CARBON & BIODIVERSITY MONITORING BASELINES ON DEGRADED SUBTROPICAL THICKET LANDS:

Overview of project progress & lessons in EC

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Parties involved:

- Department of Environmental Affairs (DEA)
- Working for Land
- SANParks
- East Cape Parks & Tourism Agency
- East Cape Restoration Programme (ECRP)
- Subtropical Thicket Restoration Programme (STRP)
- R3G
- Gamtoos Irrigation Board (GIB)
- Rhodes Restoration Research Group (RRRG)
- C4EcoSolutions

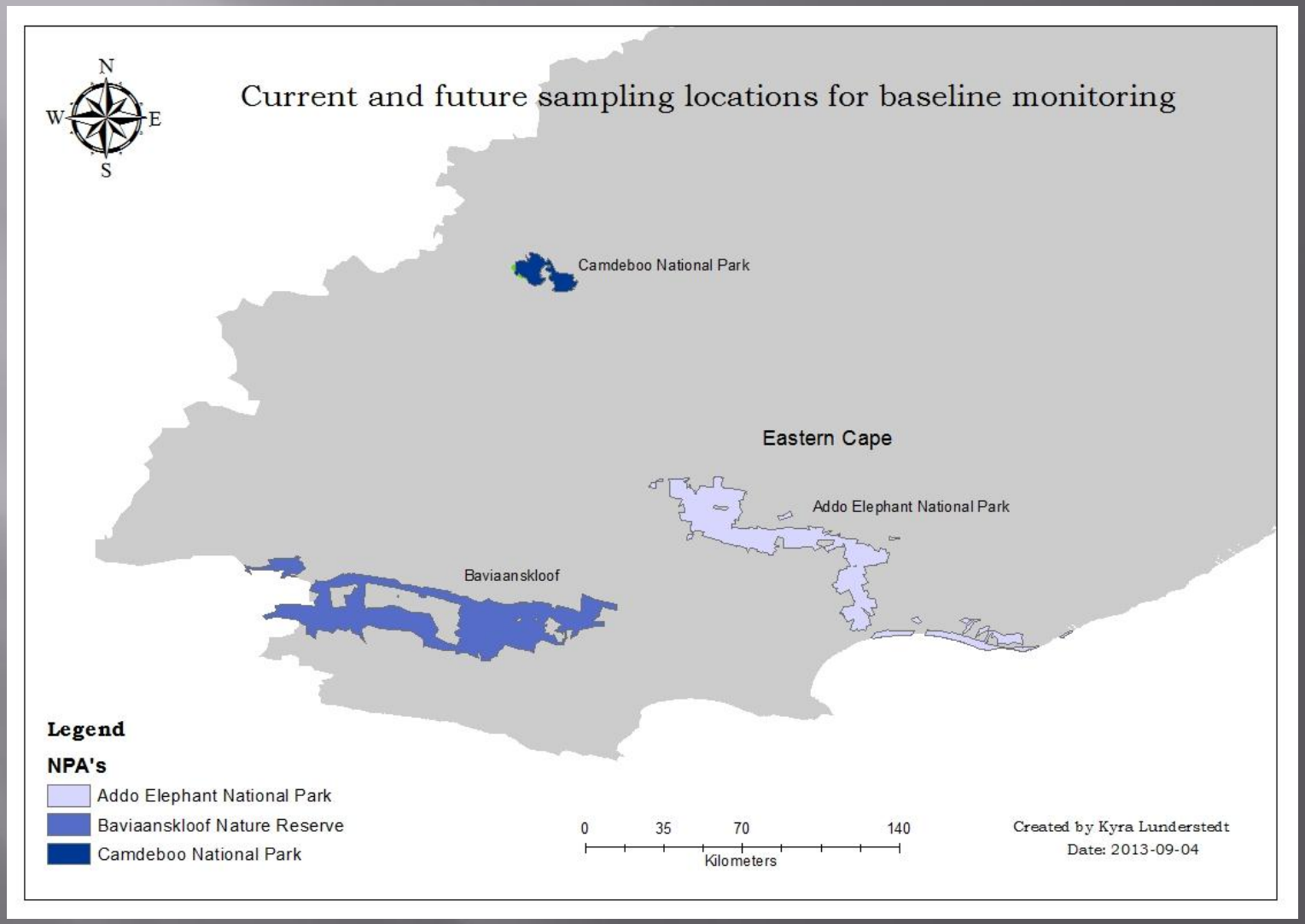
Contents

- Project Background
- Methodology
- Areas monitored
- Preliminary results
- Learning & challenges

Brief Project Background

- Working for Land programme & STRP
- Aims: Restoration of degraded thicket by planting Spekboom (*P.afra*)
- Potential for carbon/biodiversity credits - 2004
- Research on carbon stocks in thicket
  - A.Mills & R.Cowling 2005, M.Powell 2009 Msc, M. van der Vyver 2011 etc.…
- Current carbon and biodiversity monitoring started 2011

Project areas




Legend
Plots
AENP Borders
Vlok 2010
DESCRIPTION
Dam
Doringveld
Noorsveld
Pentziaveld
Spekboom thicket
Spekboomveld
A1_1
A1_2
A1_3
A1_4
A1_5
A1_6
A1_7
A1_8
A1_9
A1_10
A1_11
A1_12
A1_13
A1_14
A1_15
A1_16
A1_17
A1_18
A1_19
A1_20
A1_21
A1_22
A1_23
A1_24
A1_25
A1_26
A1_27
A1_28
A1_29
A1_30
0
1.25
2.5
5 Kilometers

Methodology

- Project Document (PD) submitted to Verified Carbon Standard (VCS)
- Planting areas are allocated
- Field sampling
- Processing and analysing of samples
- Analysing data for C stocks
- Follow up monitoring (5yrs)
- Project duration 60 yrs.

Methodology

GPS plot

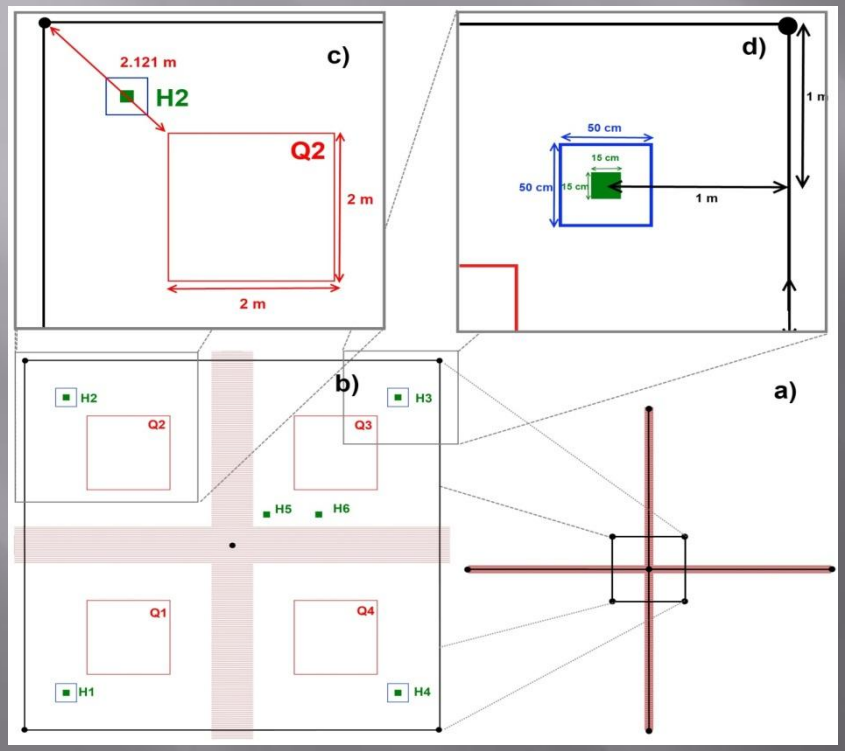
Fixed point photos

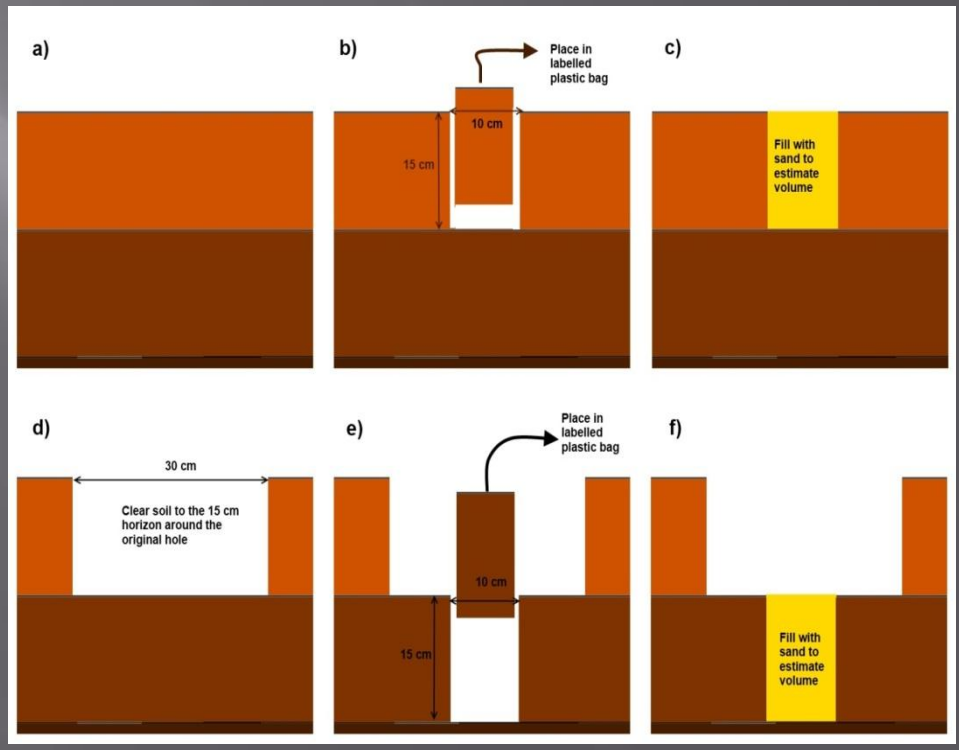
Carbon sampling

- Above ground biomass
  - Ground litter
  - Spekboom (*P.afra*) biomass
  - Noors *(E.coerulescens)* **biomass**

- Below ground carbon
  - Soil C & roots
  - Bulk density

Plot dimensions and soil sampling





VCS PD: Standard Operating Procedures, 2010 www.c4es.co.za

Soil sampling and processing

Methodology

Biodiversity

- 50M Belt transects
  - woody species cover
- 2x2m Quadrants
  - plant species % cover

Areas Monitored

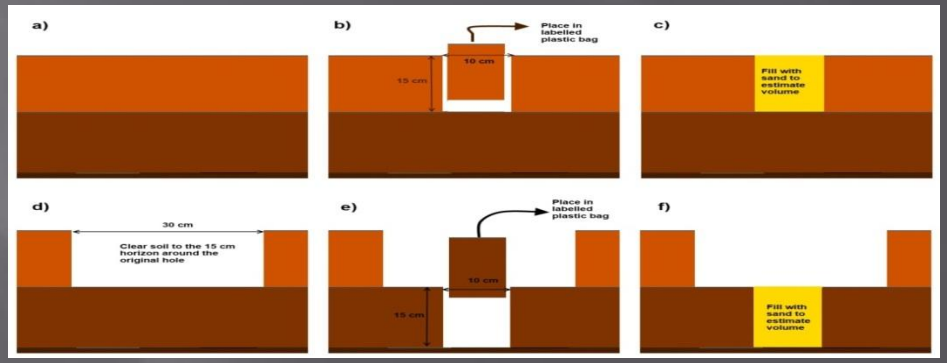
Site	Number of plots	Restoration size (ha)
Addo Darlington	30	± 23 000*
Addo Main Camp	20	
Addo Kaboega	30	
Western Baviaanskloof	29	± 7000 *
Total	109	

- Areas still to be monitored:
  - Private lands through land incentives scheme
  - Camdeboo National Park

*VCS PD: C4EcoSolutions 2010 www.c4es.co.za

Preliminary results: Addo Darlington vs Baviaanskloof

	Addo Darlington	Baviaanskloof	*Baviaanskloof: degraded lands under canopy
n	30	29	48
Mean hole depth (cm)	23 ± 8	24 ± 9	3 -10cm
Root vol . %	0.08	0.11	low
Gravel vol. %	27	30	27
Soil bulk density (g/cm³)	1.3	1.0	1.0
Mean Soil Carbon (g/kg)	8 ± 3	19 ± 8	17 ± 8



*Mills & Cowling 2010

Preliminary results: Addo Darlington vs Baviaanskloof

	Addo Darlington	Baviaanskloof	*Baviaanskloof: degraded lands under canopy
Soil Carbon stocks t C ha $^{-1}$	**29.7 ± 13 ****	?	**25 ± 2**
Intact thicket Soil Carbon Stocks t C ha $^{-1}$	?	?	**52 ± 5**

*Mills & Cowling 2010
**C4EcoSolutions unpublished www.c4es.co.za

Lessons & challenges: the way forward

- **Further develop local methodology**
  - Reduce variability
  - Stratification
  - Follow up monitoring
- **Mapping resolution**
- **Further research**
  - Allometry on thicket species
  - Remote sensing of thicket

Lessons & challenges: costs

- Need to reduce costs
- Monitoring costs: R5000 - R20 000 per plot
- Rough terrain increases costs

Lessons & challenges: Private land interest

- Future expansion – private and other lands
- Private land owner interest
- Certainty on credit returns – price variability and sequestration. Carbon tax?