Invaders or Survivors?

Understanding origins & life histories to inform management options

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Renu-karoo

SAEON

Invaders vs Survivors

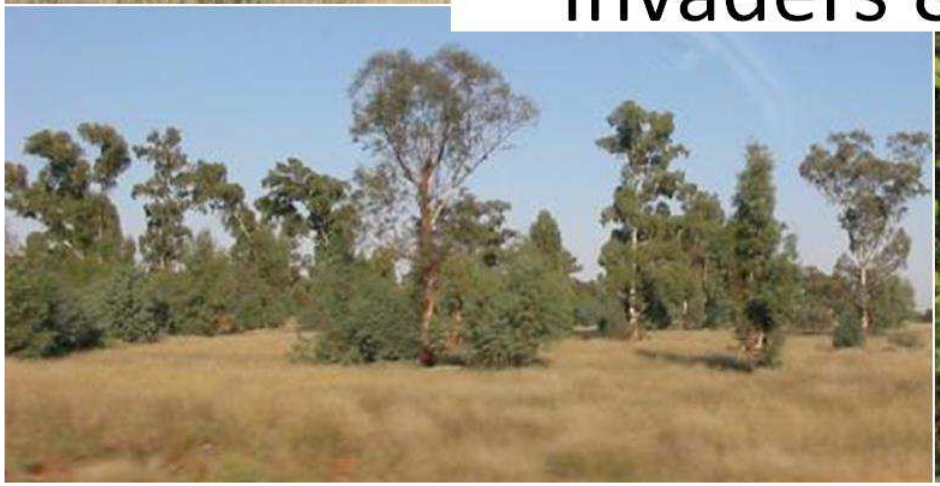
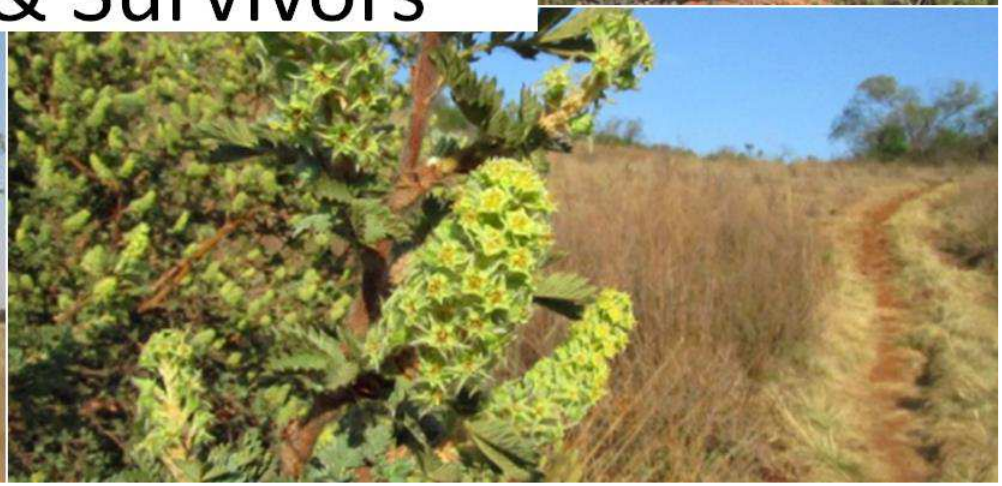
Term	Invader	Survivor
Synonym	Aggressor, encroacher, interloper, trespasser, intruder	Outlaster, endurer, remnant
Definition	One who enters by force in order to conquer	One who lives through affliction, remaining alive after an event in which others have died
Implication	The sense of coming from the outside and taking over	The sense of being a remnant of a local damaged community
Origin	Alien	Indigenous

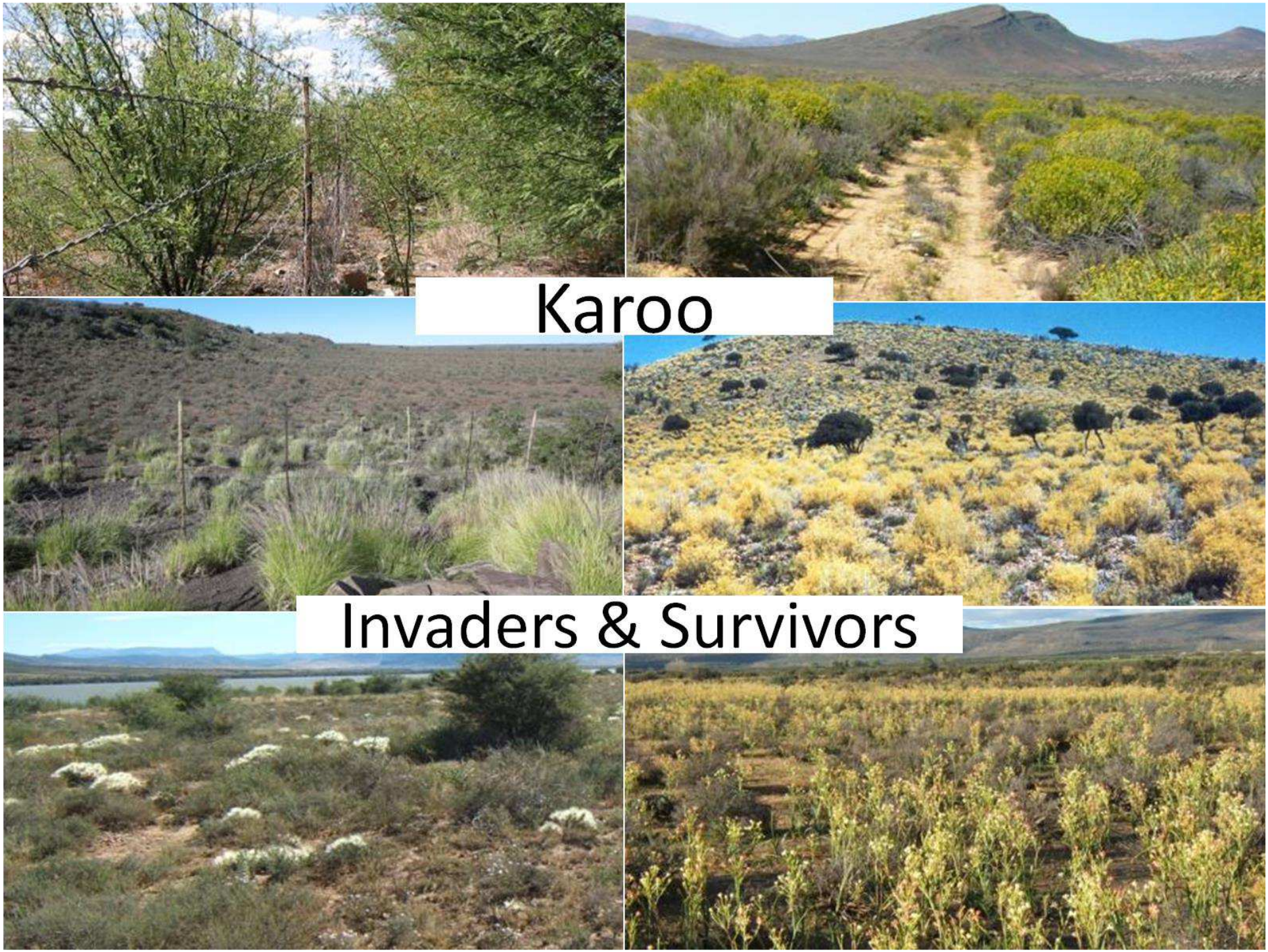
Savanna

Invaders & Survivors


Grassland

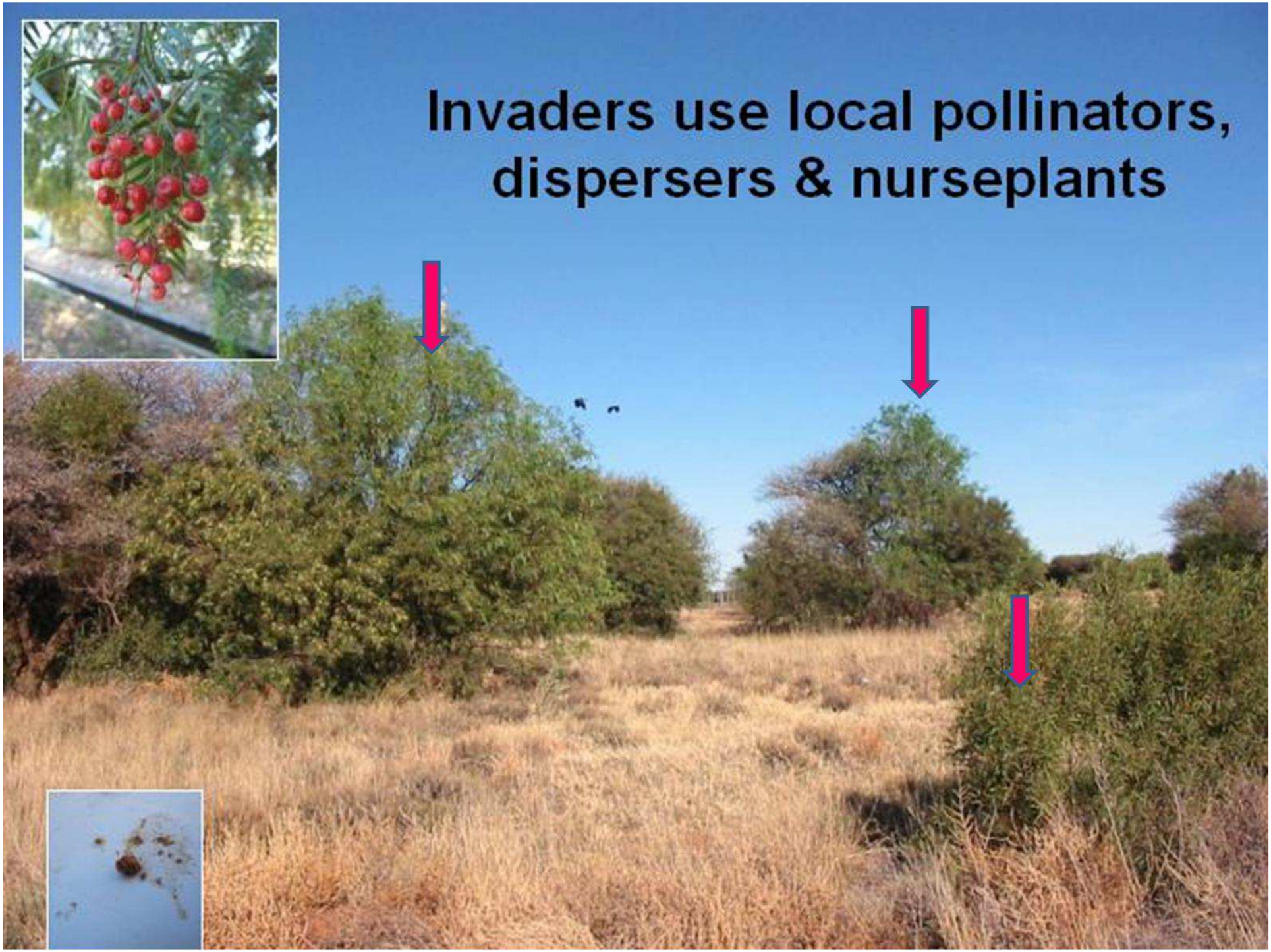

Invaders & Survivors

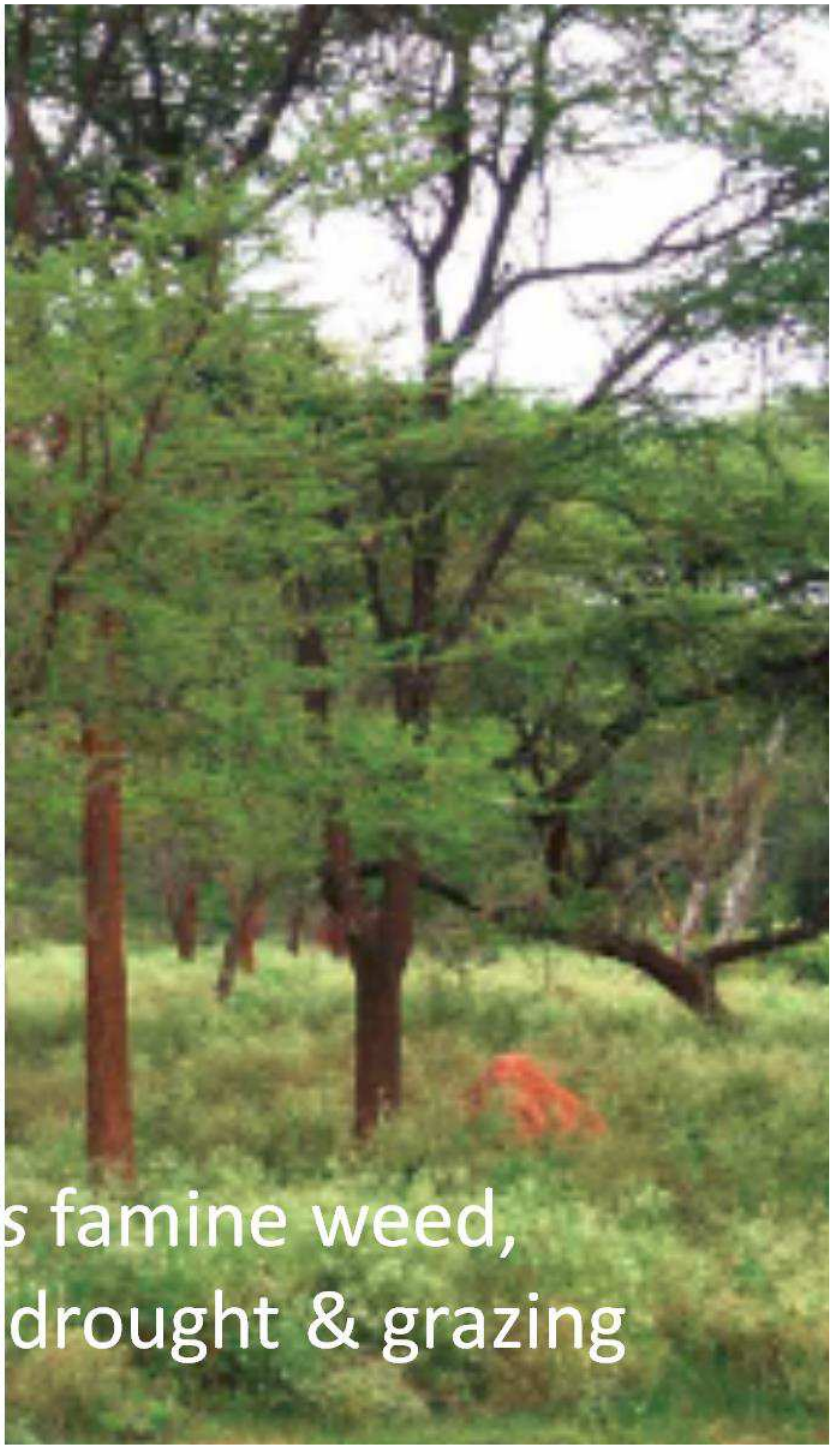




Karoo
Invaders & Survivors

Invader characteristics

- Introduction + lack of enemies
- Long-distance dispersal
- Abundant seed
- Long-lived seed
- Defended against herbivores
- Multiple recovery tactics


Invaders use local pollinators,
dispersers & nurseplants

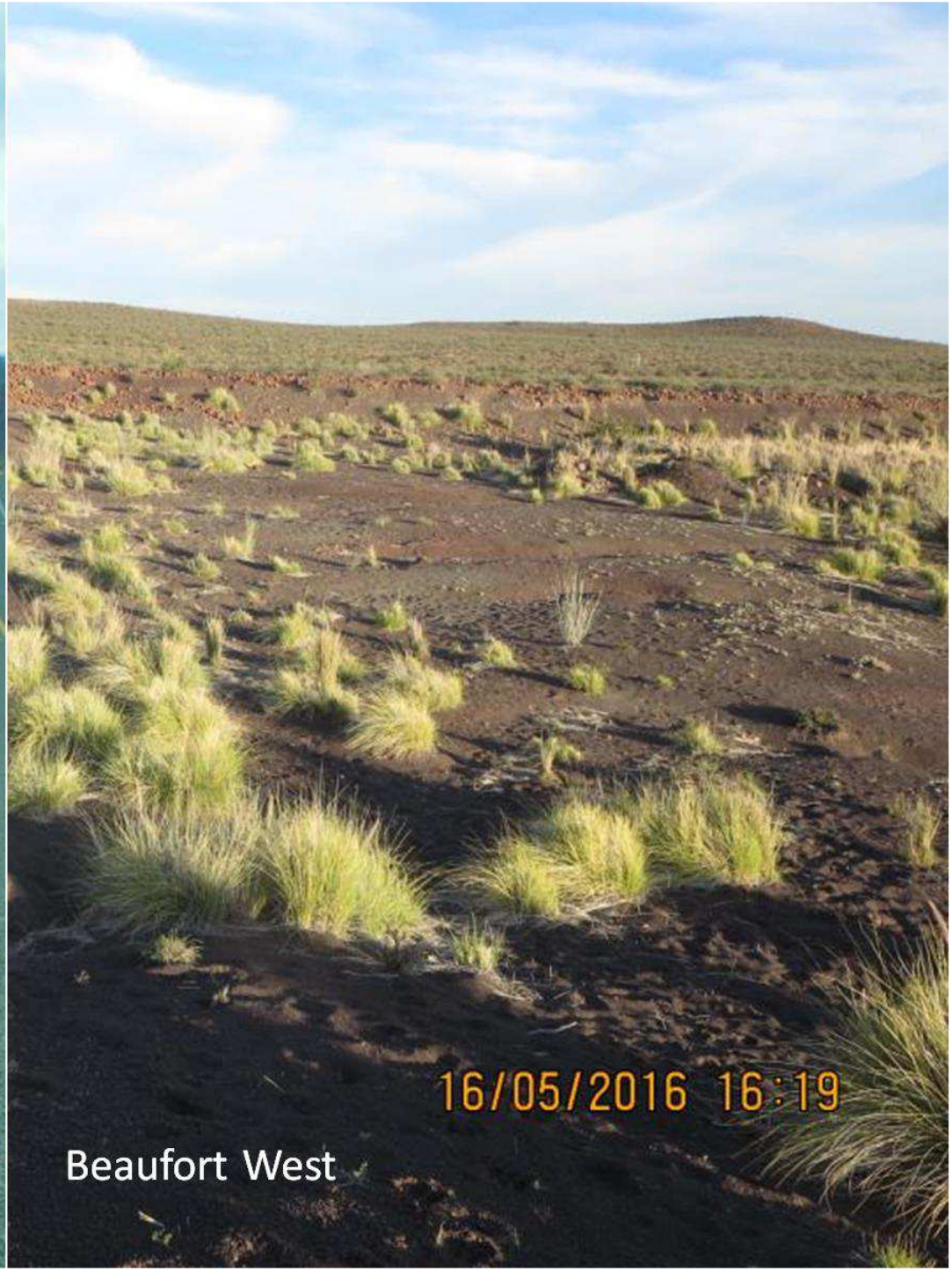


Parthenium hysterophorus famine weed,
moved by wind, favoured by drought & grazing


Acacia mearnsii, Van Reenen's Pass, KZN grassland


Nieu Bethesda
Witbank


Willowmore
1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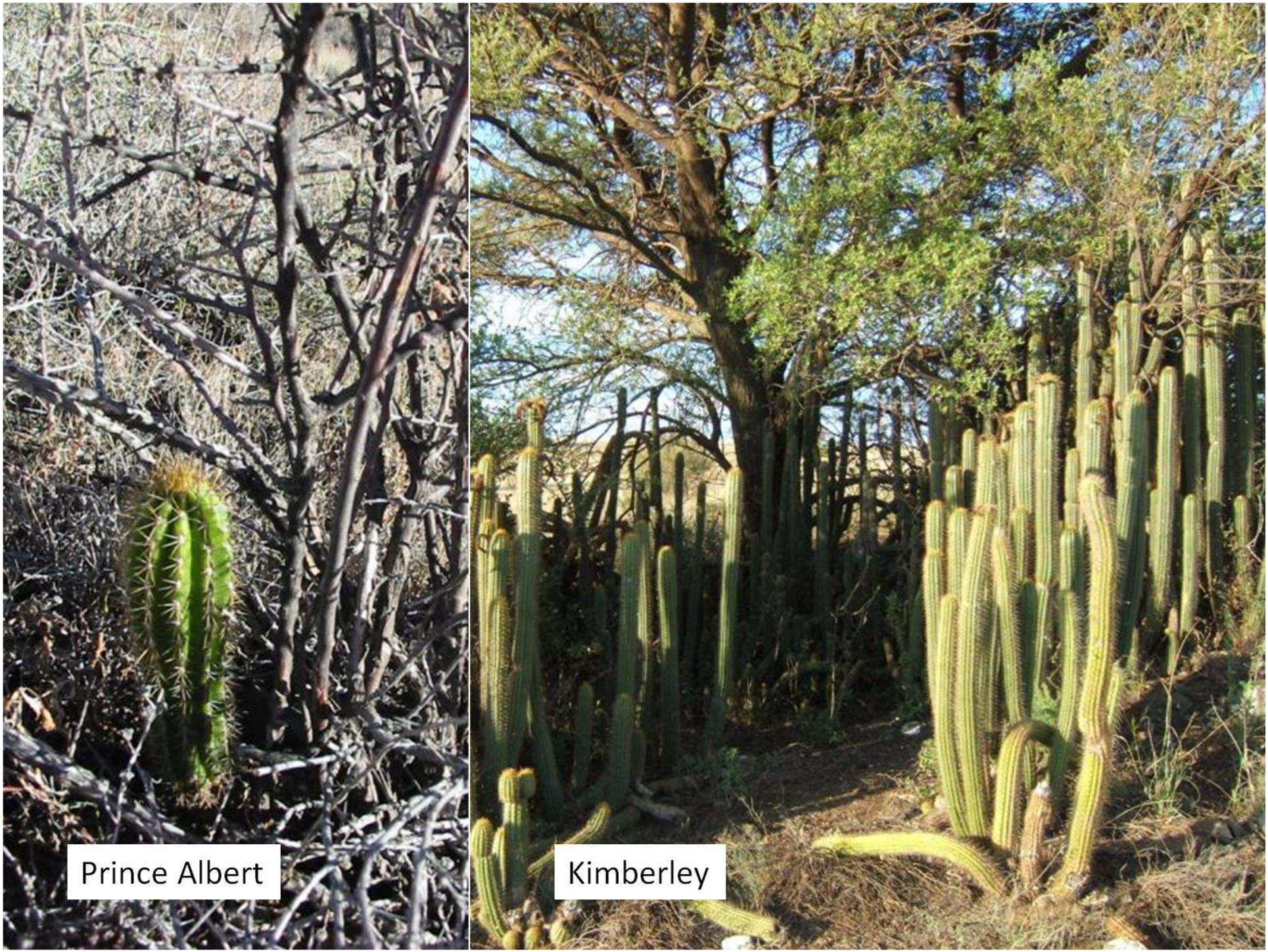
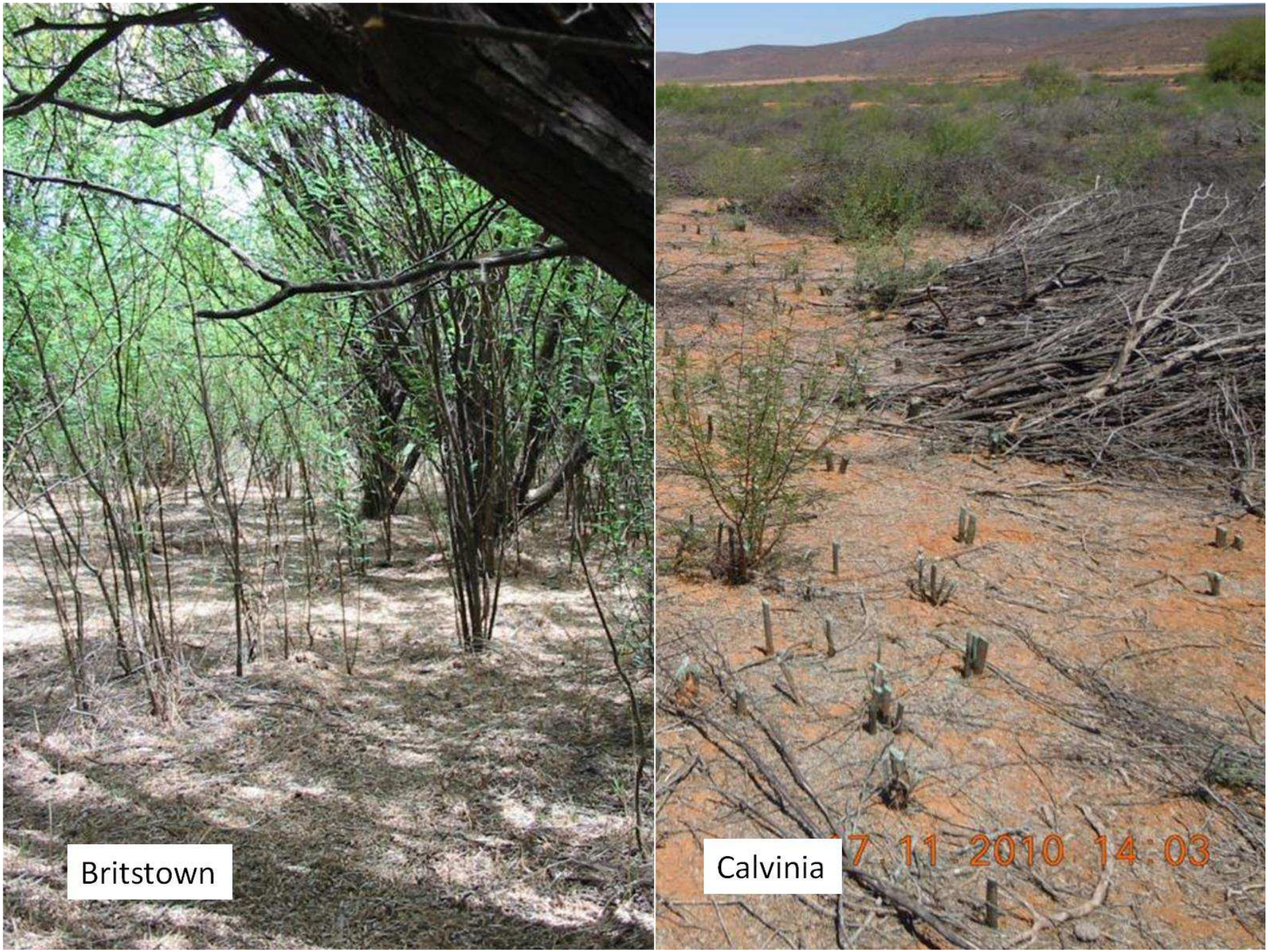
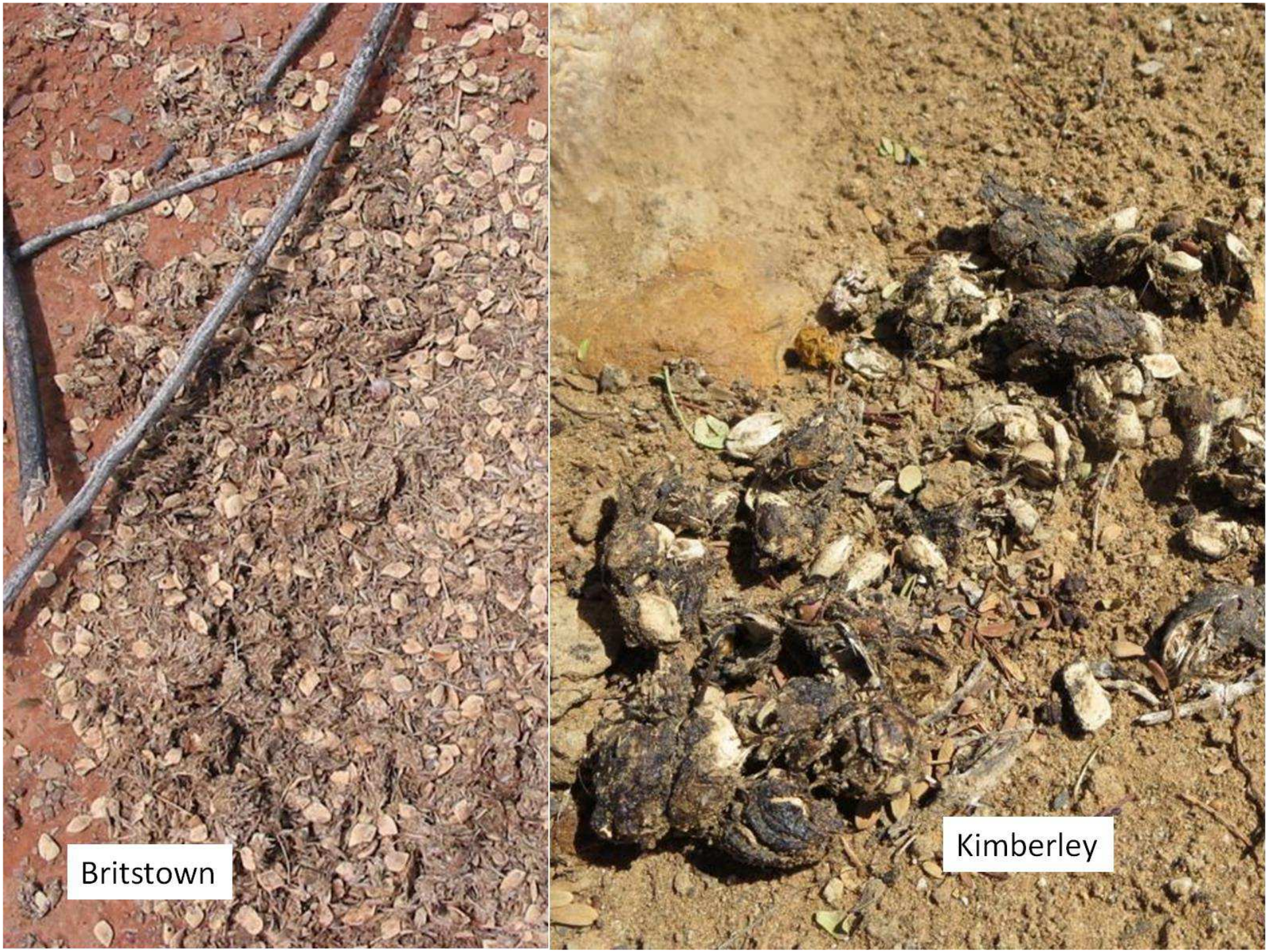
Beaufort West

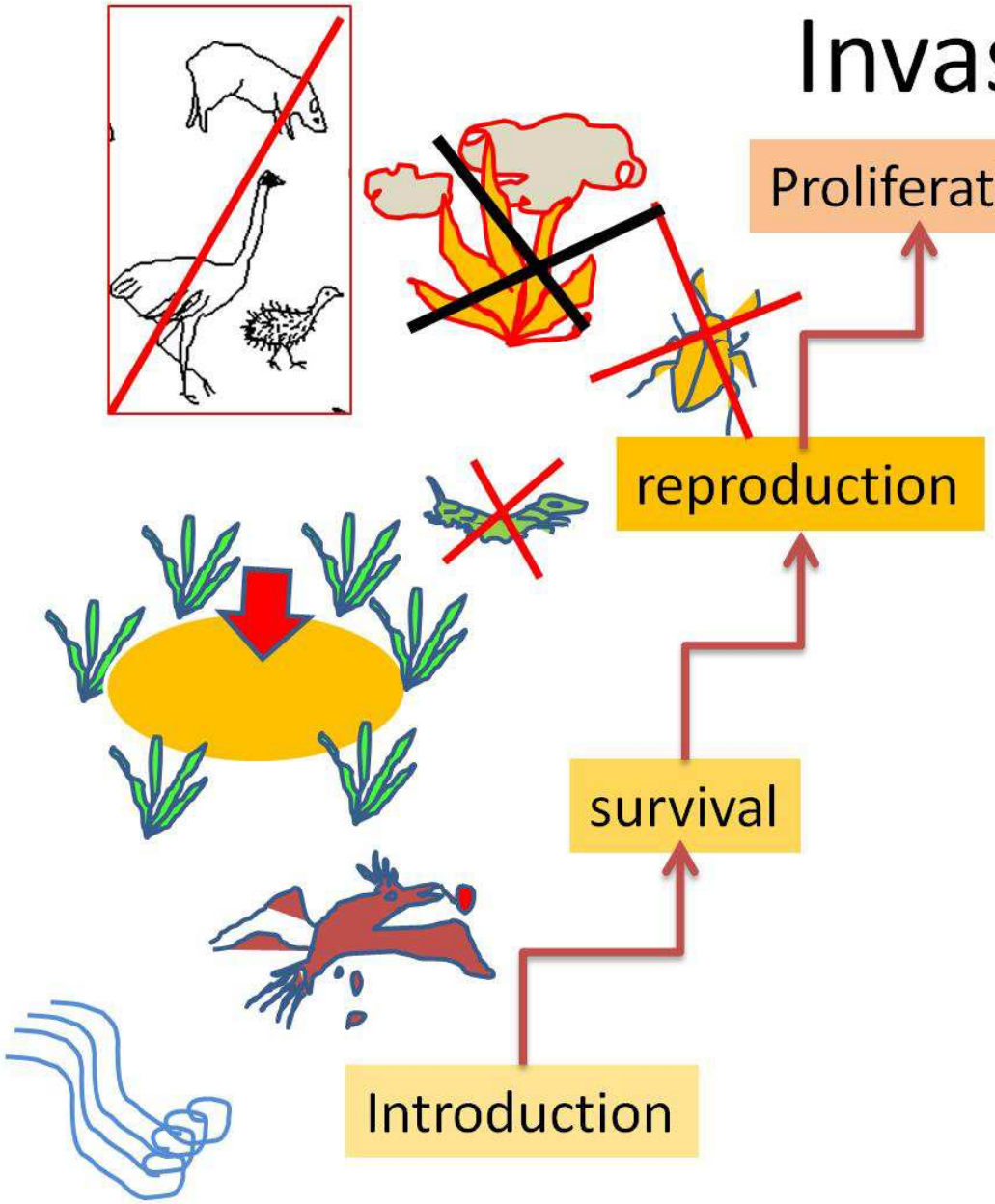

Gariep Dam


Prince Albert
Kimberley


Britstown
Calvinia
7 11 2010 14 03

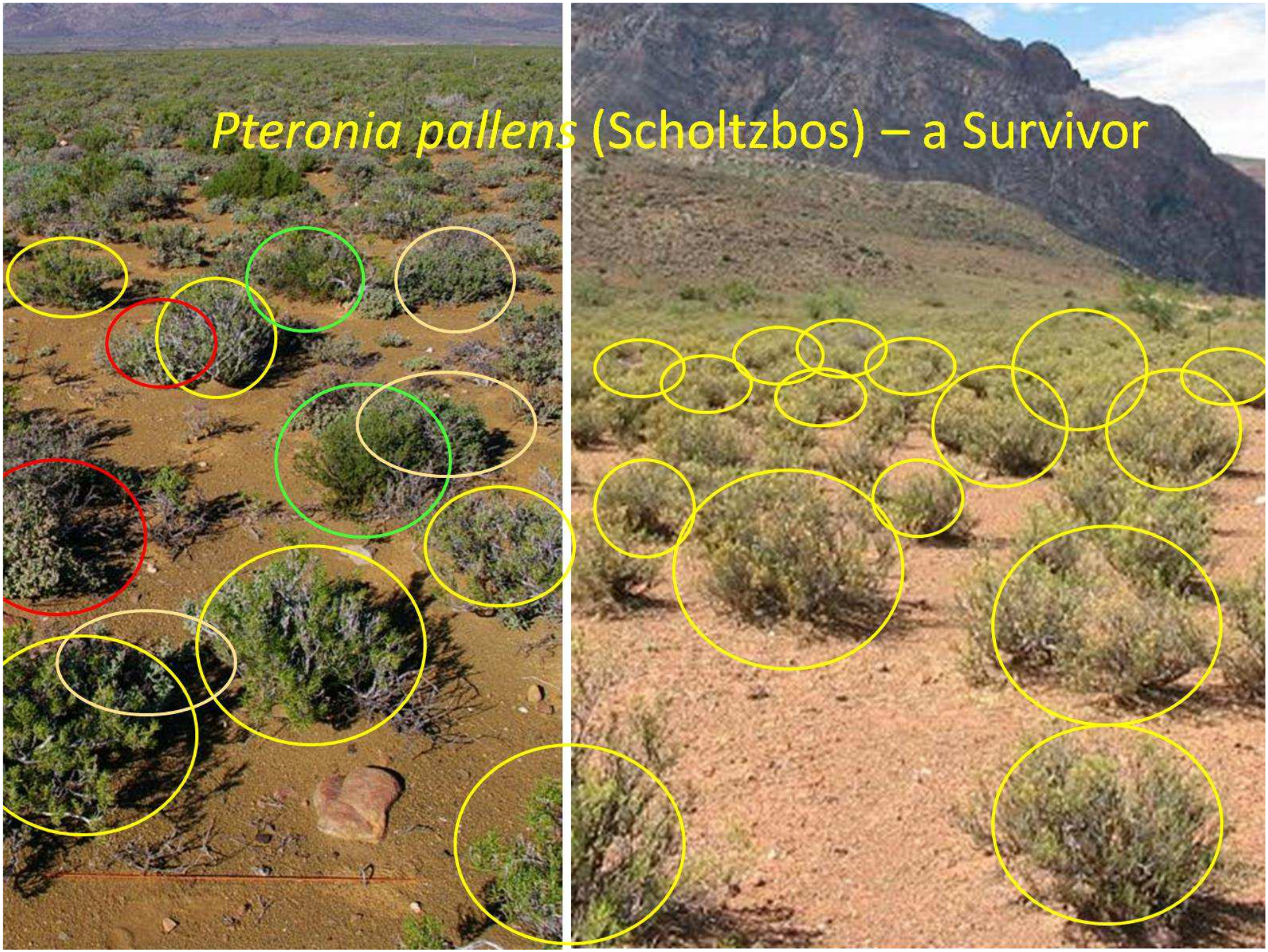

Britstown
Kimberley

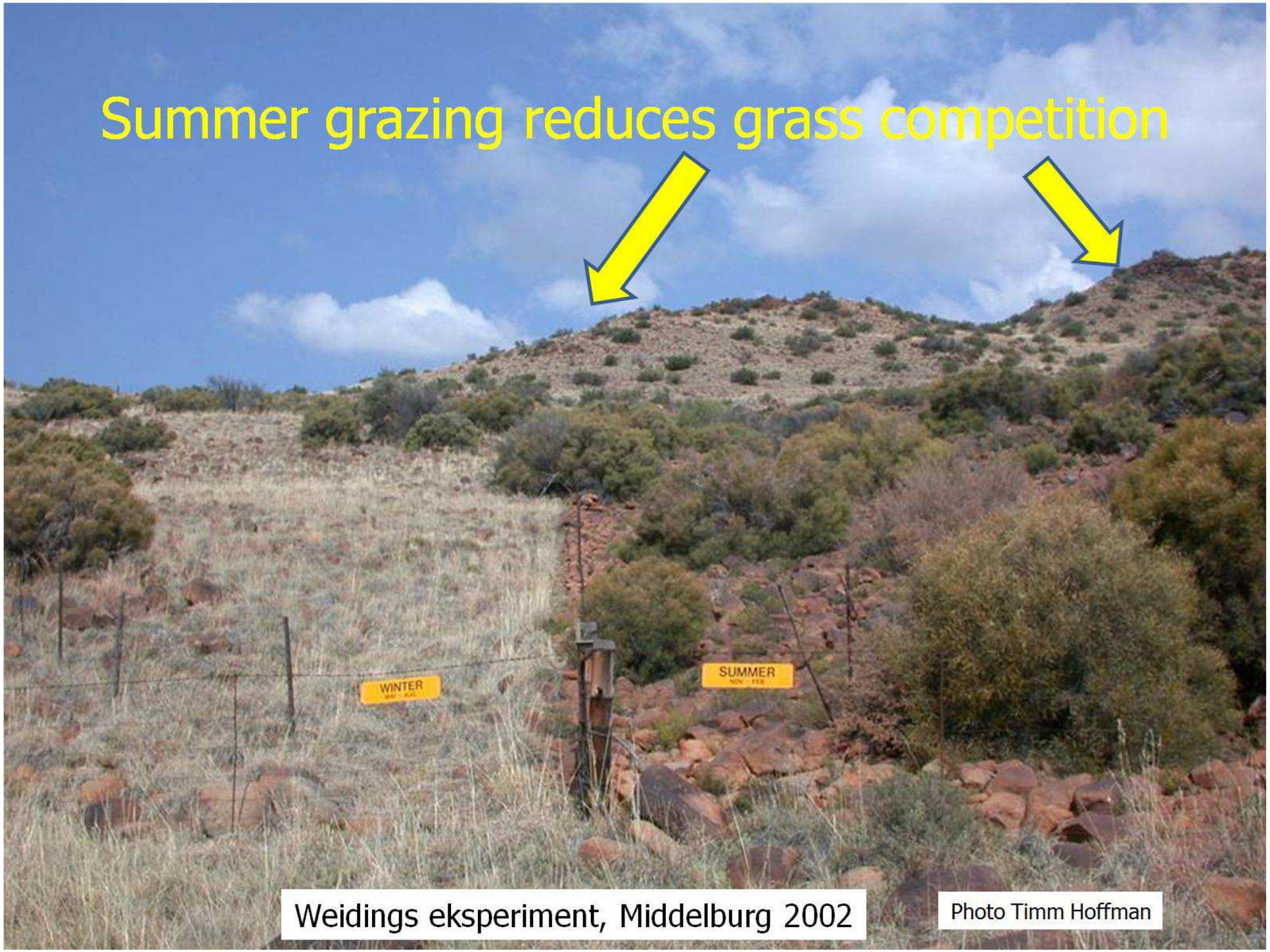
Invasion processes



Survivor-encroacher-increaser characteristics

- Livestock management driver
- Unpalatable/poisonous
- Clonal/long-lived
- Seed bank - not important
- Long-distance dispersal – not important
- Domination by default


Pteronia pallens (Scholtzbos) – a Survivor


Summer grazing reduces grass competition
WINTER
SUMMER
Weidings eksperiment, Middelburg 2002
Photo Timm Hoffman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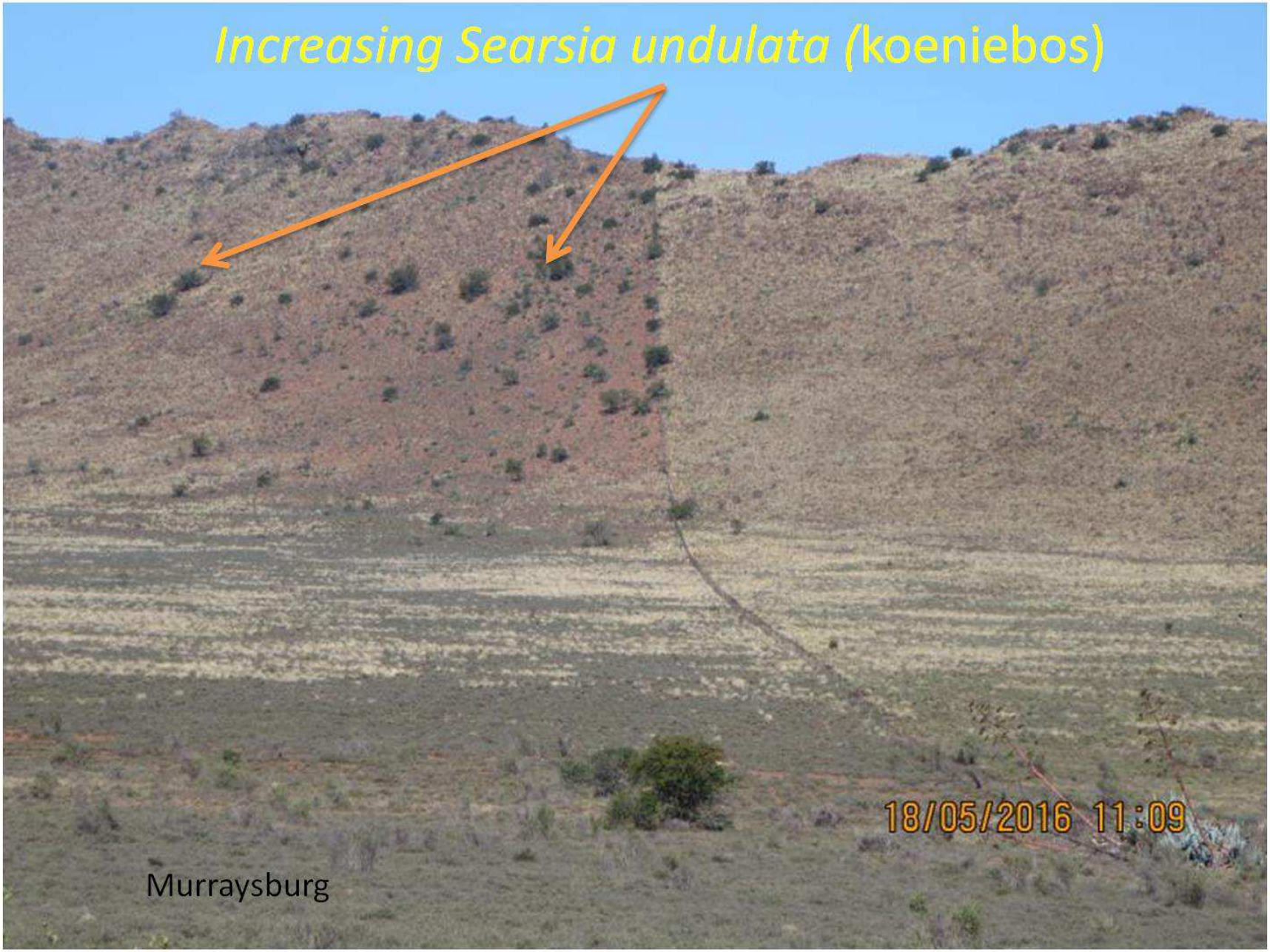
Increasing Searsia undulata (koeniebos)
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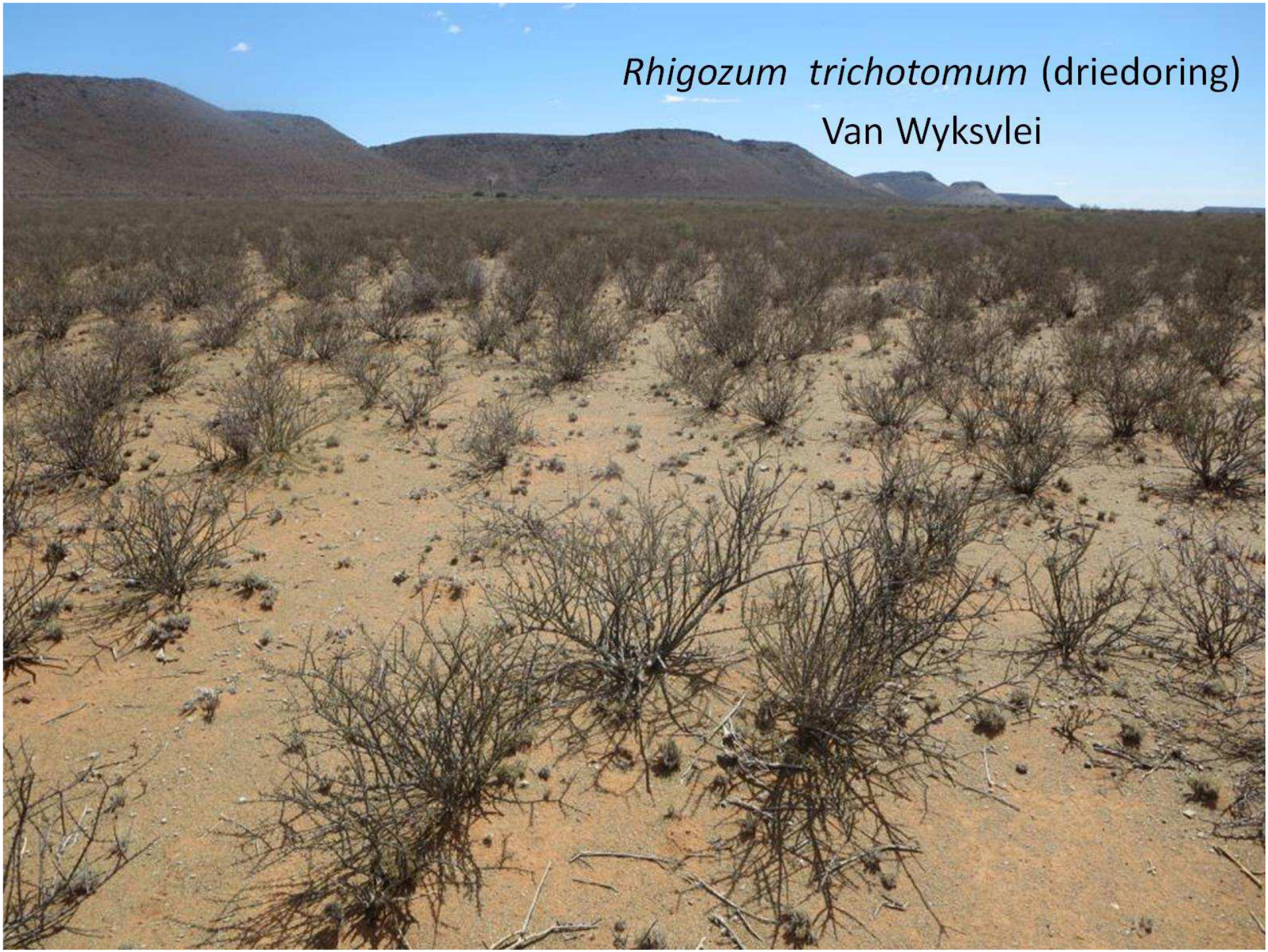
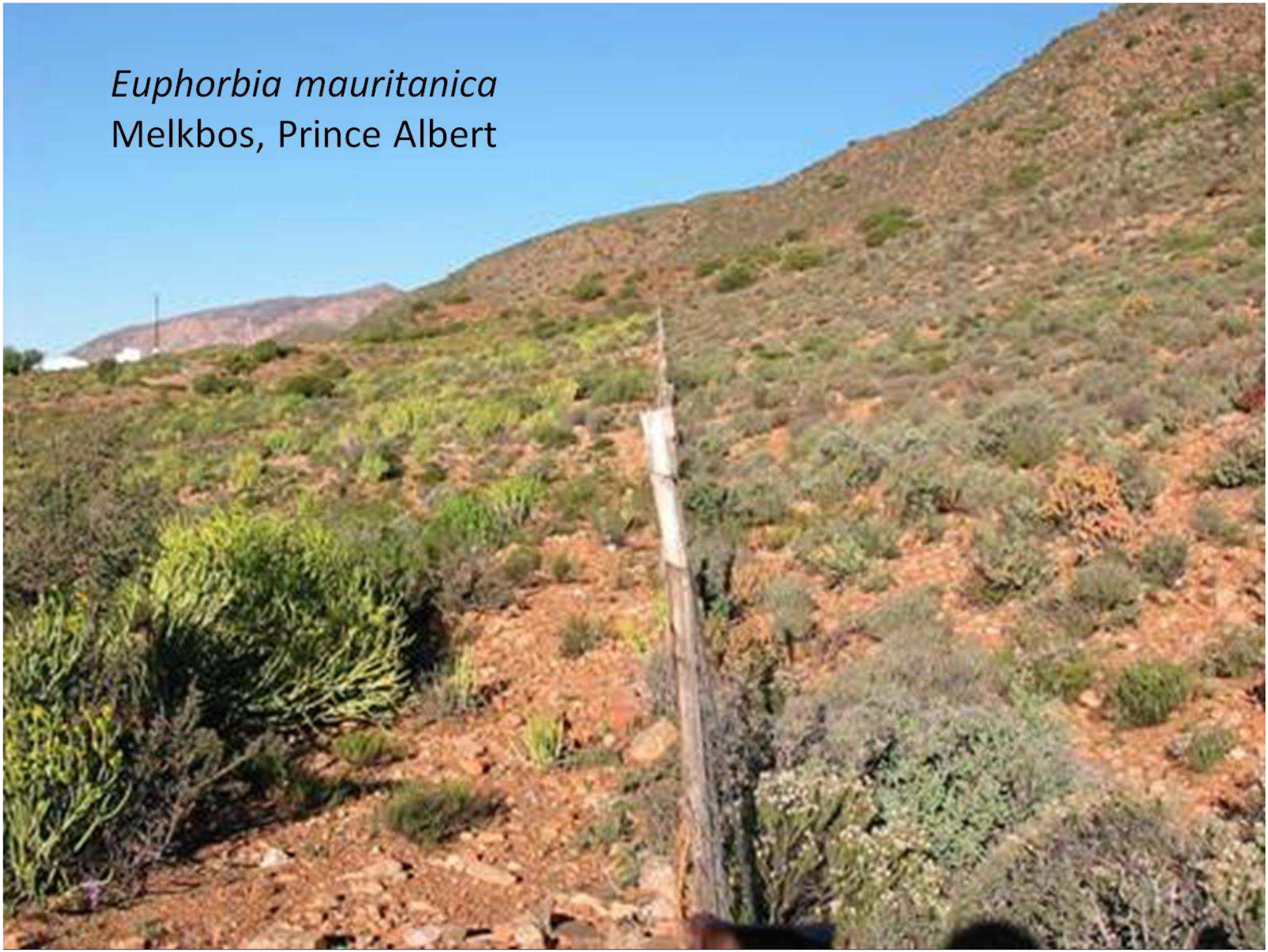
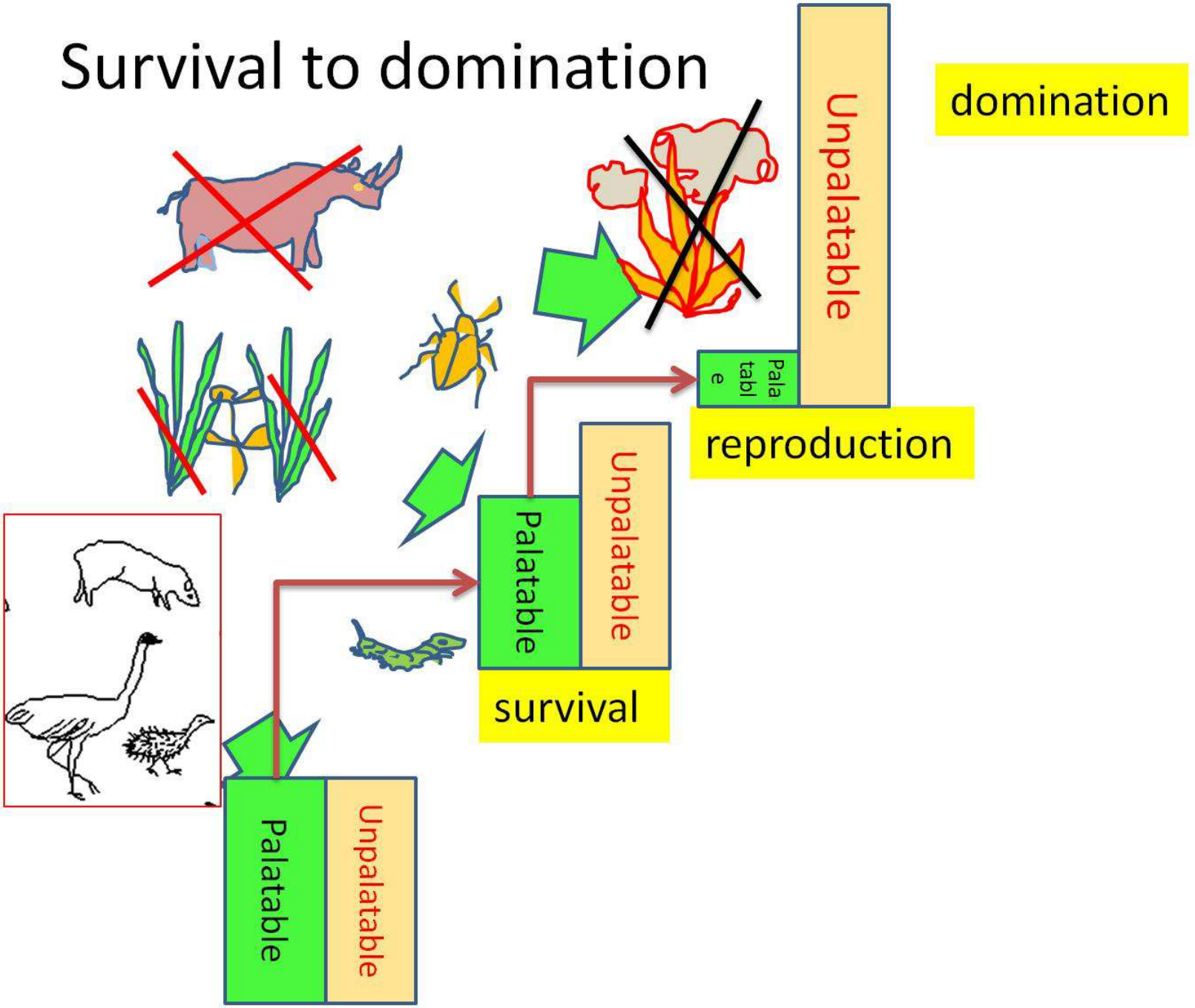
Murraysburg


Rhigozum trichotomum (driedoring)
Van Wyksvlei


Euphorbia mauritanica
Melkbos, Prince Albert


01.06.2010 09:12

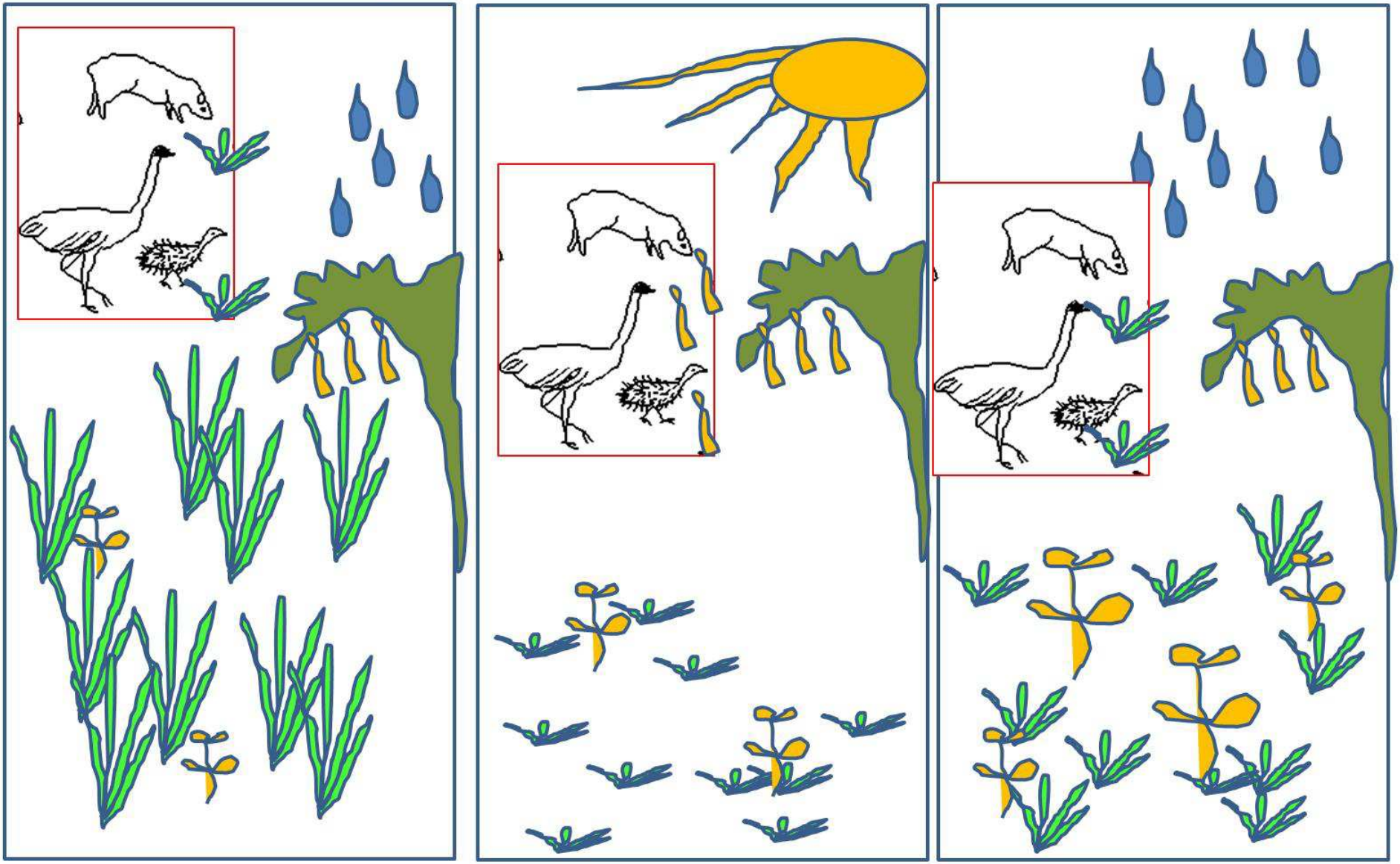
Survival to domination

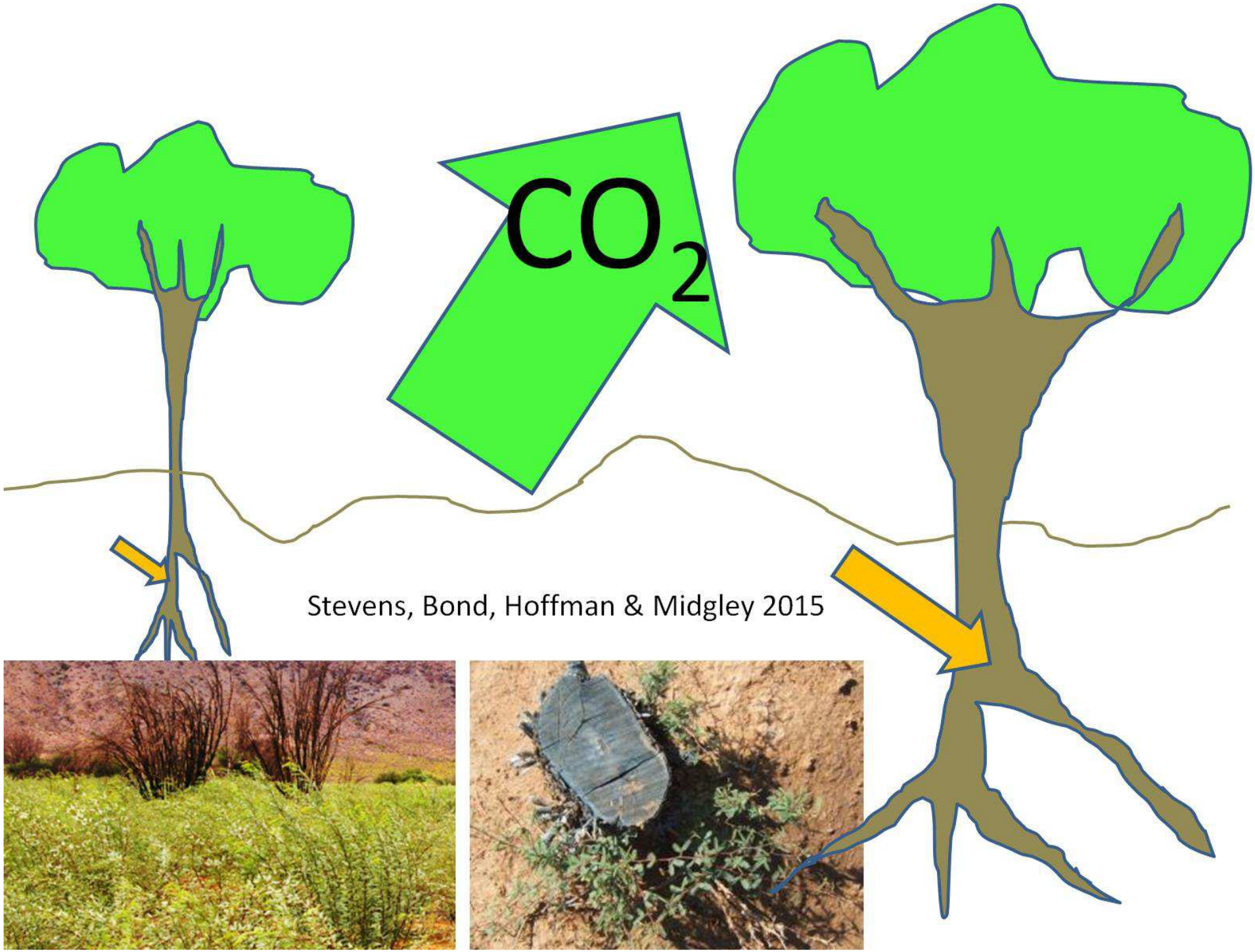


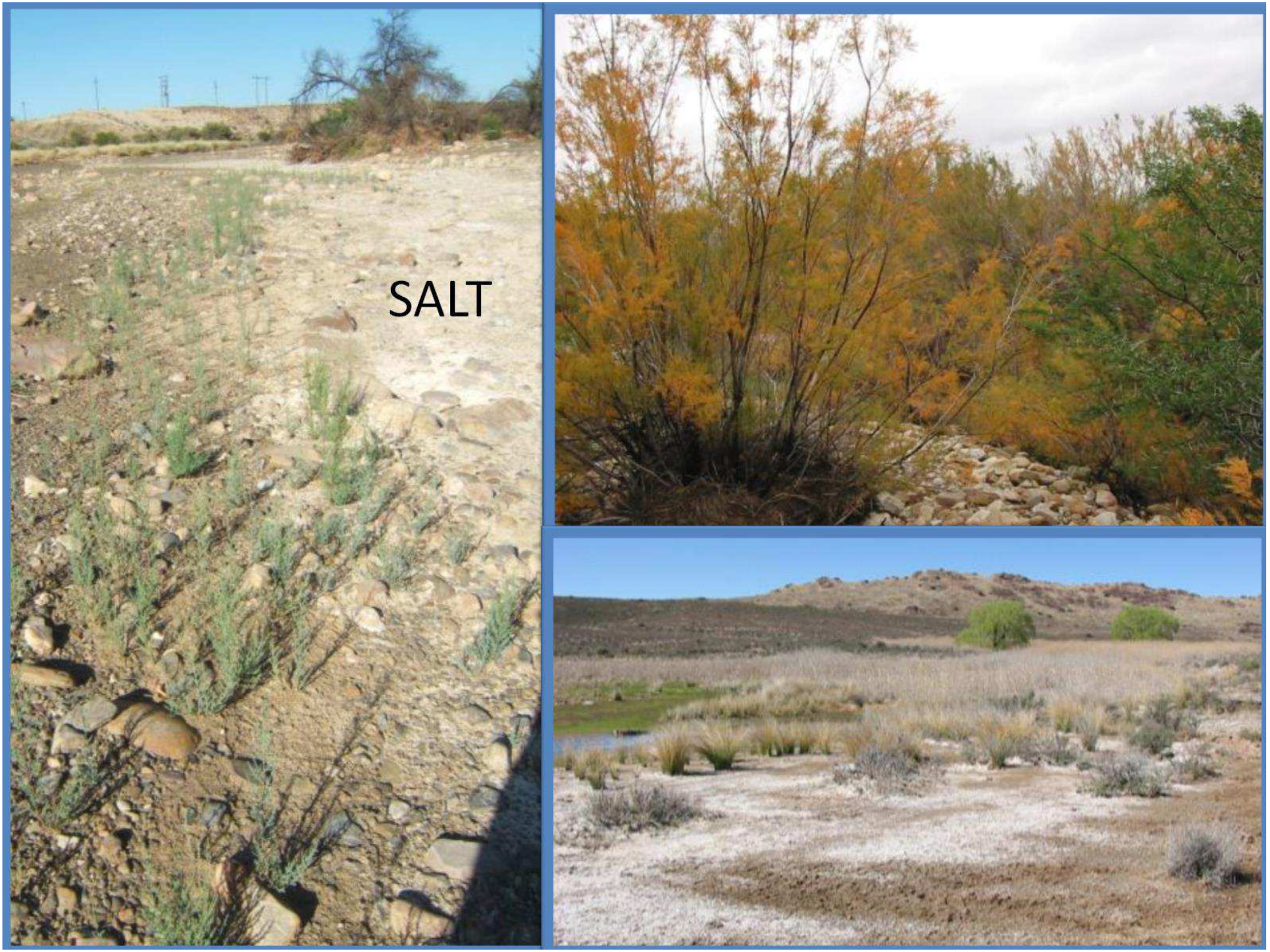
Invaders & Survivors Both Benefit from

- Fluctuations
- Directional changes

Grazing+Weather=Proliferation



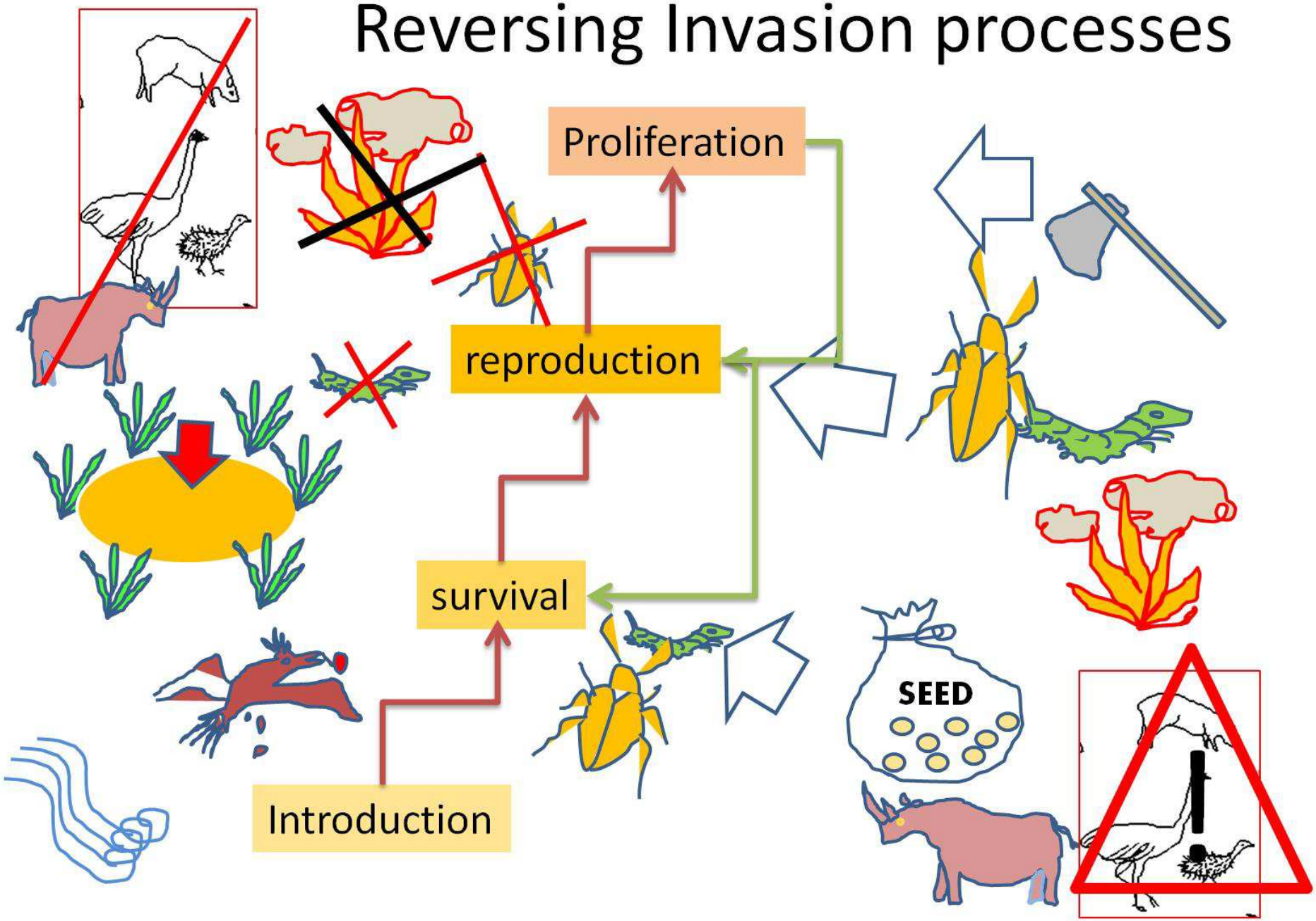

CO_2
Stevens, Bond, Hoffman & Midgley 2015


SALT

Management Options

Evicting Invaders

Reversing Invasion processes

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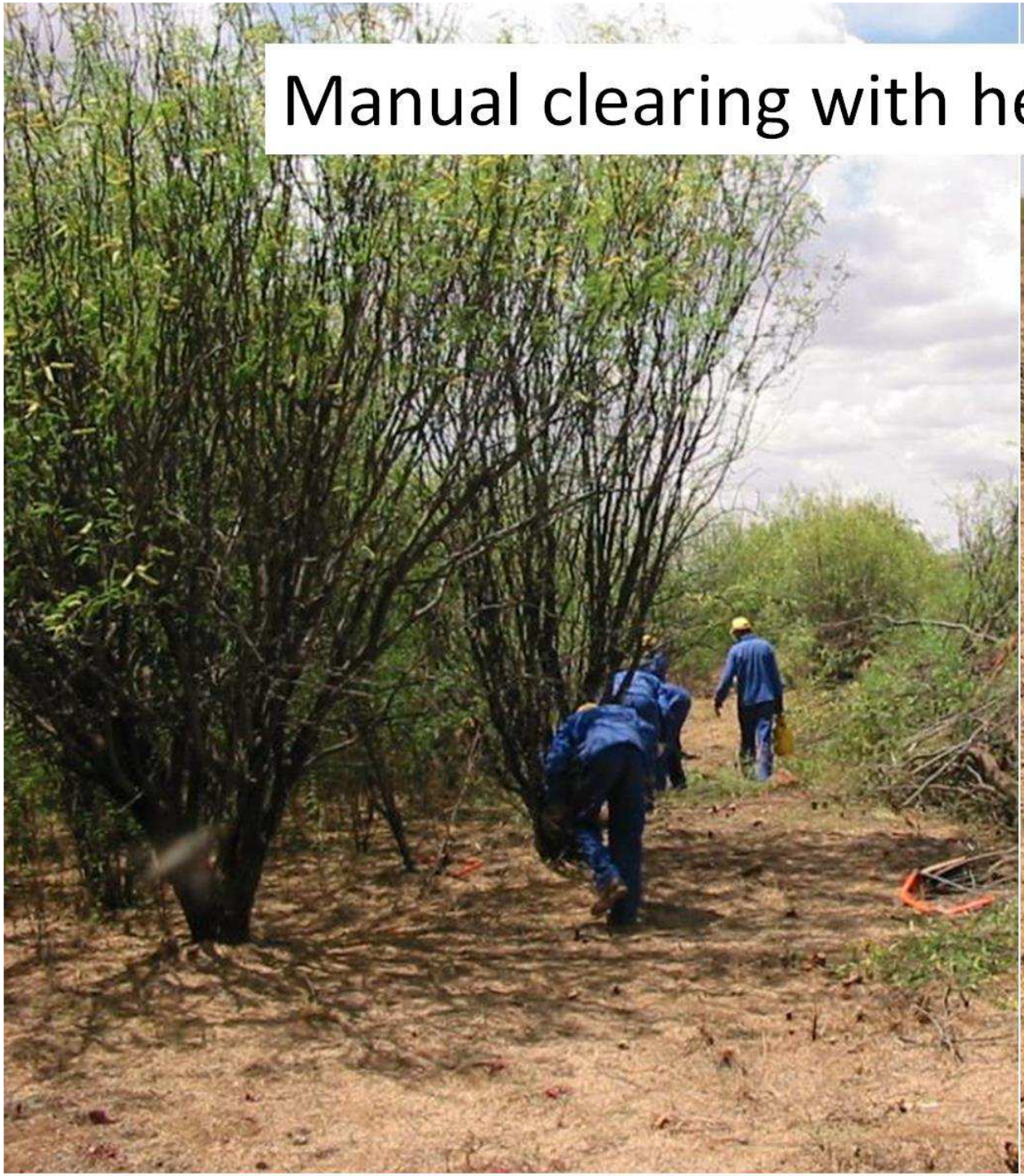
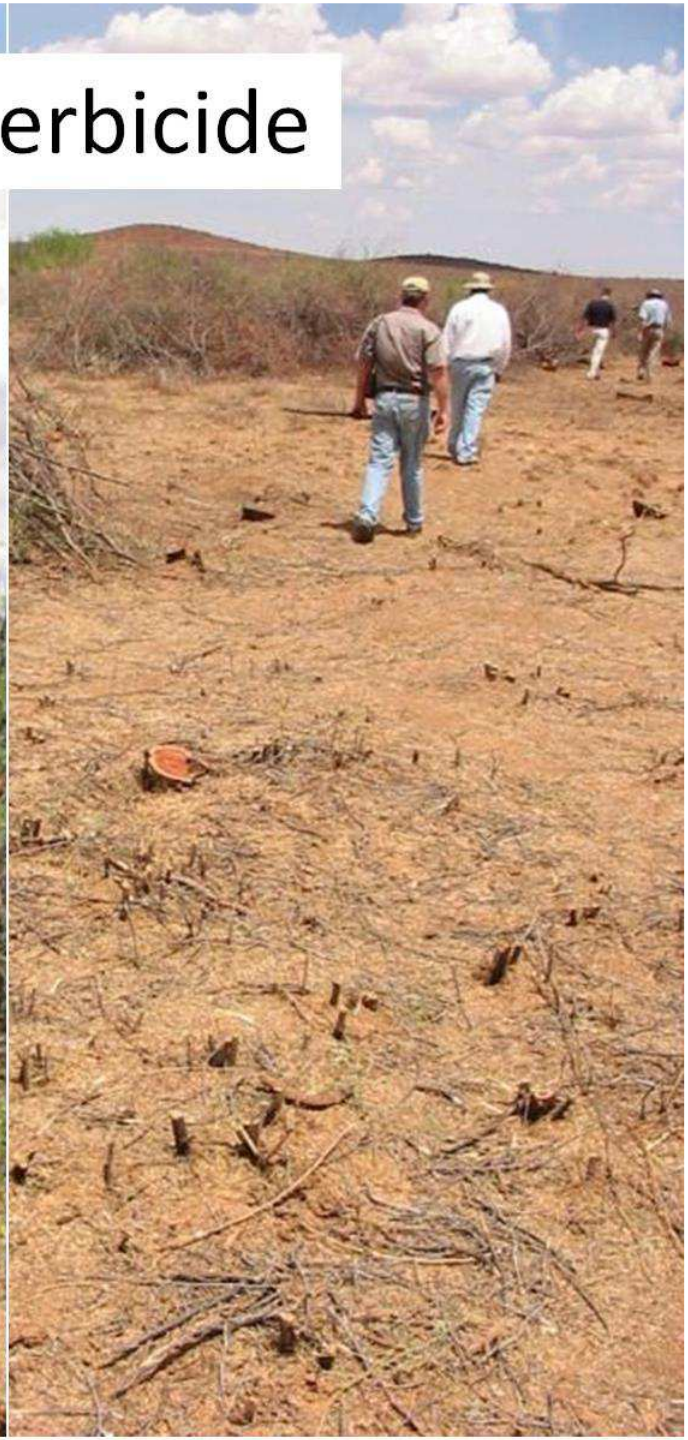
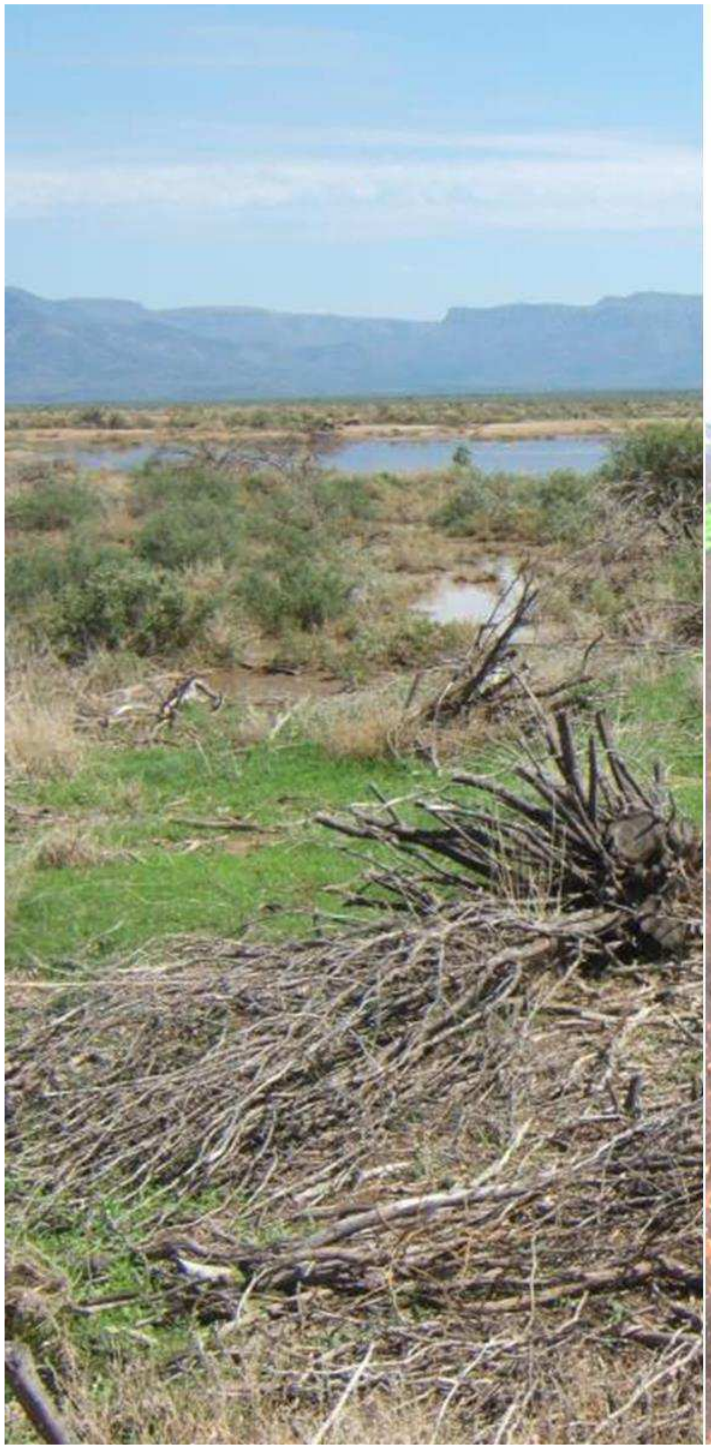
Biocontrol

Manual clearing with herbicide







Use of persistent herbicides on Prosopis could contaminate ground water

Post-clearing rehabilitation

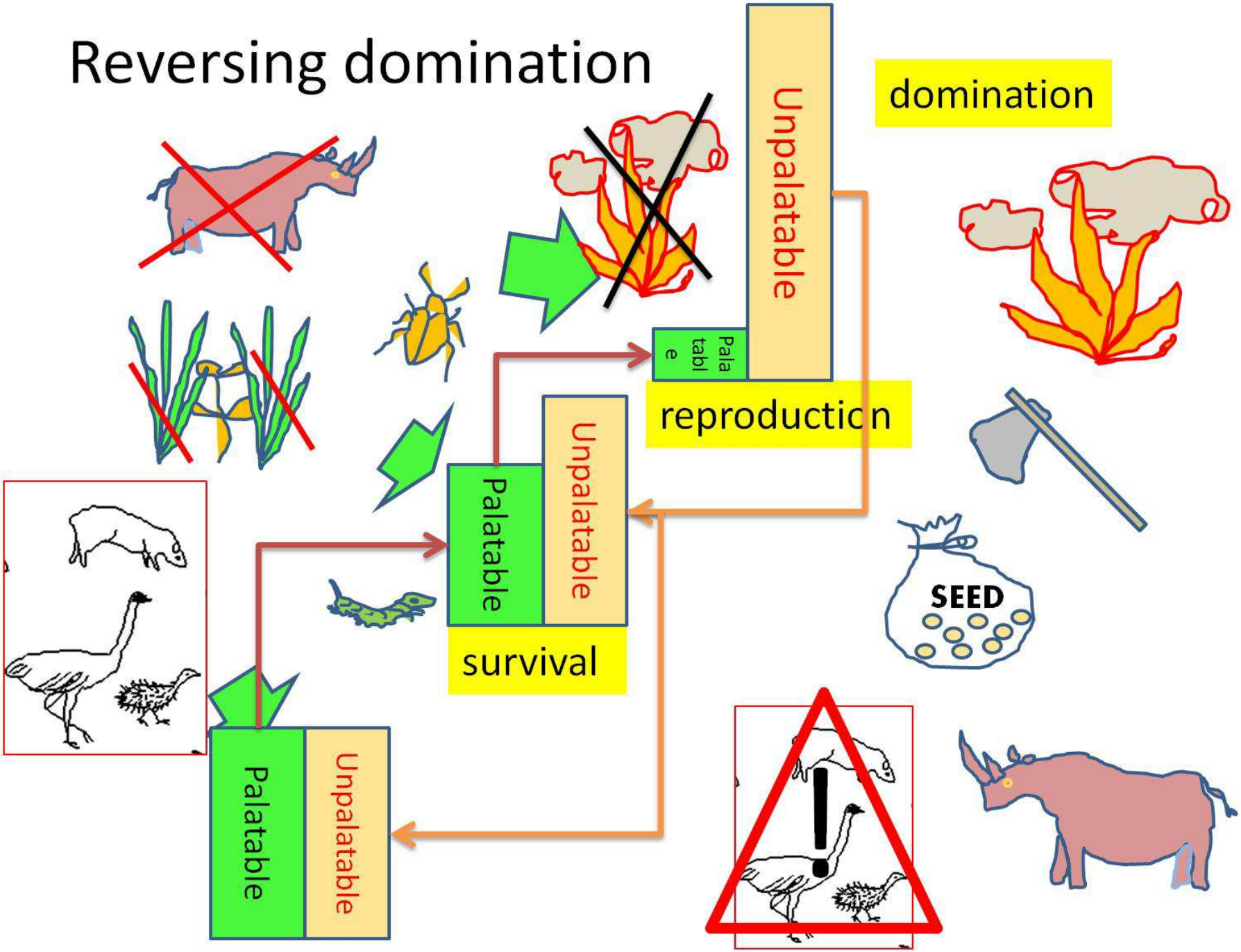
& cover crops or reseeding

Using cleared material as mulch

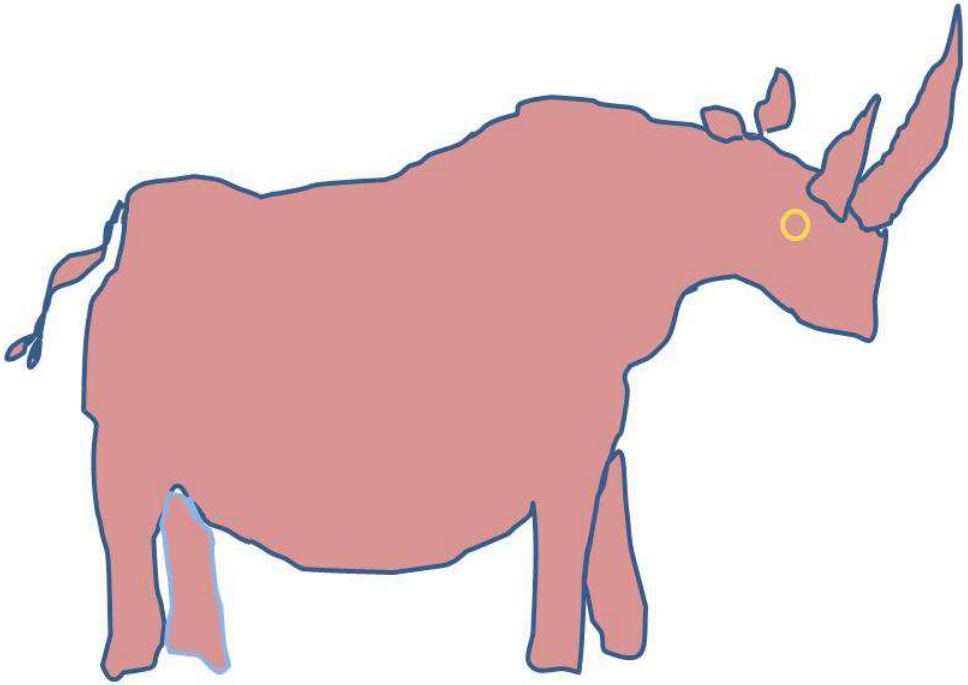
Management Options

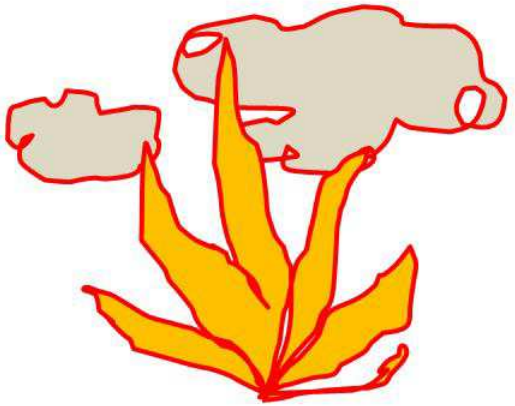
Supplementing Survivors

Reversing domination



Bring back browsers & fire



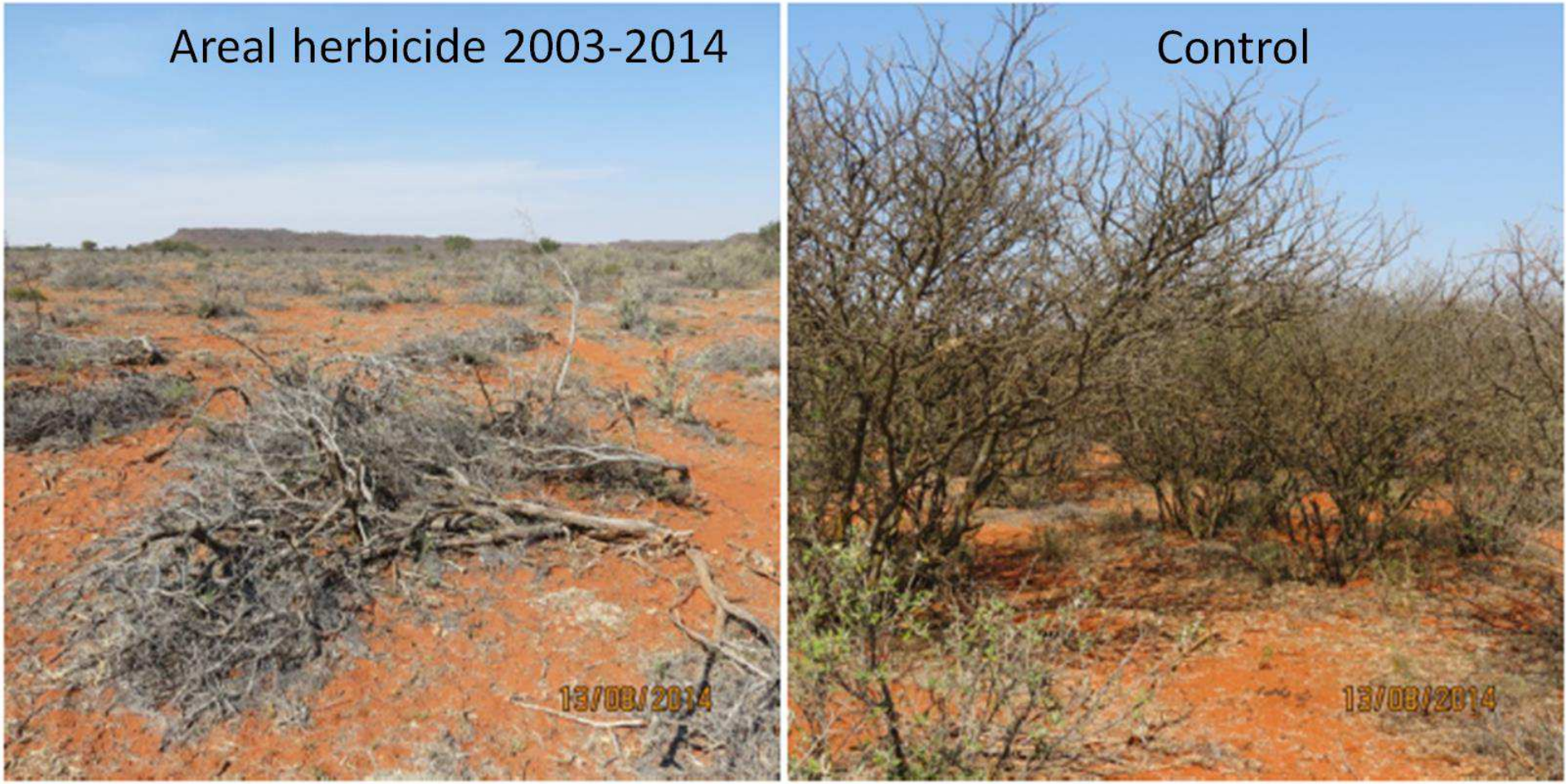


Browsers & fire

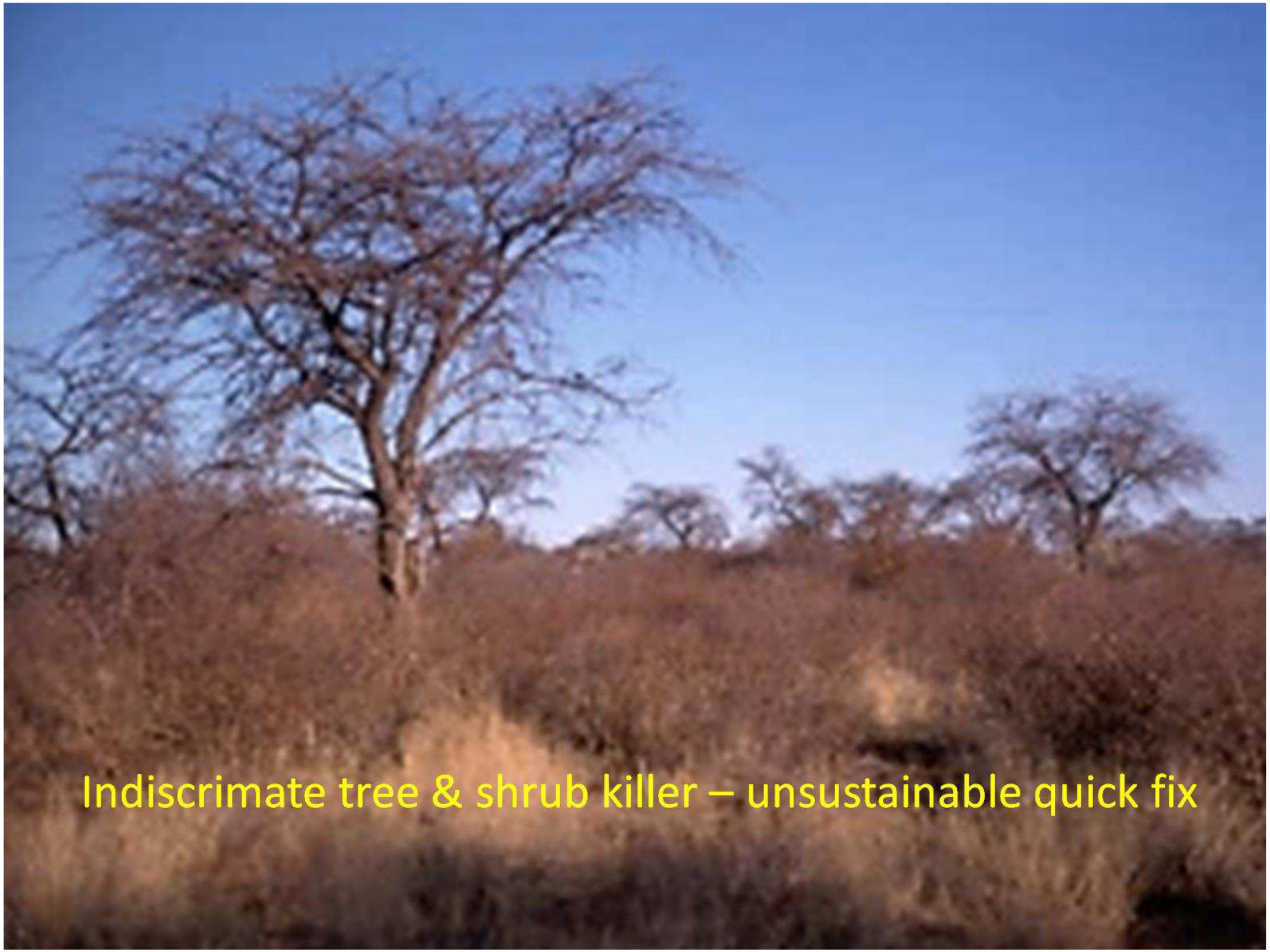
if feasible?

Herbicides – not recommended!

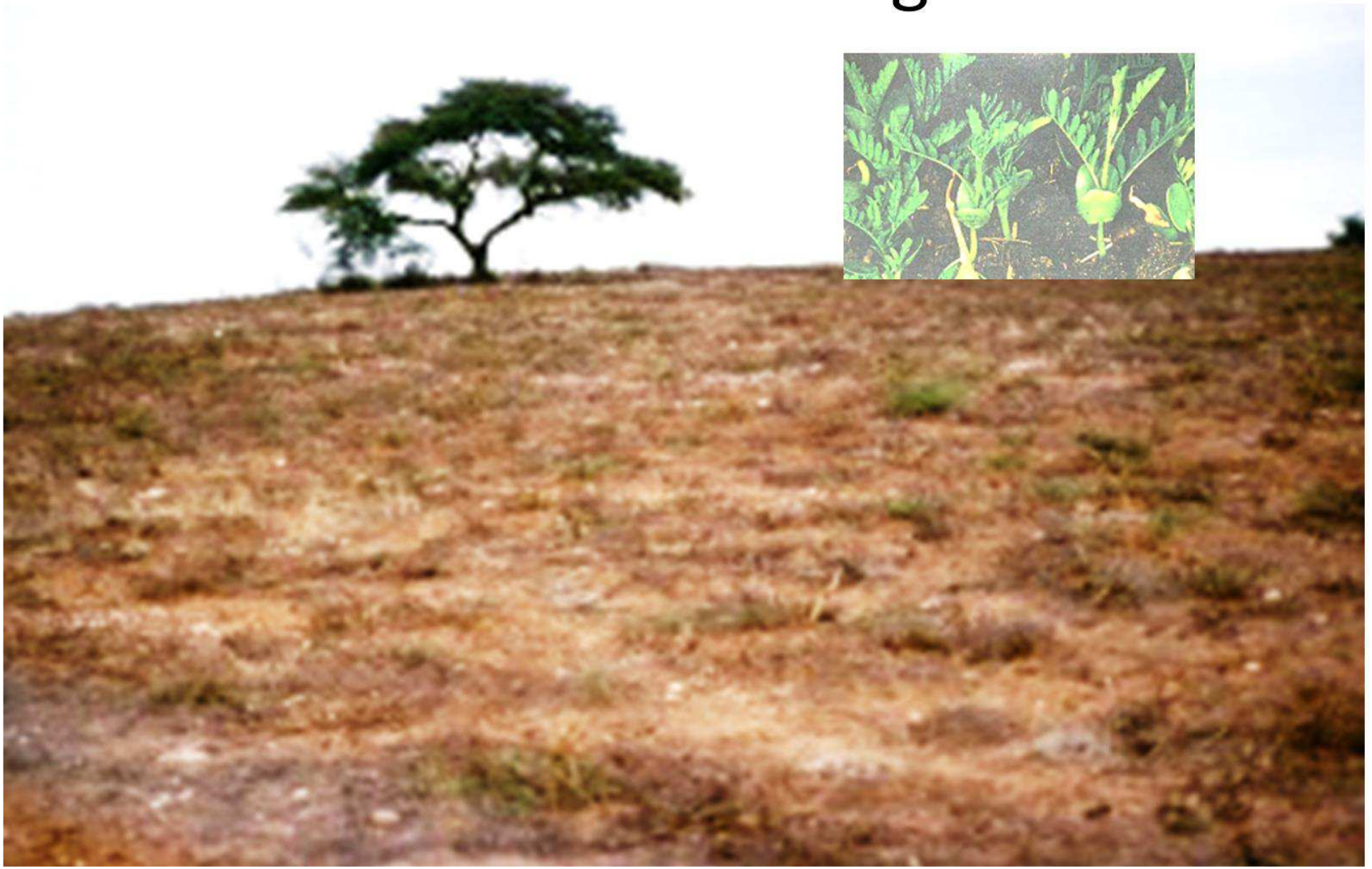
Tebuthiuron persists in soil for 11 years, Leaches to depth, Kills woody plants



Bezuidenhout, Kraaij & Baard 2015


Indiscrimate tree & shrub killer – unsustainable quick fix

Mechanical clearing scale

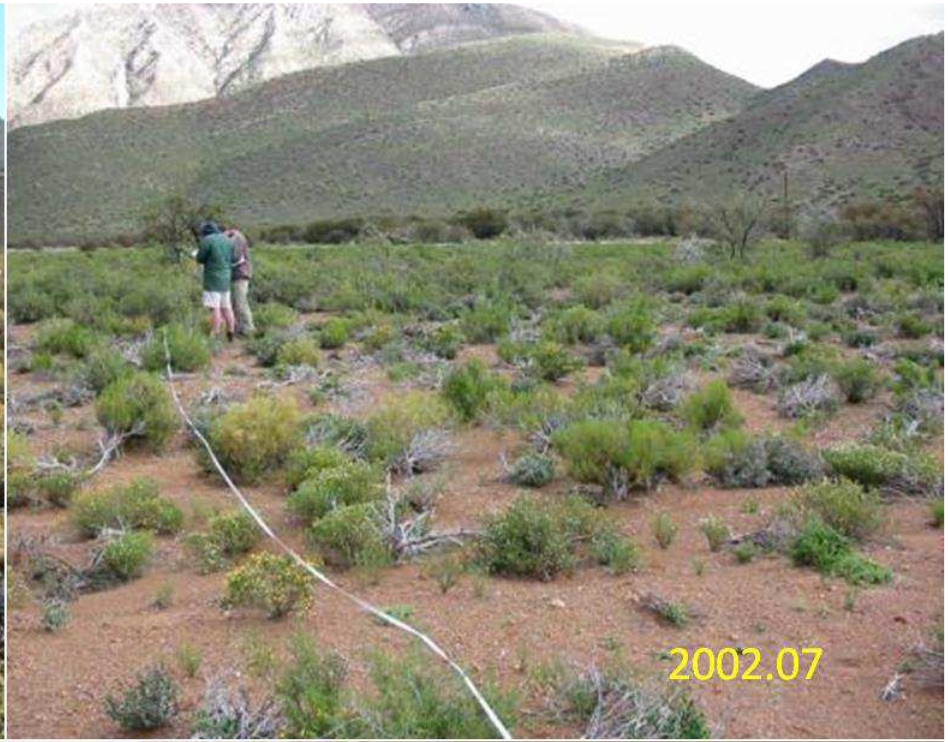


Selective thinning

Viz. Nico Smit 2001

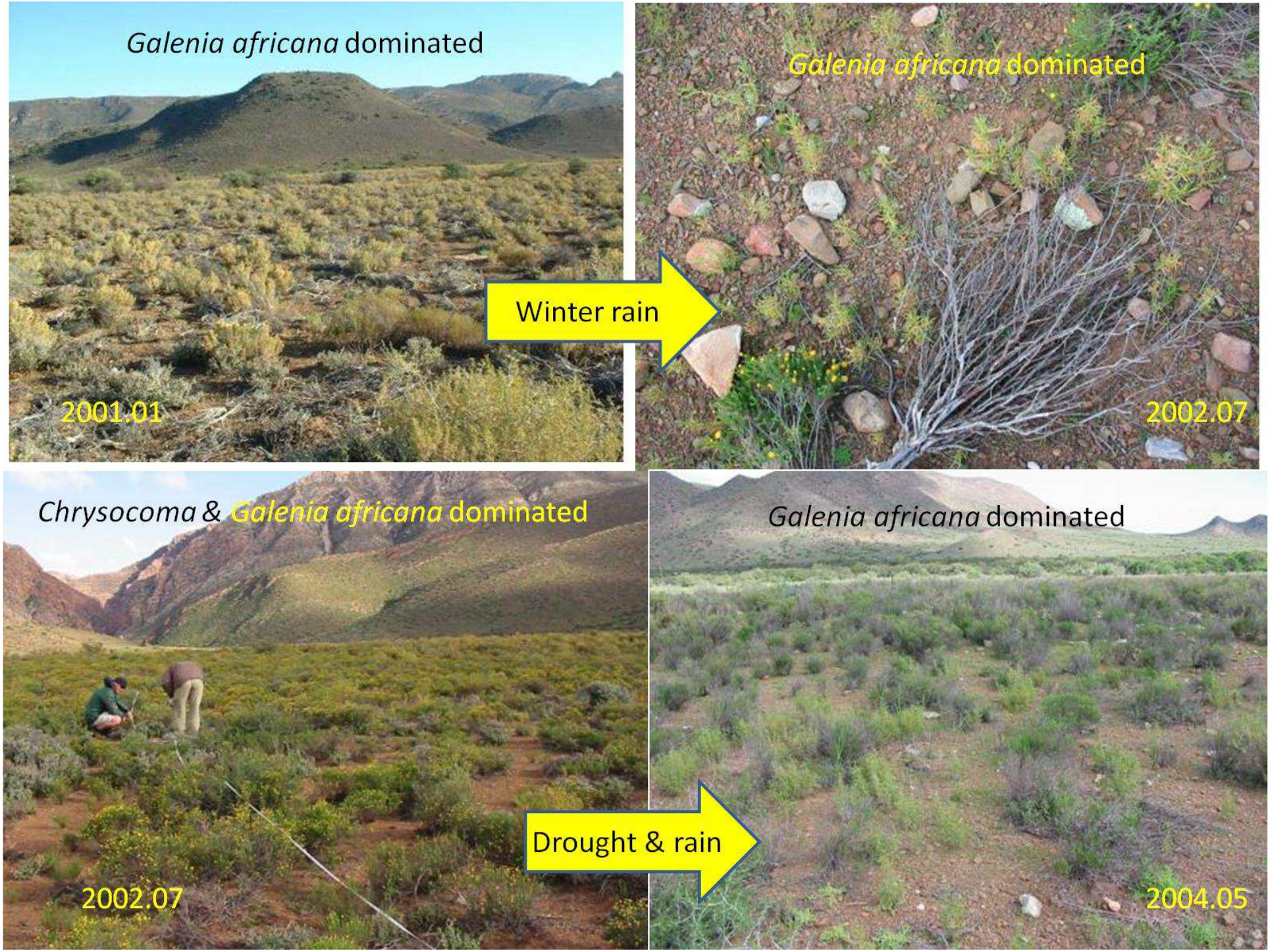
- Removal of small plants & sparing of large trees;
- Uses competition to control woody increase
- Recognises role of large trees in savannas


2001.01


2002.07

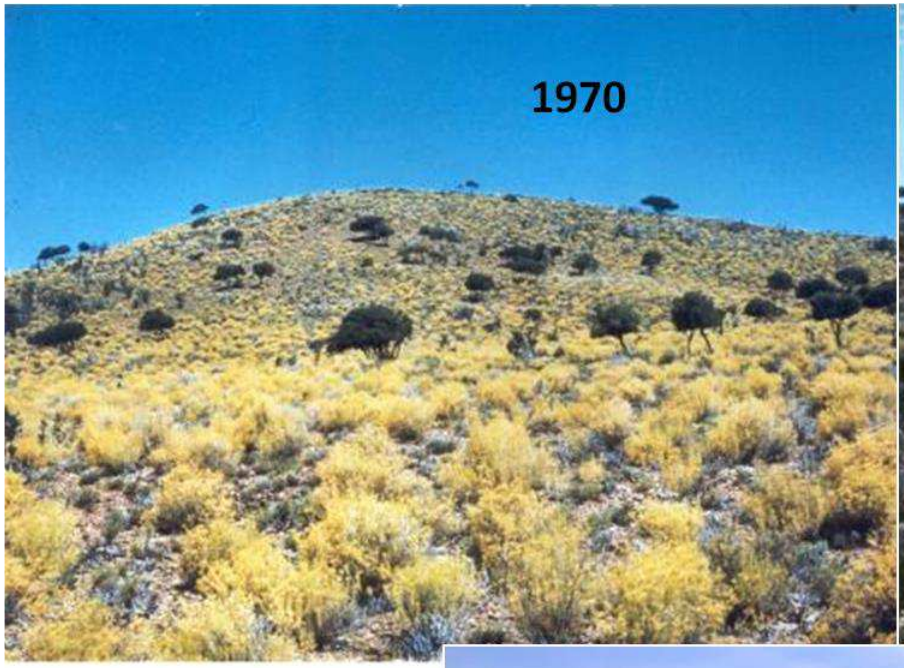

2002.07

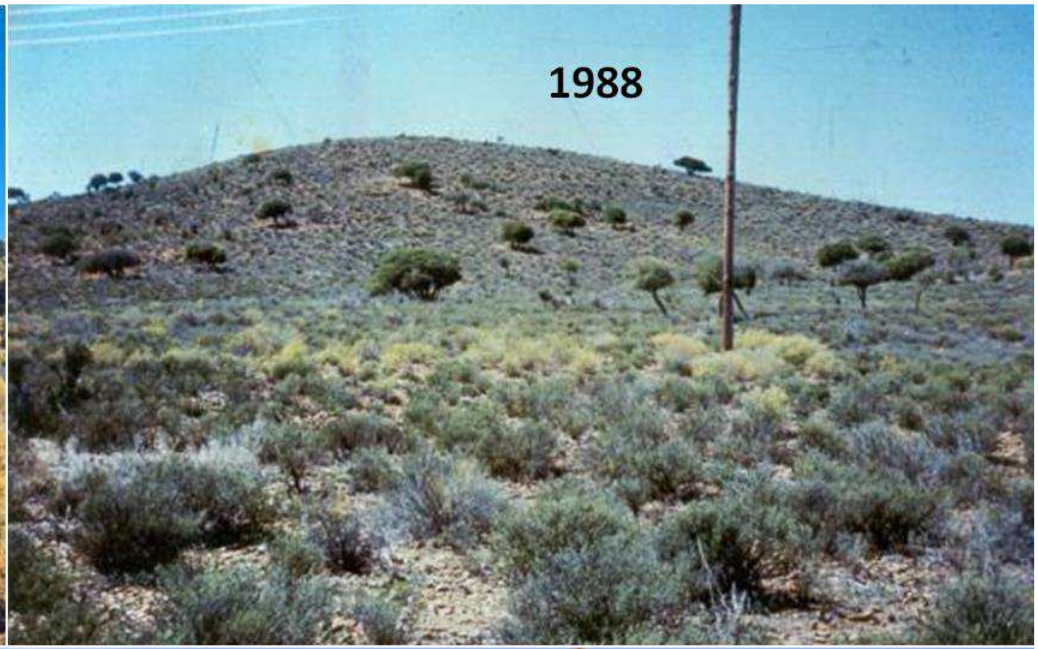

2003.09


Galenia africana dominated
2001.01
Winter rain
Galenia africana dominated
2002.07
Chrysocoma & *Galenia africana* dominated
2002.07
Drought & rain
Galenia africana dominated
2004.05


Scholzbos removal increased diversity – has no seedbank


Galenia africana (Kraalbos) & *Chrysocoma ciliata* (Bitterbos)
Removal exacerbated the problem,
Via seedbank activation





Roelie van Rensburg:

- Farm 250 to 1000 morg.
- Do not remove kraalbos – lives 10-15 y
- Its protects other spp

Rest does not always bring change: seeds of other species may be limiting

Lessons learned

	Invader	Survivor
• Elimination desirable	√	X
• Biocontrol	√	X
• Selective thinning	X	√
• Patch clearing & seeding	X	≈
• Resting/stock mgmt	X	≈
• Follow-up	√	≈
• Rehabilitation/cover crop	usually	≈
• Clear-Browse-Burn-Rest	≈	≈
• Herbicide + Mgmt	if no other option	

Thank you

PJ Pieterse and the GSSA

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