Environmental Heritage Diagnosis

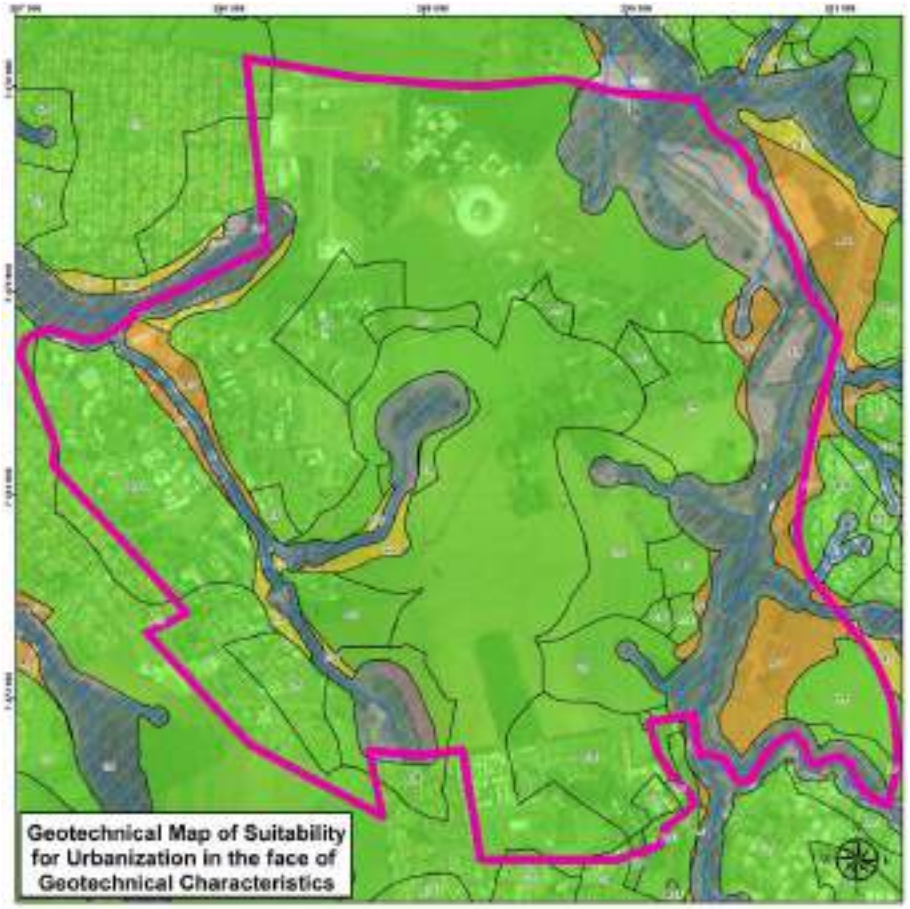
Geotechinical-Climate-Vegetation

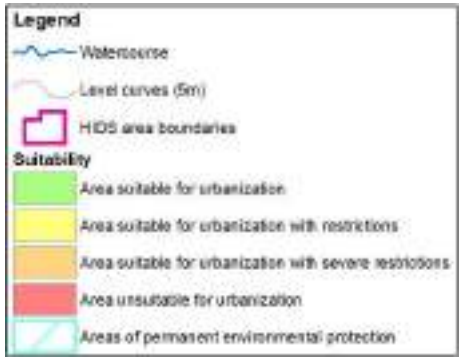
Carbono Zero

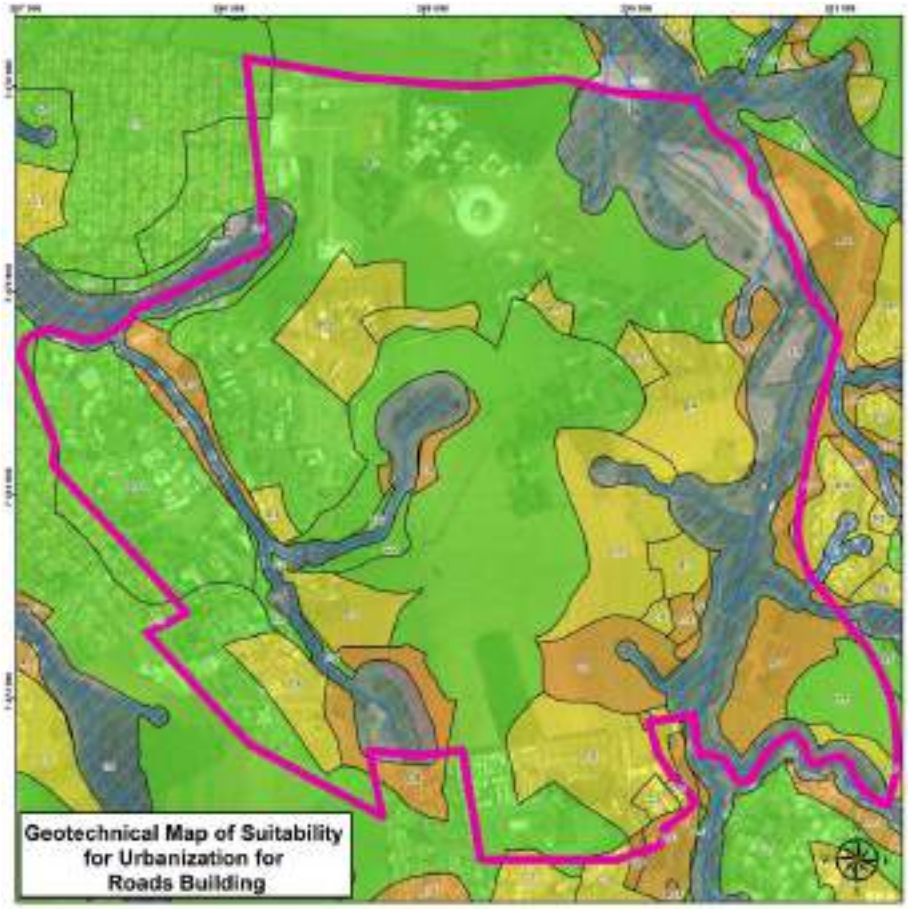
Regea

VRP-Ambiental

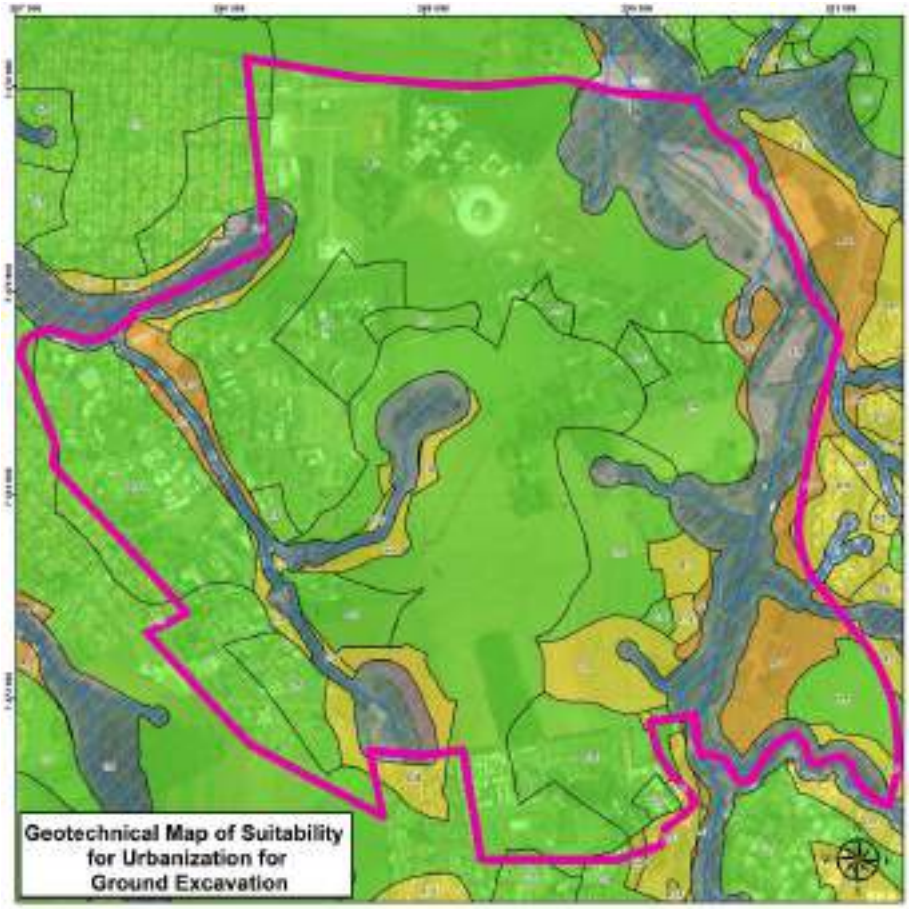
Geotechnical Maps of Suitability for Urbanization

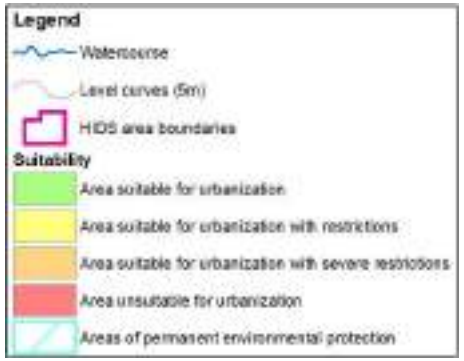


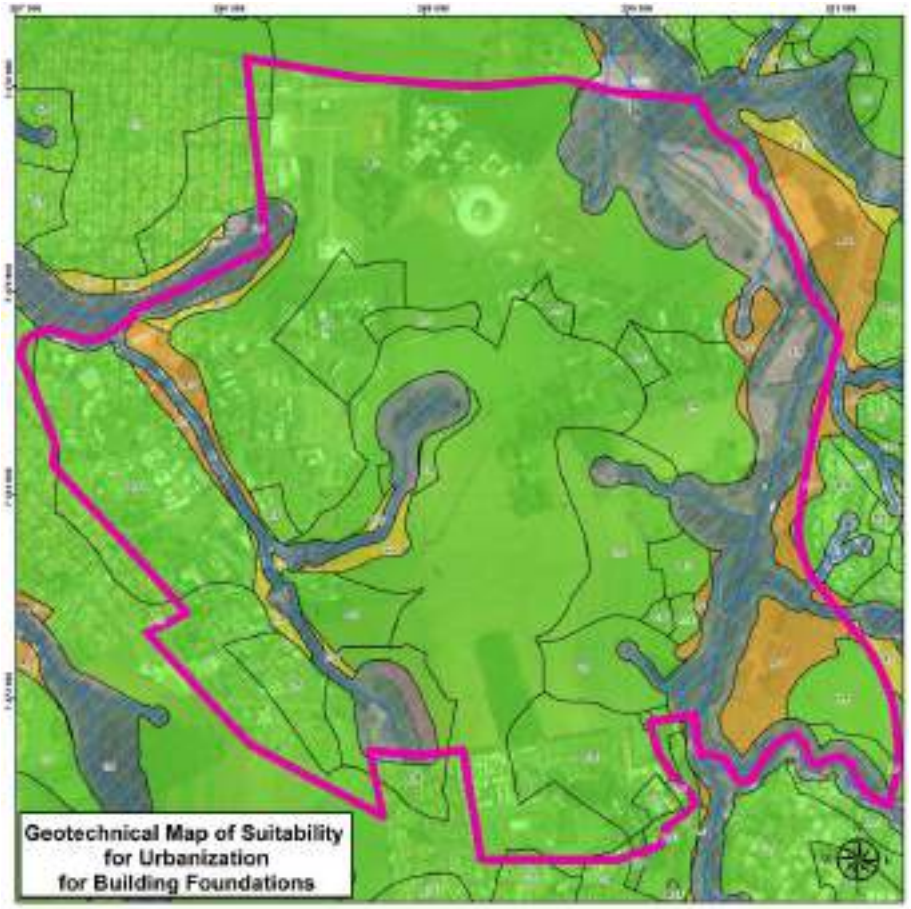




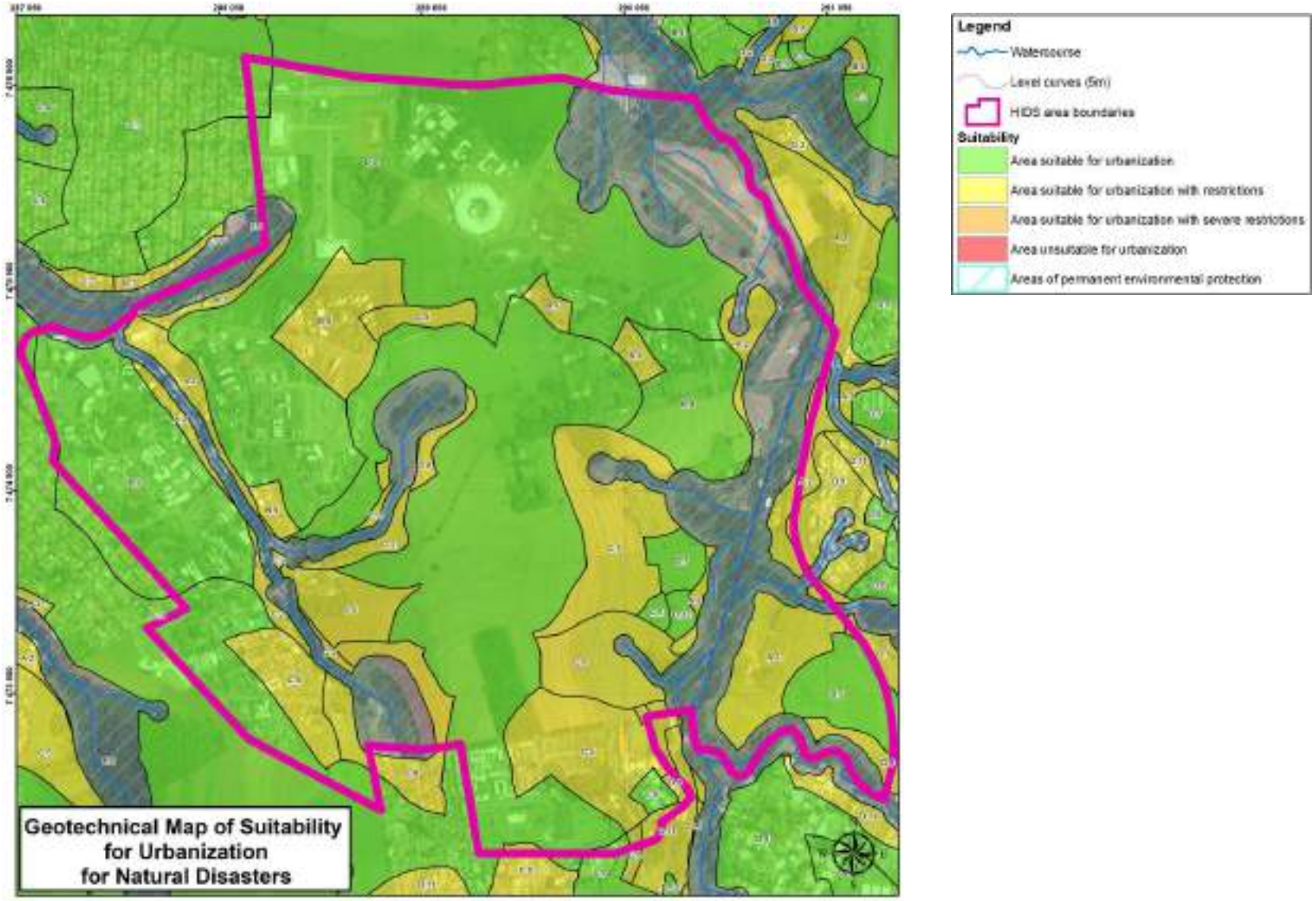
Geotechnical Maps of Suitability for Urbanization







Geotechnical Maps of Suitability for Urbanization



Three maps of susceptibility to natural disasters (landslides, erosion, and floods) were prepared for this project, in addition to a great diversity of other maps.
These maps were part of the cartographic base used for the preparation of the five geotechnical maps of suitability for urbanization foreseen in the scope of the project, which were:

- Geotechnical Map of Suitability for Urbanization in the face of Geotechnical Characteristics
- Geotechnical Map of Suitability for Urbanization for Roads Building
- Geotechnical Map of Suitability for Urbanization for Ground Excavation
- Geotechnical Map of Suitability for Urbanization for Building Foundations

The maps prepared characterize the land about its suitability for urbanization, indicating the stretches where this suitability has no restrictions, where there are and which are the restrictions, and the stretches unsuitable for urbanization, both for their geotechnical characteristics as for the restrictions of current legislation.

Climate analisys

Precipitation
Observed data-Campinas

Extreme events (RX1day) is increasing (>50mm/day)
Delay in the wet season - Prolonged drought

Numerous flood events were recorded in urban areas, responsible for various property damages evicting hundreds of residentes (Sprissler, 2011).
Floods occurred on March 24, 2016 and June 7, 2016 caused at least 19 deaths (Folha de São Paulo, 2016).
Convective systems, which in turn, are characterized by a high spatial-temporal variability of the rainfall
Vulnerabilities: Floods and drought urban areas have a great impact on the hydrometeorological behavior of the watersheds (Lima et al., 2018)
Many extreme events have already been detected in this region, such as the event of June 5, 2016 (Pereira Filho et al., 2019; Rehbein et al., 2018).
Rains come mostly from the west

Rain zones are well located, covering only a small portion of the region - **high variance of the rainfall fields**

Complexity of the atmospheric system, and, due the high variability of the types of weather systems that operate in the region (i.e., convective cells, Mesoscale Convective systems, squall lines, ZCAS, cold fronts, etc.

The severe rainfall events, are often formed by convective systems, which in turn, are characterized by a **high spatial-temporal variability of the rainfall** (Loriaux et al., 2013; Terranova & Gariano, 2014)

Climate analysis

Temperature

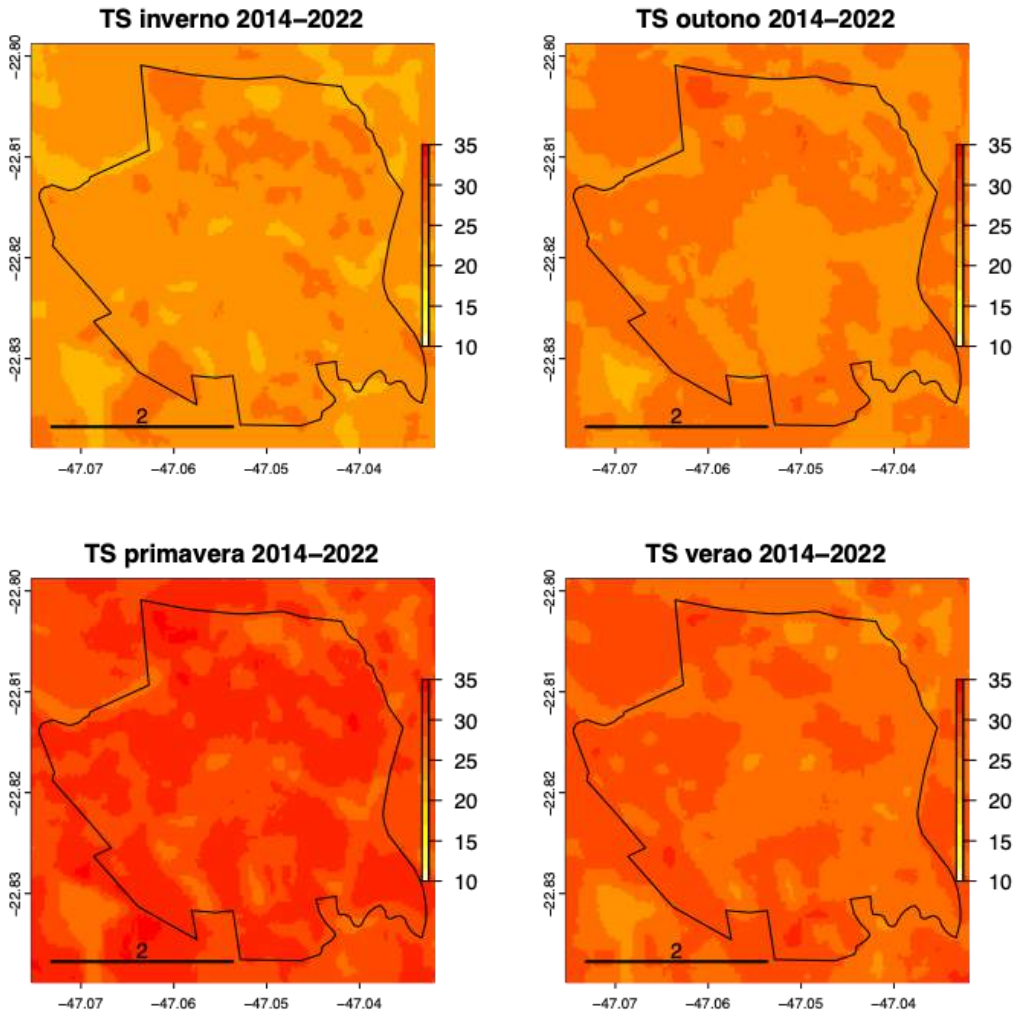
- Heat Islands are strongly related with land use (non-forested areas)

ESTAÇÃO DO ANO	GRADIENTE DE TEMPERATURA (^{O}C)
VERÃO (DJF)	14.8
OUTONO (MAM)	12.9
INVERNO (JJA)	13.9
PRIMAVERA (SON)	14.3

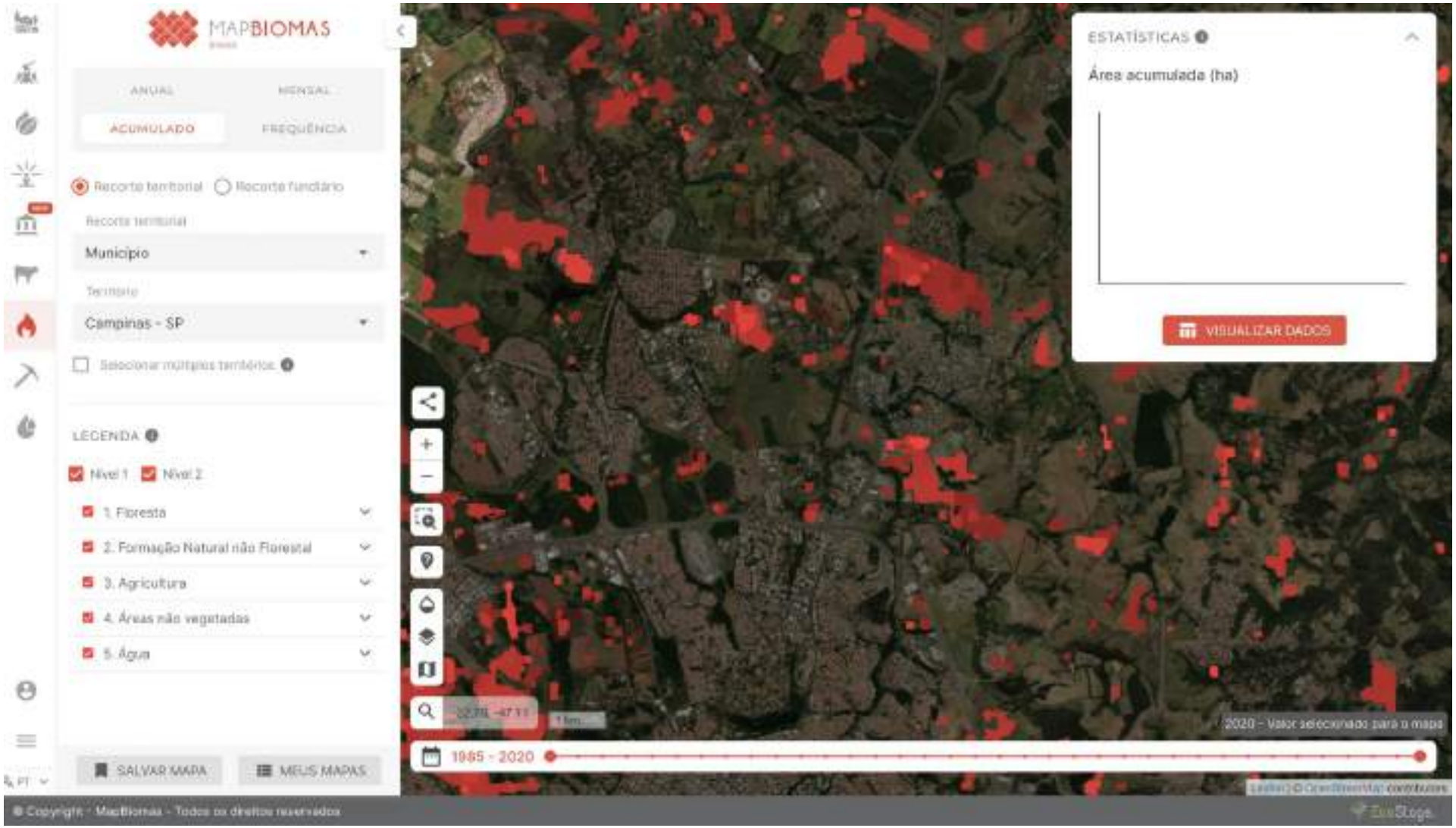
Climate analysis

Temperature

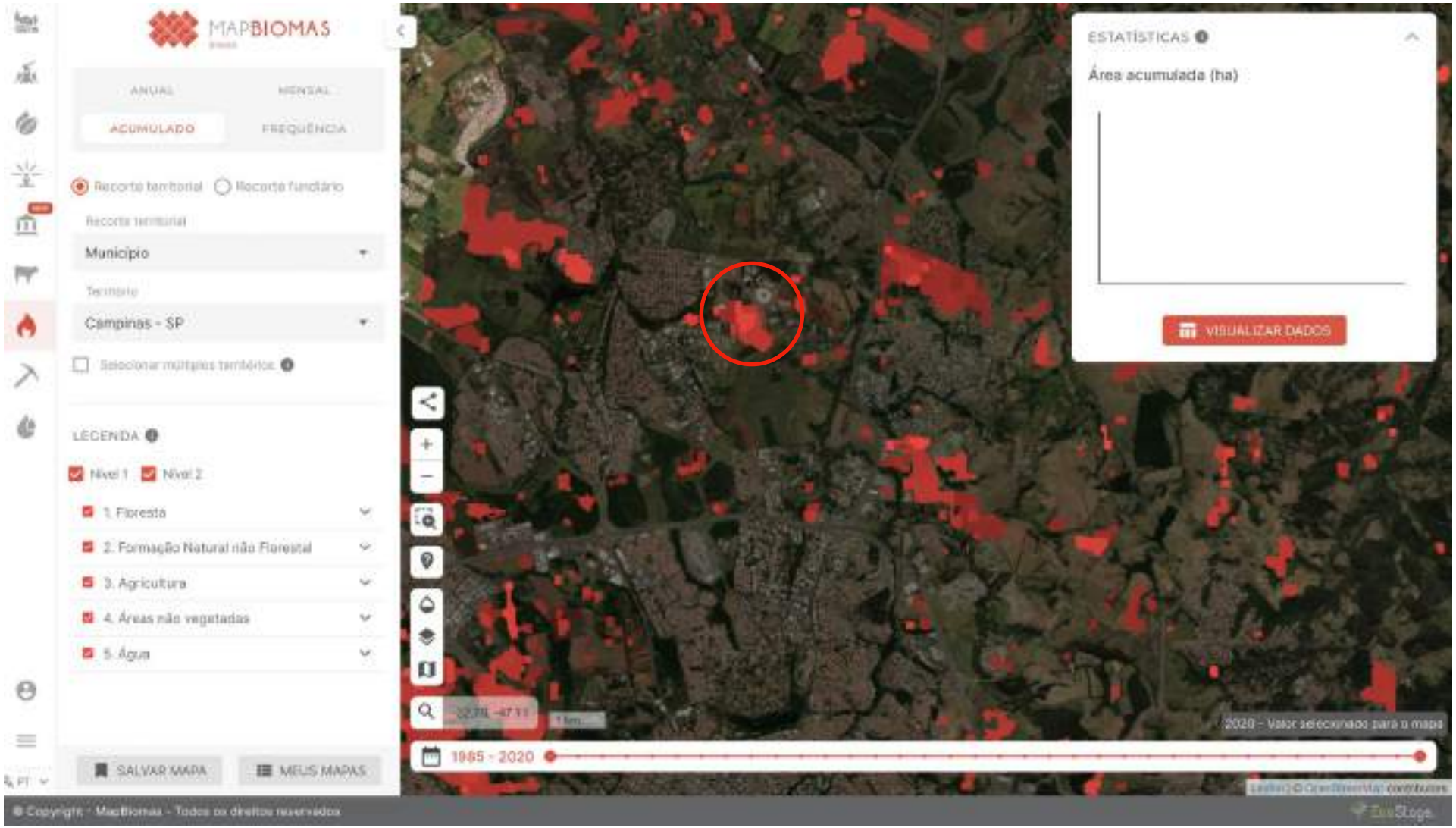
- Heat Islands are strongly related with land use (non-forested areas), altimetry, water stress, photosynthesises activity;
- Seasonal variability: the spring registered the most intense surface temperatures: season where the solar radiation has a higher incidence on surface(sensible heat).

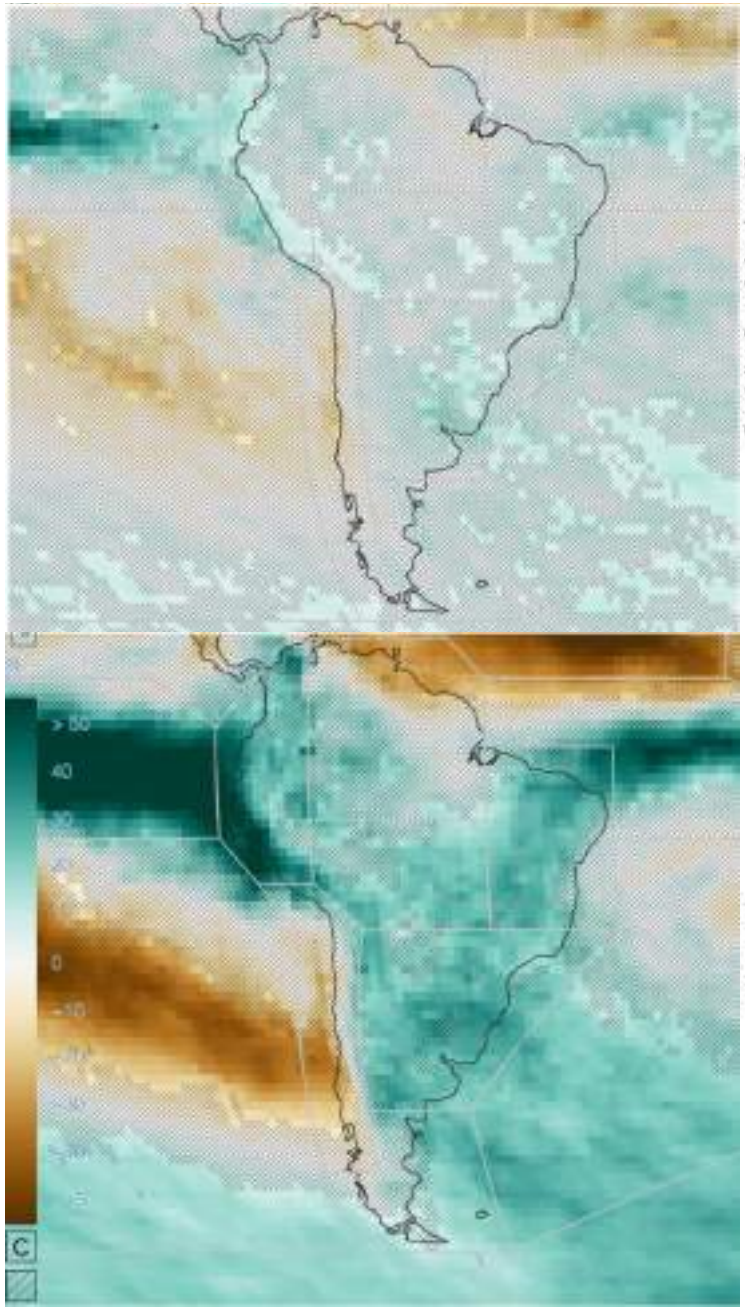


Fires scars (1985-2020)



Fires scars (1985-2020) / Heat island / Poor air quality




> 80
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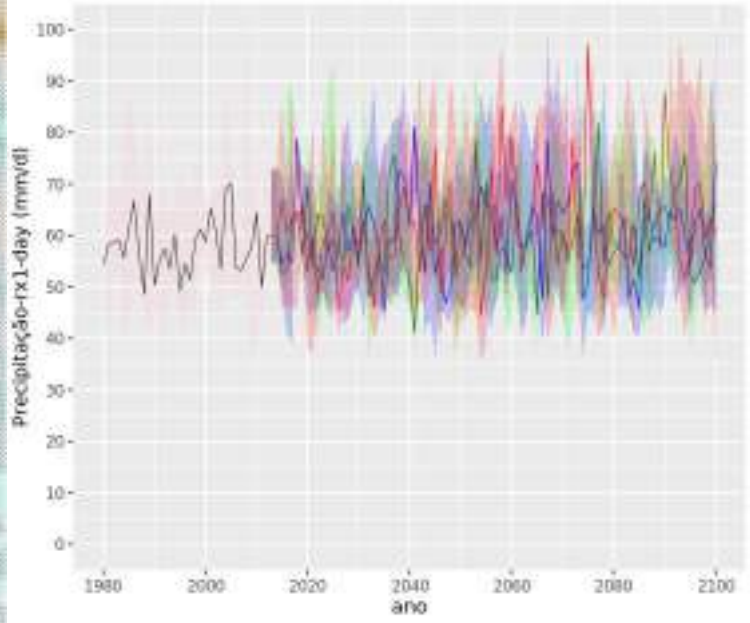
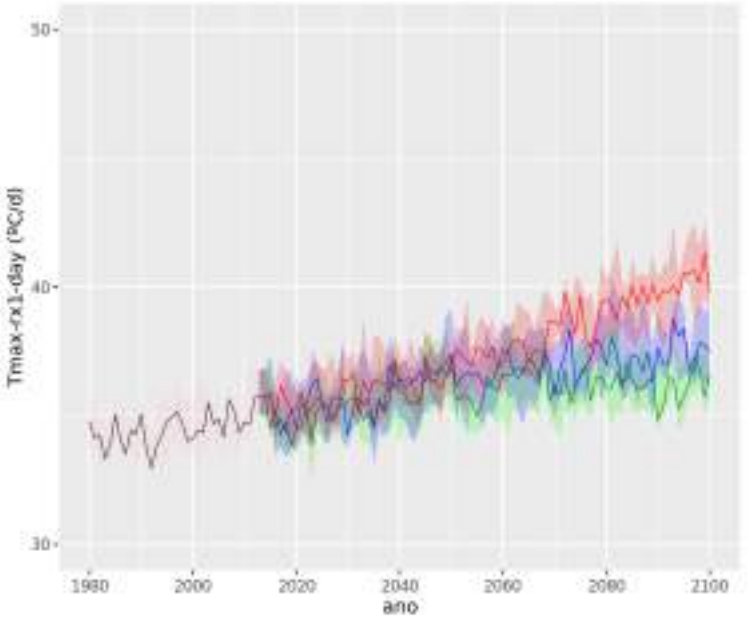
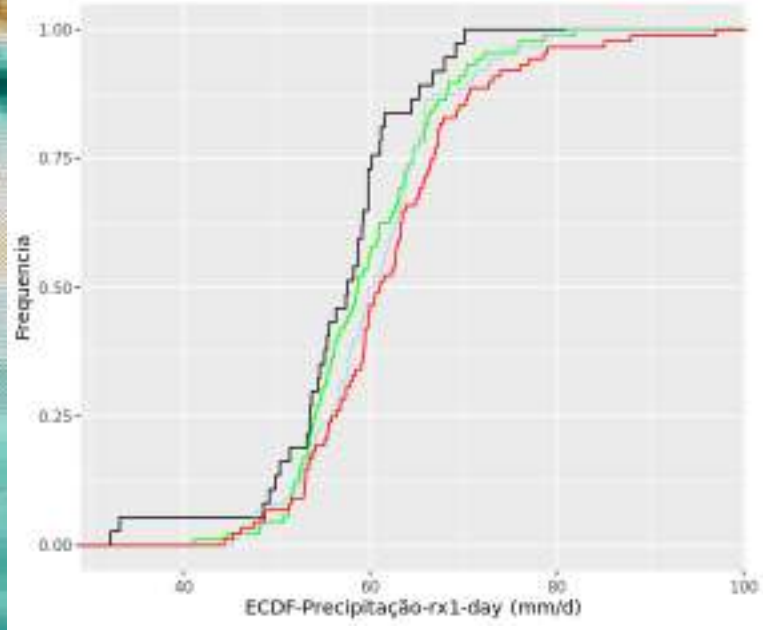
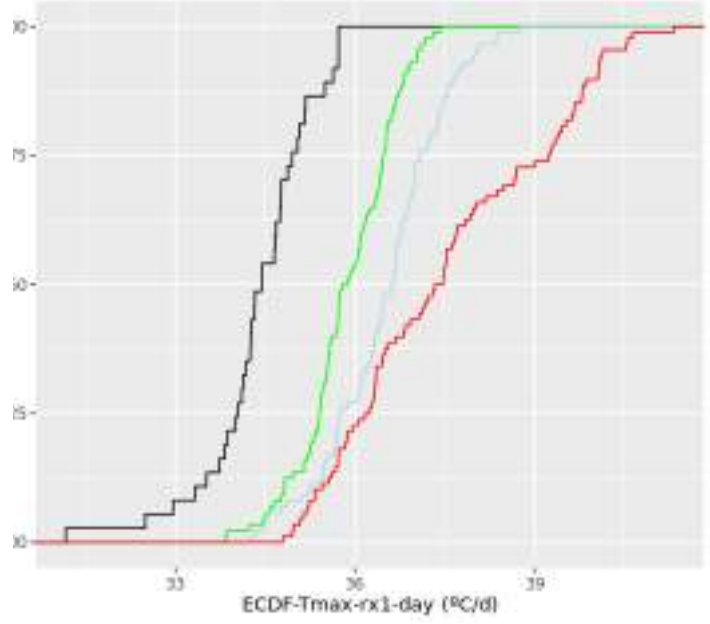
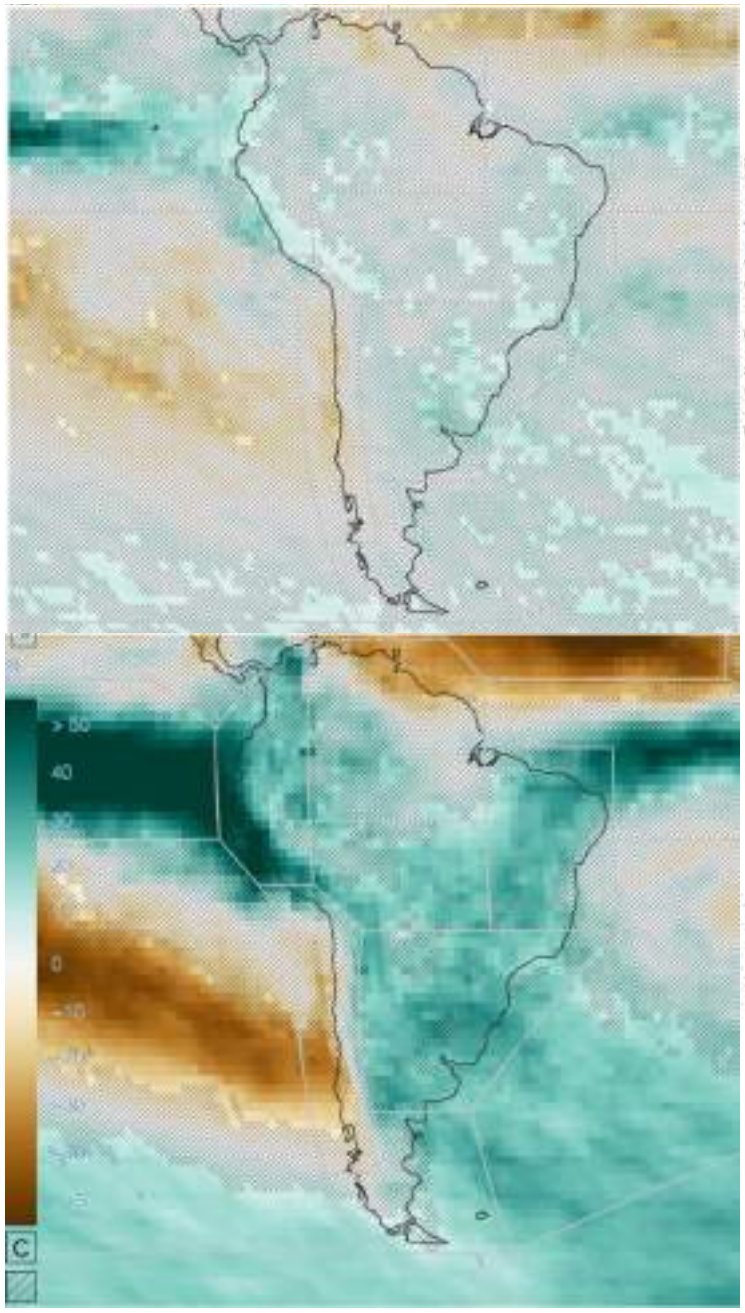
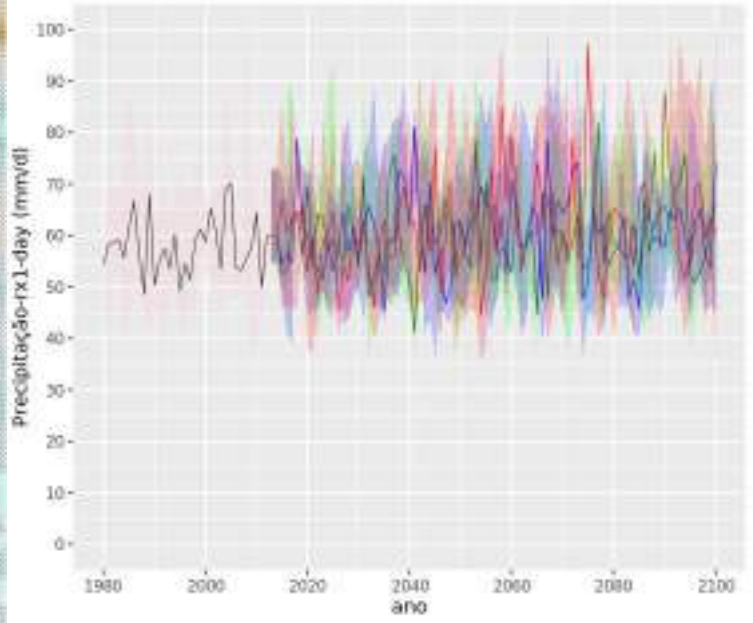

Precipitação-rx1-day (mm/d)
ano
experime
ssp126
ssp245
ssp585


Tmax-rx1-day (ºC/d)
ano
experimen
ssp126
ssp245
ssp585


Frequencia
ECDF-Precipitação-rx1-day (mm/d)
experimento
historical
ssp126
ssp245
ssp585


ECDF-Tmax-rx1-day (ºC/d)
experimen
ssp126
ssp245
ssp585

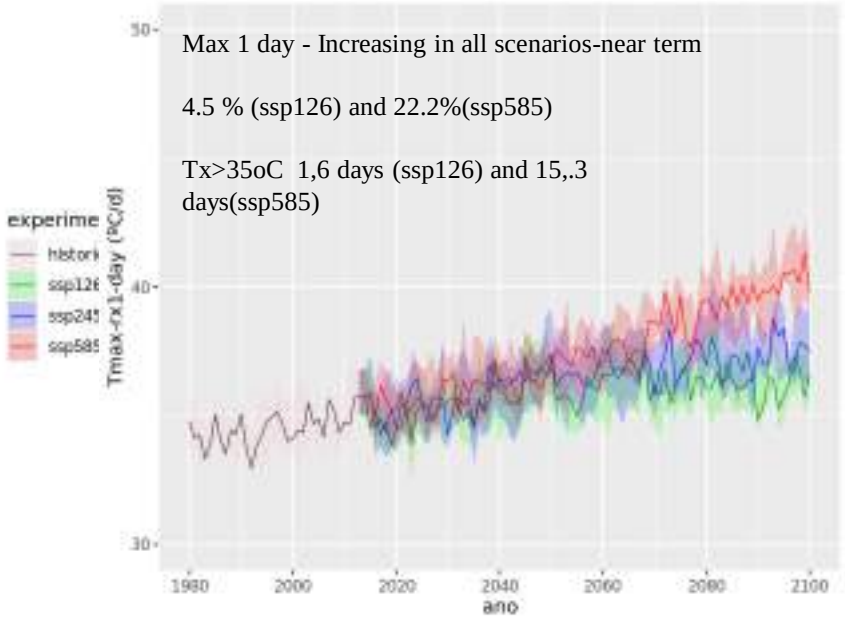


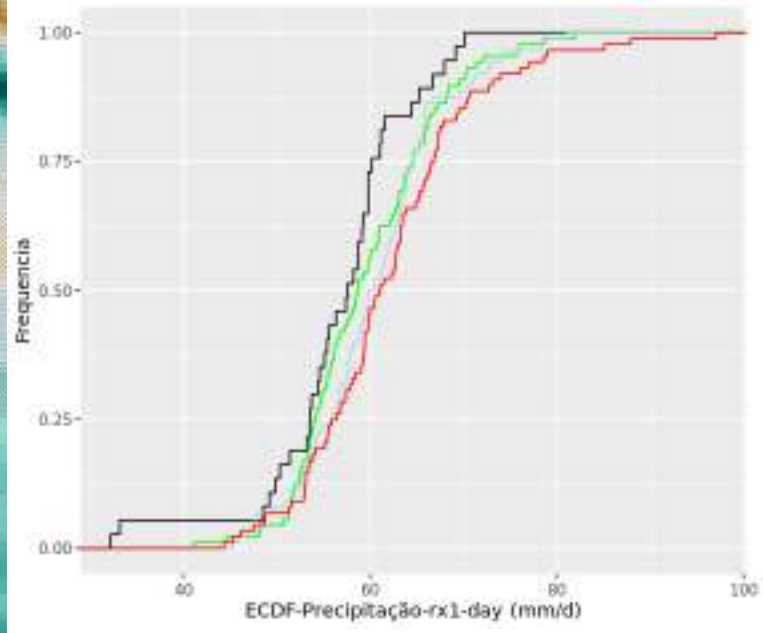


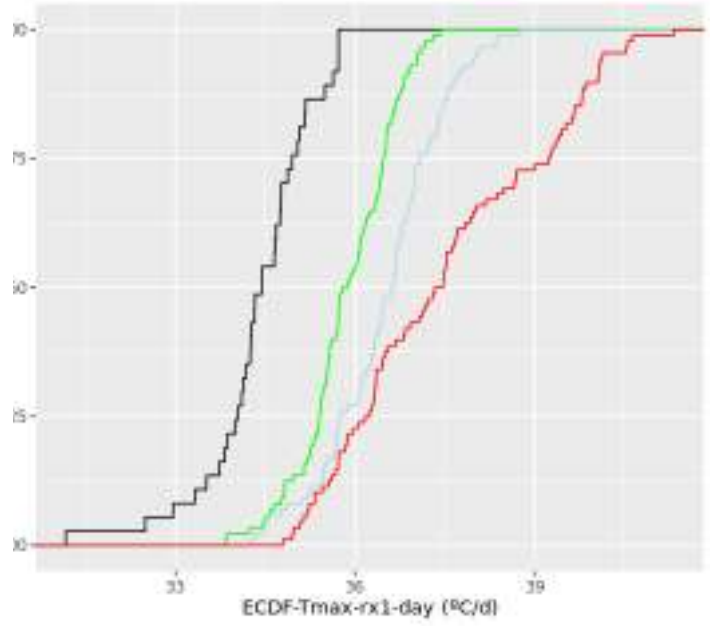
Max 1 day - Increasing in all scenarios-near term

4.5 % (ssp126) and 22.2%(ssp585)

Tx>35oC 1,6 days (ssp126) and 15,.3 days(ssp585)

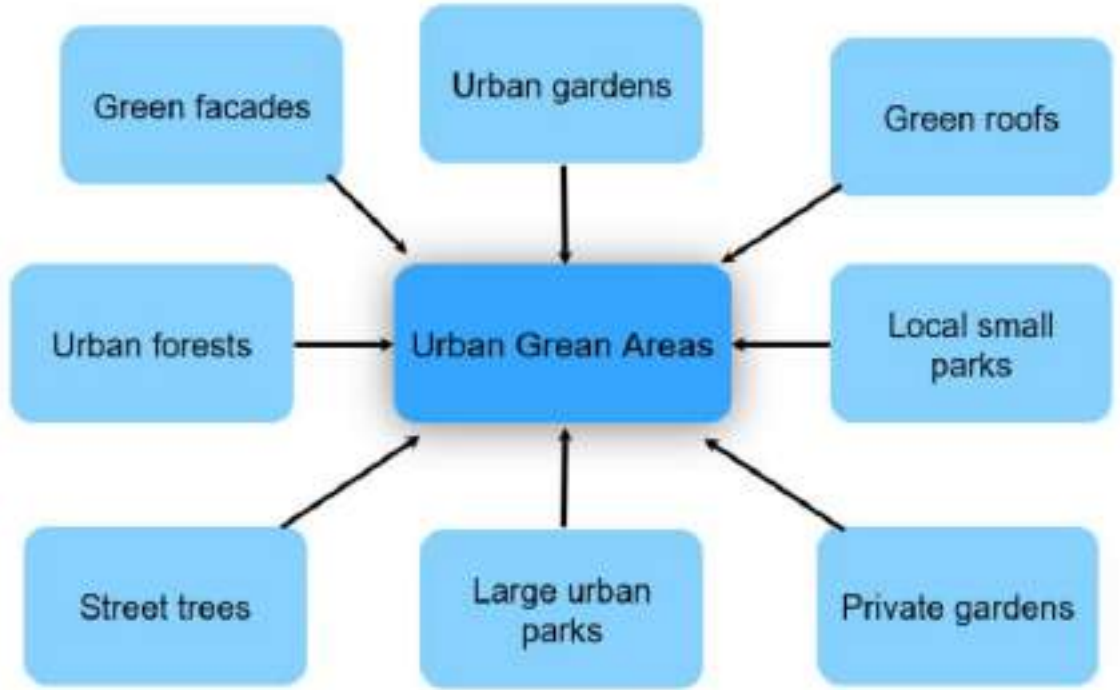




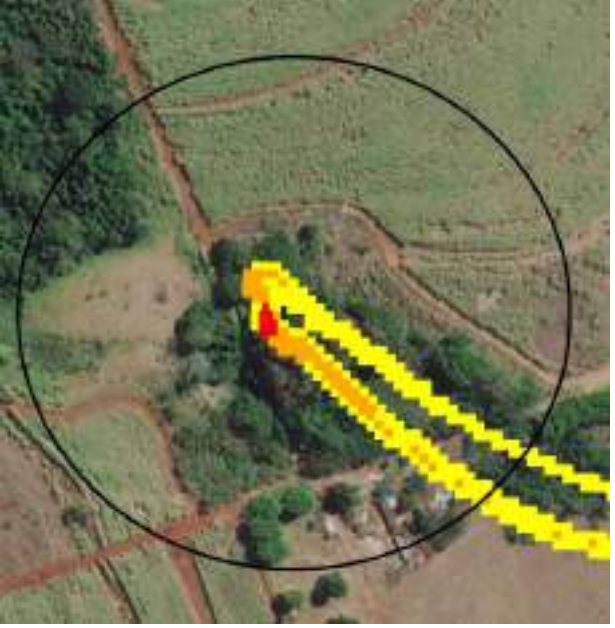


Climate analisys

Nature based Solutions
Lets make a cool island!



Sediment yield and deposition - Critical areas

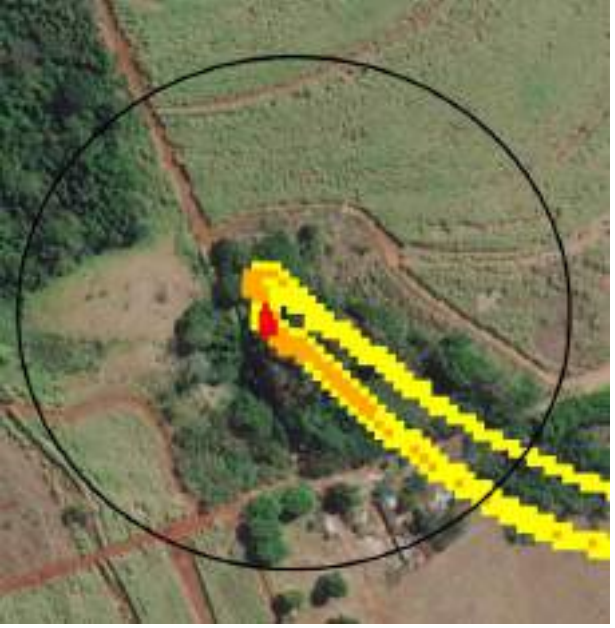


HIDS
Limite das microbacias
Hidrografia

Deposição de sedimentos intensidade

1
2
3
4
6
7
9

Sediment yield and deposition - Critical areas for water resources - Easily solved with reforestation



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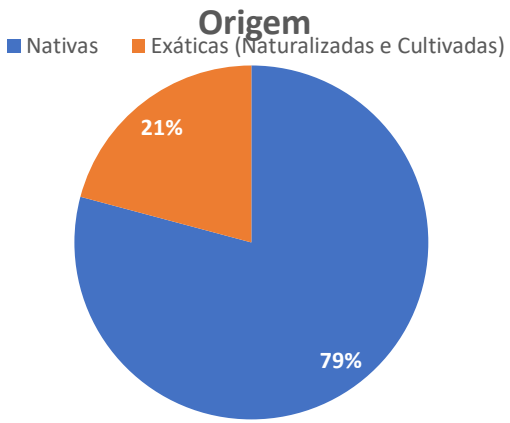
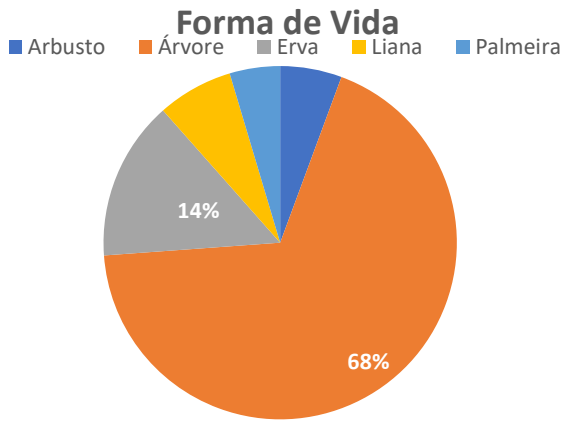
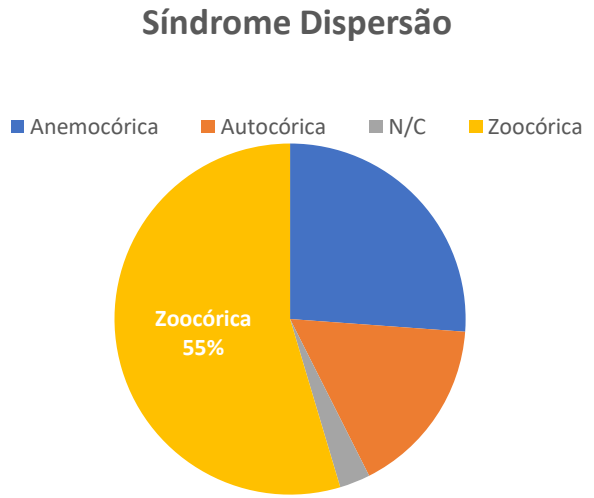
Ecosystems services - Vegetation surveys

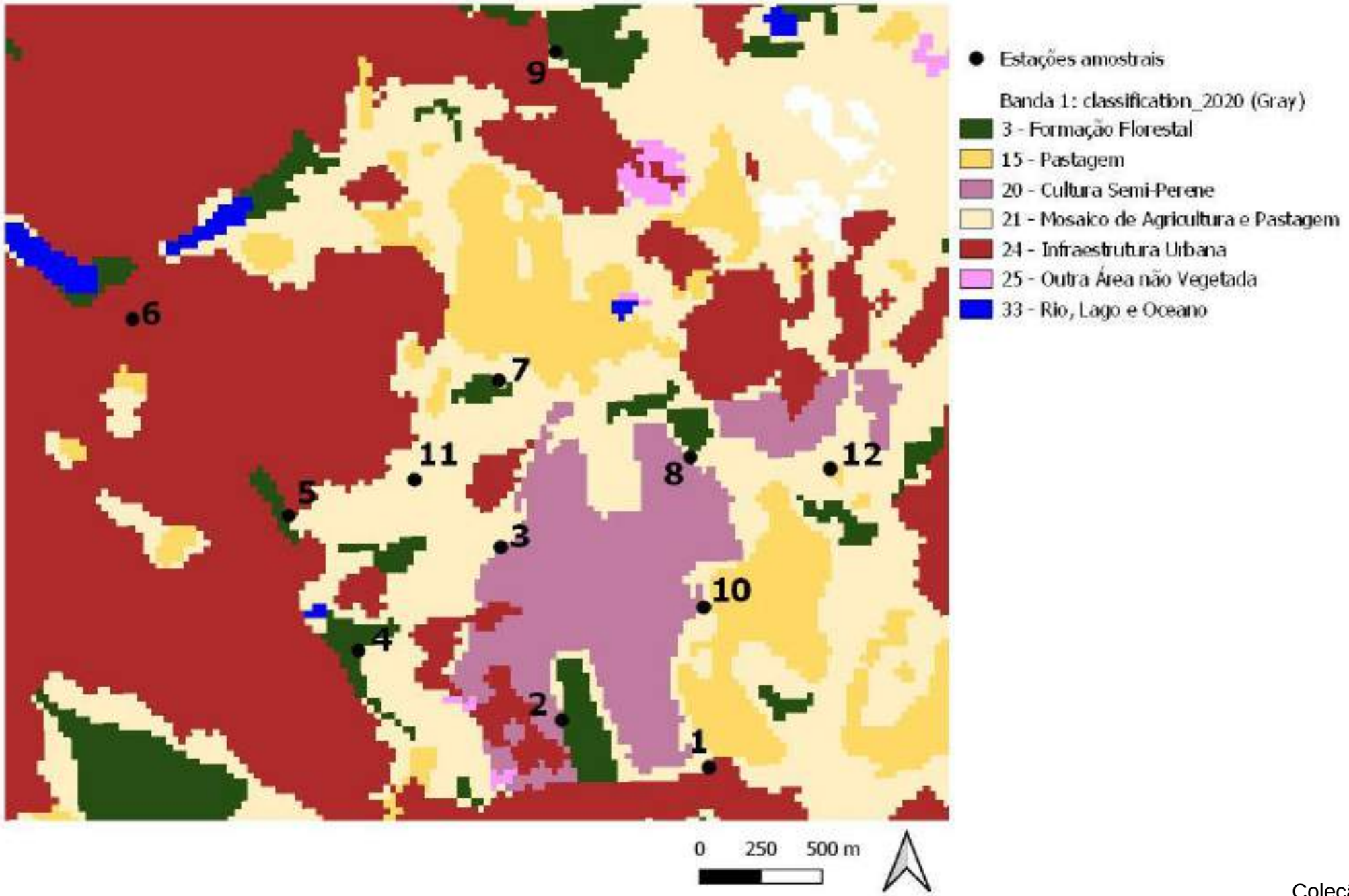
390 species e **94** families

- **300** native species / **79** exotic (naturalizadas e cultivadas)
- Life form: **266** espécies arbóreas, **57** herbáceas, **27** lianas, **22** arbustos e **18** palmeiras
- Síndrome de dispersão: **213** espécies zoocóricas, **102** anemocóricas e **64** autocóricas

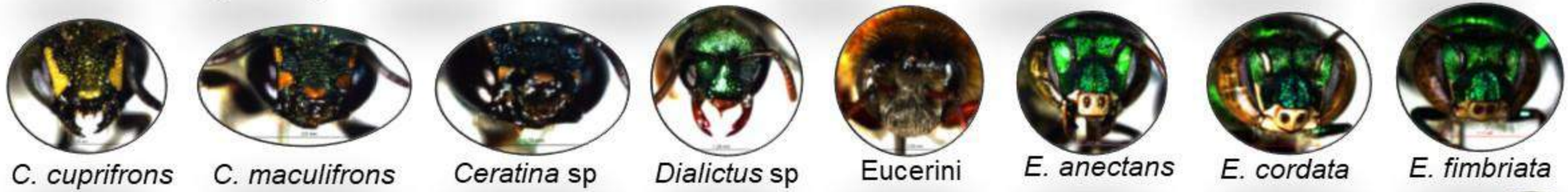








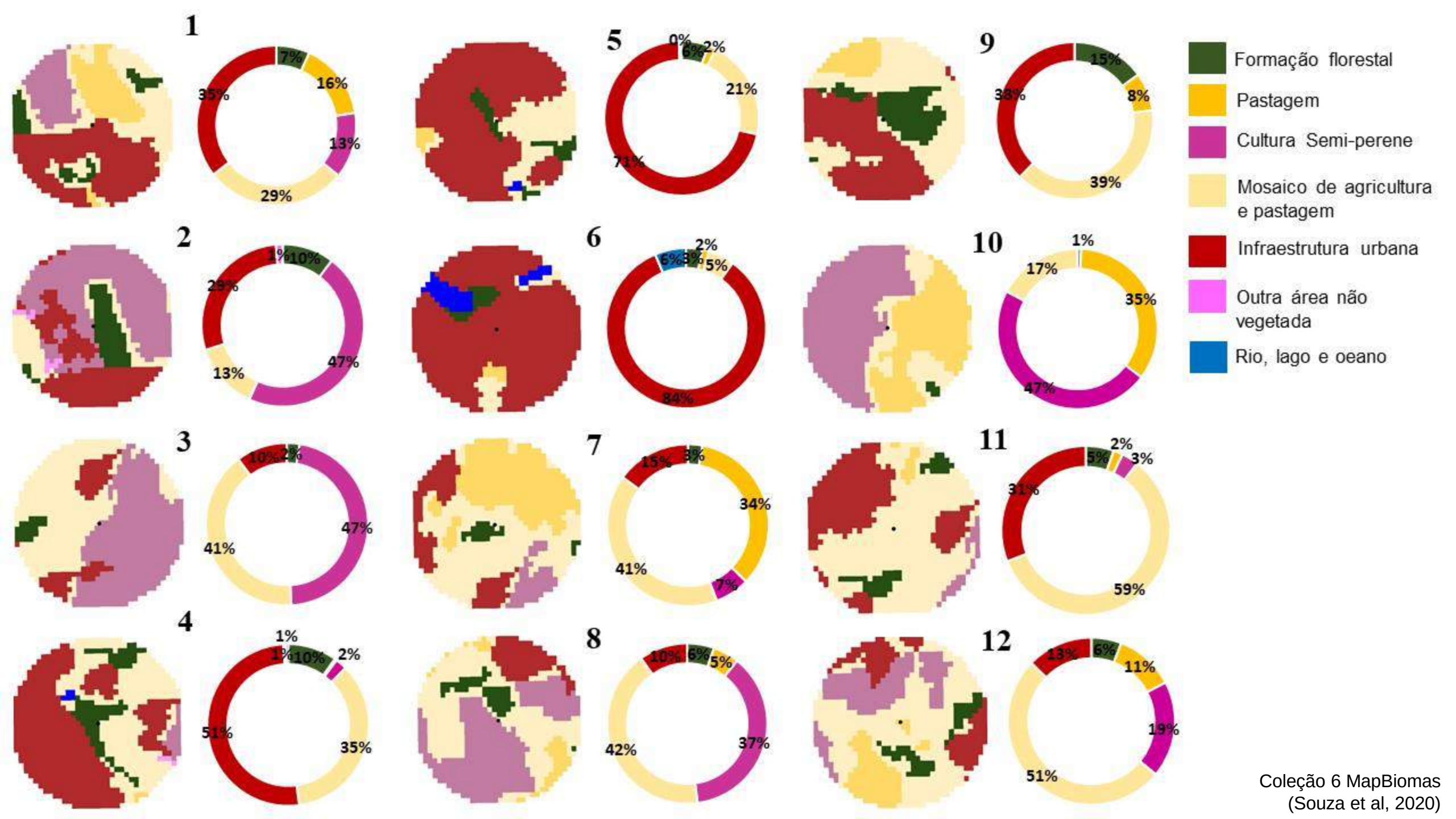
Coleção 6 MapBiomas
(Souza et al, 2020)



- These wasps are considered a biological control agent for sugarcane crops.

30 espécies de abelhas

4 espécies de vespas



Coleção 6 MapBiomas
(Souza et al, 2020)

1

Riqueza sp	Abundância
13	46

5

Riqueza sp	Abundância
6	71

9

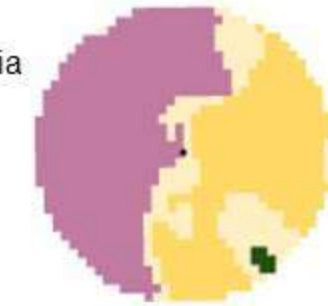
Riqueza sp	Abundância
4	67

2

Riqueza sp	Abundância
11	162

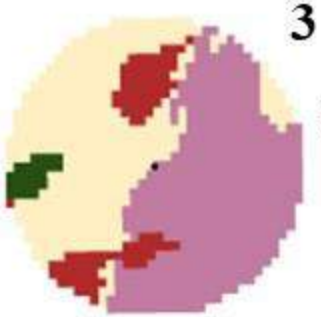
6

Riqueza sp	Abundância
6	45



10

Riqueza sp	Abundância
12	59



3

Riqueza sp	Abundância
7	108

7

Riqueza sp	Abundância
11	62

11

Riqueza sp	Abundância
5	99

4

Riqueza sp	Abundância
17	111

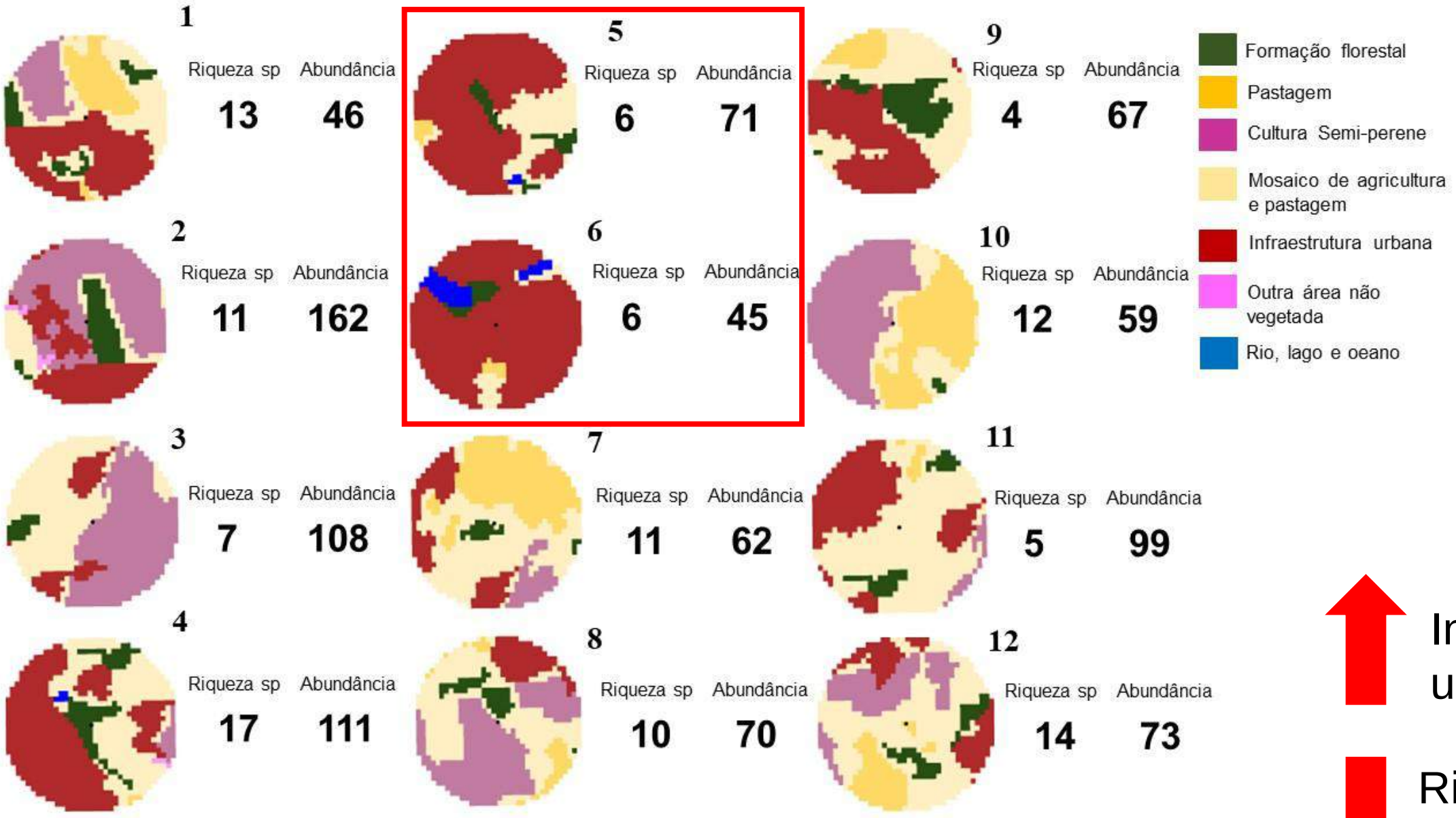
8

Riqueza sp	Abundância
10	70

12

Riqueza sp	Abundância
14	73

- Formação florestal
- Pastagem
- Cultura Semi-perene
- Mosaico de agricultura e pastagem
- Infraestrutura urbana
- Outra área não vegetada
- Rio, lago e oeano


1
Riqueza sp
Abundância
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Riqueza sp
Abundância
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Riqueza sp
Abundância
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Riqueza sp
Abundância
17
111
5
Riqueza sp
Abundância
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71
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Riqueza sp
Abundância
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Riqueza sp
Abundância
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62
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Riqueza sp
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Riqueza sp
Abundância
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67
10
Riqueza sp
Abundância
12
59
11
Riqueza sp
Abundância
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12
Riqueza sp
Abundância
14
73
Formação florestal
Pastagem
Cultura Semi-perene
Mosaico de agricultura e pastagem
Infraestrutura urbana
Outra área não vegetada
Rio, lago e oeano
Infraestrutura urbana
Riqueza de espécies


HIDS
Limite das microbacias
Hidrografia
Deposição de sedimentos
intensidade
1
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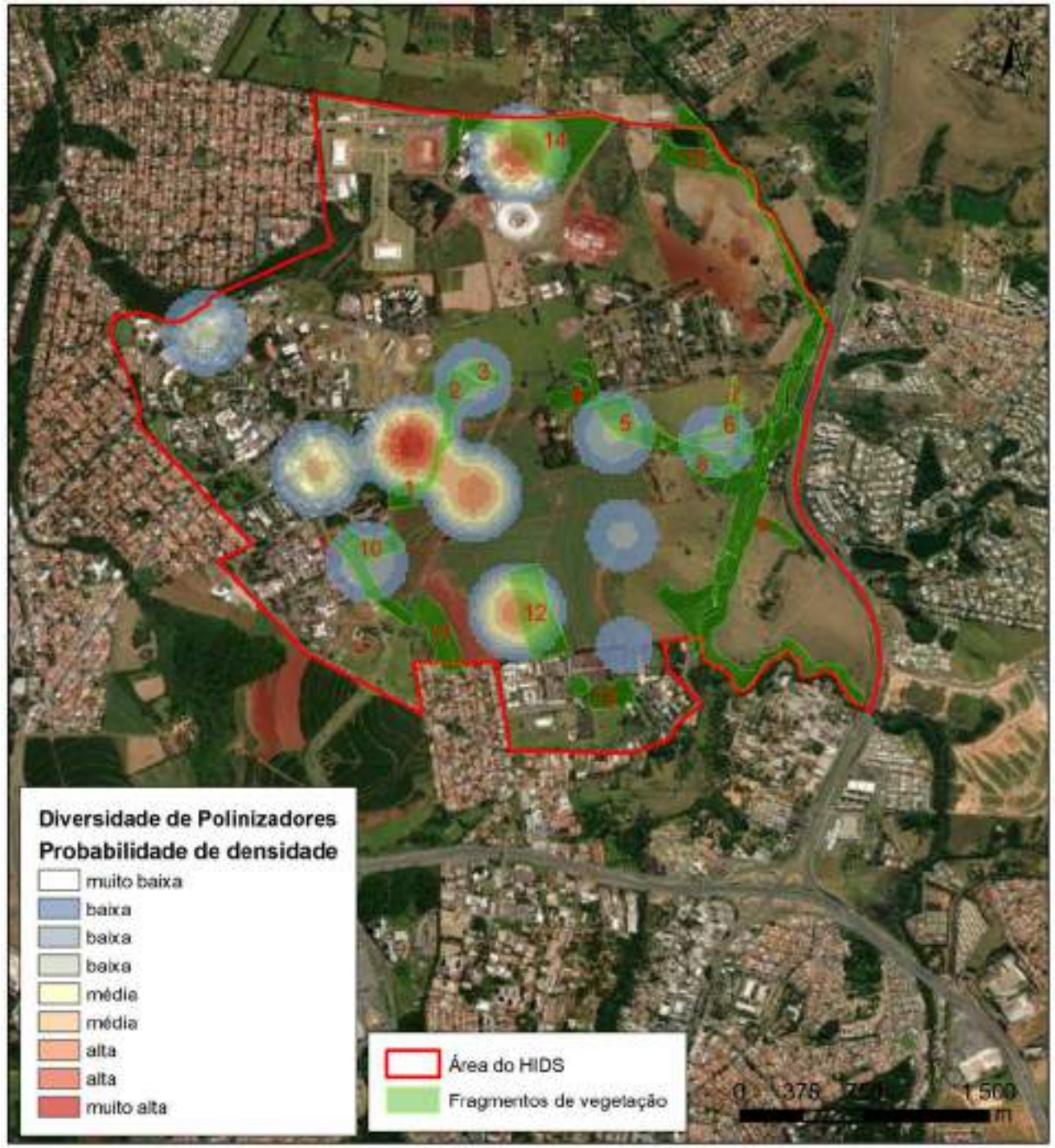
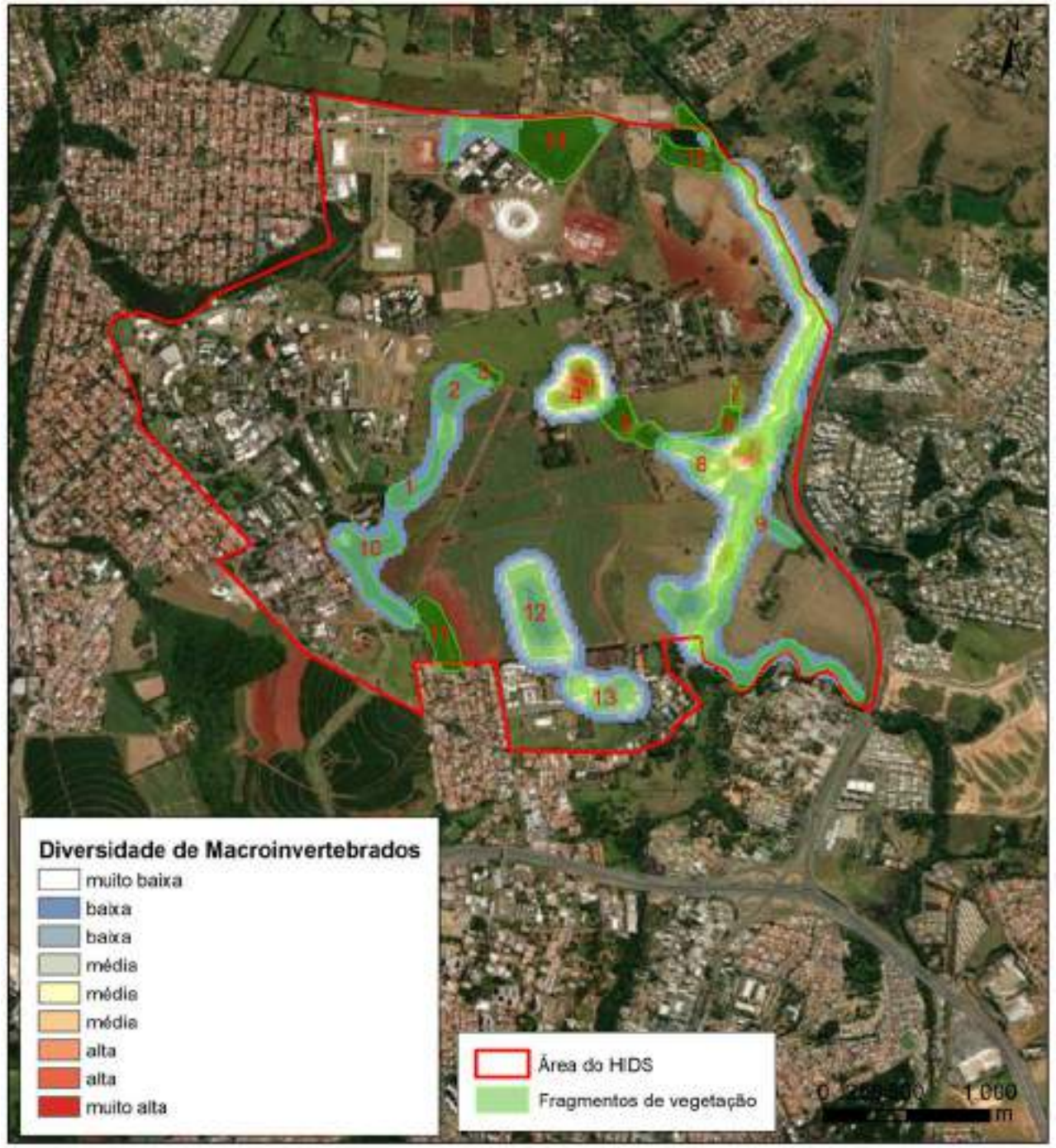
6
7
9


Diversidade de Polinizadores
Probabilidade de densidade
muito baixa
baixa
baixa
baixa
média
média
alta
alta
muito alta
Área do HIDS
Fragmentos de vegetação
0
375
750
1.500
m


Diversidade de Macroinvertebrados
muito baixa
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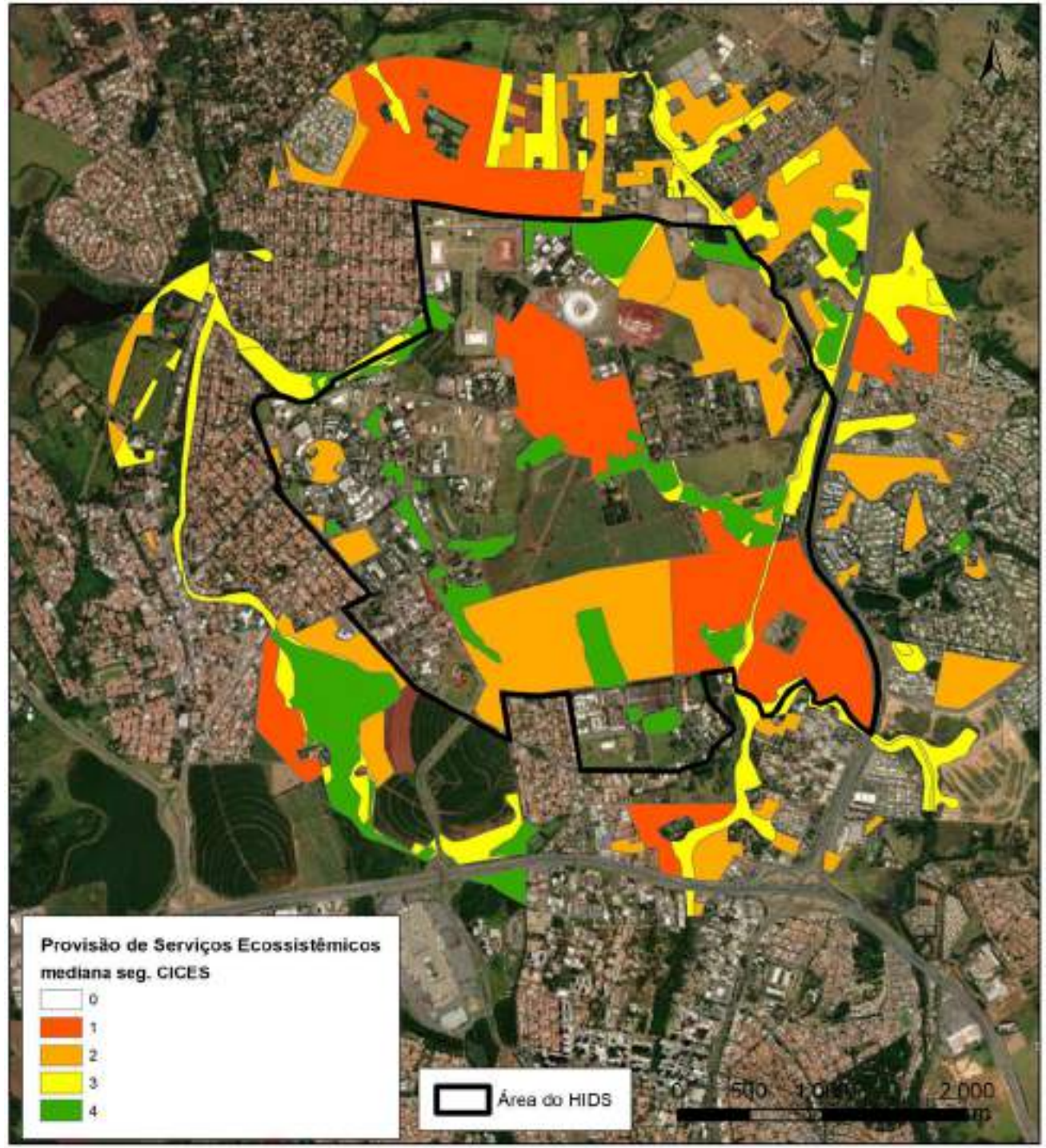
muito alta
Área do HIDS
Fragmentos de vegetação
1.000
m


N
Provisão de Serviços Ecossistêmicos
mediana seg. CICES
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Área do HIDS
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m