Do white rhino increase heterogeneity of KNP's savanna grasslands?

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Number of rhino observed
1000
1500
2000
2500
3000
3500
4000
1990
1995
2000
2005
2010
Year

Ecosystems (2007)
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ECOSYSTEMS

Ecological Engineering by a Mega-Grazer: White Rhino Impacts on a South African Savanna

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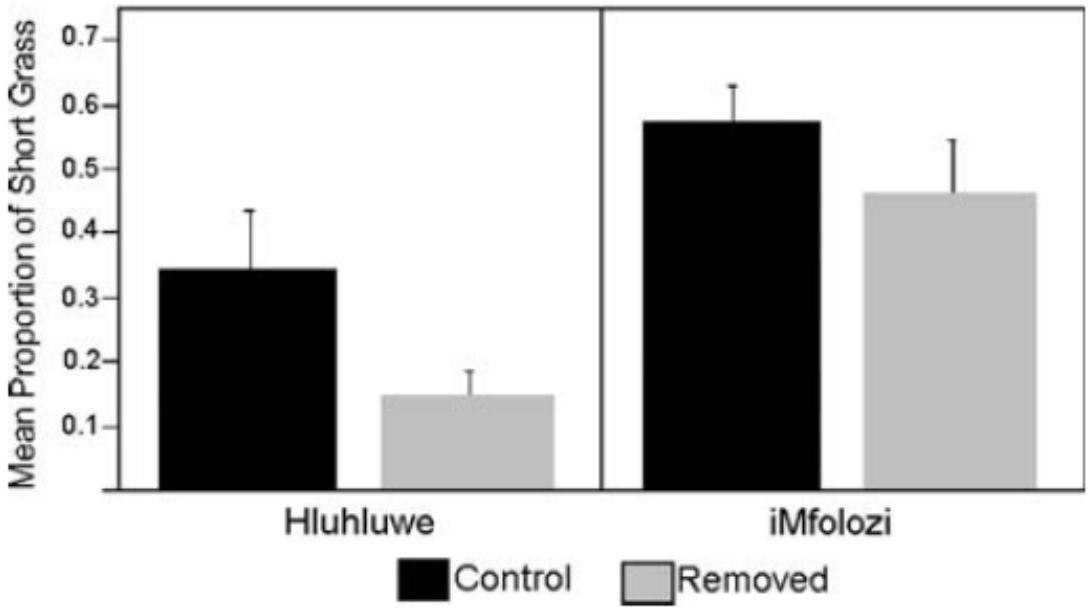
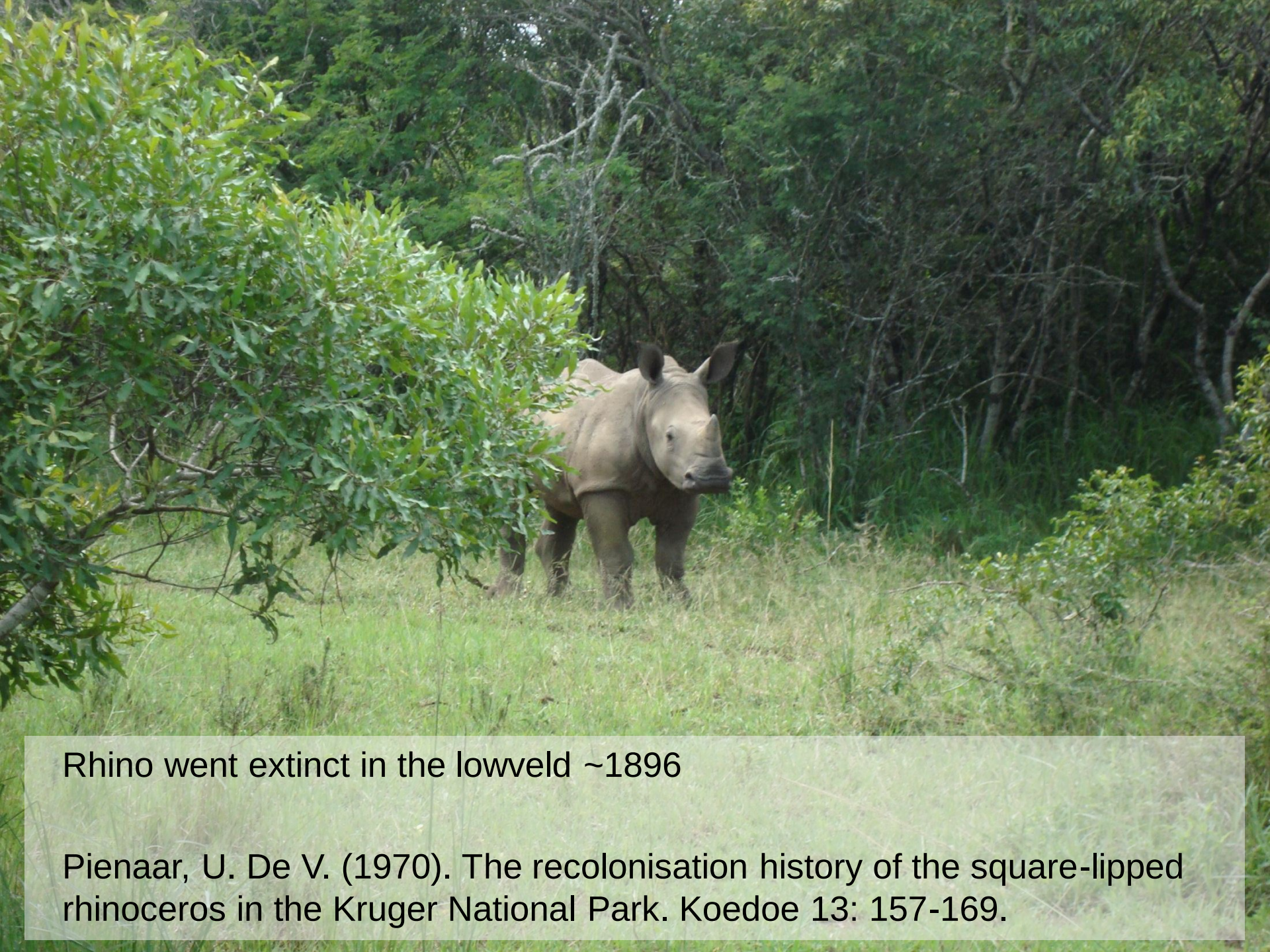


Rhino increase heterogeneity of HiP grasslands – create grazing lawns

Do we start seeing something similar in KNP?

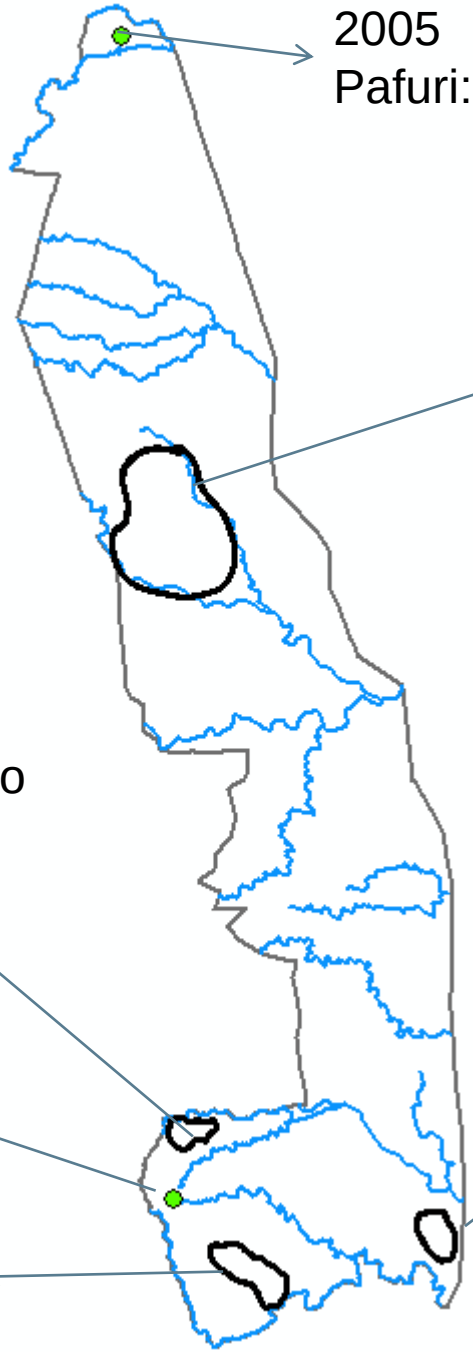
- Understanding recolonization pattern
  - Where are they
  - And since when
- Use this pattern to look at impact of white rhino on grassland heterogeneity
  - More rhino, more grazing lawns



Rhino went extinct in the lowveld ~1896

Pienaar, U. De V. (1970). The recolonisation history of the square-lipped rhinoceros in the Kruger National Park. Koedoe 13: 157-169.

Pienaar 1970
Pedersen 2009



2005
Pafuri: 6 rhino

1964
Shipandane to
Mahlangene: 16 rhino

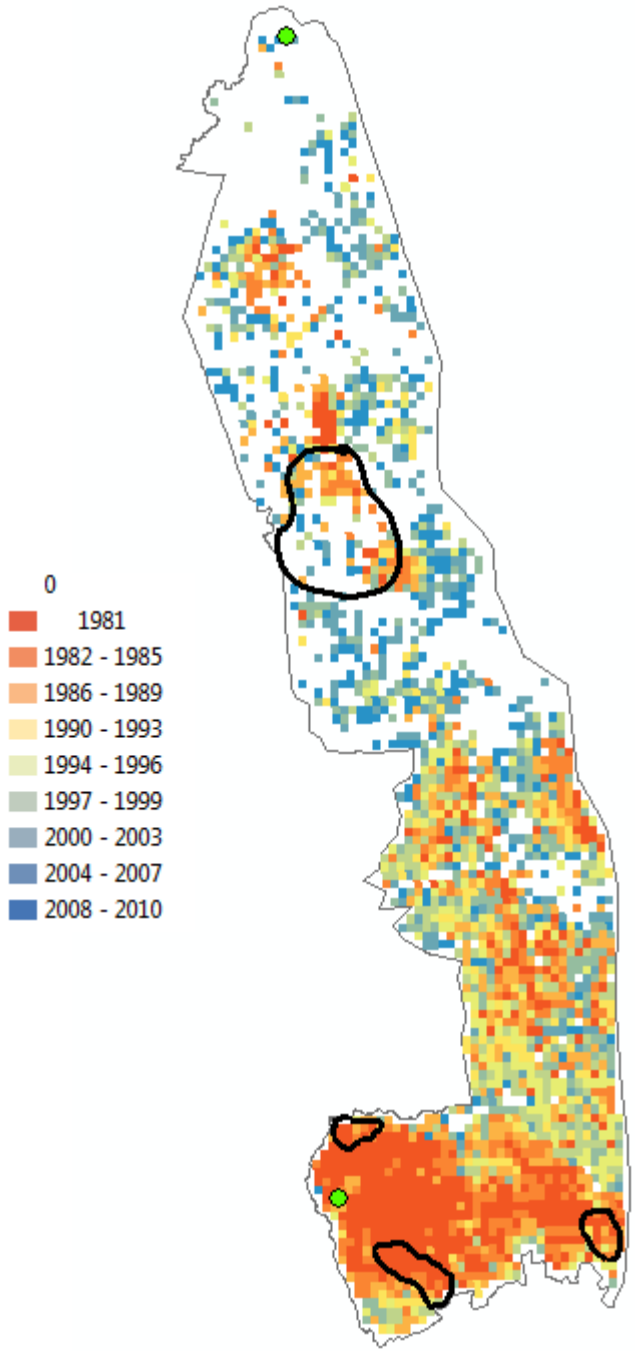
1963-64
Doispane and
Skurukwane: 59 rhino

1963-64
mhlanganzwane-
panamana area:
15 rhino

1961-63
Faai rhino
enclosure: 8 rhino

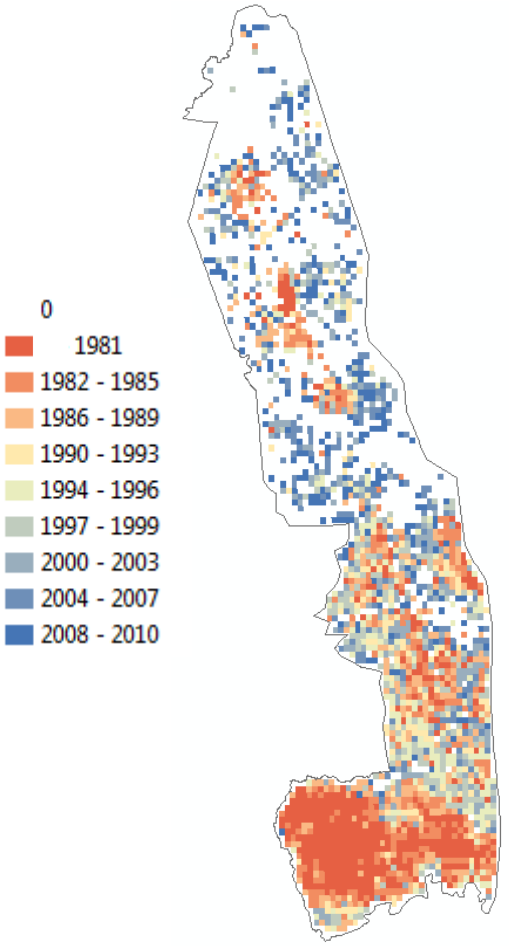
1969
mlambane-malelane
area: 40 rhino


22
0
122


0
1981
1982 - 1985
1986 - 1989
1990 - 1993
1994 - 1996
1997 - 1999
2000 - 2003
2004 - 2007
2008 - 2010

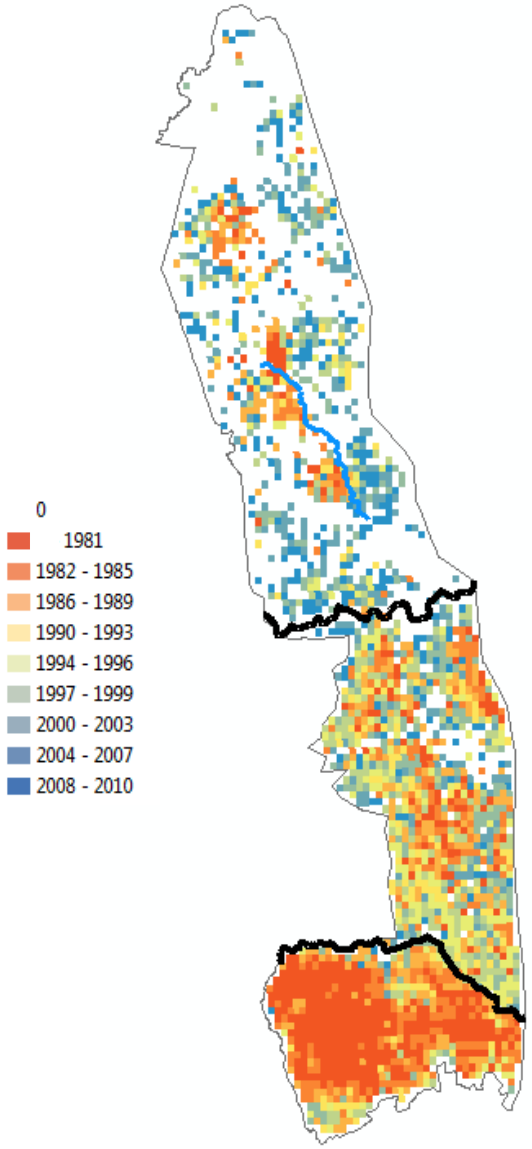
Recolonization of KNP by White Rhino

Year of colonization

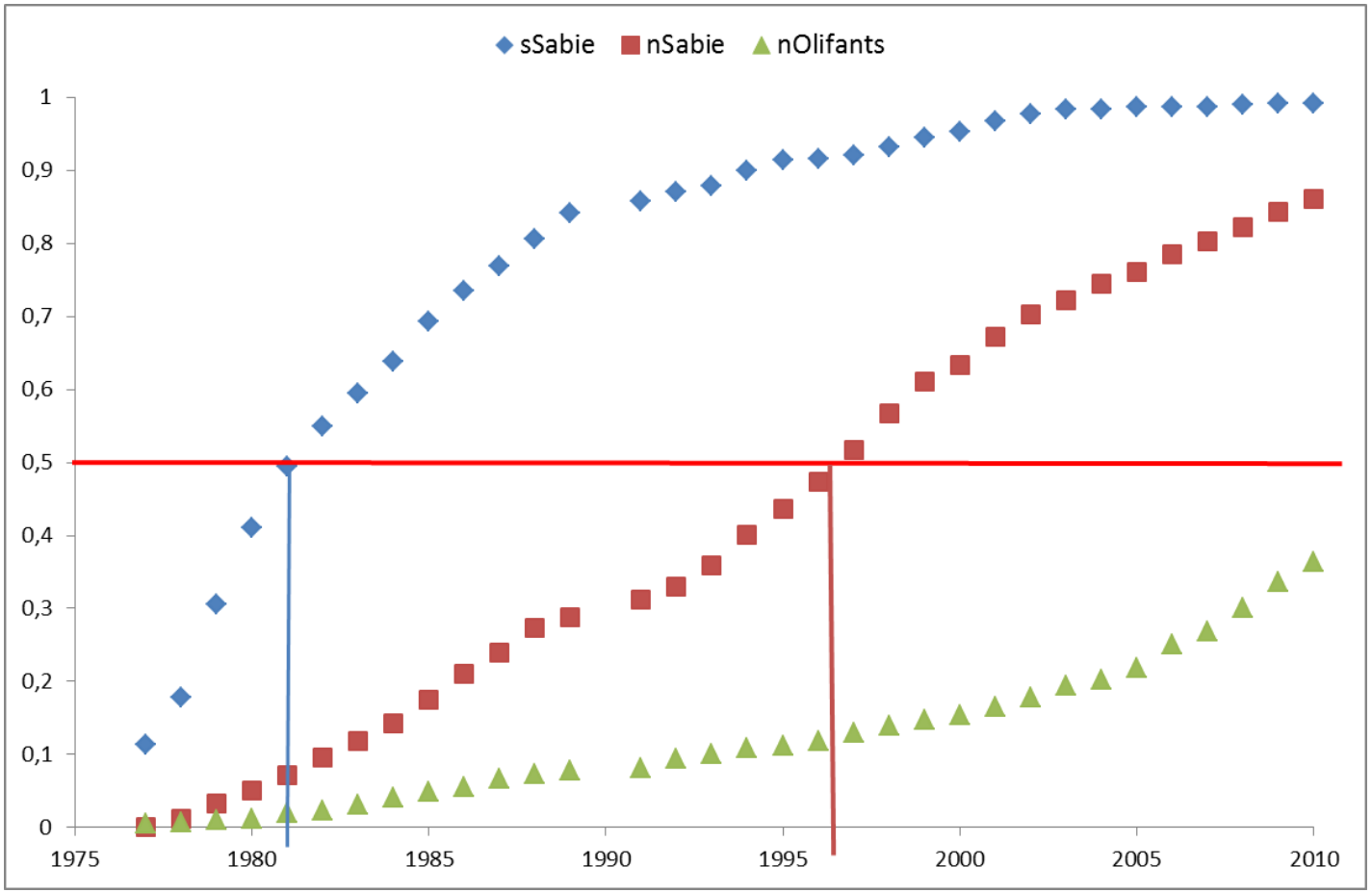


'Density'
Prob of Occurance
1989-2009

Large rivers form a barrier



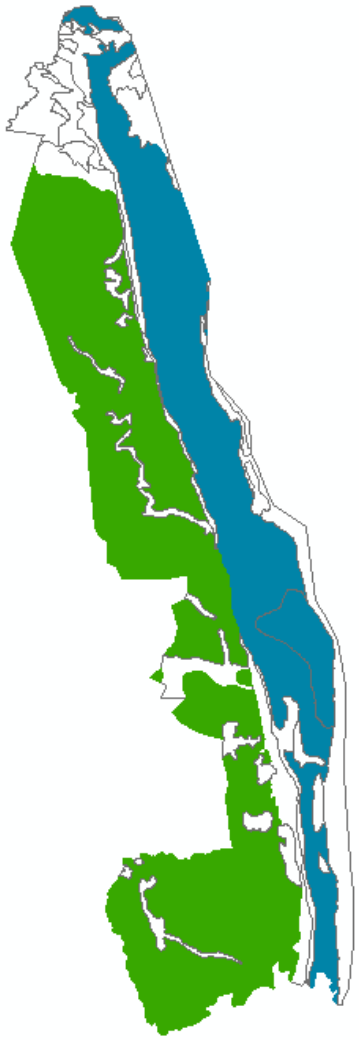
Different colonization of different ’river sections’



sSabie: 661 times 4.84 km^2 blocks
nSabie: 1082
nOlifants: 1883

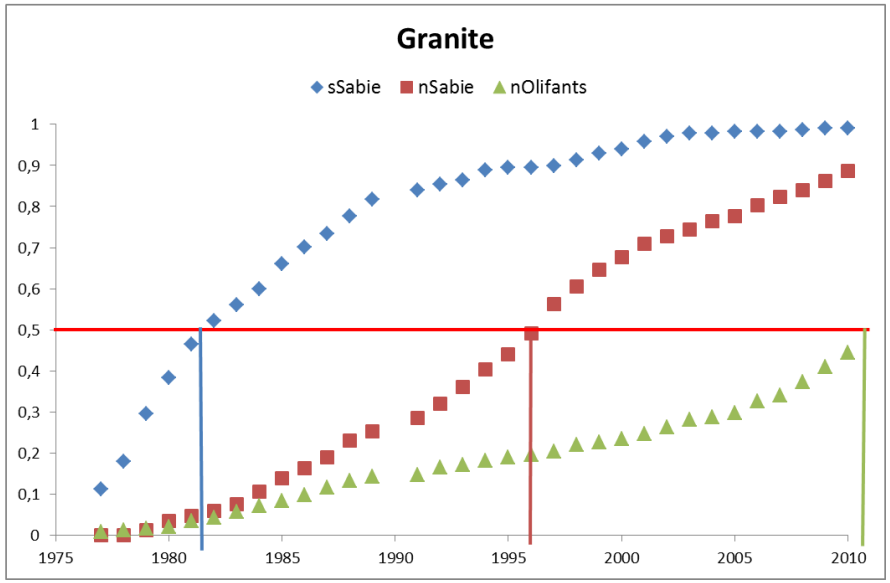
Different colonization of dominant landscapes within KNP

granite

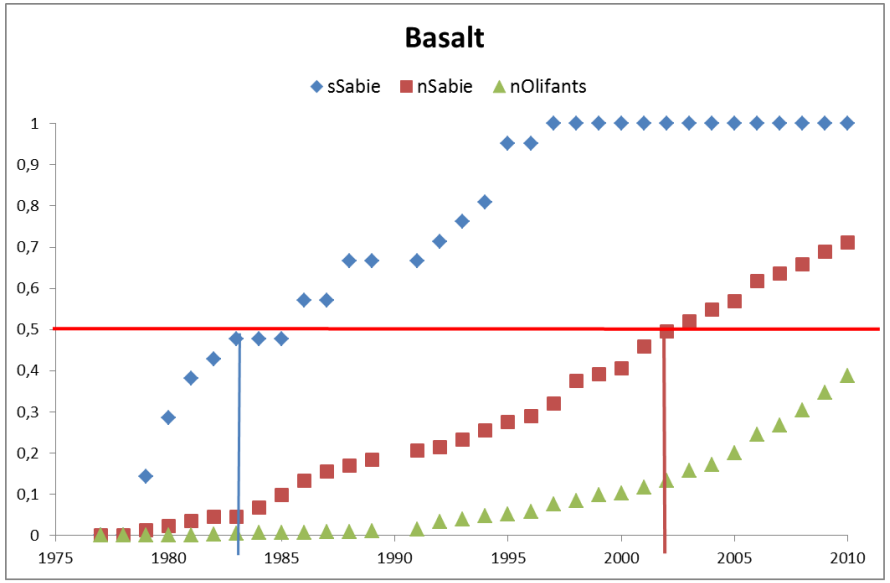


basalt

Basalts colonized later and possibly more slowly



sSabie: 499 times 4.84 km^2 blocks
nSabie: 238
nOlifants: 710



sSabie: 21 times 4.84 km^2 blocks
nSabie: 266
nOlifants: 450

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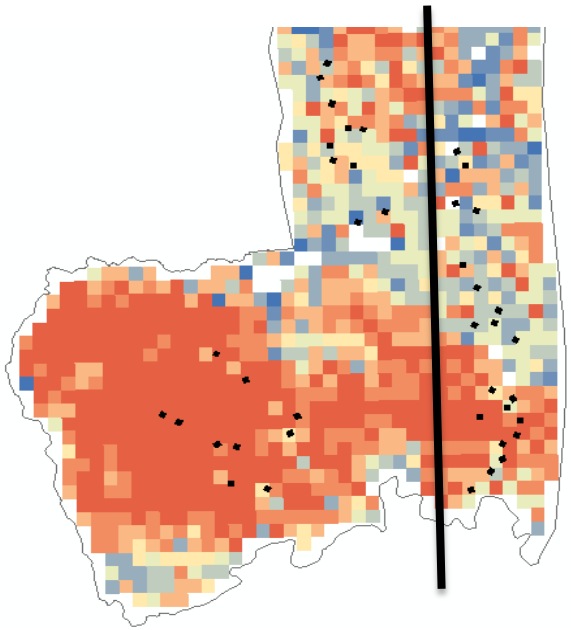
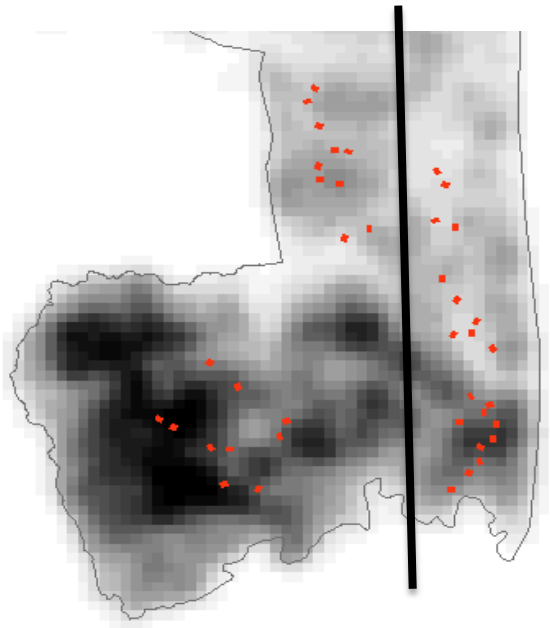
Can we detect rhino impact on grassland heterogeneity using these rhino gradients?

- Rivers and geology create gradients of rhino density and time since colonization
- Longer history of rhino and higher densities south of Sabie and on granites

Effect of rhino on grassland heterogeneity

- 750m transects with a Rhino and a Geology 'treatment'
  - 10 High Rhino Granite
  - 10 Low Rhino Granite
  - 10 High Rhino Basalt
  - 10 Low Rhino Basalt
- Recorded lawn presence/absence and DPM every 2 meters
- Lawn: patch of shortly grazed grass (2-3 cm max), consisting of stoloniferous grass species

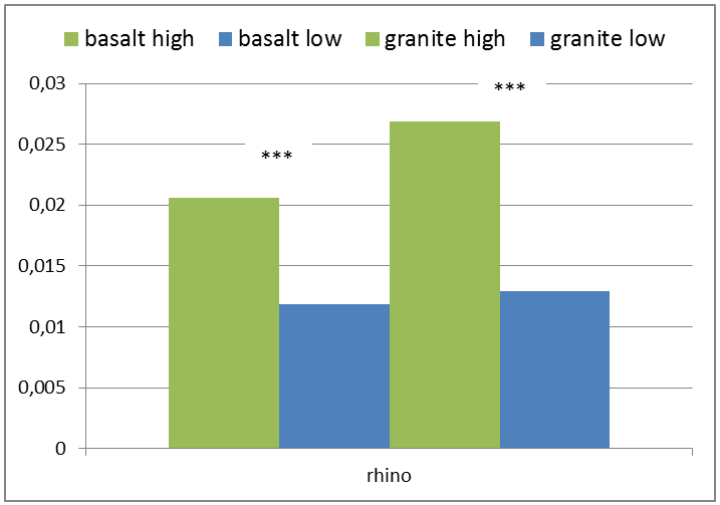


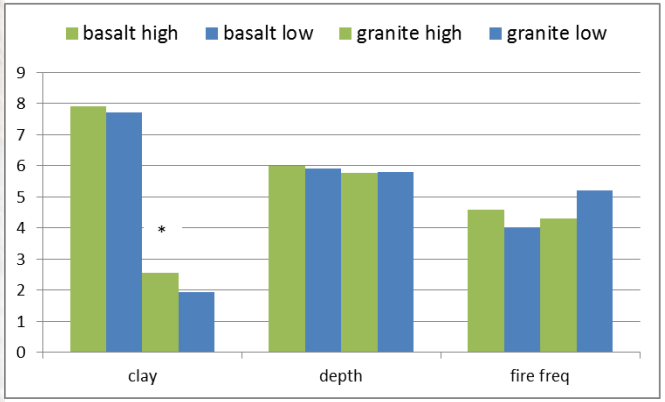


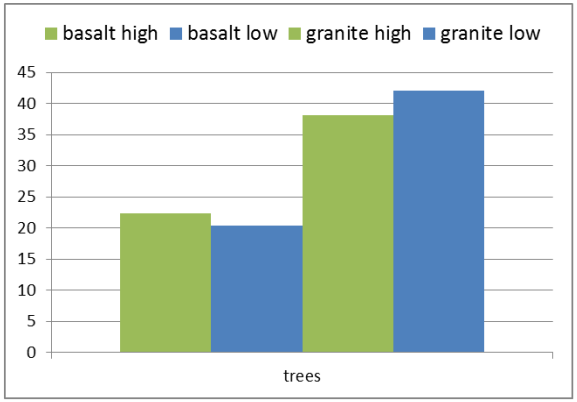
Conditions for transect location

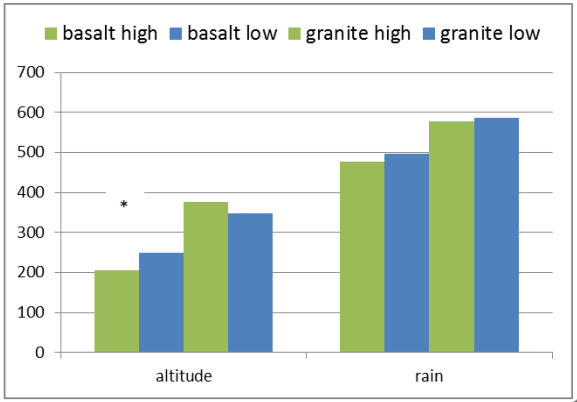
- All within same ”Gertenbach landscape”:
  - Granite plains with combretum-terminalia woodlands
  - Basaltic plains with Sclerocarya or Acacia nigrescens tree savanna
- On crest only to avoid sodic sites
- Min 1km away from Gabbro
- Min 1km away from waterpoints and rivers
- Min 1 km away from roads

Attempting to control for other variables









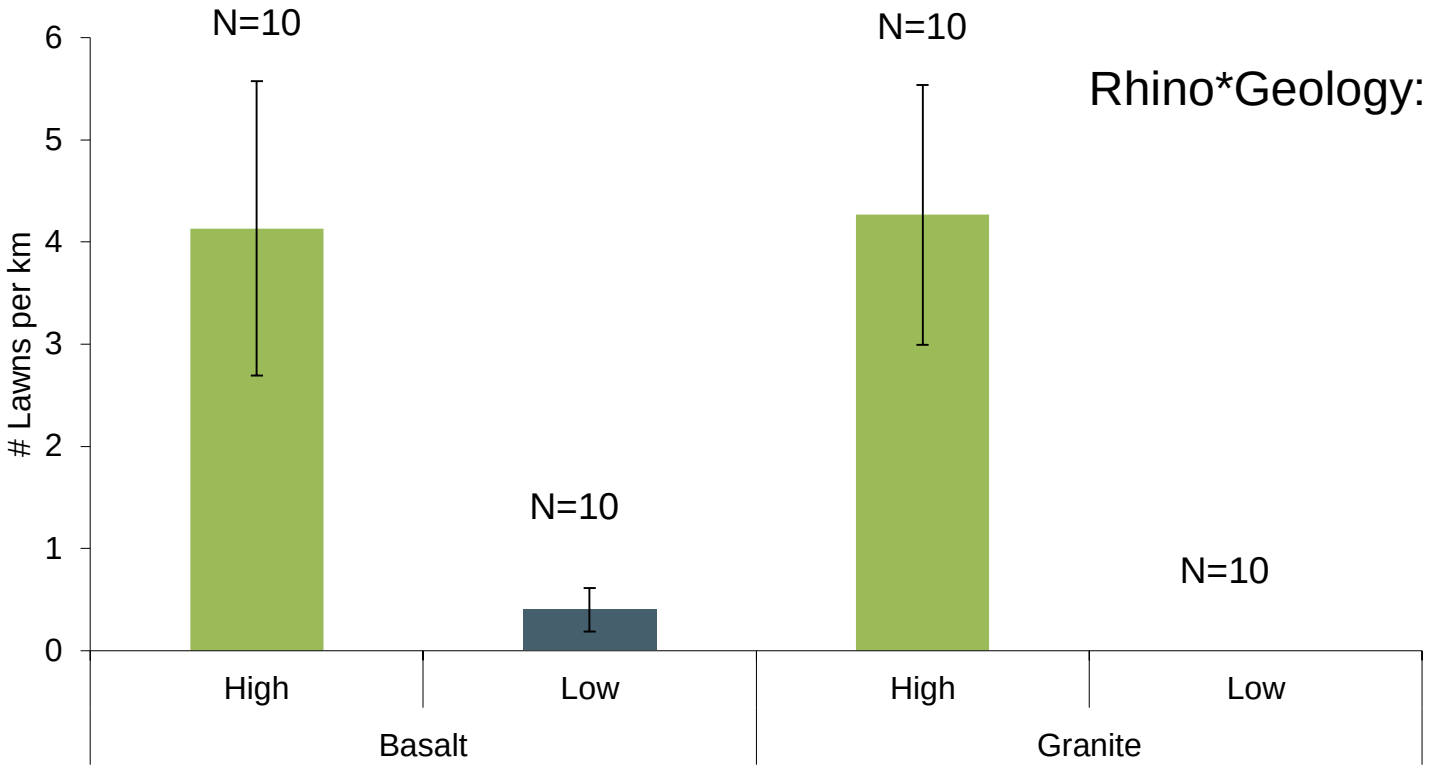
Start measuring 15,000 DPM's

Effect on number of lawns

Rhino: p = 0.0037

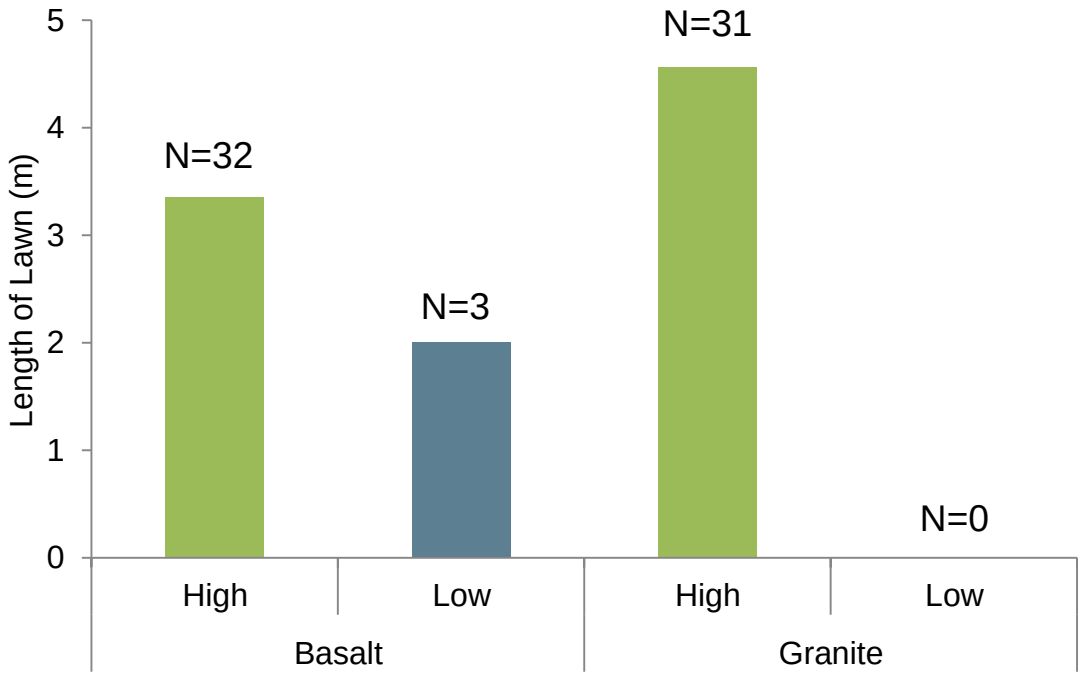
Geology: p = 0.92

Rhino*Geology: p = 0.84



Effect on size of lawn

Granite_High vs
Basalt_High; p= 0.04 (t-test)



Granite ’termite lawn’

Basalt ’forb lawn’

(Interim) summary

- Rhino might be adding to KNP grassland heterogeneity
- Effect is small (for now), 4-5 lawns per kilometer of 4-5 meter length
- Similar numbers on basalt and granite, although somewhat larger in size on granite
- Lawns on basalt qualitatively different from those on granite

- (For now) effect far smaller from what we see in HiP!

- Currently analyzing DPM data and colonization pattern in more detail

Thank you!

- SANPARKS, KNP Scientific Services, Desmond, Isaac, Mofat, Philip, Thomas, Velly, Khanyi, Izak, Rina, Don English, Neels van Wyk, Albert Smith, Kenneth Muchocho, Steven Whitfield, Rob Thompson, Adrian Shrader, EU FP7 IEF program

Fully-funded PhD Opportunity

- Impact of apex predator induced risk on savanna structure and functioning
- Offered by ACE, Nelson Mandela Metropolitan University, in collaboration with SLU
- Info: contact joris.cromsigt@slu.se and graham.kerley@nmmu.se

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