CALLANZ webinar: Biodiverse Carbon Plantings in SWWA

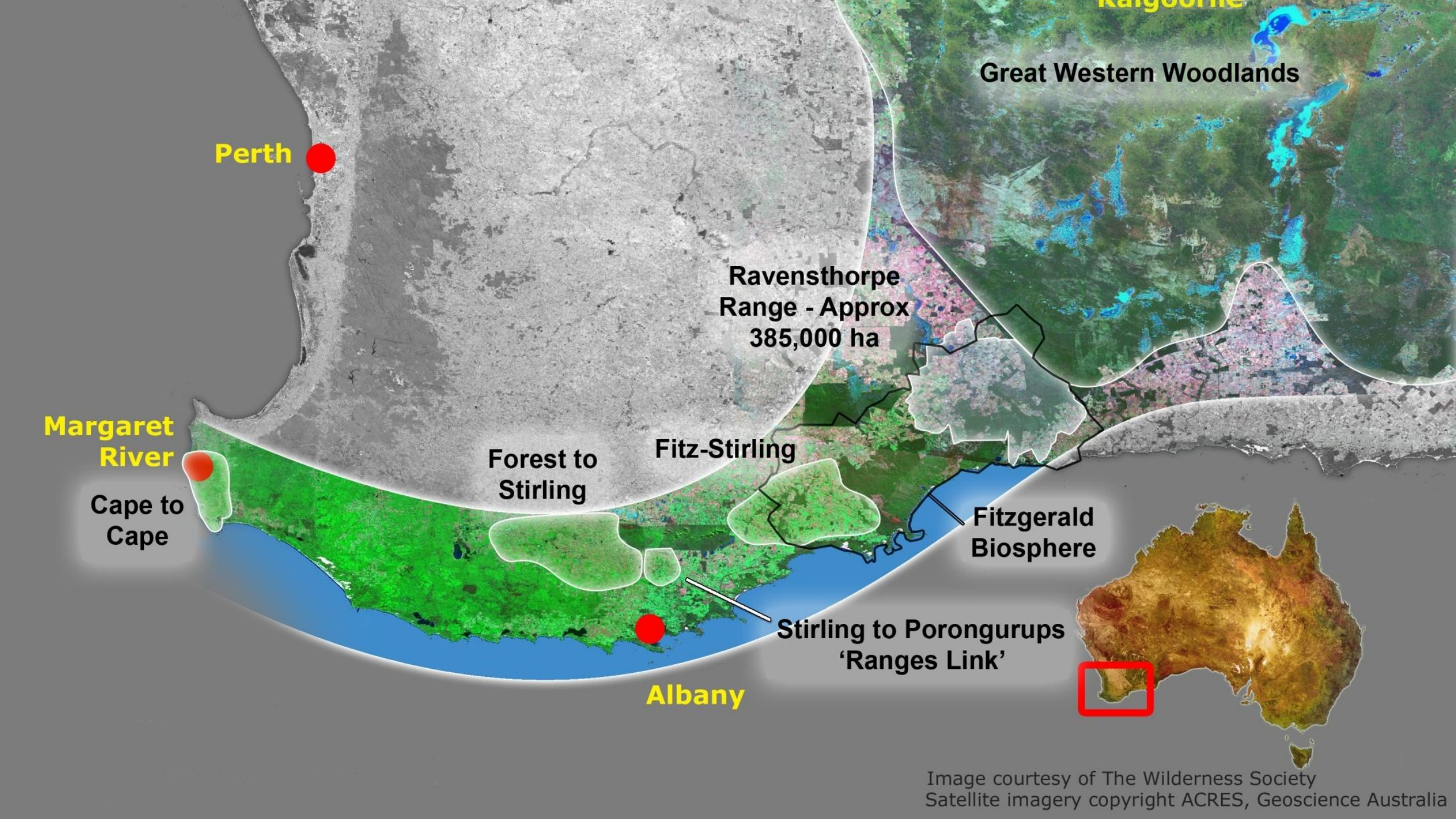


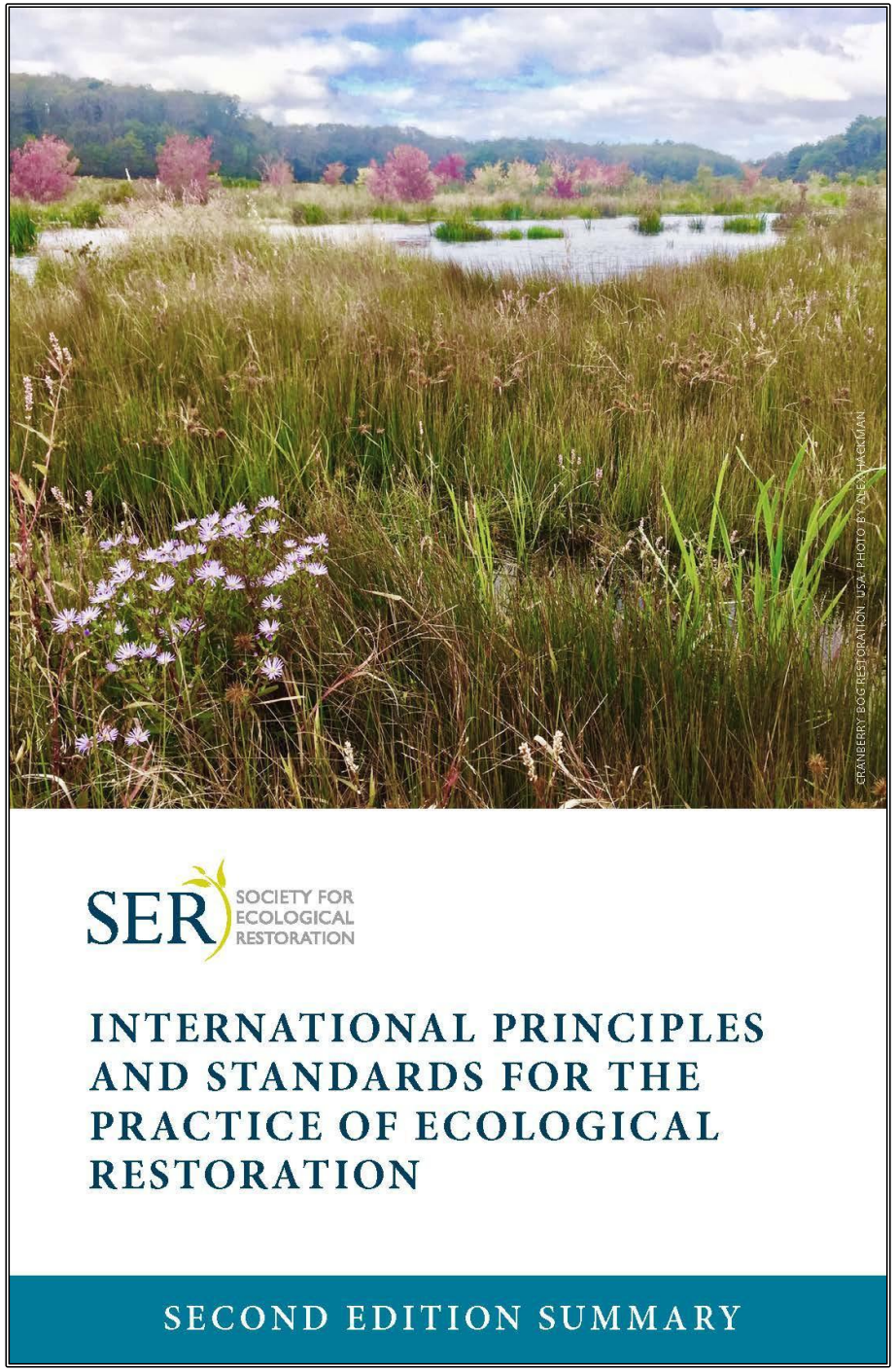
Image courtesy of The Wilderness Society

Ecological Restoration in Gondwana Link

2006 – 2021

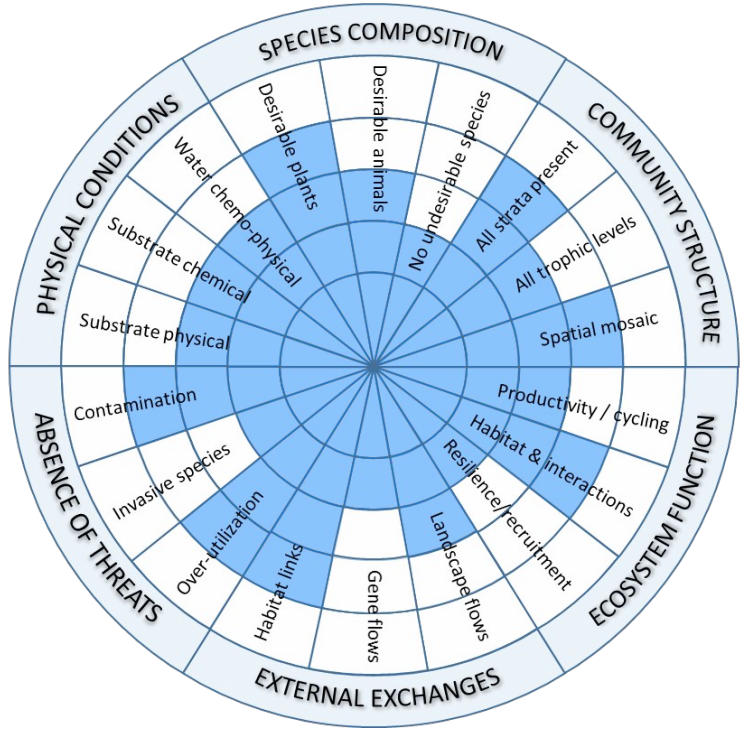
1. SYSTEMS APPROACH
2. IMPROVED POST REVEGATION STRUCTURE
3. NEW APPROACHES TO BOOST BIODIVERSITY
    a. NODES
    b. IN SITU BURNING

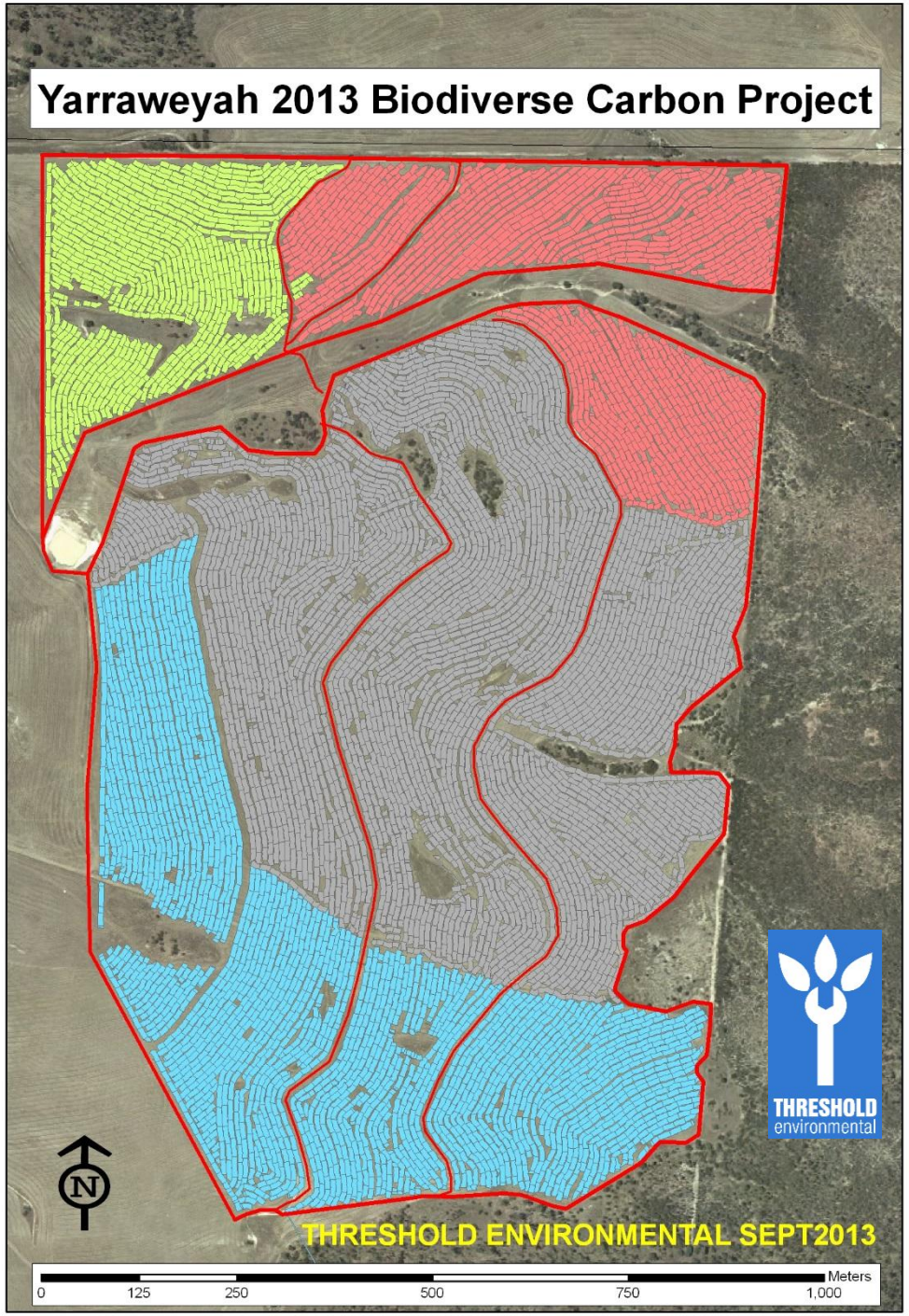
THRESHOLD
environmental



Principle 3. Use a **local native ecosystem** as a **reference model** for revegetation

Principle 5. **Ecosystem recovery is assessed** against clear goals and objectives, **using measurable indicators**





Funded by:

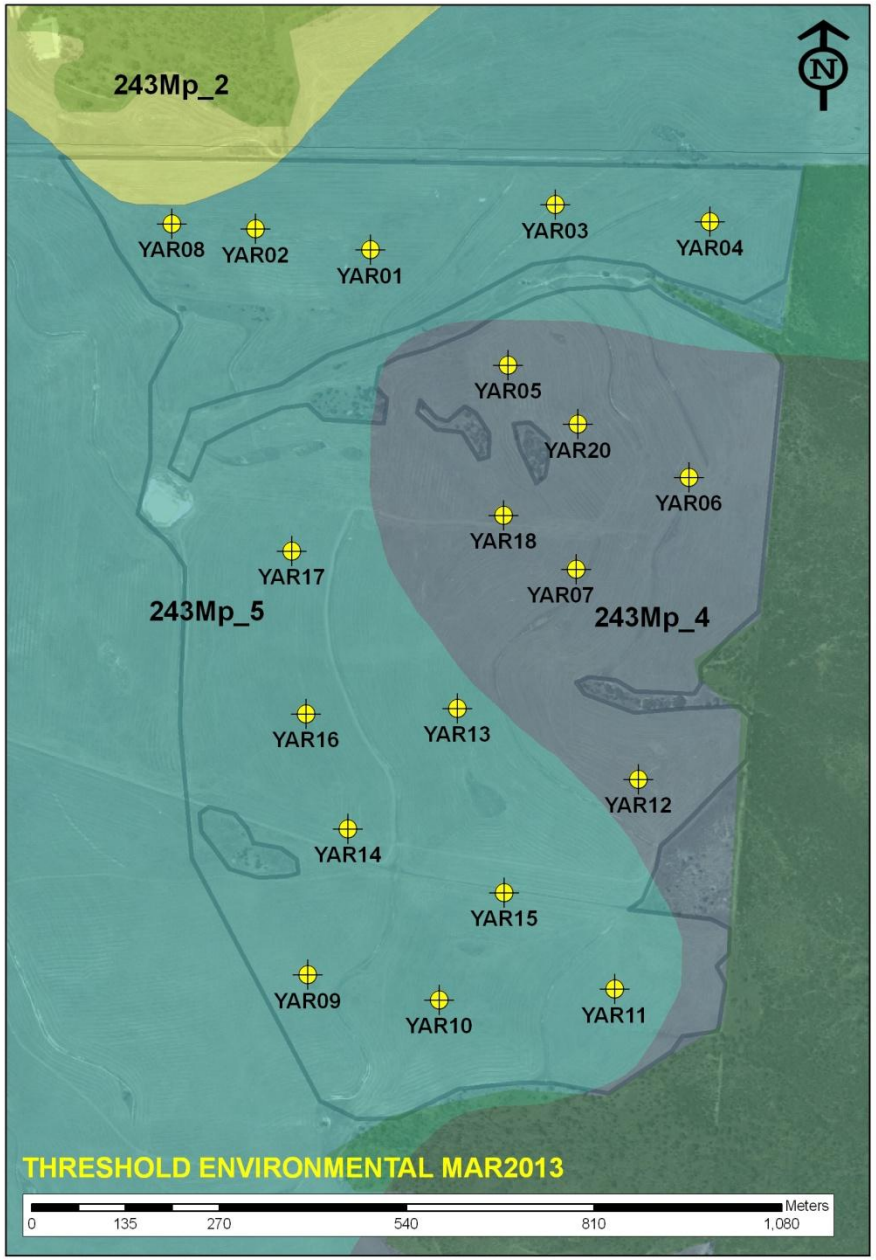
Carbon Neutral
CHARITABLE FUND

RESTORATION STARTS WITH A PLAN

SYSTEMS APPROACH

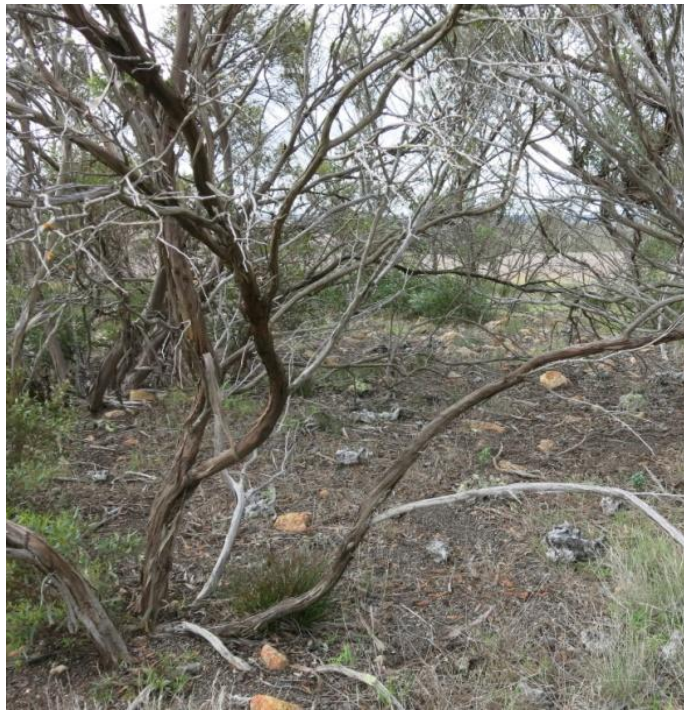
Defining major landform units with hand augured **soil sampling**

SYSTEMS APPROACH

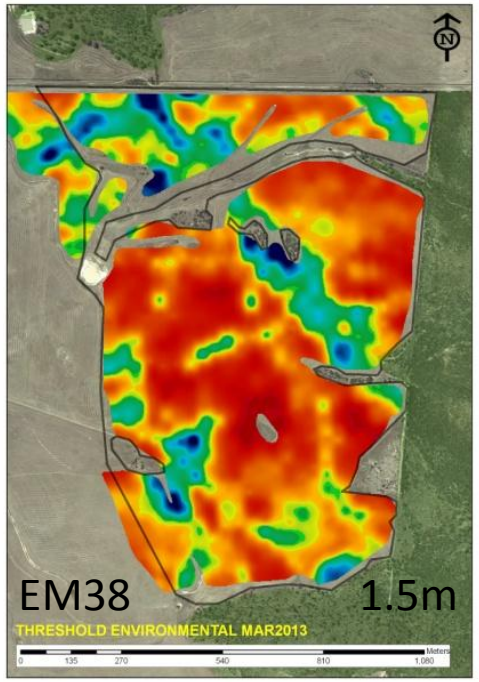


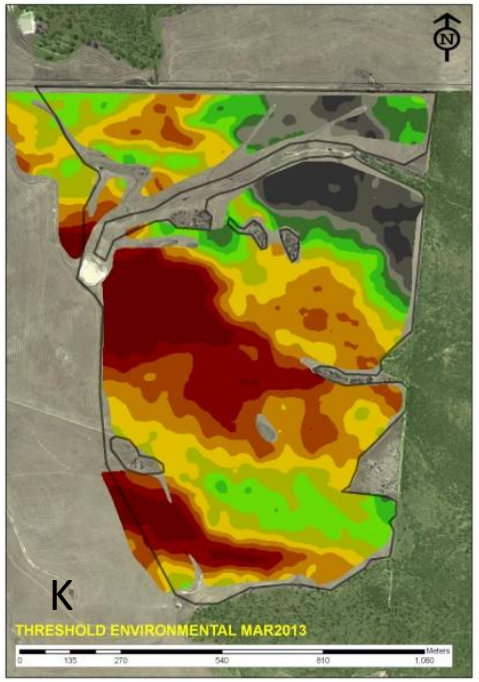
paddock	LnscpPos	radSignal	PitNo	SandDpth(AB)	Color	Texture	Depth_BC	Type	Photos	SWHC
1st Cleared	UPPER MID SLOPE GENTLE	GRADE	64	0-7	0-7 SNDY LM. 8-12 Grey Sand 12-30 By Md Clay w/ Red Mottles 30-53 Md Brn Brn Clay		75++	1b(Md clay) or 4a	103-105	MED
"	"	"	65	0-8	0-8 SNDY LOAM 8-75	By Md/Hvy Gritty Clay	75++	4a	106-108	MED-HI
"	" SLIGHT DEPRESSION		66	0-8	0-8 SND LOAM 8-27 Grey Sand 30-46 V. LGHT By Clay w/ Red Mottles (moist to 40)		X 46 too dry	1b	109-110	LOW
"	UPPER MID SLP MOD		67	0-9	0-9 SNDY LOAM 10-20 By w/ Red Mottles, Md. Clay 20-60 Brn By Md. Clay w/ 46 By w/R		65X too dry	1b	111-113	LOW
"	UPPER GNTL SLP	SS Dry	68	0-5	0-5 SNDY LOAM 5/10 B Sand w/ Red Clay Streaks 16-20 BR Light Clay 20-35 BR Md. Clay 35-55 By w/ Md SC-72 Brn w/ some Red By		? 72 Dry	1a but Md. Clay	114-116	MED
House Pk	UPPER MID GNTL SLP	GRD.	69	0-5	0-5 SNDY LOAM 5-12 Hvy By Clay almost to Clay	72-82 Md. By Clay	? 82 H	4d	117-119	MED HI
Stick ys	Upper Mid	GNTL SLOPE	70	0-10	0-10 SND LOAM 10-30 By Sand 30 w/ some Red		X 30 too	?	120	LOW
"	"	MOD GRD.	71	0-6	0-6 SANDY LOAM 6-20 By SND w/ GRVL (some) 20-30 By Light Clay (Dry)		X 33 Too Dry	1b	121	LOW
"	"	"	72	0-6	0-6 SNDY LM. 6-15 BR 15-45 By Md/Light Clay w/ Mottles 45-72 Brn By Md Clay		X 72 Too Dry	1b or 1d	124-125	MED
"	"	"	73	0-6	0-6 SNDY LOAM 6-15 By Sand, 15-30 BR Light Clay 30-38 BR v. Light Clay (Dry)		X 38 Too Dry	1a	126-128	LOW
WINDMILL	MID SLOPE MODERATELY GRD.		74	0-10	0-10 SANDY LM. 10-25 Brown Earth 25 Granite		hard pan			LOW
"	MID UPPER SLOPE	MOD GRD.	75	0-5	0-5 SNDY LM. 5-15 Brown Earth 20 Granite Rock				127-130	LOW
"	MID SLOPE	MOD GRADE	76	0-8	0-8 SNDY LM. 8-20 By SND w/ Gravel 20-38 BR Md Light Clay		X 37 Too Hard		131-133	MED LOW
"	"	"	77	0-5	0-5 SNDY LM. 5-30 B Stony Soil/Earth		X 30 too stony	2b	134-135	
"	MID SLOPE	Gentle Grade	78	0-10	0-10 SNDY LM. 10-15 Grey Sand w/ By Clay Drops 15-45 Md By Clay 45-70 Light By Clay, 70-Bright By Clay		75++	4a ? or 4d ?	136	MED
HOUSE	MID SLOPE	"	79	0-10	0-10 SNDY LOAM 10-15 B Earth w/ By Clay 15-30 Md Light B Clay 30-40 Light By Clay 40-47 V Light By Clay		X 47 Too Dry	4a ?	137	LOW
LONG	MID SLP Almost Flat		80	0-10	0-10 SNDY LM. 10-20 By Pale Md Clay 20-55 Md/Hvy By Pale Clay 55-70 Granite Gravel 70-77 Hvy By Clay		? 77++	3 Clay	138-139	HIGH
LONG	LOWER FLATS/ SLIGHT RISE	V. Slight Grade	81	0-39	0-3 Sdy Loams / 3-9 Sand 9-40 Md/Hvy By Clay 40-59 By Light Clay		59 Rock	1b or 4a ?	23-26	Md.
"	LO MED FLATS/ V. Slight depression	"	82	0-7	0-7 Sandy Loam 7-15 Grey Sand w By Clay Drops 15-40 V. Lite By Clay, 40-43 Md. By Clay 43-Rock (white) Gravel		43 ++	1b	27-29	Med-Low
"	MID SLOPE FLATS	SLight Grade	83	0-10	0-10 Light Sandy Loam 10-20 Md/Lte B. Clay 30-40 Md. Gritty Clay 46-85 By light Gritty Clay		X 100%	4b	30-33	M-H
"	MID SLOPE FLAT/ Slight Rise (Red)	Slight Grade	84	0-10	0-10 Light SNDY LOAM 10-15 Sand (Grey) w/ Brn Clay Drops 15-20 By Md/light Clay 30-43 By (Grey) clay - Md.		43 Rock	1b but Clay	34-36	M-L

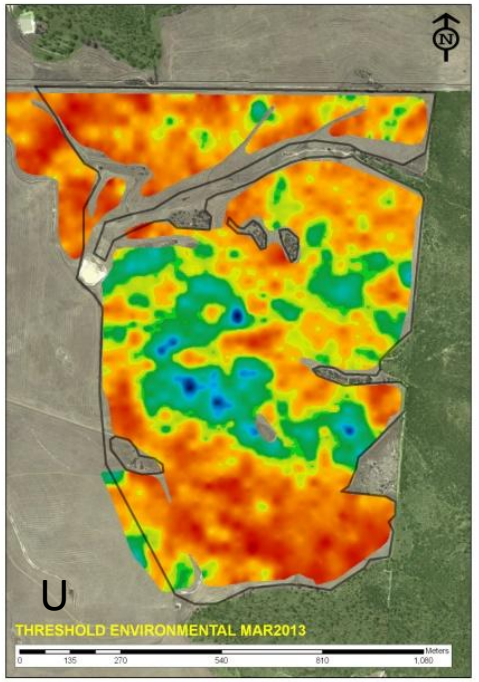
Acacia cyclops	Dianella revoluta	Hakea laurina	Melaleuca undulata
Acacia glaucoptera	Dryandra falcata	Hakea lehmanniana	Melaleuca violacea
Acacia lasiocarpa	Dryandra lindleyana	Hakea lissocarpa	Mesomelaena pseudostygia
Acacia mimica	Dryandra sp.	Hakea marginata	Mesomelaena stygia
Acacia multispicata	Dryandra tenuifolia	Hakea newbeyana	Neurachne alopecuroidea
Acacia saligna	Eucalyptus annulata	Hakea strumosa	Patersonia occidentalis
Acacia sphacelata	Eucalyptus conglobata	Hakea verrucosa	Petrophile divaricata
Acacia trulliformis	Eucalyptus dissimulata	Harperia sp.	Petrophile seminuda
Allocasuarina campestris	Eucalyptus flocktoniae	Hibbertia sp.	Petrophile sp.
Allocasuarina corniculata	Eucalyptus incrassata	Hovea pungens	Rhagodia sp.
Allocasuarina huegliana	Eucalyptus occidentalis	Hybanthus sp.	Schoenus sp.
Allocasuarina humilis	Eucalyptus occidentalis x thamn.	Isopogon boxifolius	Taxandria spathulata
Allocasuarina thyoides	Eucalyptus phaenophylla	Isopogon sp.	Templetonia retusa
Allocasuarina tortiramula	Eucalyptus phenax	Kunzea affinis	Thomasia sp.
Andersonia simplex	Eucalyptus pleurocarpa	Kunzea sp.	Thryptomene saxicola
Andersonia sp.	Eucalyptus sinuosa	Lepidosperma sp.1	Trachymene sp.
Asplenium sp.	Eucalyptus sporadica	Lepidosperma sp.2	Verticordia
Astroloma sp.	Eucalyptus thamnoides	Lepidosperma sp.3	
Austrodanthonia sp.	Eucalyptus uncinata	Leporella fimbriata	
Austrostipa elegantissima	Eucalyptus xanthonema	Leptospermum erubescens	
Beyeria sp.	Exocarpos sparteus	Leptospermum spinescens	
Borya sp.	Ficinia nodosa	Leucopogon sp.	
Calothamnus quadrifidus	Gahnia ancistrophylla	Lomandra sp.	
Conostylis setigera	Gastrolobium parviflorum	Melaleuca apodocephala	
Cryptandra	Gastrolobium spinosum	Melaleuca acuminata	
Darwinia sp.	Grevillea concinna	Melaleuca calycina	
Daucus carota	Grevillea oligantha	Melaleuca hamata	
Daviesia benthamii	Grevillea sp.	Melaleuca sp.	
Daviesia decurrens	Grevillea tetragonoloba	Melaleuca subfalcata	
Daviesia sp.	Hair orchid	Melaleuca subtrigona	
Desmocladus sp.	Hakea corymbosa	Melaleuca tuberculata	

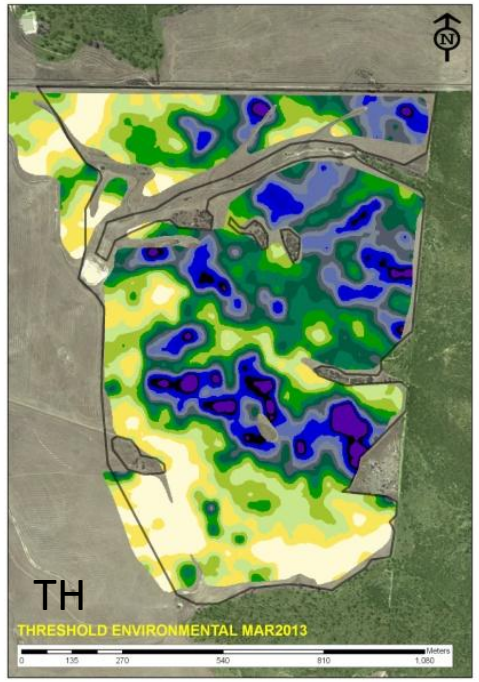


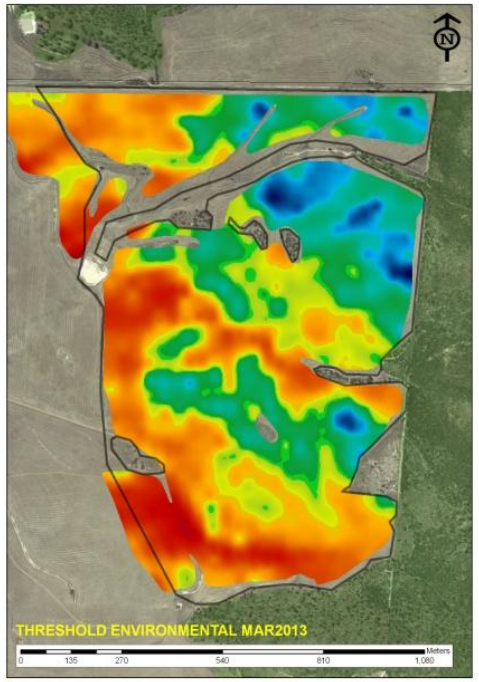
119 Plant species identified across 15 vegetation survey sites

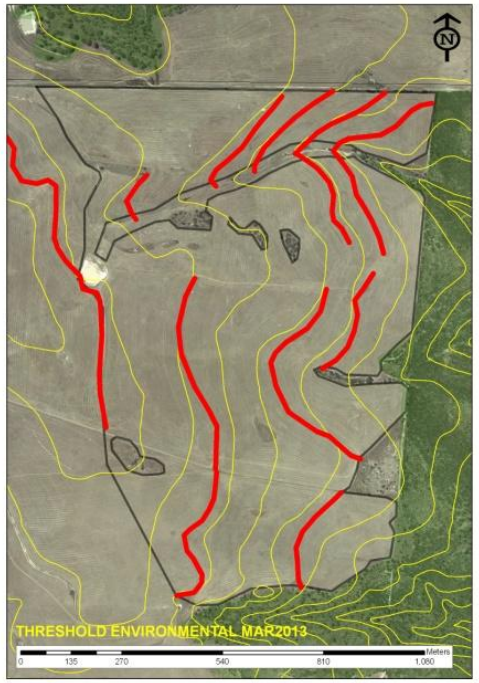


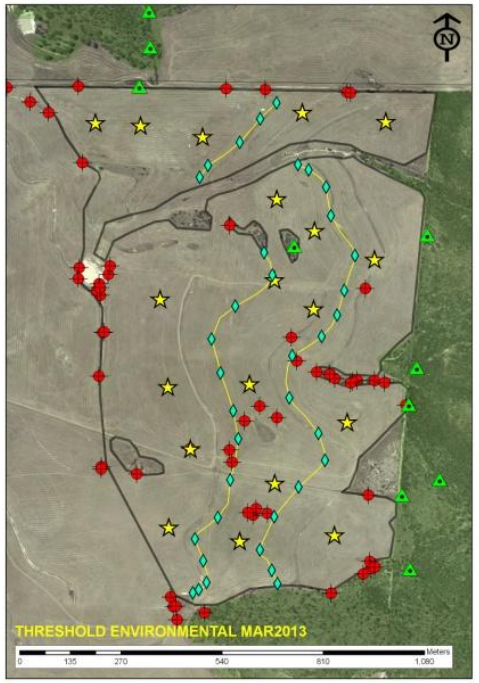


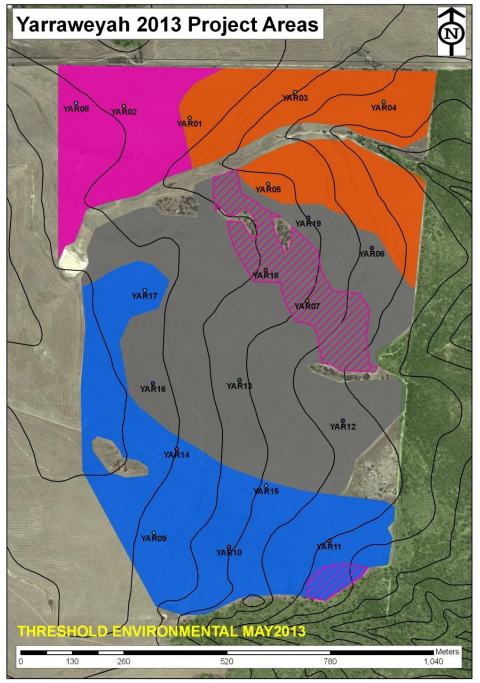












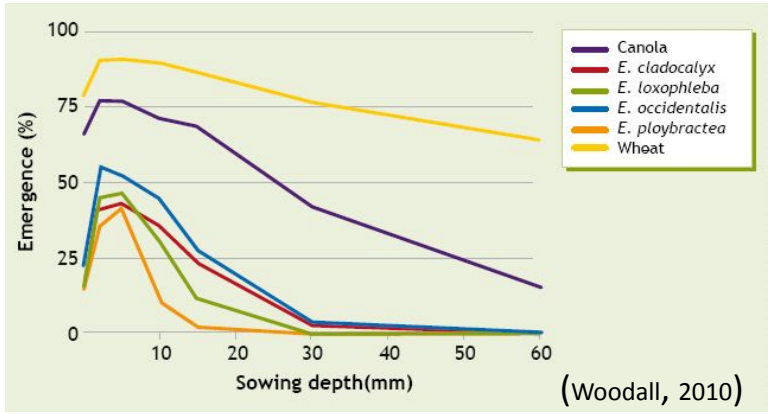
Defining Restoration Systems Mosaic

1. **Upland Yate Woodland System** (11.3 Ha)
2. **York Gum Woodland System** (17.7 Ha)
3. **Granitic Mallee Complex** (41.5 Ha)
4. **Duplex Mixed-Mallee Complex** (28.6 Ha)

THRESHOLD environmental

FROM PLANNING TO OPERATIONS: ***Filling the Biodiversity Basket while Sequestering Carbon***

DIRECT SEEDING IN SWWA



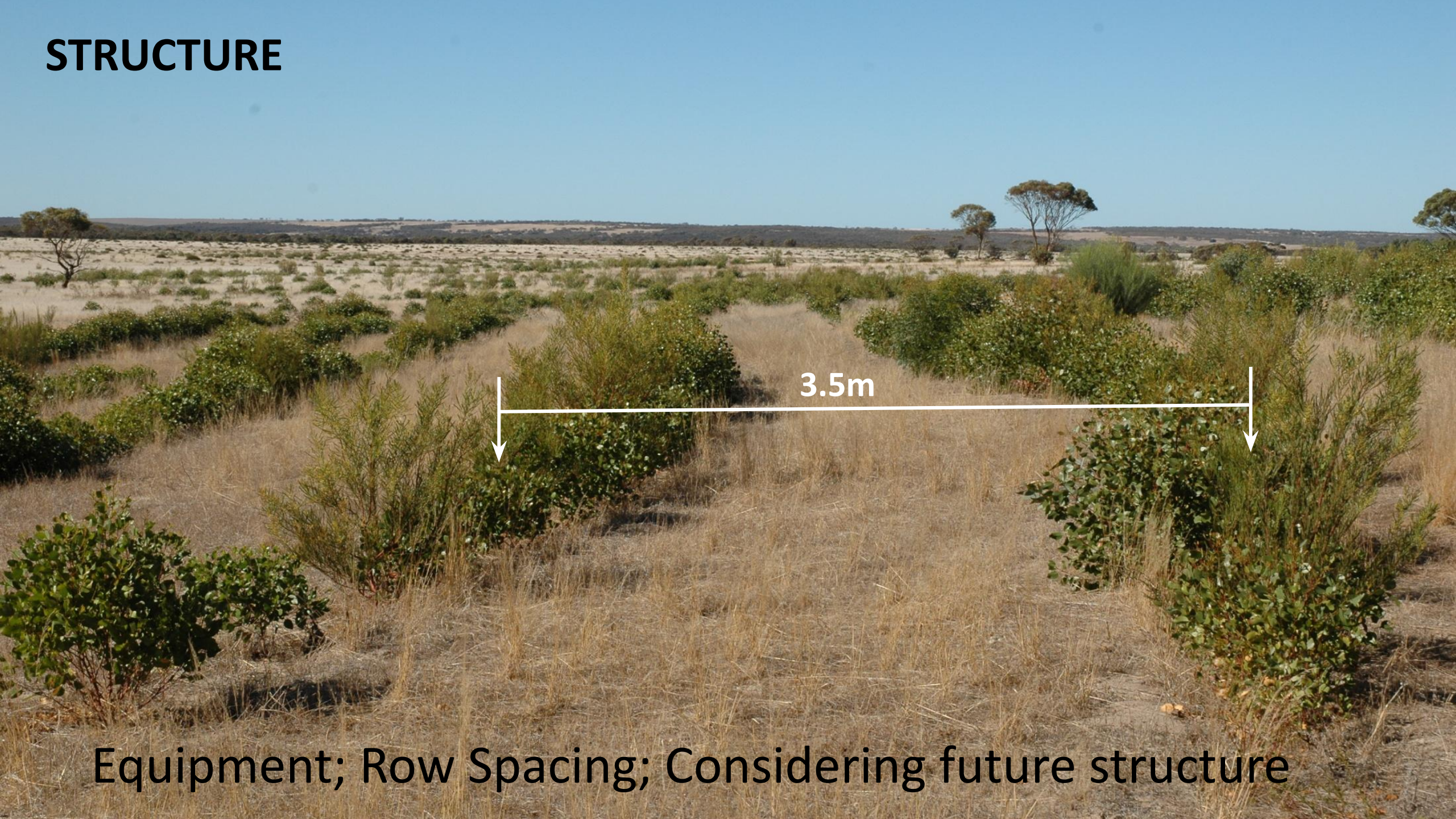
(Woodall, 2010)

STRUCTURE

Learning from a Legacy of Linear Seeding/Tree Planting

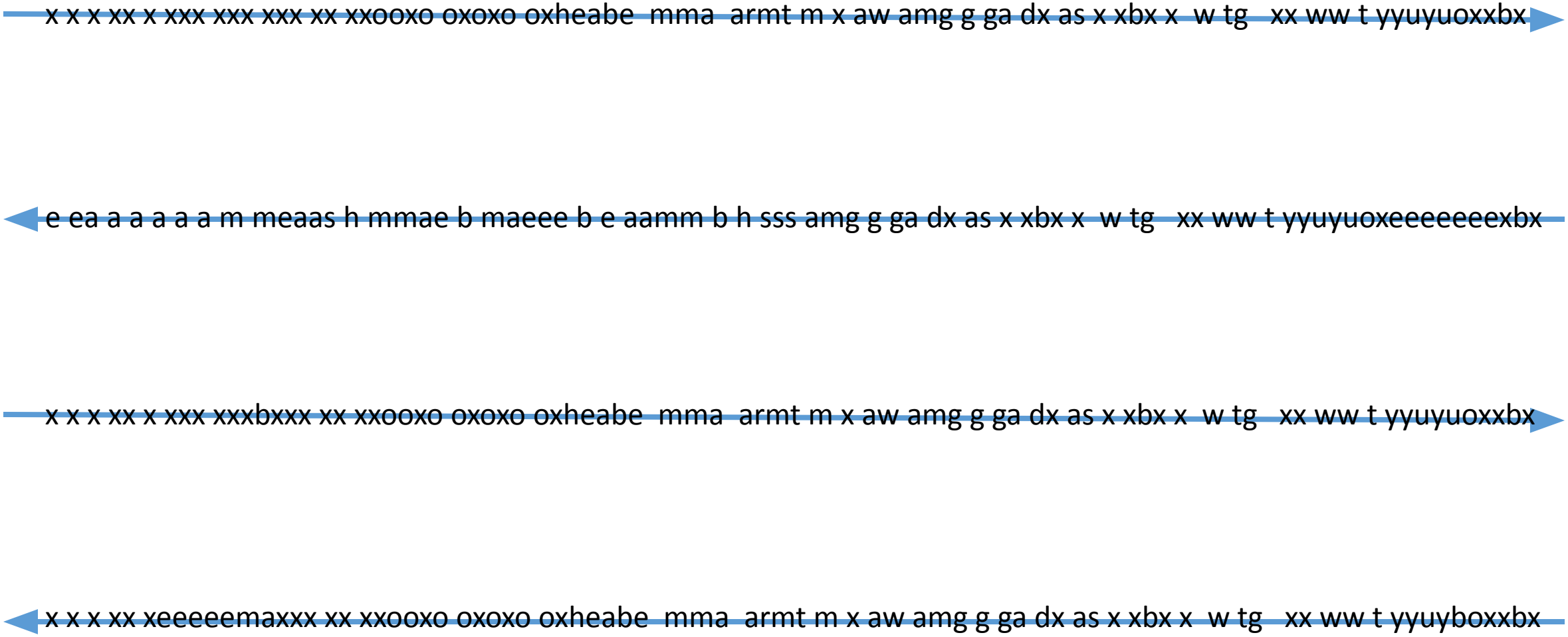
- Improvement Model
- To maximise conservation of biodiversity…
- …consider composition
- …consider structure
- Not just plants, but for animals too

STRUCTURE

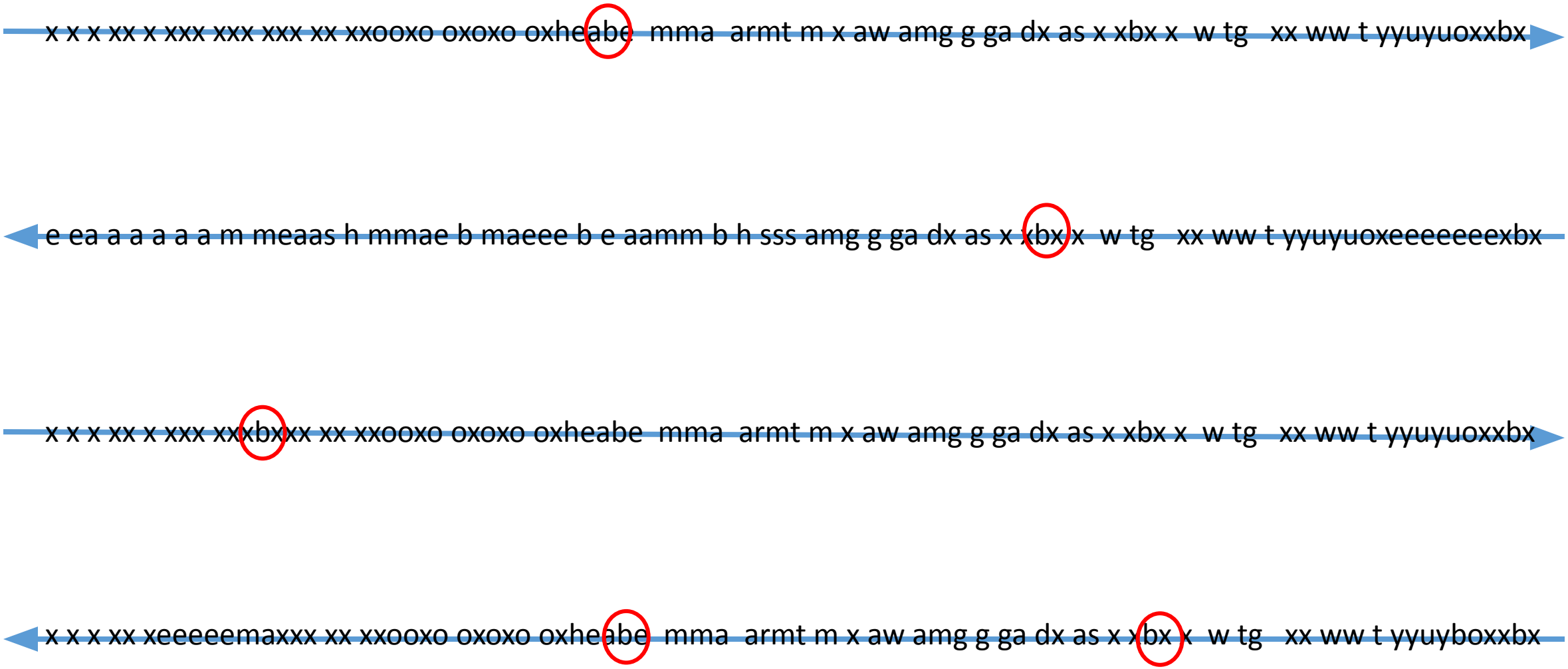


Equipment; Row Spacing; Considering future structure

STRUCTURE

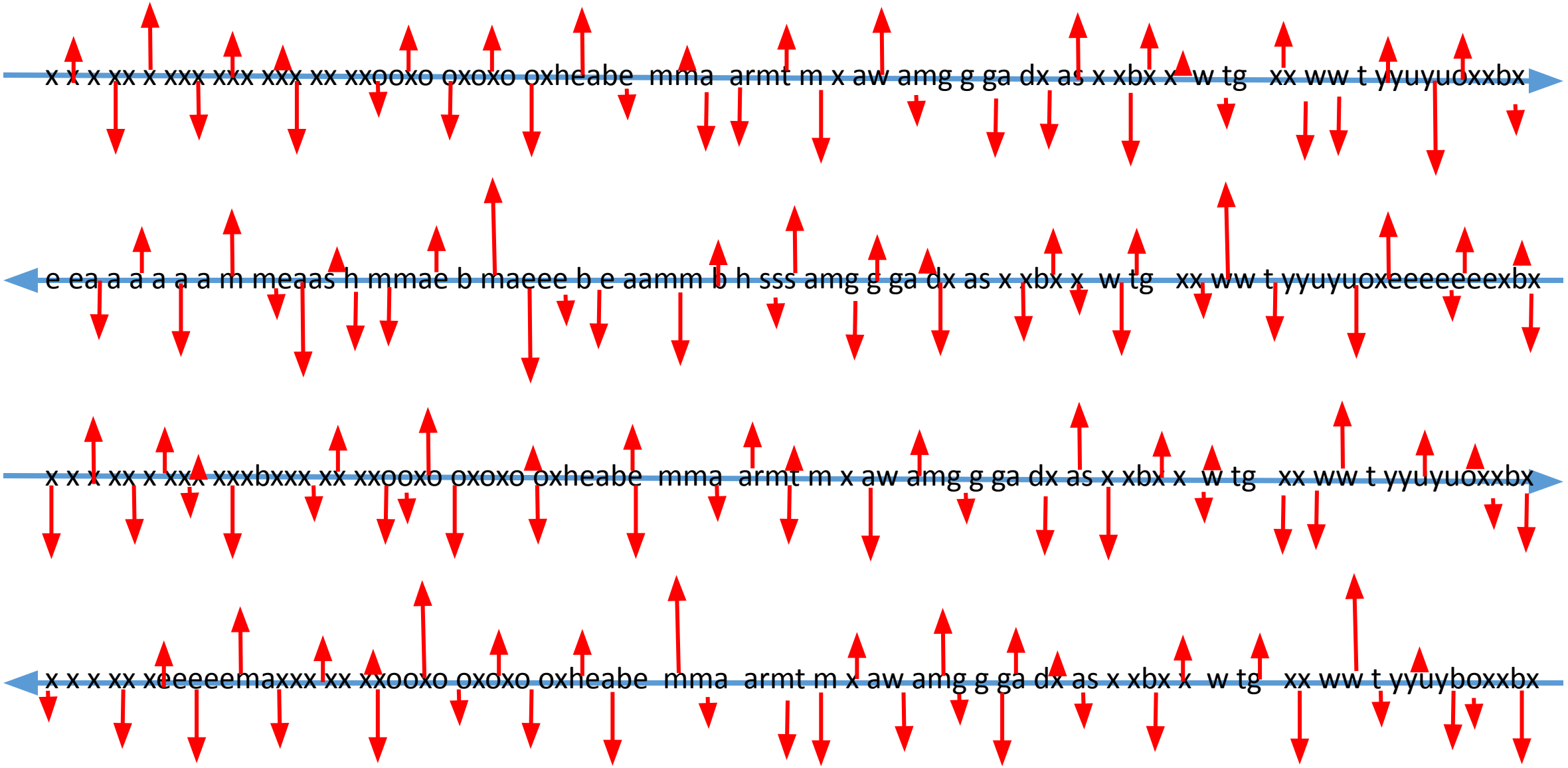

x x x xx x xxx xxx xxx xx xxooxo oxoxo oxheabe mma armt m x aw amg g ga dx as x xbx x w tg xx ww t yyuyuoxxbx
e ea a a a a a m meaas h mmae b maeee b e aamm b h sss amg g ga dx as x xbx x w tg xx ww t yyuyuoxeeeeeeexbx
x x x xx x xxx xxxbxxx xx xxooxo oxoxo oxheabe mma armt m x aw amg g ga dx as x xbx x w tg xx ww t yyuyuoxxbx
x x x xx xeeeeemaxxx xx xxooxo oxoxo oxheabe mma armt m x aw amg g ga dx as x xbx x w tg xx ww t yyuyboxxbx

STRUCTURE

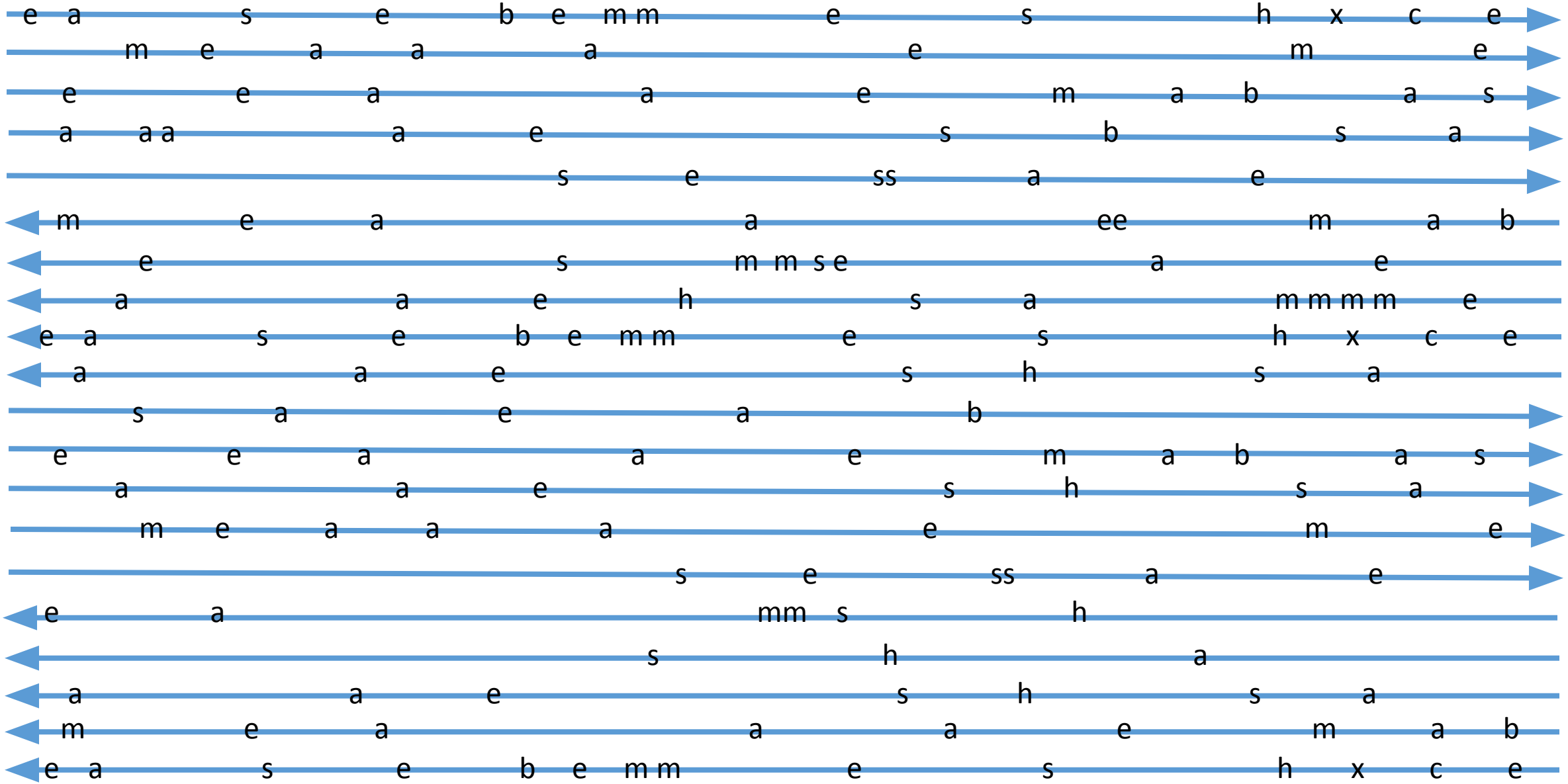


Competition for nutrients. Competition for water. Competition for light.

STRUCTURE


x x x xx x xxx xxx xxx xx xxooxo oxoxo oxheabe mma armt m x aw amg g ga dx as x xbx x w tg xx ww t yyuyuoxxbx
e ea a a a a a m meaas h mmae b maeee b e aamm b h sss amg g ga dx as x xbx x w tg xx ww t yyuyuoxeeeeeeexbx
x x x xx x xxx xxxbxxx xx xxooxo oxoxo oxheabe mma armt m x aw amg g ga dx as x xbx x w tg xx ww t yyuyuoxxbx
x x x xx xeeeeemaxxx xx xxooxo oxoxo oxheabe mma armt m x aw amg g ga dx as x xbx x w tg xx ww t yyuyboxxbx

STRUCTURE For Growth and Habitat Complexity




1.4m
1.4m
1.4m
1.4m

THRESHOLD
environmental

THRESHOLD
environmental


THRESHOLD
environmental

THRESHOLD
environmental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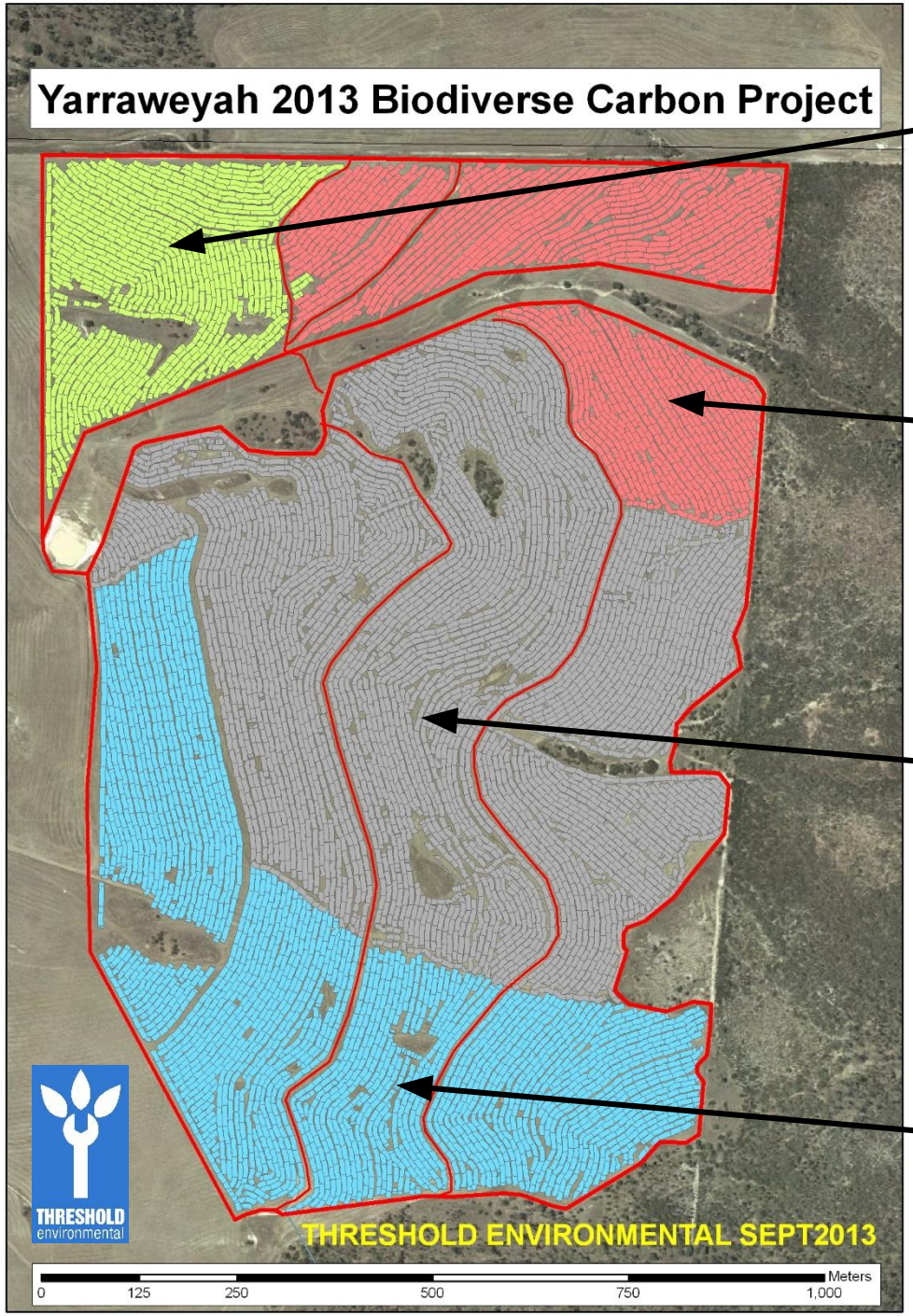
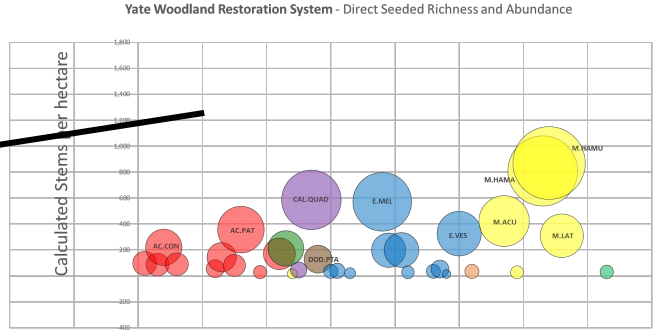
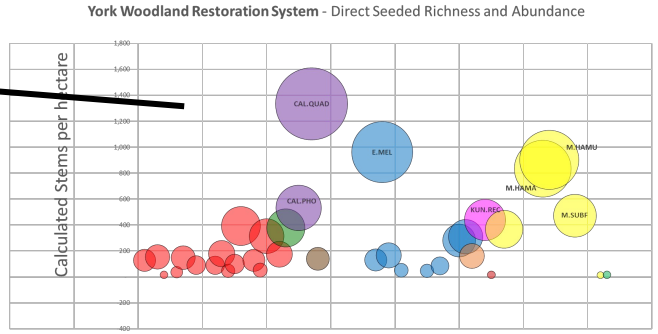
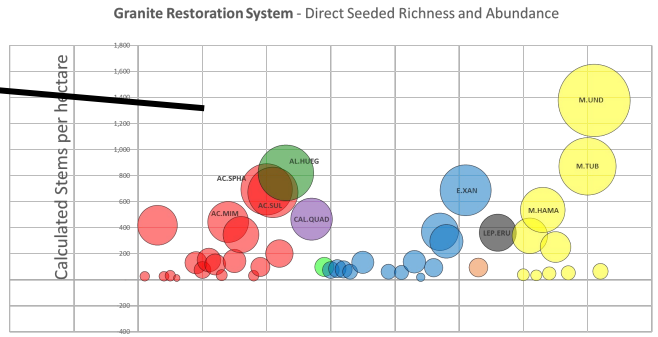
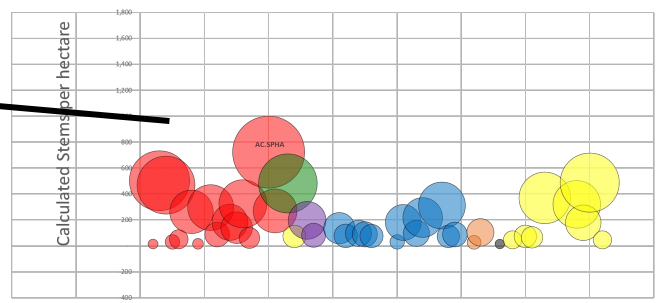
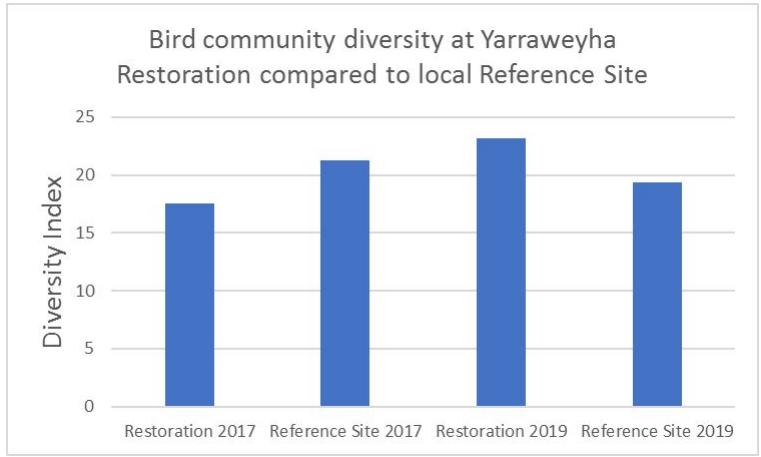








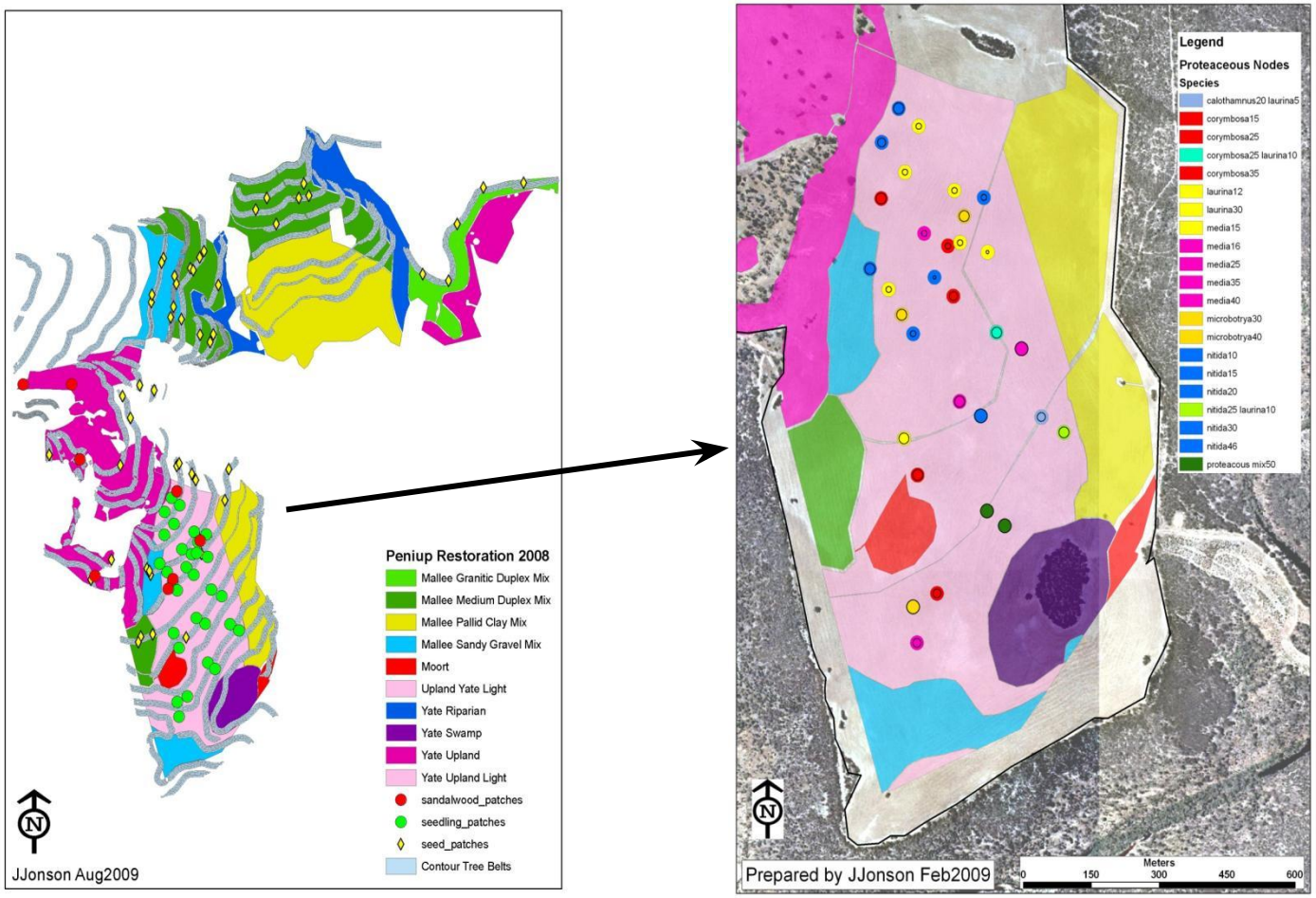




(Bird Survey: Nic Dunlop – Citizen Science)

Project funded by:
Carbon Neutral
CHARITABLE FUND

NEW APPROACHES – PROTEACEOUS NODES

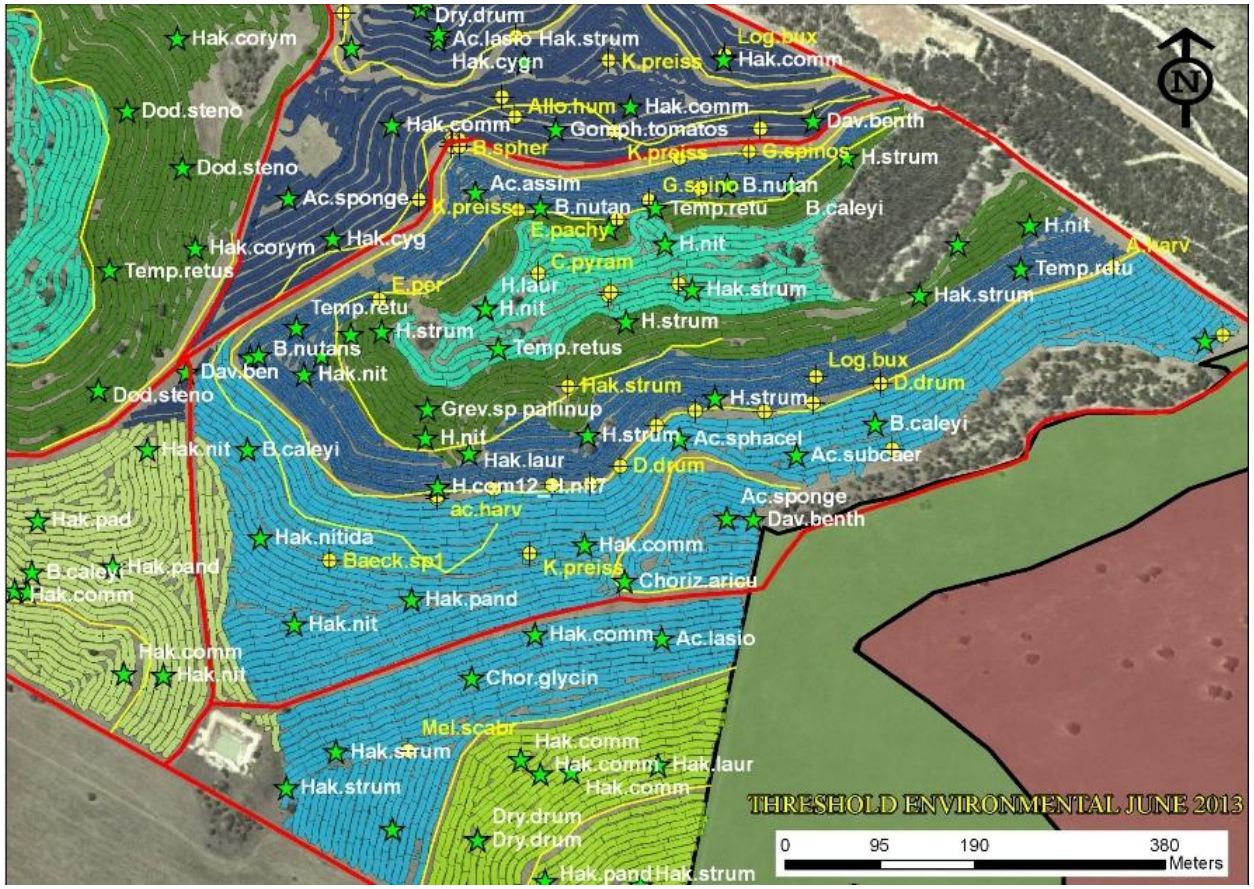


Jonson, J., 2010. Ecological restoration of cleared agricultural land in Gondwana Link: lifting the bar at 'Peniup'. Ecological Management and Restoration, 11, 16-26. (https://thresholdenvironmental.files.wordpress.com/2012/03/emrarticle_peniuprestoration1.pdf)

More info see: https://site.emrprojectsummaries.org/2016/03/07/peniup-ecological-restoration-project/

NODES

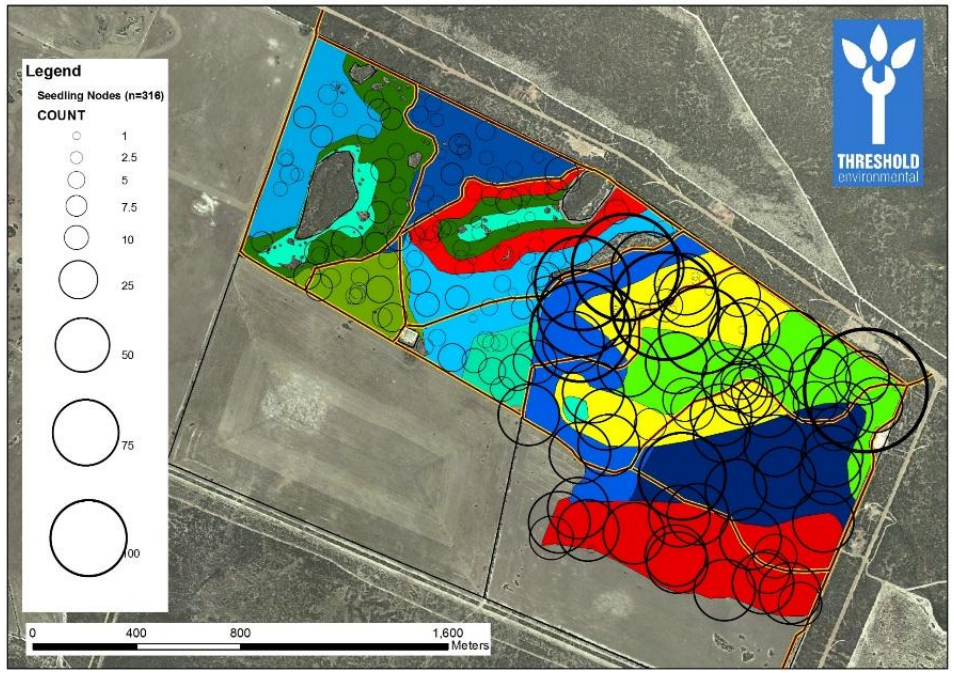
THRESHOLD
environmental



(JONSON 2010)

More info see:

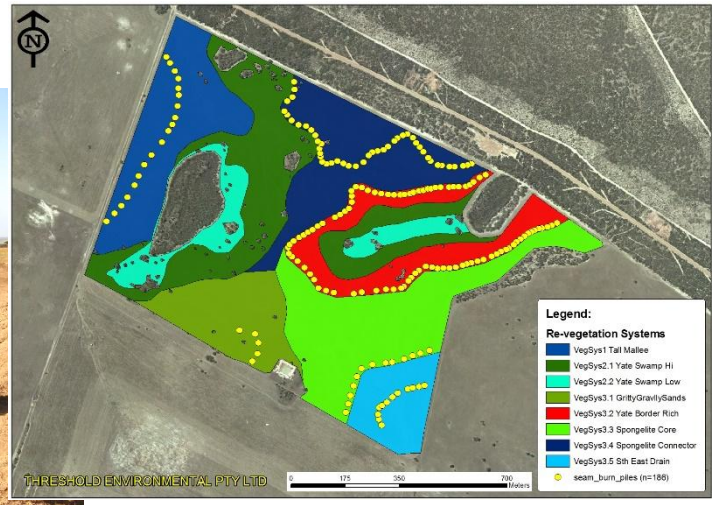
https://site.emrprojectsummaries.org/2016/03/06/defining-reference-communities-for-ecological-restoration-of-monjebup-north-reserve-in-gondwana-link/


Legend
Seedling Nodes (n=316)
COUNT
1
2.5
5
7.5
10
25
50
75
100
0
400
800
1,600
Meters
THRESHOLD
environmental

(JONSON 2010)

NEW APPROACHES – IN SITU BURNING

In-situ seeding; graded; 180 piles of branches with serotinous fire seed release traits



THRESHOLD environmental

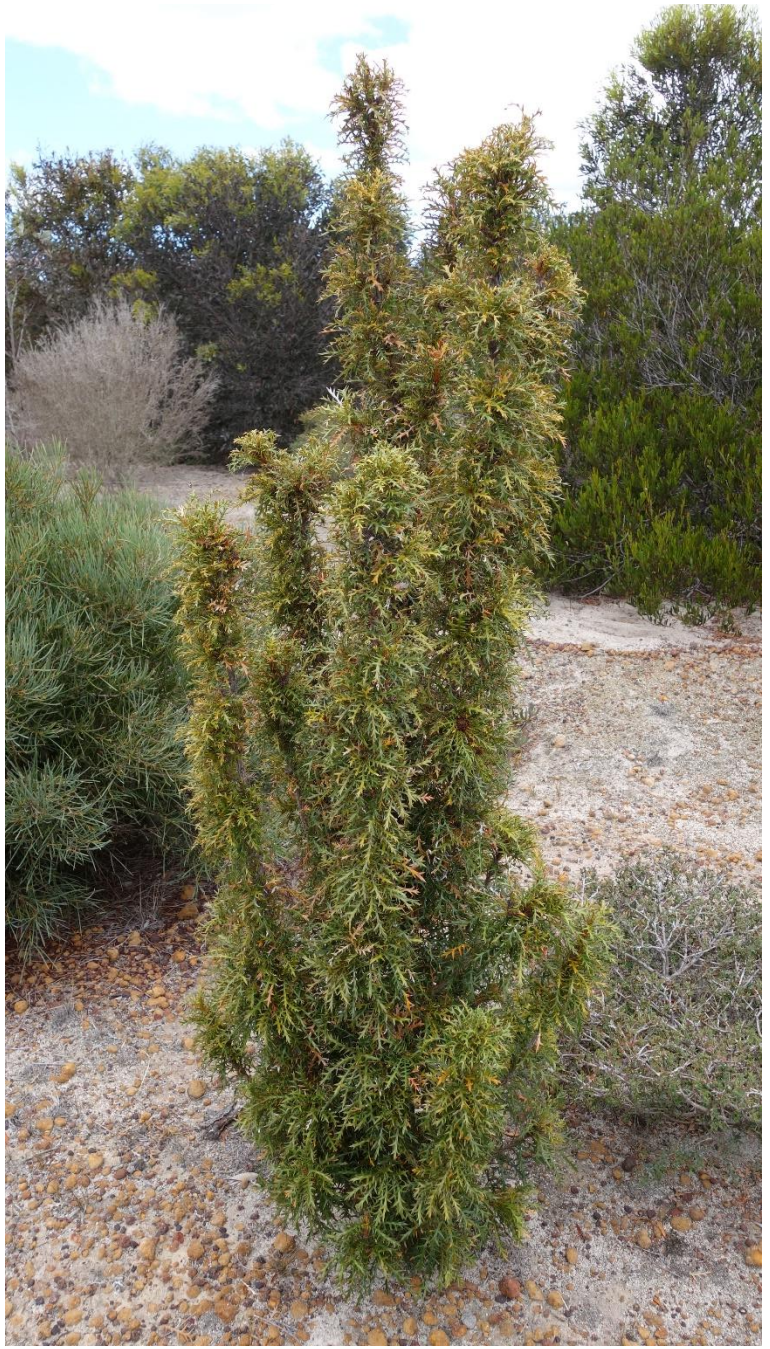
More info see: https://thresholdenvironmental.files.wordpress.com/2012/03/anpc-article_sept-nov-2012.pdf

THRESHOLD environmental

Dryandra nervosa

Dryandra drummondii

THRESHOLD environmental



Dryandra circioides


Honey Possum

Thank you

Justin Jonson MSc
Managing Director
THRESHOLD ENVIRONMENTAL PTY LTD
Board Member – Society of Ecological Restoration Australasia (SERA)
President – SER's Large-scale Ecosystem Restoration Section (LERS) Board

THRESHOLD environmental

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