

INVESTIGATING CALCRETE BONTVELD LANDSCAPE ECOLOGY FOR BIODIVERSITY CONSERVATION AND RESOURCE MANAGEMENT



Betsie Milne

Promoter: Prof Eileen Campbell



BONTVELD

Slang!



BONTVELD

MOSAIC / PATCHY VELD

1st

→ Archibald (1955): ADDO

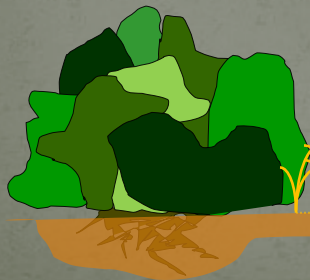
bushclumps

grasses & low shrubs

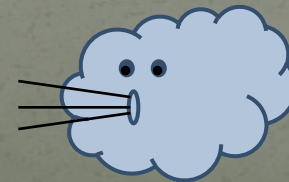
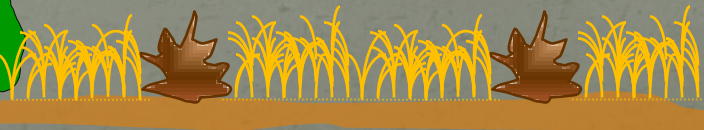
windblown sands



PATCH



MATRIX



VEGMAP (2006)

Coega Bontveld

STEP (2002)

Gamtoos Bontveld

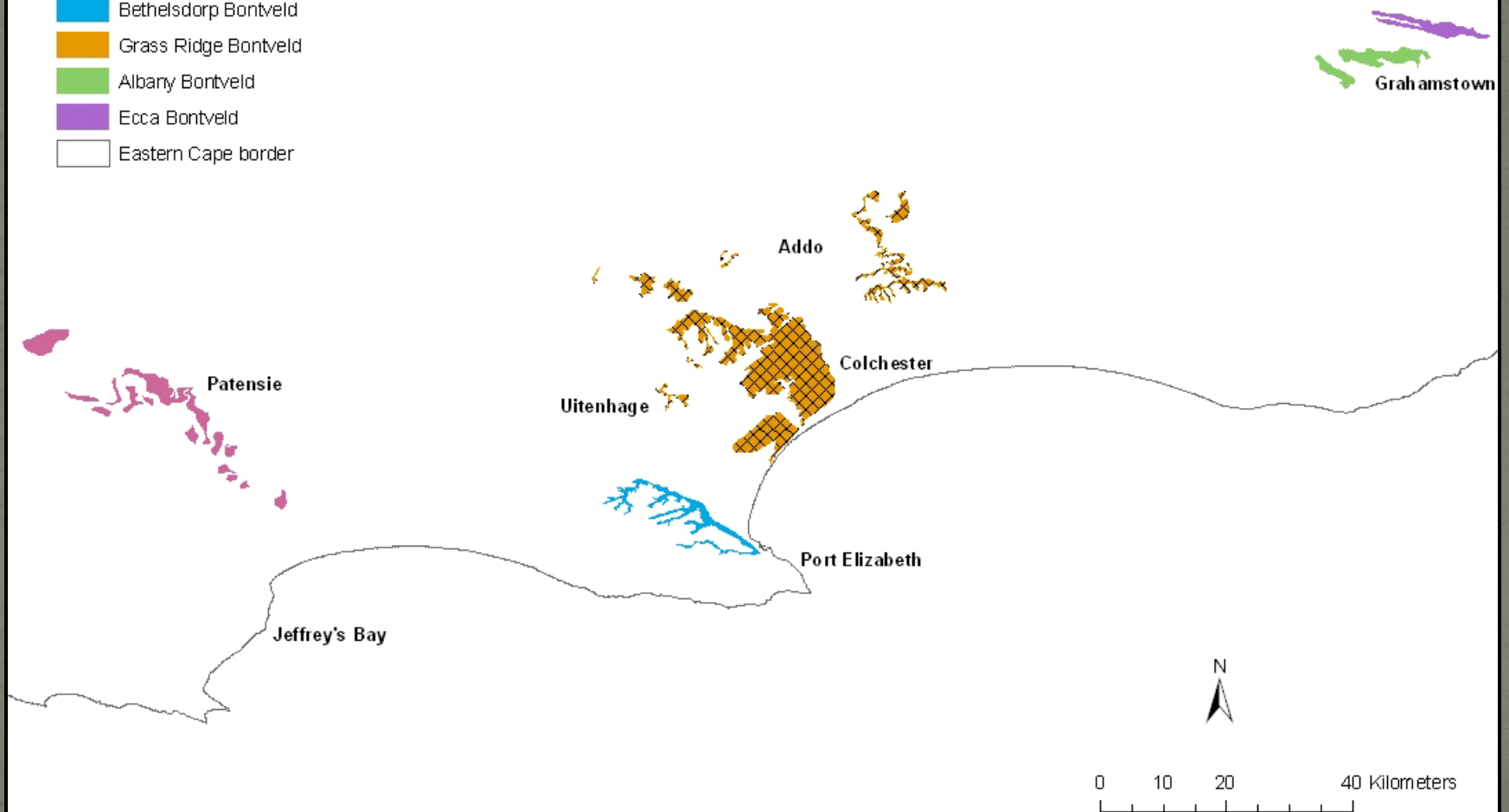
Bethelsdorp Bontveld

Grass Ridge Bontveld

Albany Bontveld

Ecca Bontveld

Eastern Cape border

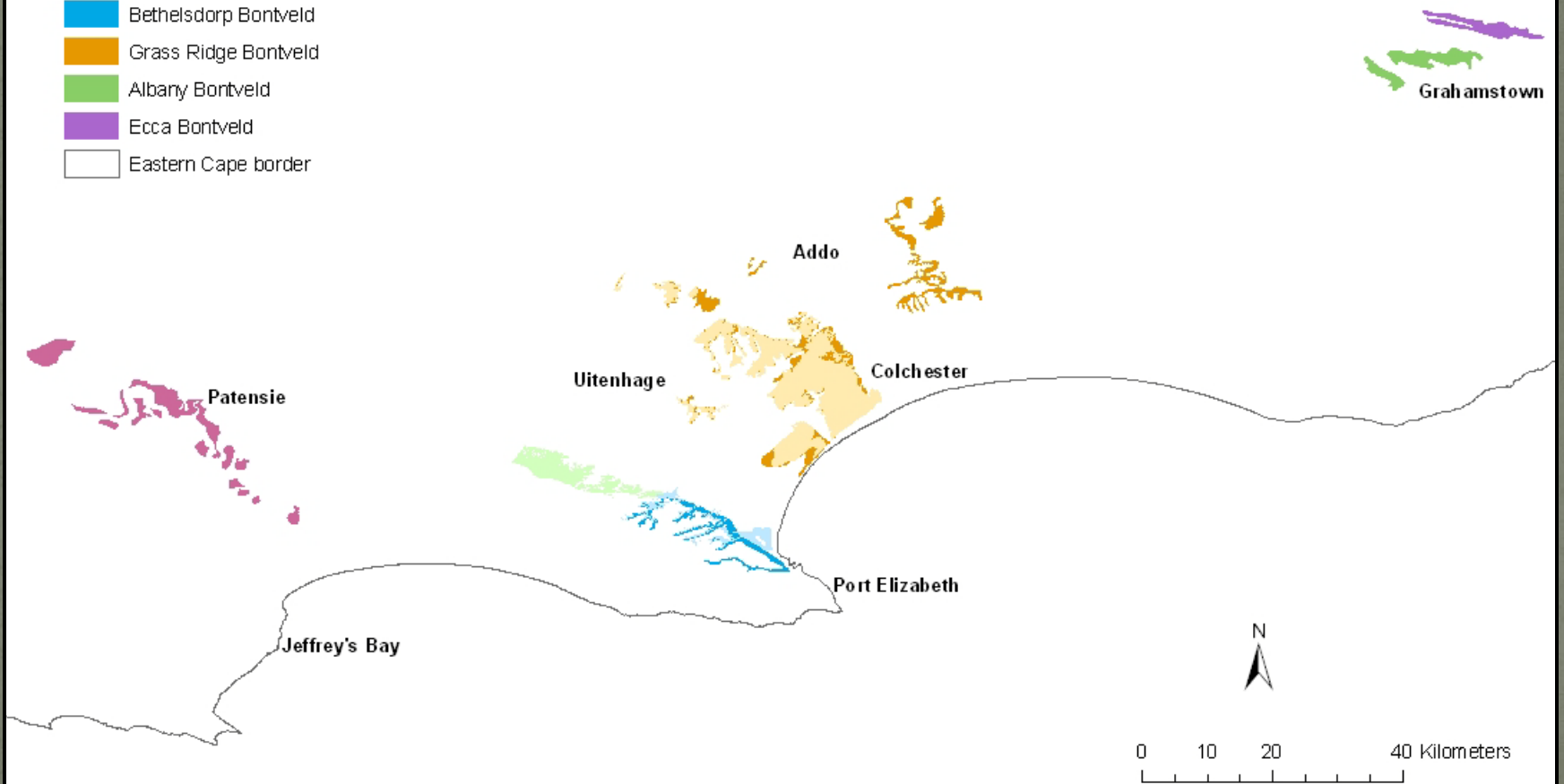


STEWART (2008)

- Rocklands Renoster Bontveld
- Bethelsdorp Bontveld
- Grass Ridge Bontveld

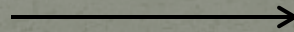
STEP (2002)

- Garntoos Bontveld
- Bethelsdorp Bontveld
- Grass Ridge Bontveld
- Albany Bontveld
- Ecca Bontveld
- Eastern Cape border

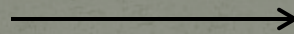


WHY THIS PROJECT?

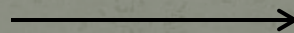
Bontveld



SPATIAL PATTERNS

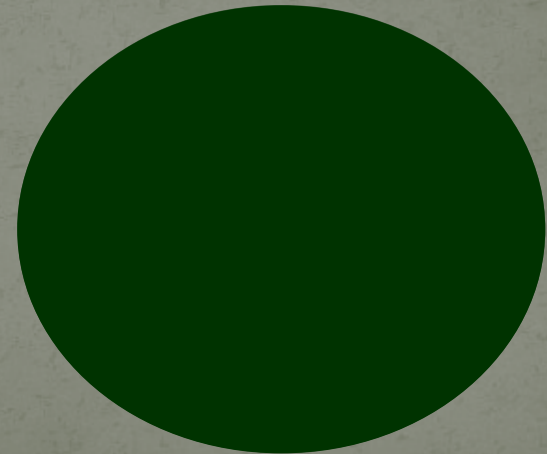


RARITY / ENDEMISM



SPECIES RICHNESS

MOSAICS = transformed Thicket

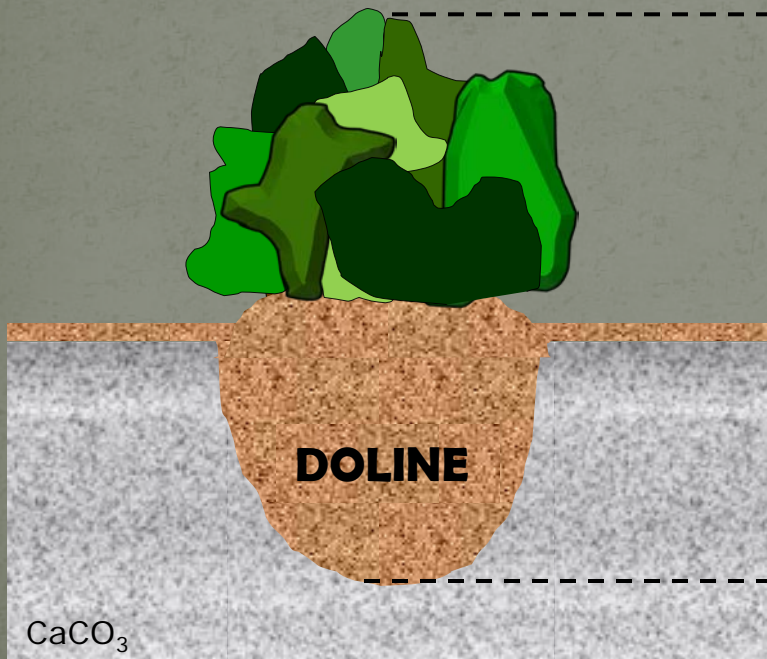


WHY THIS PROJECT?



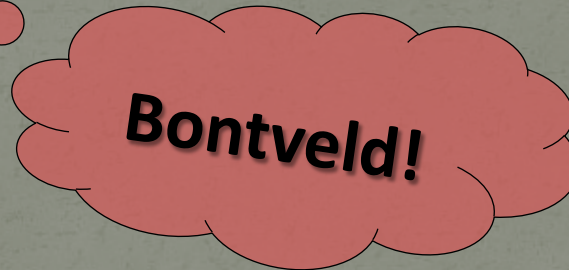
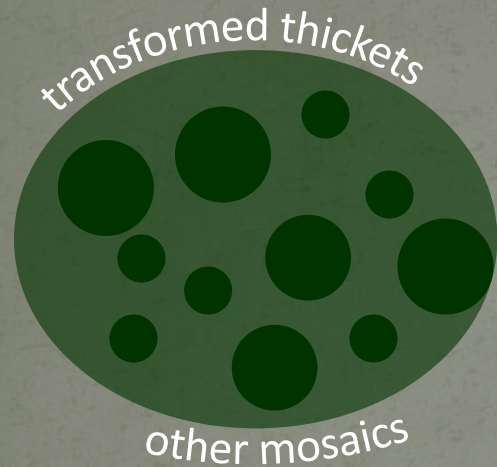
Landscape patterns = soil depth

Bushclumps < SEPARATE COMMUNITY > Thicket



NB!! RESOURCE PATCH

WHY THIS PROJECT?

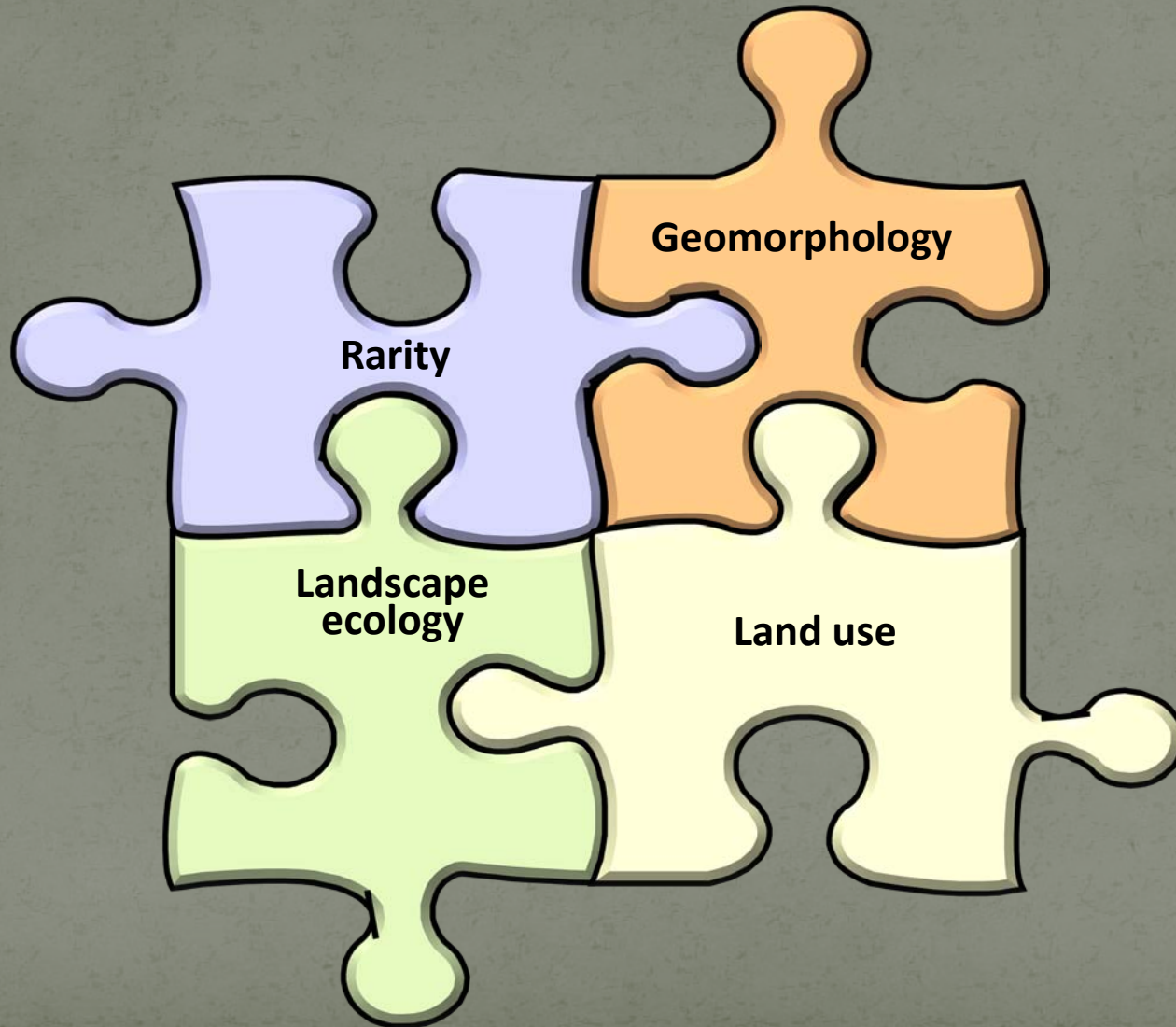


CALCRETE BONTVELD

- ! Overlooked
- ! Land use management
- ! Anthropogenic disturbance



IMPORTANT ELEMENTS



NB Spatial patterns → ecological processes

- Spatial pattern + ecological function = TIGHTLY LINKED
- Principles = CONSERVATION



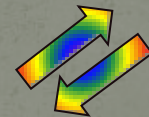
Landscape composition



Structure



Function



Change



UNDERSTAND:

- 1) Spatial heterogeneity
- 2) Biodiversity
- 3) Landscape function

Rarity

UNDERSTAND:

- 1) Plant species distribution + dynamics
- 2) Ecological processes
- 3) Diversity <> rarity
- 4) Geomorphology

NB Biodiversity conservation

- Diversity hotspots = **HOTSPOTS OF RARITY**
- Often **TOLERATE** disturbances = **REDUCES COMPETITION**
(not frequent)
- Specialised **HABITAT + GEOMORPHOLOGY**
(calcarous soils/limestone)



Syncarpha recurvata



Euphorbia meloformis

NB Doline and soil depth

- ~~Trees~~ / perimeter shifted = alter doline development
- ENVIRONMENTAL DAMAGE >>> change geomorphology
- REMOVAL of natural COVER (soil / vegetation):
Hydrology → EROSION
- Change VEGETATION STRUCTURE



UNDERSTAND:

- 1) Edaphic factors
- 2) Different land use

NB Resource management

- STEP Biodiversity region:

Crop farming

Poorly-managed livestock farming

Alien plant invasion

Urban & resort development

Industry & mining

- Original vegetation degraded
- 50% remaining vegetation threat of degradation

- POOR LAND USE:

Decrease farm productivity

Decrease ecotourism potential

Increase restoration costs

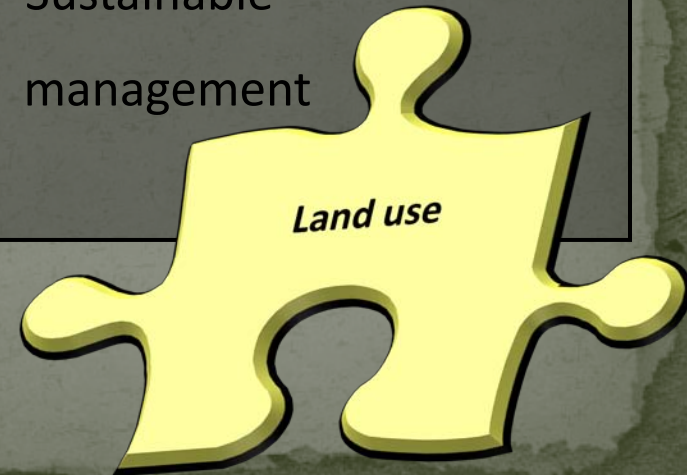
Reduce biodiversity + ecosystem services



UNDERSTAND:

- 1) Ecosystem responses
- 2) Sustainable management

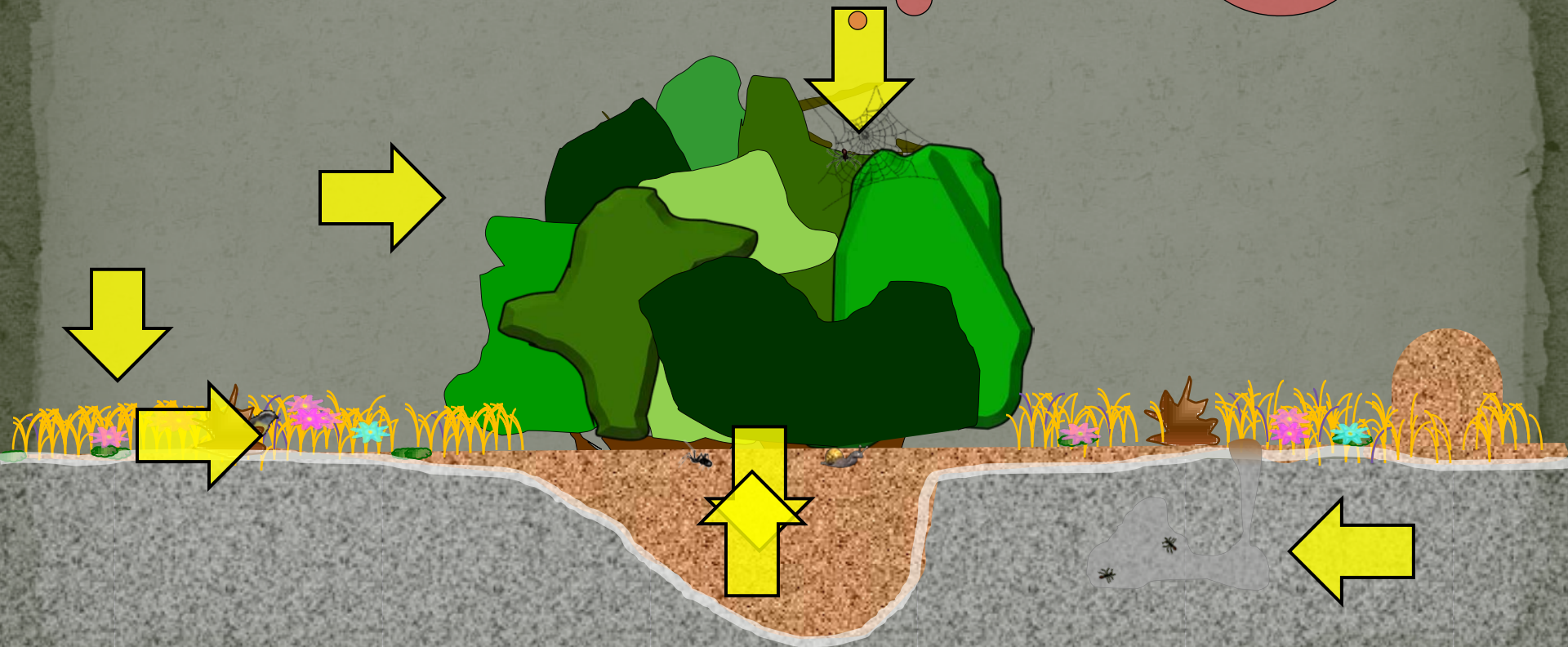
Land use



STUDY AIMS

Investigate...

Phytosociology
Biodiversity
Landscape functioning

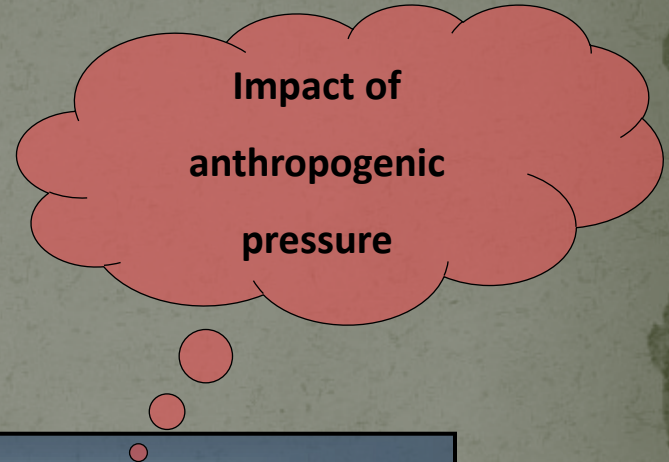


STUDY AIMS

Compare...

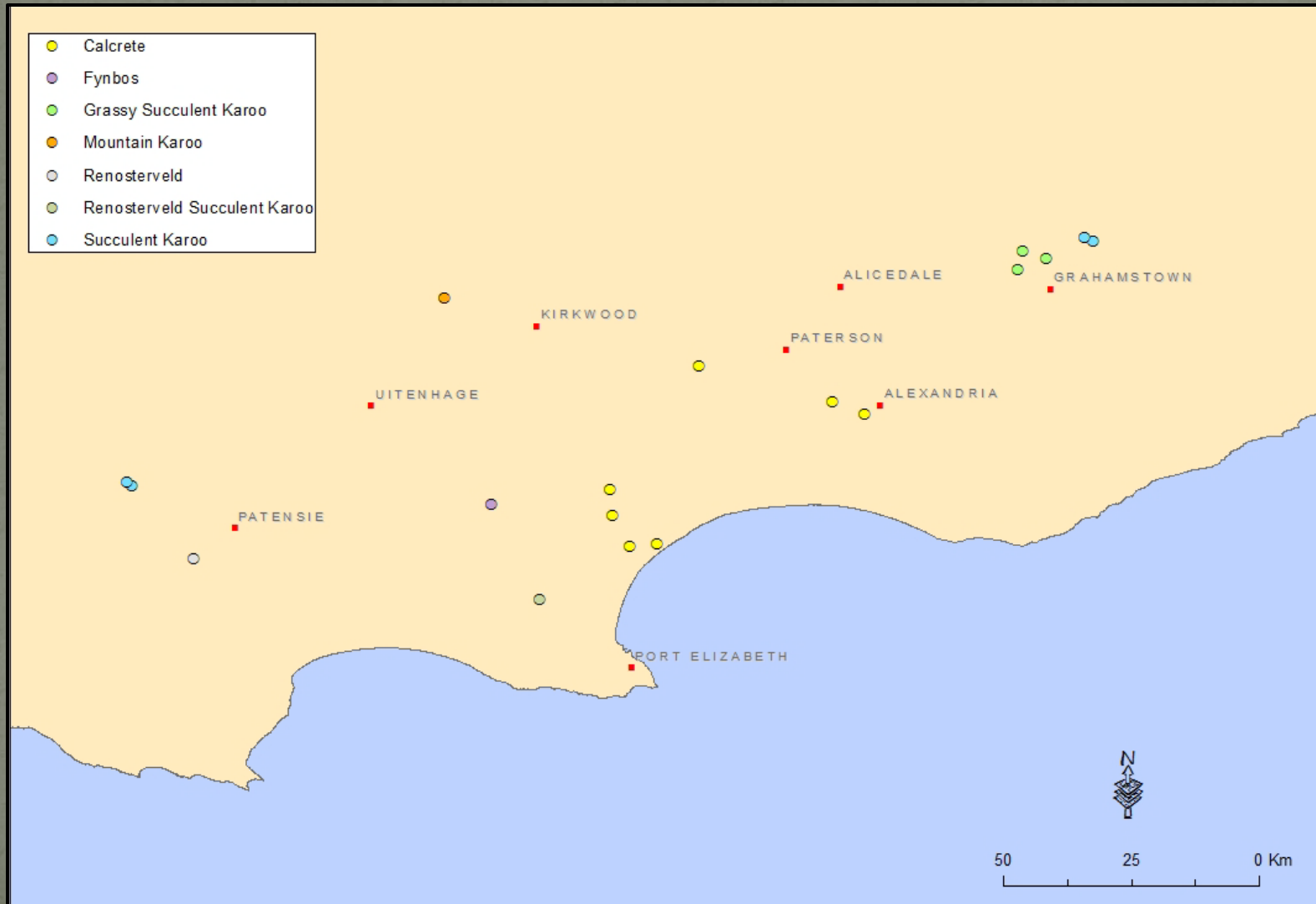
1 — Calcrete vs. non-calcrete

2 — Calcrete Bontveld different land use regimes

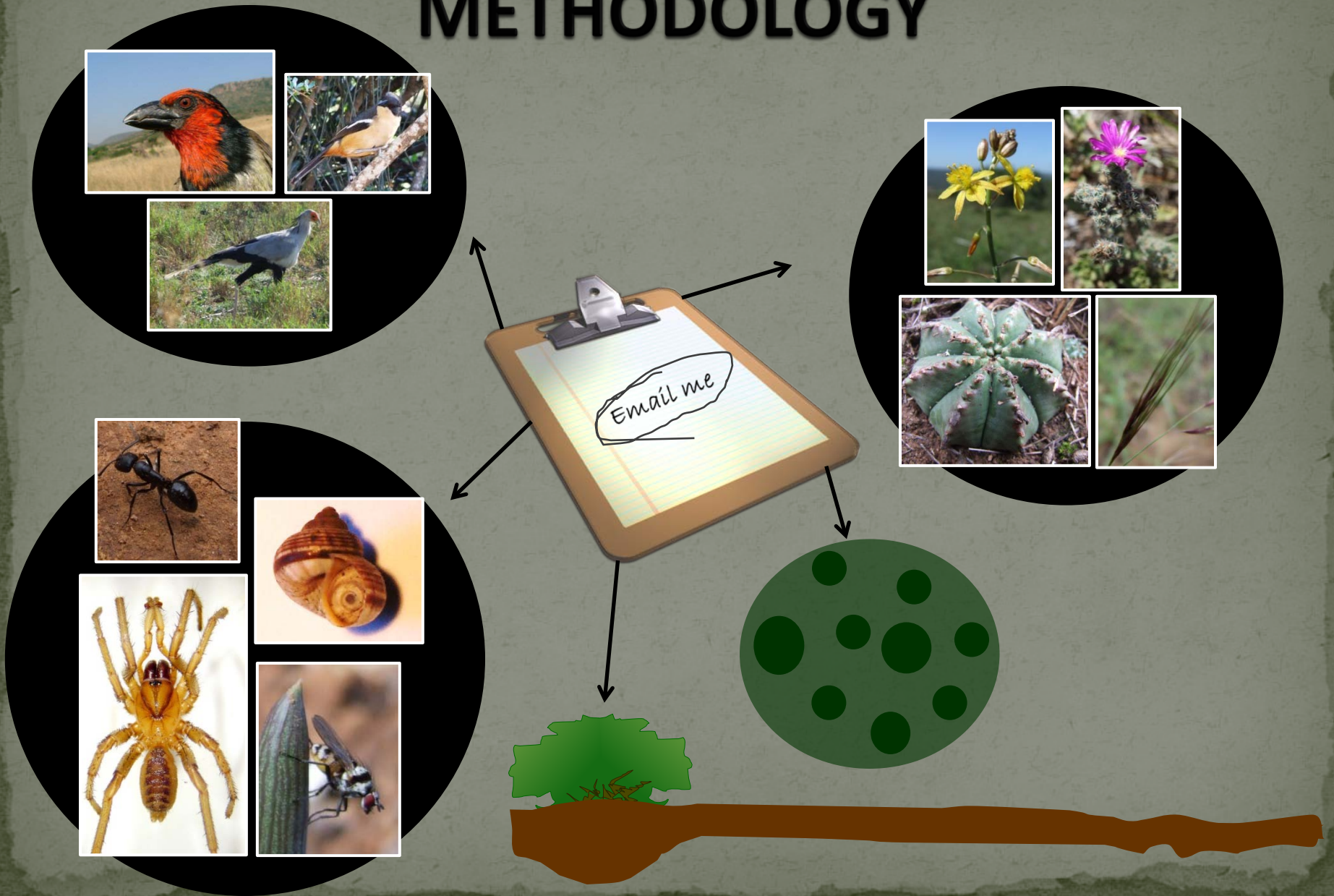


**BIODIVERSITY CONSERVATION
RESOURCE MANAGEMENT**

STUDY AREA



METHODOLOGY



ACKNOWLEDGEMENTS

- Prof Eileen Campbell

- Funding / Resources / Technical

Botany Department + staff + students

NMMU

ACE

Zoology Department

Geology Department

Chief Surveyor General

- External scientific contributors

Dr Serban Proches (UKZN) – Insect ID

Prof Ansie Dippenaar-Schoeman (ARC) – Spider ID

- External advisors

Dr Brigitte Braschler (CIB) - Ants

Dr Dai Herbert (NMSA KZN) - Snails

ACKNOWLEDGEMENTS

- Land owners

SANParks

ECPTA

EAET - EC

NMBM

PPC

COEGA IDZ

RSA Defense Force (Grahamstown)

Shamwari Private Game Reserve

Amakhala Private Game Reserve

Private Land Owners

Thank you!

