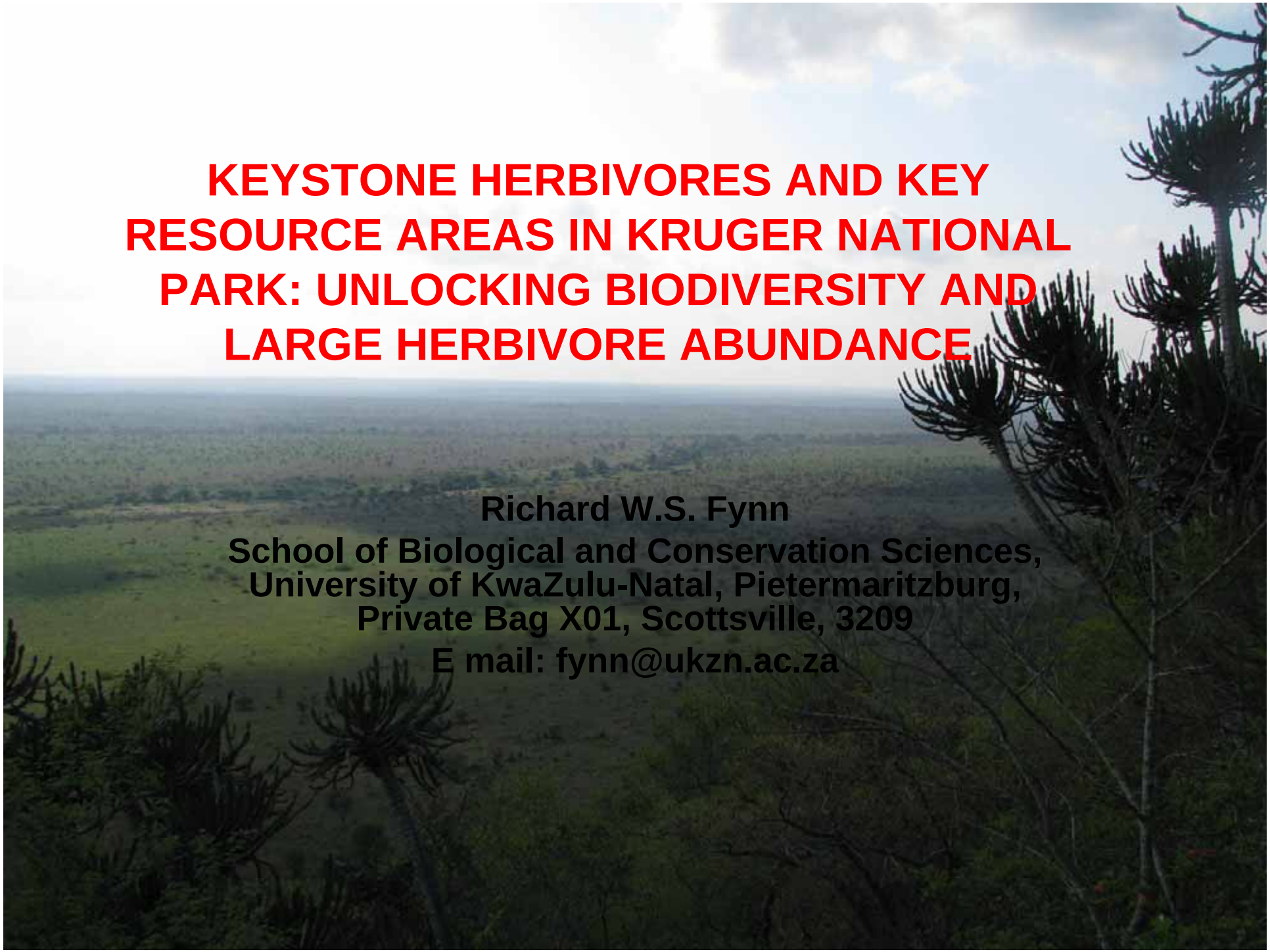

KEYSTONE HERBIVORES AND KEY RESOURCE AREAS IN KRUGER NATIONAL PARK: UNLOCKING BIODIVERSITY AND LARGE HERBIVORE ABUNDANCE

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Acknowledgements

My colleagues of the savanna convergence experiment

Deron Burkepile, Dave Thompson, Greg Buis, Andrew Zinn

Alan Knapp (Colorado State University)

Melinda Smith (Yale University)

Scott Collins (University of New Mexico)

John Blair (Kansas State University)

Kevin Kirkman (UKZN)

Craig Morris (UKZN)

Support from Navashni Govender, Rina Grant and Danie Pienaaar (Scientific Services, KNP)

Three principal potential sources of landscape heterogeneity in Kruger

- Source A - Variation in forage quality and quantity as a result of changes in clay content, moisture, and nutrients along toposequences – Zones of accumulation vs Zones of loss

- Source B - Variation in grass height and forage quality (tall vs. short grasslands) as a result of patch grazing by mega herbivores

- Source C - Variation in grass height and forage quality as a result of fire (transient)

Source A - Bottomland zones of accumulation along rivers

Source A - Pan system zones of accumulation

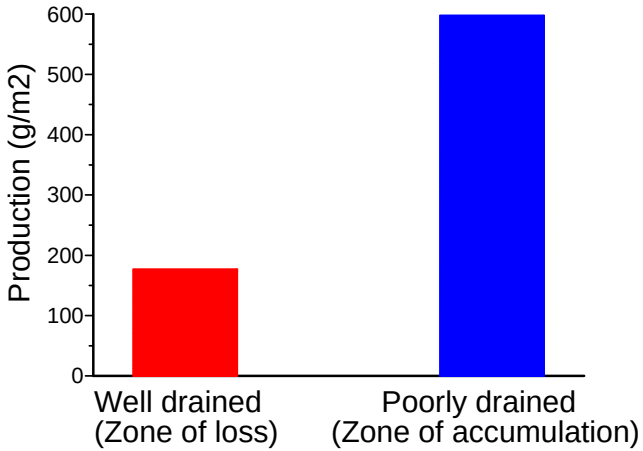
Typical soils of a key resource area – Vertisols

Morris CD, Tainton NM & Boleme 1989. Final report of the Fire and Grazing Sub-project of the Drakensberg/Maluti Mountain Catchment Conservation Programme. Natal Parks Board, Pietermaritzburg, 204p.

	Wetland	Dryland
Crude protein (%)	14.02	6.75
Crude fibre (%)	34.28	42.63

Key resource areas have a grass/legume mix

Contrast of productivity between a poorly-drained and well-drained site



Poorly drained site at the end of winter and mid summer (Satara)

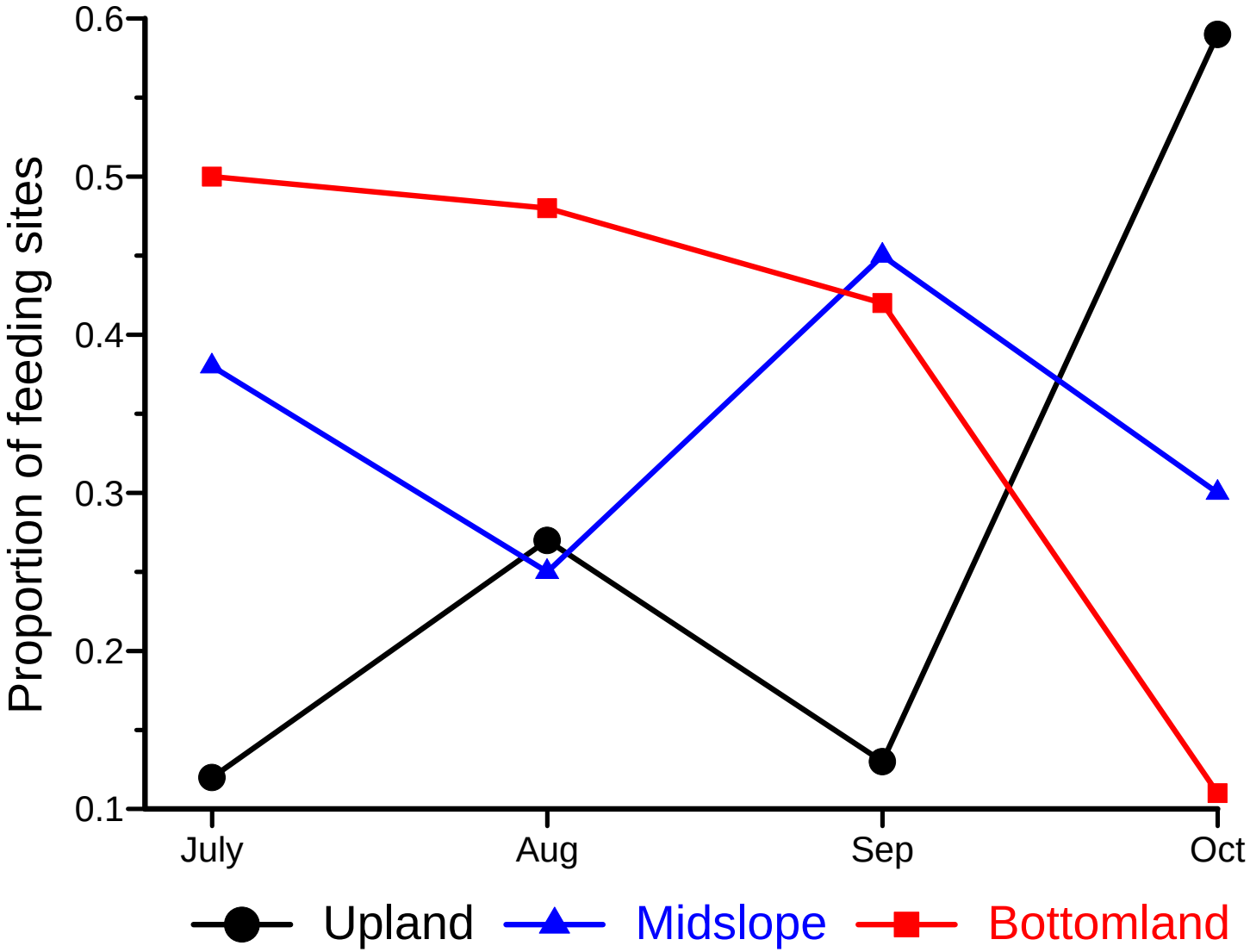
Poorly drained site at the end of winter (Tambling flats)

Poorly drained site at the end of winter (Shibotwana)

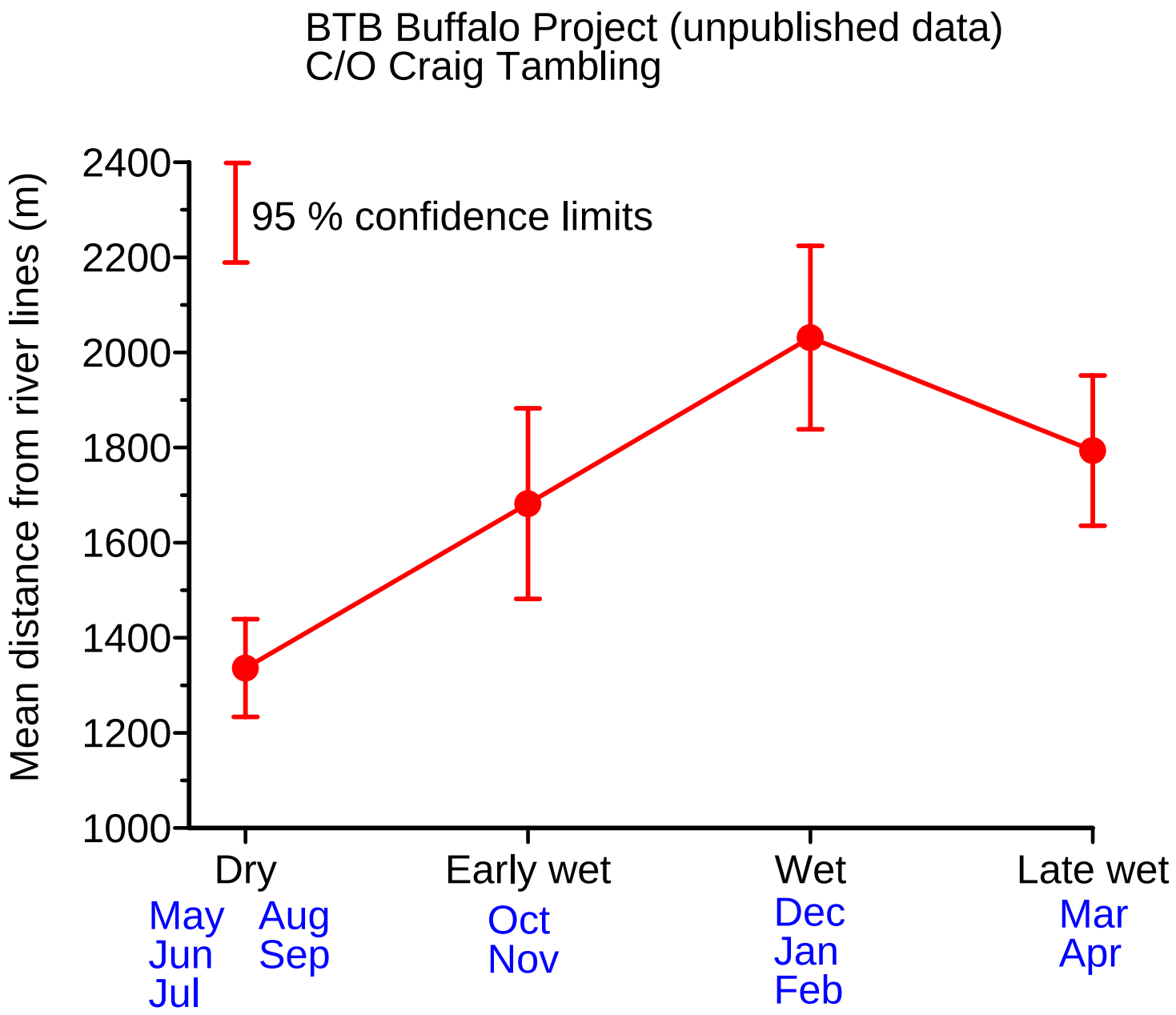
Mavumbe river key resource areas

Buffalo Seasonal Distributions in Kruger

Adapted from Macandza et al. 2004
S.A.Journal Wildlife Research 34:113-121

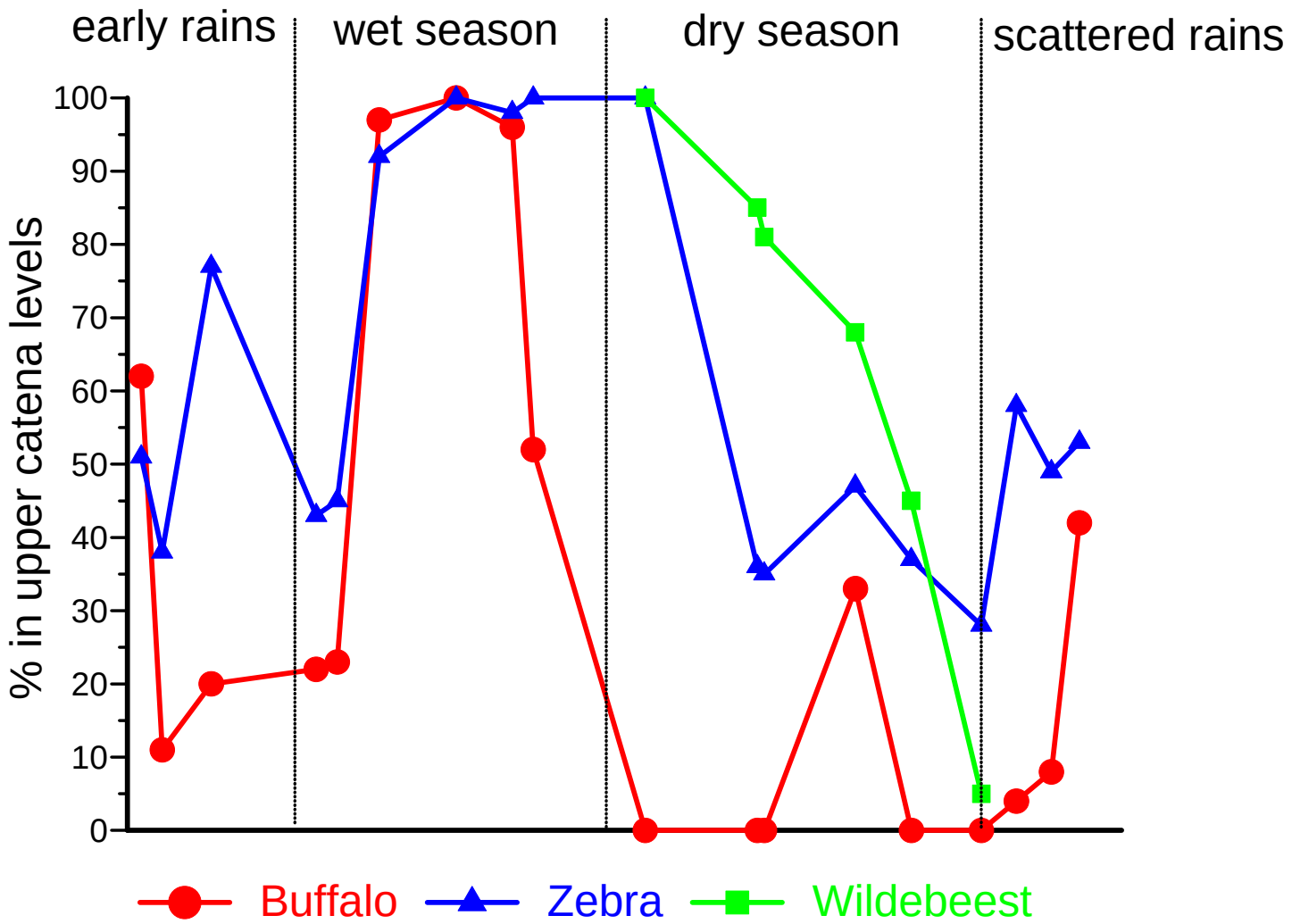


Buffalo Seasonal Distributions in Kruger (Sweni, Mavumbe and Lower Sabie herds)

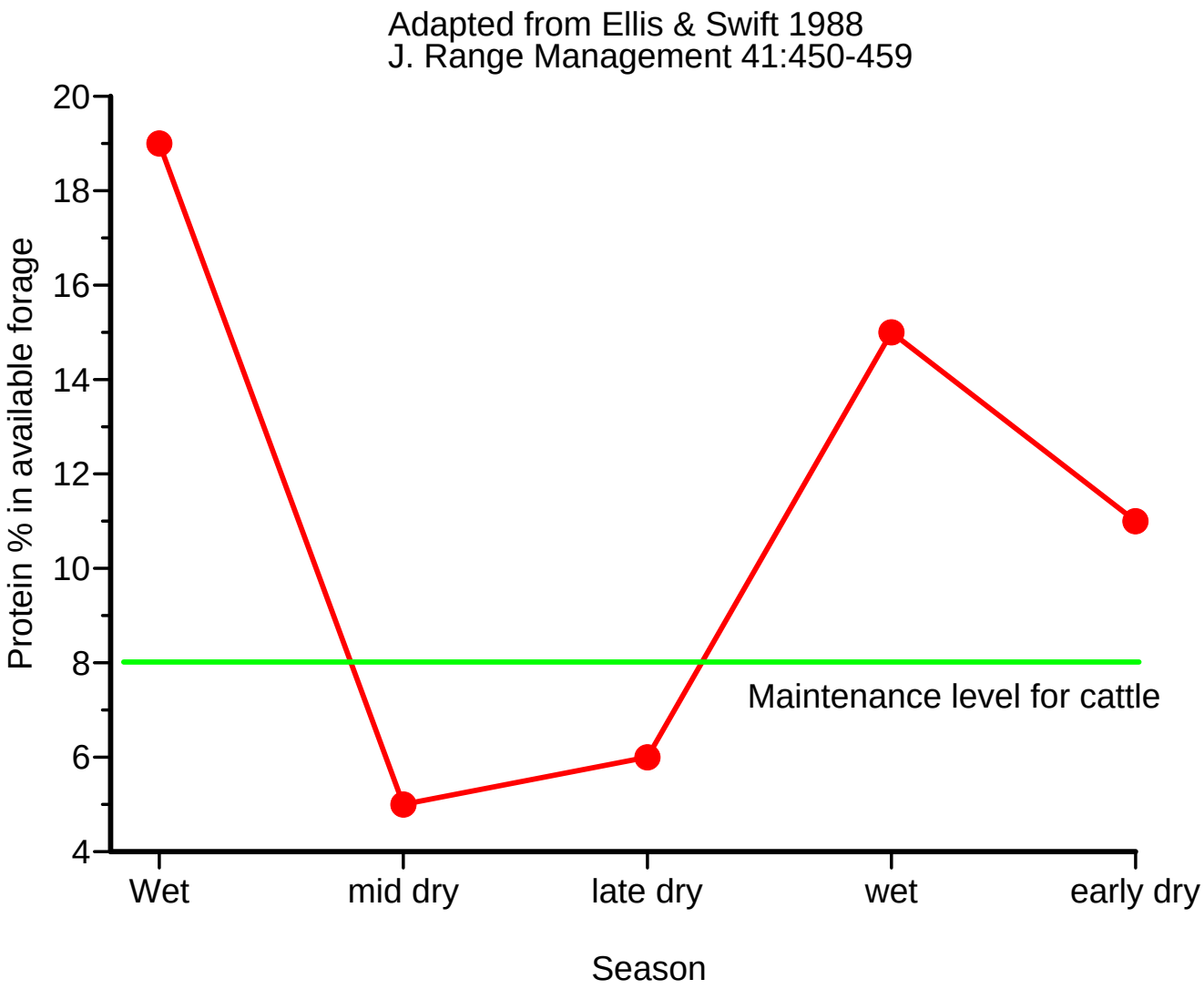


Winter dependence on key resource areas

Adapted from Bell (1970) in
Animal populations in relation to the food resources
(ed A. Watson)



The Protein Bottleneck in winter



Ellis & Swift 1988 J. Range Management 41:450-459

“Once the forages cure the animals have begun the process of starvation”

Scoones (1992) Land Degradation & Rehabilitation 3:99-113

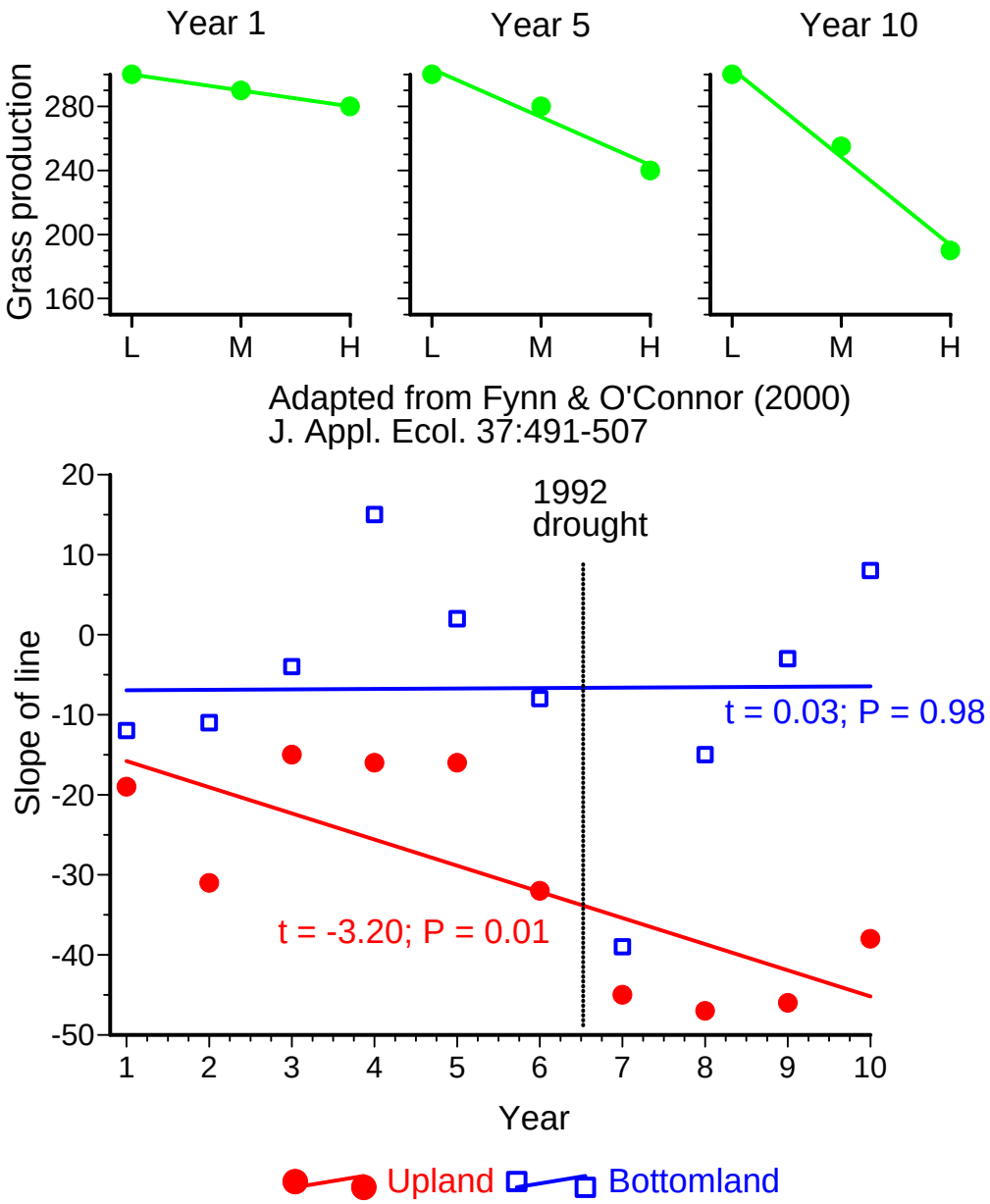
“It is particular ‘key resource’ grazing areas that provide the most significant contribution to cattle feed and so ultimately determine the potential carrying capacity of the land as it is these areas that provide fodder at the end of dry seasons or in droughts”

Scoones (1992) Land Degradation & Rehabilitation 3:99-113

"Key grazing resources, such as dambos (pans), river banks and drainage lines, may be sustaining cattle populations but are presently not suffering significant erosion impacts"

- Why? A zone of accumulation cannot erode it can only accumulate eroded material from zones of loss.

Key resource areas are extremely resistant to degradation



The key is patchiness of well and poorly drained habitat!

- Too much poorly-drained habitat and animals wont be able to keep up with grass production and short-grass grazers would be eliminated (poor quality forage and no visibility for detection of lions)
- No poorly-drained habitat and large herbivores would crash or even be eliminated in droughts

Source B - Variation in grass height (tall vs. short grasslands) as a result of grazing by large herbivores

Short vs. tall patches

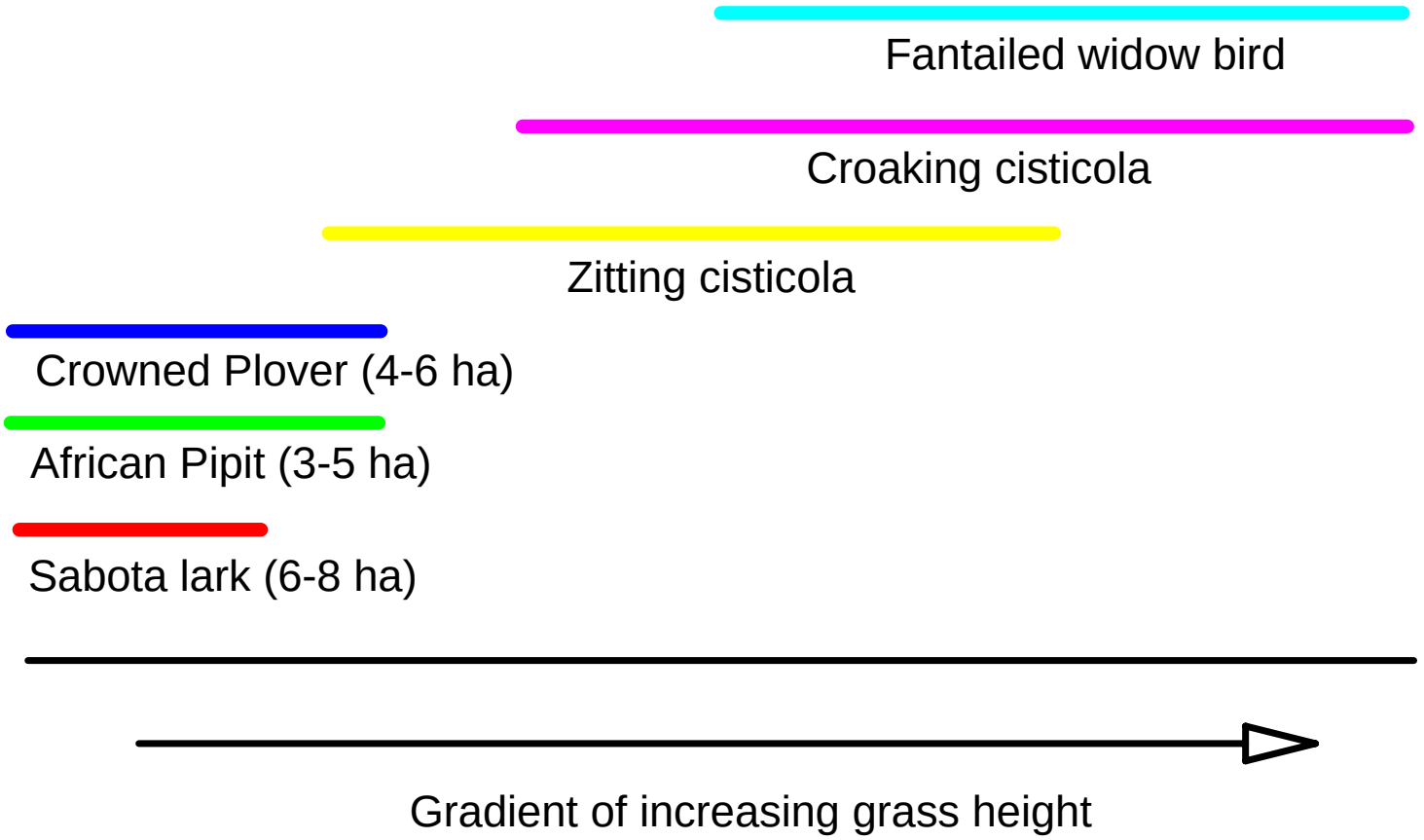
Short- vs. Tall-grass specialists

- Across all taxa short- and tall-grass specialists have been observed

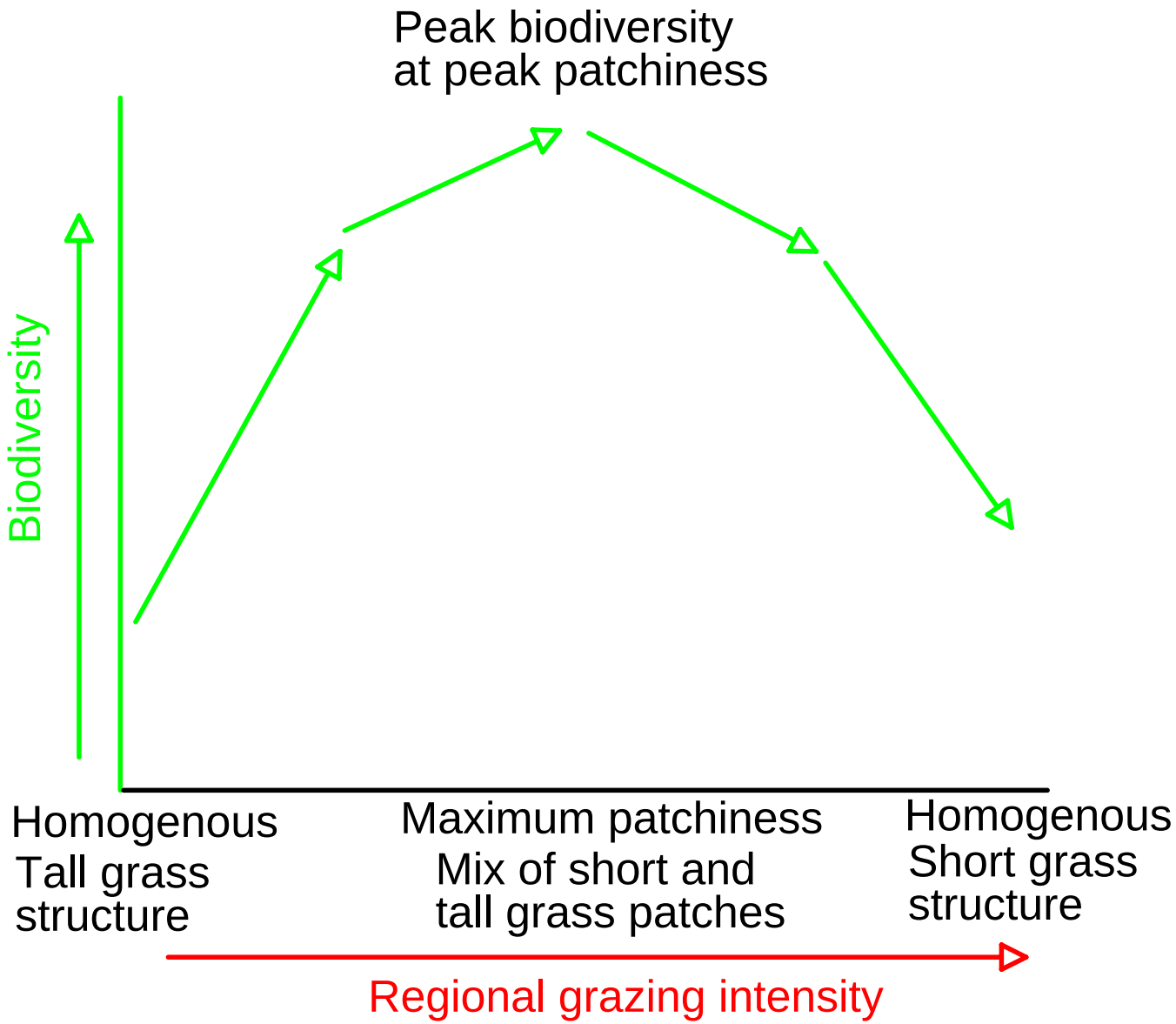
- Plants (Collins *et al*. 1998; Fynn *et al*. 2004)
- Insects (Chambers & Samways 1998)
- Birds (Fuhlendorf *et al*. 2006; Krook *et al*. 2007)
- Large mammals (Bell 1970)

Bird distributions on grazing-induced grass height gradients in HluHluwe-Umfolozi game reserve

Adapted from Krook et al (2007)
Ostrich 78:271-279



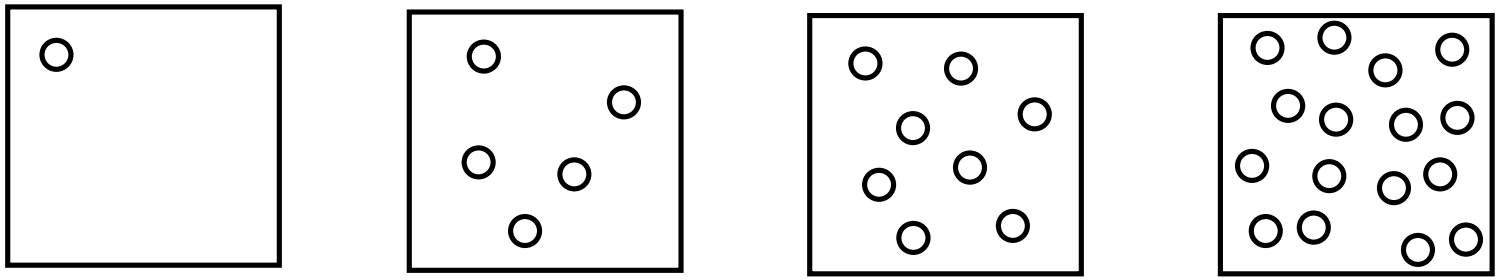
Predictions of how grazing-mediated patch heterogeneity will affect biodiversity



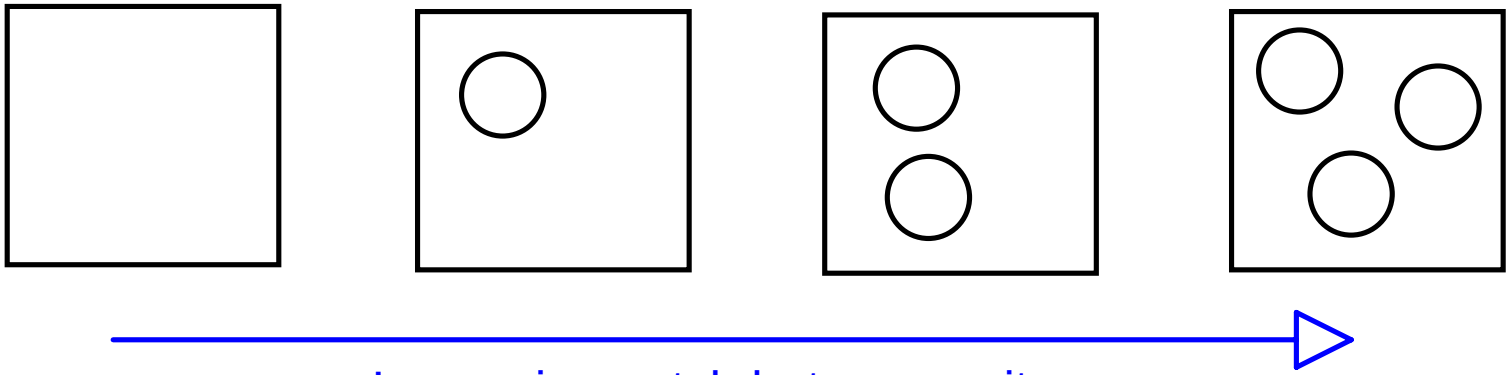
Biodiversity responses on different types of patch heterogeneity gradients

Types of patch heterogeneity gradients

Gradient type 1 - small patches



Gradient type 2 - large patches



Wildebeest and short-grass patches - Orpen

Wildebeest and short-grass patches -Orpen

Wildebeest and short-grass patches - Shibotwana

Wildebeest and short-grass patches – visibility not just grazing

The importance of short-grass patches for large herbivores

- They provide higher quality forage
- They provide greater visibility for detection of predators

However!

- They make up only a small percentage of the total surface area on the basalts (<1 %)
- This is surely compromising biodiversity on the basalts

White rhino as keystone herbivores

White rhino as keystone herbivores

- **White rhino create short-grass patches**
- **Their numbers are rapidly increasing in Kruger**
- **We need to allow them to reach a critical density that maximizes patch heterogeneity and, therefore, biodiversity**

- **Too many rhino – dominantly short grass**
- **Too few rhino – dominantly tall grass**

White rhino as keystone herbivores

- White rhino hold great potential for enabling management to meet the biodiversity objectives of a national park (maximizing biodiversity)

- It is predicted that wildebeest numbers will increase as white rhino numbers increase in the central region of the park and create more favourable habitat in their traditional stronghold

THANKS FOR SITTING IT OUT!