Managing elephant in large conservation areas: a wicked problem with no definitive solution

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&
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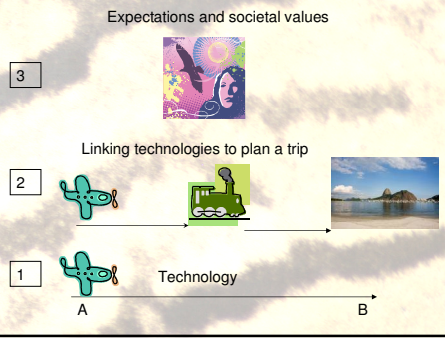
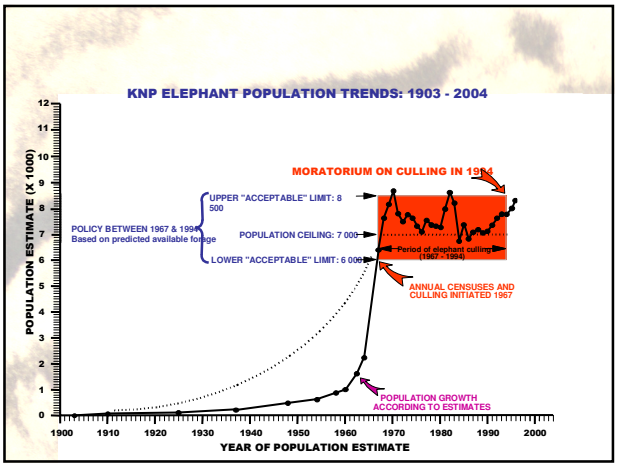
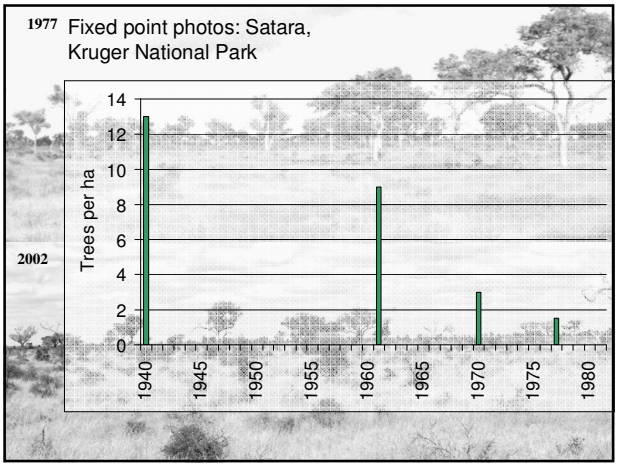
The techno-human condition by Allenby and Sarewitz 2011 .

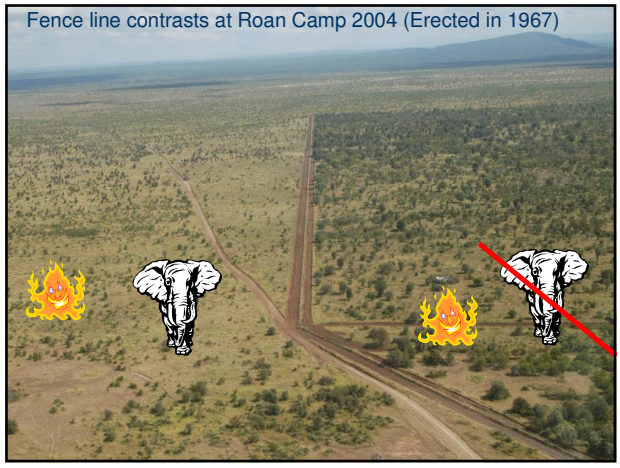


Level 1

Management according to carrying capaci
Outcomes of this management
What is the cause?



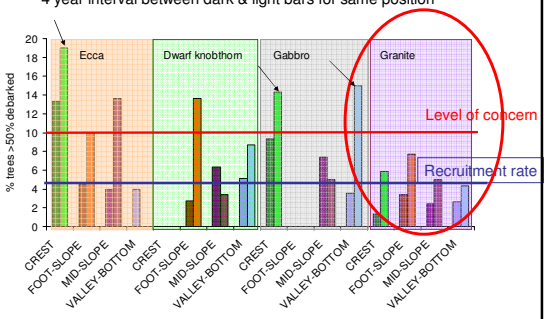




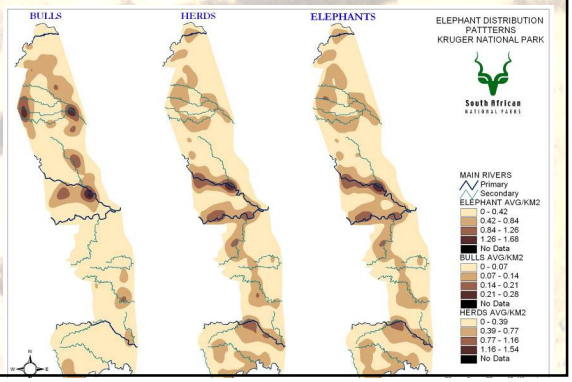
Is elephant impact the cause of the decline?

- Tag trees to represent landscapes and catenal positions

Landscapes and catenal positions
% trees >5m >50% debarked
4 year interval between dark & light bars for same position



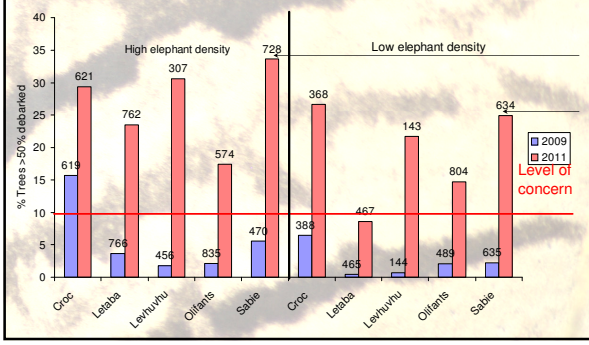
Elephant concentrate along rivers
Distribution and density of elephants from 1985-2004.



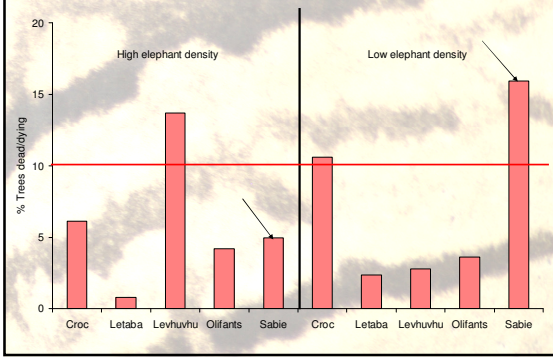
What is the impact along the perennial rivers?

- Tag large trees along main rivers

Main rivers
% trees >50% debarked
2009 & 2011

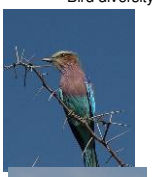


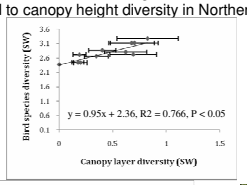
% Trees dead or dying along main rivers after 2 years

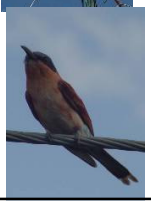


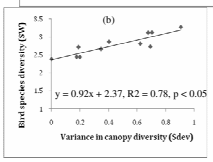
What is the effect on biodiversity?

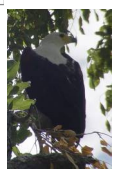
Bird diversity linked to canopy height diversity in Northern KNP







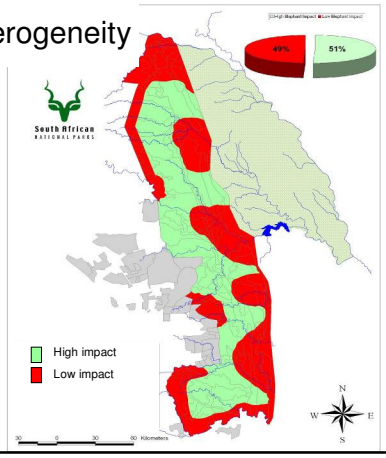




Level 2

Should we be concerned?
What can we do about the concern?
What other factors should we consider

Heterogeneity



Interventions considered by management

- Water provision
- Increased area
- Translocation
- Culling
- Contraception
- Hunting
- Fencing
- Migration corridors
- Do nothing (laissez-faire).

•Most promising to create heterogeneity: disturbance culling

Norms and standards: Population control by culling

Level 1

Culling may be used to reduce the size of elephant populations subject to certain conditions

Does not allow for disturbance culling at this stage

Level 2

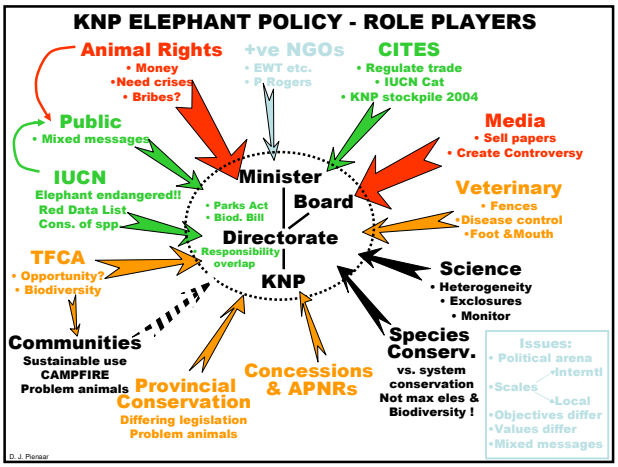
Level 3

Looking at the entire system

–Aesthetics – large trees vs ethics culling or disturbing elephant

–Ethics of contraception and tourism expectation to see small calves

–Poor communities see potential of using 'excess' elephant for food or financial returns on hunting



Conclusion

- **Level 1** Thinking has provided a lot of info, but rules at this level limit responses at **Level 2**
- We have to embrace Level 3 thinking to address the challenges in management
- No guarantees on outcomes of management actions.
- Acknowledge that these systems are "wicked" - cannot be definitively optimized.
- Shifting goalposts and surprises will forced us to adjust our decisions as new facts and facets emerge.
- Question predictions: be critical of the data used for the predictions,
  - discuss the outcomes with a wide audience before accepting.
- Ensure continual learning. Complex systems cannot be fully known - we have to adapt as we learn.

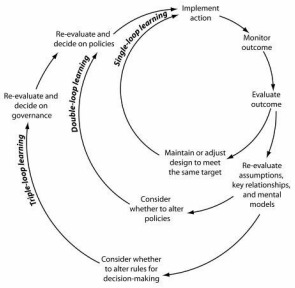


Fig. 5.1. Triple-loop learning involves the same re-evaluation of assumptions and models as double-loop learning (see Fig. 4.2) but considers whether to alter norms, institutions, and paradigms in ways that would require a fundamental change in governance (e.g., a shift from an agricultural systems focused on supporting farmers to a tourist-based economy requiring a broader, more inclusive from of governance).