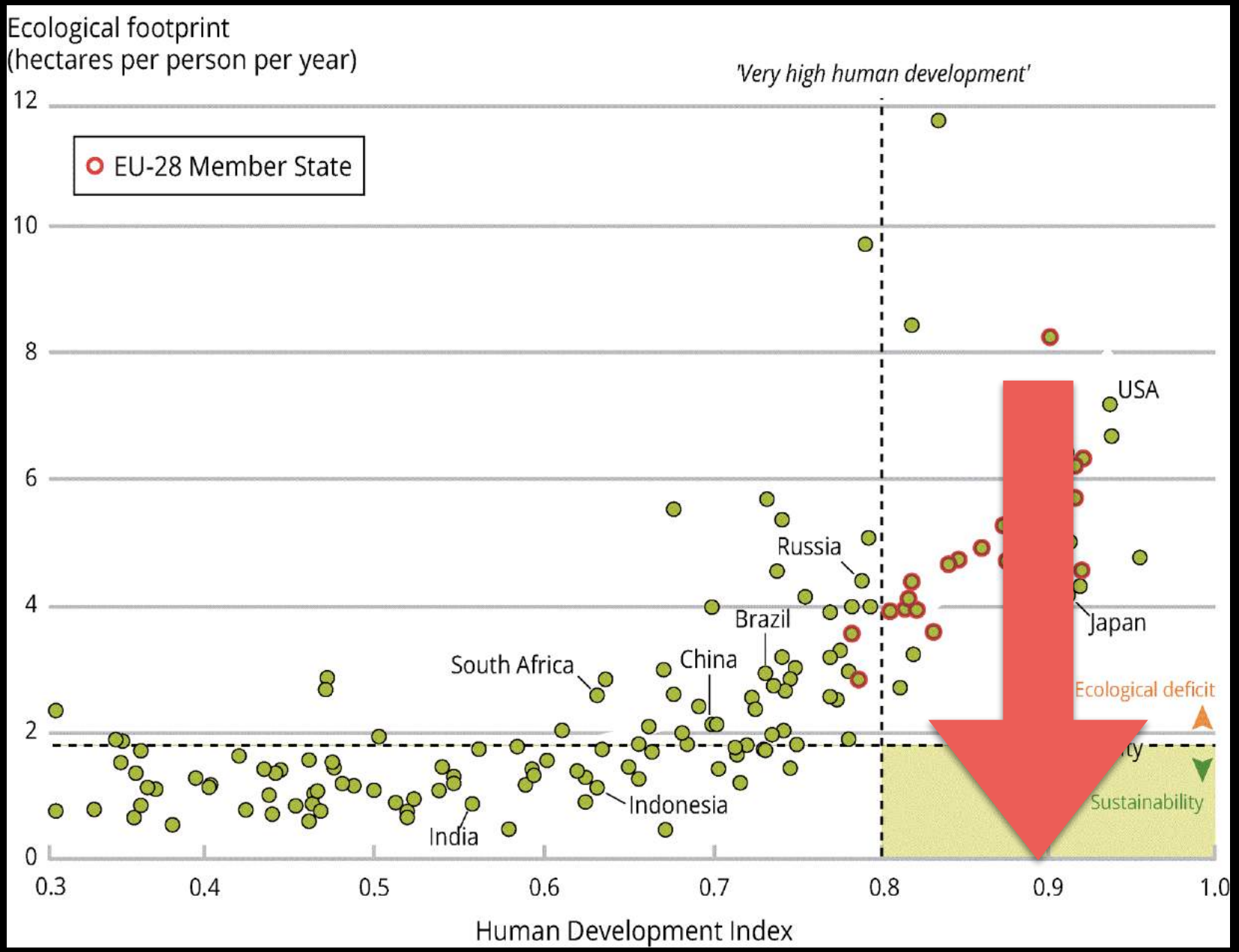
Human Development Index


Ecological footprint
(hectares per person per year)
'Very high human development'
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12
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0
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Japan
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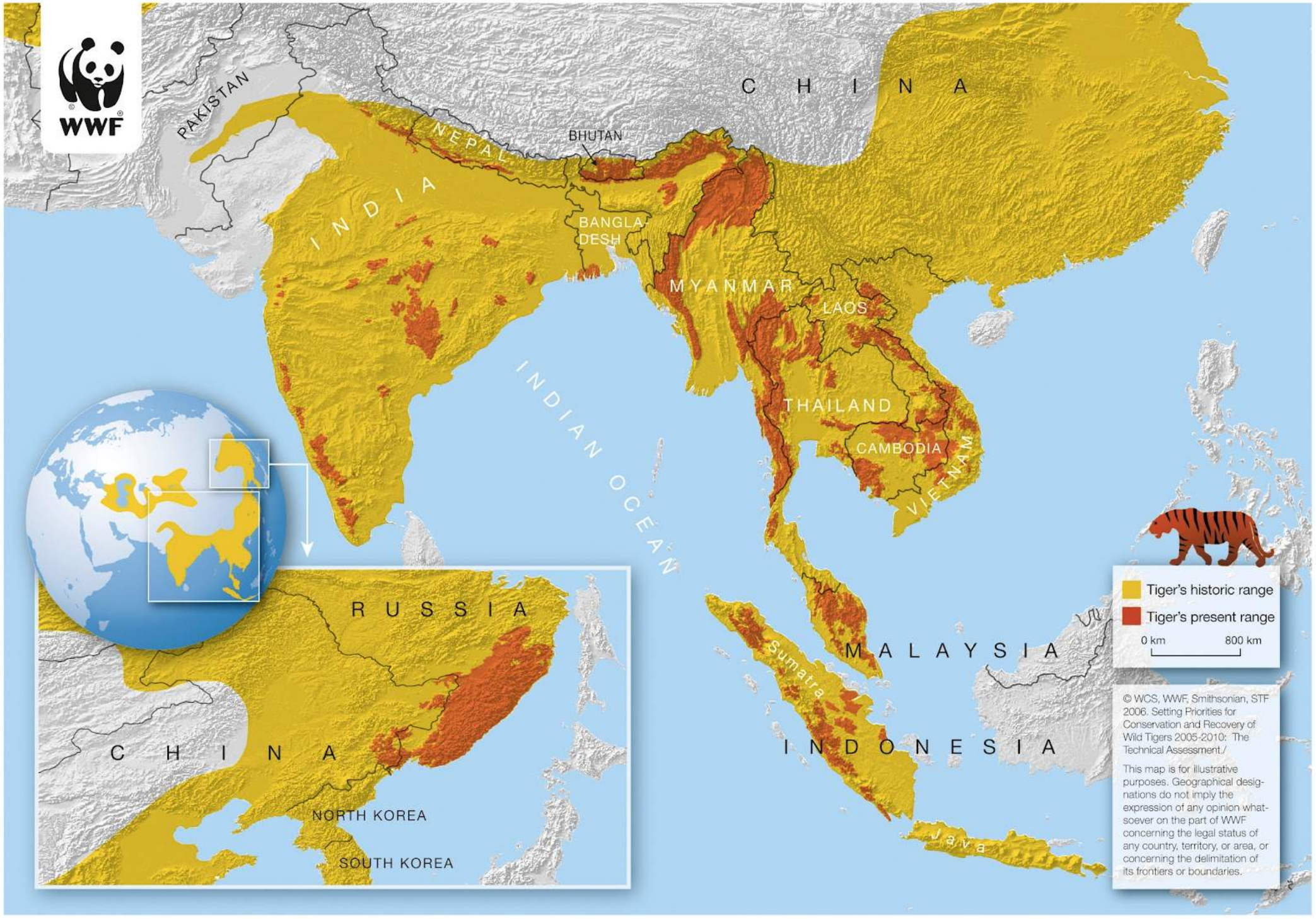
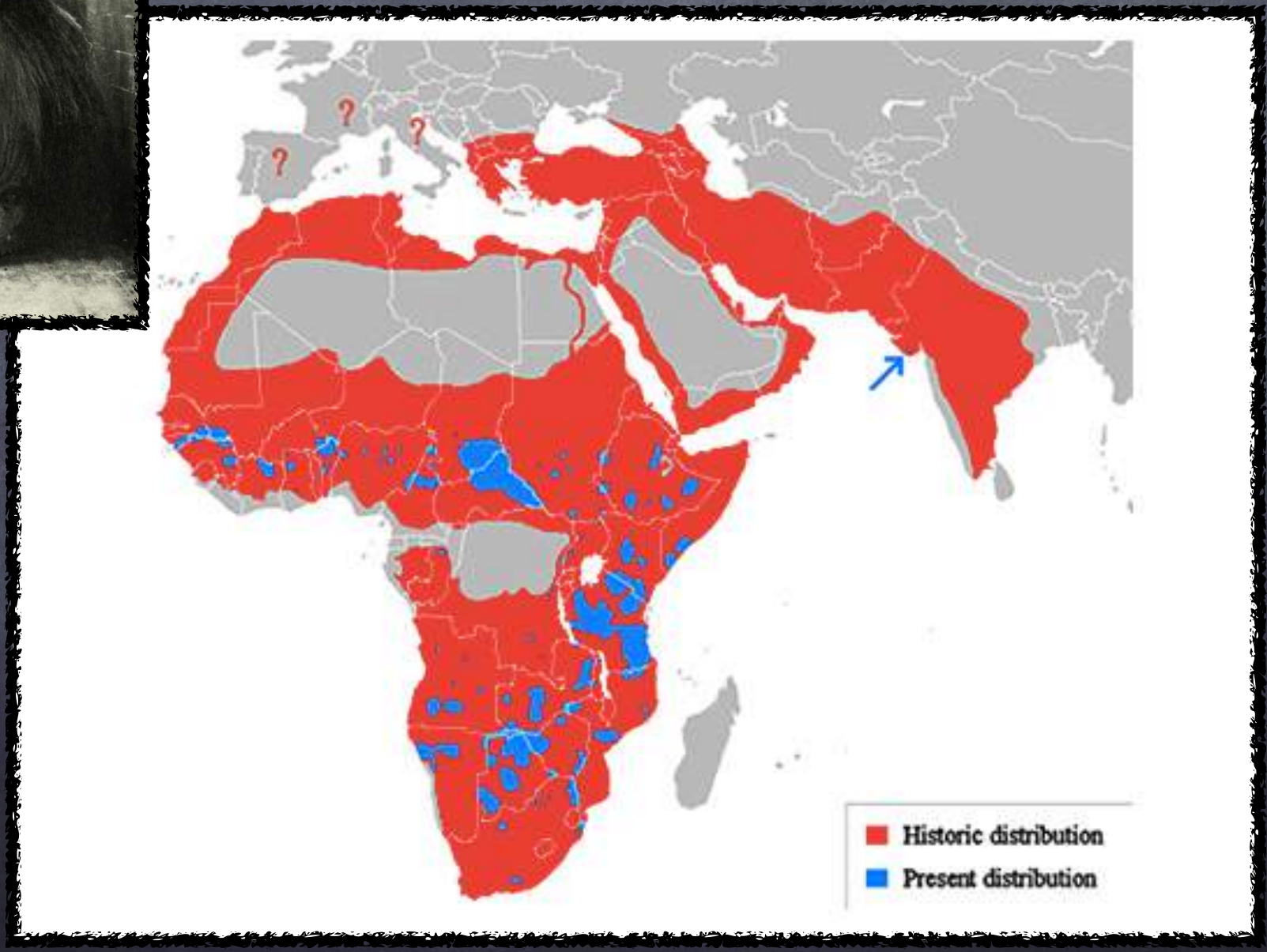
South Africa
Indonesia
India
Ecological deficit
Sustainability
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Human Development Index

As ameaças à diversidade

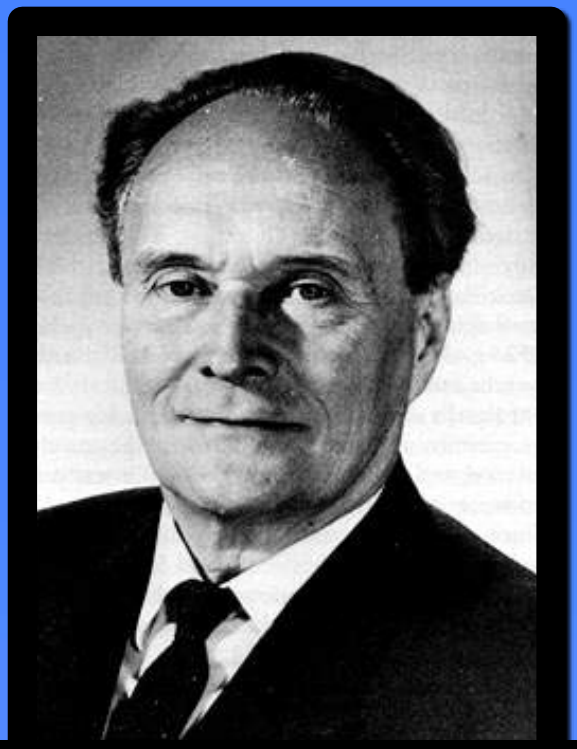
1. Crescimento populacional humano
2. **Perda de habitat**


WWF
PAKISTAN
CHINA
NEPAL
BHUTAN
INDIA
BANGLA-
DESH
MYANMAR
LAOS
THAILAND
CAMBODIA
VIETNAM
INDIAN OCEAN
MALAYSIA
Sumatra
INDONESIA
Java
RUSSIA
CHINA
NORTH KOREA
SOUTH KOREA
Tiger's historic range
Tiger's present range
0 km
800 km
© WCS, WWF, Smithsonian, STF 2006. Setting Priorities for Conservation and Recovery of Wild Tigers 2005-2010: The Technical Assessment./
This map is for illustrative purposes. Geographical designations do not imply the expression of any opinion whatsoever on the part of WWF concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries.

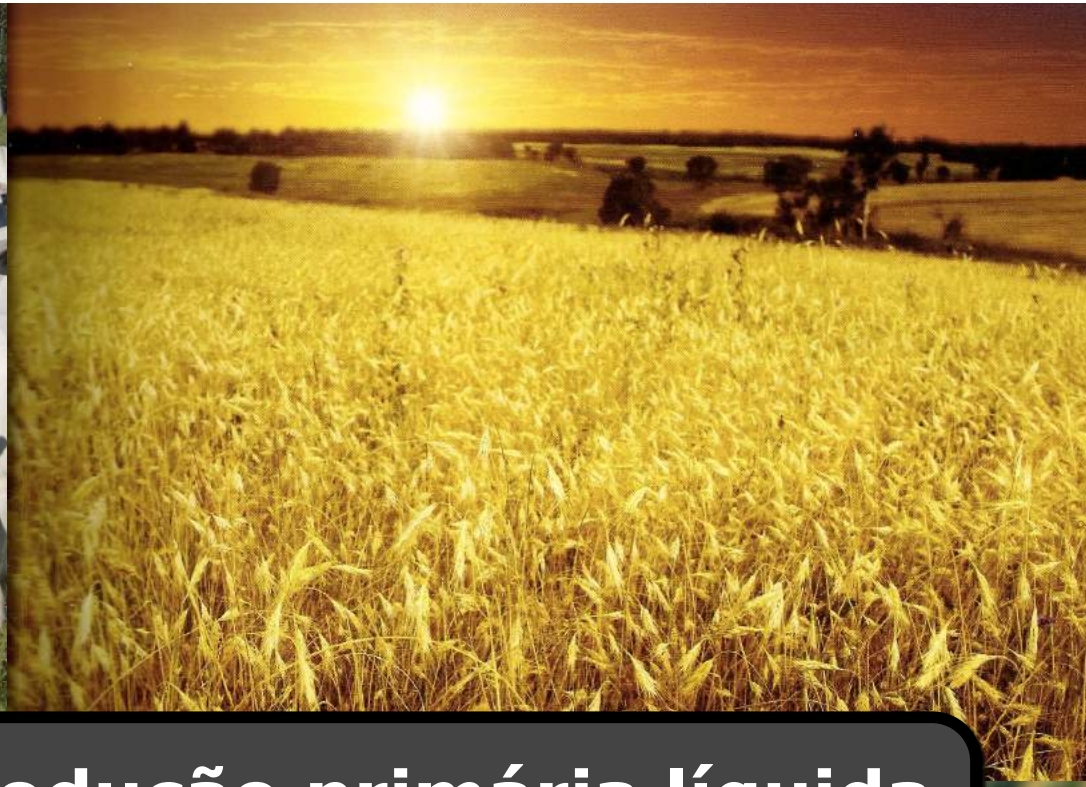

?
?
?
Historic distribution
Present distribution

O princípio da exclusão competitiva

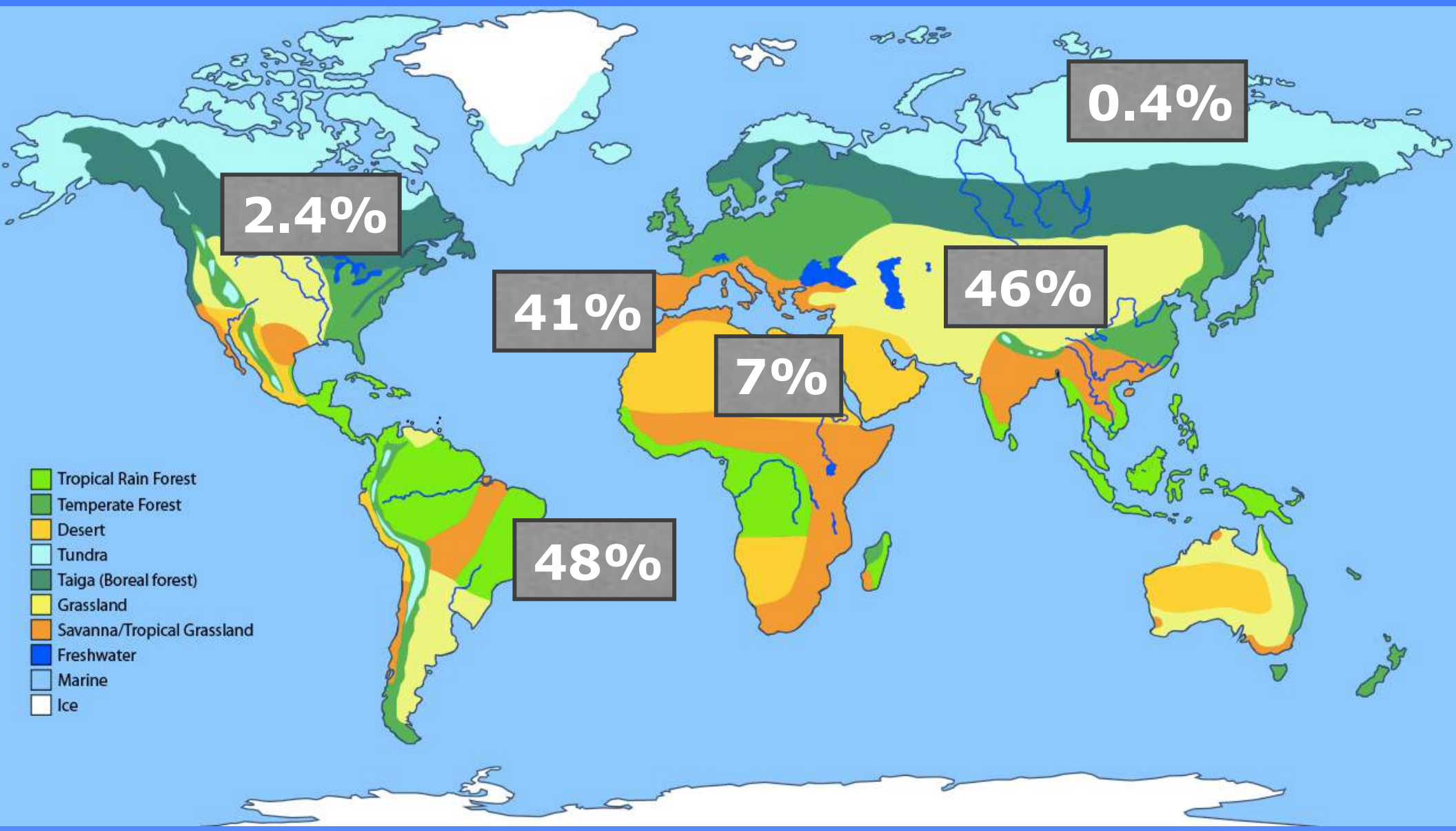
Paramecium

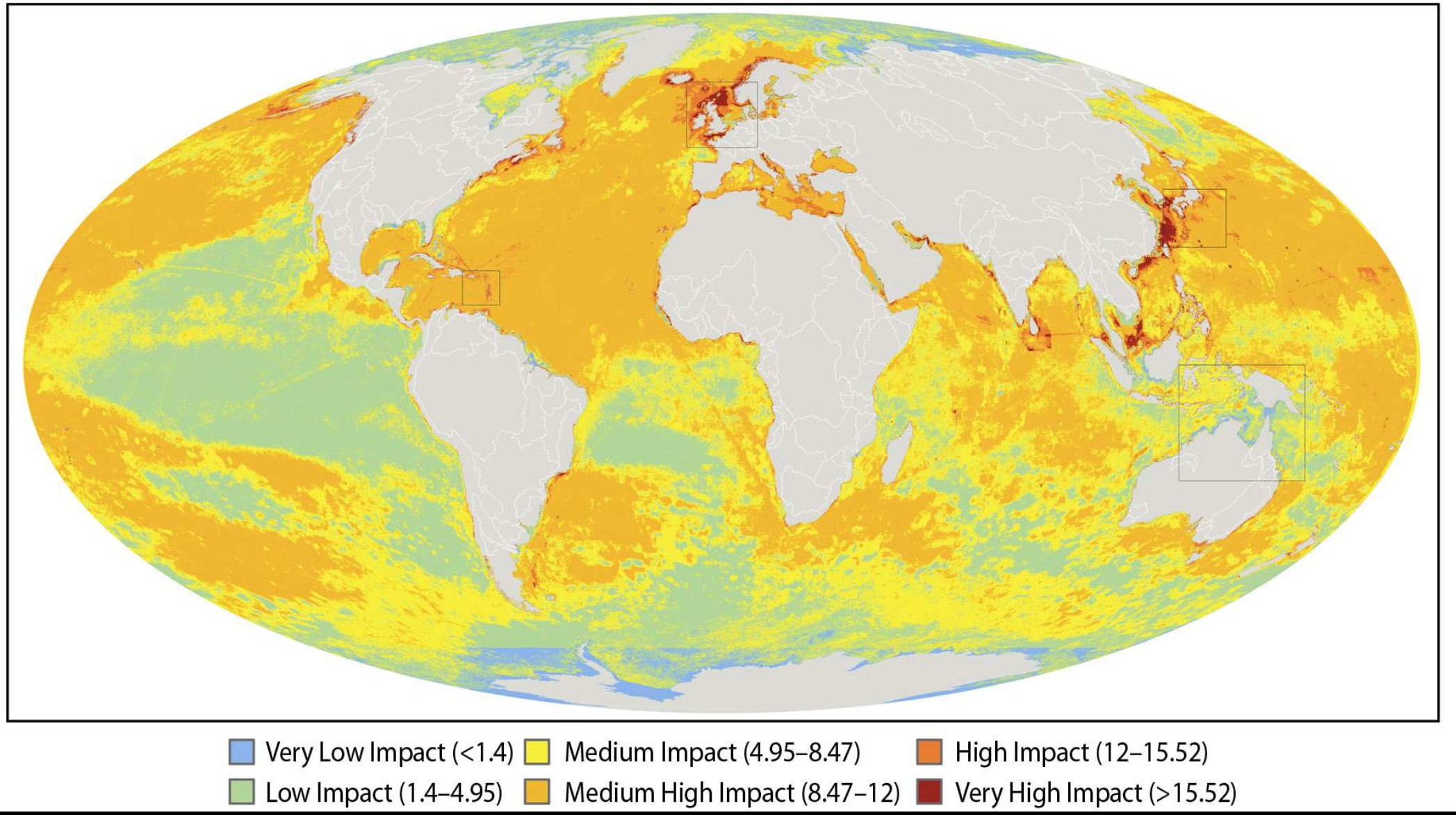


Georgy Gause
1910 - 1986



20% - 40% da produção primária líquida


0.4%
2.4%
41%
46%
7%
48%
Tropical Rain Forest
Temperate Forest
Desert
Tundra
Taiga (Boreal forest)
Grassland
Savanna/Tropical Grassland
Freshwater
Marine
Ice

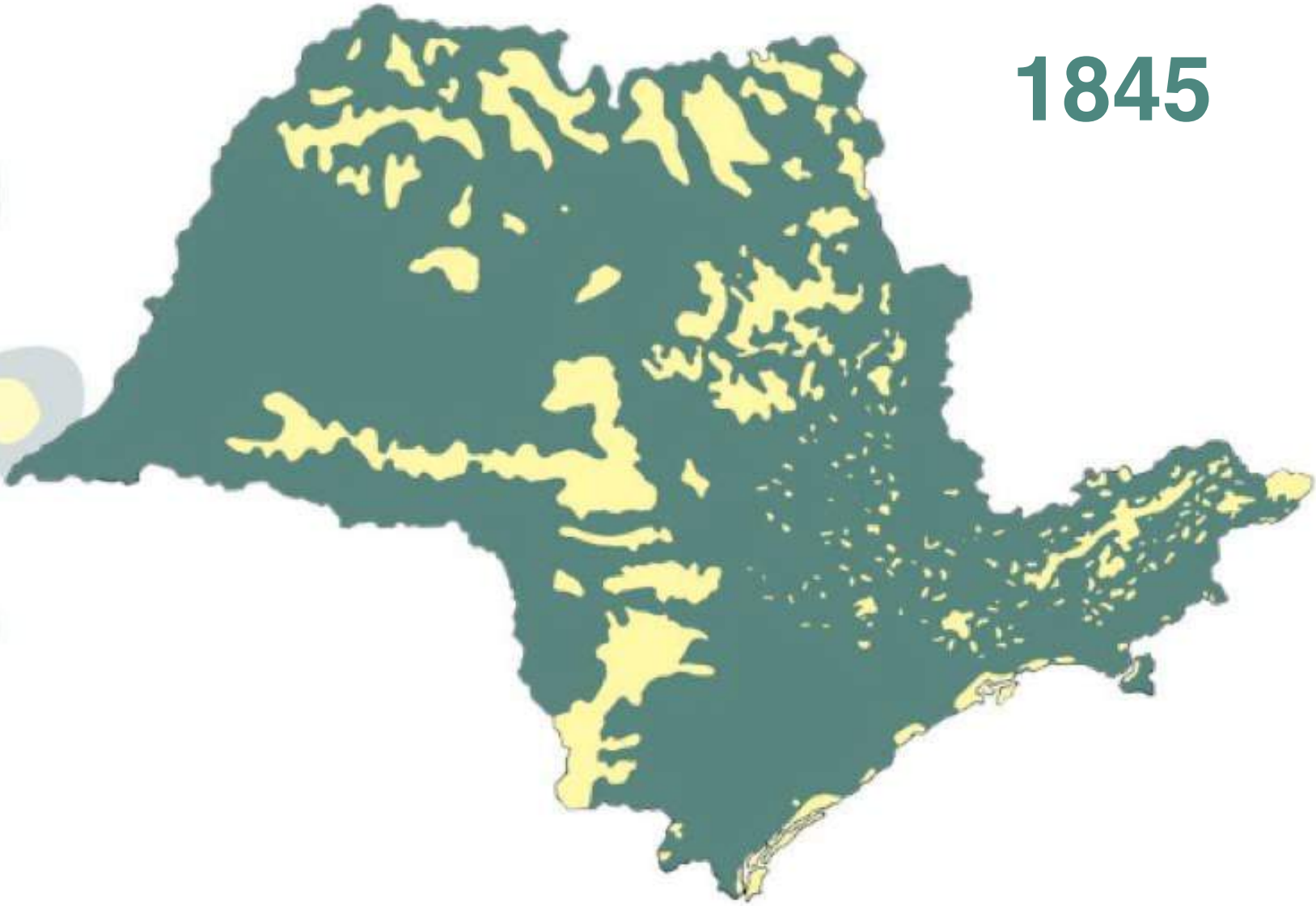

Very Low Impact (<1.4)
Low Impact (1.4–4.95)
Medium Impact (4.95–8.47)
Medium High Impact (8.47–12)
High Impact (12–15.52)
Very High Impact (>15.52)

As ameaças à diversidade

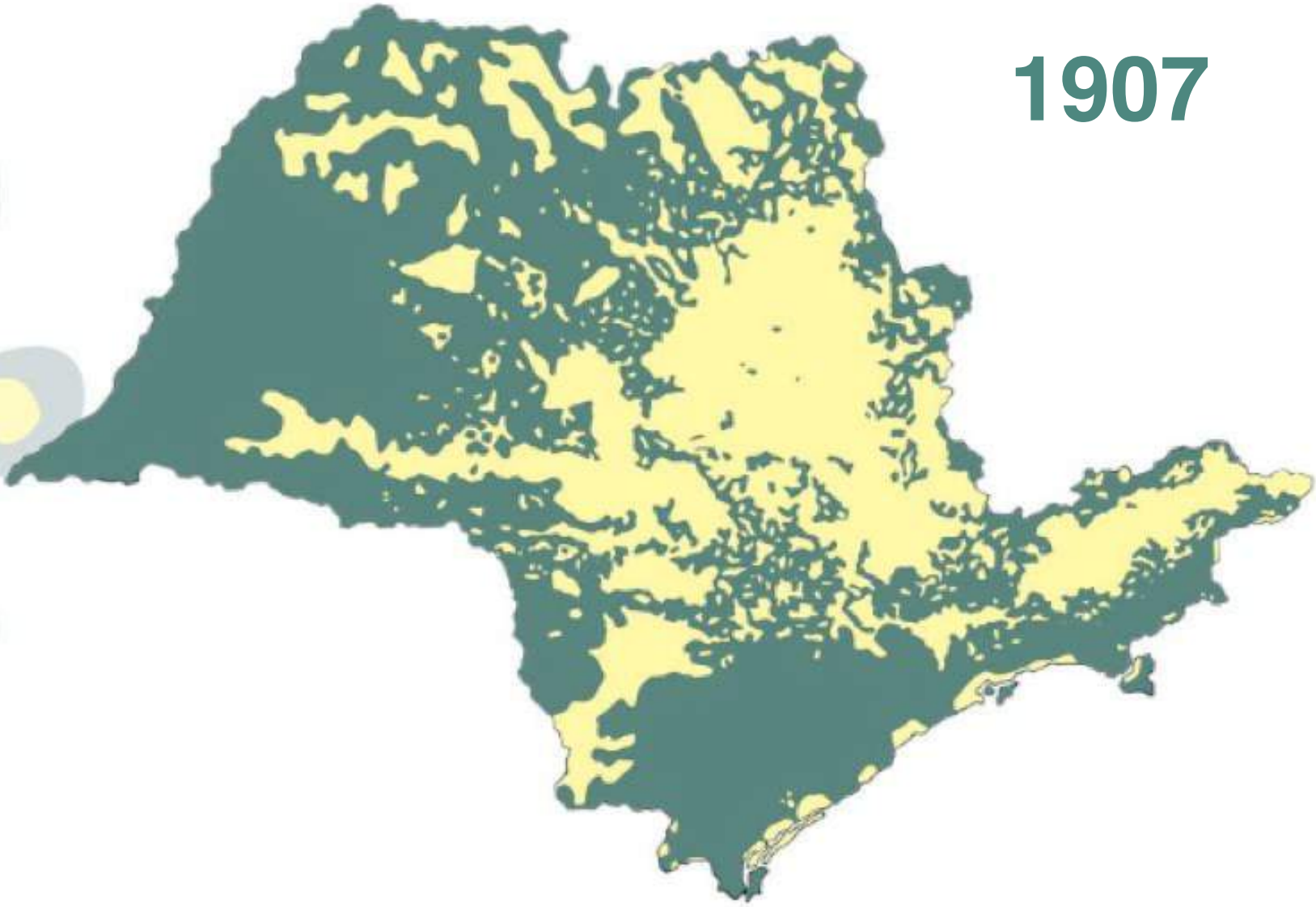
1. Crescimento populacional humano
2. Perda de habitat
3. **Fragmentação de habitat**

The Atlantic Forest

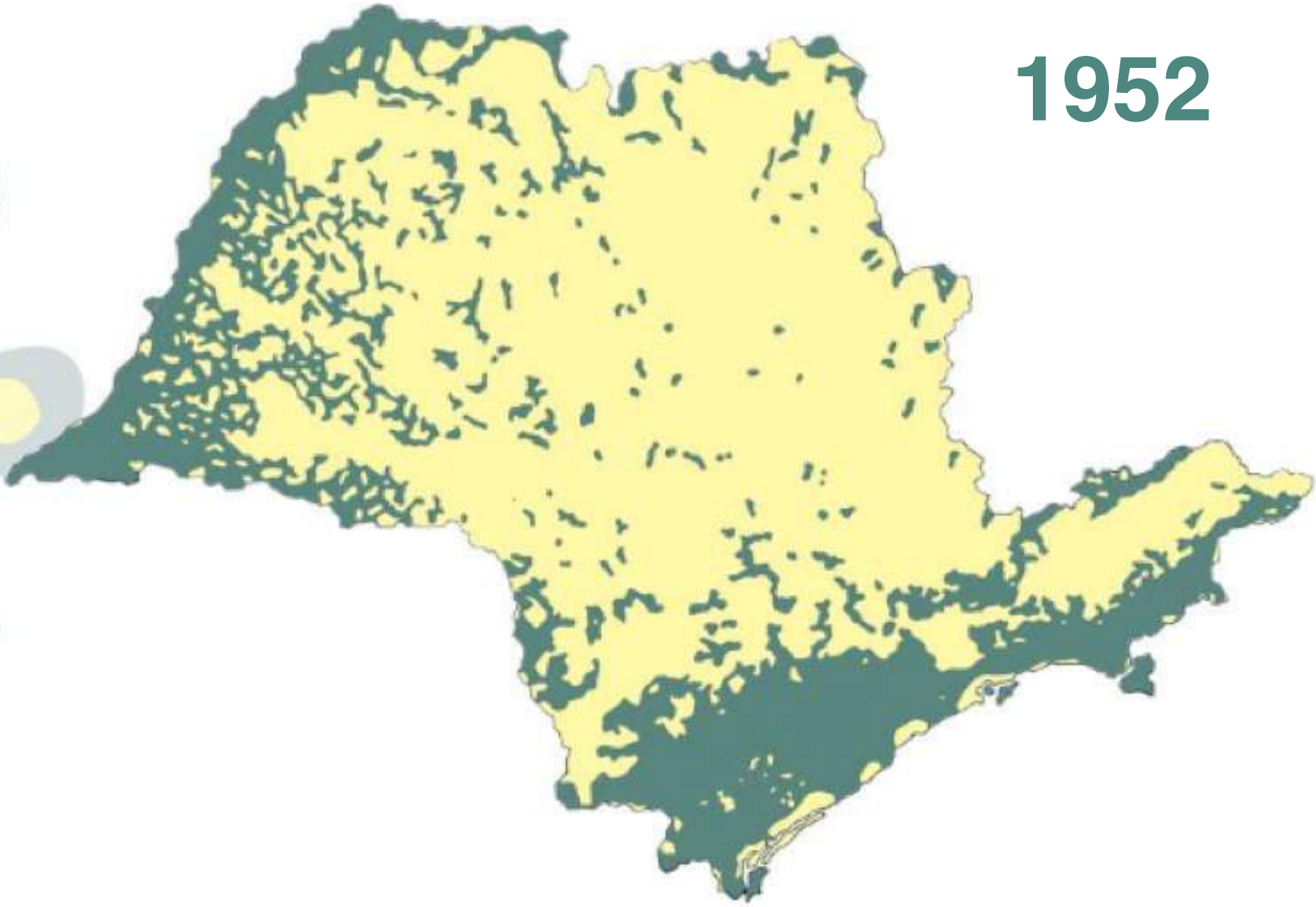
1500

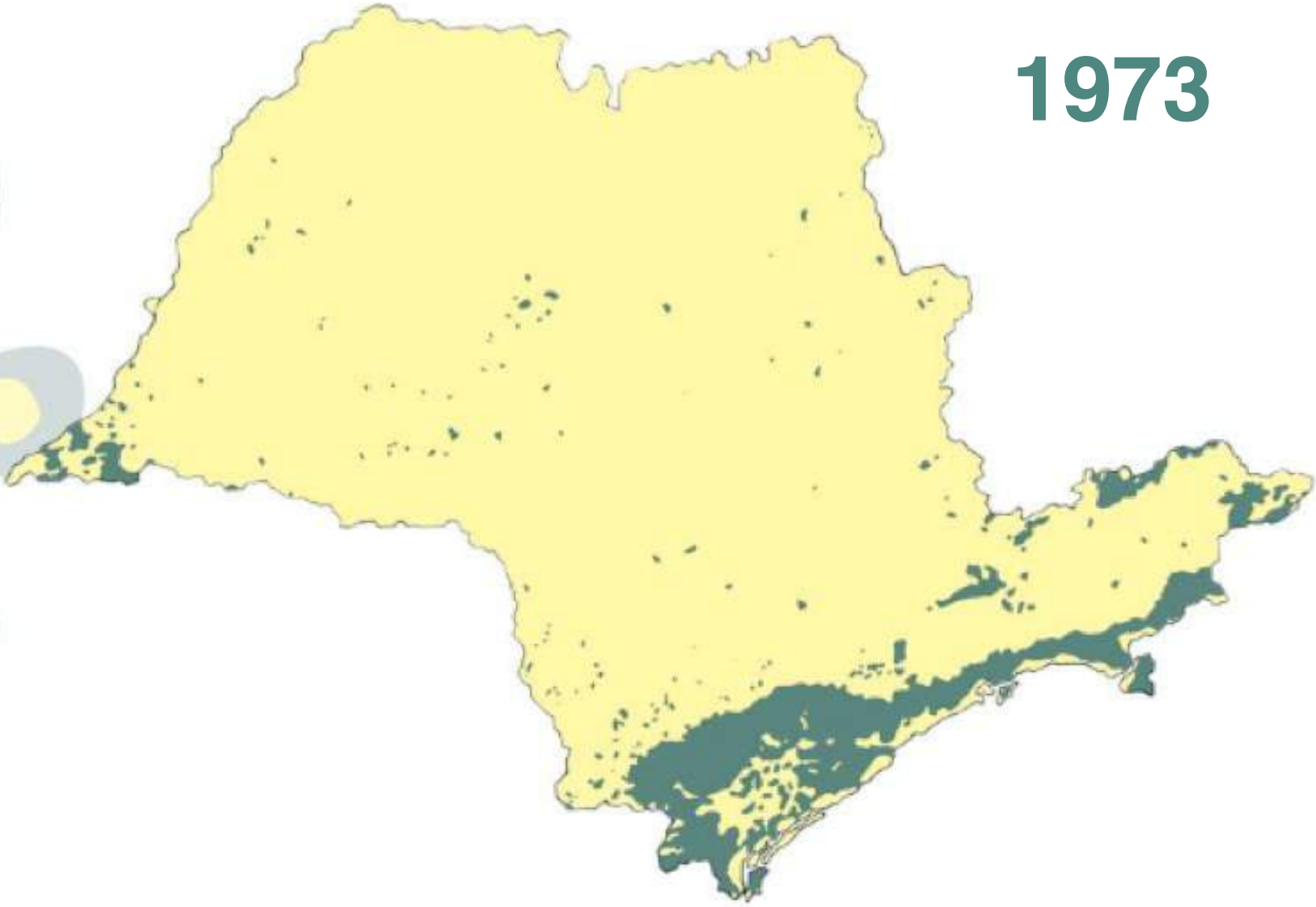


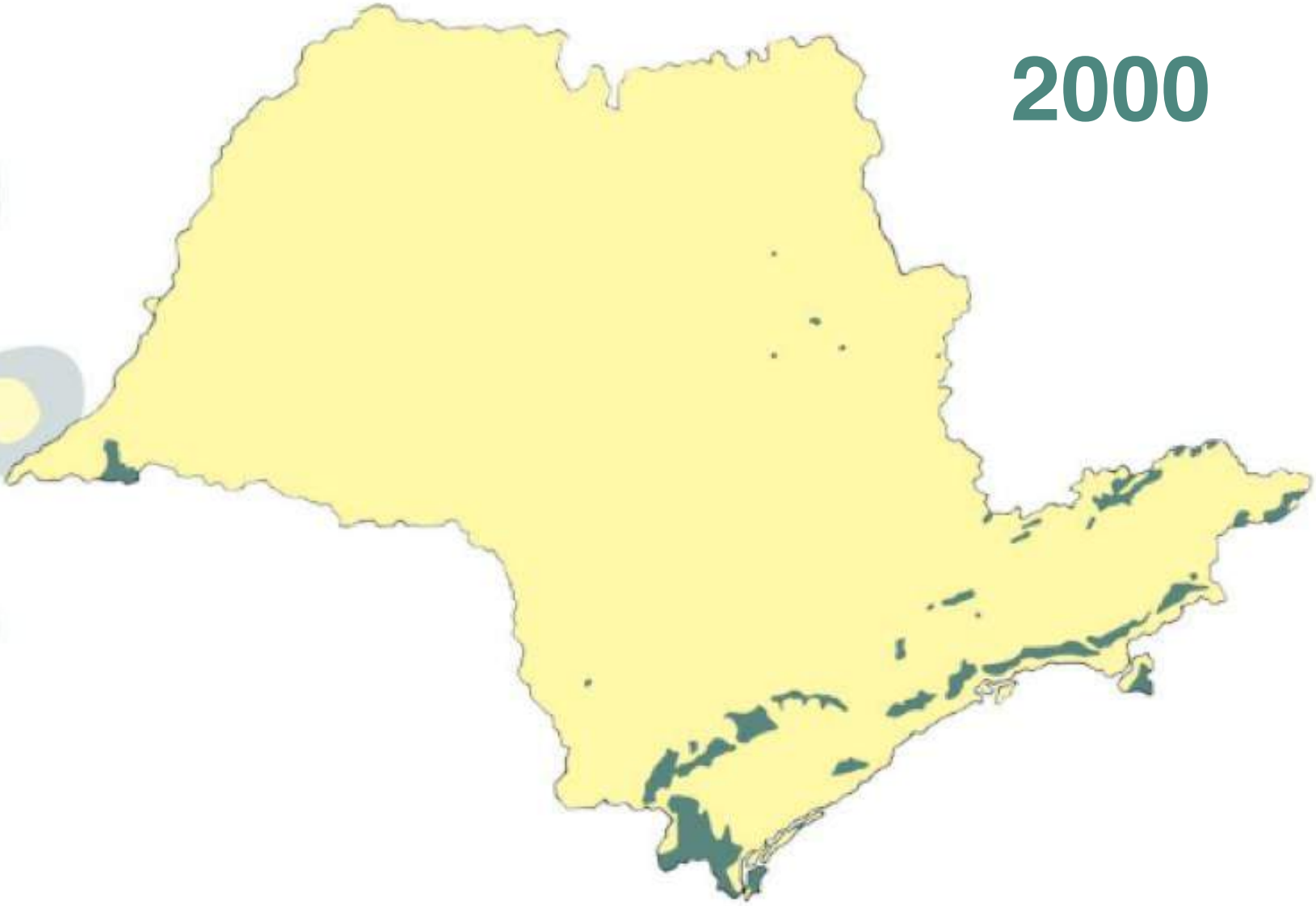
1845

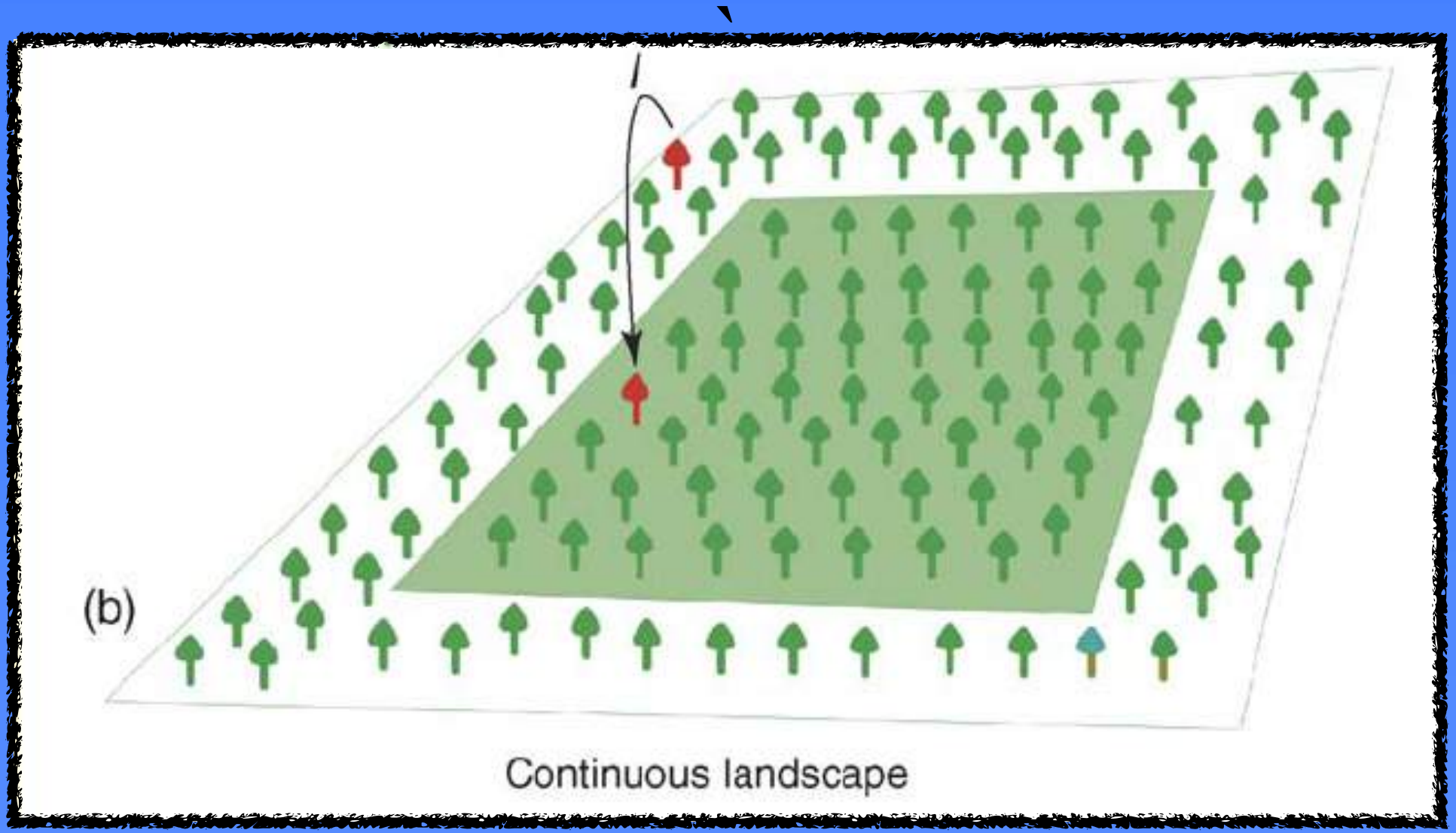


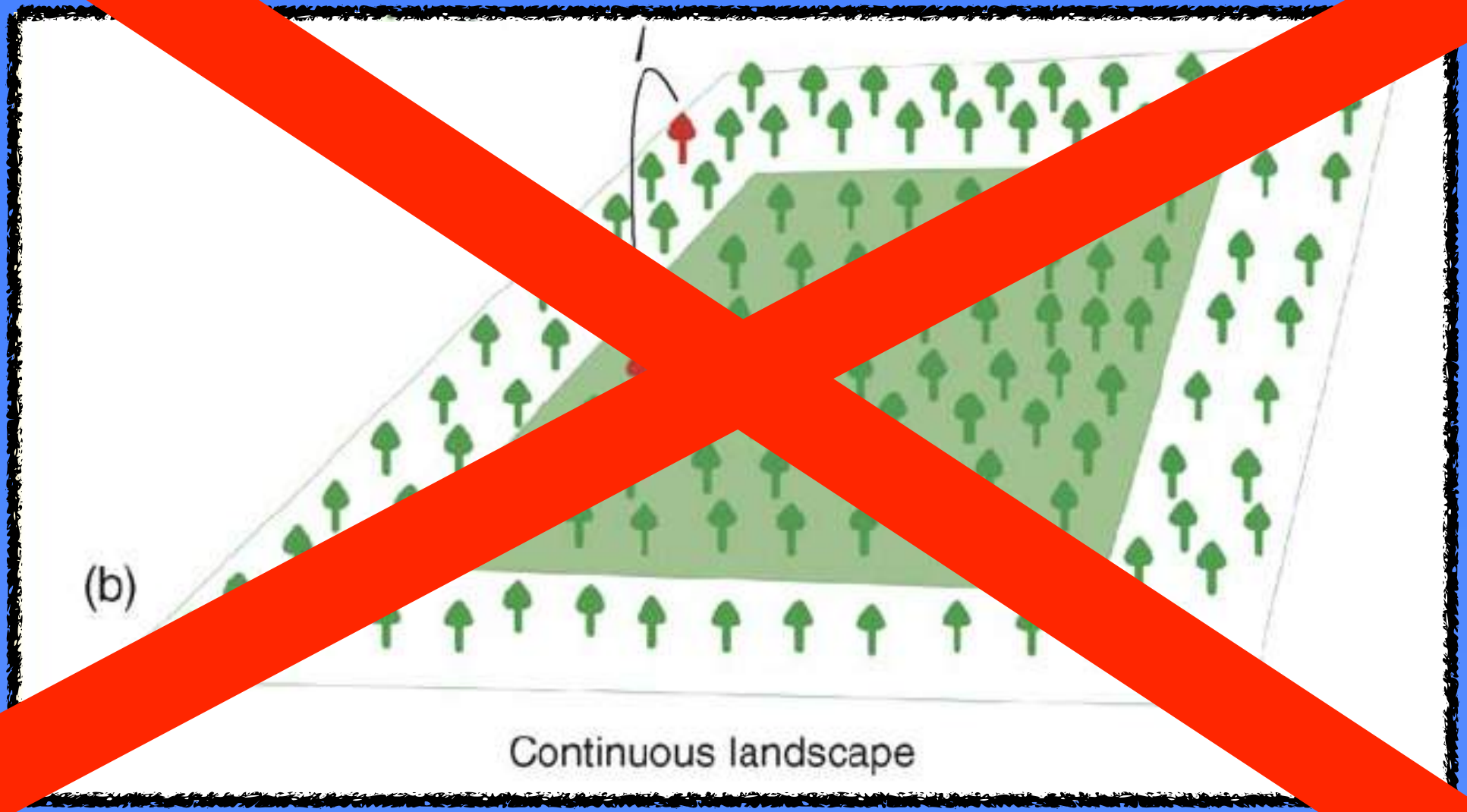
1907


1952

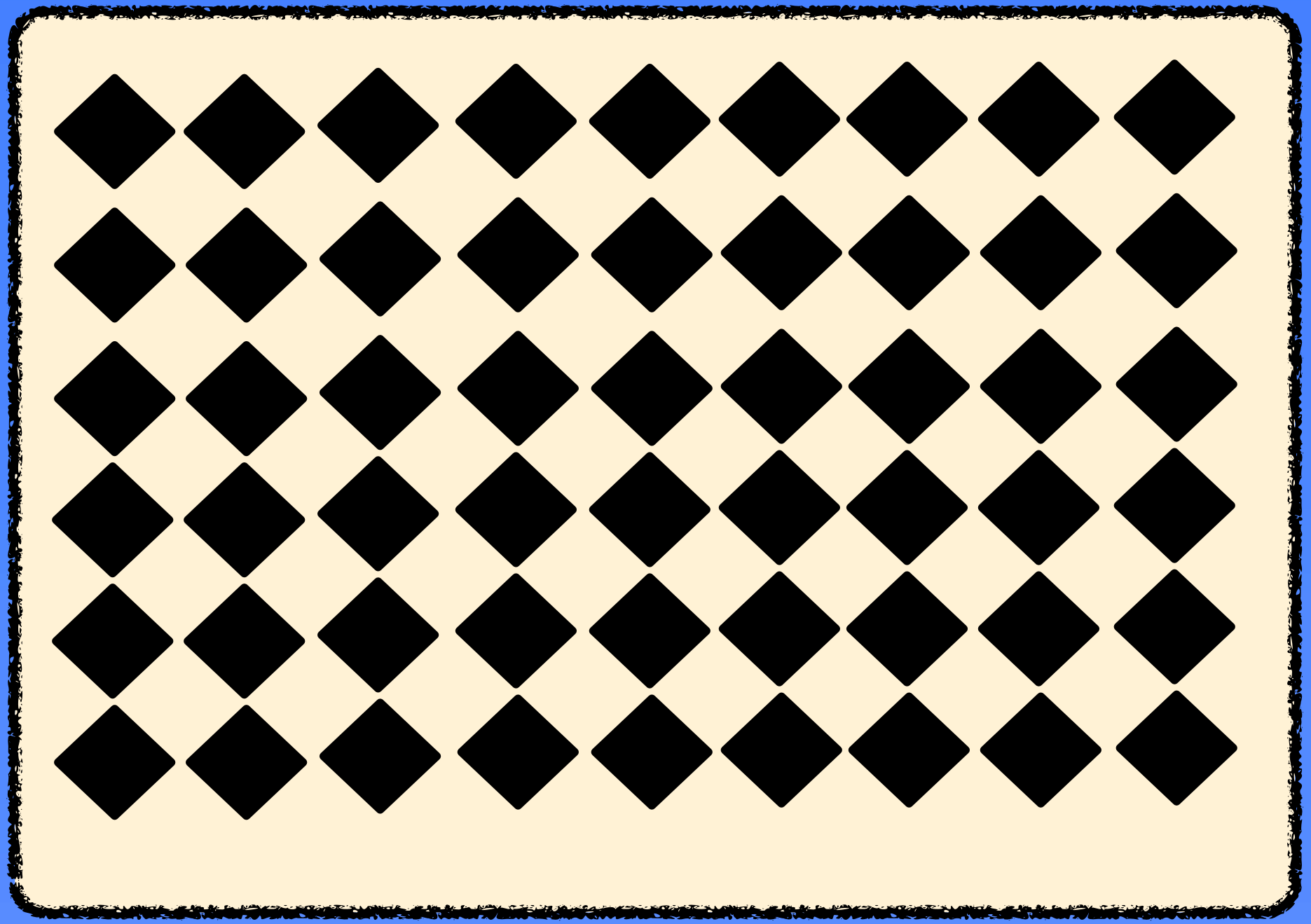

1973


2000

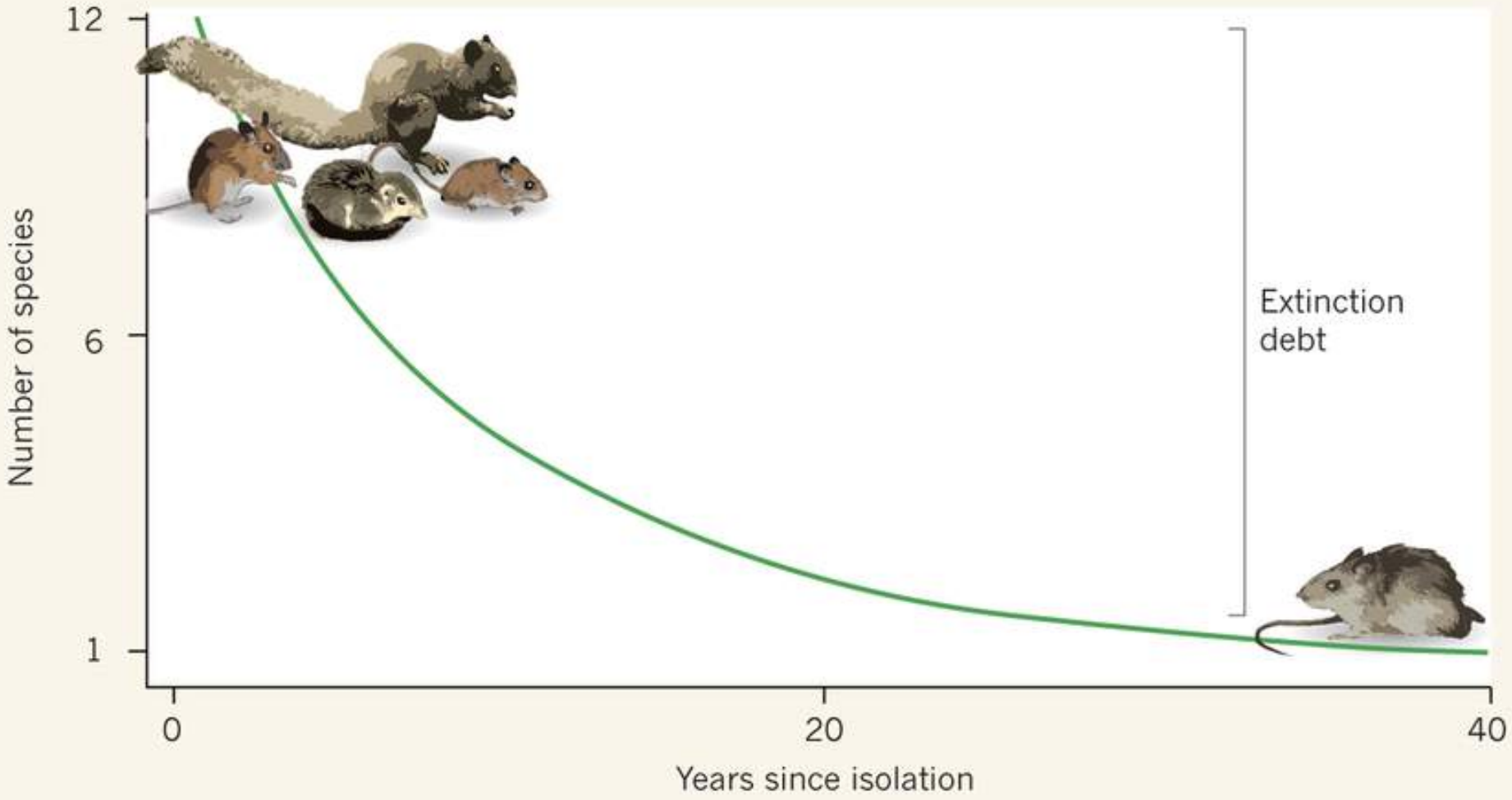

(b)
Continuous landscape


(b)
Continuous landscape


31
9
22
18
29
7
28
12
35
3
26
0
32
15
1
33
16
24
5



Débito de extinções



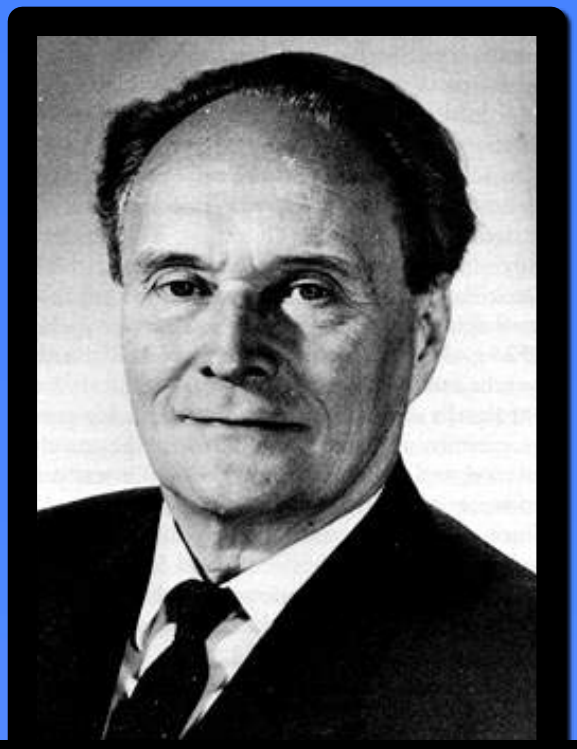
As ameaças à diversidade

1. Crescimento populacional humano
2. Perda de habitat
3. Fragmentação de habitat
4. **Espécies invasoras**

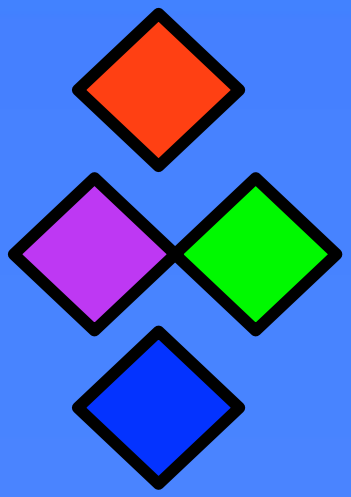
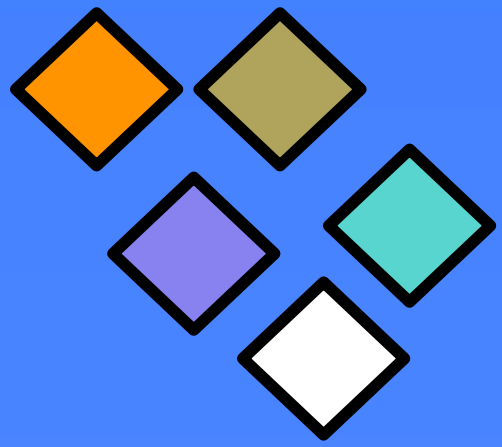
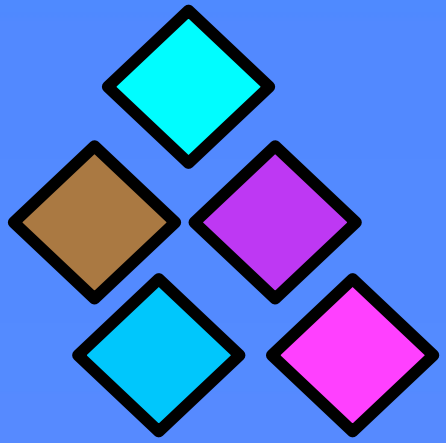
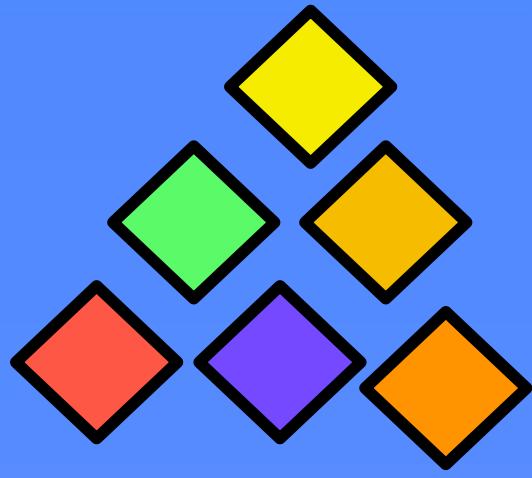

sPots and Greens

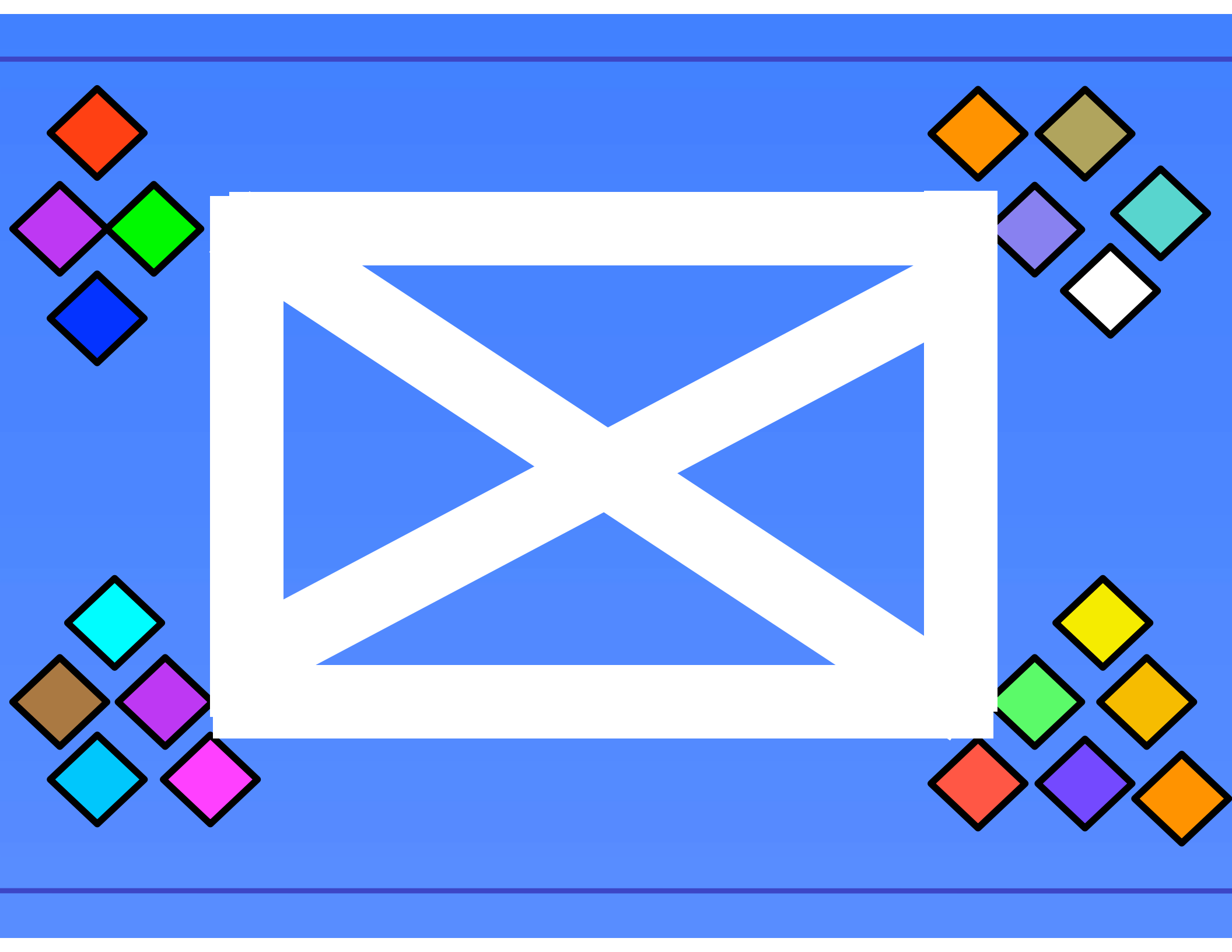
O princípio da exclusão competitiva

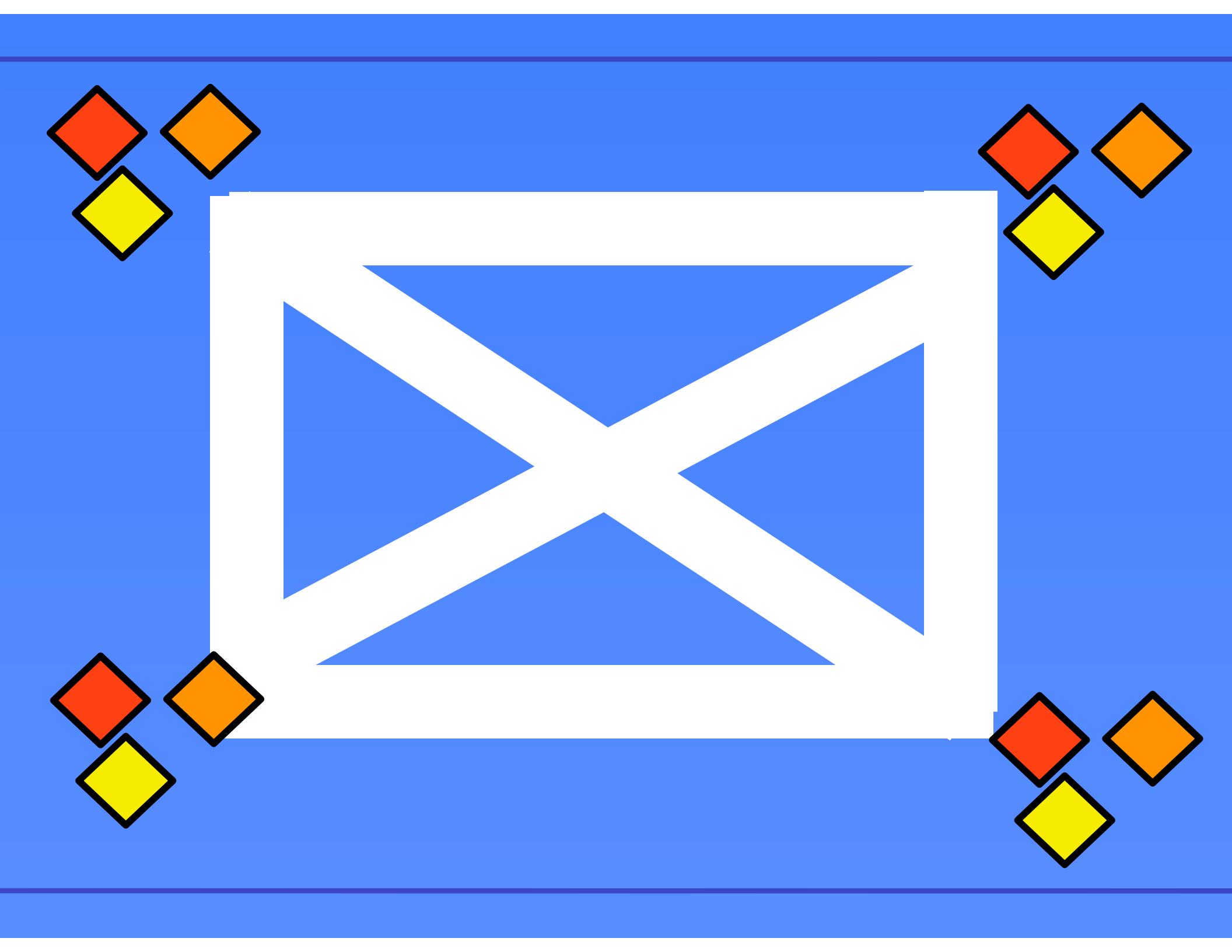
Paramecium



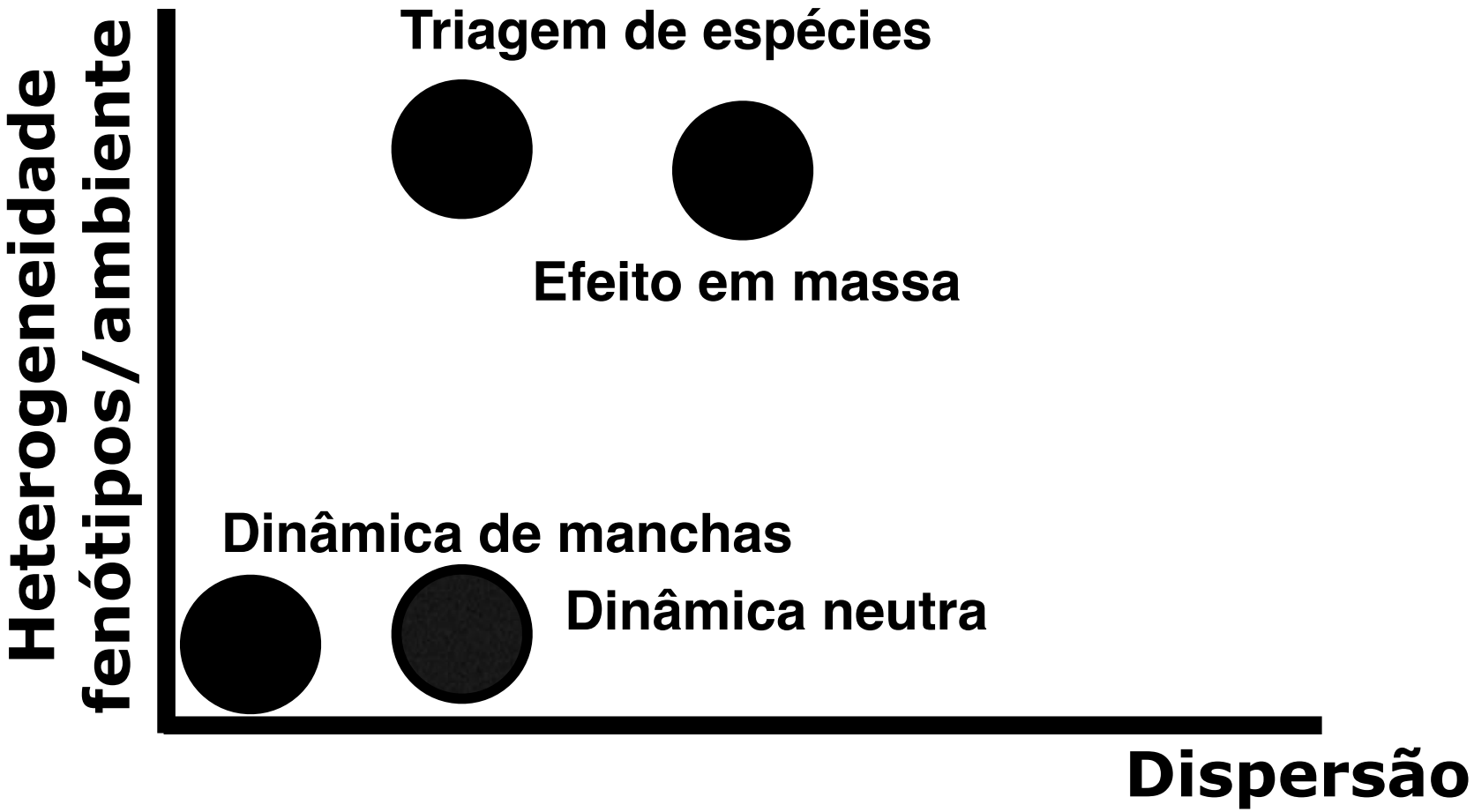
Georgy Gause
1910 - 1986

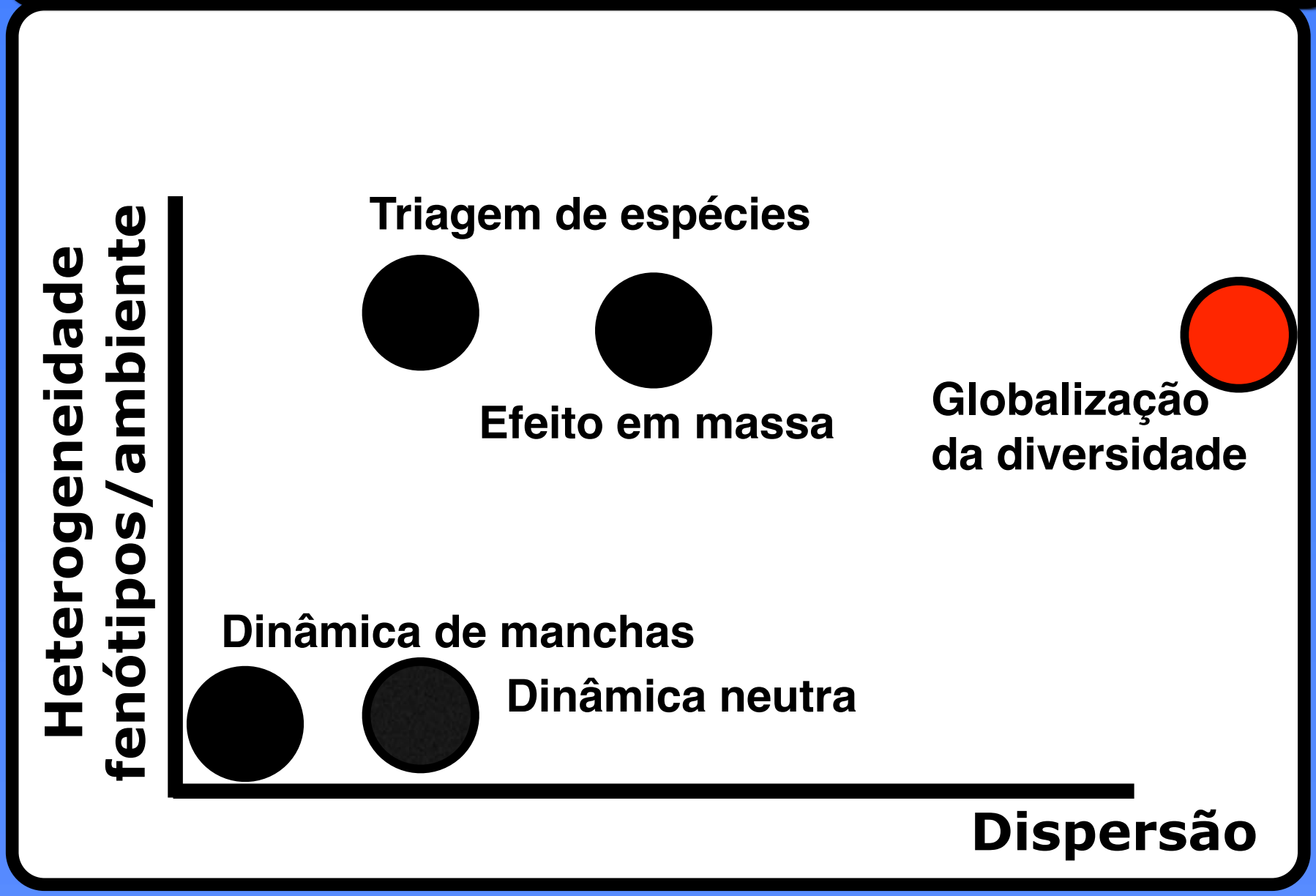




Quatro formas de ver uma metacomunidade

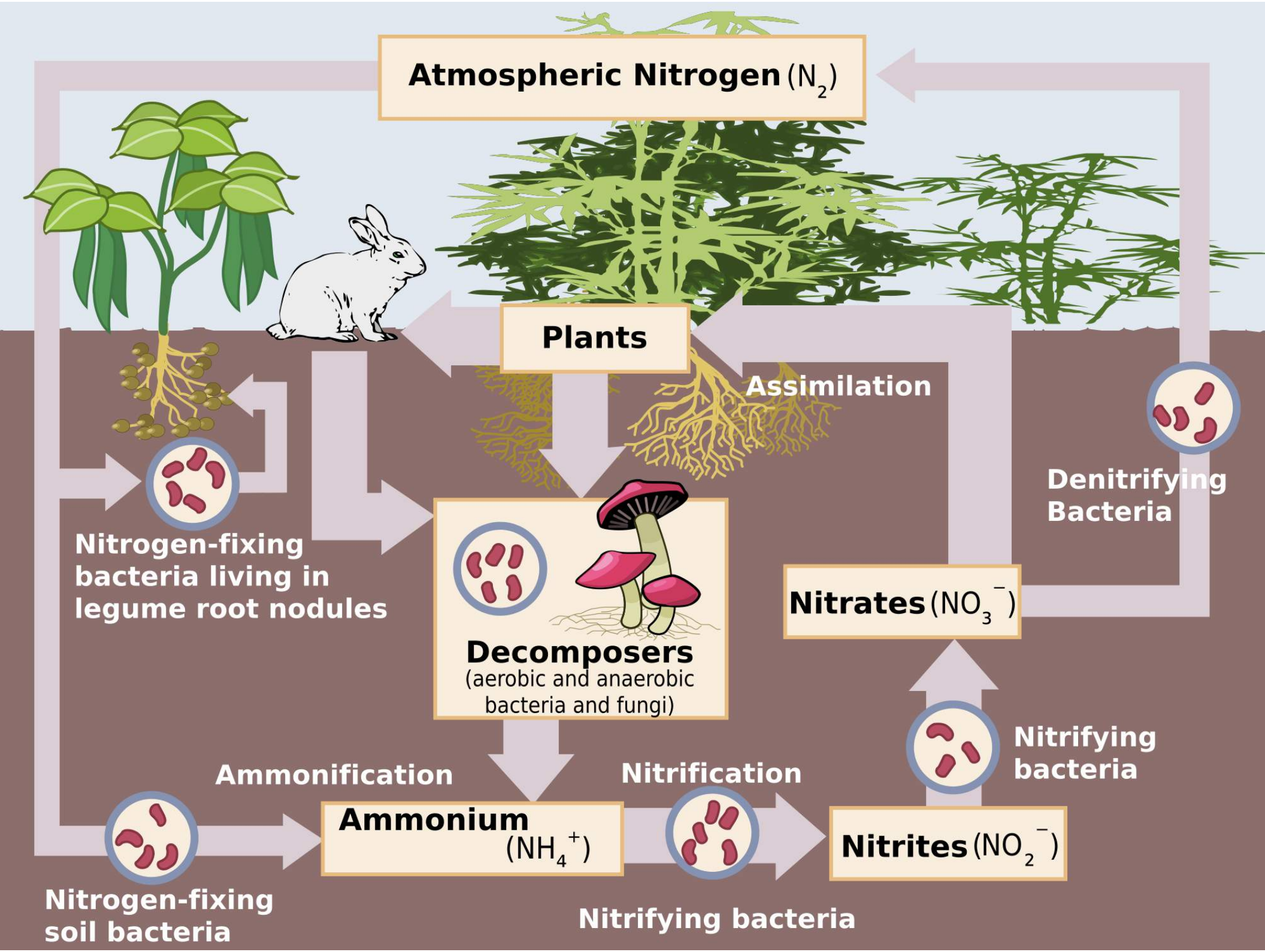


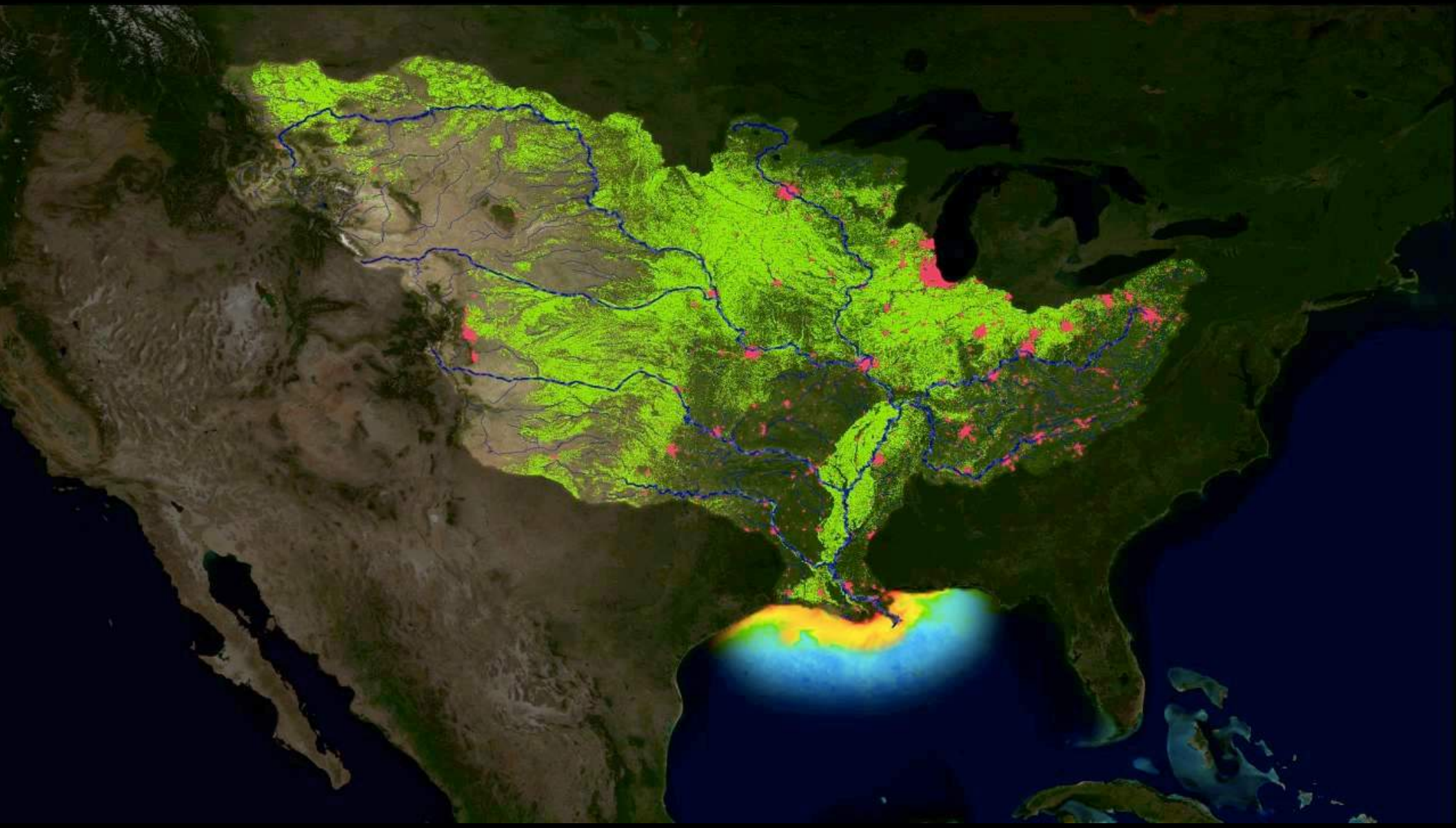
Cinco formas de ver uma metacomunidade

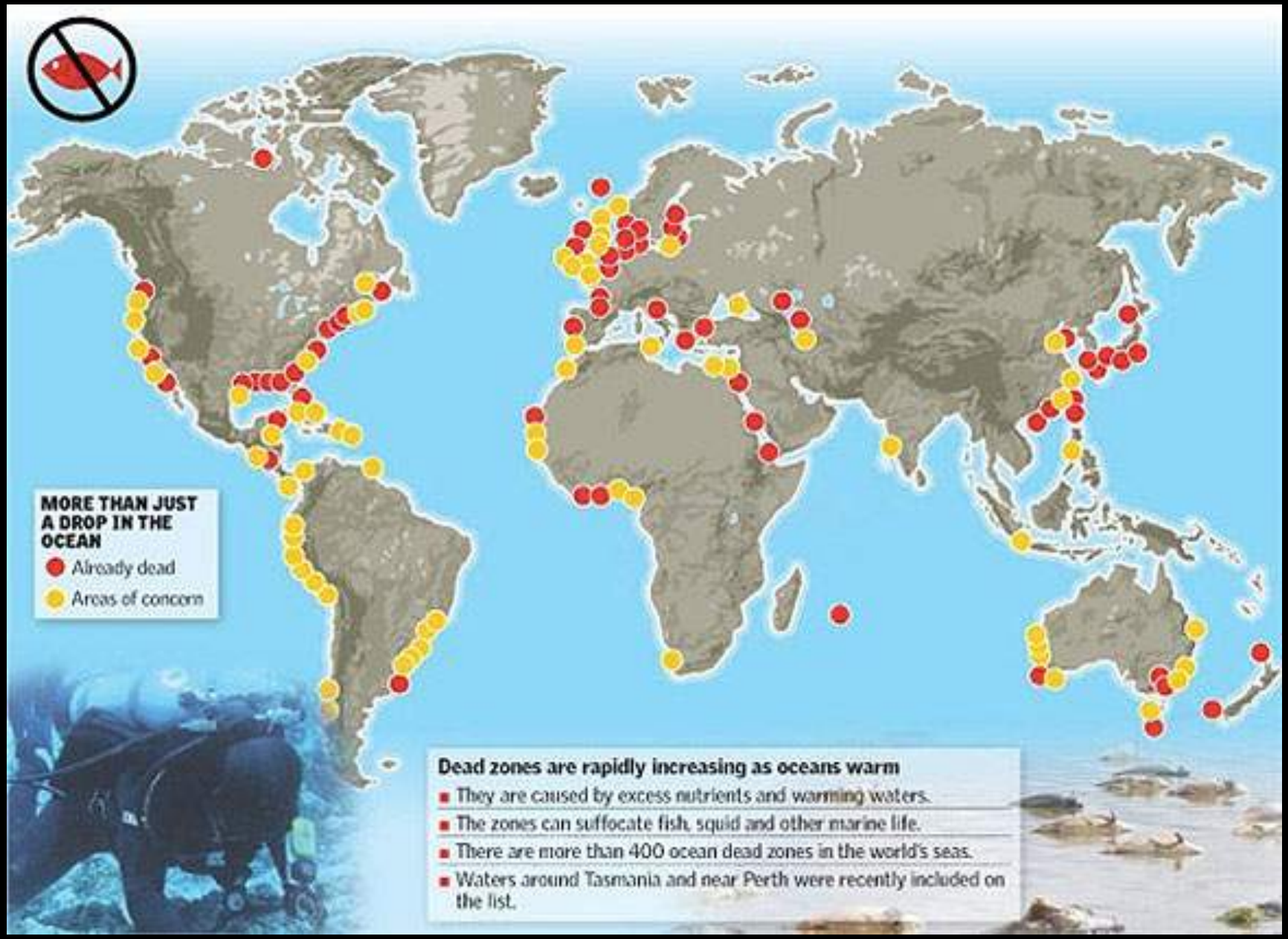


As ameaças à diversidade

1. Crescimento populacional humano
2. Perda de habitat
3. Fragmentação de habitat
4. Espécies invasoras
5. **Poluição**


Atmospheric Nitrogen (N_2)
Plants
Assimilation
Denitrifying Bacteria
Nitrogen-fixing bacteria living in legume root nodules
Decomposers
(aerobic and anaerobic bacteria and fungi)
Nitrates (NO_3^-)
Nitrifying bacteria
Ammonification
Nitrification
Ammonium (NH_4^+)
Nitrites (NO_2^-)
Nitrogen-fixing soil bacteria
Nitrifying bacteria




MORE THAN JUST A DROP IN THE OCEAN
Already dead
Areas of concern
Dead zones are rapidly increasing as oceans warm
They are caused by excess nutrients and warming waters.
The zones can suffocate fish, squid and other marine life.
There are more than 400 ocean dead zones in the world's seas.
Waters around Tasmania and near Perth were recently included on the list.

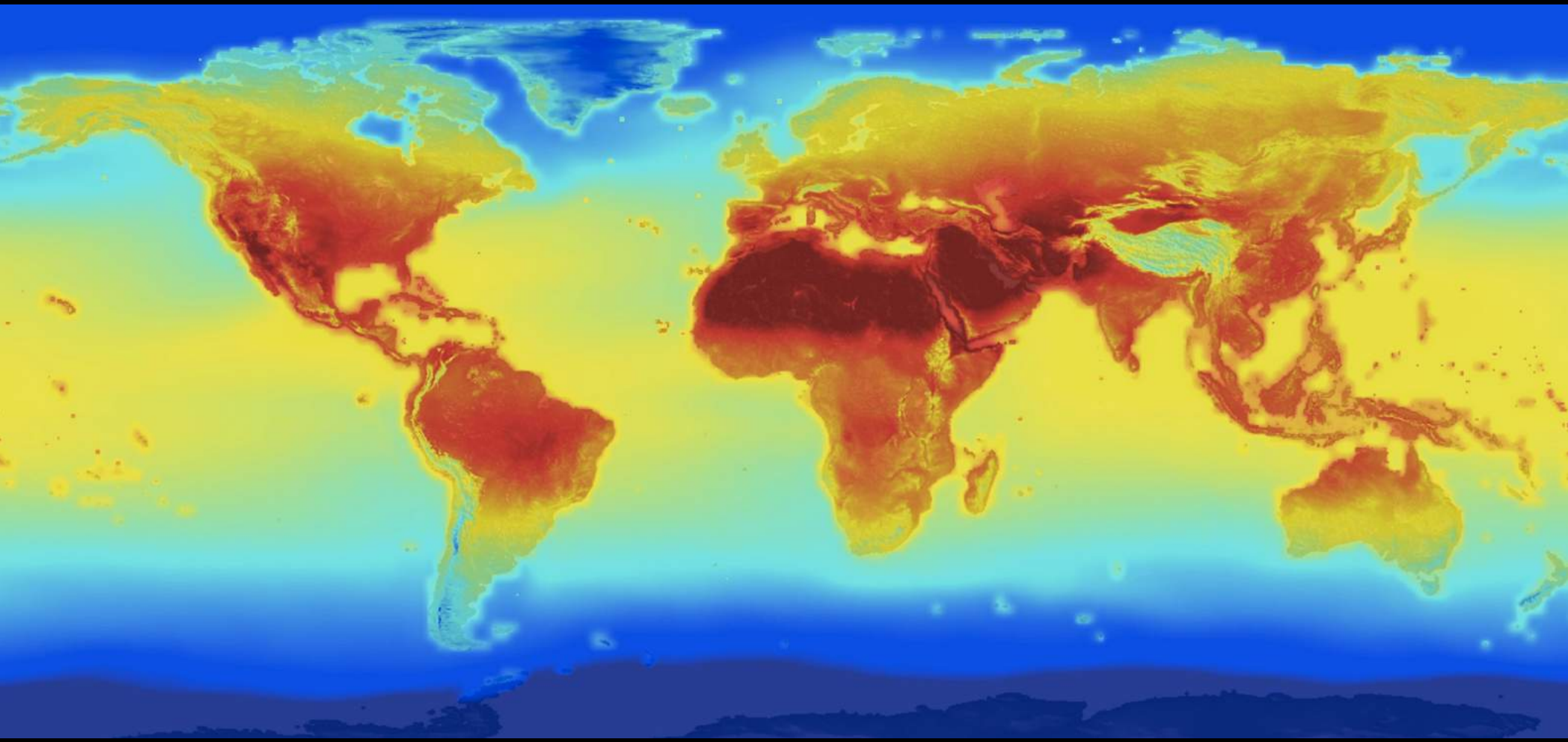
As ameaças à diversidade

1. Crescimento populacional humano
2. Perda de habitat
3. Fragmentação de habitat
4. Espécies invasoras
5. Poluição
6. **Sobre-exploração**

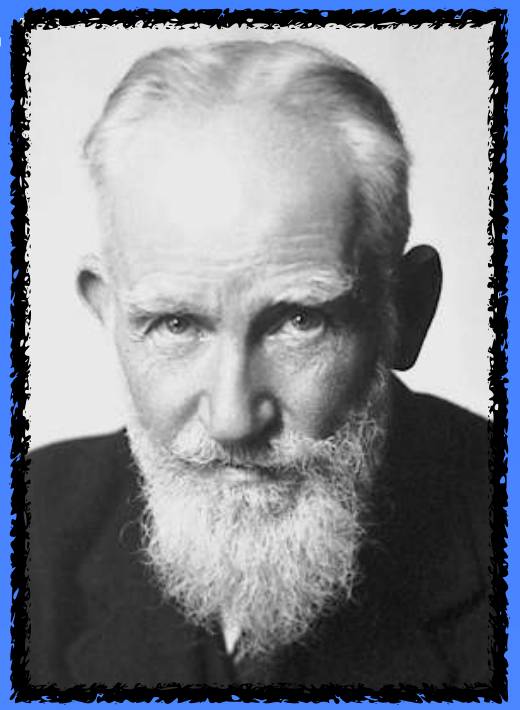
1. A ave mais abundante da Terra
2. 25-40% das aves norte-americanas
3. Um bando
    1. 3,5 bilhões de aves
    2. 1,5 x 500 km
    3. 14h passando

As ameaças à diversidade

1. Crescimento populacional humano
2. Perda de habitat
3. Fragmentação de habitat
4. Espécies invasoras
5. Poluição
6. Sobre-exploração
7. **Mudança climática global**



The reasonable man adapts himself to the world; the unreasonable one persists in trying to adapt the world to himself. Therefore all progress depends on the unreasonable man.



George Bernard Shaw

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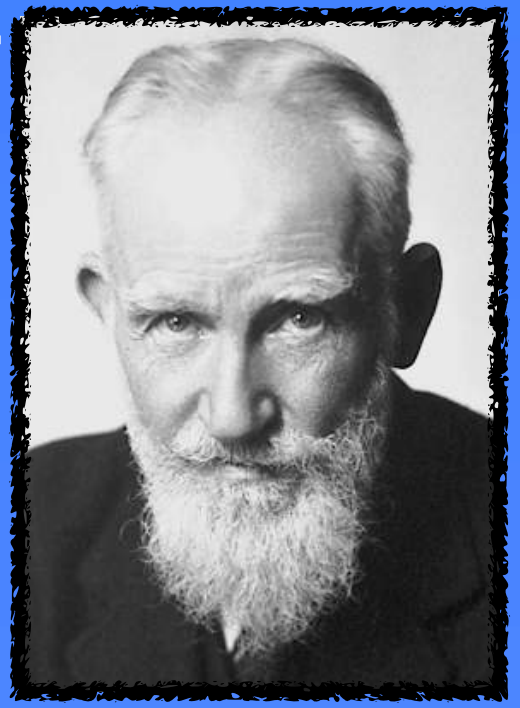


George Bernard Shaw

For myself, I am an optimist — it does not seem to be much use being anything else

Winston Churchill

Conservação de comunidades ecológicas

1. Definição, motivos e o que já aprendemos
2. A dinâmica da destruição
3. **Estados estáveis alternativos**
4. Resumo
5. Sugestão de leitura

As ameaças à diversidade

1. Crescimento populacional humano
2. Perda de habitat
3. Fragmentação de habitat
4. Espécies invasoras
5. **Poluição**

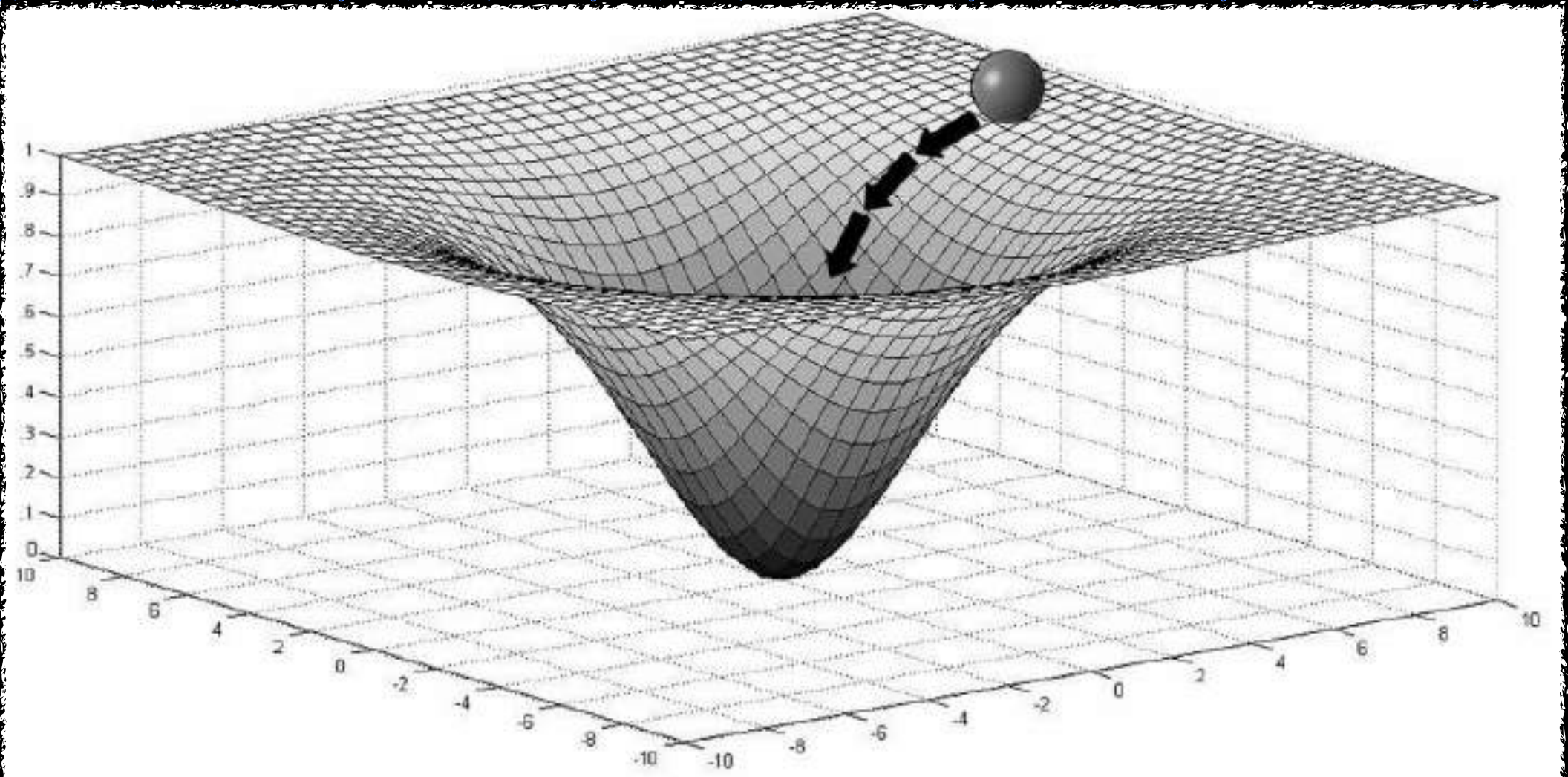
Estabilidade

1. Estabilidade no tempo

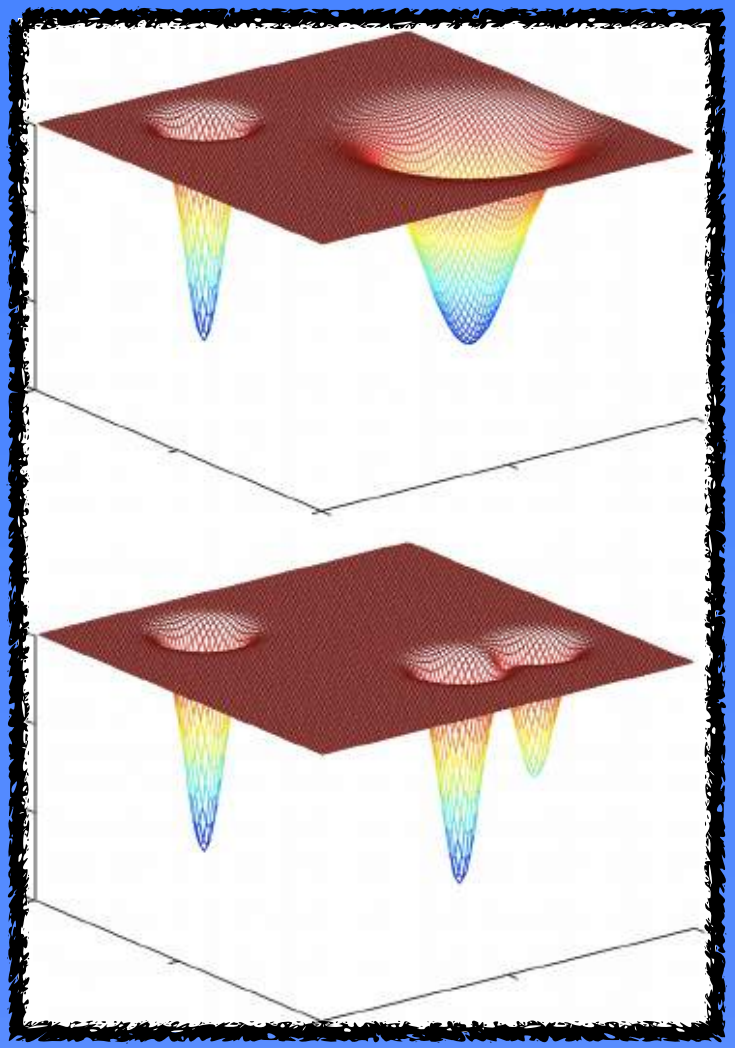
2. Dois componentes:

Resiliência: quão rápido a comunidade retorna ao equilíbrio
Resistência: quão difícil é para a comunidade sair do equilíbrio

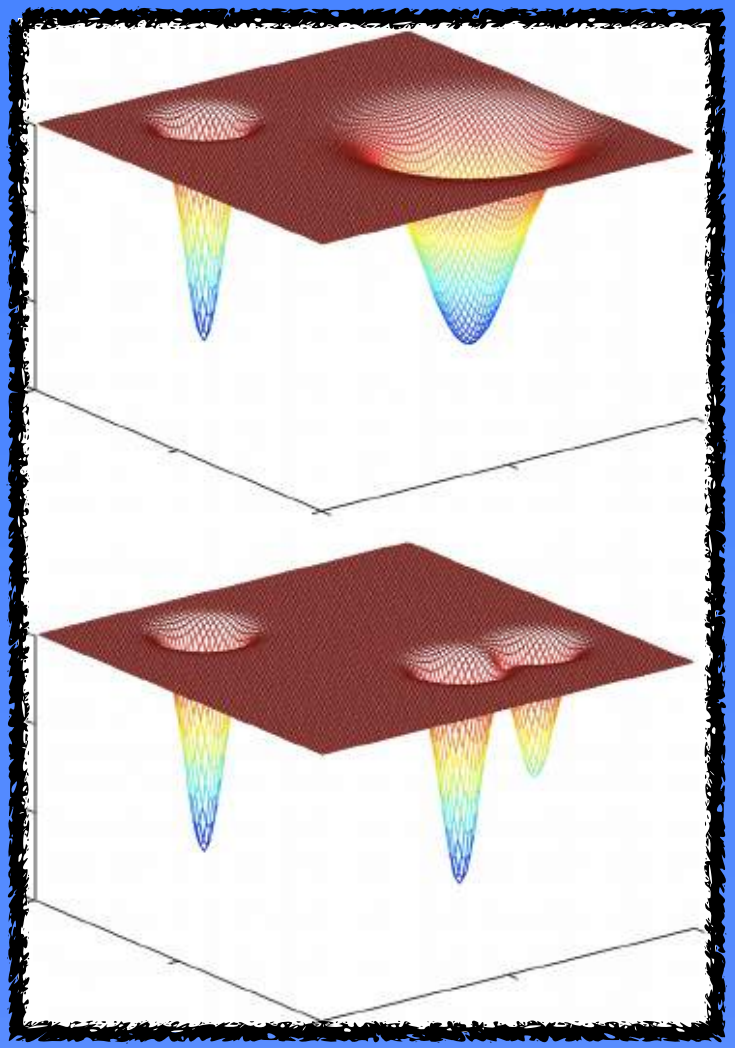
Atrator

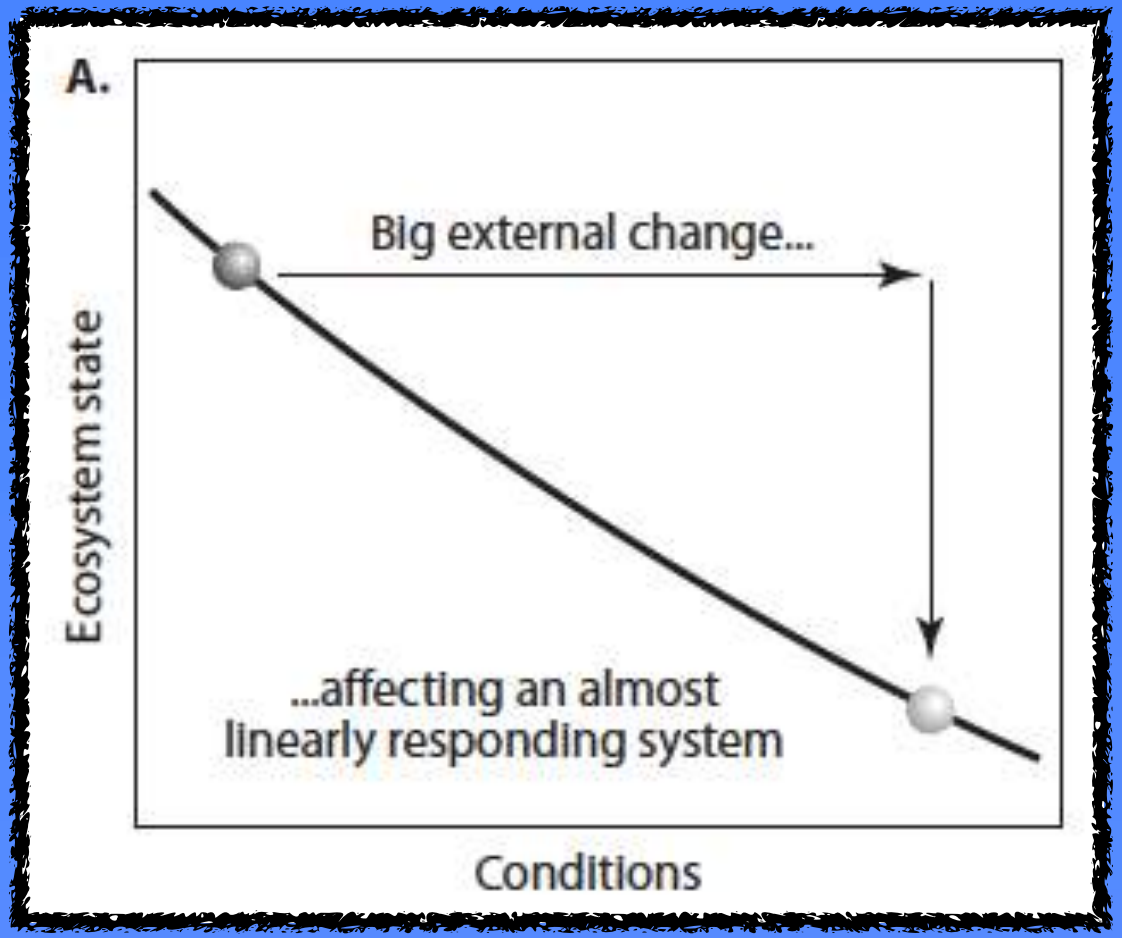


Múltiplos atratores

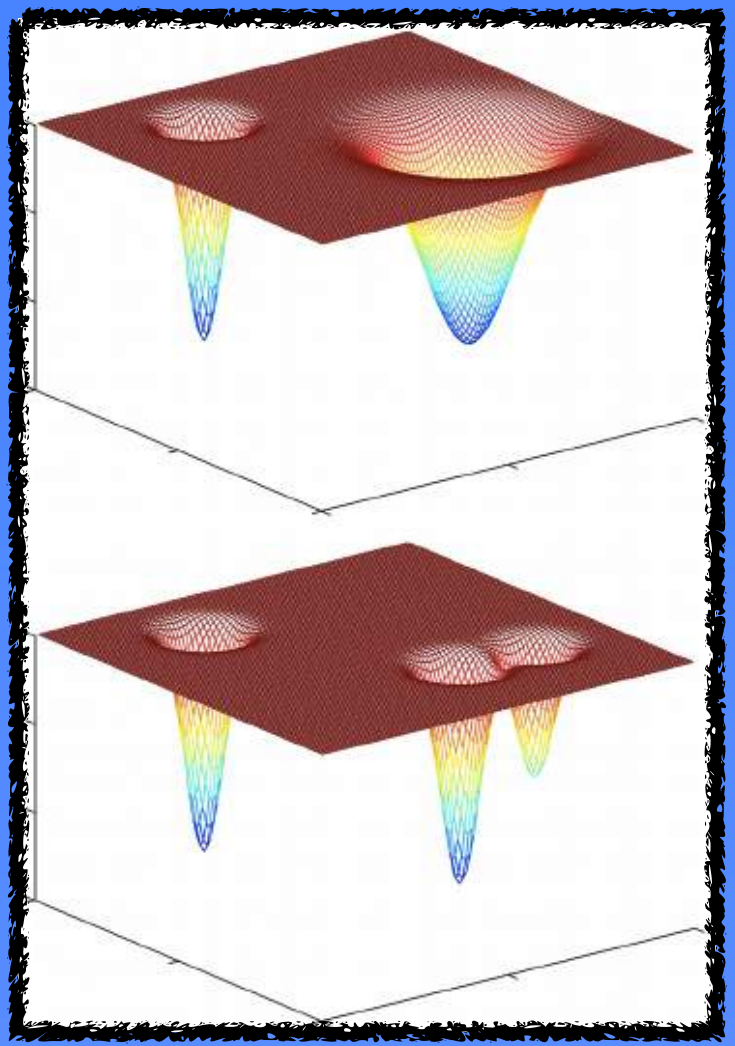


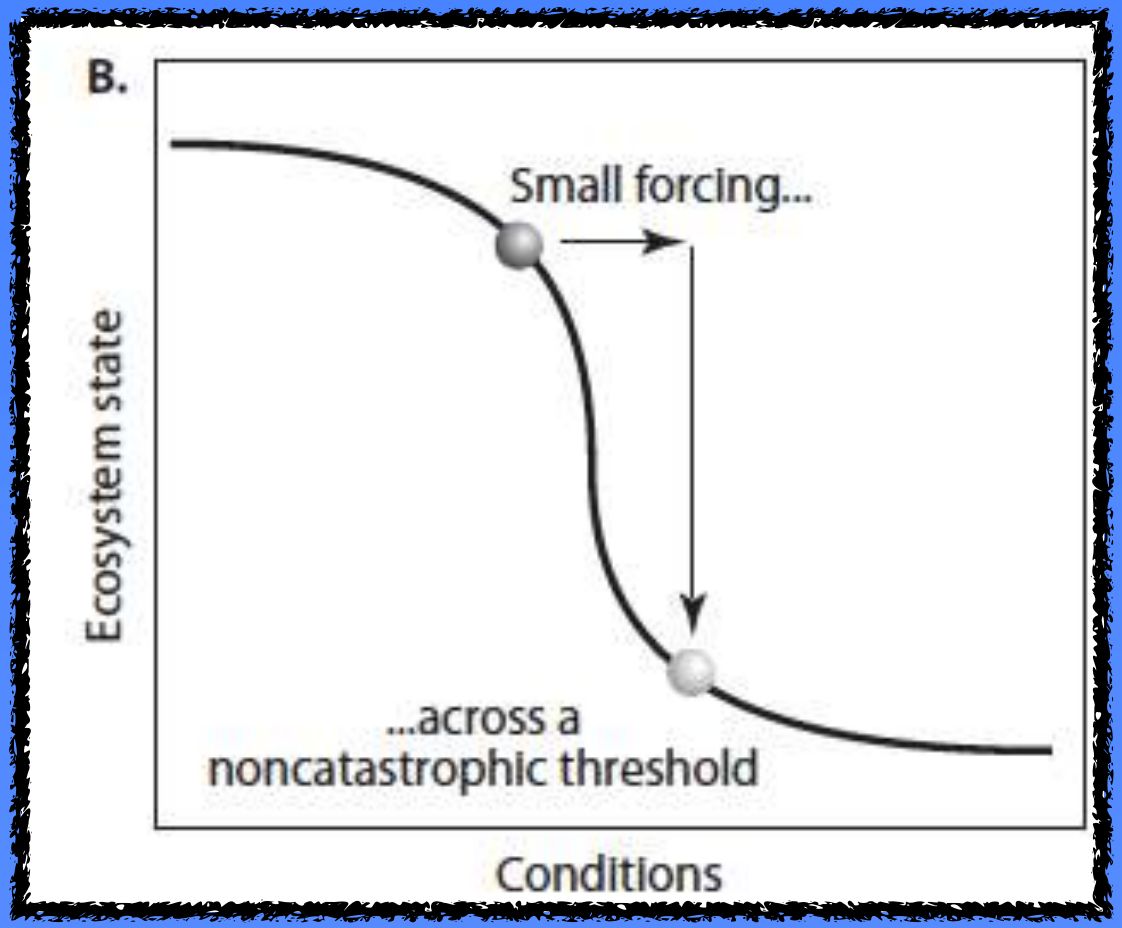
Múltiplos atratores



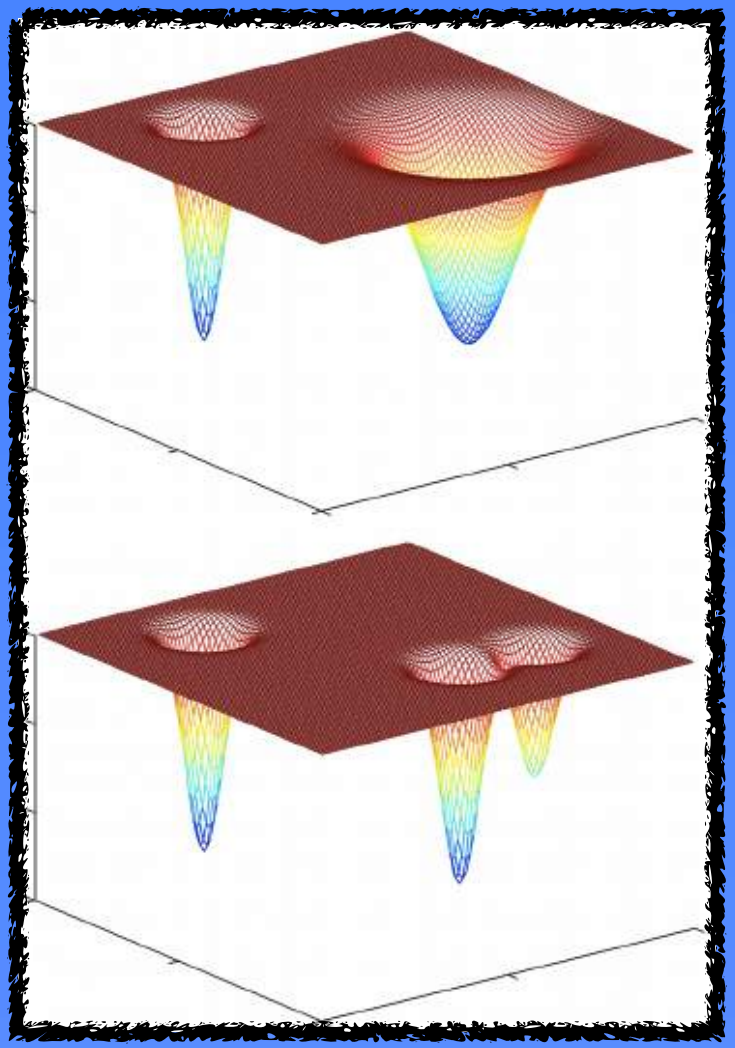


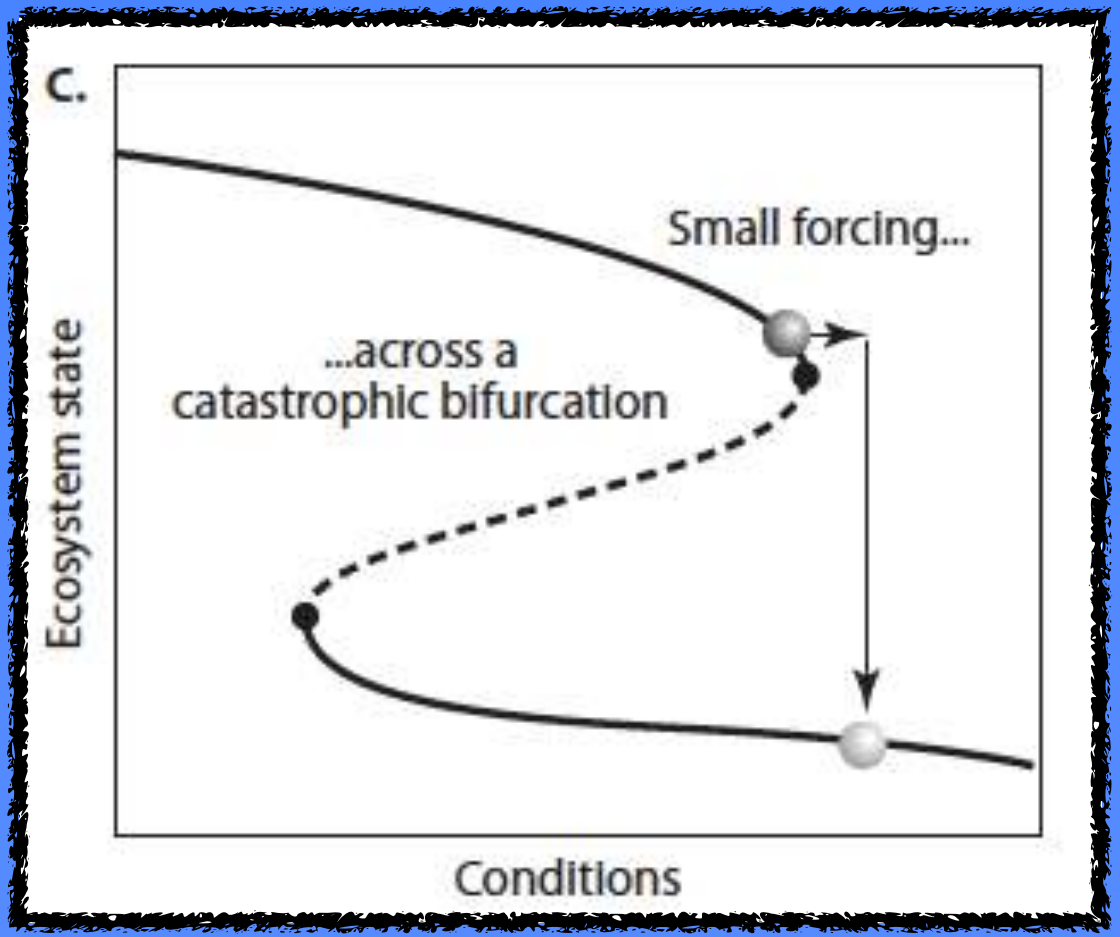
Não-linear




B.
Small forcing...
Ecosystem state
...across a
noncatastrophic threshold
Conditions

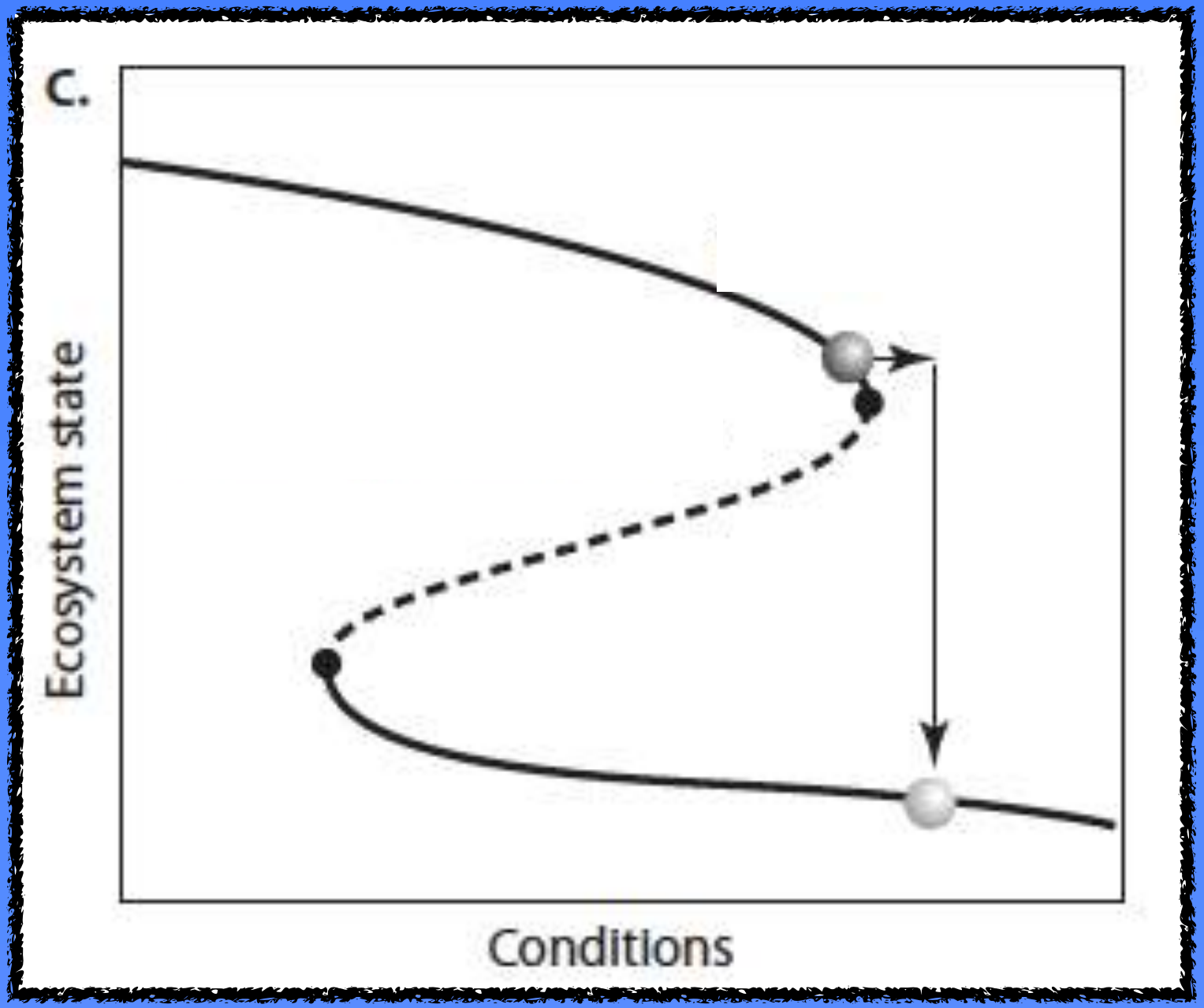
Estados estáveis alternativos

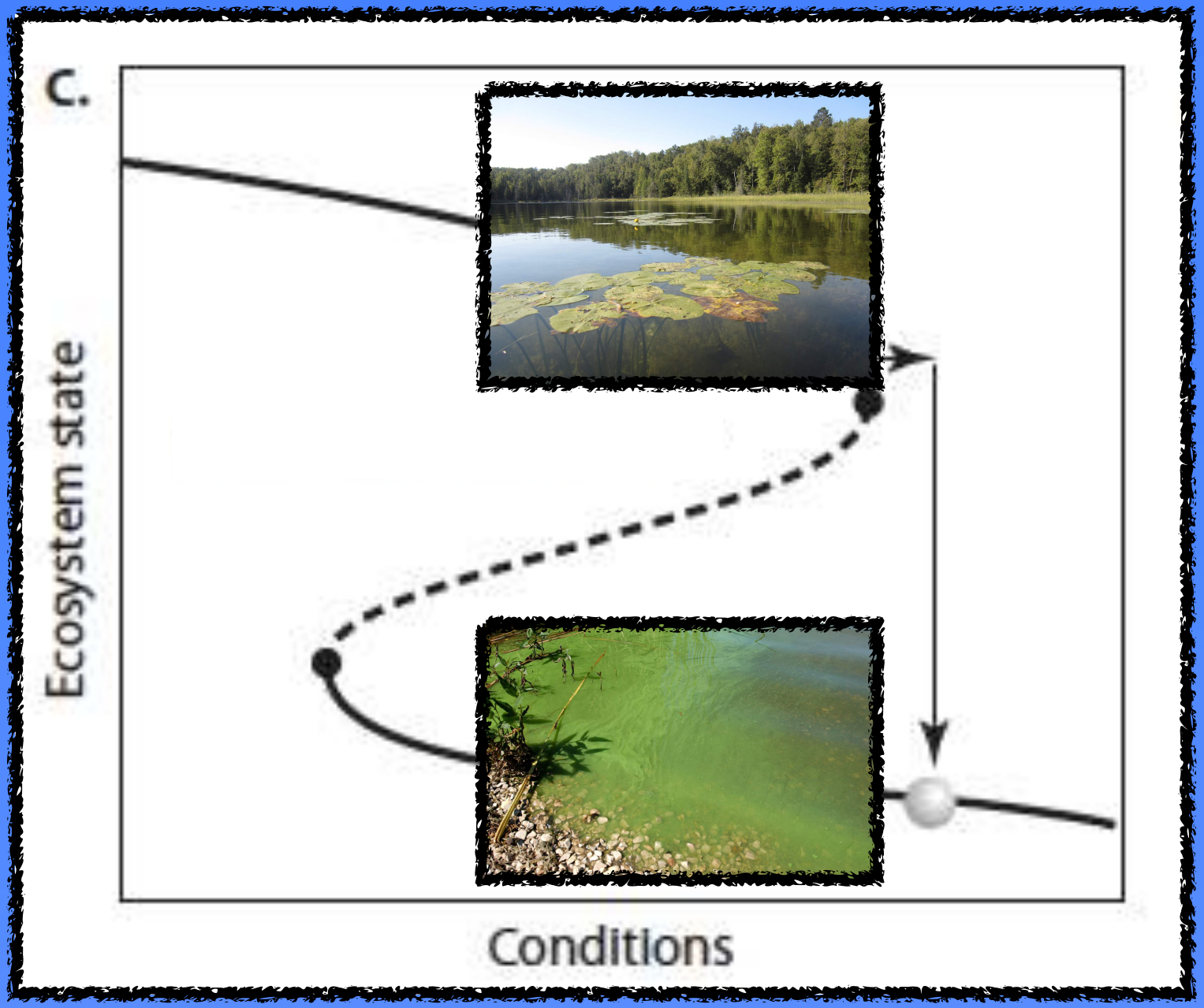


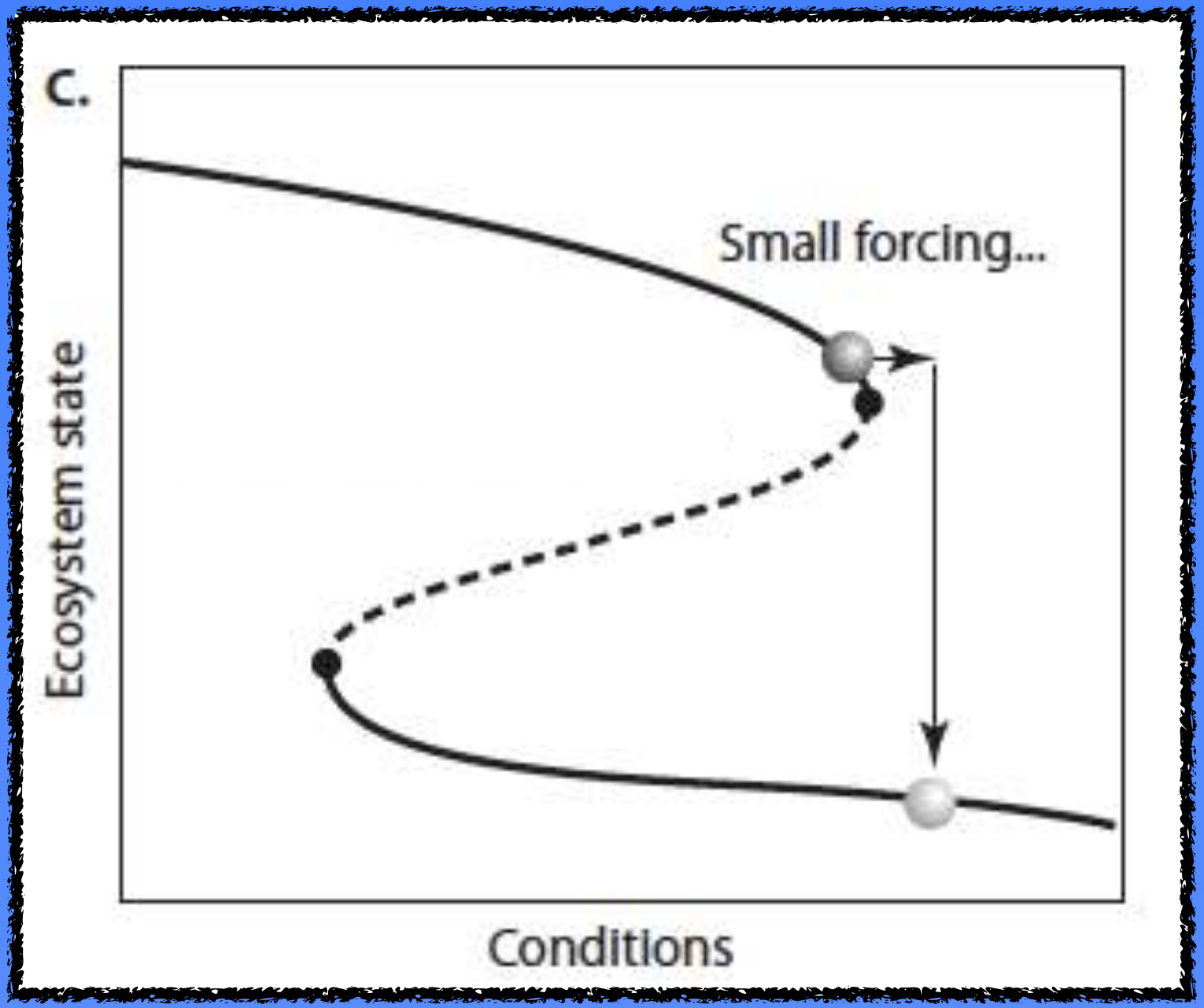


Estados estáveis alternativos

A system is said to have alternative stable states if under the same external conditions (e.g., nutrient loading, harvest pressure, or temperature) it can settle to different stable states (Scheffer, 2009).


c.
Ecosystem state
Conditions


c.
Ecosystem state
Conditions

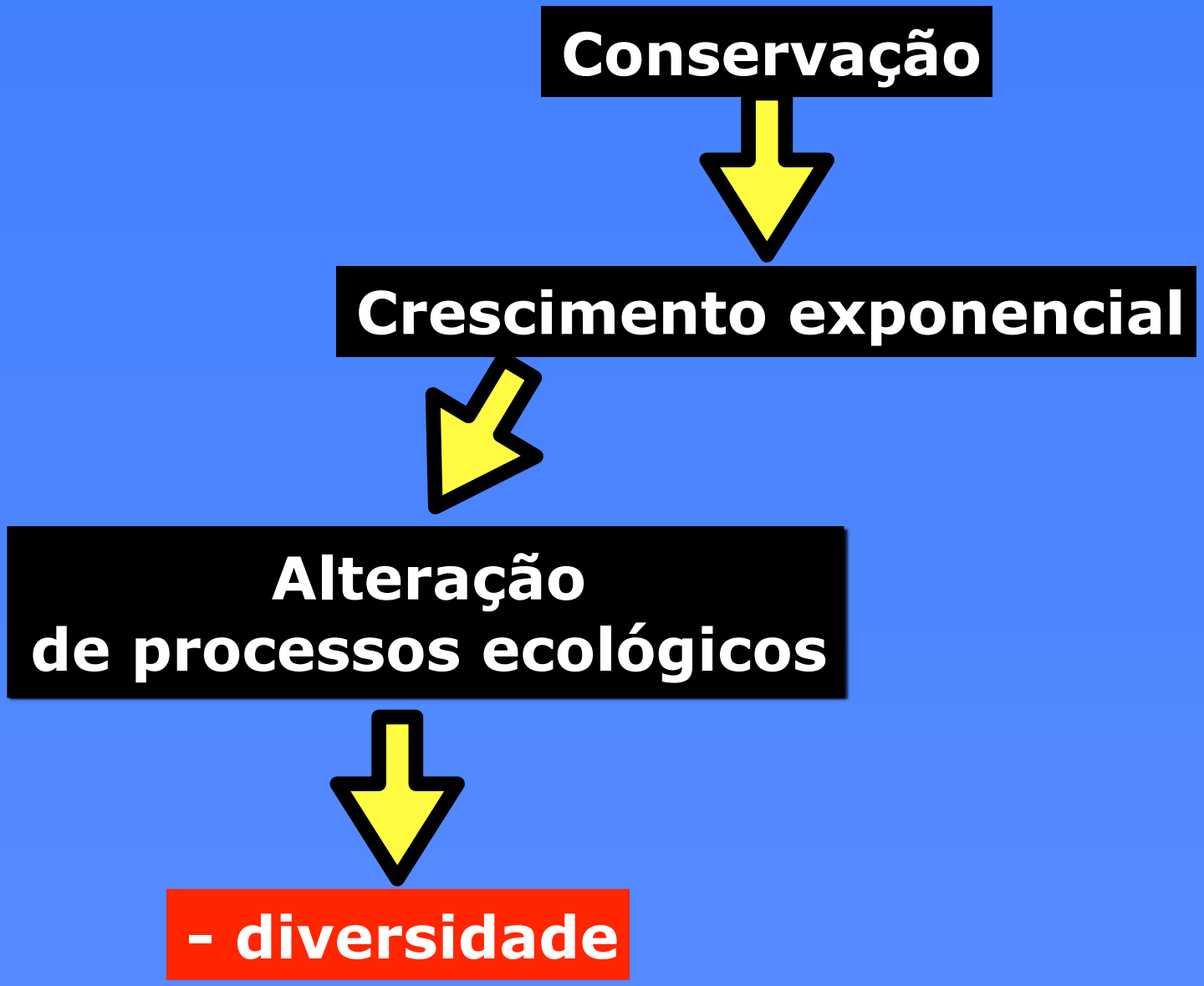

c.
Small forcing...
Ecosystem state
Conditions

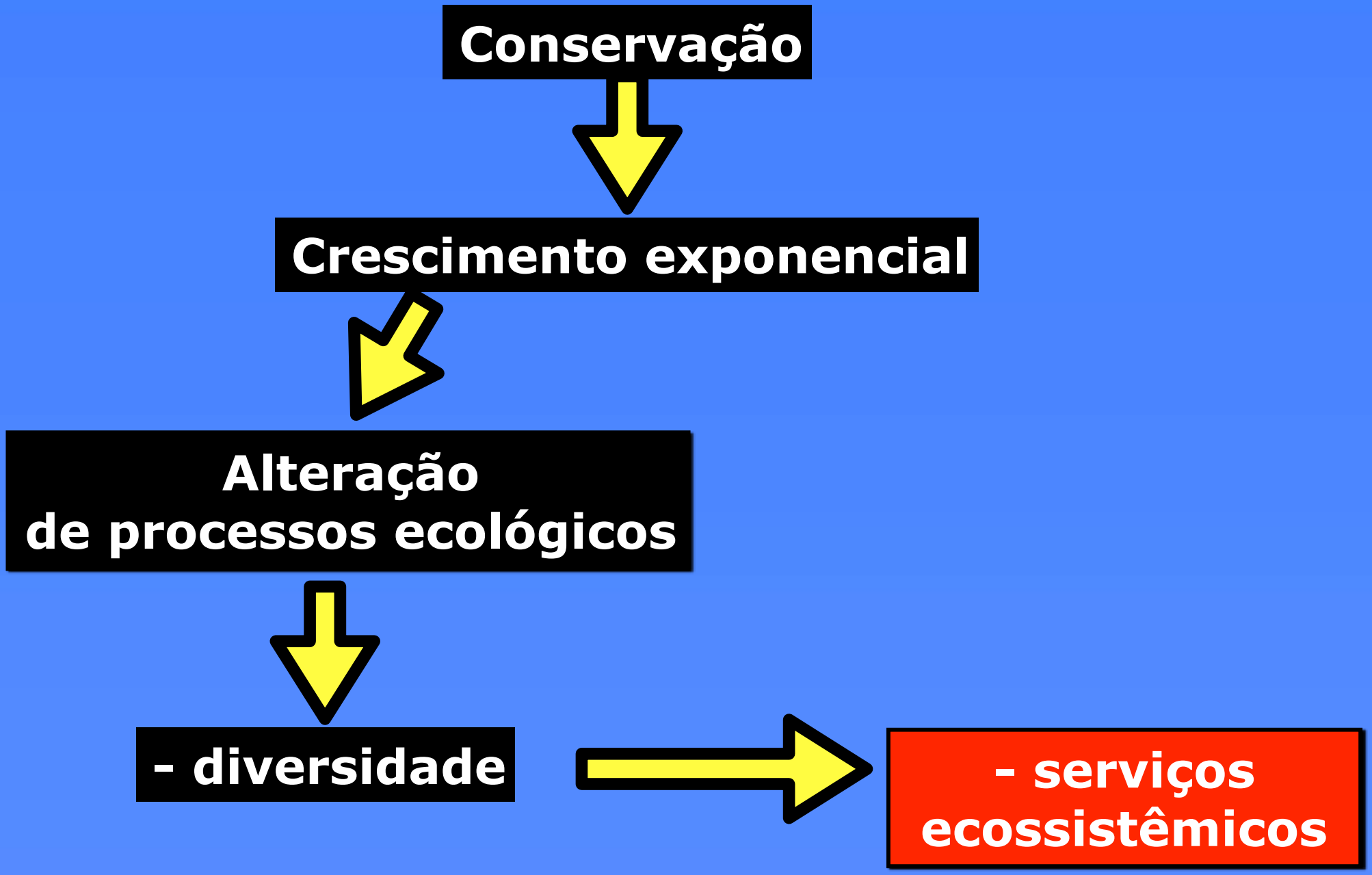
Conservação de comunidades ecológicas

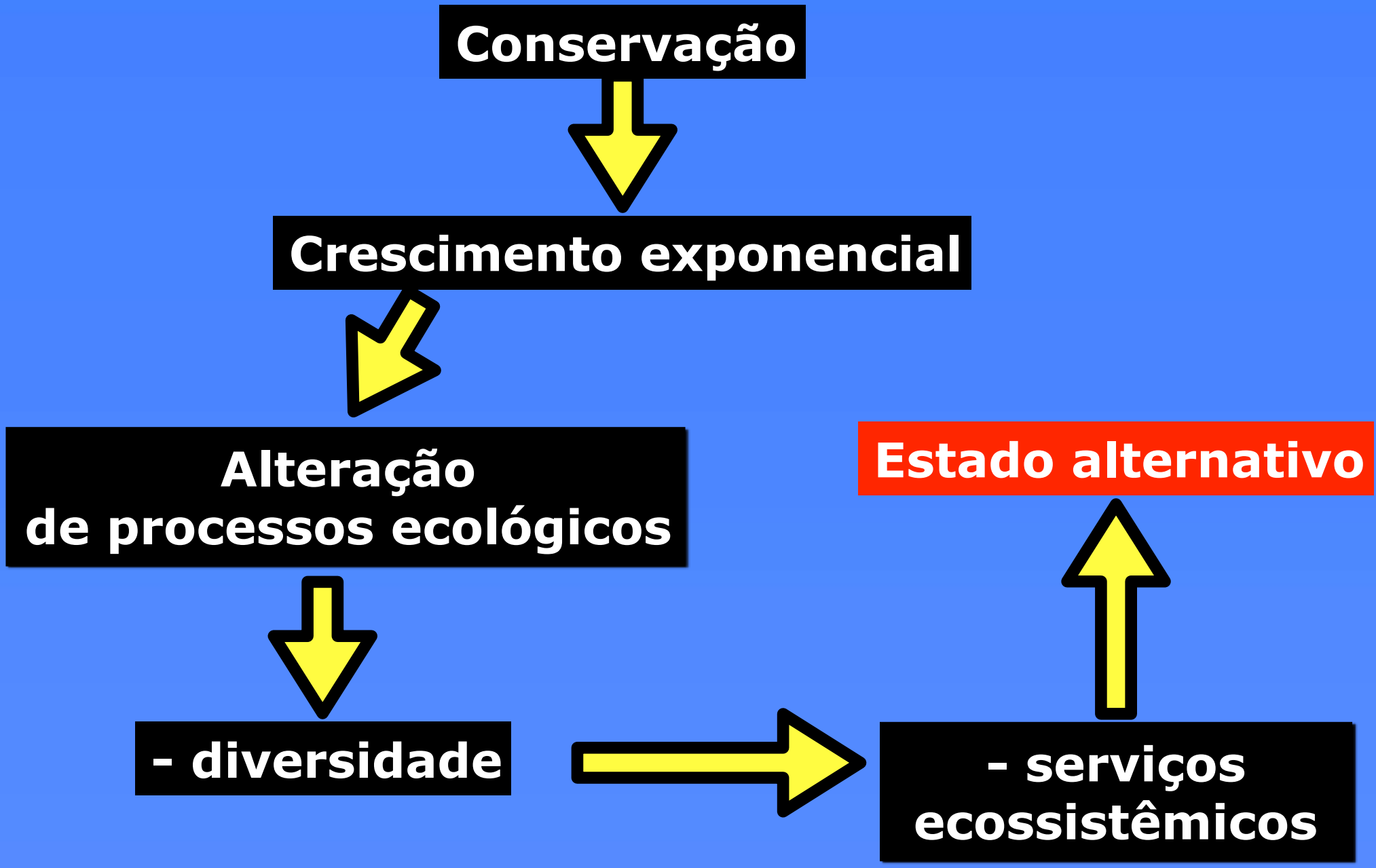
1. Definição, motivos e o que já aprendemos
2. A dinâmica da destruição
3. Estados estáveis alternativos
4. **Resumo**
5. Sugestão de leitura


Conservação
Crescimento exponencial


Conservação
Crescimento exponencial
Alteração
de processos ecológicos


Conservação
Crescimento exponencial
Alteração
de processos ecológicos
- diversidade


Conservação
Crescimento exponencial
Alteração
de processos ecológicos
- diversidade
- serviços
ecossistêmicos


Conservação
Crescimento exponencial
Alteração
de processos ecológicos
- diversidade
- serviços
ecossistêmicos
Estado alternativo

Conservação de comunidades ecológicas

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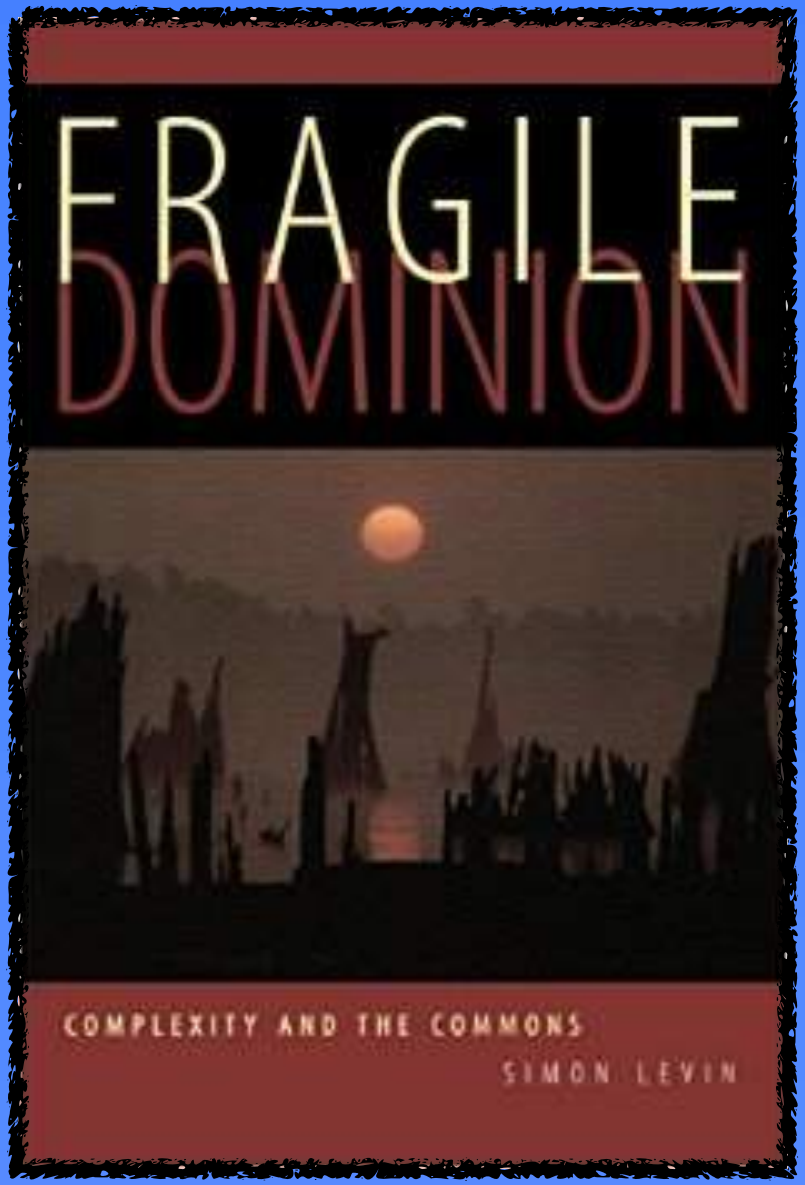
FRAGILE
DOMINION
COMPLEXITY AND THE COMMONS
SIMON LEVIN