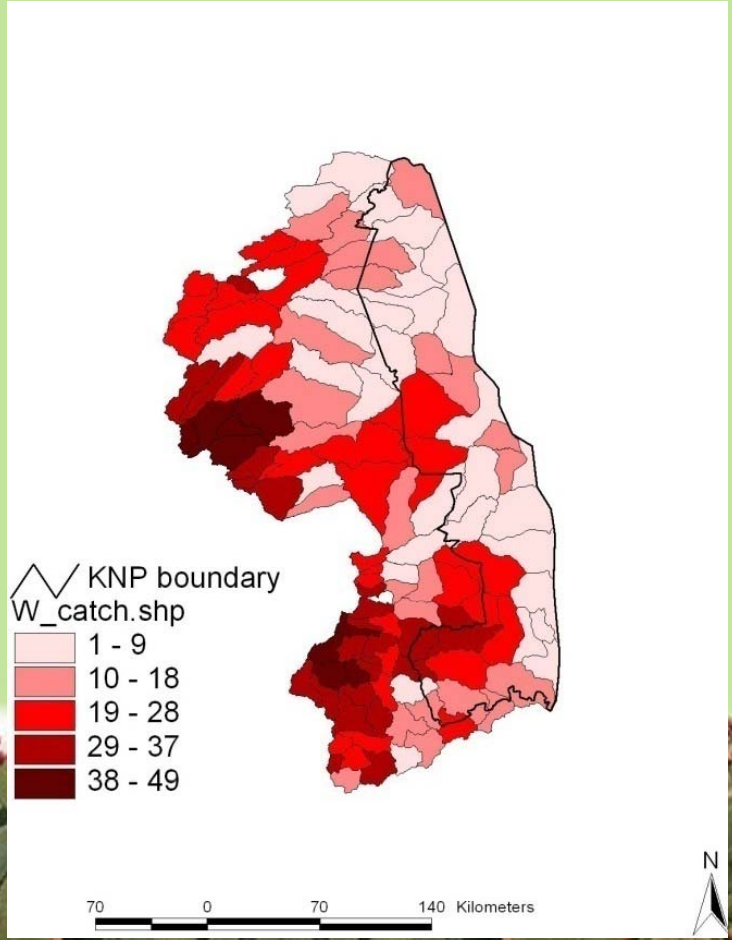
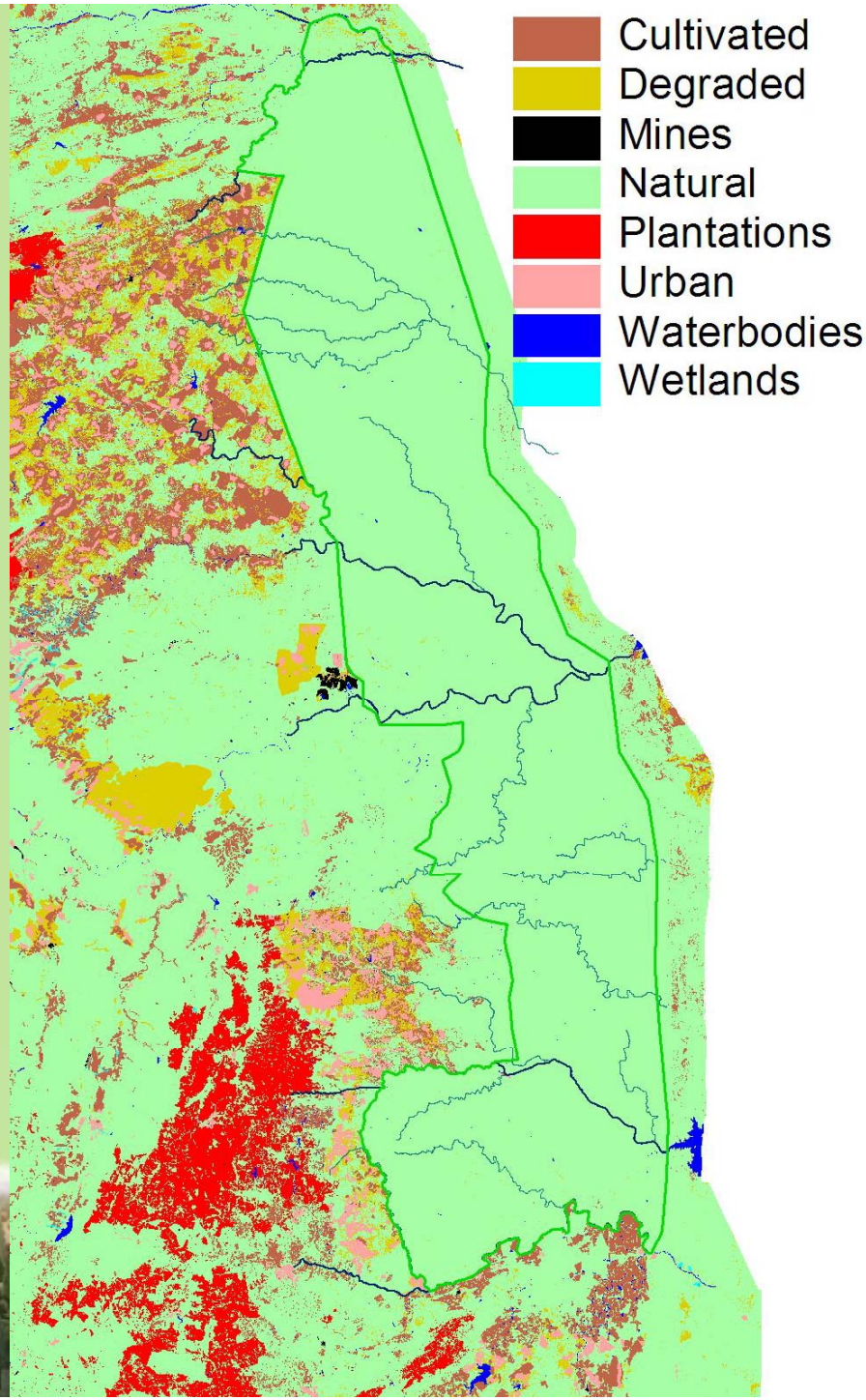
Invasive alien species in Kruger National Park- status and prospects

Llewellyn Foxcroft
South African National Parks

KNP - large protected area

➢ Island in sea of different land use types





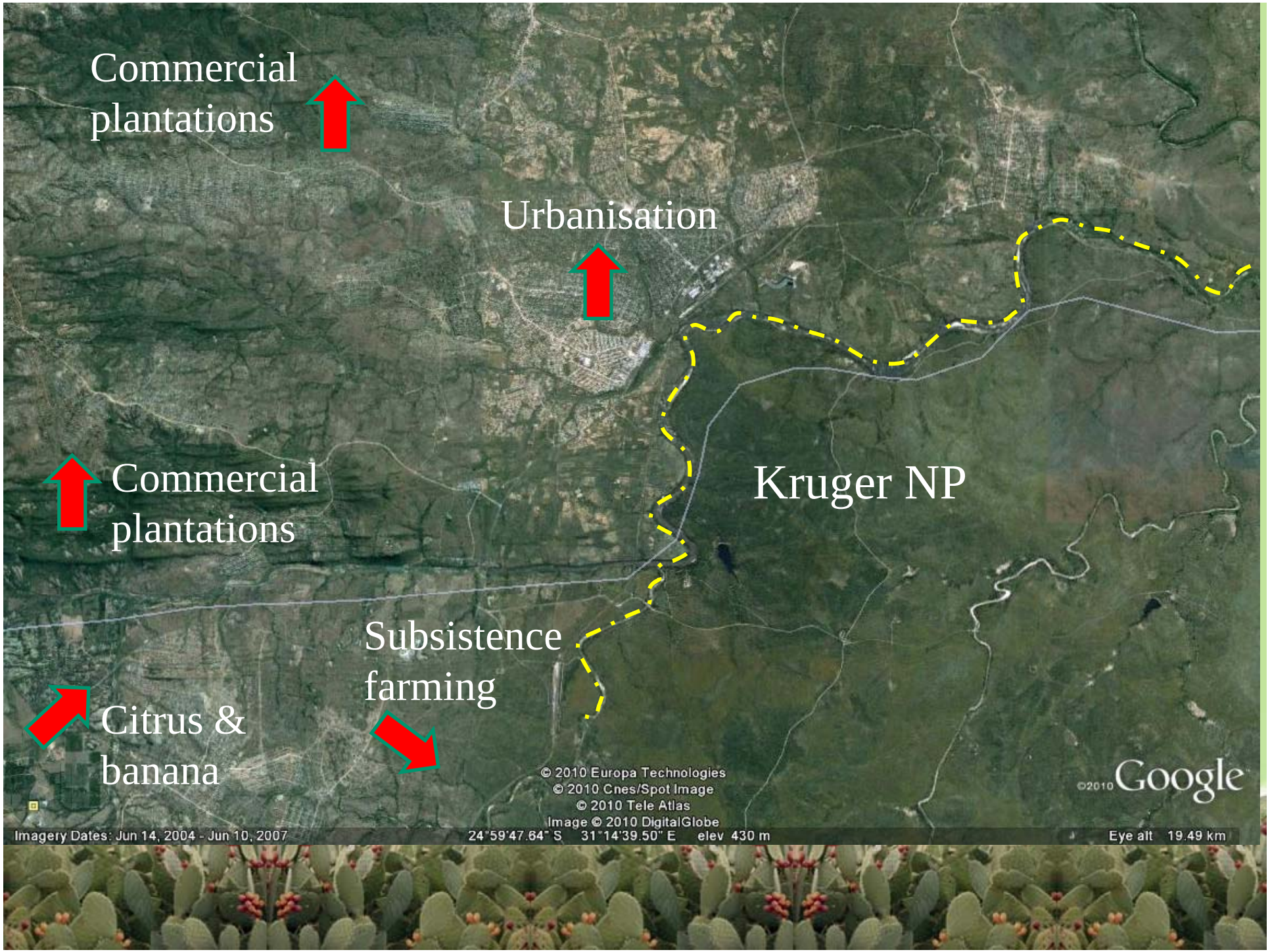

Commercial plantations
Urbanisation
Commercial plantations
Kruger NP
Subsistence farming
Citrus & banana
© 2010 Europa Technologies
© 2010 Cnes/Spot Image
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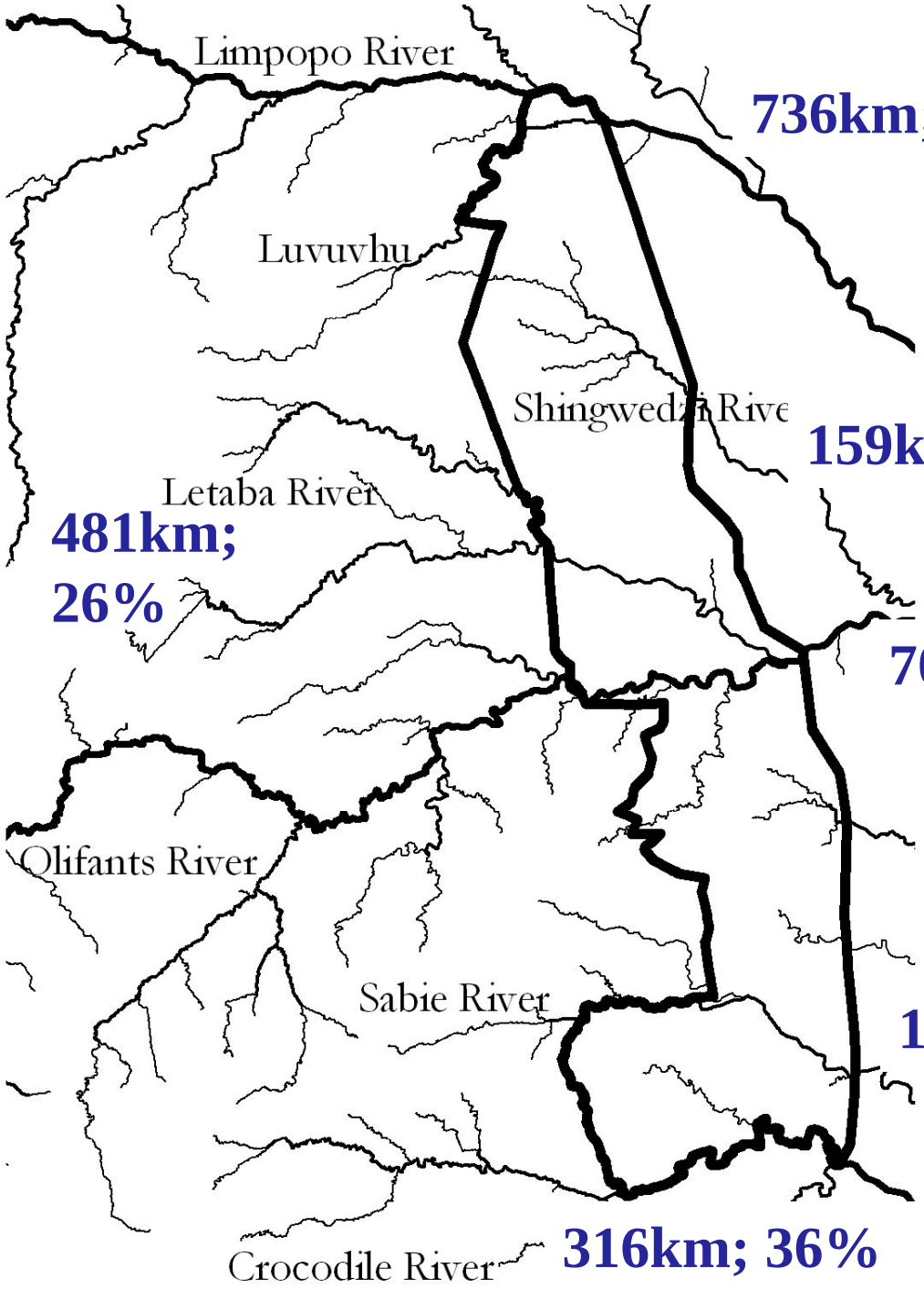
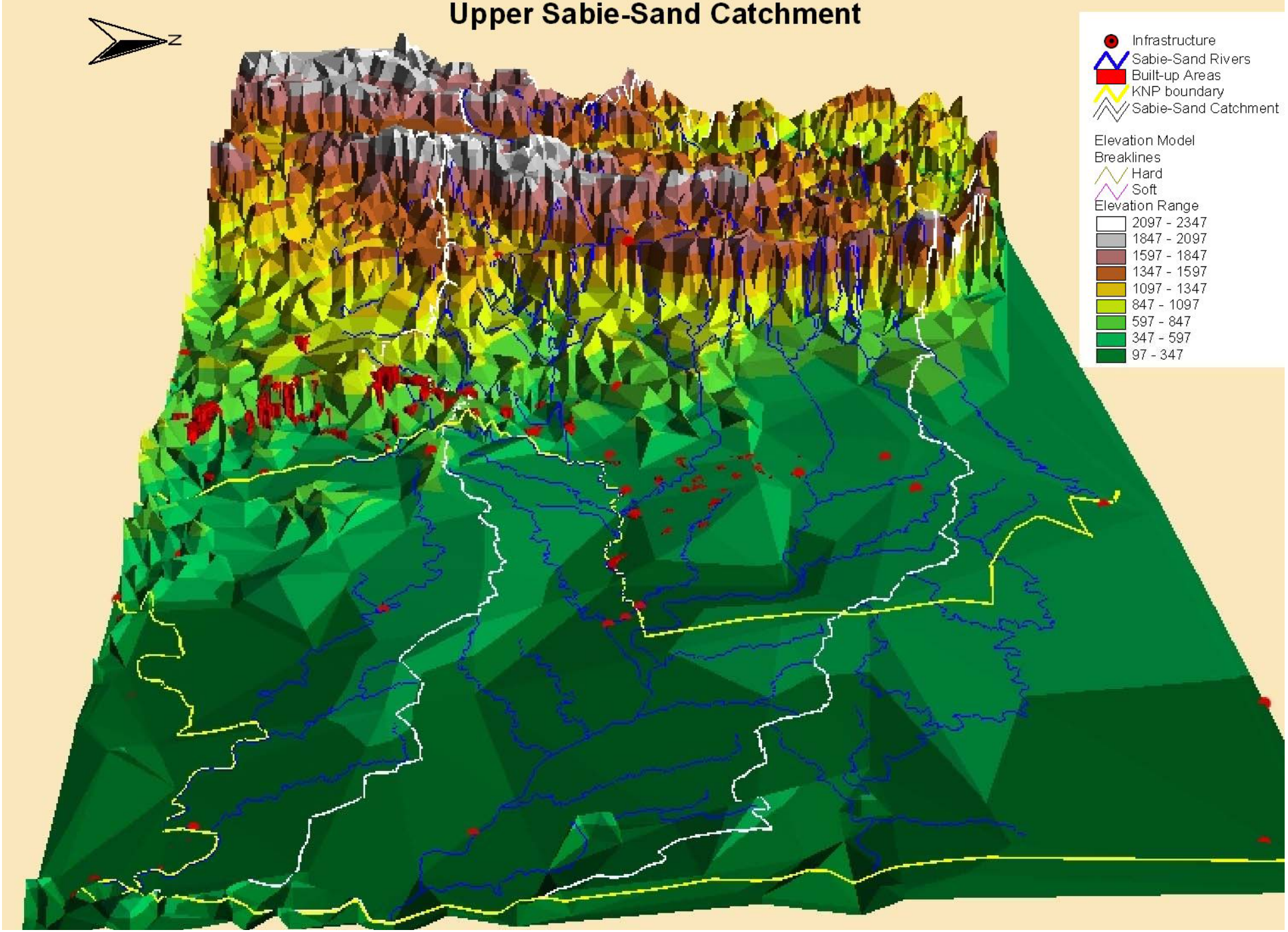
Image © 2010 DigitalGlobe
©2010 Google
Imagery Dates: Jun 14, 2004 - Jun 10, 2007
24°59'47.64" S 31°14'39.50" E elev 430 m
Eye alt 19.49 km

Key:

River length; % under protection in the KNP

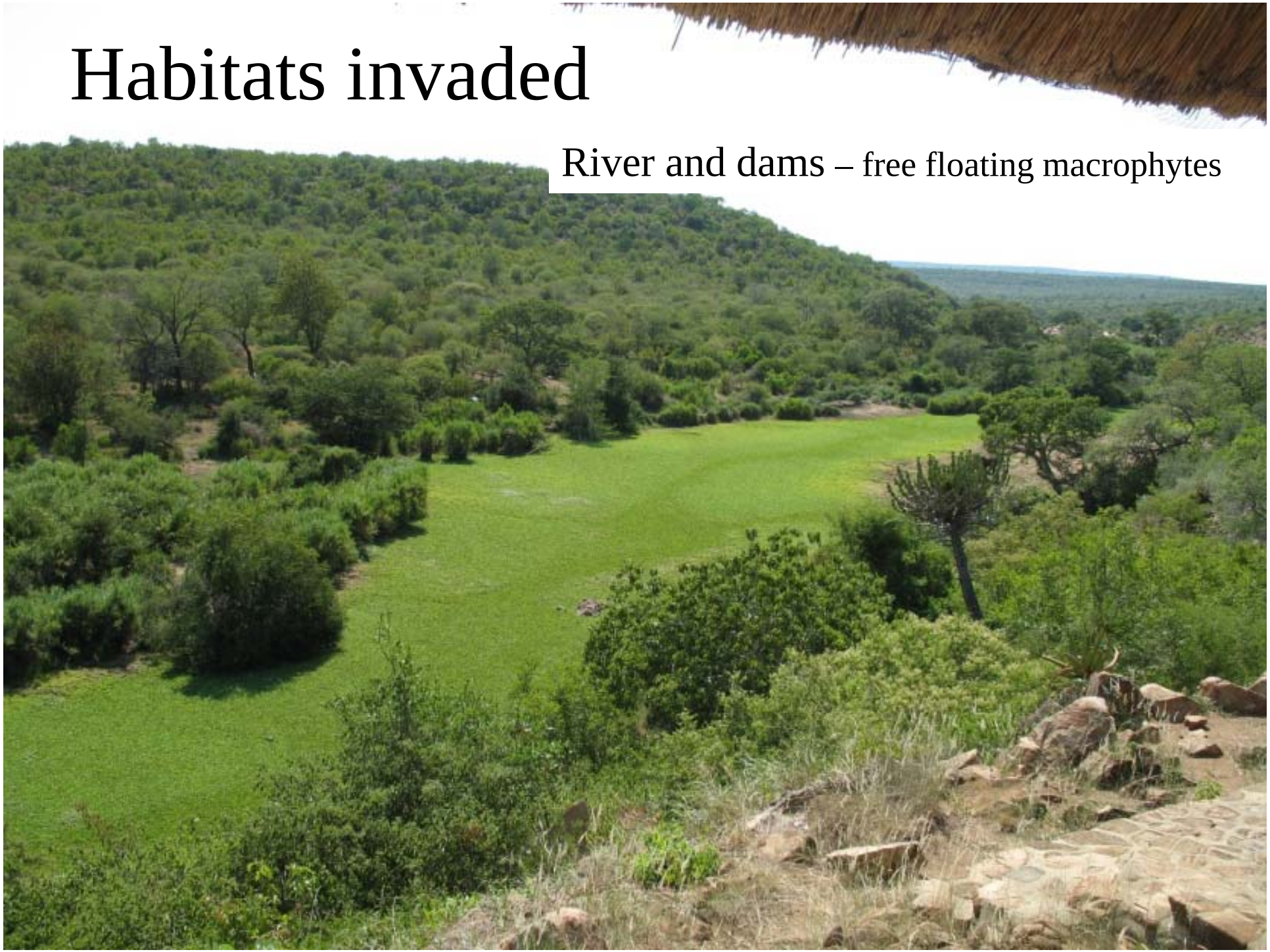


Invasive Species threats from Upper Sabie-Sand Catchment



Habitats invaded

Habitats invaded



River and dams – free floating macrophytes

Habitats invaded

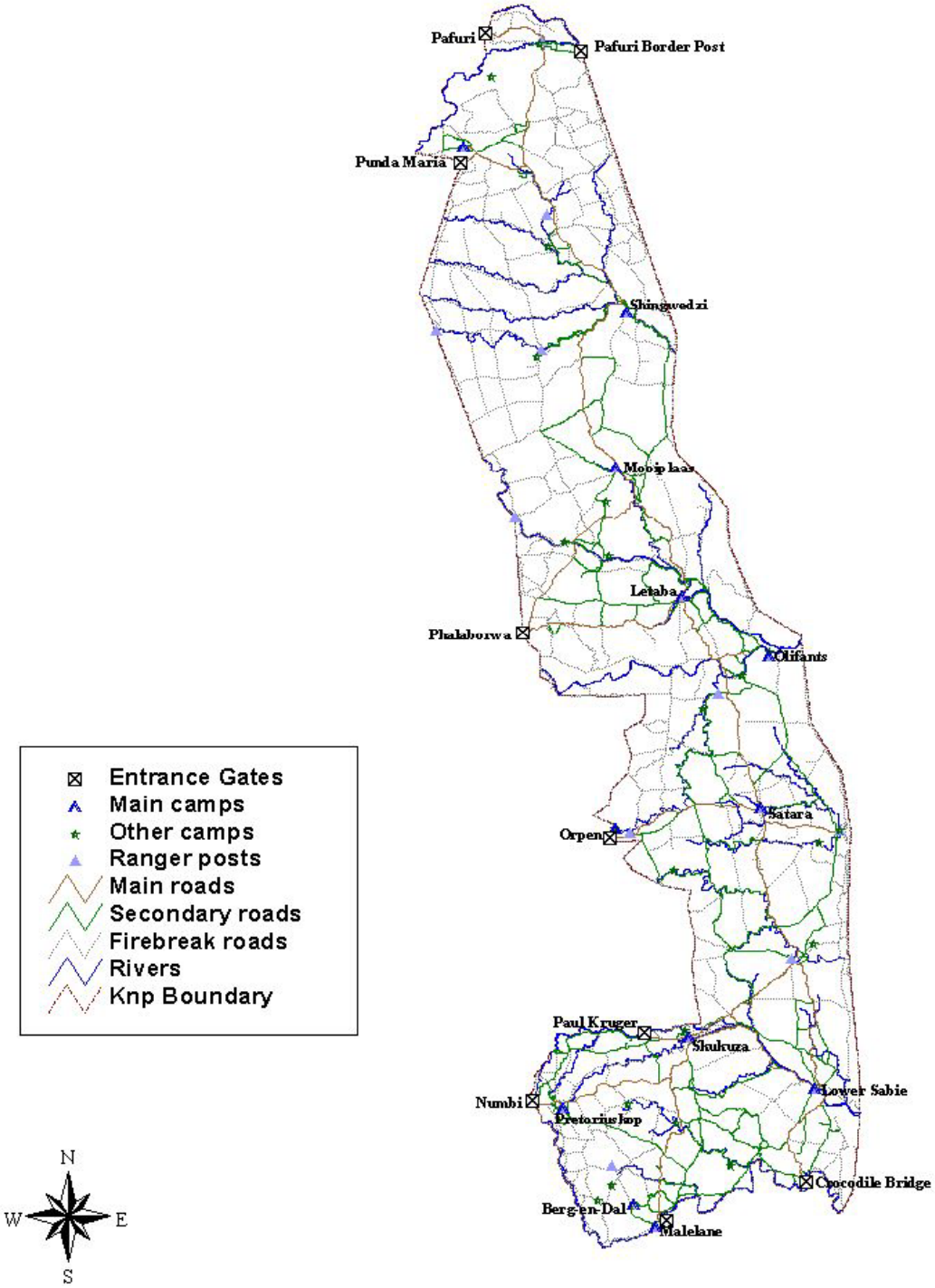
- Disturbed areas (mainly annual weeds)
- Dry river beds (mainly annual weeds)

Habitats invaded

Villages – ornamental species escaping

Role of disturbance:

- Roads
- Entrance gates
- Staff villages
- Tourist camps



Invasive alien plants in the KNP

Main concerns

Plants: (>370 ALIEN PLANTS RECORDED)

- *Opuntia stricta* (Sour prickly pear)
- *Chromolaena odorata* (Chromolaena/Triffid weed)
- *Lantana camara* (Lantana)

Mammals:

- Cats (*Felis catus*)
- Dogs (*Canis domesticus*)

Birds:

- Myna bird (*Acridotheres tristis*)

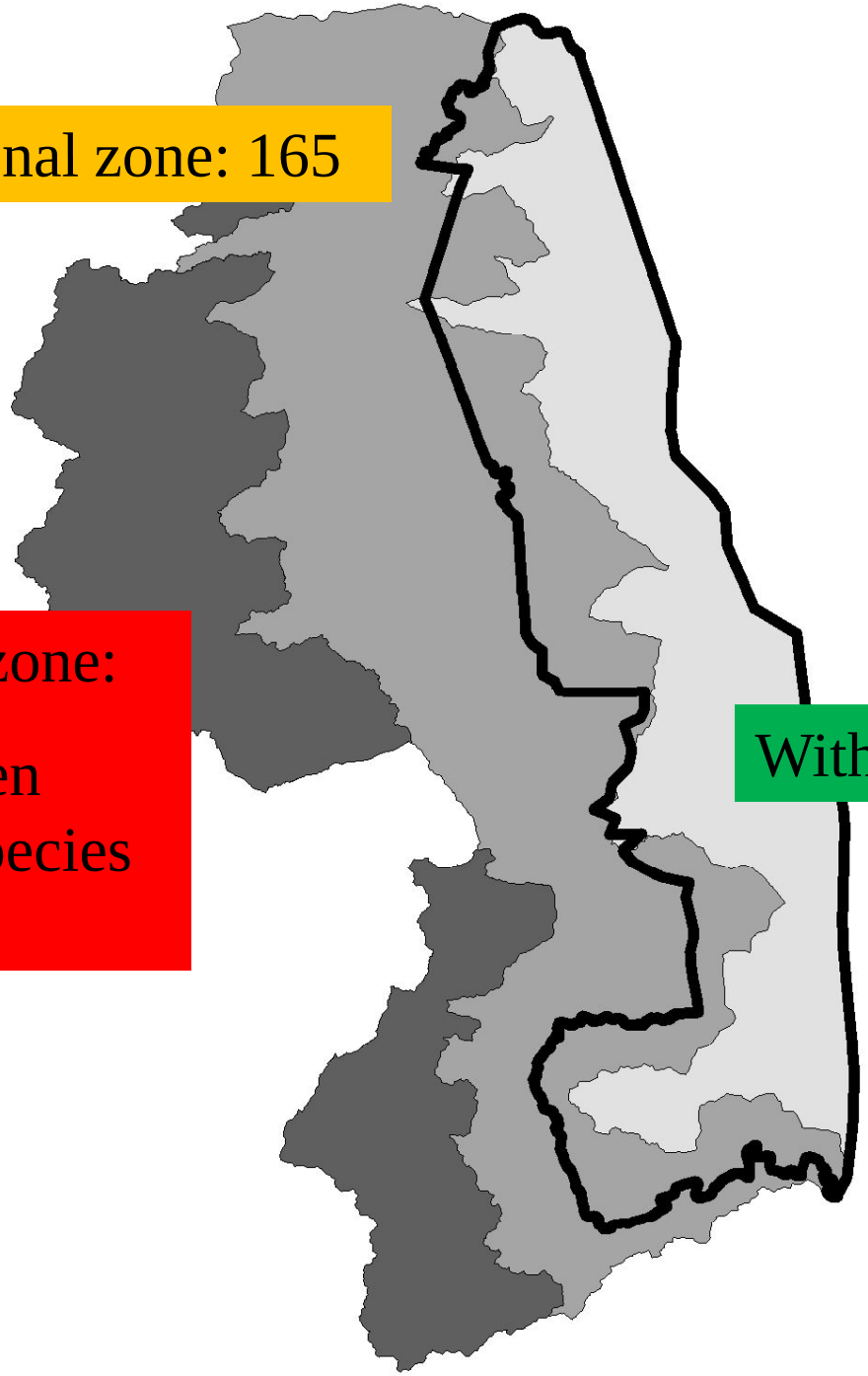
Fish:

- Carp
- Nile Tilapia

Transitional zone: 165

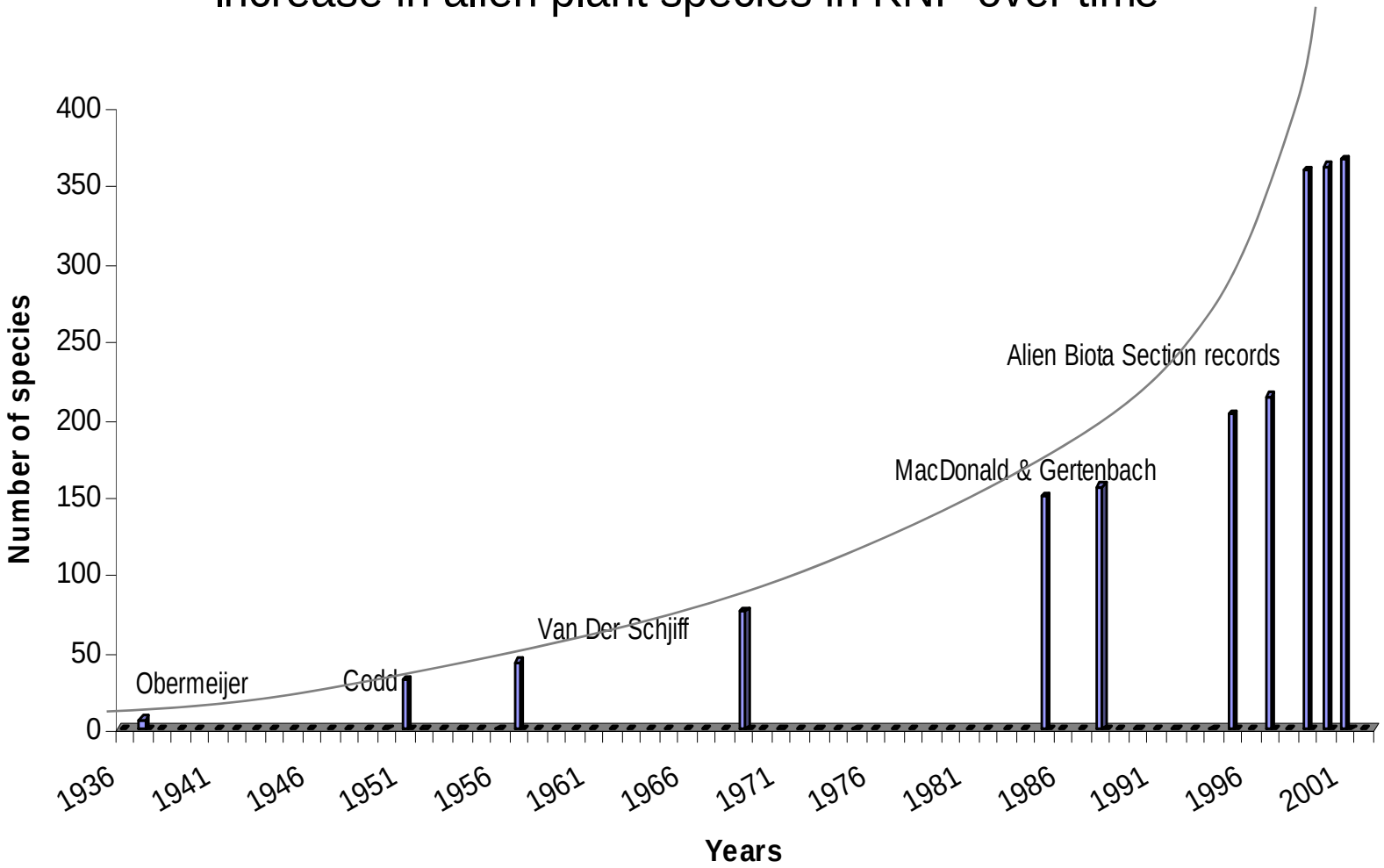
Upper zone:

191 alien plant species

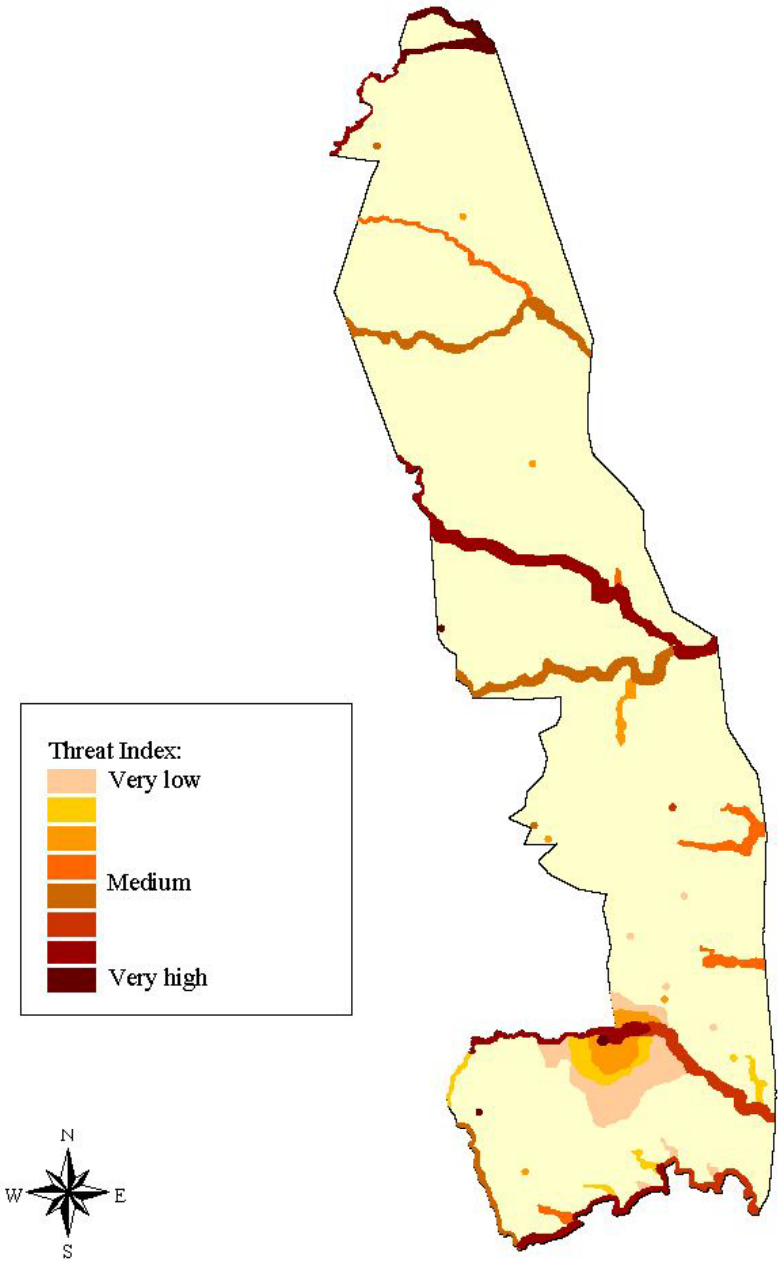


Within KNP: 97

Increase in alien plant species in KNP over time



Distribution of IAS in KNP



Invasive alien plants are regarded as one of the most important threats to biodiversity in the Kruger National Park

(1997) Management review on biodiversity Conservation in the KNP.

Globally

Invasive alien plants are regarded as one of the greatest threats to biodiversity

Alien species management objectives

Alien Impact

To anticipate, prevent entry and where feasible and/or necessary control IAS, in a effort to minimize the impact on, and maintain the integrity of indigenous biodiversity

- Strategy and support
- Prevention
- Control
- Research

Strategy and support

To develop a long-term strategy for the management of IAS, by evaluating the current and projected future overall scale of threat, addressing organisational and infrastructural capacity, developing policy and building support for continued high level commitment

- Assessment & Priority setting
- Building support
- Policy development

Prevention

To anticipate and evaluate imminent or potential risks to the KNP, as well as pathways of invasion and develop effective mechanisms to monitor, manage or mitigate these

- Identify Pathways
- Exclusion Prohibit/ discourage
- Early detection
- Risk assessment

Control

To ensure the effective and timely development and implementation of integrated control strategies, in such a manner that both rapid response and long-term maintenance goals are met

Implementation

Best management practices

Research

To promote and develop a co-ordinated research programme in order to develop a clearer understanding of the dynamics and impacts of alien species invasions

- Impacts
- Ecology
- Control methods

Current management of IAP in the KNP

- Removal of ornamental plants
- WfW clearing rivers- inside and upstream from KNP
- Biological control
- Integrated control
- Maintenance of cleared areas

Funding spent in KNP:

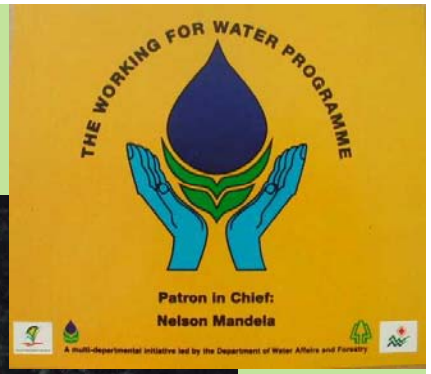
1997: R 3 million from Royal Netherlands Embassy for 3 years (R1 million/annum)
1997- end March 1998: R 6 million from Poverty Relief funding
April 1998- March 1999: R 3,3 million
April 1999- March 2000: R 1,4 million
April 2000- March 2001: R 4,5 million
April 2001- March 2002: R 3,4 million
April 2002- March 2003: R 9,2 million
April 2003- March 2004: R8.5 million
April 2004-March 2005: R6.5million
April 2005- March 2006: R7.8 million
April 2006- March 2007: R6.8 million
April 2007- March 2008: R6.0 million
April 2008- March 2009: R6.8 million
April 2009- March 2010: R7.9 million
April 2010- March 2011: R8.5 million (current year)

TOTAL: R89.6 million (~ 35.8 million CZK)

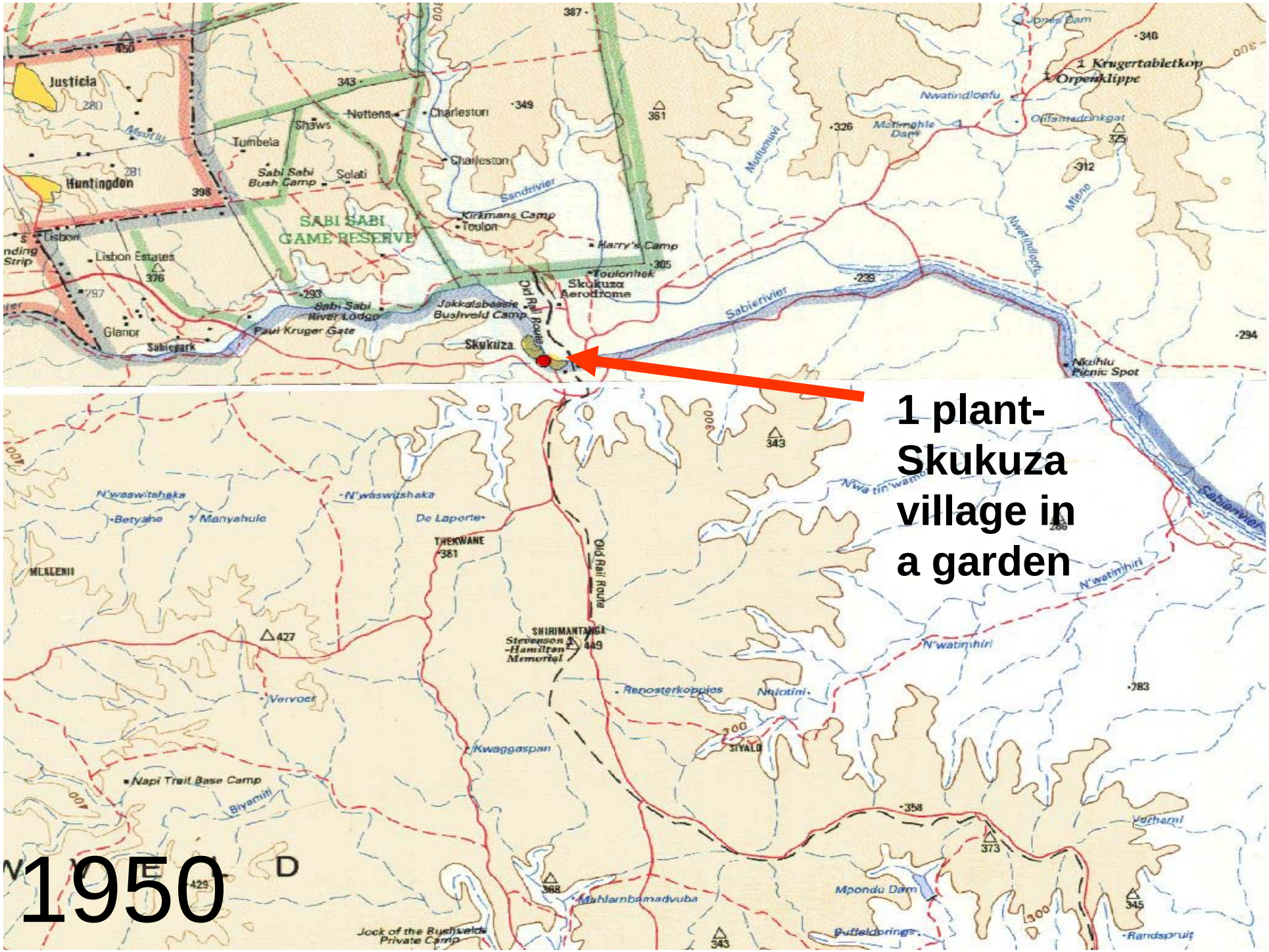
[excludes KNP own expenditure]

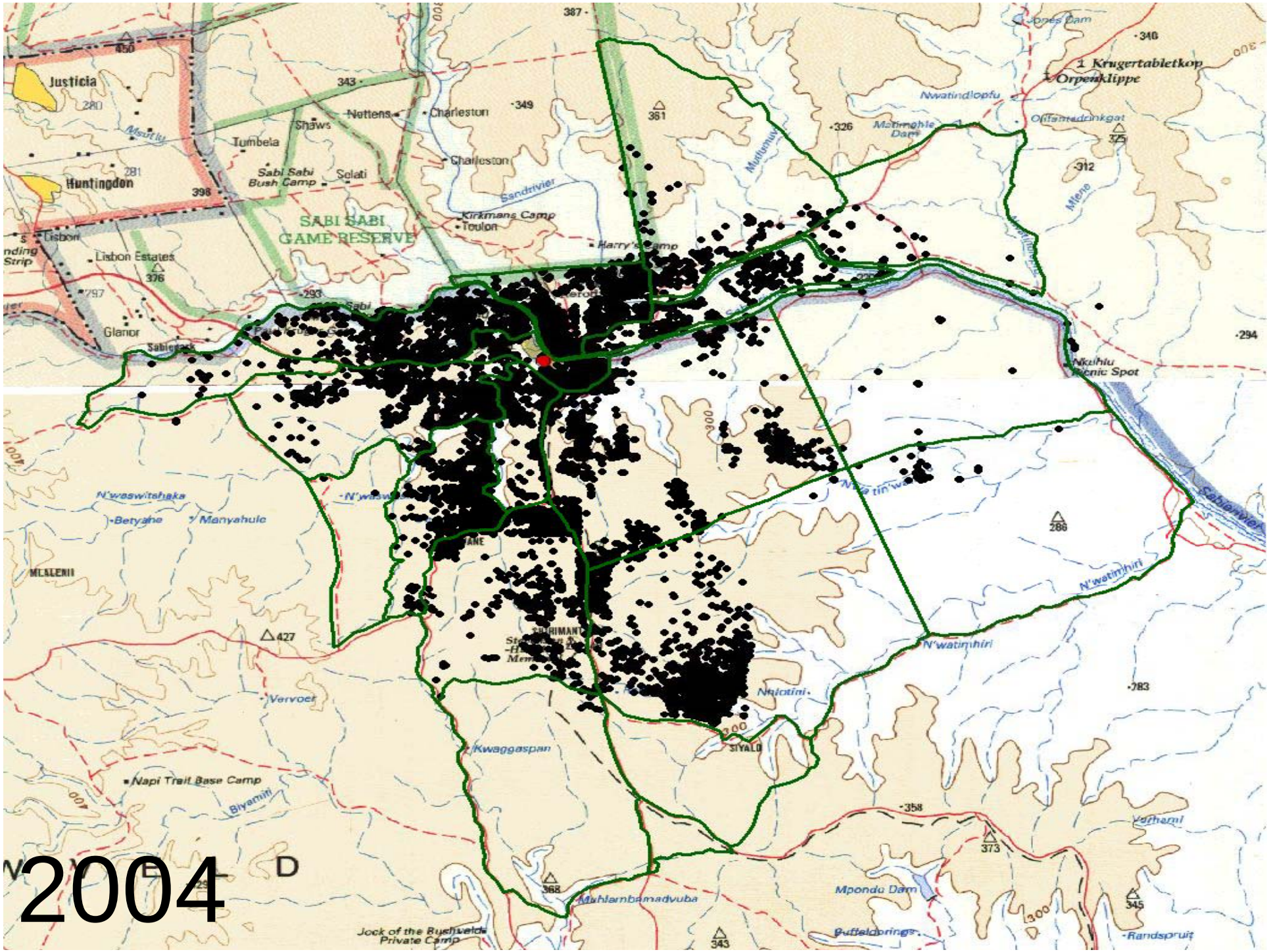
Change in area cleared and costs in varying densities of plant invasion

Working for Water



Opuntia stricta as a case study


Justicia
Huntingdon
Nettens
Charleston
Shaws
Tumbela
Sabi Sabi Bush Camp
Selati
SABI SABI GAME RESERVE
Kirkmans Camp
Toulon
Harry's Camp
Toulontiek
Skukuza Aerodrome
Lisbon
Lisbon Estates
Glanor
Sabiepark
Sabi Sabi River Lodge
Jakkalsbessie Bushveld Camp
Paul Kruger Gate
Skukuza
Old Rail Route
Sandrivier
Sabierivier
Nwatindlopfu
Mutlumuvi
Matimahle Dam
Olifantsdonkgat
1 Krugertabletkop
Orpenklippe
Nkuhlu Picnic Spot
1 plant-
Skukuza
village in
a garden
N'waswitshaka
Betyahe
Manyahulo
De Laporte
THEKWANE
MLALENI
SHIRIMANTANGA
Stevenson-Hamilton Memorial
Renosterkoppies
Nhlatini
SIYALO
Vervoet
Kwaggaspan
Napi Trail Base Camp
Biyamiti
N'watimhiri
Vathami
Mpondo Dam
Mahlambamadvuba
Buffelsbrings
Jock of the Bushveld Private Camp
Randspruit
1950


2004
Justicia
Huntingdon
Nettens
Charleston
Shaws
Tumbela
Sabi Sabi Bush Camp
Selati
SABI SABI GAME RESERVE
Kirkmans Camp
Toulon
Lisbon
Lisbon Estates
Glanor
Sandrivier
Krugertabletkop
Orpenklippe
Nwatindlopfu
Matimphe Dam
Mutlumuvi
Mlene
Nkuhlu Picnic Spot
N'waswitshaka
Betyane
Manyahule
MLALENI
N'watimhiri
Nhlotini
SIYALO
Vervoet
Kwaggaspan
Napi Trail Base Camp
Biyamiti
Vathani
Mpondo Dam
Mahlambamadvuba
Jock of the Bushveld Private Camp
Randspruit

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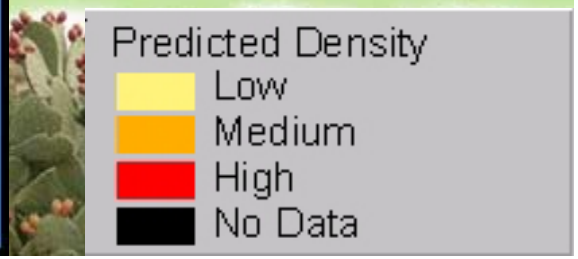
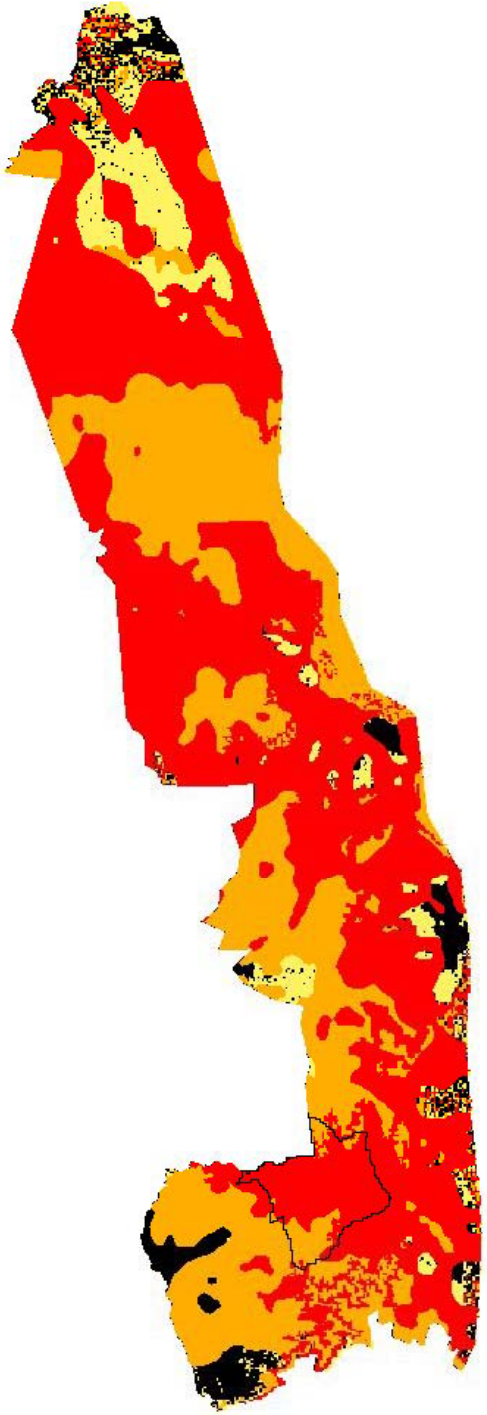
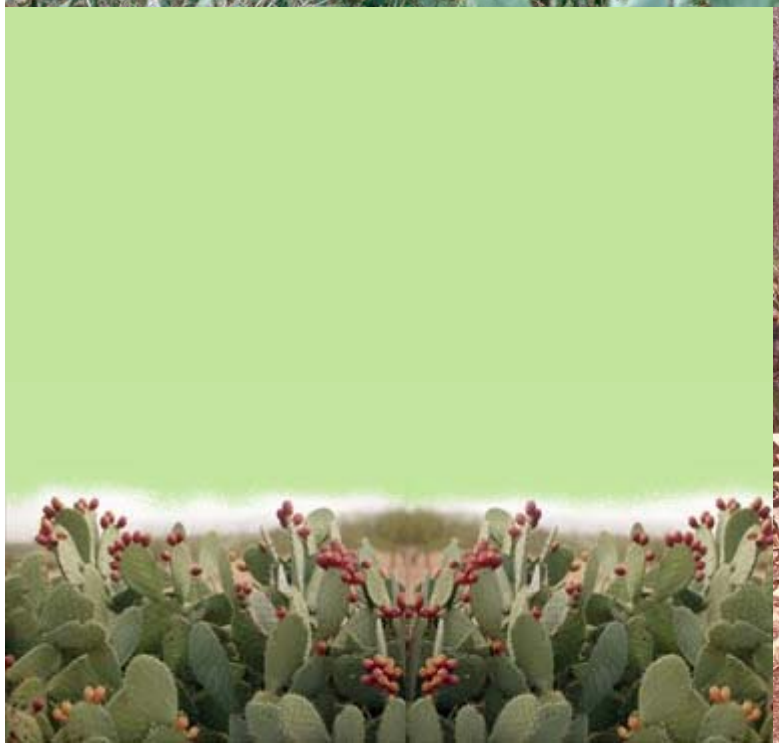

Predicted Density
Low
Medium
High
No Data

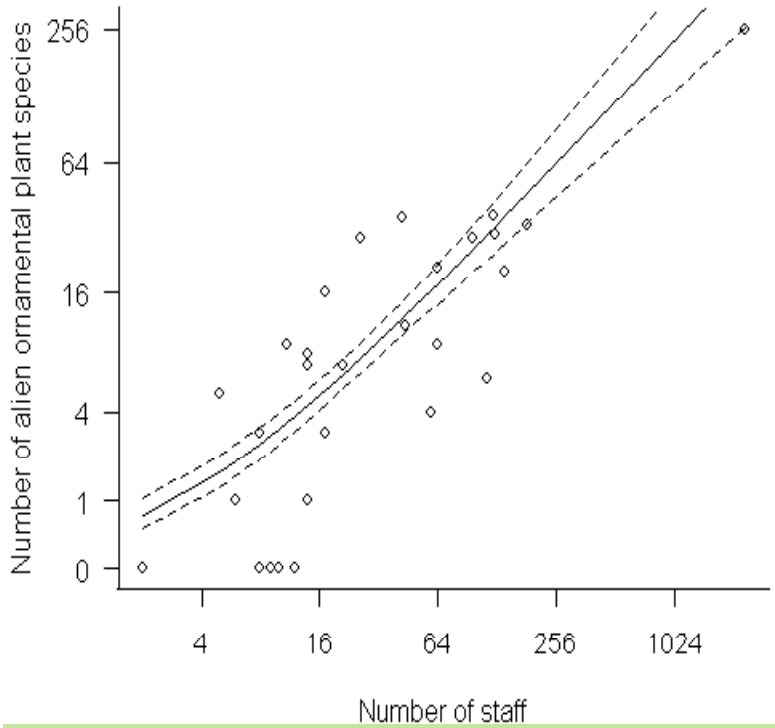


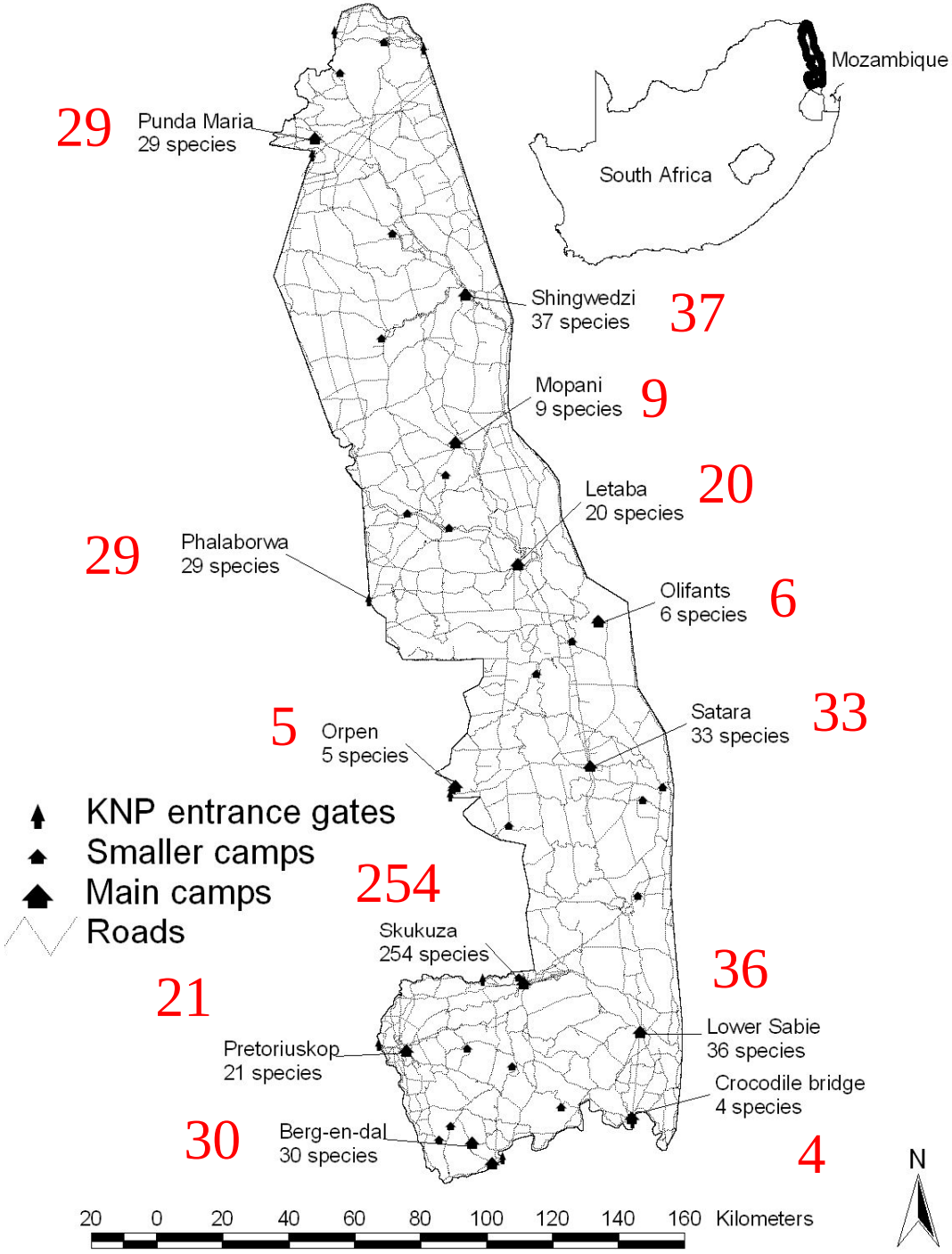
Herbicides

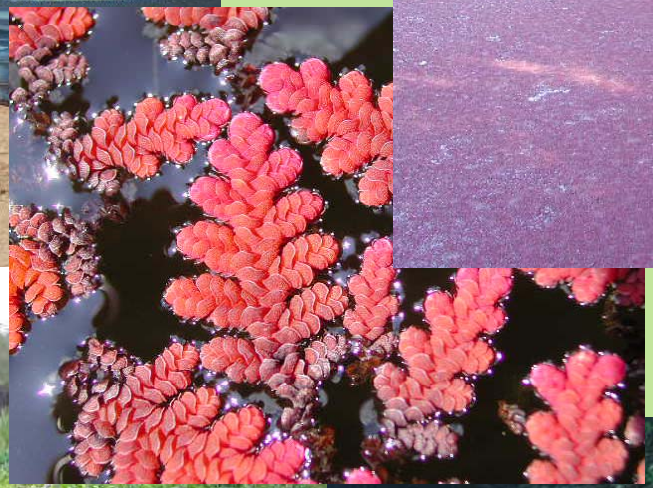


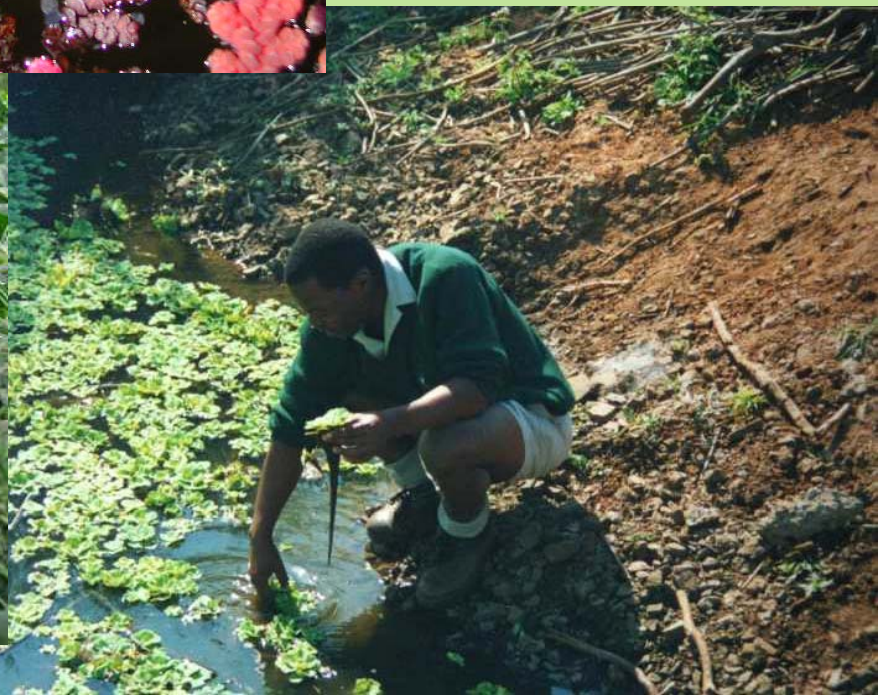
Human dimensions of plant invasions: the role of KNP staff

alien species per camp









Pistia stratiotes (water lettuce) as a case study

Pan

Time to control the weed (water lettuce) on different water bodies

Nhlangaluwe:
Dec. 1985

Nhlangaluwe:
Sept. 1986

River / Rivier

Time to control the weed (water lettuce) on different water bodies

Lower Sabie:
Sept. 1987

Lower Sabie:
Jan. 1993

Dam

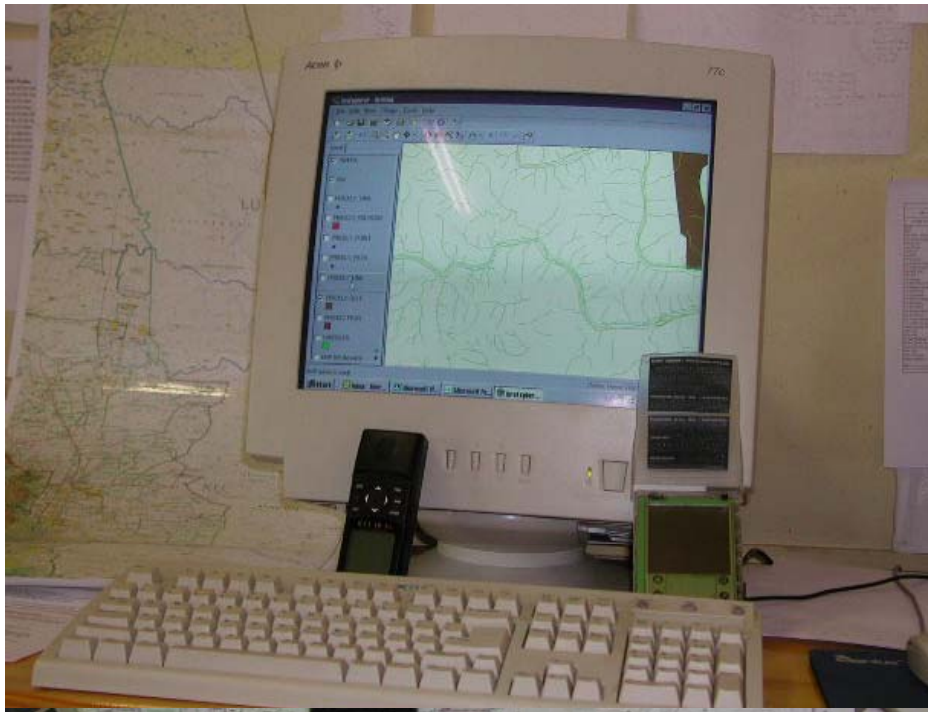
Sunset Dam:
May - June
1997-2002

Sunset Dam:
Sept.- Nov.
1997-2002

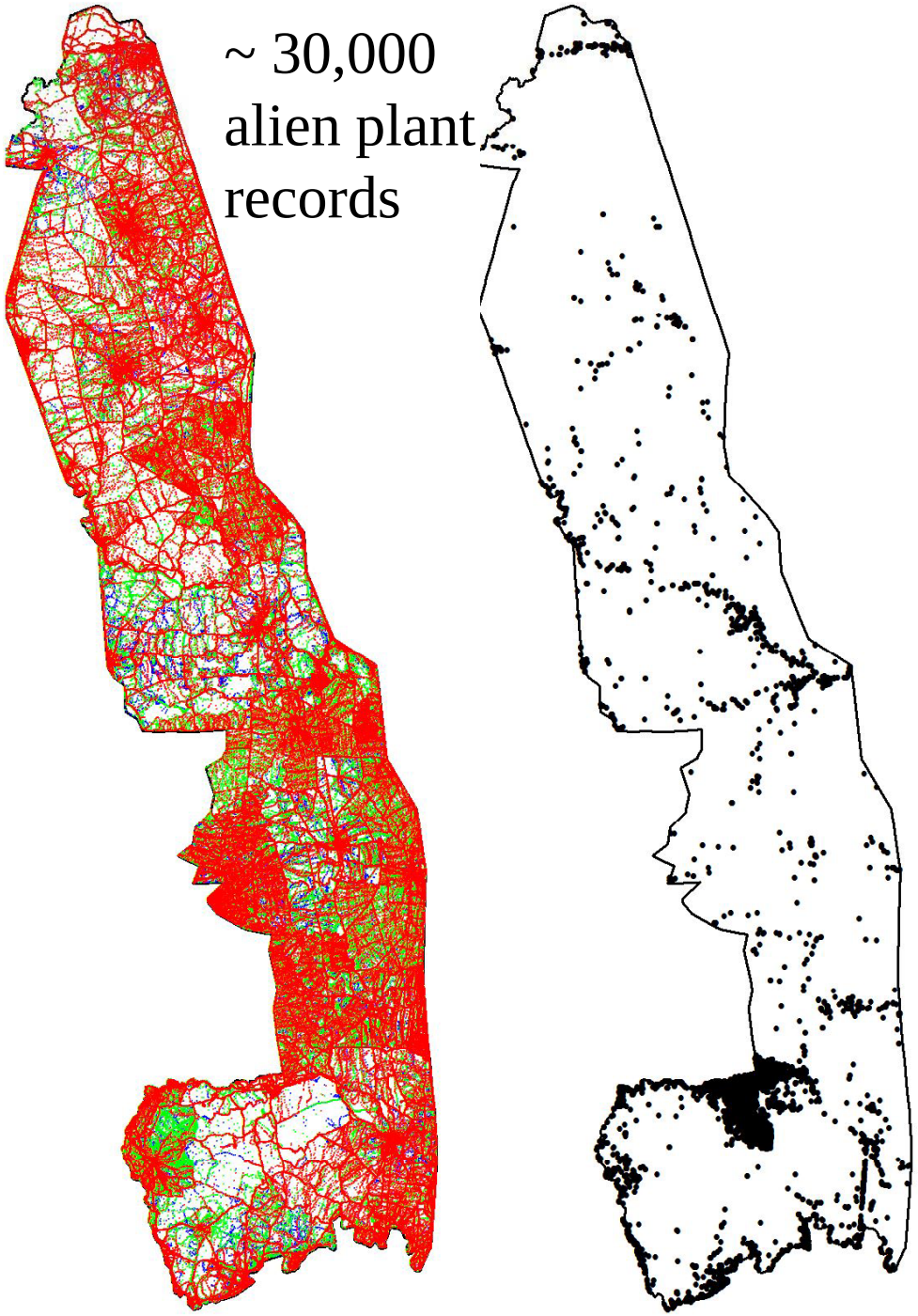
Biological control agents released to date:

15 agents: 8 fully successful; 5 limited effect; 2 no effect.

- ***Azolla filiculoides*** (Red water fern) - *Stenopelmus rufinasus*
- ***Eichhornia crassipes*** (Water hyacinth) - *Cercospora rodmanii; Eccritotarsus catarinensis; Neochetina bruchi; Neochetina eichhorniae; Niphograpta albiguttalis; Orthogalumna terebrantis*
- ***Lantana camara*** (Lantana) - *Falconia intermedia; Octotoma scabripennis*
- ***Opuntia stricta*** (Sour prickly pear) - *Dactylopius opuntiae; Cactoblastis cactorum*
- ***Pistia stratiotes*** (Water lettuce) - *Neohydronomus affinis*
- ***Salvinia molesta*** (Kariba weed) - *Cyrtobagous salviniae*
- ***Sesbania punicea*** (Red sesbania) - *Neodiplogrammus quadrivattatus; Rhyssomatus marginatus; Trachapion lativentre*



KU
NPUMALANGA
LOWVELD
KRUGER NATIONAL PARK
WHITE RIVER
JU


~ 30,000
alien plant
records

SYSTEM OVER-VIEW

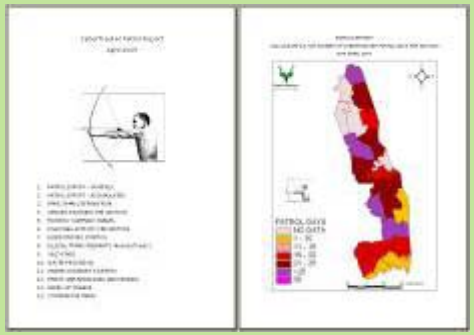
In the Field

Back in the office

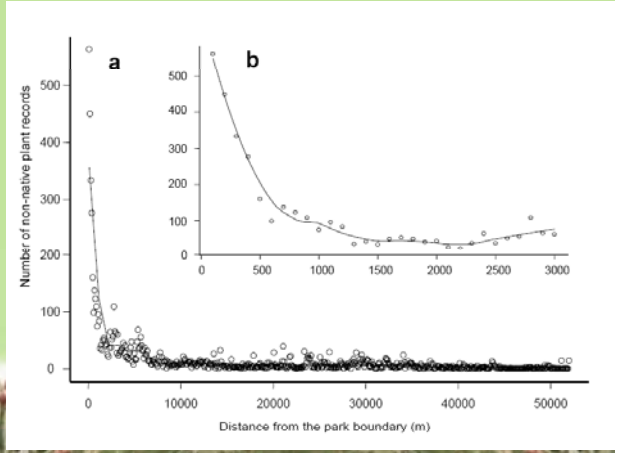
Sent to Scientific Services

Info collated – Kruger wide database

Reporting to Managers



Research & Monitoring

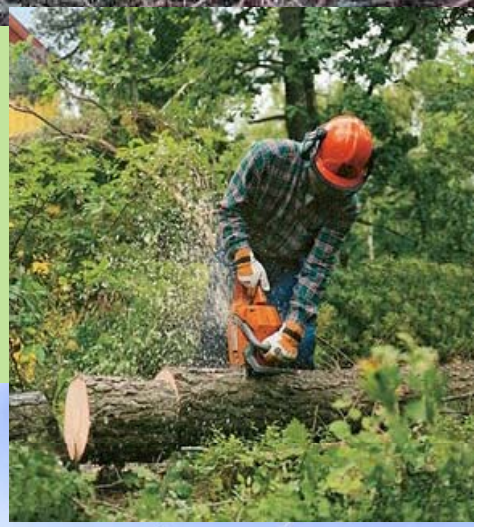


Science and management

- Vast understanding of ecology of invasions
- But still does not necessarily make the control any easier…

Constraints to management:

Expensive & simple tools available



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Acknowledgements:

Charles University- Mobility Grant

Prof Jarošík, Department of Botany, Charles University

Prof Pyšek, Academy of Science of Czech Republic