

# Management objectives and artificial water provision in the Great Limpopo Transfrontier Park



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# Project overview

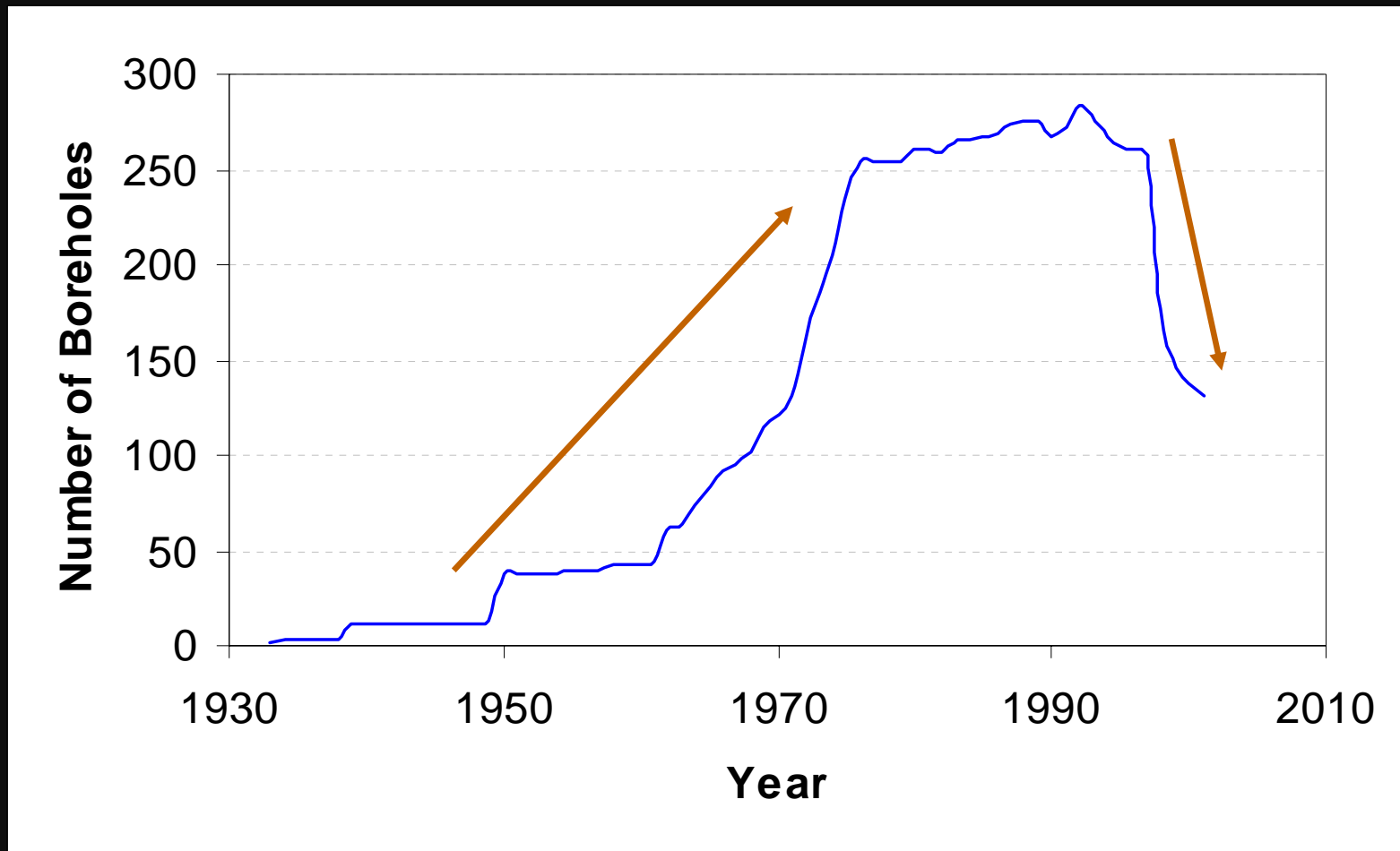
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- Theoretical aspects: spatial heterogeneity, ecosystem resilience and water provision
- Management aspects: management theory and waterpoint monitoring



# Artificial water provision

Example: Open borehole numbers in Kruger National Park 1933 - 2001



# Study area

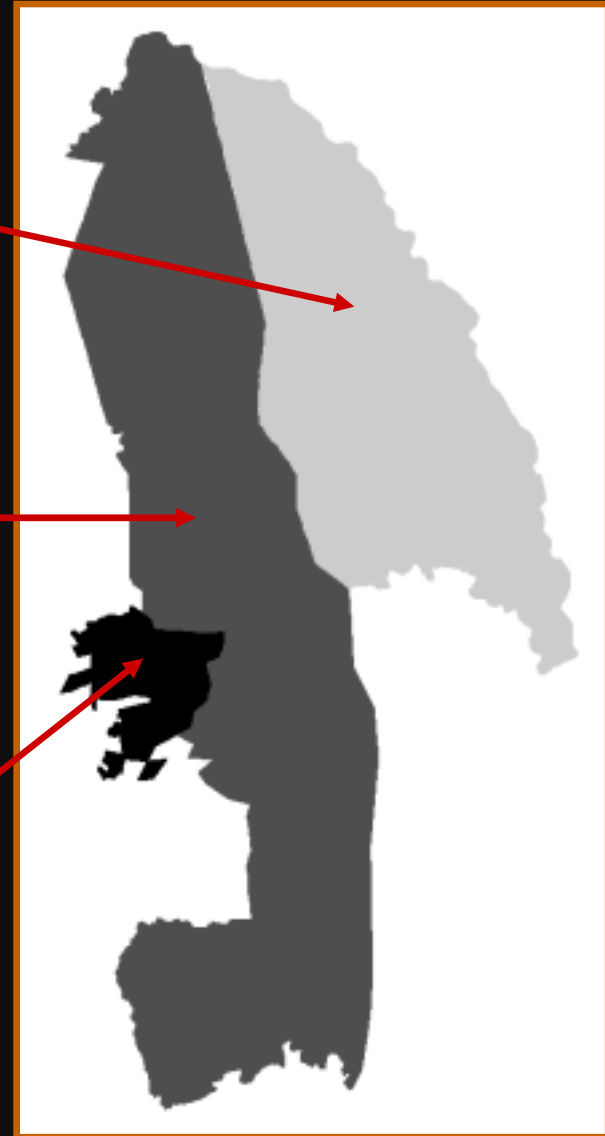
Limpopo  
National  
Park



Kruger  
National  
Park



Six  
private  
reserves



# Data availability

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- Artificial waterpoint databases
    - GPS, digitising from topographical maps, digitising from expert knowledge, aerial census records
  - Natural water availability
    - Kruger ecological aerial census 1981 – 2001 (presentineas.shp)
  - Landscape type maps
    - Extended east (Stalmans *et al.* 2004) and west (Peel *et al.* 2005)
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# Methods

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- Artificial waterpoint databases
    - Points per km<sup>2</sup> for property and landscape type
    - Kruger database used “as is” and with multiple records removed
  - Natural water availability
    - Density rasters
    - Permanency calculated from repeats in census
    - Natural water availability “score” - to be calculated
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# Results: Artificial density

	Open points/km <sup>2</sup>	Closed points/km <sup>2</sup>	Total points/km <sup>2</sup>
Private reserves (range)	0.150 (0.120 - 0.360)	0.008 (0 - 0.048)	0.158 (0.130 - 0.360)
Kruger	0.009	0.014	0.023



# The Kruger database...

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Kruger with no double/triple waterpoint records:  
total density = 0.019 waterpoints/km<sup>2</sup>

Open/Closed status of Kruger waterpoints:  
accuracy = 50% (n = 24)

12.5% incorrect label open, 37.5% incorrect label closed

Distance to trough/dam: 241m (n = 18, SE = 56)

Range: 28m to 893m

Distance to borehole: 203m (n = 19, SE = 56)

Range: 33m to 884m

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# Results: Natural availability

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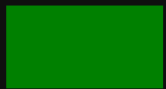
% of years  
recorded



1-25



26-50

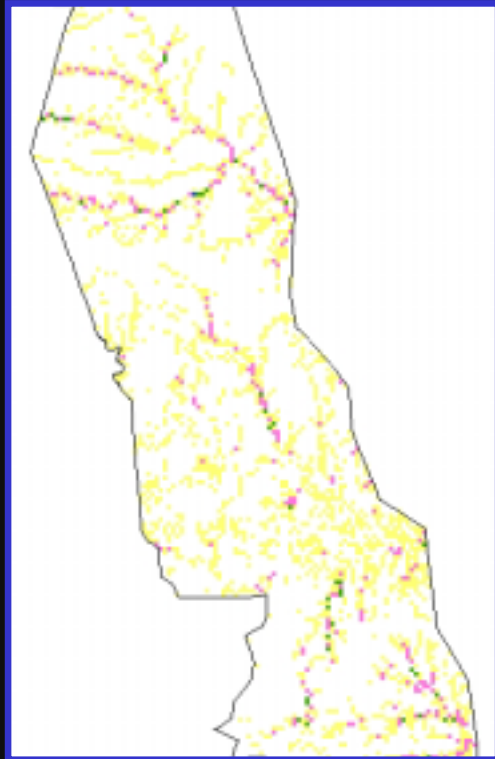


51-75

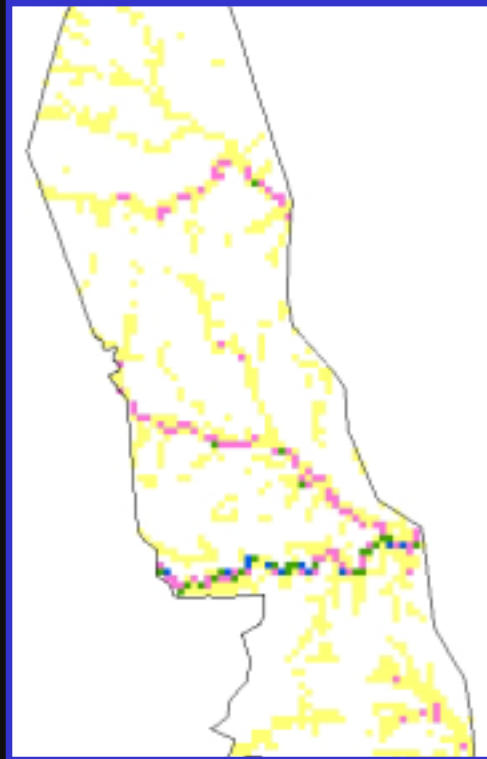


76-100

Pools



Flowing rivers



Densities based on repeated locations in census records

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# Results: Natural availability

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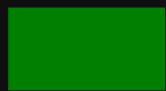
% of years recorded



1-25



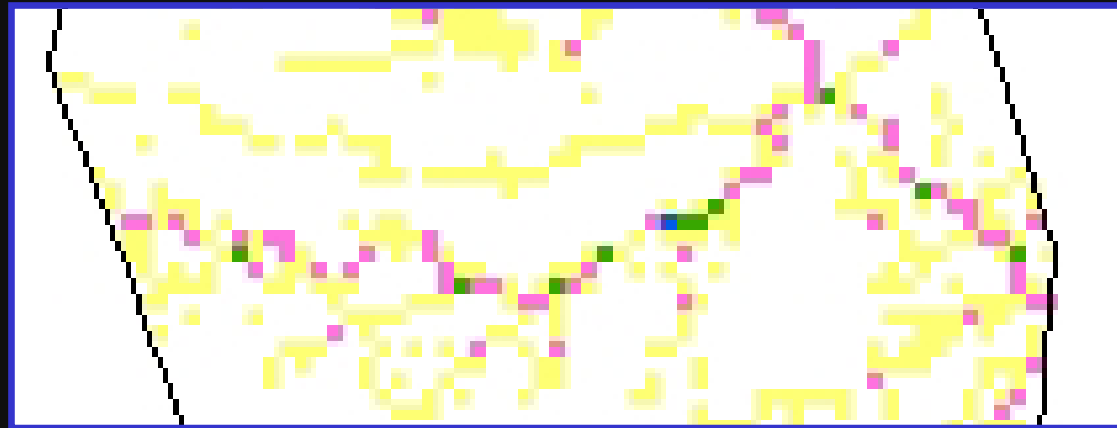
26-50



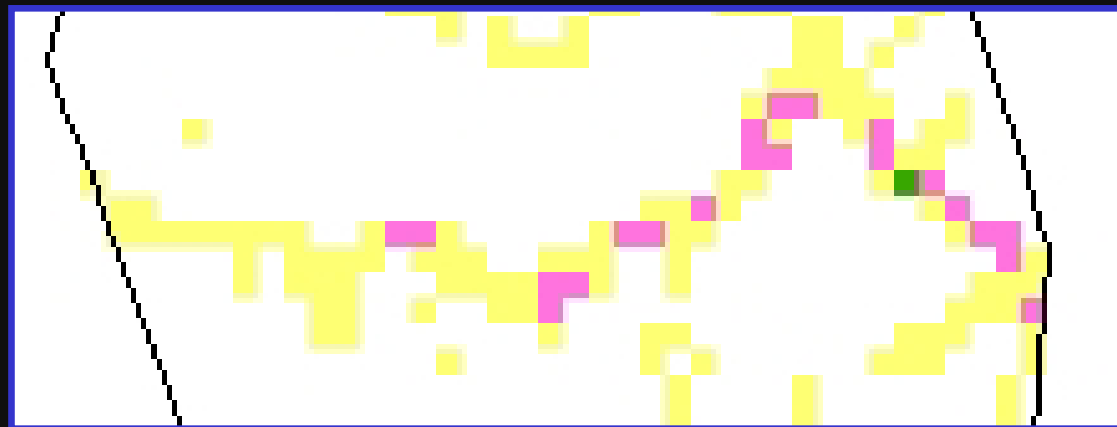
51-75



76-100



Pools



Flowing  
rivers

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# Results: Natural availability

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% of years  
recorded

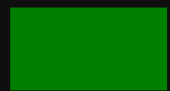
Olifants River



1-25



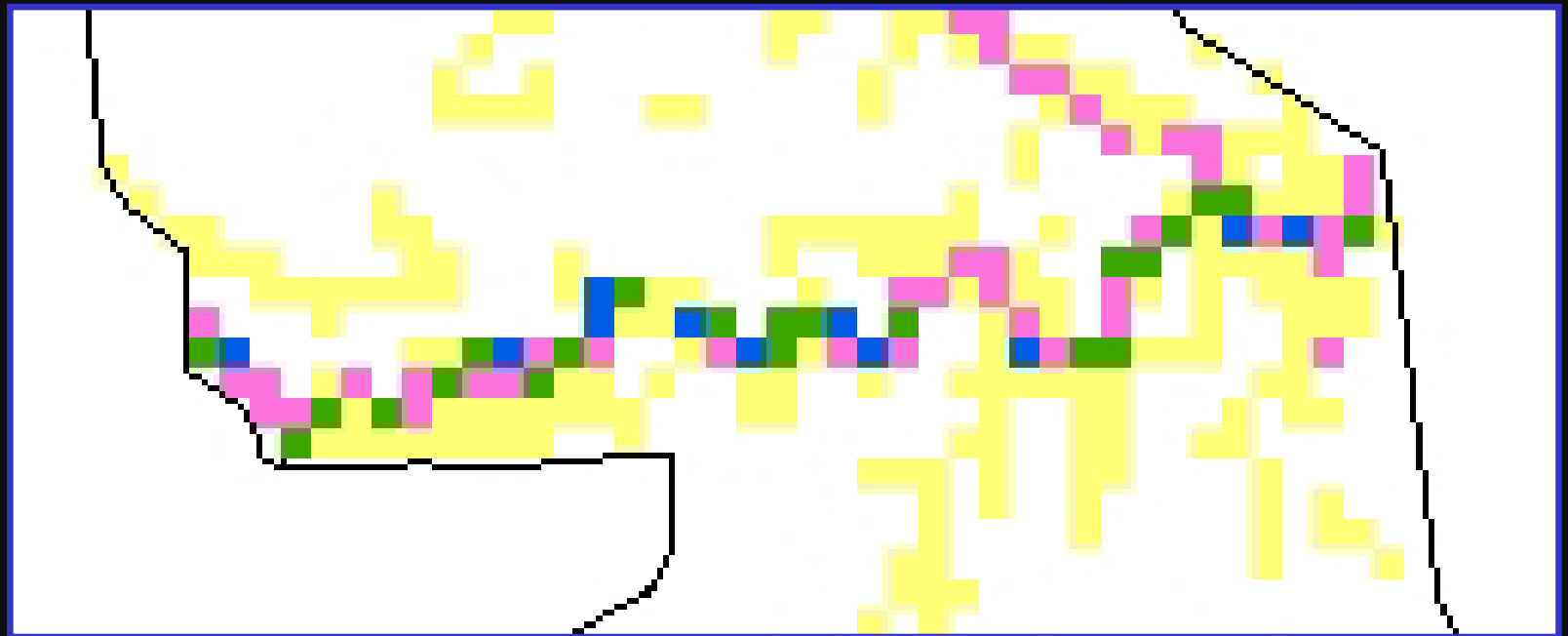
26-50



51-75



76-100



# Results: Natural availability

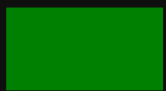
% of years recorded



1-25



26-50

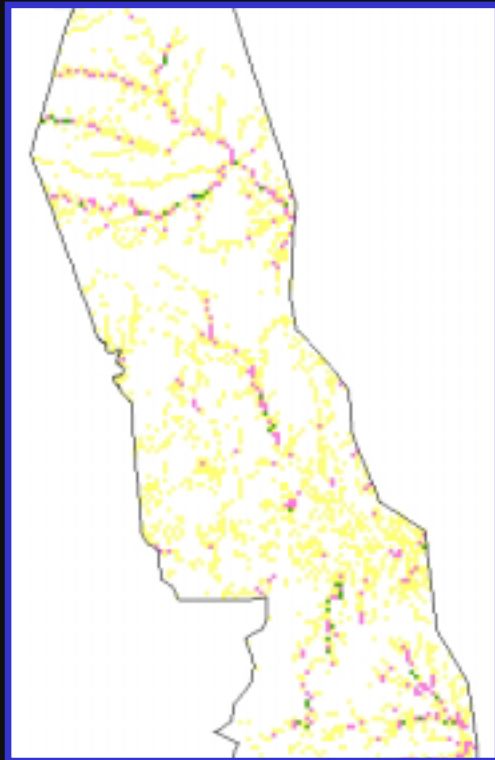


51-75

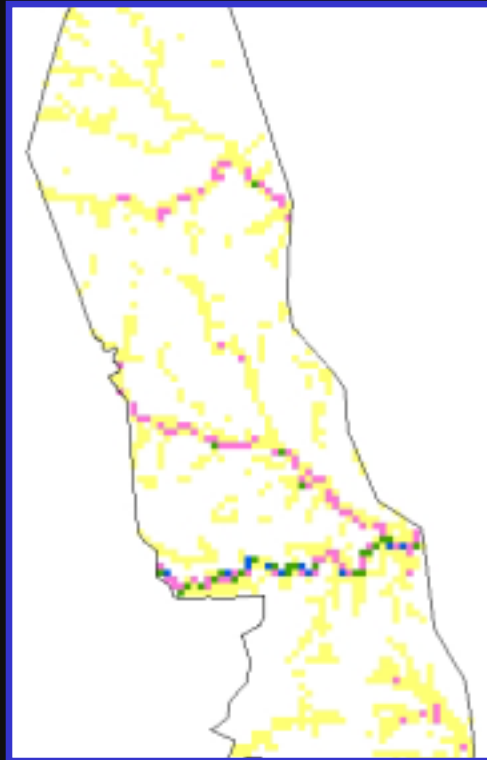


76-100

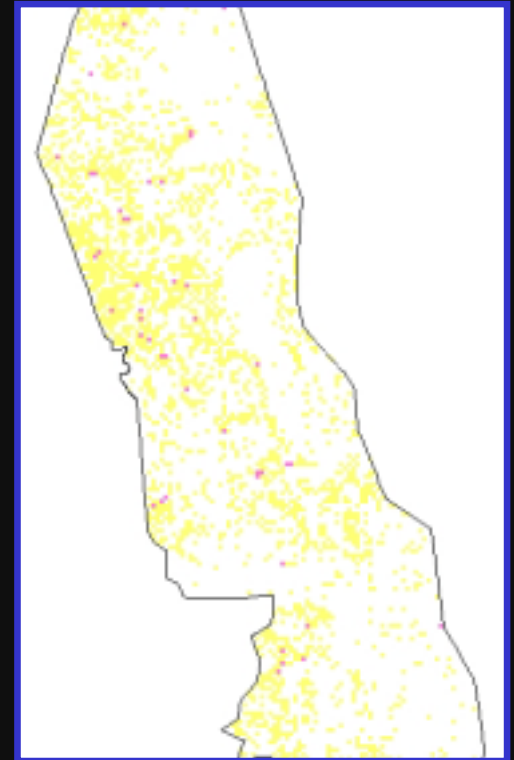
Pools



Flowing rivers



Pans



Densities based on repeated locations in census records

# Results: Natural availability

% of years recorded



1-25



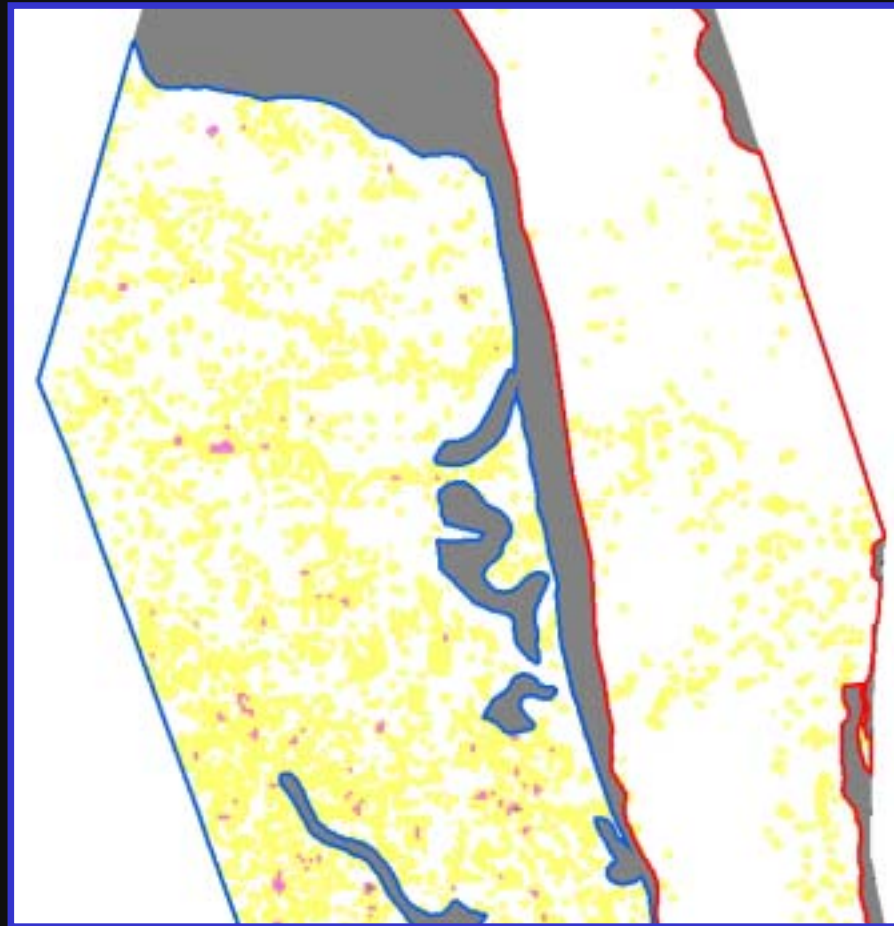
26-50



51-75



76-100



Pans

Granites

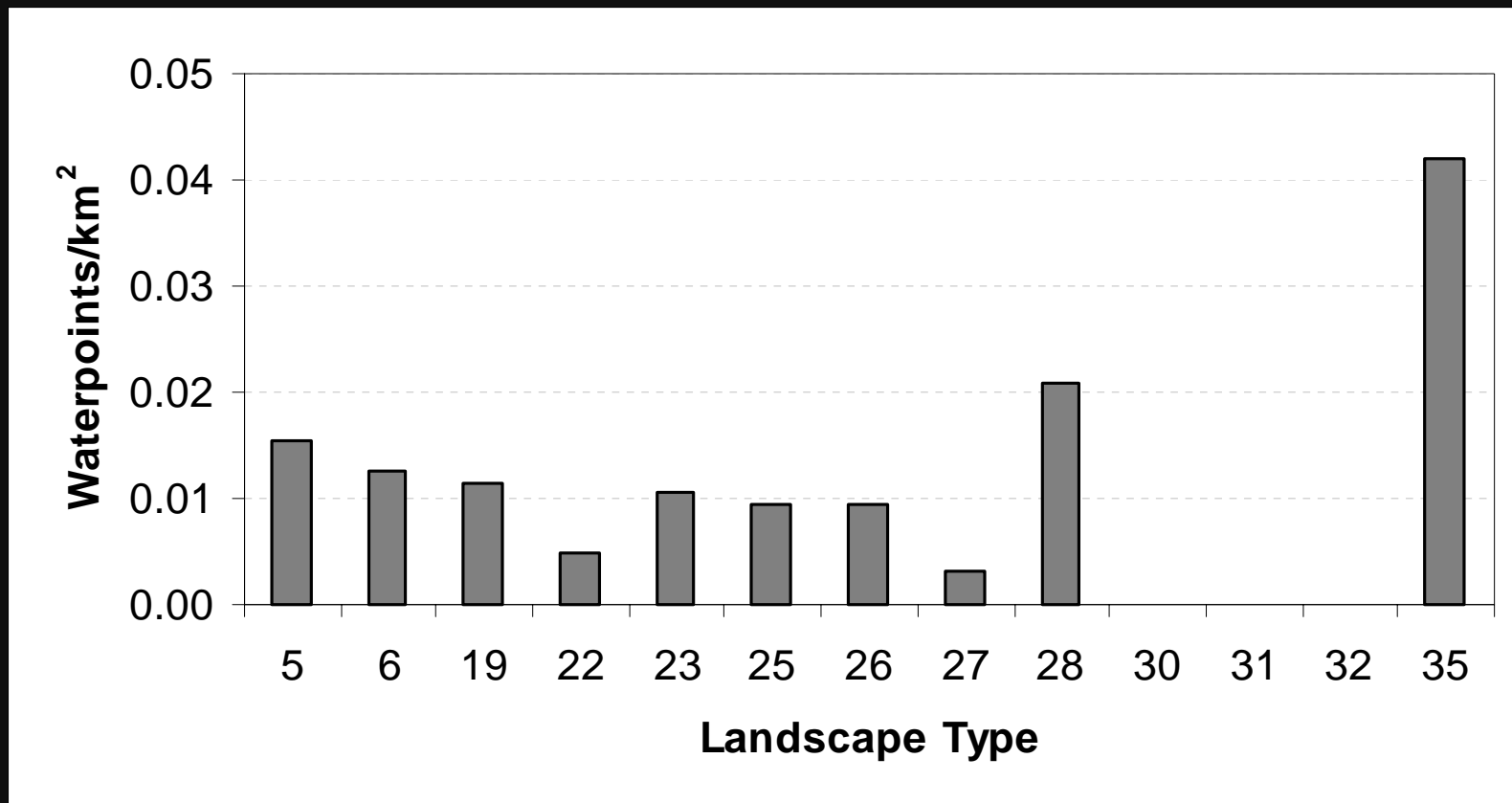
Basalts

Other

Densities based on repeated locations in census records

# Results: Landscapes

Artificial waterpoint density of landscape types of study area within Kruger



# What would it look like?

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## Objectives homogenisation

(Kruger database: 0.009 open waterpoints/km<sup>2</sup>)

<b>Property</b>	<b>Current density points/km<sup>2</sup></b>	<b>Waterpoints to close</b>	<b>New number of waterpoints</b>
Private Reserves	0.11	12	1
	0.36	17	0
	0.12	63	5
Limpopo National Park	0	Open 89	89

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# Acknowledgements

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National Park, Limpopo National Park,  
Mohlabetse Association of Landowners,  
Thornybush Private Nature Reserve,  
Timbavati Private Nature Reserve, Umbabat  
Private Nature Reserve



Presentation preparation: Joost & Noor 😊