Restoration and monitoring framework in the State of São Paulo, Brazil

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GOVERNO DO ESTADO DE SÃO PAULO

Sistema Ambiental Paulista
www.ambiente.sp.gov.br

Workshops

2010 - SMA

Participantes do grupo de trabalho "indicadores universais"

2011 - PACTO

2012 - SMA

2014 - REBRE

2013 - PACTO

REBRE
Rede Brasileira de Restauração Ecológica

rebre.org

PACTO
PELA RESTAURAÇÃO DA
MATA ATLÂNTICA

www.pactomataatlantica.org.br

SOBRE
SOCIEDADE BRASILEIRA DE RESTAURAÇÃO ECOLÓGICA

www.sobrestauracao.org

Initiative
20x20

initiative20x20.org

Restoration framework overview - SP

- commitments
- mandatory restoration
- biodiversity offsetting
- funding

REQUIRE

measurability and criteria to assess
the outcomes of restoration projects

evidence-based
ecological indicators
integrating
public policies

VERIFY

achievement of
goals and targets
(BC; ES*)

Project managers

CALLED UPPON

adaptative management

*

Legal context

National Constitution (1988)

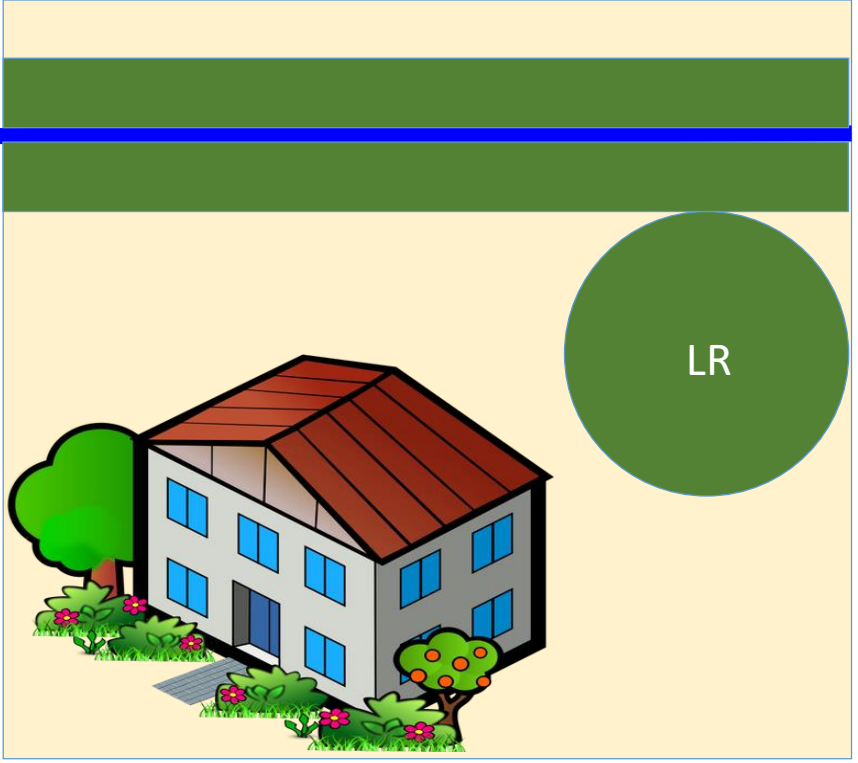
- Art. 225:

"preserve and restore the essential ecological processes"

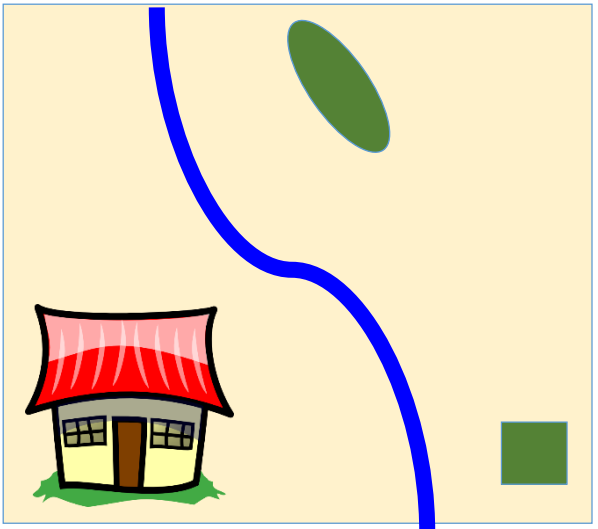
Law 12.651/2012

- Mandatory restoration
- Monitoring in the State level

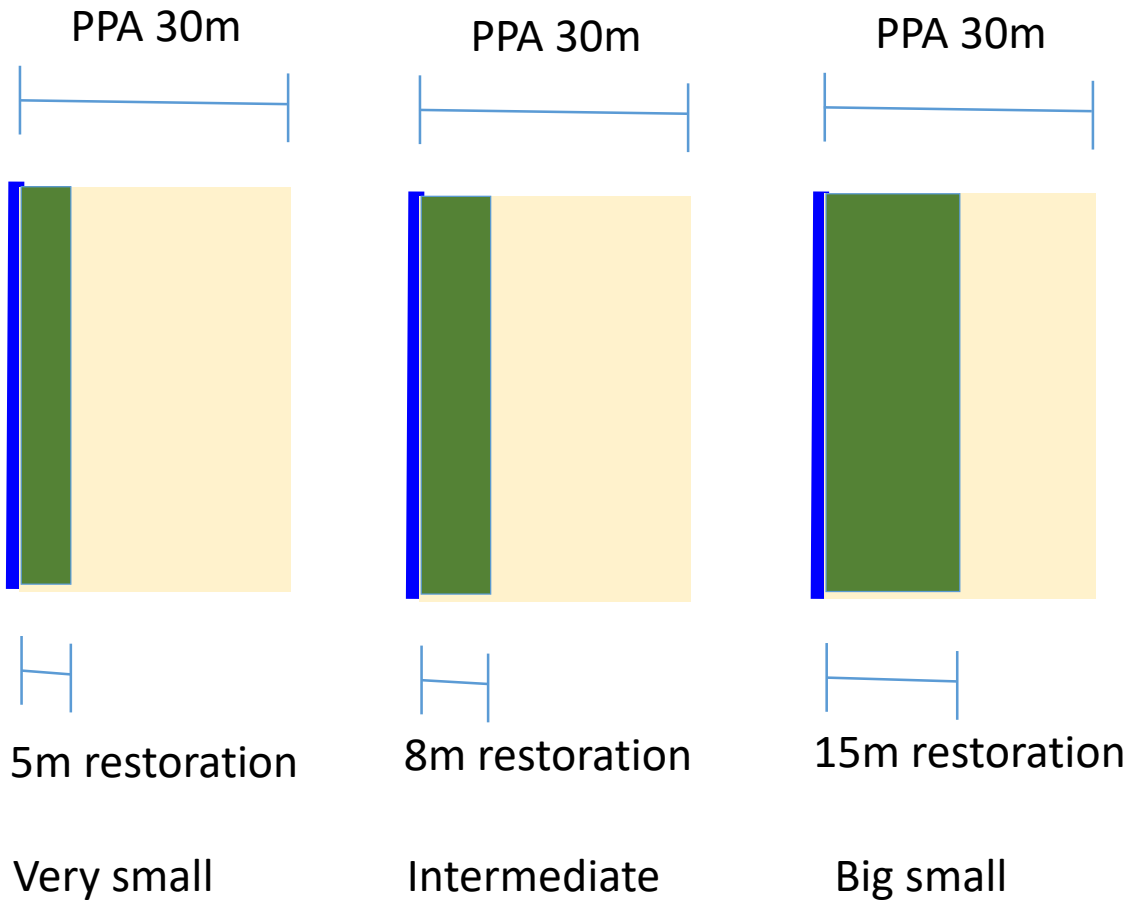
Mandatory restoration in Brazil
General law requirements



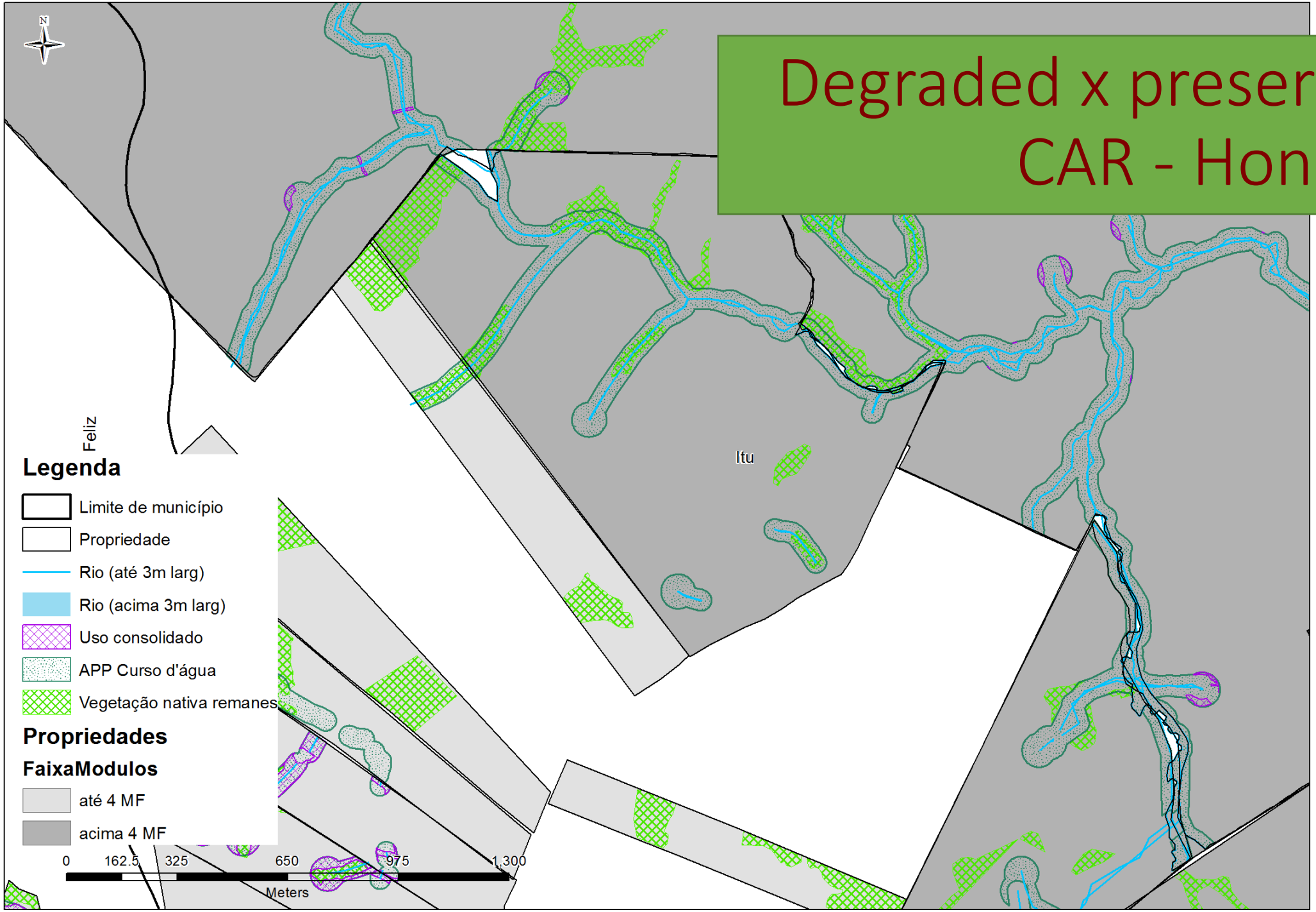
Big



Small

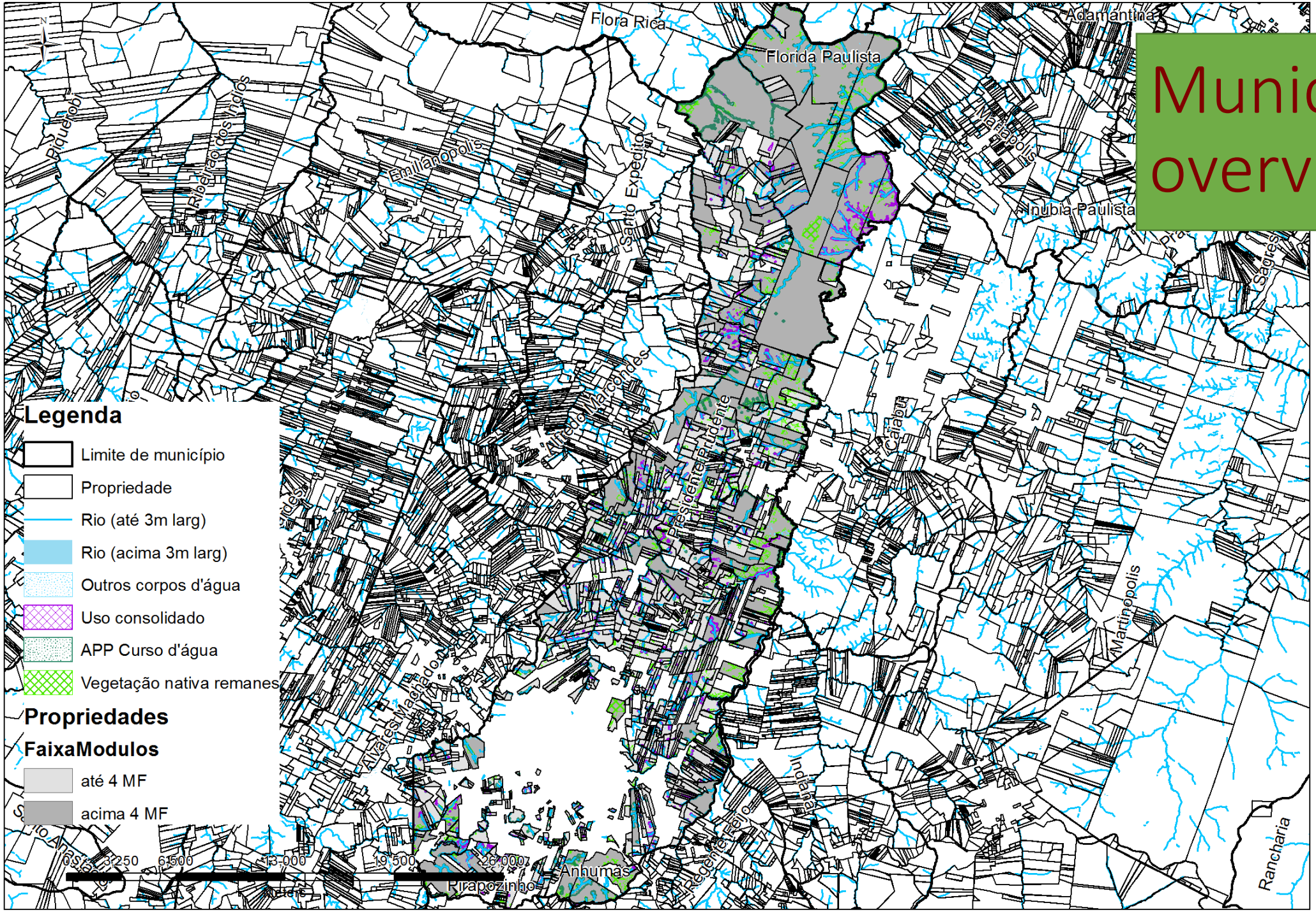


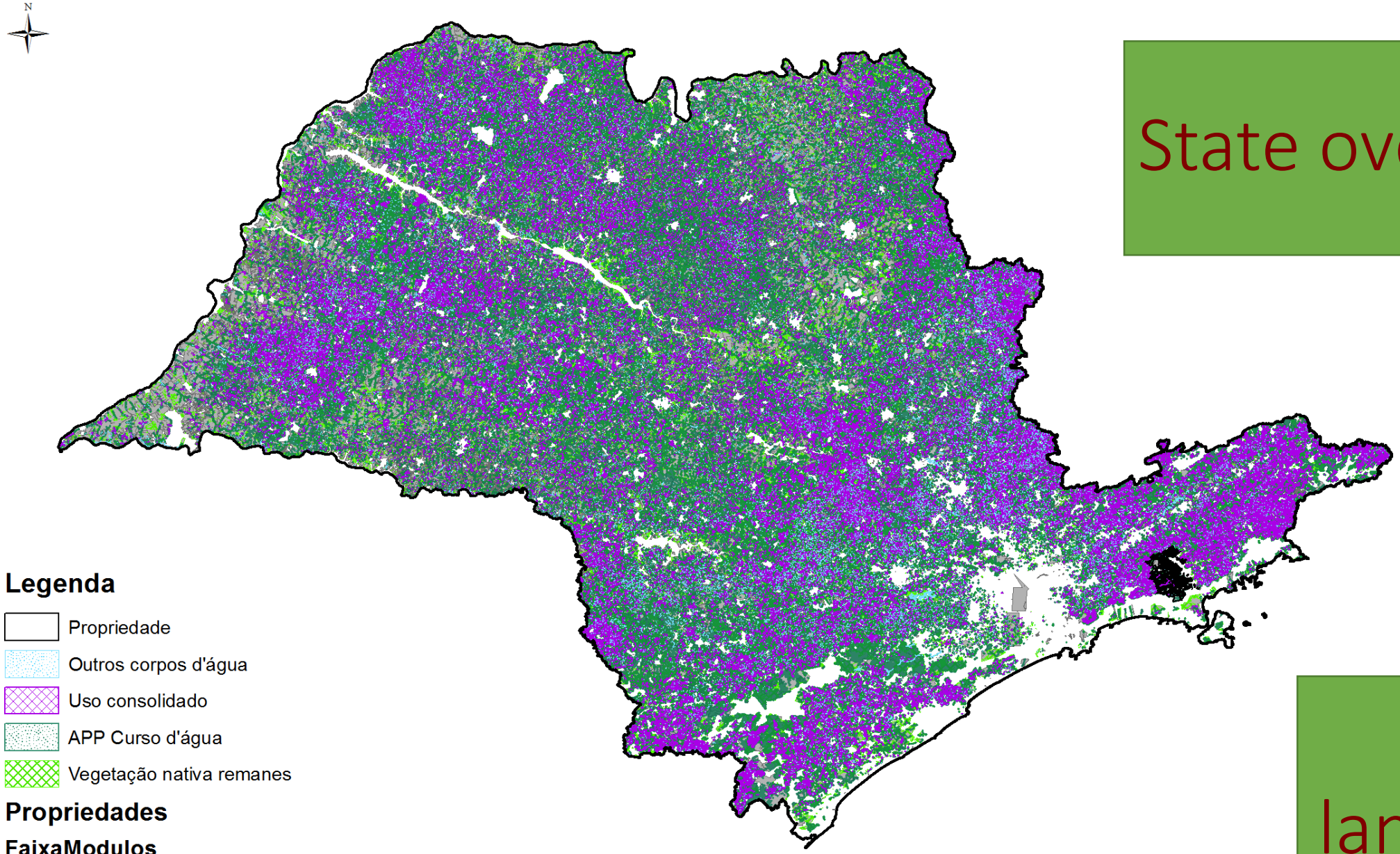
Degraded x preserved areas
CAR - Honor system



Landholdings

Municipality overview





State overview

Legenda

- Propriedade
- Outros corpos d'água
- Uso consolidado
- APP Curso d'água
- Vegetação nativa remanes

Propriedades

FaixaModulos

- até 4 MF
- acima 4 MF

0 45,500 91,000 182,000 273,000 364,000

Meters

20 Million Ha

348.000 landholdings registered

System integration

Scaling up

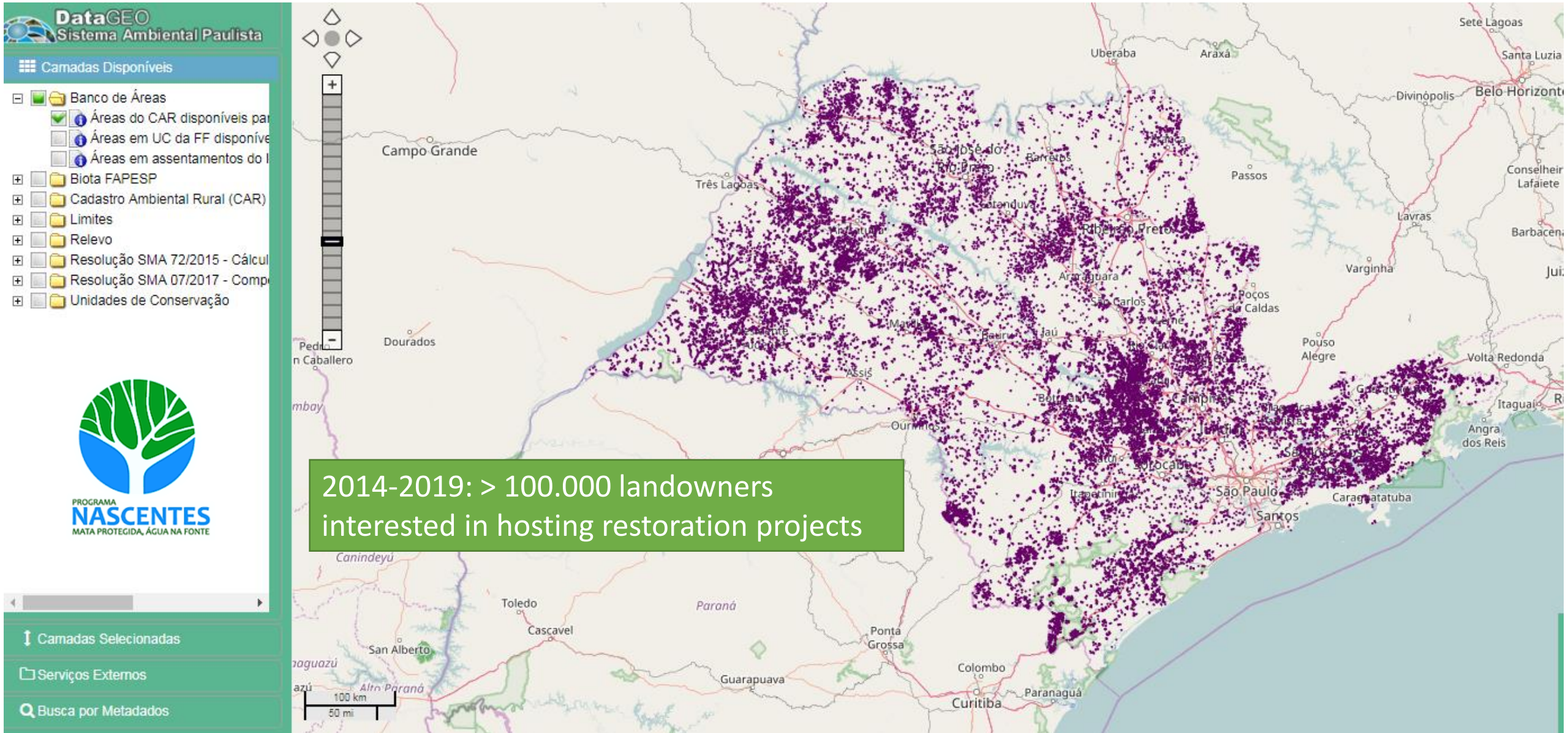
SiCAR•SP
SISTEMA DE CADASTRO AMBIENTAL RURAL

PROGRAMA
NASCENTES
MATA PROTEGIDA, ÁGUA NA FONTE

Do you need help to restore?

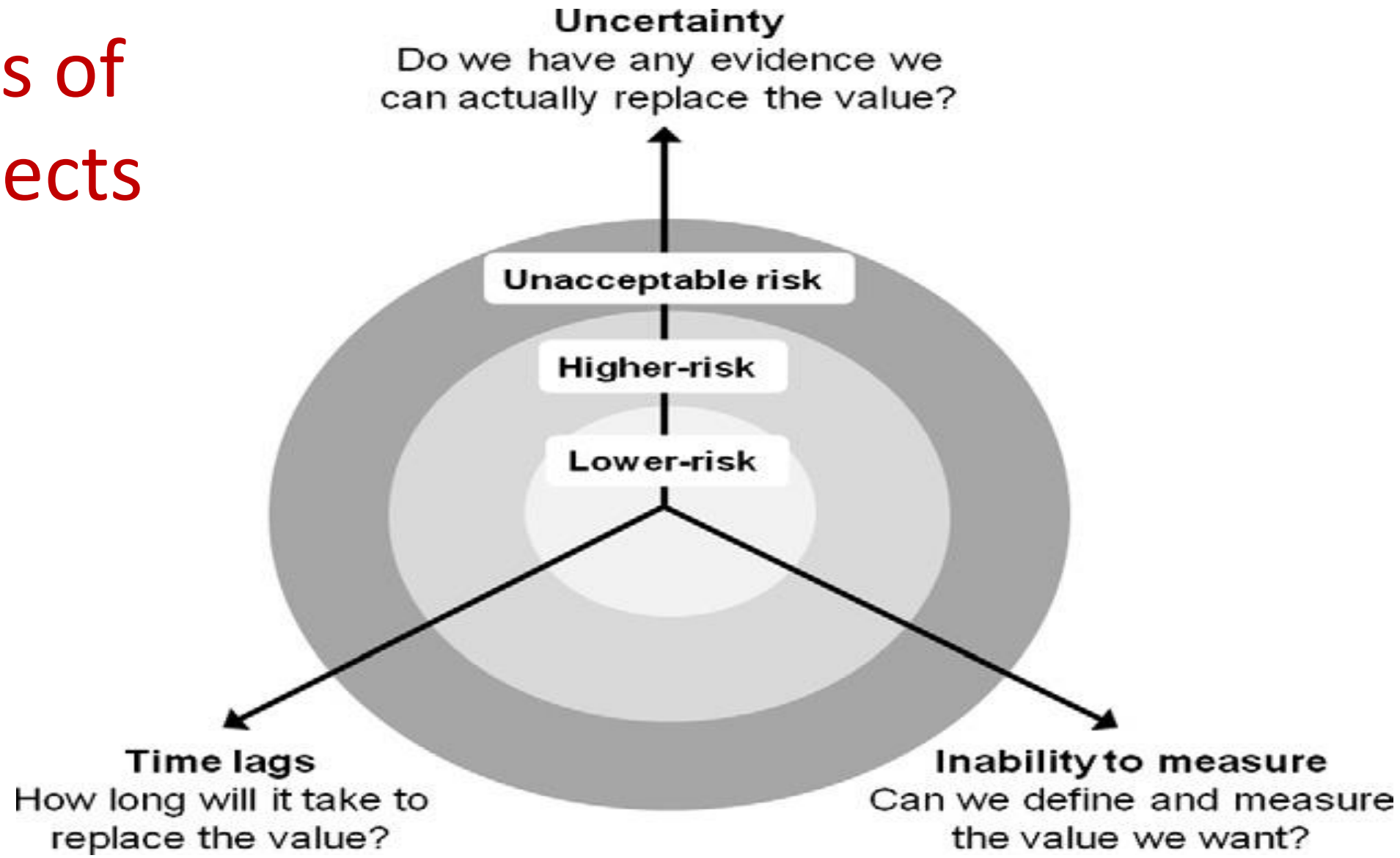
- Landowners and practitioners linked to a platform
- Land available for restoration
- Opportunity for investors

Available areas → Landholdings



2014-2019: > 100.000 landowners interested in hosting restoration projects

Risks of projects

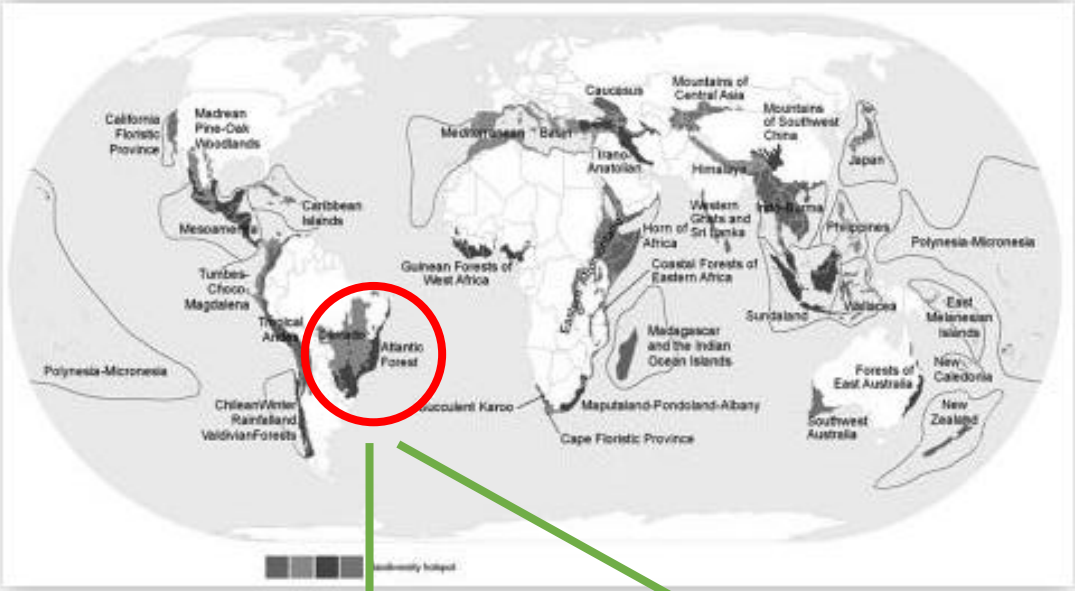


Maron et al. 2012

Mittermeier et al.

Hotspots

SP



Cerrado

Atlantic Forest

restoration framework: on the way

importance

debate

research

indicators

targets

monit. protocol

online system

trainning

practice

consolidation

support

communication

2010

2020

importance

The need of monitoring…

International commitments

Aichi / Nagoya

New York

Bohn challenge

Legal requirements

Offset policies

Regularization programs

Watershed management

Financing / compliance

Public funding

Green marketing

Climate change mitigation

…to access the achievement of goals and targets…

1)…made us debate…

Restoration Ecology
THE JOURNAL OF THE SOCIETY FOR ECOLOGICAL RESTORATION INTERNATIONAL

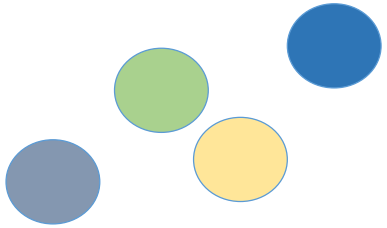
OPINION ARTICLE

What Role Should Government Regulation Play in Ecological Restoration? Ongoing Debate in São Paulo State, Brazil

(Aronson et al 2011)

REBRE
Rede Brasileira de Restauração Ecológica

PACTO
PELA RESTAURAÇÃO DA MATA ATLÂNTICA



Methods

Monitoring
Targets
Results

2)…research…

Contents lists available at ScienceDirect

Biological Conservation

journal homepage: www.elsevier.com/locate/biocon

On the restoration of high diversity forests: 30 years of experience in the Brazilian Atlantic Forest

Ricardo R. Rodrigues, Renato A.F. Lima *, Sérgius Gandolfi, André G. Nave

Restoration Ecology

THE JOURNAL OF THE SOCIETY FOR ECOLOGICAL RESTORATION

RESEARCH ARTICLE

Indicators of restoration success in riparian tropical forests using multiple reference ecosystems

Marcio S. Suganuma[1,2,3], Giselda Durigan[1]

- Oliveira, 2011 - O estado da arte da ecologia da restauração e sua relação com a restauração de ecossistemas florestais no bioma Mata Atlântica

Restoration Ecology
THE JOURNAL OF THE SOCIETY FOR ECOLOGICAL RESTORATION

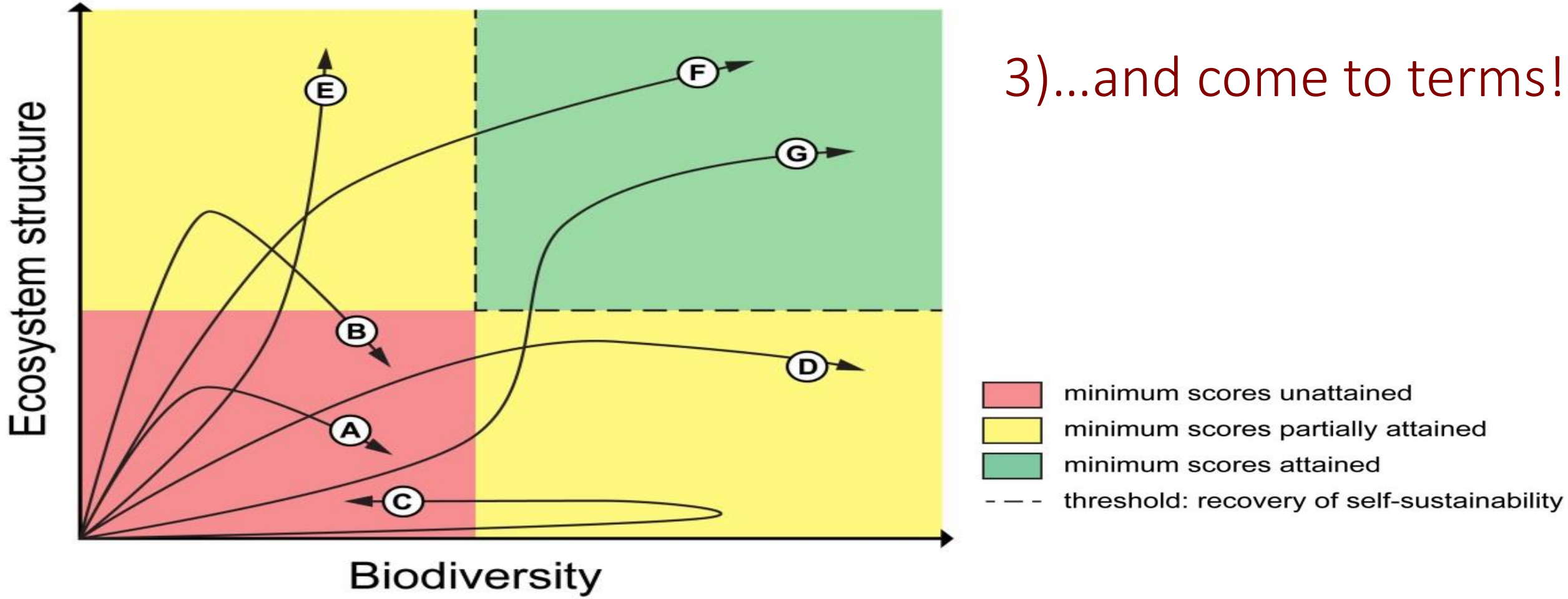
indicators

targets

POLICY ARTICLE

On the need of legal frameworks for assessing restoration projects success: new perspectives from São Paulo state (Brazil)

(Chaves et al. 2015)



3)…and come to terms!

Restoration Ecology
THE JOURNAL OF THE SOCIETY FOR ECOLOGICAL RESTORATION

indicators

targets

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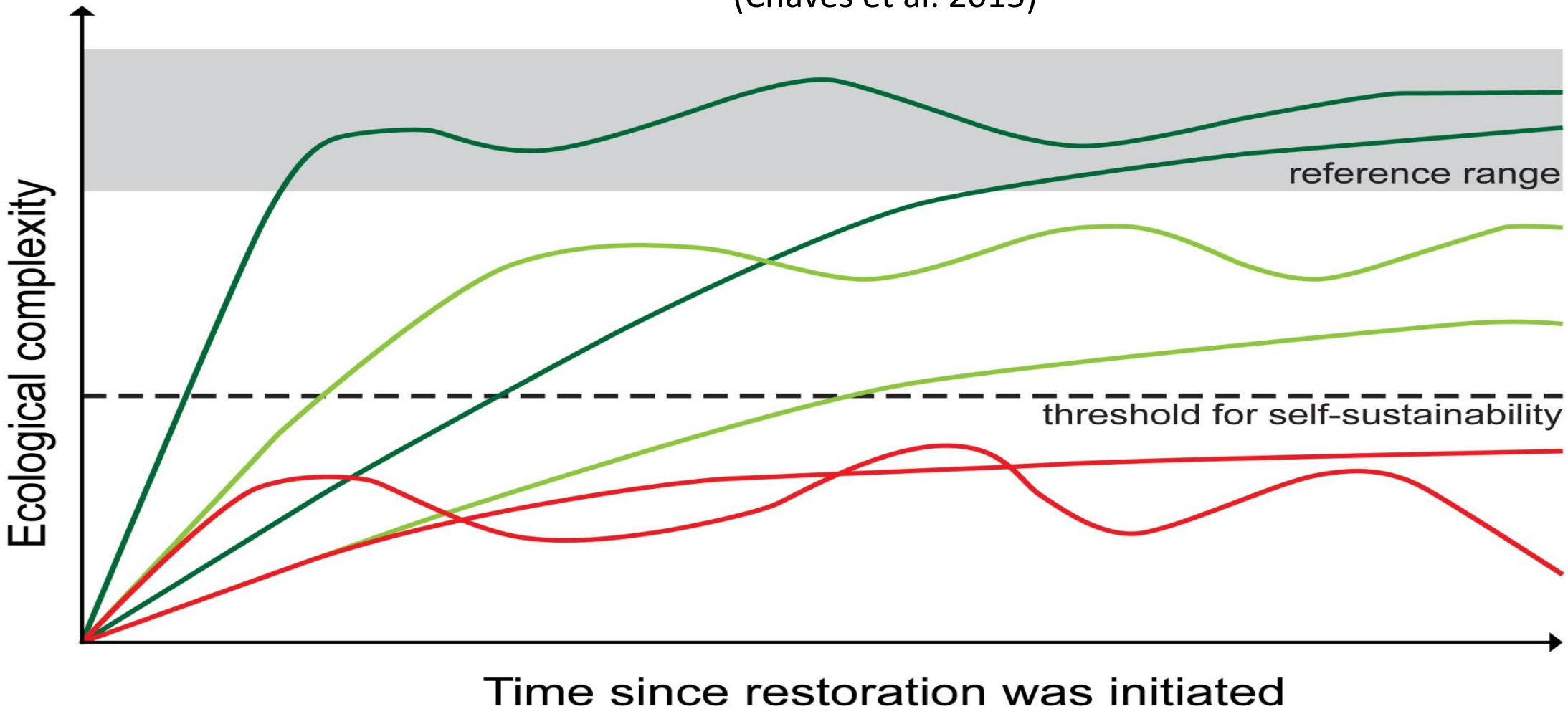


indicators

targets

The 3 ecological indicators *

Resolution launched by Sao Paulo
(SMA 32/2014)

INDICATORS	Ground coverage with native vegetation (%)	Density of native plants spontaneously regenerating (ind/ha)	Number of spontaneously regenerating native plant species (nº spp)

indicators

targets

Resolution launched by SP (SMA 32/2014) - targets

know it when you see it!

	INDICATORS		
ECOSYSTEM TYPE	**Soil cover with native vegetation (%)**	**Density of native plants spontaneously regenerating (ind./ha)**	**Number of native plant species spontaneously regenerating (n)**
Forests	> 80	> 3000	> 30
Savannas	> 80	> 2000	> 25
Grasslands / Open	> 80	-	-

indicators

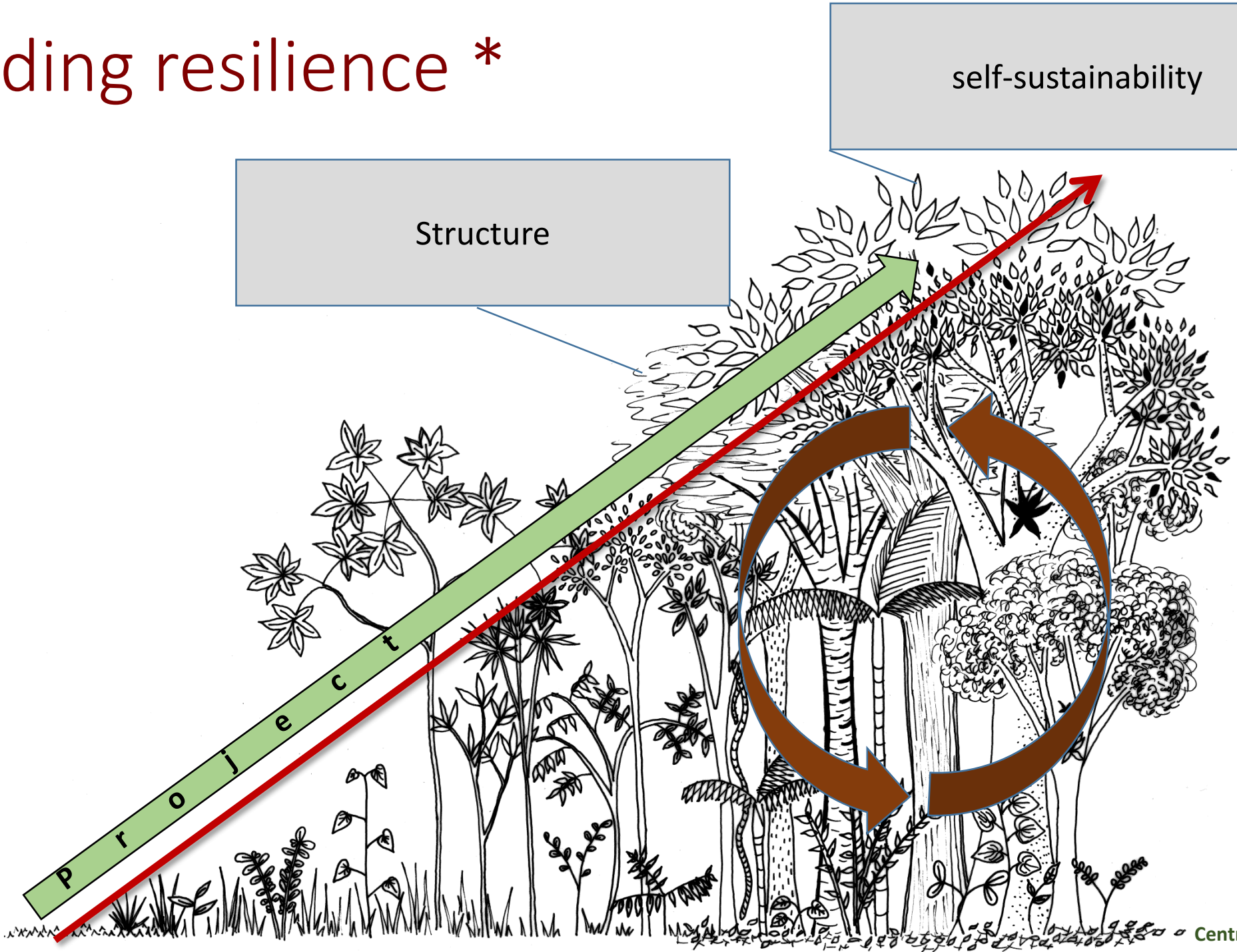
targets

Long-term intermediate targets *

		ADEQUACY LEVEL		
		Critical range	Minimum range	Adequate range
ECOLOGICAL INDICATOR	TIME			
Ground cover with native vegetation (%)	3 years	0 - 15	15 - 80	> 80
	5 years	0 - 30	30 - 80	> 80
	10 years	0 - 50	50 - 80	> 80
	15 years	0 - 70	70 - 80	> 80
	20 years	0 - 80	-	> 80
Density of native plants spontaneously regenerating (ind./ha)	3 years	-	0 - 200	> 200
	5 years	0 - 200	200 - 1000	> 1000
	10 years	0 - 1000	1000 - 2000	> 2000
	15 years	0 - 2000	2000 - 2500	> 2500
	20 years	0 - 3000	-	> 3000
Number of native plant species spontaneously regenerating (n)	3 years	-	0 - 3	> 3
	5 years	0 - 3	3 - 10	>10
	10 years	0 - 10	10 - 20	> 20
	15 years	0 - 20	20 - 25	> 25
	20 years	0 - 30	-	> 30

Adaptative management

Building resilience *



communication

But how to measure?

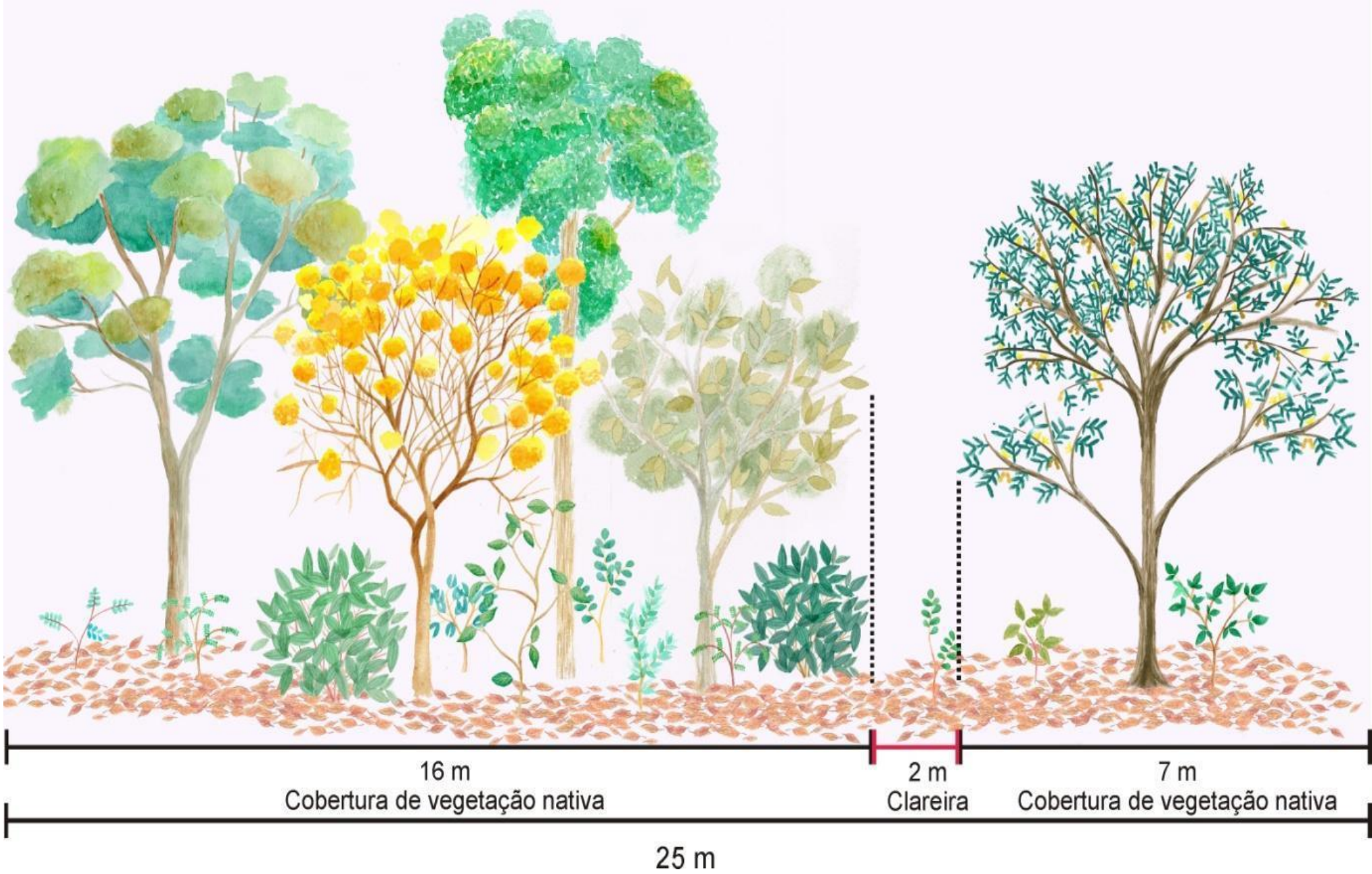
SP Restoration Monitoring Protocol

monit. protocol | communication

Atlantic Forest

Soil cover
=
canopy cover

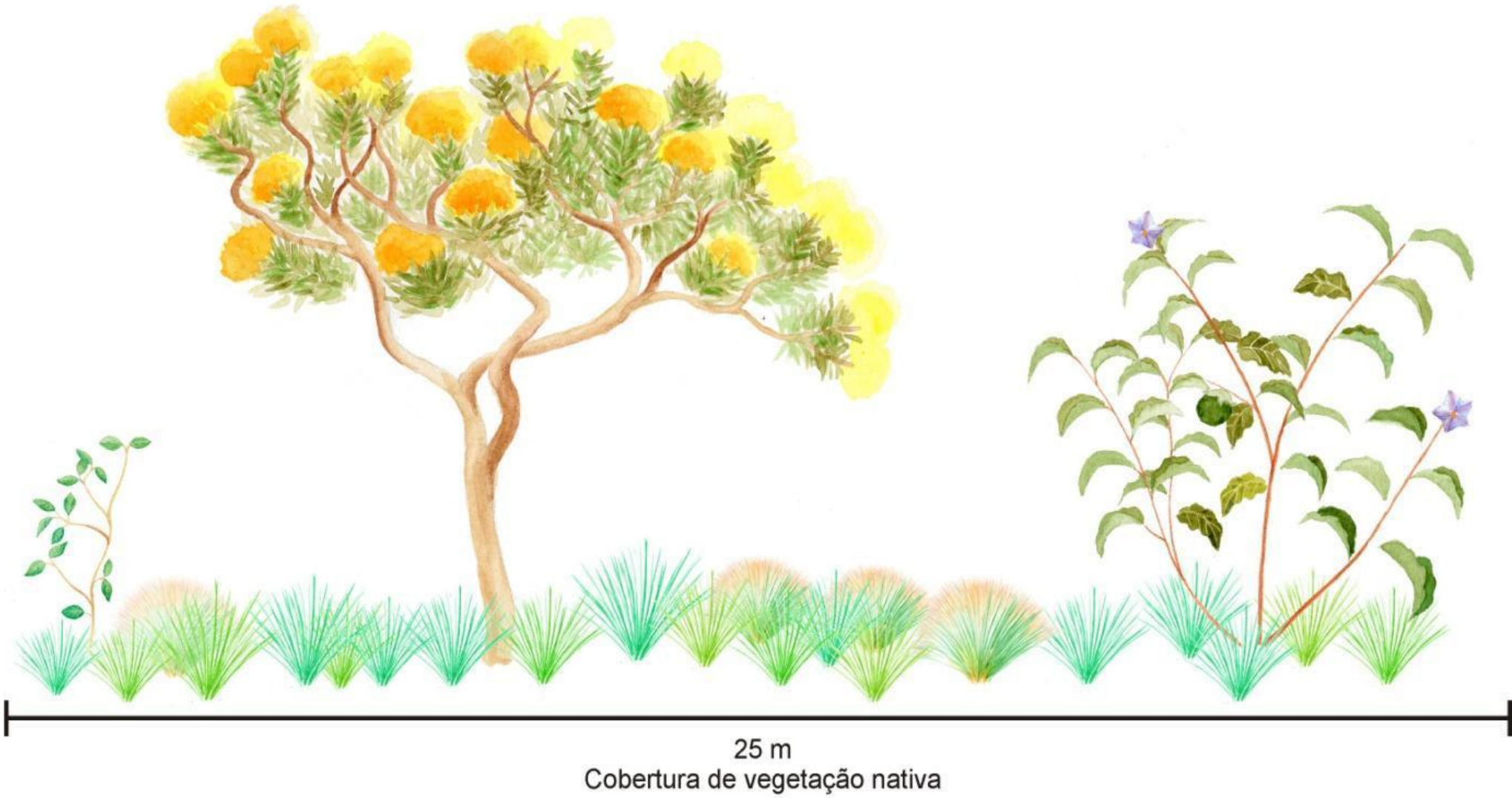
(the plot)
reached
the target

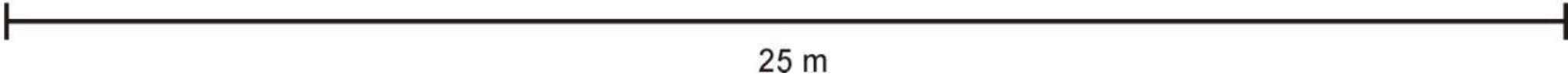


Cerrado (savanna)

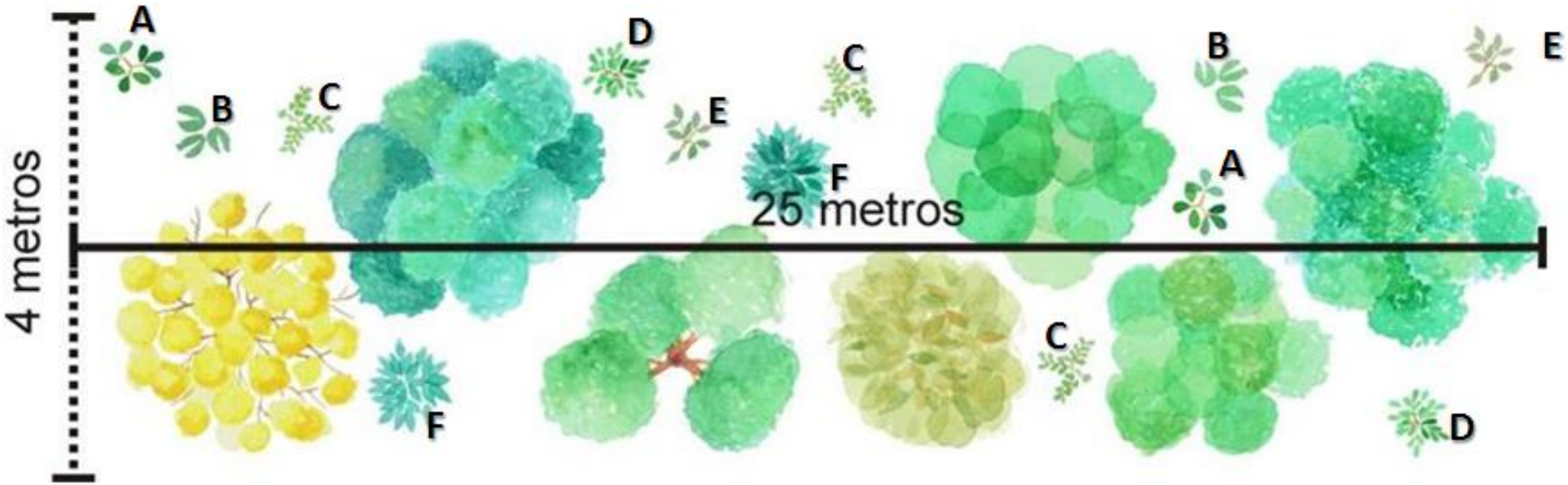
Soil cover
=
vegetation cover
(trees, shrubs
herbs, grasses)

(the plot)
reached
the target





Density and richness of regenerants



Ecological Restoration Supporting System

www.ambiente.sp.gov.br/sare/

communication

support

consolidation

online system

sare

communication

support

consolidation

online system

support

consolidation

degradation overview

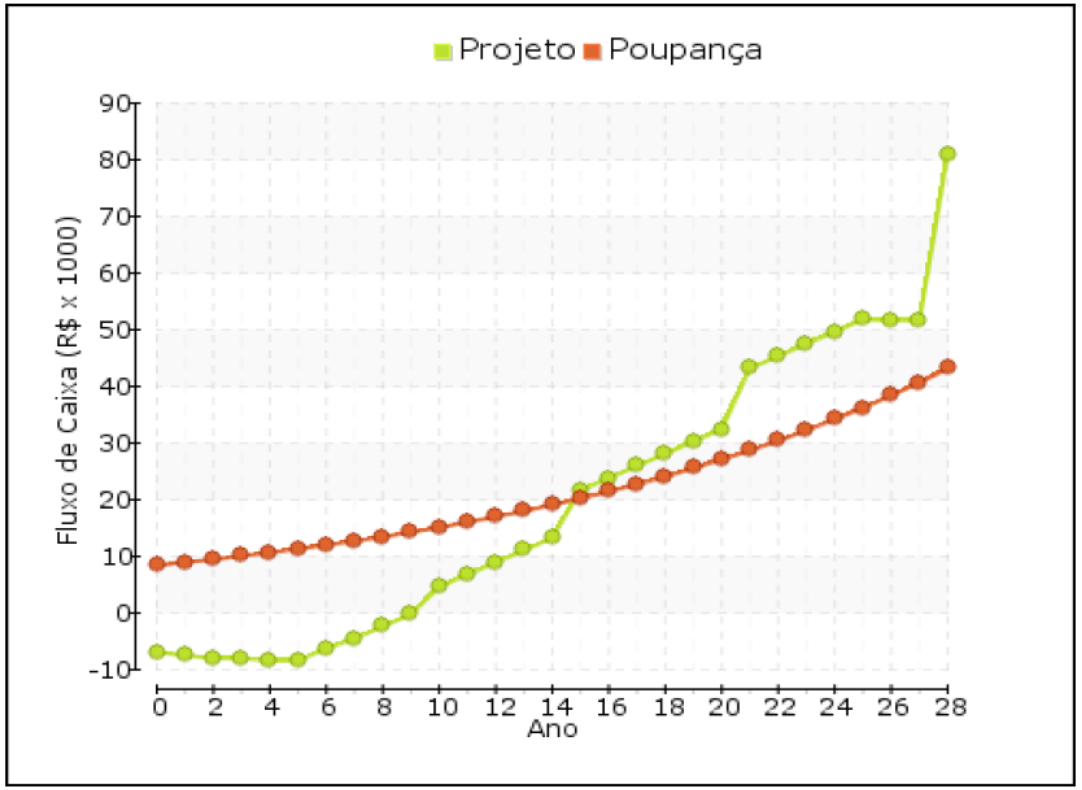
dynamic monitoring

sare

general reccomendation

actions schedule

Fluxo de Caixa



Ano	Receita (R$/ha)	Despesa (R$/ha)	Caixa Acumulado (R$/ha)
0	.00	-6949.70	-6949.70
1	.00	-482.25	-7431.95
2	.00	-584.25	-8016.20
3	89.83	-96.25	-8022.62
4	89.83	-497.50	-8430.28
5	89.83	-96.25	-8436.70
6	2245.83	-96.25	-6287.12
7	2245.83	-497.50	-4538.78
8	2245.83	-96.25	-2389.20
9	2245.83	-96.25	-239.62
10	4939.52	-96.25	4603.66
11	2245.83	-96.25	6753.24
12	2245.83	-96.25	8902.82
13	2245.83	-96.25	11052.41
14	2245.83	-96.25	13201.99
15	8528.42	-96.25	21634.16
16	2245.83	-96.25	23783.74
17	2245.83	-96.25	25933.32
18	2245.83	-96.25	28082.91
19	2245.83	-96.25	30232.49
20	2245.83	-96.25	32382.07
21	10881.85	-96.25	43167.67
22	2245.83	-96.25	45317.25
23	2245.83	-96.25	47466.83
24	2245.83	-96.25	49616.42
25	2245.83	-96.25	51766.00
26	.00	-96.25	51669.75
27	.00	-96.25	51573.50
28	29360.11	-96.25	80837.36

Trainning courses

practice

trainning

- 124 participants
- small groups (2-4)

Trainning courses

practice

trainning

- Alignment meeting with regional representatives

Trainning courses

practice

trainning

support

- Public agents

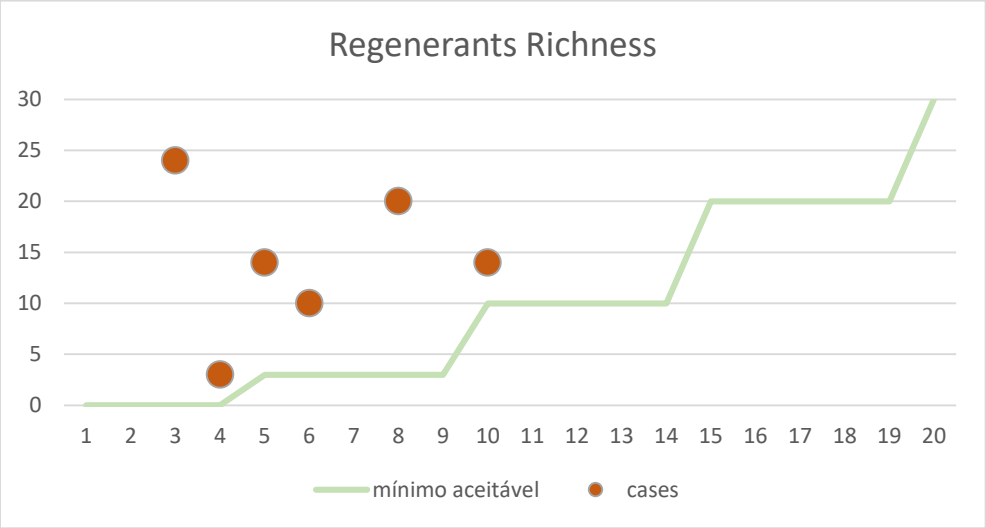
support

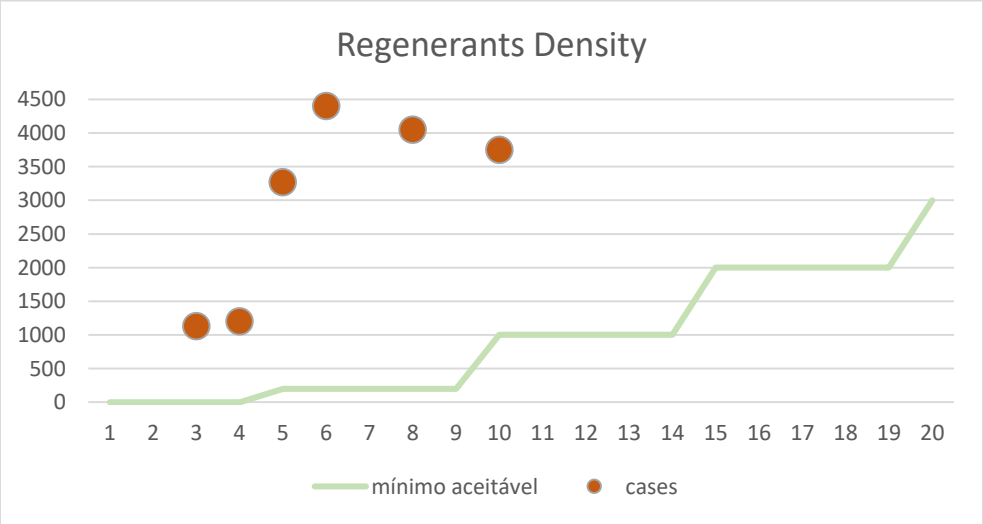
trainning

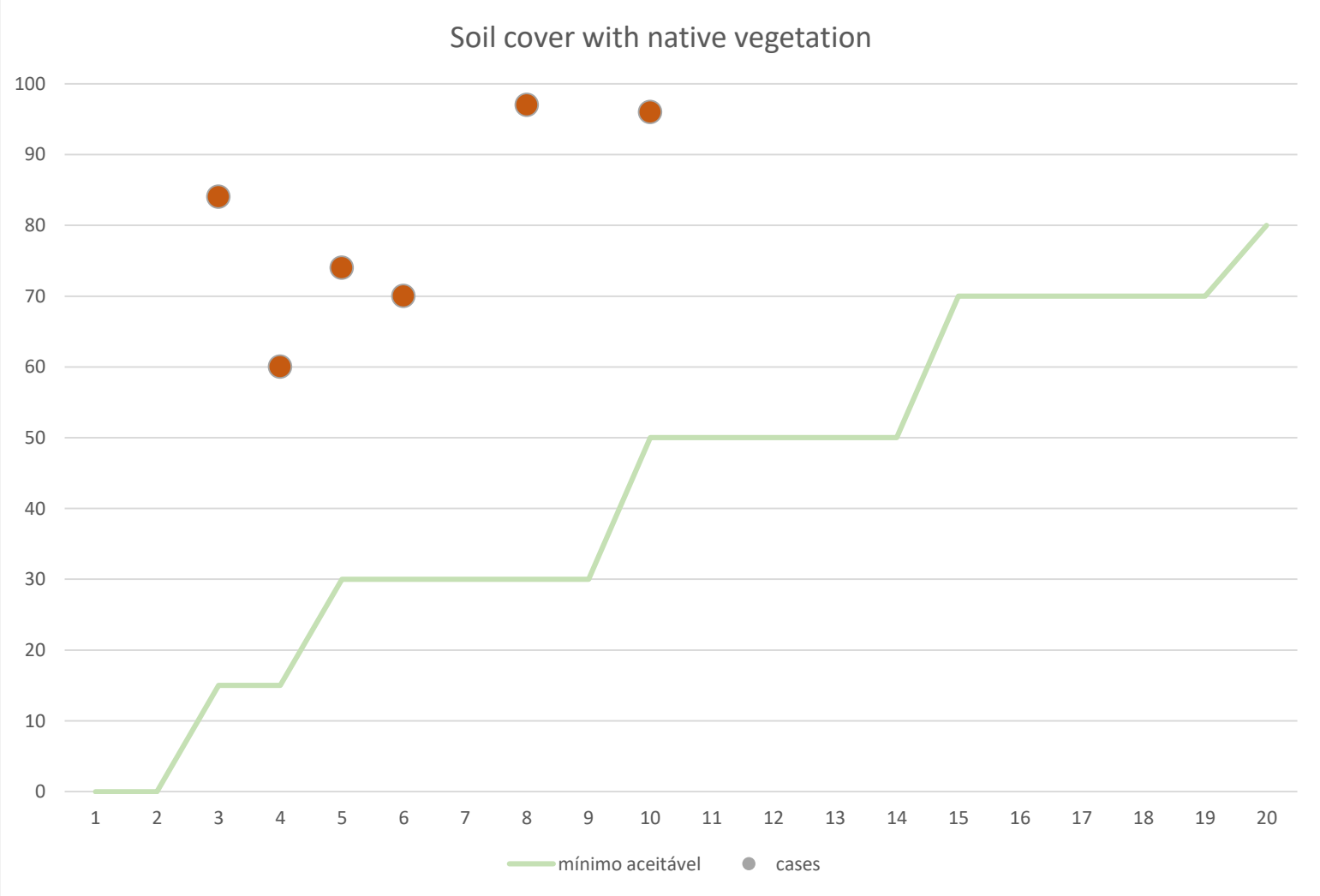
consolidation

practice

More people boarding







support

communication

Project: Águas de Santa Bárbara 2
Vegetation: CE
Age: 10 anos
Soil Cover: A (100,00%)
Density: A (4.900 reg./ha)

support

communication

Project: Agudos
Vegetation: FES
Age: 18 anos
Soil Cover: A (100,00%)
Density: A (4.700 reg./ha)

support

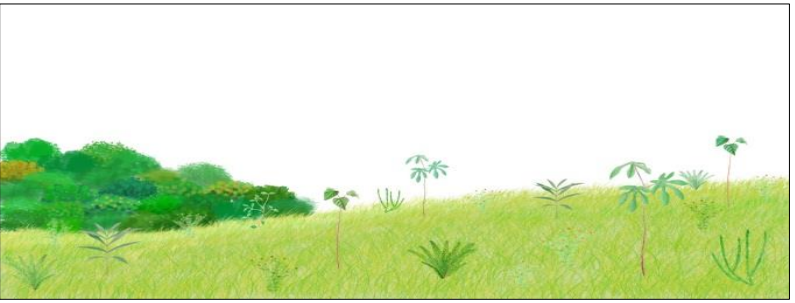
communication

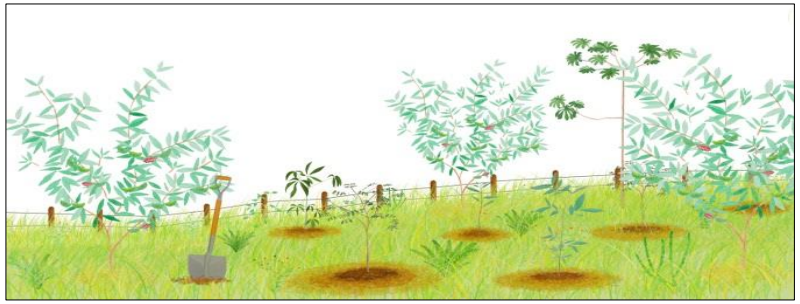
Project: SAF Sete Barras
Vegetation: FOD
Age: 17 anos
Soil Cover: A (100,00%)
Density: A (10.500 reg./ha)

communication support

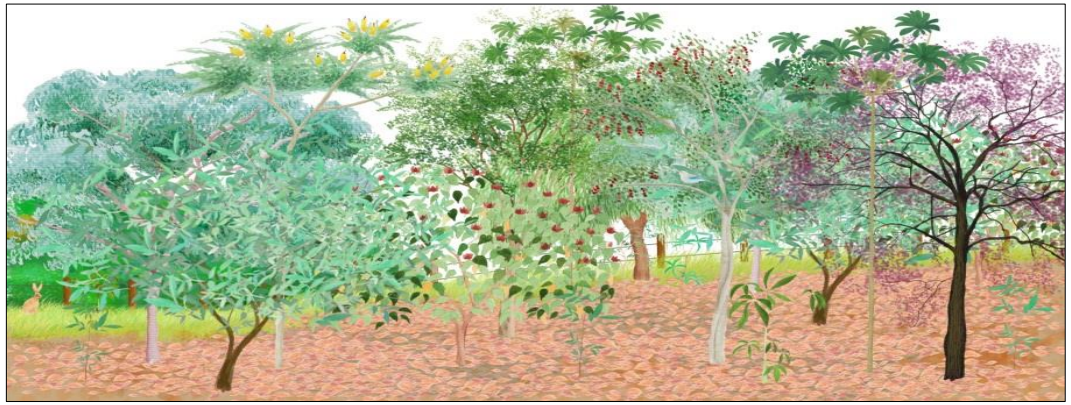
Ecological Indicators

Effectiveness



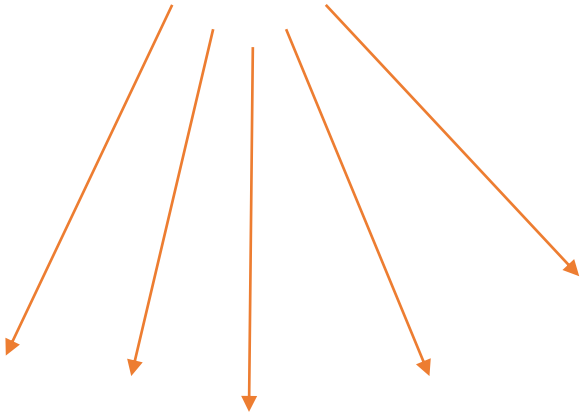


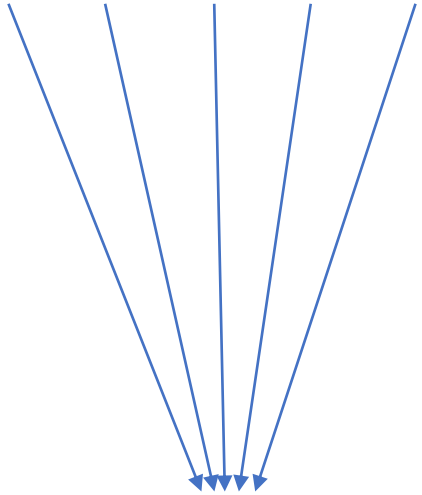
Indicators integrating structure, diversity, and ecosystem functioning



Fostering convergence

Focus on implementation detailed aspects





Focus on comprehensive results

We can speak a common FLR language

FLoRES

Take away messages

- Addressing the long-term and resilience aspects within FLR policy is essential
- Success indicators for each land use type can bring materiality to FLR outcomes
- Indicators are not just for accessing results, but a tool for convergence of ideas
- Focusing comprehensive results is a good way to foster convergence
- Reliability: trust the framework, use the tools
- Support public agents: they will support practitioners

- Do it collaboratively

REBRE Rede Brasileira de Restauração Ecológica

PACTO PELA RESTAURAÇÃO DA MATA ATLÂNTICA

SOBRE SOCIEDADE BRASILEIRA DE RESTAURAÇÃO ECOLÓGICA

“o real não está na saída nem na chegada: ele se dispõe para a gente é no meio da travessia”

João Guimarães Rosa

(in Grande Sertão: Veredas)

Rafael B Chaves
rafaelbc.sma@gmail.com

Salamat, po

Secretariat for the Infrastructure and Environment of the State of São Paulo

GOVERNO DO ESTADO DE SÃO PAULO

Sistema Ambiental Paulista
www.ambiente.sp.gov.br

Figures: Patrícia Yamamoto