



**Hochschule  
Bonn-Rhein-Sieg**  
University of Applied Sciences

**Internationales Zentrum  
für Nachhaltige Entwicklung**  
*International Centre for  
Sustainable Development*



# Reconciling mental health promotion and wildlife conservation in a megacity: the importance of urban parks' qualities.

Jéssica Felappi

Supervisors: Prof. Dr. Theo Kötter | Prof. Dr. Wiltrud Terlau

Workshop One Health Digitalisation



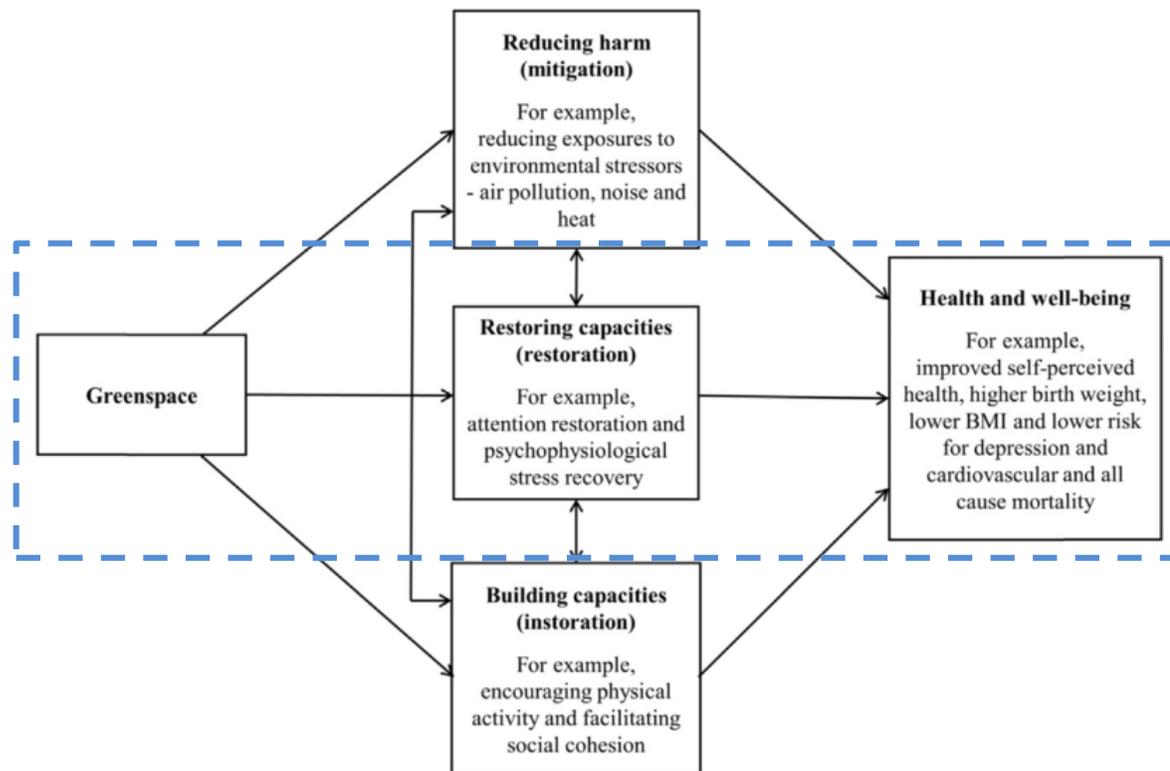
# Outline

---

- Introduction
- Objective
- Conceptual framework
- Methodological framework
- Research progress



# UGS and human health&well-being



Markevych et al., 2017

## Restorative environments:

- Biophilia <sup>1</sup>
- Stress Recovery Theory <sup>2</sup>
- Attention Restoration Theory <sup>3</sup>

## Key finding:

- Natural settings are more restorative than built-up areas.

## Limitations:

- Usually comparisons only between built-up and natural areas.
- Little knowledge on how different natural settings may have different restorative effects <sup>4</sup>
- Geographical bias - geographic conditions, local demands and cultural-specific perceptions and behaviors shape human-nature relationships <sup>5,6</sup>



# UGS and wildlife support

## Theory:

- Island biogeography theory <sup>7</sup>, parks can be considered “island-like habitats” surrounded by the inhospitable urban matrix.
- Not all types of UGS may provide the balance among characteristics (e.g. habitat area, quality, and connectivity) necessary for wildlife support <sup>8</sup>

## Key findings:

- UGS support significant animal species <sup>9,10,11</sup>
- Main drivers of urban biodiversity richness can be divided into patch/local effects (e.g. patch size, habitat heterogeneity, vegetation structure) and matrix/landscape effects (e.g. urban-rural gradient and patch isolation) <sup>12,13</sup>

## Limitations:

- Commonly used indicators of quantity and abundance do not allow the differentiation between native, exotic, endemic, invasive or threatened species, therefore future research should also comprise indicators related to the quality of communities <sup>14,15</sup>
- Geographical and taxonomic biases.



# São Paulo, Brazil

- High prevalence of mental disorders (29%, Andrade et al 2012)
  - Biodiversity hotspot (Atlantic Forest)
  - Densification and real estate sector pressure
  - Government's financial constraints



Maximize UGS functions –  
Socioecological benefits



# General objective

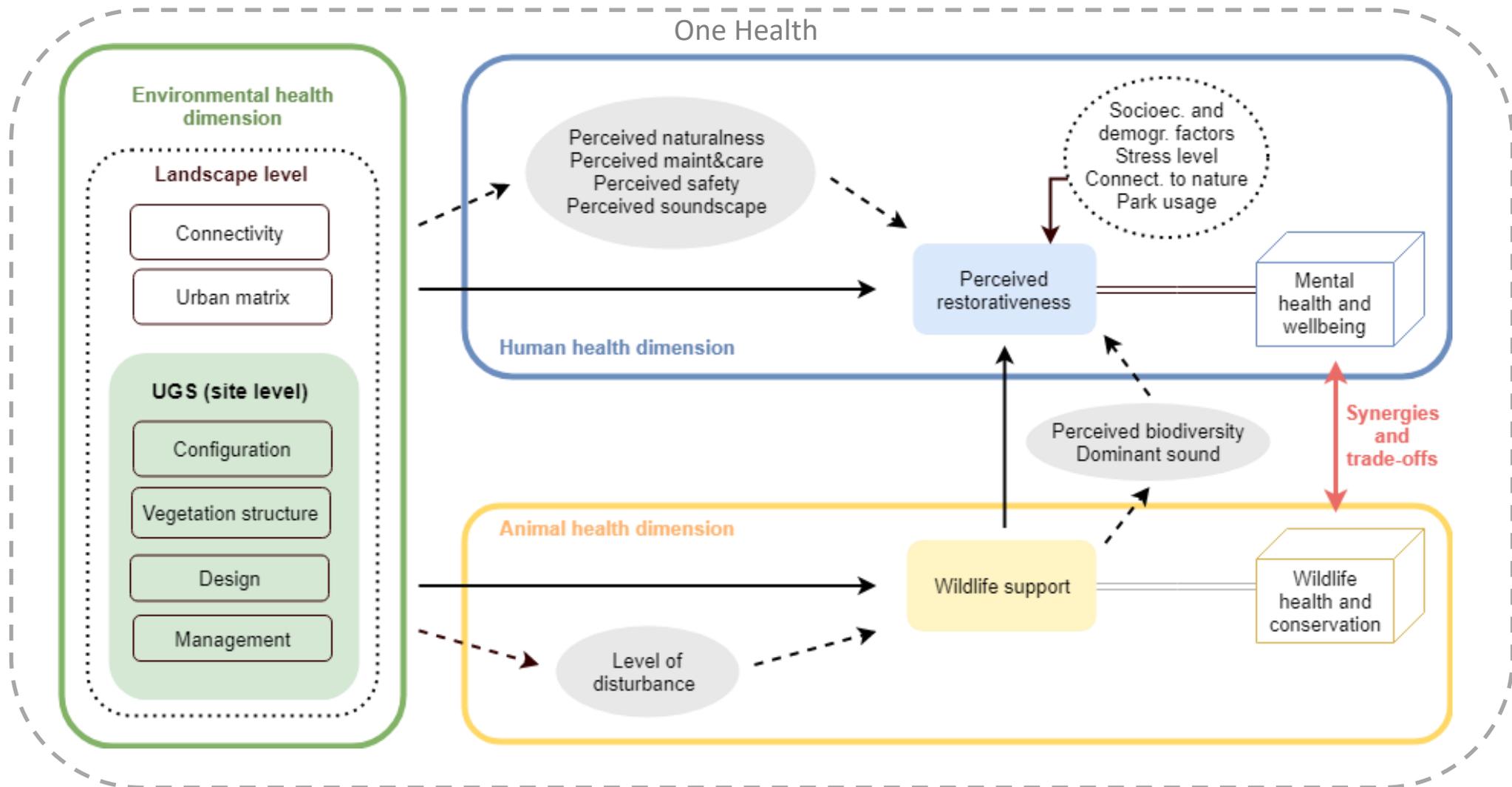
---

This study aims at identifying which and to what extent specific characteristics of urban green spaces may affect human health and wildlife support, and which are the synergies and trade-offs between these two dimensions.

Thus, it will contribute with empirical evidence to the design and management of multifunctional urban green spaces which meet human needs and biodiversity conservation.



# Conceptual framework

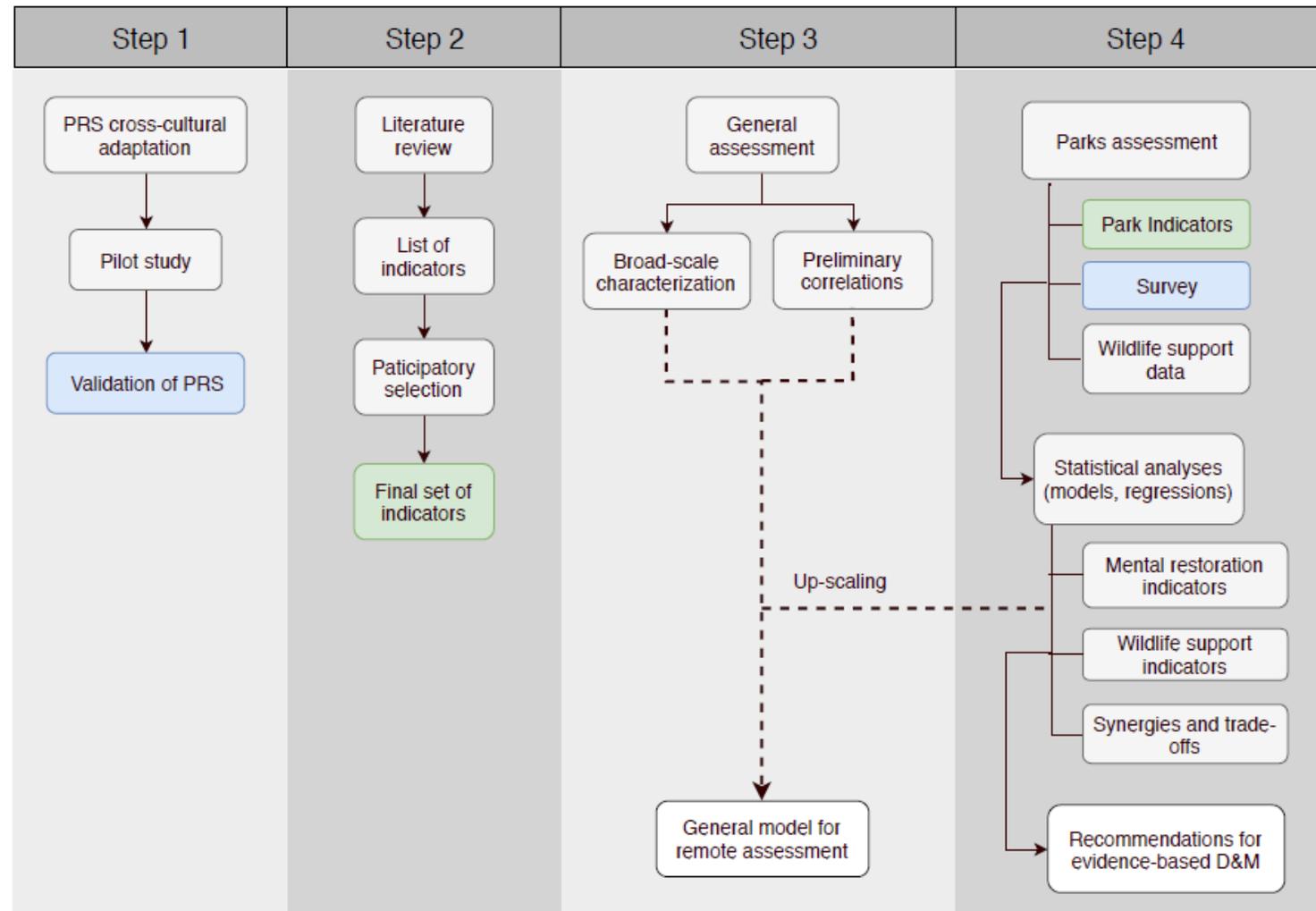




# Methodological framework

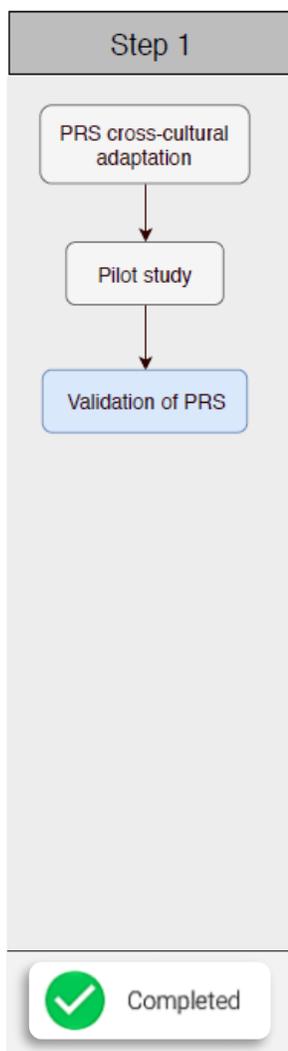
## Study design

- Interdisciplinary observational study with cross-sectional data collection.
- Transdisciplinary.
- Quantitative and qualitative methods.





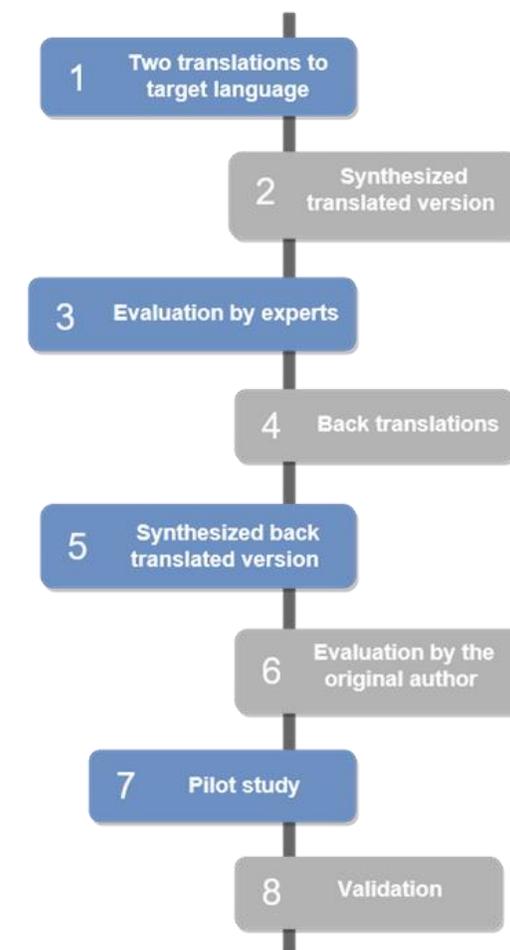
# S1: Cross-cultural adaptation and validation of scales



- Collaboration with the Psychology Department from UFRGS (Prof. Livia Bedin)
- Two psychometric scales:
  - Perceived Restorativeness Scale <sup>16</sup> - environment's restorative quality
  - Restoration Outcome Scale <sup>17</sup> – perceived restorative experience
- Validation analysis:
  - Pilot study in Porto Alegre (n= 170)
  - Sub sample from Sao Paulo (n= 400)

Reliability analysis

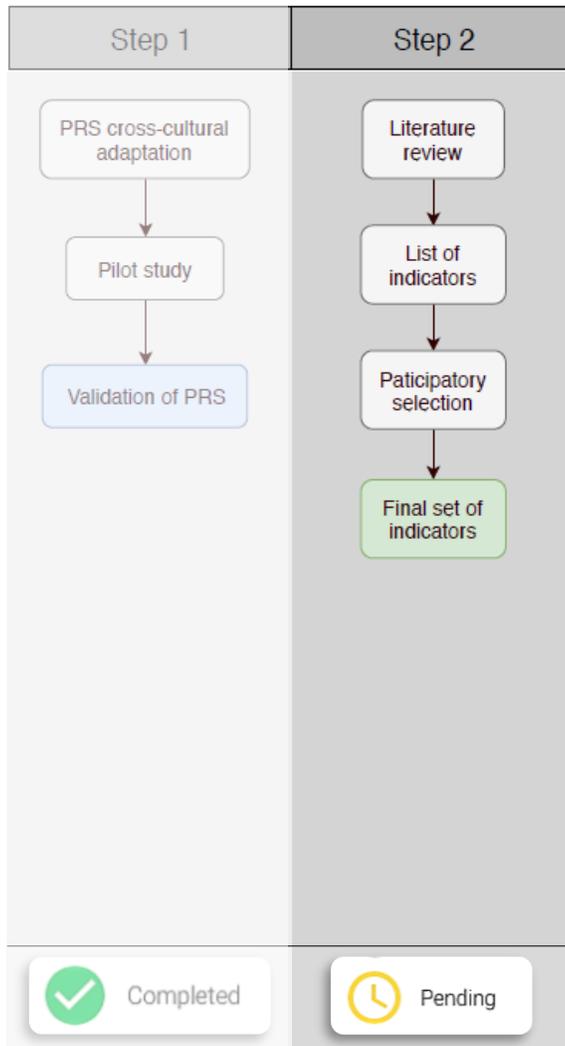
	PRS			ROS	Recom.
	BA	FA	CO		
Cronbach $\alpha$	0.813	0.806	0.798	0.908	>0.7



<sup>16</sup> Hartig et al., 1997, <sup>17</sup> Korpela et al 2008



## S2: Selection of UGS indicators



### Indicators from literature review:

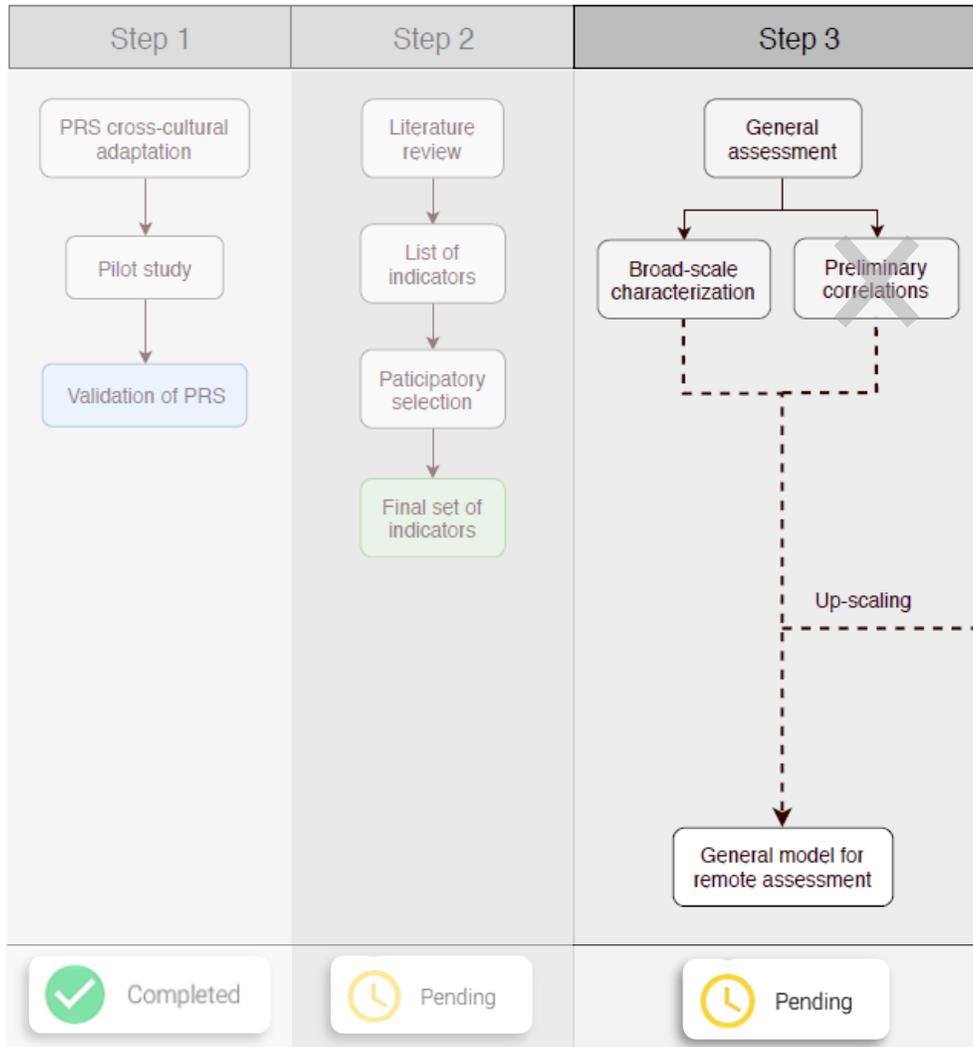
- Mental health/Restoration x green spaces/parks
  - 58 indicators – 15 significant correlations
- Biodiversity x green spaces x urban
  - 52 indicators – 19 significant correlations
- Currently - indicators observed/measured on the ground

### Practitioners selection:

- Validation and ranking process done by public agents from the Secretariat for the Green and Environment of SP.
- Scores (1-10) given to the indicators according to (1) relevance to wildlife support and human mental health, (2) practical relevance (3) and the availability of data or effort necessary for data collection.
- Set with the most relevant indicators to focus the final recommendations to stakeholders.



# S3: General assessment and selection of parks



- Municipal urban and linear parks (N= 92).
- Outliers (size)= 5.
- **Stratification into 6 groups:**
  - patch size: small (<10 ha) and large (>10 ha)
  - vegetation coverage (low, medium, high)
- **Selection of 3 representatives for each group:**
  - Reality on the ground (field visit, park manager)
  - Social vulnerability index
  - Feasibility (safety)

Statistics

		Group1	Group2	Group3	Group4	Group5	Group6
N	Valid	17	22	24	6	9	9
	Missing	70	65	63	81	78	78



## S3: General assessment and selection of parks

Research  
progress



### Group 1

Small size

Low tree coverage

Medium-high vulnerability



### Group 2

Small size

Medium tree coverage

Low vulnerability



### Group 3

Small size

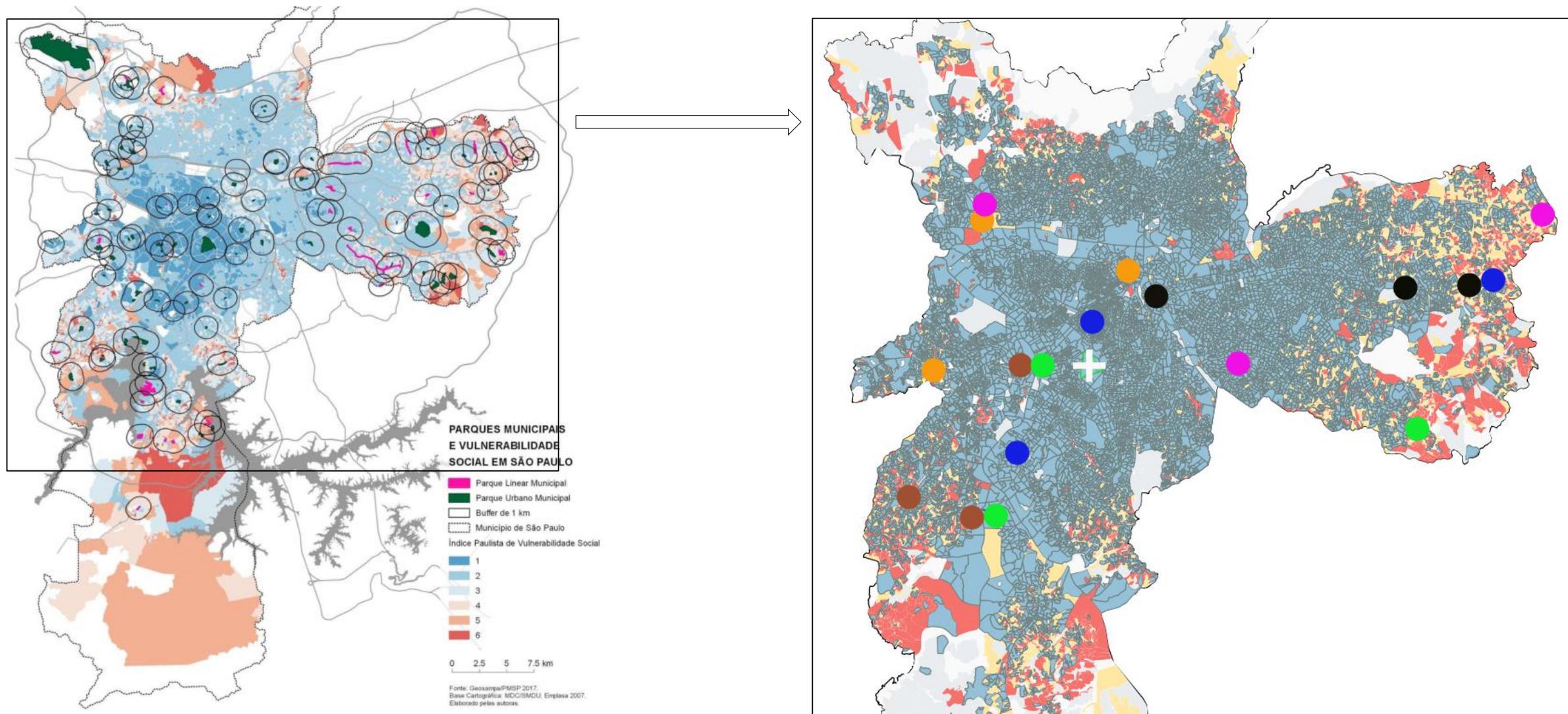
High tree coverage

Low vulnerability



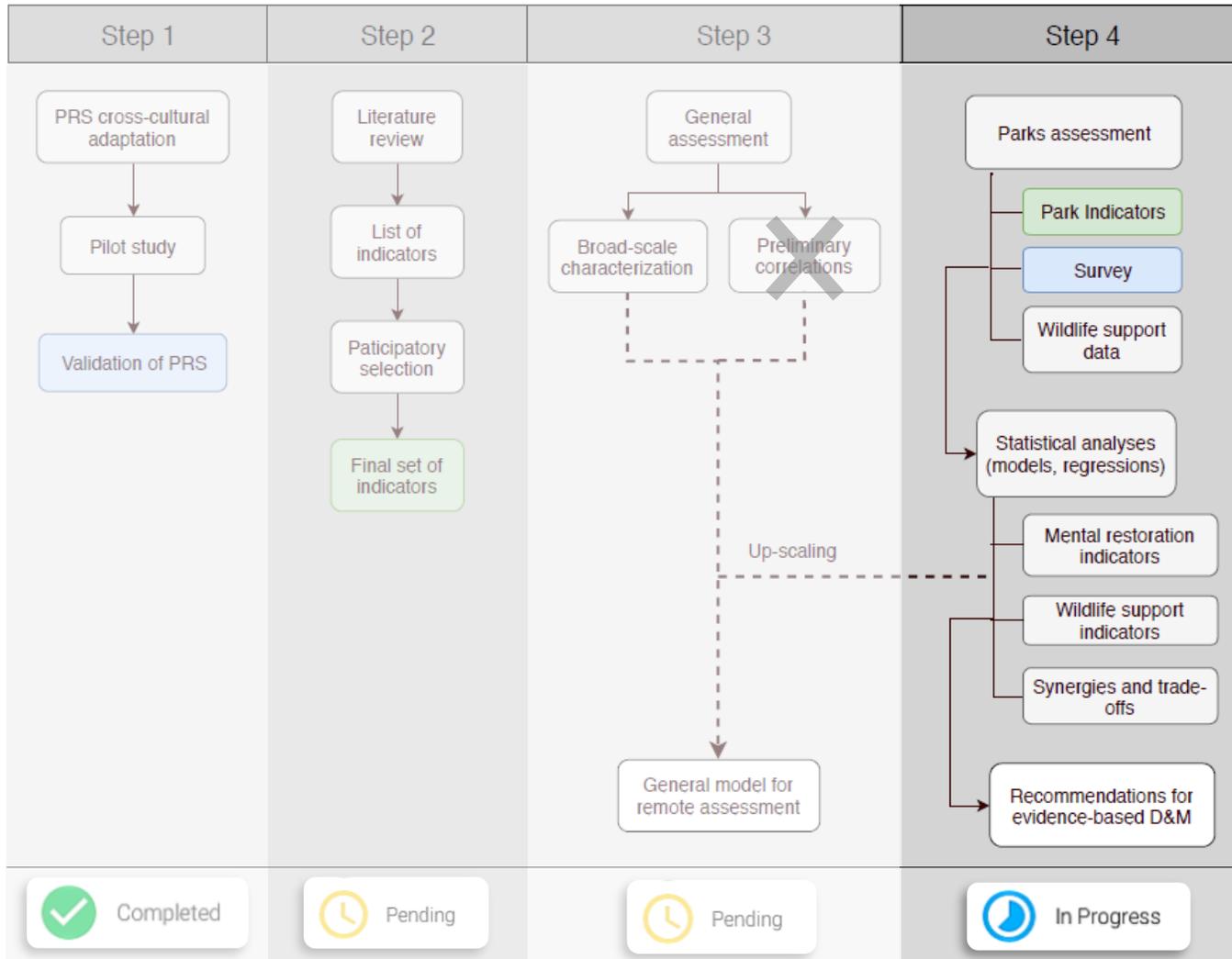
# S3: General assessment and selection of parks

Research  
progress





# S4: Parks' assessment



- **Survey:**
  - N= 18 parks
  - + 1 square (Largo da Batata)
  - + 1 outlier park (Ibirapuera)
  - N= 881 questionnaires
- **Secondary data (City Hall inventories):**
  - List of birds species
  - List of plants species
  - Sampling effort



## References

---

- Andrade LH, Wang Y-P, Andreoni S, Silveira CM, Alexandrino-Silva C, et al. (2012) Mental Disorders in Megacities: Findings from the Sao Paulo Megacity Mental Health Survey, Brazil. *PLoS ONE* 7(2): e31879. doi:10.1371/journal.pone.0031879
- Beninde J, Veith M, Hochkirch A (2015) Biodiversity in cities needs space: a meta-analysis of factors determining intra-urban biodiversity variation. *Ecology Letters*.
- Cohen P, Potchter O, Schnell I (2014) The impact of an urban park on air pollution and noise levels in the Mediterranean city of Tel-Aviv, Israel. *Environmental Pollution* 195: 73-83.
- Grahn P, Stigsdotter UK (2010) The relation between perceived sensory dimensions of urban green space and stress restoration. *Landscape and Urban Planning* 94: 264–275.
- Hartig T , Korpela K , Evans GW, Gärling T (1997) A measure of restorative quality in environments. *Scandinavian Housing and Planning Research* 14:4, 175-194.
- Hartig T, Mitchell R, Vries S, Frumkin H (2014) *Natura and Health*. *Annual Review of Public Health* 35: 207–28.
- Ives CD, Lentini PE, Threlfall CG, Ikin K, Shanahan DF, Garrard GE, Bekessy SA, Fuller RA, Mumaw L, Rayner L, Rowe R, Valentine LE, Kendal D (2015) Cities are hotspots for threatened species. *Global Ecology and Biogeography* 25:1, 117-126.
- Kaplan R, Kaplan S (1989) *The experience of Nature*. 360p.



## References

---

Klemm W, Heusinkveld BG, Lenzholzer S, Jacobs MH, Hoved BV (2015) Psychological and physical impact of urban green spaces on outdoor thermal comfort during summertime in The Netherlands. *Building and Environment* 83: 120-128.

Prefeitura de Sao Paulo (2014) *Guia dos Parques Municipais de Sao Paulo*. 4a Edition

Sandifer PA, Sutton-Grier AE, Ward BP (2015) Exploring connections among nature, biodiversity, ecosystem services, and human health and well-being: Opportunities to enhance health and biodiversity conservation. *Ecosystem Services* 12: 1-15

Shwartz A, Turbé A, Simon L, Julliard R (2014) Enhancing urban biodiversity and its influence on city-dwellers: An experiment. *Biological Conservation* 171: 82–90.

Stigsdotter UK, Corazon SS, Sidenius U, Refshauge AD, Grahn P (2017) Forest design for mental health promotion—Using perceived sensory dimensions to elicit restorative responses. *Landscape and Urban Planning* 160: 1–15.

Wilson, Edward O. (1984). *Biophilia*. Cambridge: Harvard University Press.

Thank you! Obrigada!

