Australian Government

Stipa
Native Grasses Association Inc.

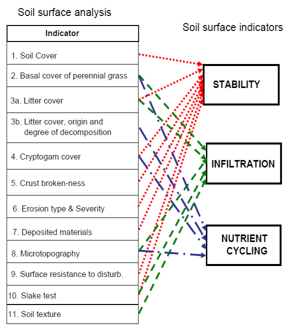
Grass Matters

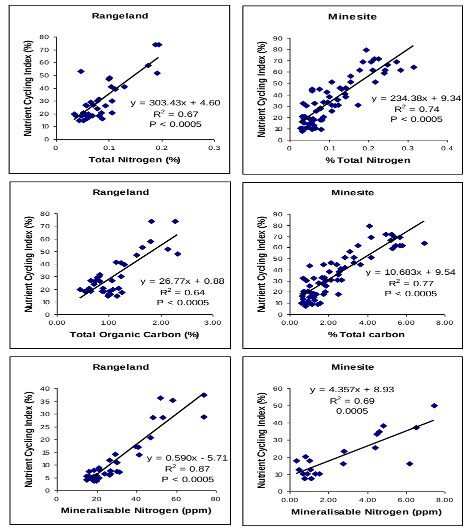
This Action on the Ground field day and research results is supported by funding from the Australian Government.

THE UNIVERSITY OF SYDNEY

Agenda: Grass Matters

9.50	Welcome and Introductions Annabel	10 min
10.00	Project design, monitoring results and future work - Graeme	60 min
11.00	Lessons learned and on farm results - Col	60 min
12.00	Questions and discussion	30 min
1.00	Field Walk – Monitoring and corrective action training	90 min
2.30	Finish	





David Tongway http://members.iinet.net.au/~lfa_procedures/

LFA produces numbers that reflect soil health.

Stability = 69.1
Infiltration = 39.8
Nutrient cycling = 31.7

Stability = 43.3
Infiltration = 24.0
Nutrient cycling = 11.5

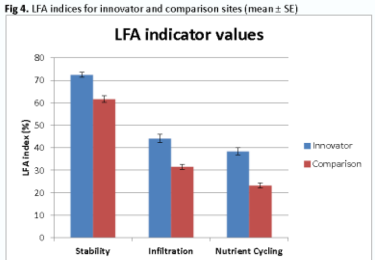
Sydney University Communities in Landscapes project

Benchmark Study of Innovators
Final Report November 2011
By Peter Ampt & Sarah Doornbos

Table 4. Differences in LFA indicator values between innovator and comparison sites (mean ± SE) and the p-values for paired t-tests.

LFA indicator	Innovator	Comparison	Difference	p-value	% increase
Stability	72.4 ± 1.0	61.6 ± 1.5	10.8 ± 1.1	<0.001	17.5
Water Infiltration	44.0 ± 1.9	31.5 ± 1.2	12.5 ± 1.0	<0.001	40
Nutrient Cycling	38.4 ± 1.6	23.2 ± 1.1	15.2 ± 0.9	<0.001	65

Fig 4. LFA indices for innovator and comparison sites (mean ± SE)



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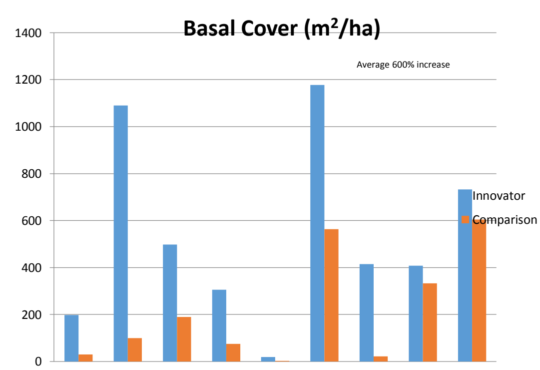

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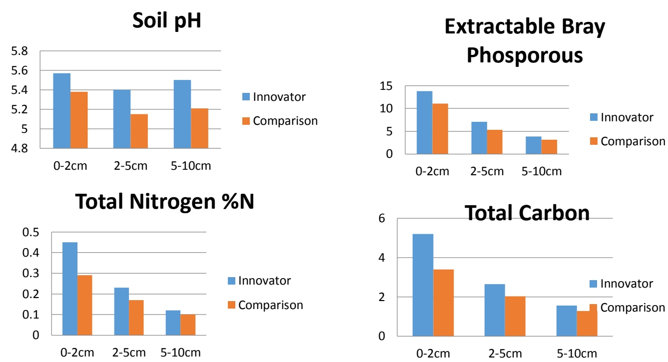

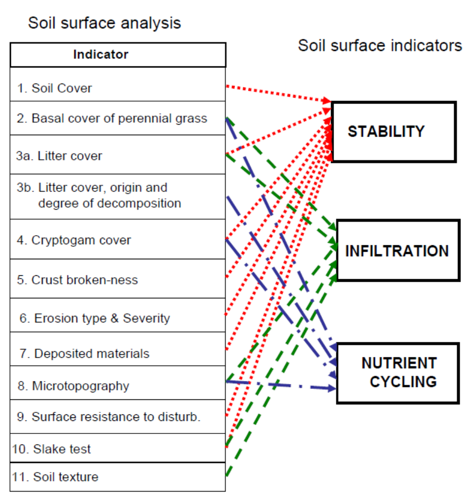

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Landscape goal

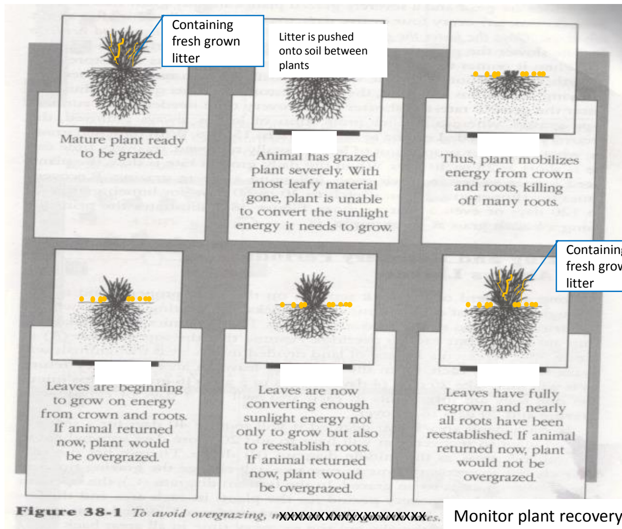
- Dense perennial grassland with high landscape function and biodiversity
- Deep, stable litter layer with visible fungal attack (LFA litter class >6lm)
- Increasing mature perennial grass plants (large bases)
- More than 30 perennial grass species with healthy age structure

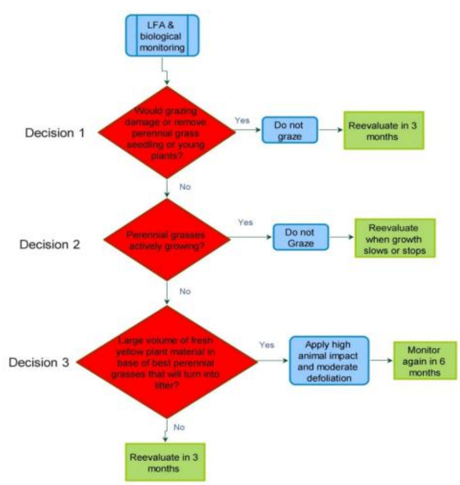
Features	Max score	Rep1
Soil Cover	5	5
Per. basal / canopy cover	4	4
Litter cover, orig & incorp.	10	6lm
Cryptogam cover	4	0
Crust broken-ness	4	0
Erosion type & severity	4	4
Deposited materials	4	4
Soil surface roughness	5	3
Surface resist. to disturb.	5	5
Slake test	4	3
Texture	4	3

Stability:-	84.4
Infiltration:-	60.6
Nutrient Cycling:-	56.3

Clear Definition of Perennial Grass Recovery

- When it looks like an ungrazed plant & contains fresh yellow litter
- Depends on soil moisture, air temperature, aspect etc. which means we need to monitor


Containing fresh grown litter
Litter is pushed onto soil between plants
Mature plant ready to be grazed.
Animal has grazed plant severely. With most leafy material gone, plant is unable to convert the sunlight energy it needs to grow.
Thus, plant mobilizes energy from crown and roots, killing off many roots.
Containing fresh grown litter
Leaves are beginning to grow on energy from crown and roots. If animal returned now, plant would be overgrazed.
Leaves are now converting enough sunlight energy not only to grow but also to reestablish roots. If animal returned now, plant would be overgrazed.
Leaves have fully regrown and nearly all roots have been reestablished. If animal returned now, plant would not be overgrazed.
Figure 38-1 To avoid overgrazing, xxxxxxxxxxxxxxxxxxx Monitor plant recovery


LFA & biological monitoring
Decision 1
Would grazing damage or remove perennial grass seedling or young plants?
Yes
Do not graze
Reevaluate in 3 months
No
Decision 2
Perennial grasses actively growing?
Yes
Do not Graze
Reevaluate when growth slows or stops
No
Decision 3
Large volume of fresh yellow plant material in base of best perennial grasses that will turn into litter?
Yes
Apply high animal impact and moderate defoliation
Monitor again in 6 months
No
Reevaluate in 3 months

Large increases in dry matter and soil organic matter

Mumblebone Treatment

Mulloon

Treatment

Control

Wilmond Park

Treatment

Control

Coroona

Treatment

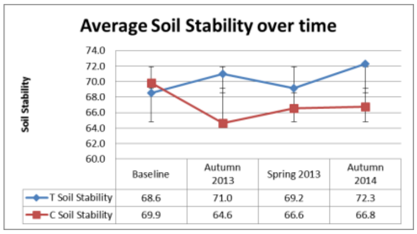
Control

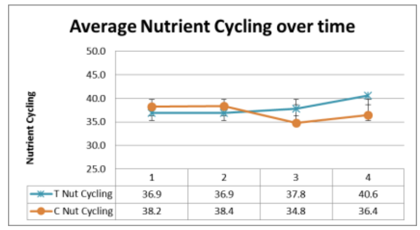
Inverary

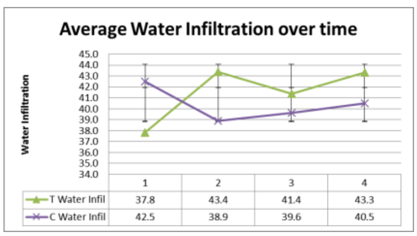
Treatment

Control

Combined LFA Results



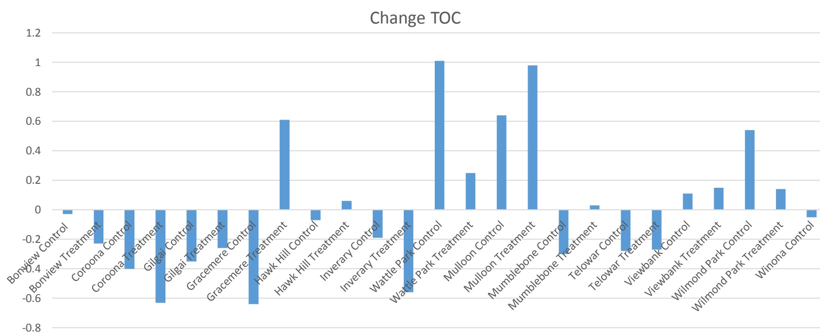




Wilmond Park

Increase over all sites

Slightly more by number decreased



Stocking

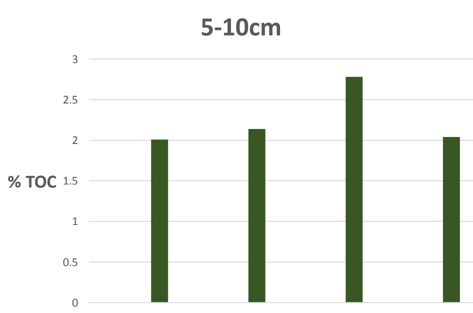
- 1 DSE/acre ~ 2.5 DSE/ha district average
- Lets say 1 DSE eats 1kg DM/day
- 2.5 x 365 = 912 kgDM/an
- Site grazed with 700 dry ewes for 4 hours
- 3 grazing's (this Friday)
- This equates to ~ 3.2 DSE/ha or 1.3 DSE/acre

- (Dry seasons and focus on carbon)

Australian soil carbon stocks: a summary of the SCaRP program results

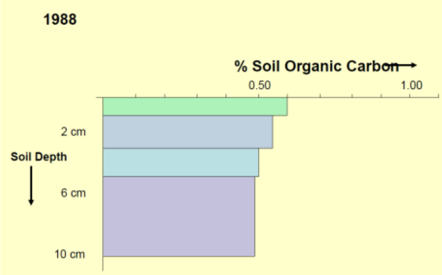
Victoria	Hamilton Long-term Phosphorus Experiment,	No differences were detected due to phosphorus application or stocking rates.
	Ararat grazing management trial	No differences were detected between continuous grazing (63), optimised deferred grazing (50) and timed grazing (61).
	LR1 cropping trial near Horsham	Soil organic C stocks were greater in the Pea-wheat-barley (30) and Pea-wheat-oats (27) rotations than in the others (Fallow-wheat-oats(22), Fallow-wheat-oats-pasture(22), Fallow-wheat-pasture(25), Wheat(24), Wheat-fallow(23)).
	SCRIME trial near Horsham	No differences were detected between applied stubble management and tillage treatments (range of soil OC stocks was 22.4-25.8).
	MC14 trial near Walpeup,	No differences were detected between rotation and tillage treatments (range of soil OC stocks was 17.0-22.2).
	Wimmera Recharge trials (Antwerp and Boolite)	Antwerp – lucerne (28.4), tagasaste (28.0) and salt bush (28.9) > chemical fallow (22.4). Boolite – native grass (35.5), tagasaste (31.5) and salt bush (32.2) > chemical fallow (24.5).

Control higher than treatment



David Tongway Brush packs

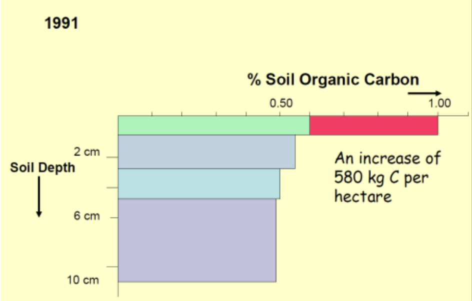
An experiment in restoration: before; bare, crusted, low *OC* soil, erosion, and high water runoff maintained by persistent, set-stock grazing by sheep and kangaroos.



A truncated soil OC profile prior to treatment application.

David Tongway Brush packs

The restoration treatment was simply to build **brush-packs** across the contour to trap water, soil and plant litter, slowing overland outflow. Also preventing grazing down to ~ 1 cm



Soil *OC* accession in 3 years

David Tongway Brush packs

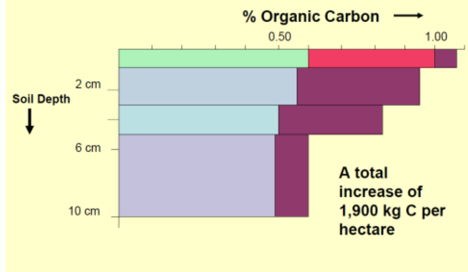
Vegetation response after 10 years, confirmed the concepts (i) regulating the overland flow of resources and

(ii) Maintaining a high above-ground grass biomass enabled **high soil productivity** to be achieved whilst

(iii) maintaining wool production and sequestering soil *C*.

Note: no improvement in untreated plots

1998. Soil *OC* accession has extended to lower soil layers, partly by root decomposition and partly by bioturbation



Repeating pattern in subsoil


07.05.2015

Future Work

- Subsoil mapping?
- US experience
- Follow sites over time
- Other?

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