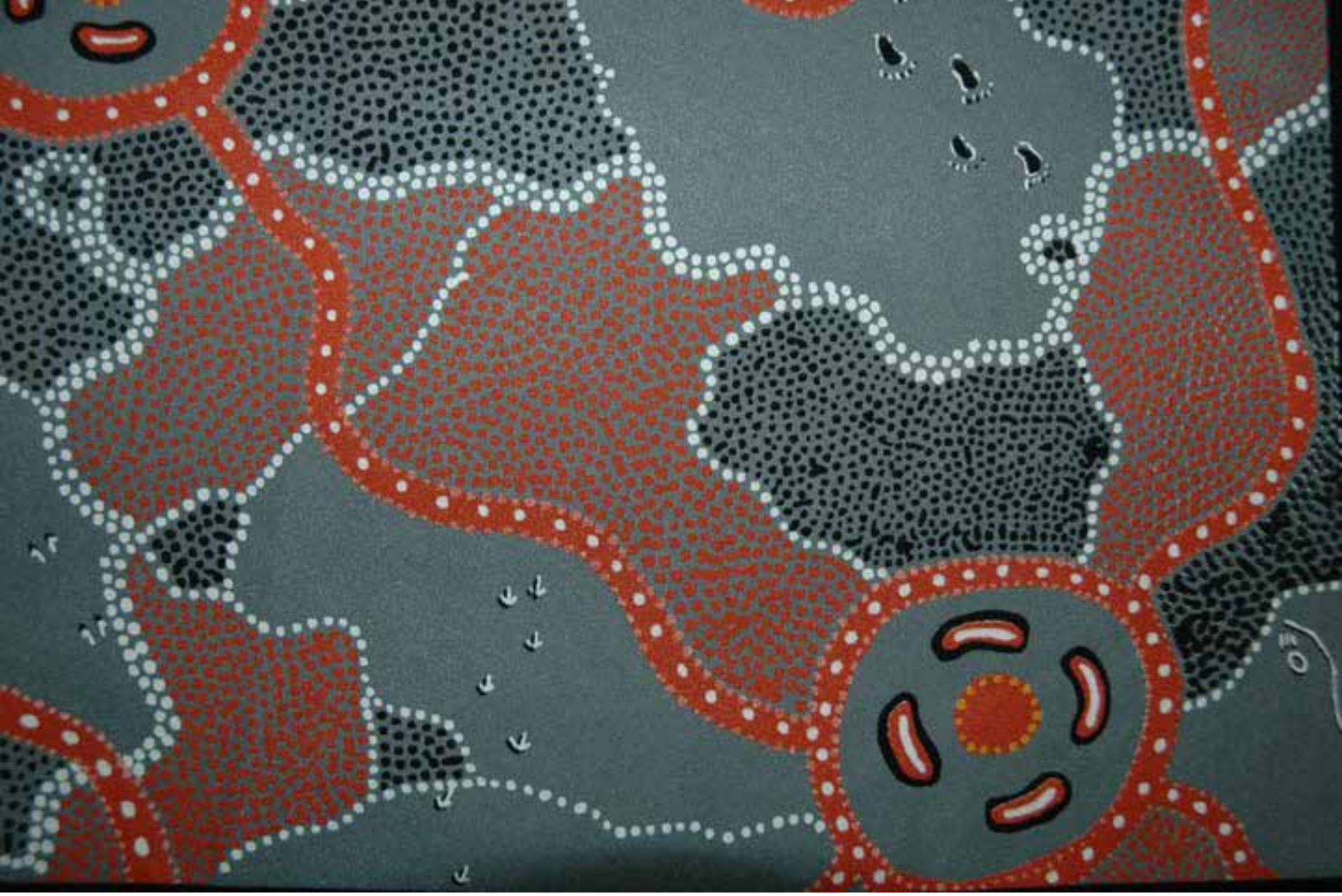
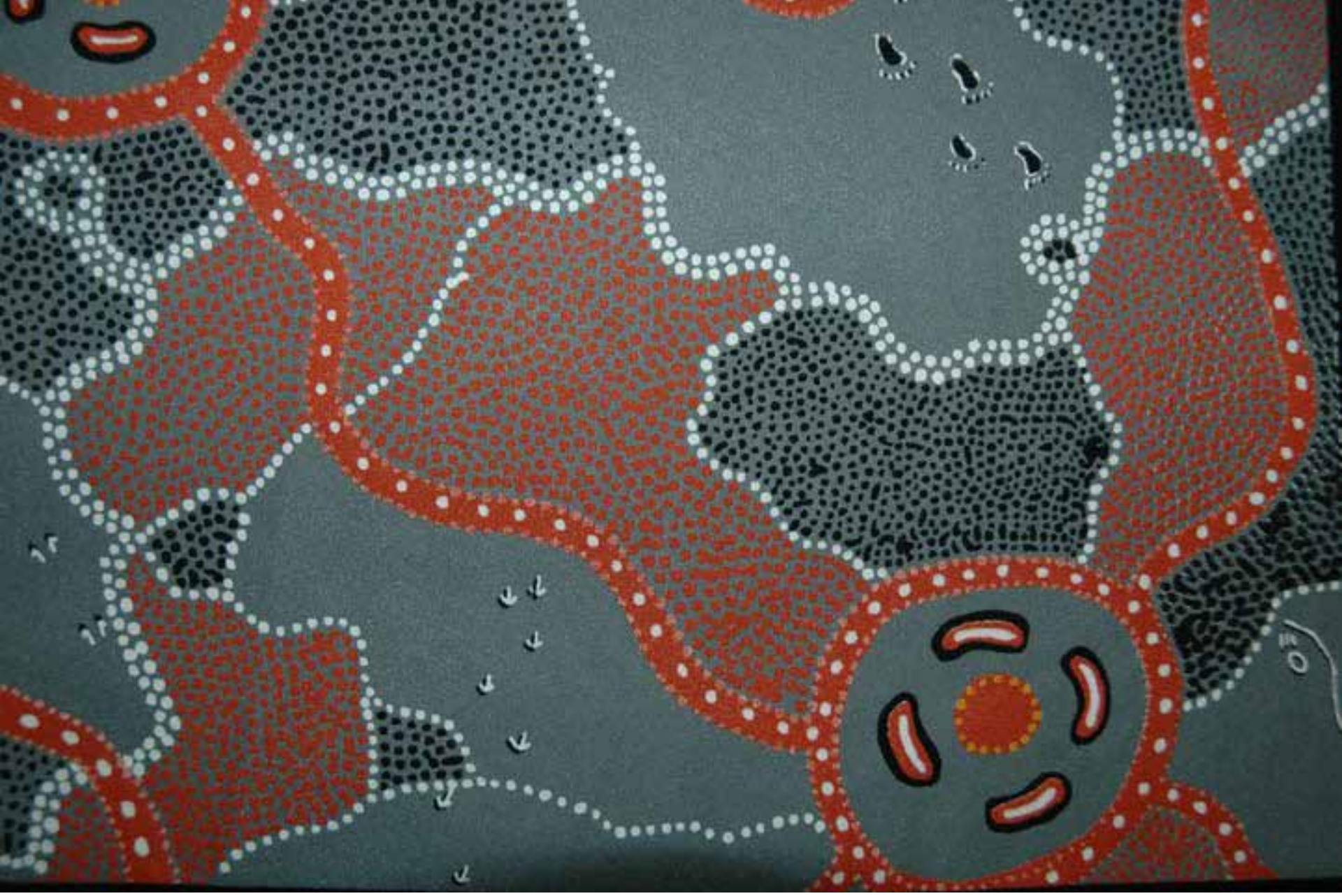


By Craig McVee, Kojonup



White Man lost in a Black Man's world *By Craig McVee, Kojonup*

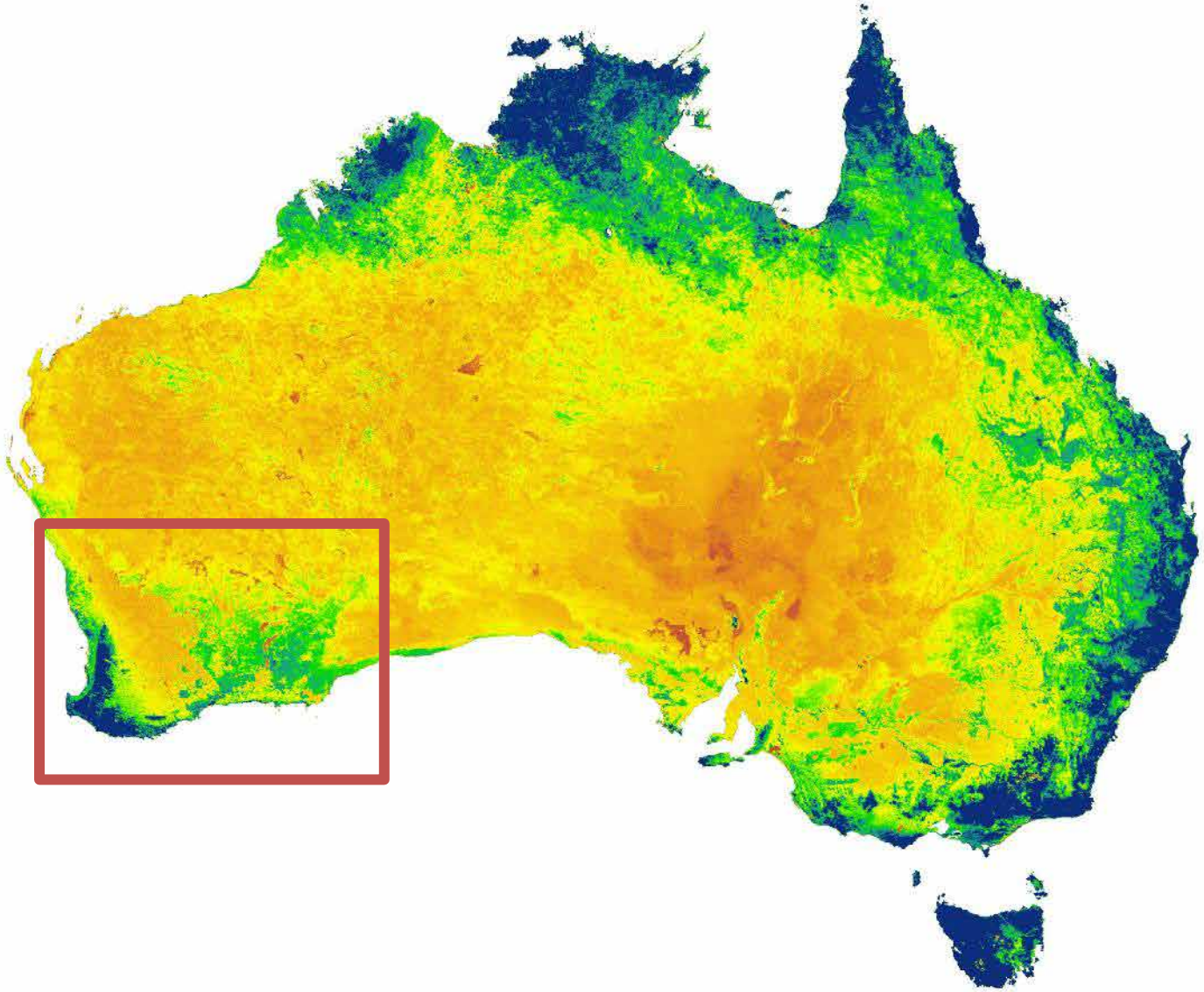
Sandy soils and our shared future

Keith Bradby
bradby@gondwanalink.org

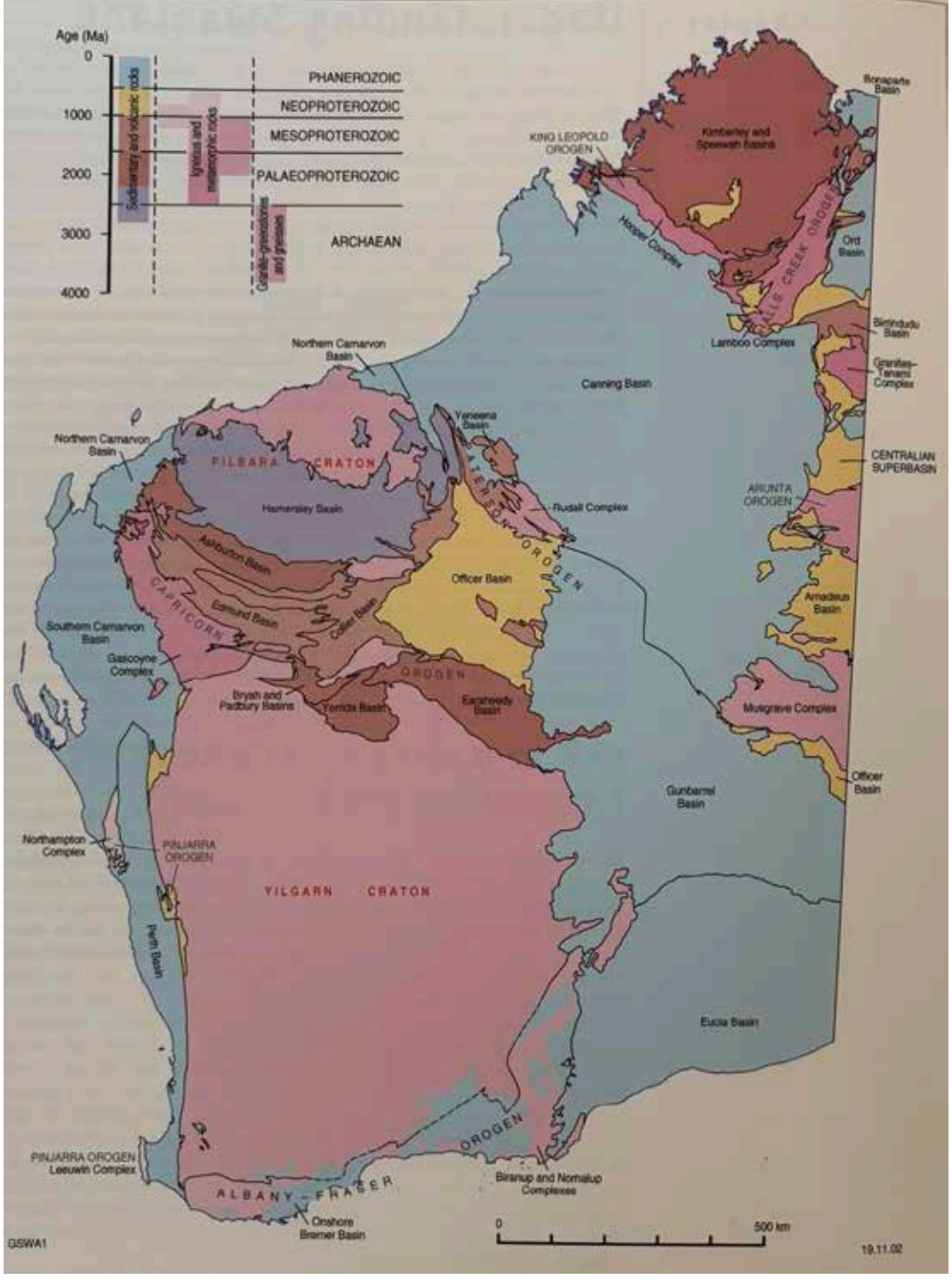
Gondwana Link
connecting people...connecting nature

Proud to be one of the #Founding50

UNITED NATIONS DECADE ON ECOSYSTEM RESTORATION 2021-2030



MODIS Date Biomass production January 2003 NDVI


Age (Ma)
0
1000
2000
3000
4000
Sedimentary and volcanic rocks
Igneous and metamorphic rocks
Granite–gneiss domes and gneisses
PHANEROZOIC
NEOPROTEROZOIC
MESOPROTEROZOIC
PALAEOPROTEROZOIC
ARCHAEAN
Bonaparte Basin
KING LEOPOLD OROGEN
Kimberley and Speewah Basins
Hooper Complex
ALEC GREEK OROGEN
Ord Basin
Lamboo Complex
Birrindudu Basin
Granites–Tanami Complex
Northern Carnarvon Basin
Canning Basin
Yeneena Basin
PILBARA CRATON
Hamersley Basin
Rudall Complex
CENTRALIAN SUPERBASIN
ARUNTA OROGEN
Ashburton Basin
CAPRICORN OROGEN
Edmund Basin
Collier Basin
Officer Basin
Amadeus Basin
Southern Carnarvon Basin
Gascoyne Complex
Bryah and Padbury Basins
Yerrida Basin
Earaheedy Basin
Musgrave Complex
Officer Basin
Gunbarrel Basin
Northampton Complex
PINJARRA OROGEN
YILGARN CRATON
Perth Basin
Eucla Basin
PINJARRA OROGEN
Leeuwin Complex
ALBANY–FRASER OROGEN
Biranup and Nornalup Complexes
Onshore Bremer Basin
0
500 km
GSWA1
19.11.02


https://www.youtube.com/watch?v=mWVATekt4ZA

Journal of the Royal Society of Western Australia, 104: 91–122, 2021

One biodiversity hotspot to rule them all: southwestern Australia—an extraordinary evolutionary centre for plant functional and taxonomic diversity

MARK C. BRUNDRETT

School of Biological Sciences, University of Western Australia, 35 Stirling Highway, Crawley, WA 6009, Australia.

✉ *mark.brundrett@uwa.edu.au*

Abstract

The Southwest Australian Floristic Region (SWAFR) is a global biodiversity hotspot with exceptional plant species richness, endemism and rarity linked to ancient landscapes, extremely infertile soils, complex habitats and a relatively stable climatic history. It contains about 9000 plant taxa (~8000 species), the majority of which are endemic. Key functional traits for nutrition, fire and pollination were assigned to 77% of taxa and extrapolated for all genera using existing data sources and new observations. Plants with complex mineral nutrition traits are 3–14 times more abundant than global averages, including 18% of all known ectomycorrhizal plants, 40% of nonmycorrhizal plants with cluster roots, 18% of carnivorous plants and most *Thysanotus* species with unique

Always was – Always will be

Market optimism fuelling speculation

‘ . . . possessing great varieties of excellent Soil, well Watered by springs, Creeks and refreshing Showers, it appears to hold out every attraction . . .’’

James Stirling to Governor Darling, 14 December 1826, quoted in in R.T. Appleyard and T. Manford 1980 ‘The Beginning, UWA Press

‘It is well known that the soil of Swan River, from its moist state, is better adapted to the cultivation of tobacco and cotton than any other part of Australia. Both of these articles are intended to be cultivated on a large scale, as also sugar and flax . . .’’ Thomas Peel led syndicate, November 1828, in R.T. Appleyard and T. Manford 1980 ‘The Beginning, UWA Press

And then reality

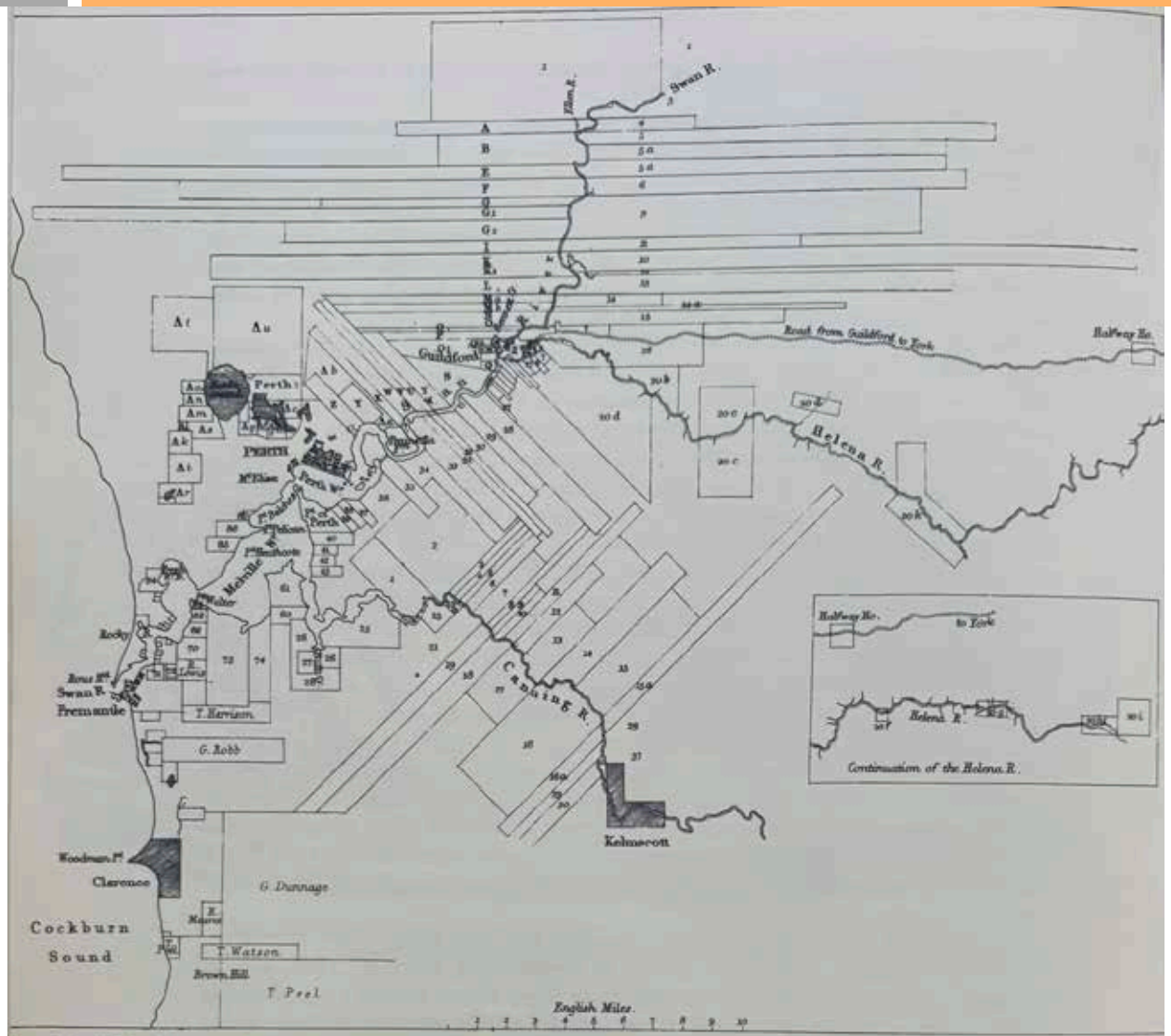


Fig. 5.1 'Strip' lots on the Upper Swan & Canning Rivers. [Reproduced from Arrowsmith Map 1839 and published in Nathaniel Ogle, *The Colony of Western Australia*]

'. . . Truly appalling . . . Not a blade of grass to be see – nothing but sand, scrub, shrubs and stunted trees . . . I say with certainty, that the soil is such, on which no human being can possibly exist. . . .'' *Samuel Taylor, quoted in J.M.R. Cameron, Coming to Terms, the Development of Agriculture in Pre-Convict Western Australia. Geowest, n0 11, 1977, UWA p13.*

Figure 1: Drainage pattern in the southwest of Western Australia

Phil Commander, Noel Schoknecht, Bill Verboom and Peter Caccetta (2001) THE GEOLOGY, PHYSIOGRAPHY AND SOILS OF WHEATBELT VALLEYS

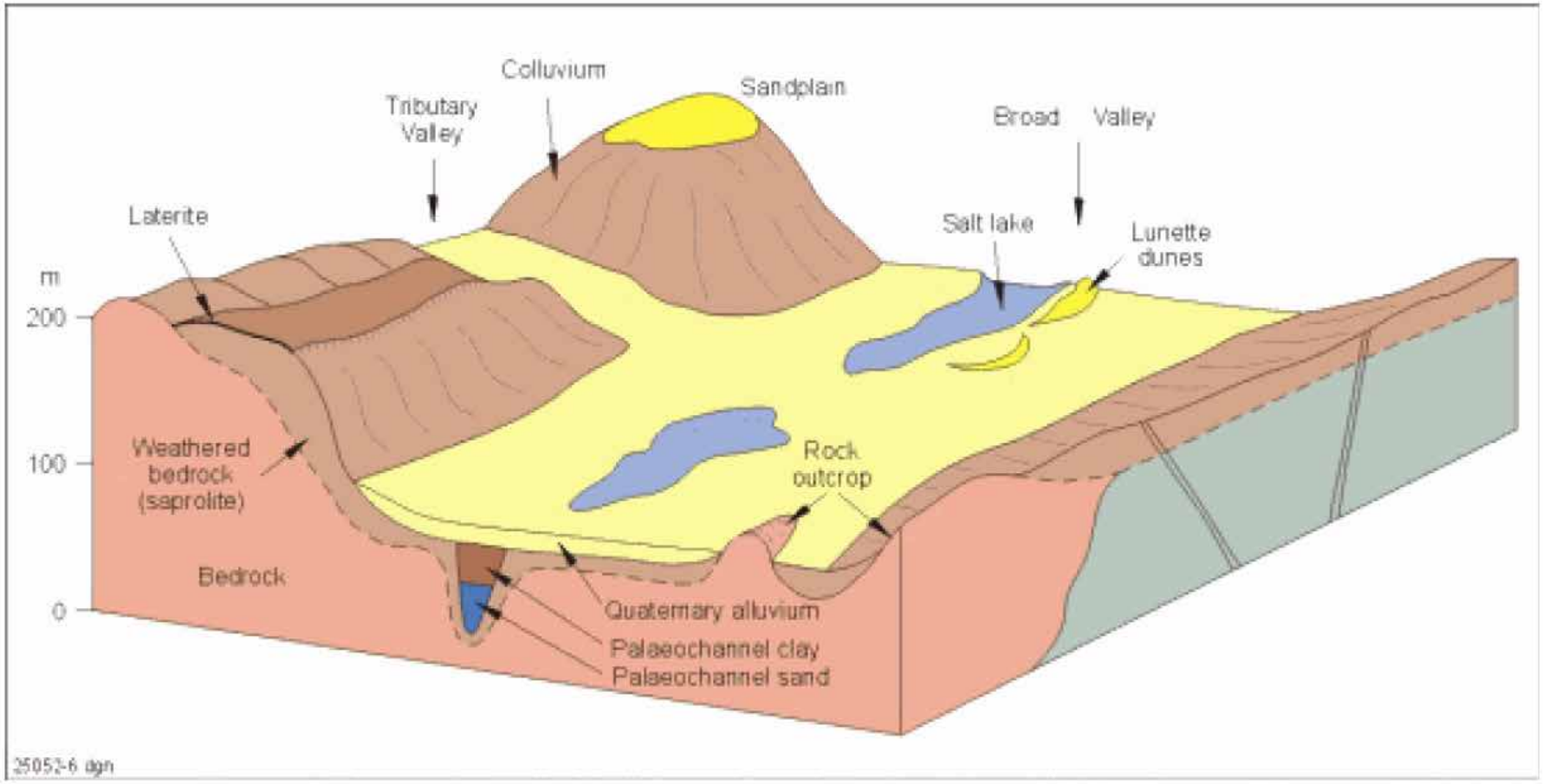
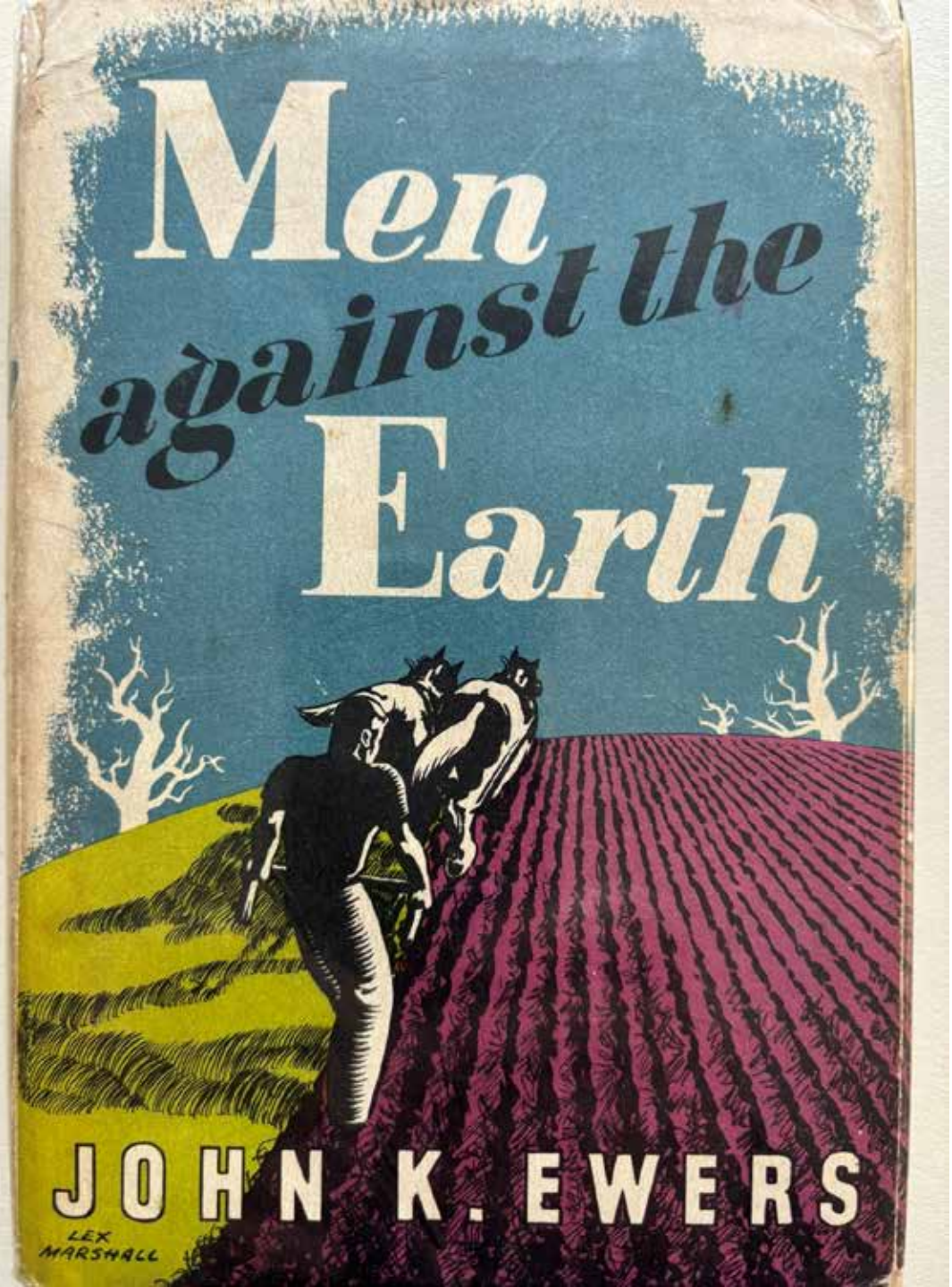


Figure 7: Block diagram showing schematic geology of a wheatbelt valley

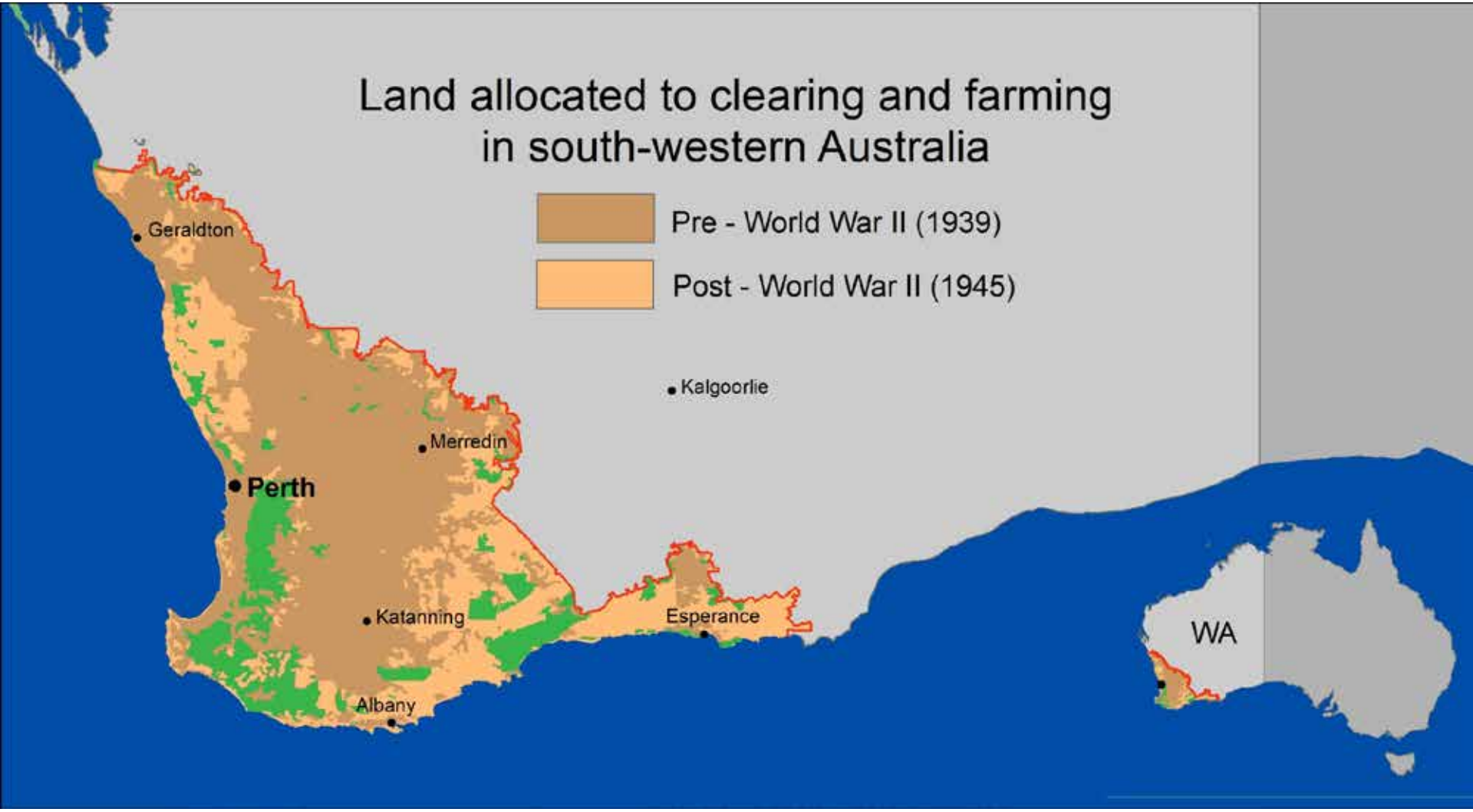
Phil Commander, Noel Schoknecht, Bill Verboom and Peter Caccetta (2001) THE GEOLOGY, PHYSIOGRAPHY AND SOILS OF WHEATBELT VALLEYS

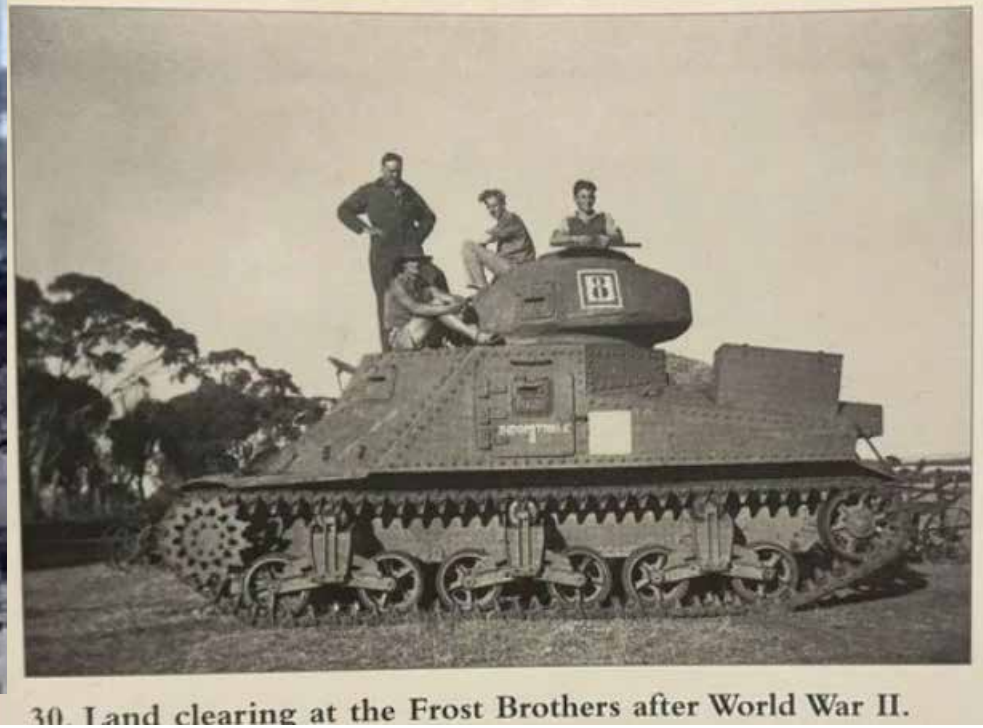
Men against the Earth



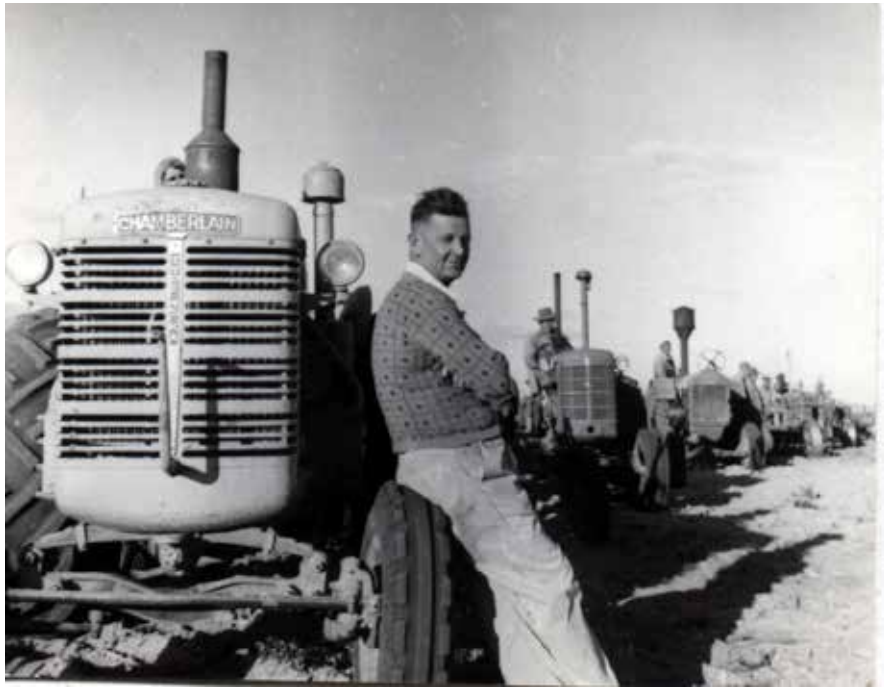
JOHN K. EWERS

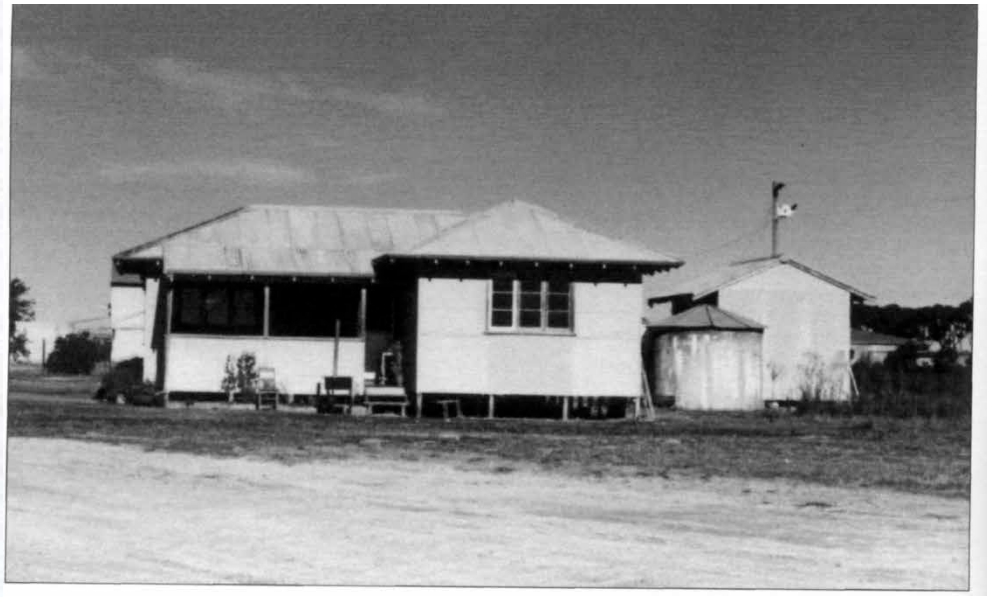
LEX MARSHALL


Land allocated to clearing and farming
in south-western Australia
Pre - World War II (1939)
Post - World War II (1945)
Geraldton
Kalgoorlie
Merredin
Perth
Katanning
Esperance
Albany
WA



30. Land clearing at the Frost Brothers after World War II.



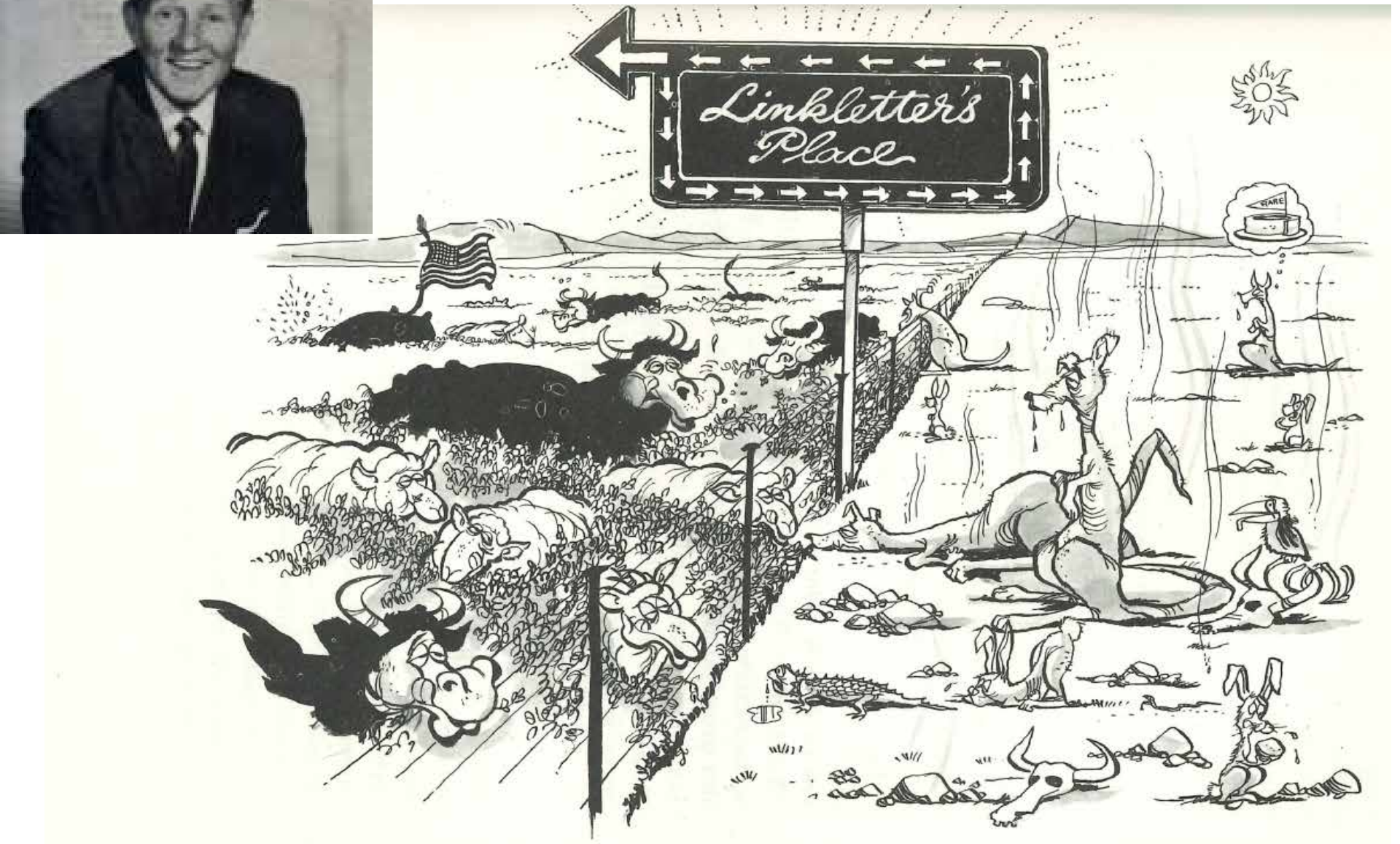


John Hagon (at the gate to his "palace"): *"Fair Dinkum, mate, does it LOOK like the Rockefeller Estate?!. . . ."*

Cartoons by Paul Rigby, taken from A. Linketter (1968) 'Linkletter Down Under' Ure Smith Sydney.

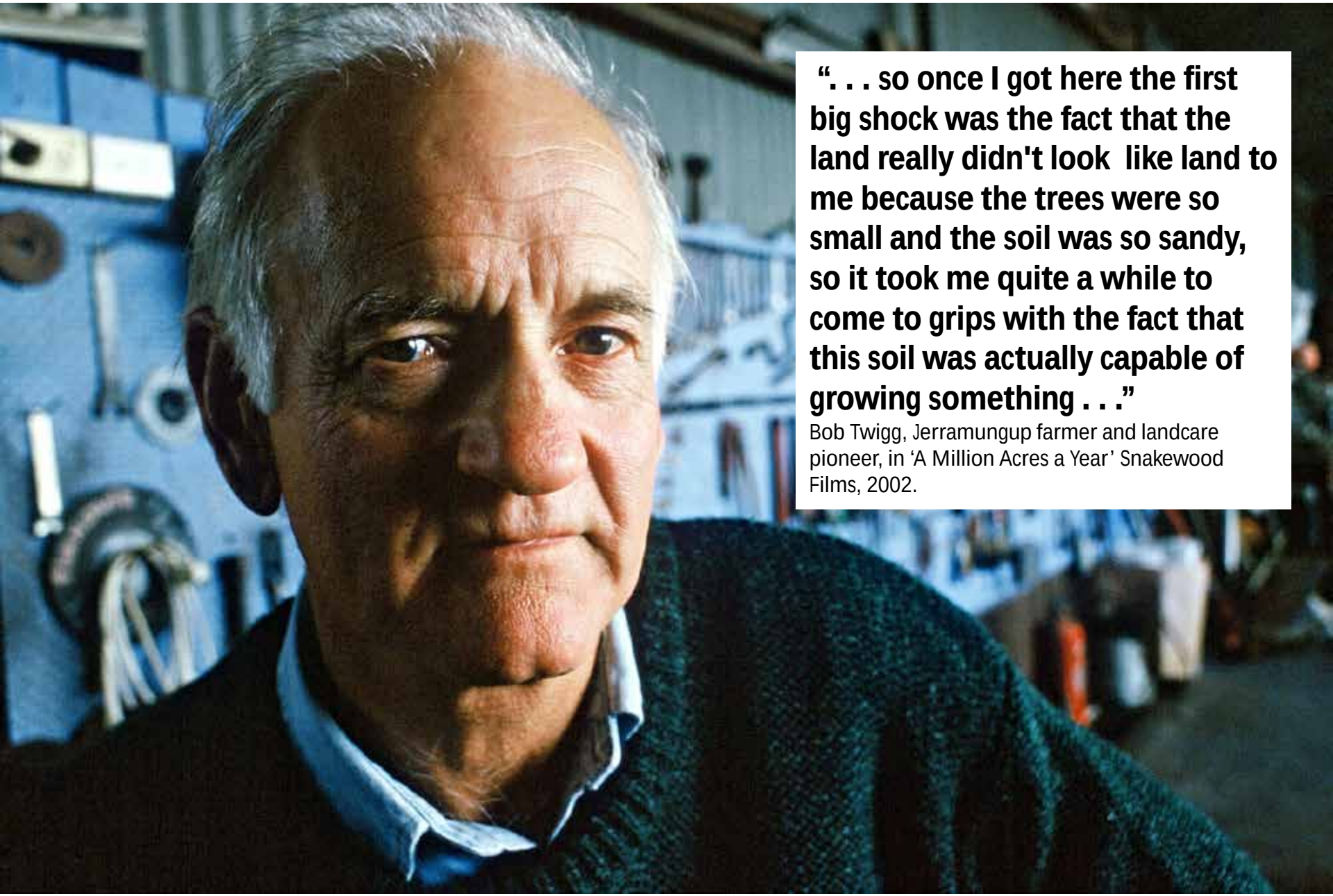
Allen Chase shows Linkletter's Condingup holdings: *"There you are, Art! That's ALL YOURS!!!"*

Cartoons by Paul Rigby, taken from A. Linketter (1968) 'Linkletter Down Under' Ure Smith Sydney.



A desert wasteland has been transformed into productive acres, feeding sheep and cattle.

Cartoons by Paul Rigby, taken from A. Linketter (1968) 'Linkletter Down Under' Ure Smith Sydney.

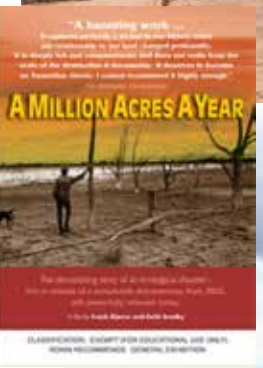


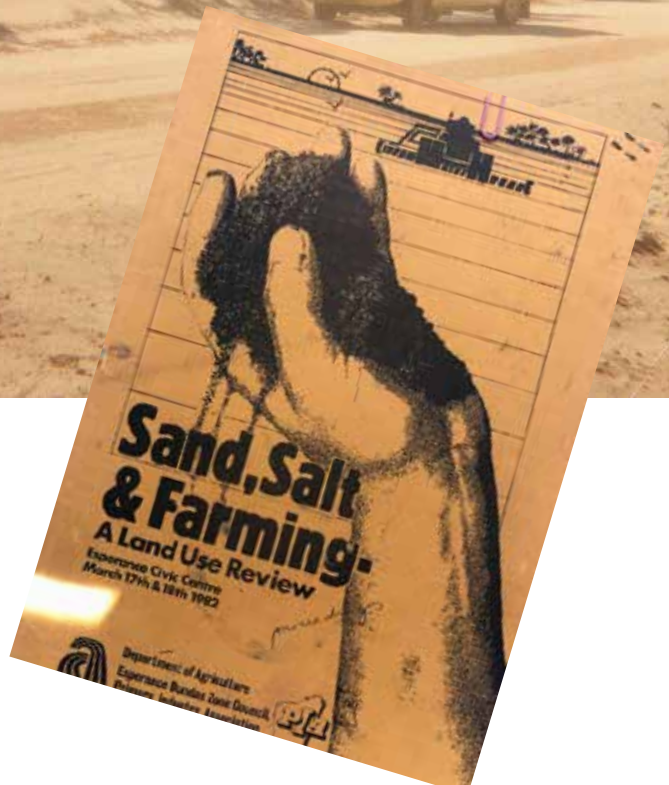
“. . . so once I got here the first big shock was the fact that the land really didn't look like land to me because the trees were so small and the soil was so sandy, so it took me quite a while to come to grips with the fact that this soil was actually capable of growing something . . .”

Bob Twigg, Jerramungup farmer and landcare pioneer, in ‘A Million Acres a Year’ Snakewood Films, 2002.

Photo courtesy :*Geoff Bee*

some hard realities in the 1980s – and onwards





Led to many landcare success stories J

National Landcare Network

WA LANDCARE network

Nodularia spumigena blooms on the Serpentine River (courtesy of Water and Rivers Commission, June 2000).

Figure 5: Macroalgal accumulation at Cox Bay, Peel Inlet (courtesy Dr Tom Rose).

Image; konoplizkaya/stock.adobe.com

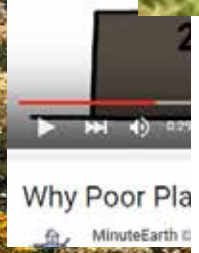
Men constructing the Harvey River Diversion were equipped with no more than axes, shovels and wheelbarrows for most of the work, with horses and mechanical excavators only used in the final stages of the project. (Courtesy Battye Library)

LANDCARE SJ
Serpentine - Jarrahdale

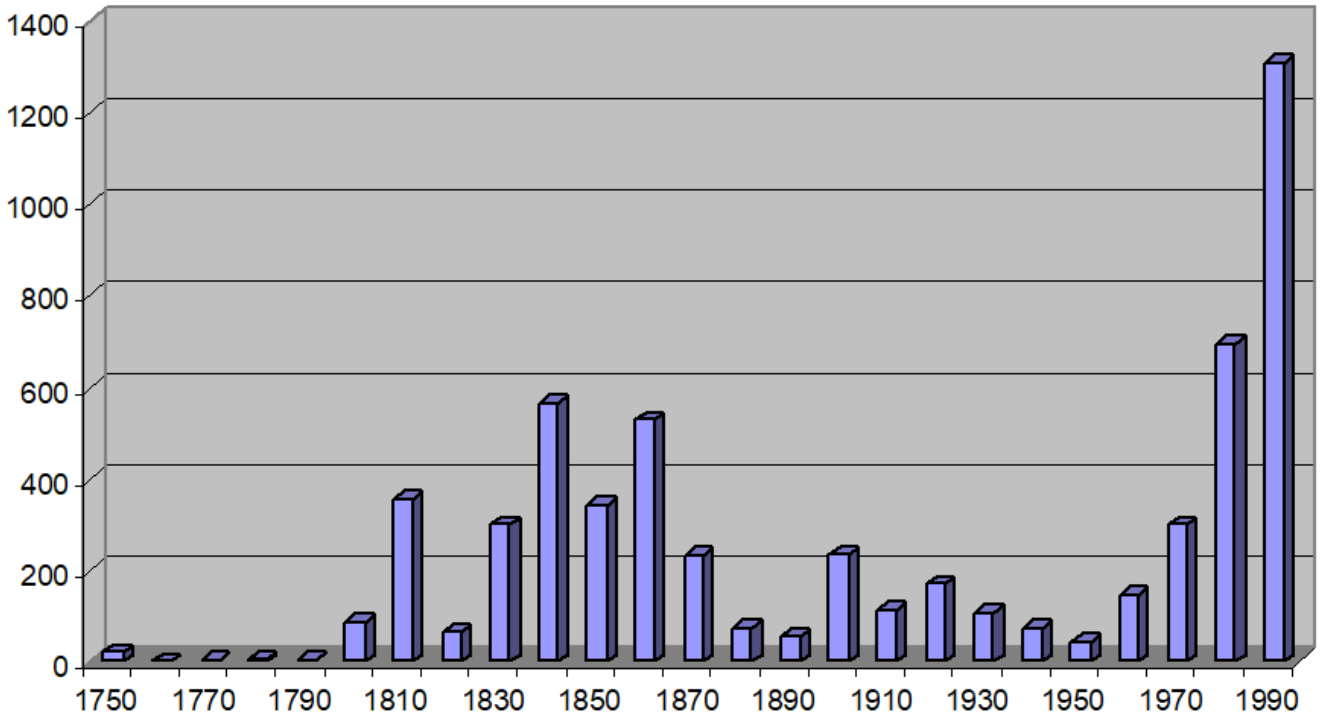
Planting site, July 29th, 2011.

Planting site, November 15th, 2011.


https://www.youtube.com/watch?v=mWVATekt4ZA



Number of currently recognised native South-western Australian vascular plant taxa described per decade

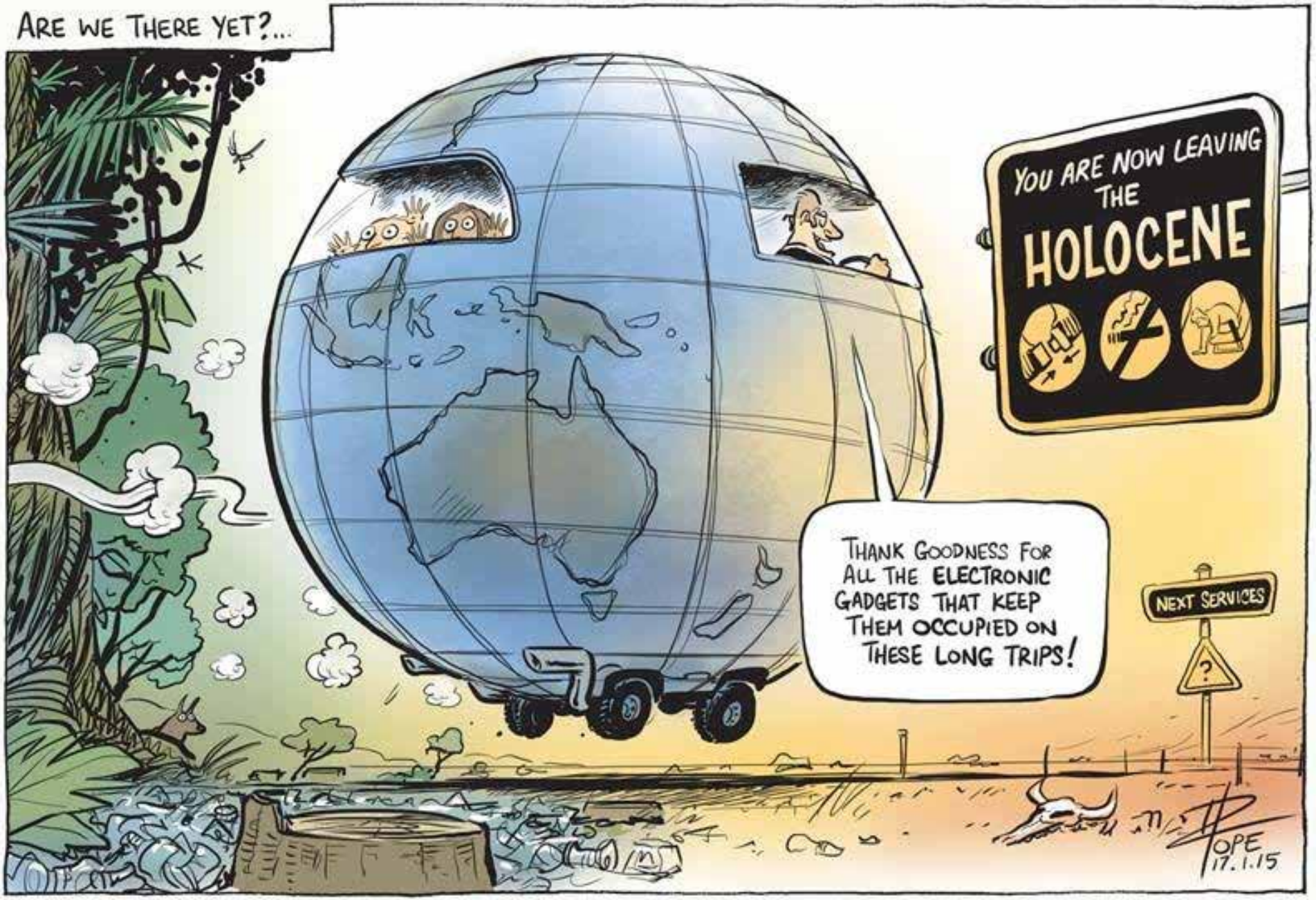


Stephen D. Hopper and Paul Gioia (2004) *The southwest Australian Floristic Region: Evolution and Conservation of a Global Hotspot of Biodiversity*. Annu. Rev. Ecol. Evol. Syst. 2004. 35:623–50

Images by Mark Brundrett, in https://particle.scitech.org.au/earth/meet-the-underground-orchids/

Images by Greg Harold

female trapdoor spider (*Gaius villosus*, family Idiopidae) that lived in North Bungulla Reserve near Tammin, Western Australia. She lived an estimated 43 years and became the longest-lived spider on record, beating a 28-year-old tarantula who previously held the title.[1] Number 16 died in 2016 from a parasitic wasp sting.[2]


ARE WE THERE YET?...
YOU ARE NOW LEAVING THE HOLOCENE
THANK GOODNESS FOR ALL THE ELECTRONIC GADGETS THAT KEEP THEM OCCUPIED ON THESE LONG TRIPS!
NEXT SERVICES
?
OPE
17.1.15

From: I.N. Esau & T.J. Lyons (2002) *Effect of sharp vegetation boundary on the convective atmospheric boundary layer*. Agricultural and Forest Meteorology 114 (2002) 3–13

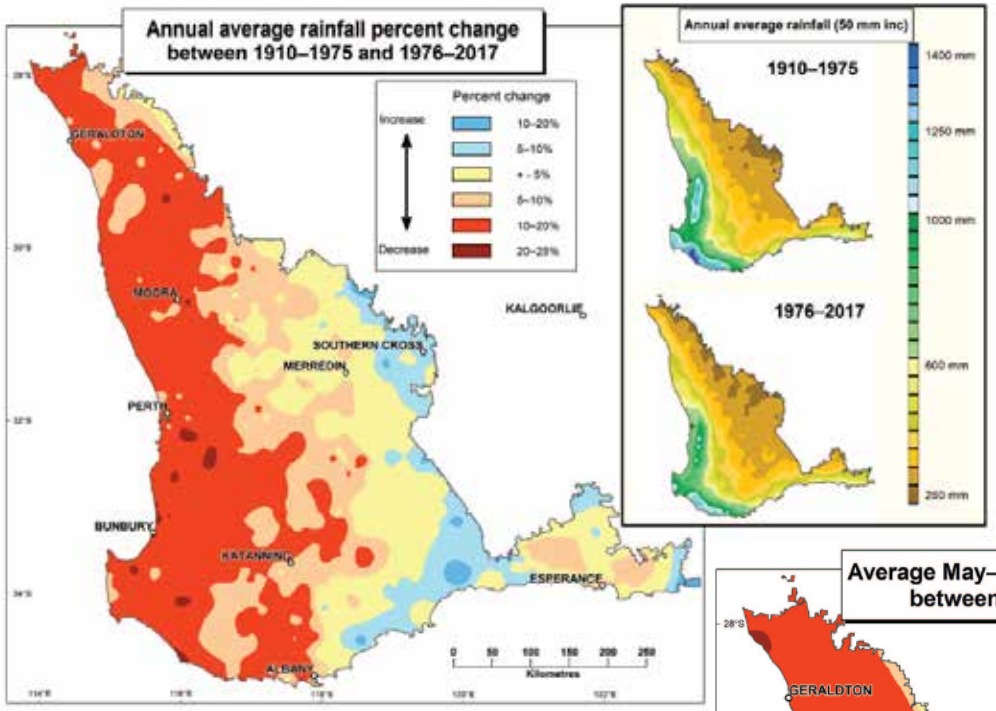


Figure 3. Average annual rainfall (upper right) and percentage change in annual averag
1976–2017 in southwestern Australia. Gridded data from Bureau of Meteorology and D
and Regional Development weather stations.

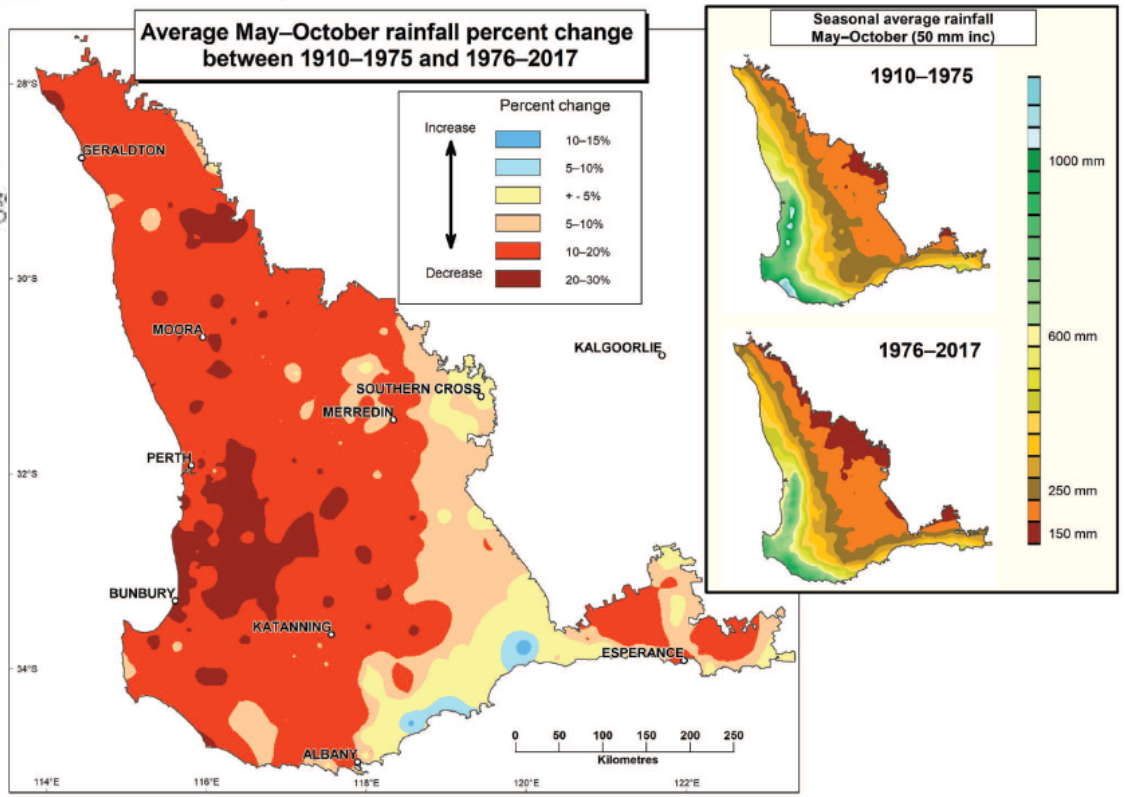


Figure 4. Average May to October rainfall (upper right) and percentage change in May to October rainfall between 1910–1975 and 1976–2017 in southwestern Australia. Gridded data from Bureau of Meteorology and Department of Primary Industries and Regional Development weather stations.

Don Mcfarlane, Richard George, John Ruprecht, Steve Charles, Geoff Hodgson (2020) *Runoff and groundwater responses to climate change in South West Australia*. Journal of the Royal Society of Western Australia, 103: 9–27, 2020

The mathematics of island biogeography

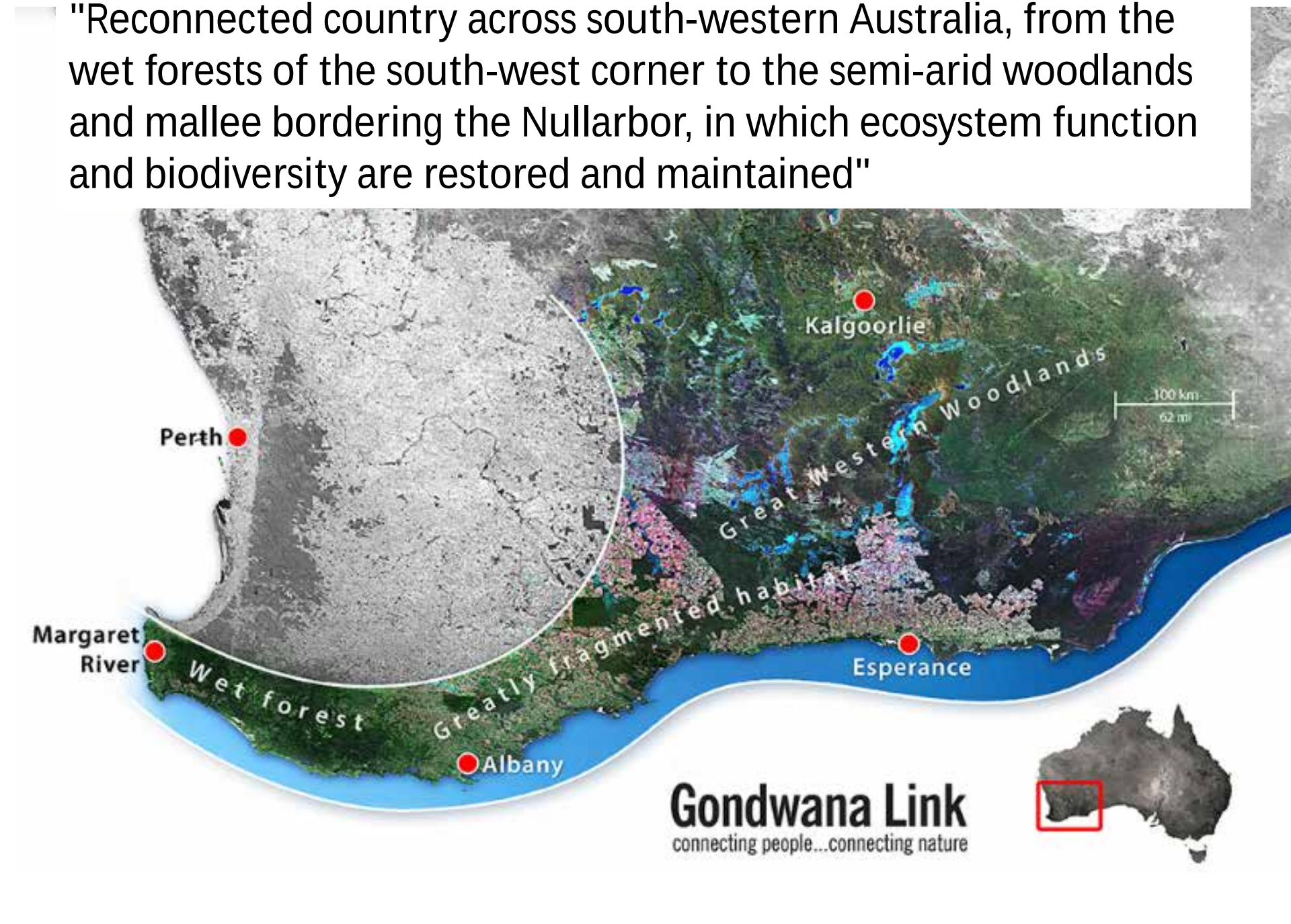
"Reserves of the order of 30-94,000 ha are required to conserve most of the avifauna of the wheatbelt"

D.J. Kitchener, J. Dell, B.G. Muir, M. Palmer (1982)
Birds in Western Australian Wheatbelt Reserves – implications for conservation. Biol. Cons. 22, 127-163

"40,000ha approximates the area of nature reserve likely to conserve that part of the regional assemblage of mammals in southern Western Australia liable to persist in the face of moderate disturbance by man and his agencies"

D.J. Kitchener, A. Chapman, B.G. Muir (1980)
The conservation value for mammals of Reserves in the Western Australian Wheatbelt Biol. Cons. 18, p179

"Reconnected country across south-western Australia, from the wet forests of the south-west corner to the semi-arid woodlands and mallee bordering the Nullarbor, in which ecosystem function and biodiversity are restored and maintained"



Ecosystem restoration has many challenges

Peniup - 2007

THRESHOLD environmental

Greening Australia

But we can do it!

- The technologies of high standard ecosystem revegetation have been developed, tested, proven and demonstrated

Peniup - 2020

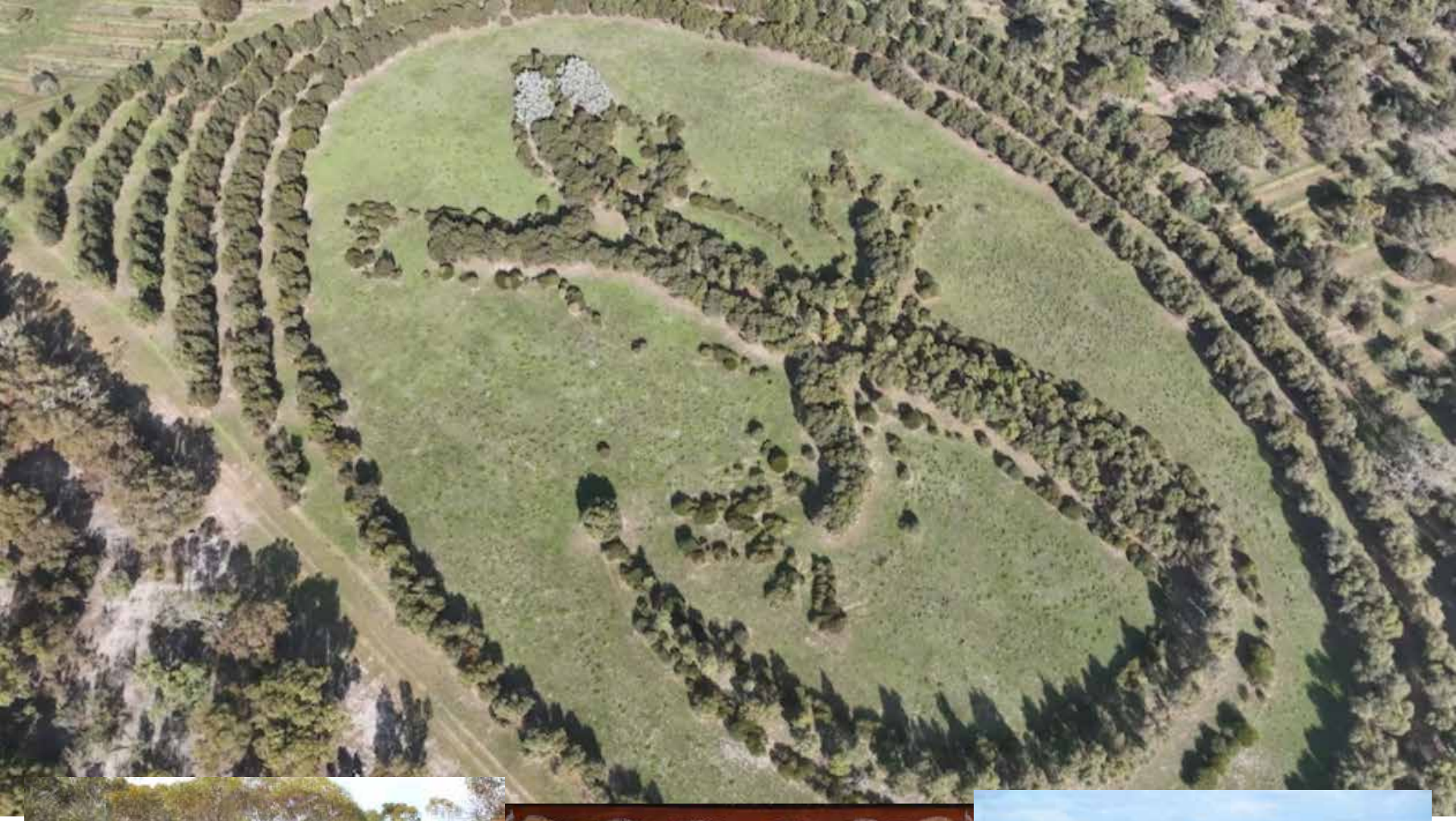
And do it well!

North Monjebup– three years after planting

THRESHOLD environmental

BUSH HERITAGE AUSTRALIA

But restoration can be so much more



Enriching the social fabric


Welcome to Wilyun Pools Farm
Seeking Balance
Carer's of this land
Traditional Custodians 40 000 years ago to present:
Noongar Peoples
1985 - 2014:
Pattie and Russell Leighton, Penny, Sam, Jim, Sylvia and Kyle
2014 - Present day:
Peter, Sylvia, Kait, Tom, Aidan, Jonas and Alex
LAND FOR WILDLIFE
Master TreeGrower

Old custodians become new owners

WOLLEMI

Welcome to Wilyun Pools Farm
Seeking Balance

Gondwana Link
connecting people...connecting nature

wirlomin
NOONGAR LANGUAGE & STORIES

carbonneutral

Yarramoup Aboriginal Corporation

L'Oréal's Fund for Nature Regeneration initiative boosts Indigenous land restoration

https://nit.com.au/11-07-2024/12470/loreals-fund-for-nature-regeneration-initiative-boosts-indigenous-land-restoration?fbclid=IwY2xjawEY_ytleHRuA2FlbQIxMQABHeN2e_glu2N5Ixh5AYfNMWIXFzV5FgCihzn1XSedboY5QLqQn1CY2wV8MQ_aem_h5eKxvHTnrfLHxc4MavJ1g


Gnamma Baanang


Elders Guidance


Cultural Mapping


Seed Processing


Archaeology


Revegetation


Heritage Surveys


eDNA Study


Salinity Measures


BRUVS Training


Seabird Studies


Ancient Wetland

Motion Sensors


Fish traps & TEC

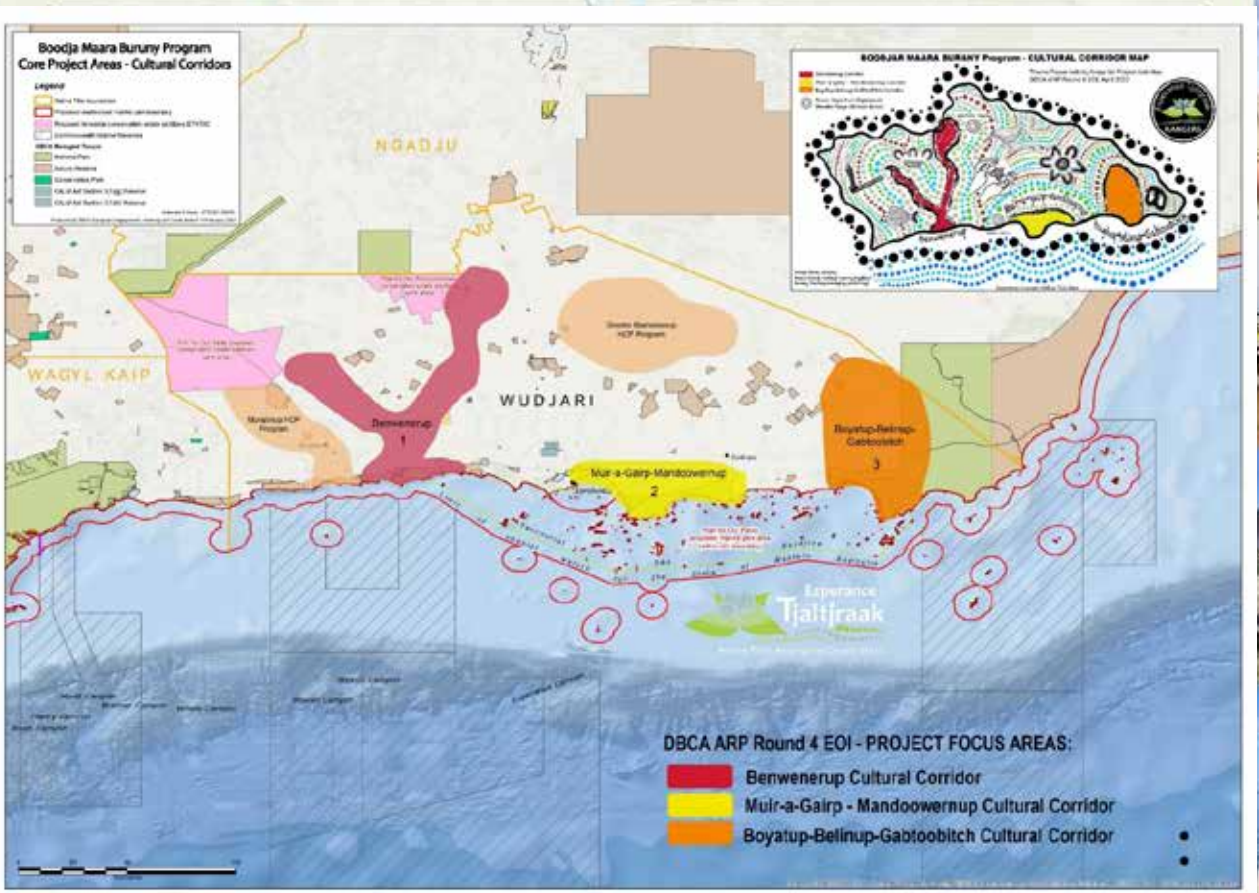

Site Forms


Cultural Plants


Site Protection


Fire Mitigation


Marine Science



GONDWANA LINK PRESENTS THE FILM

Breathing Life into Boodja

Social and ecological restoration in an ancient land

Available at https://www.roninfilms.com.au/

https://vimeo.com/channels/gondwanalink

Understanding the social science

‘Bright spots’ in landscape-scale restoration: insights for governance and innovation

Why do some large landscape-scale restoration efforts succeed? What makes some programs able to overcome challenges and navigate changing circumstances? A new action-research collaboration between the Valuing Sustainability Future Science Platform at CSIRO and Gondwana Link is seeking to answer these questions to help define how we can better support restoration across large landscapes in the future.

Food and Agriculture Organization of the United Nations

UN environment

IUCN

"We are excited that momentum for restoring our natural environment has been gaining pace because nature is our best bet to tackle climate change and secure the future."

Joyce Msuya, Acting Executive Director of the UN Environment Programme

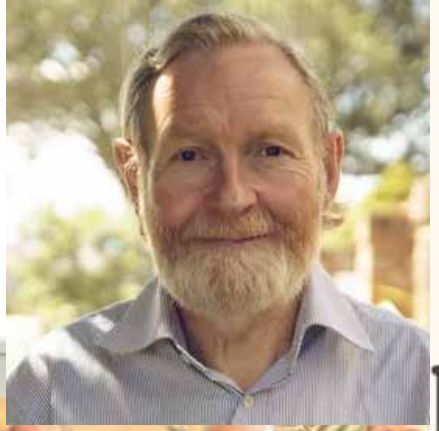
"Our global food systems and the livelihoods of many millions of people depend on all of us working together to restore healthy and sustainable ecosystems for today and the future."

José Graziano da Silva, Director-General of the Food and Agriculture Organization of the United Nations (FAO)

Restoration Decade Alliance

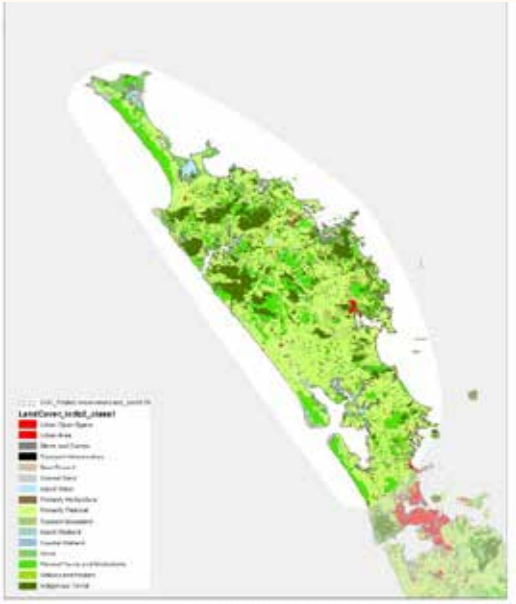
Australian restoration organisations supporting the

UN Decade on Ecosystem Restoration



Reconnecting Northland

Whenua ora, wai ora, tangata ora



1. Kaipara to the Cape – Landcover

World Agroforestry Centre

African LandCare NETWORK

Australian Landcare International

LANDCARE INTERNATIONAL

THE CRAWFORD FUND
For a Food Secure World

Australian Government
Australian Centre for International Agricultural Research

Key elements of the last 200 years

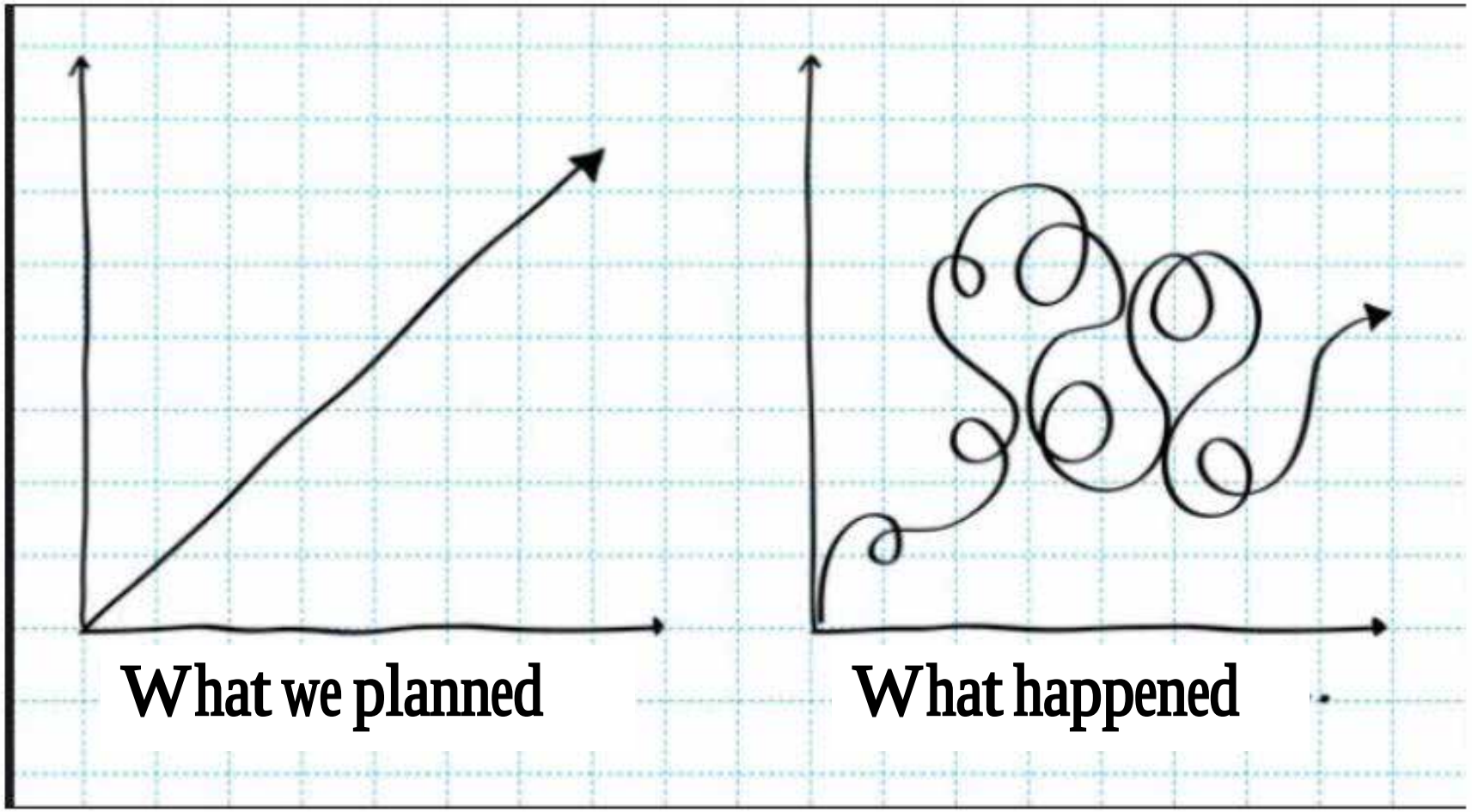
- Our agricultural optimism has been a tad ‘over the top’ at times (ie bordering on deceitful and inhumane from the beginning)
- Regardless of which, we have been very good at, eventually, building a strong and productive agricultural sector (on some very sandy soils)
- At the same time, rural populations and communities have diminished
- The world population is getting bigger, and still needs feeding
- There are some unresolved social justice issues here (but being worked on across society now)
- In the last few decades south-western Australia has been ‘discovered’ as one of the biologically richest places on earth
- And then there’s the climate!

The next 75 years?
(actually the challenge is the next 10-15)

To achieve and benefit from the transformational changes necessary, we need to:

- Maintain high levels of food production and farm profitability
- Reverse land degradation as well as improving soil fertility and moisture holding capacity
- Transition rapidly from fossil fuels to mainly renewables
- Restore and connect enough areas of high ecological value sandplain and woodland to ensure ecological viability in a time of climate change
- Strengthen the populations and economies of the small rural communities and towns

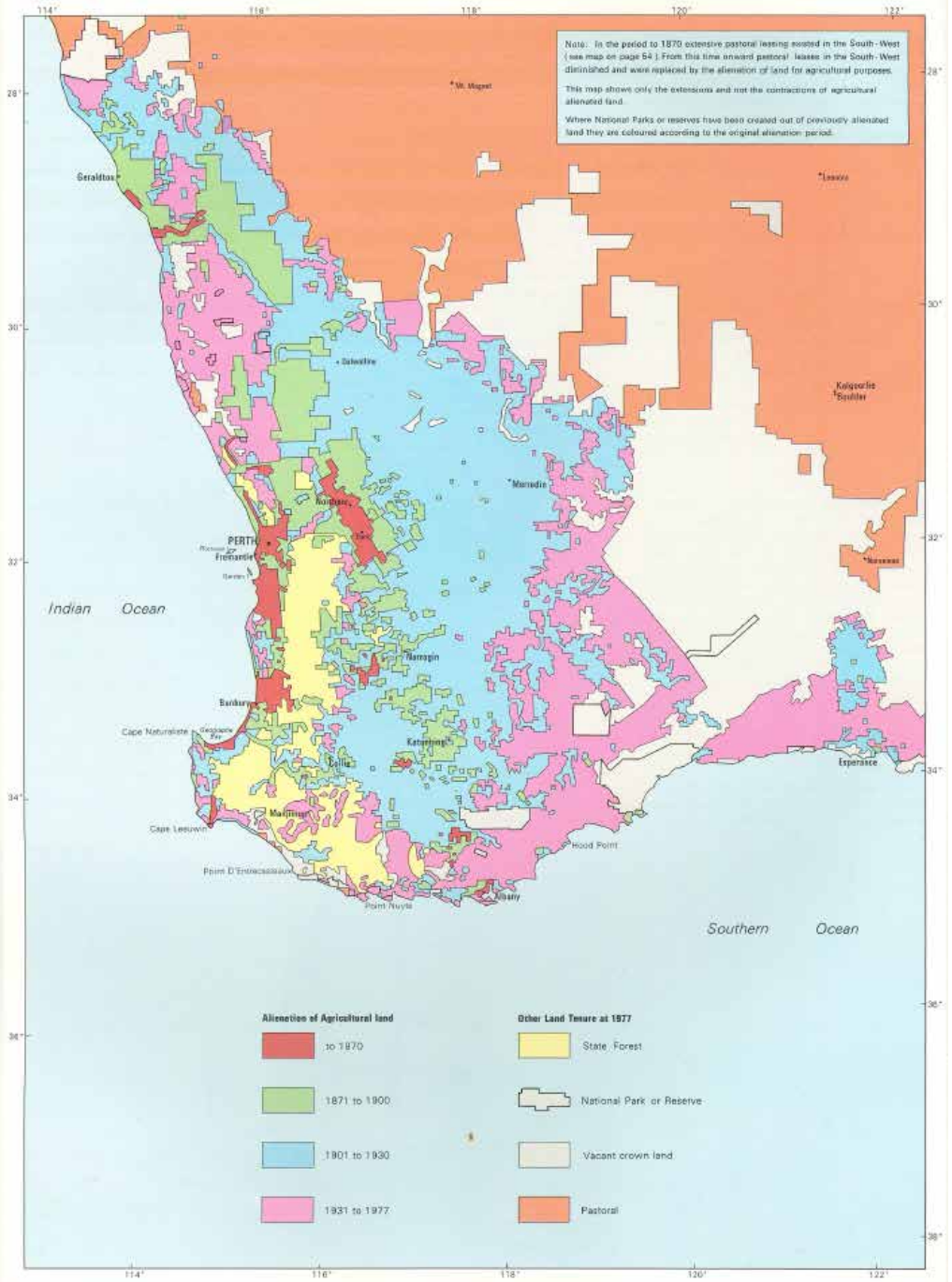
Gondwana Link: 2002-2025



A diagram of life

Maybe insert a CP photo of some sort

AGRICULTURAL ALIENATION



1 : 4 000 000

Modified Polyconic Projection
Central Meridian at 121° East

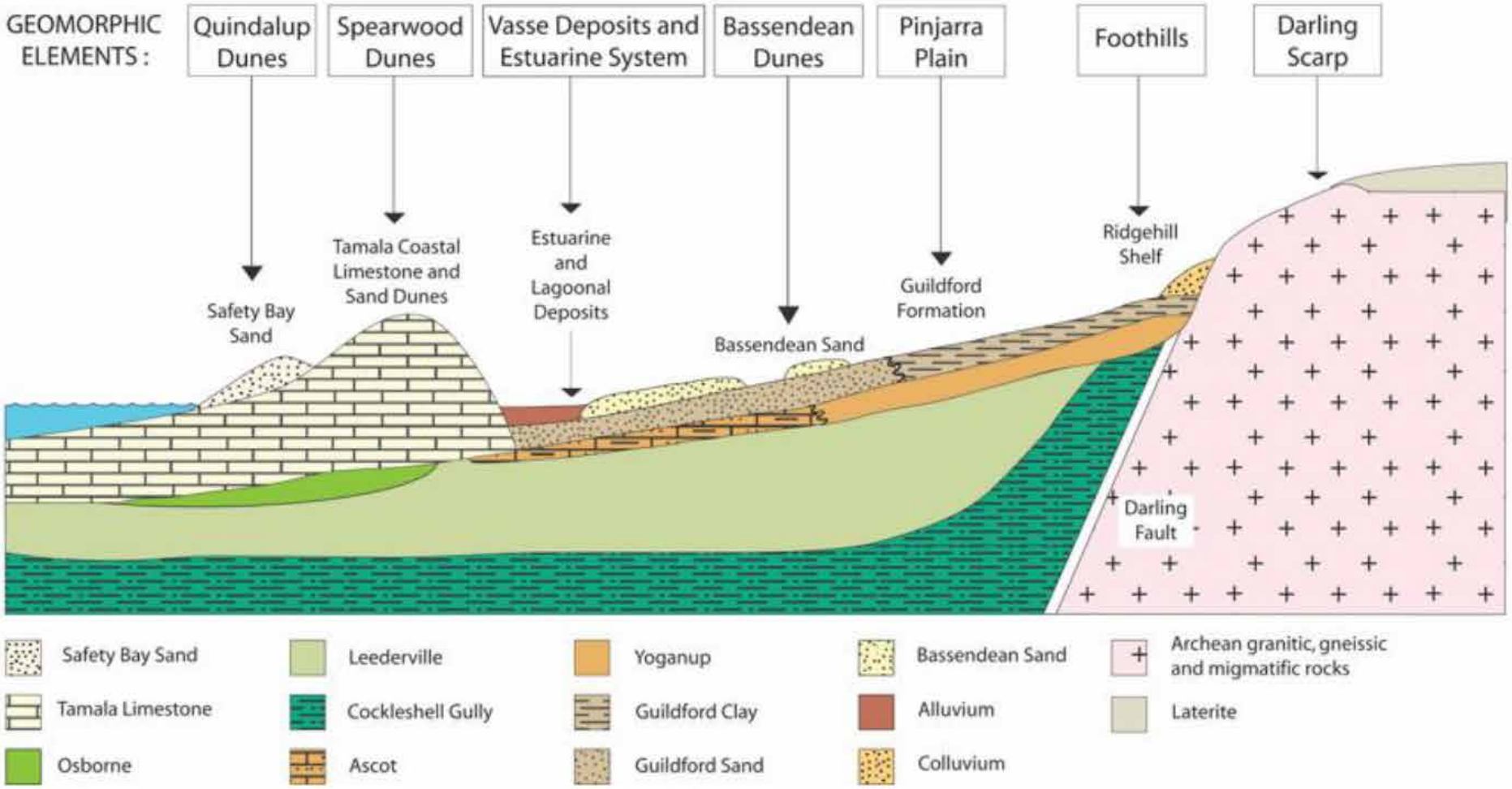
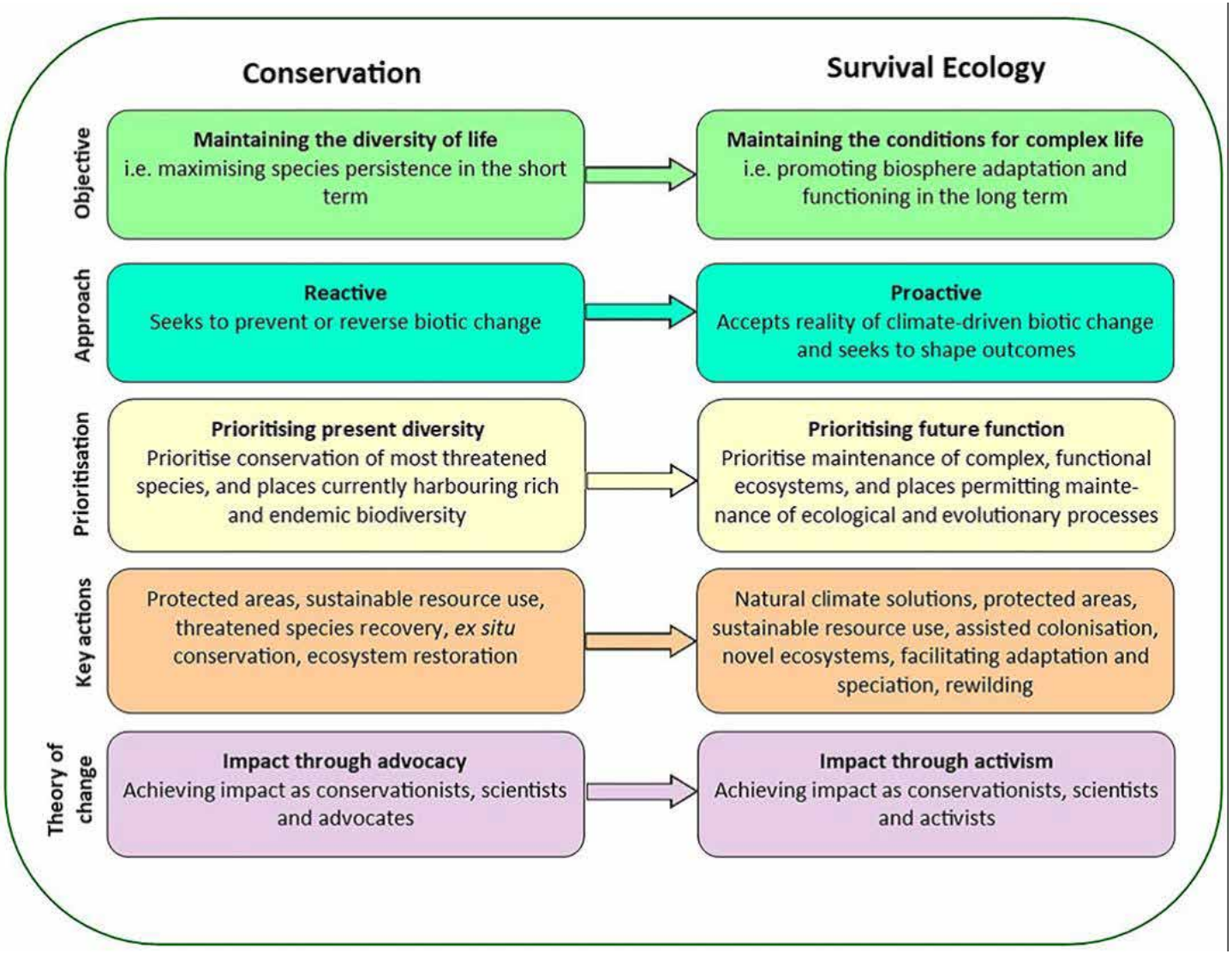


Figure 2.3: East to west s

The recommended reference for this publication is: Hennig, K, Kelsey, P, Hall, J, Gunaratne, GG & Robb, M 2021 *Hydrological and nutrient modelling of the Peel-Harvey catchment*, Water Science Technical Series, report no. 84, Aquatic Science Branch, Department of Water and Environmental Regulation, Perth, Western Australia.

How to be a good ecologist today?



Charlie J. Gardner, James H Bullock (2021) *In the Climate Emergency, Conservation Must Become Survival Ecology*
Front. Conserv. Sci., 28 October 2021Volume 2 - 2021 | https://doi.org/10.3389/fcosc.2021.659912

Healthy Country – Healthy People?

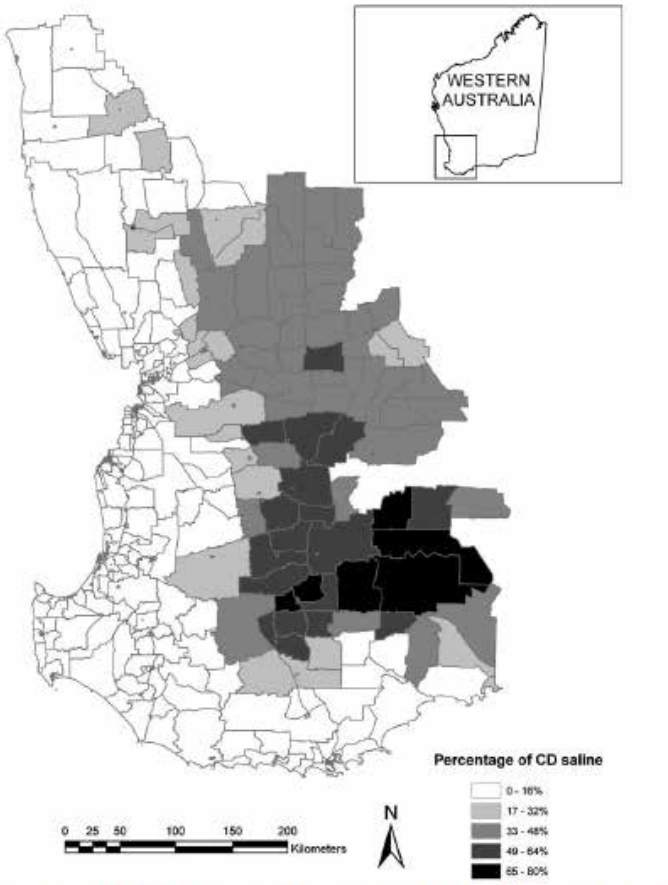


Fig. 1. Map of soil units within the study area showing the percentage of soil unit presently saline or at high risk of salinisation. Note that the Pert included in study area.

A relationship between environmental degradation and mental health in rural Western Australia. Peter Speldewinde, Angus Cook, Peter Davies, Philip Weinstein (2009) Health & Place 15 (2009) 880–887

'In summary, dryland salinity was associated with increased relative risk for hospitalisation for depression. Although socio- economic status and the proportion of the population identified as Indigenous were important predictors of the relative risk for depression, dryland salinity also contributed to the relative risk independently.'

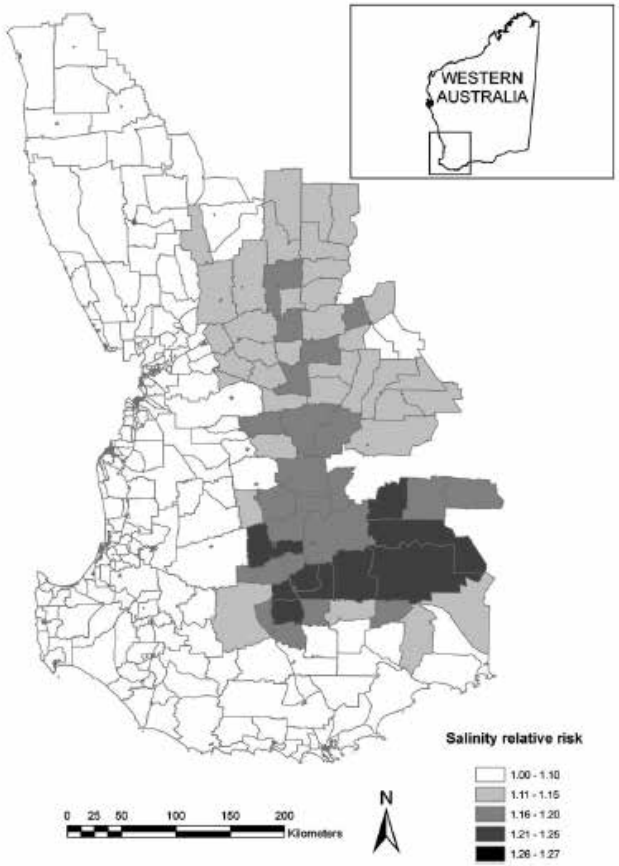


Fig. 3. Relative risk for depression based only on salinity ($RR[i] = \exp(\alpha + \beta 1 \times SEIFA[i] + \beta 2 \times ind[i] + \beta 3 \times sal[i] + b[i] + h[i])$ where $\alpha = -0.991$, $\beta 1 = 0.207$, $\beta 2 = 0.039$, $\beta 3 = 0.003$).