



Karda mia and wilgie gnamma



(goanna shelters and red ochre pools):

two poorly documented aspects of Noongar cultural heritage on granite rocks

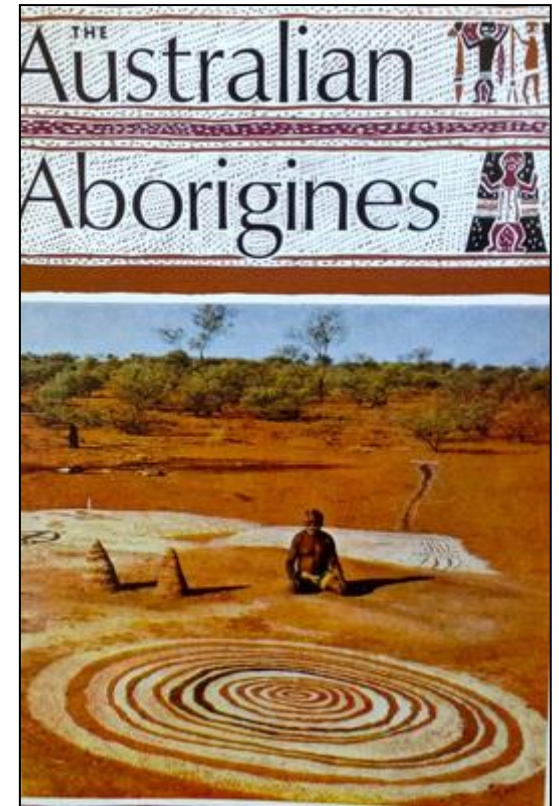
Stephen D. Hopper, Larry Blight, Genevieve Carey,

Len Collard, Harley Coyne, Averil Dean, Joe Dortch, Aden Eades, Eugene Eades, Rod Garlett, Vernice Gillies, David Guilfoyle, Lynette Knapp, Stan and Geraldine Loo, Alison Lullfitz, Nathan McQuoid, Myles Mitchell, Catherine Morgan, Sheila Murray, Noel Nannup Karda, Carol Pettersen, Ron Doc Reynolds, Graeme Simpson, Peter Speldewinde, Wayne Webb, Eliza Woods, Micheal Woods, Steve Woods, Treasy Woods, Esperance Noongar families participating in Gabbie Kylie Field Schools, and Noongar and neighbouring people, past and present

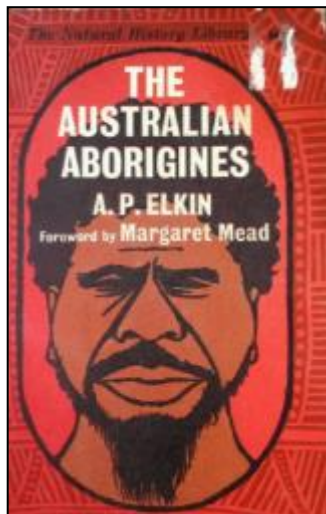


Initial anthropological theory

‘The Aborigines are food-gatherers and hunters. They do not practise any form of gardening or animal husbandry, and we have no reason for thinking they ever did’.



Elkin 1974, pg 31.

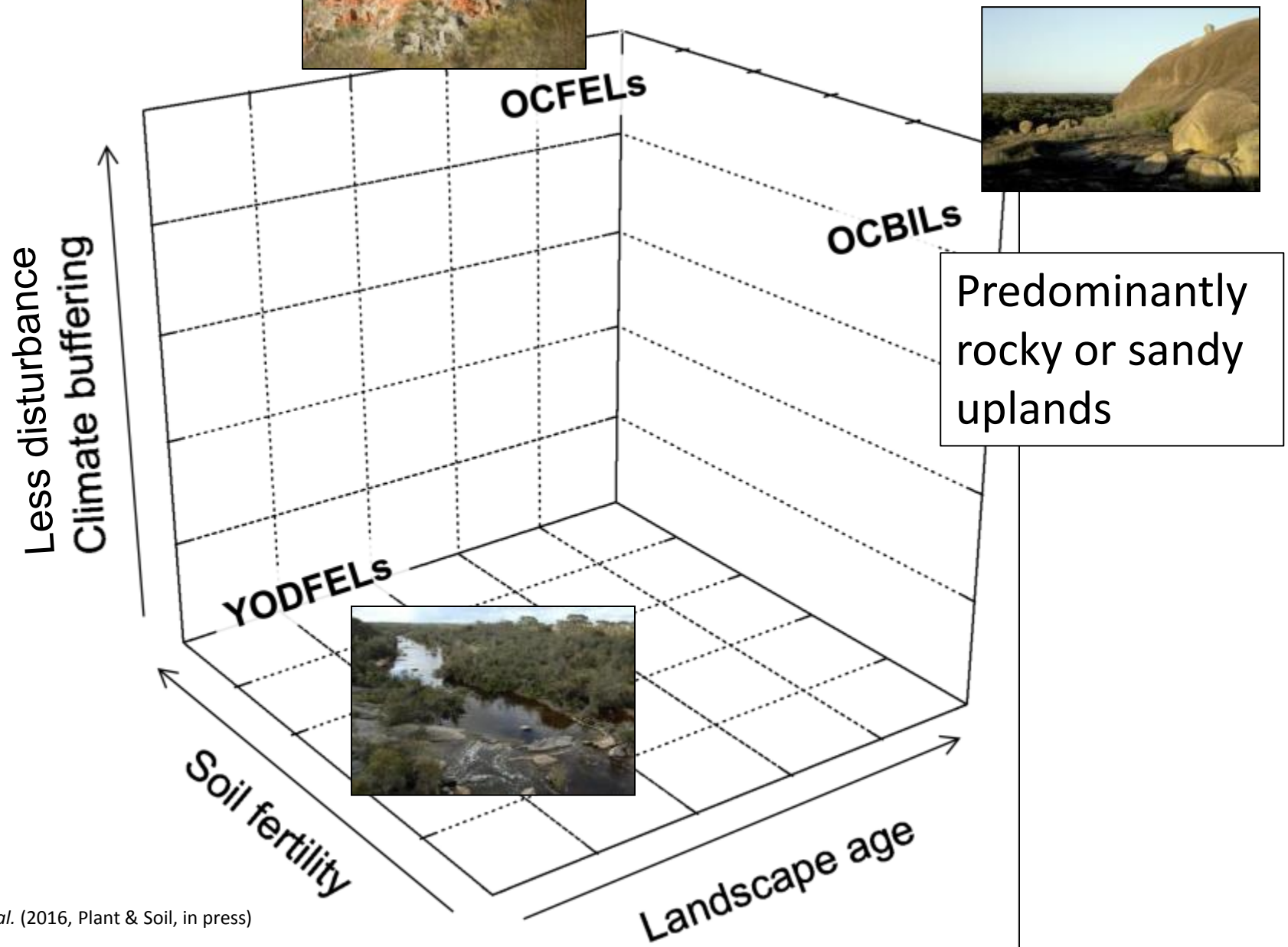


Ocbil theory and human cultural adaptations

a new line of cross-cultural research

- Evolution, ecology and conservation of biodiversity on old, climatically buffered infertile landscapes (Ocbils – Hopper 2009)
- Found in a third of the world's 35 Global Biodiversity Hotspots, mainly Southern Hemisphere
- Our species may have evolved in regions with Ocbils in southern Africa
- Granite outcrops are common in some Ocbils
- Aboriginal cultures and Australia's Ocbils offer profound insights and research opportunities
- Are there human cultural adaptations for living on or with Ocbil granites?





An Ocbil (SW Australia)

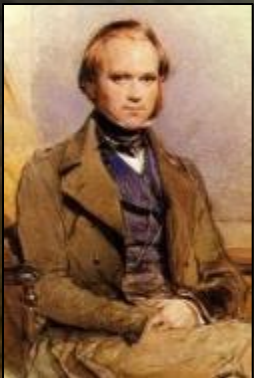


Granitites



W.R. Barker

A Yodfel (Wales)



Darwin

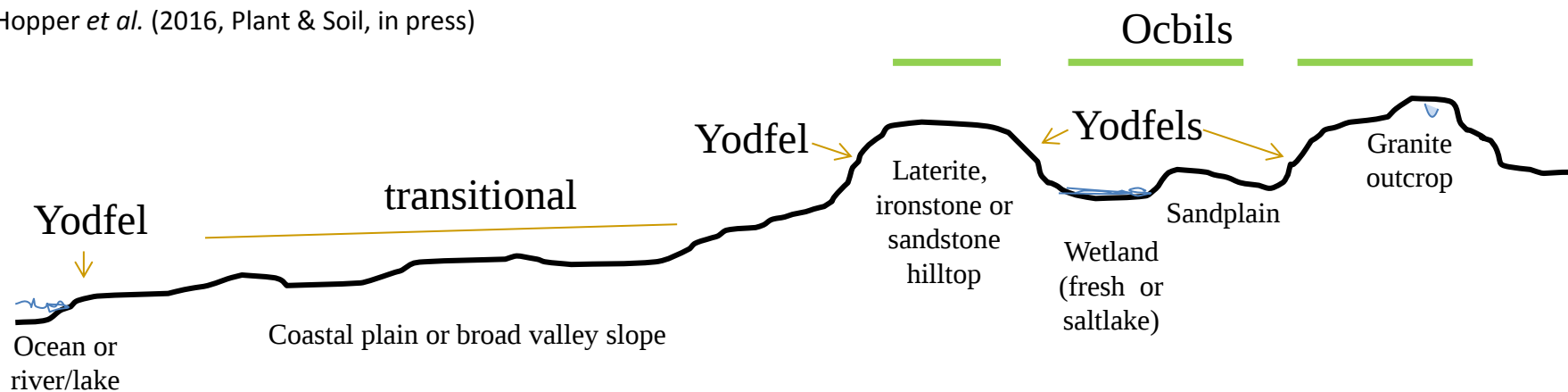


a



b Not whole regions – Ocbils are embedded in a matrix of Yodfels

Hopper *et al.* (2016, Plant & Soil, in press)



c



d



OCBIL theory – principle hypotheses

Hopper (2009) *Plant and Soil* 322:49-86

- Accentuated persistence of lineages (Gondwanan Heritage hypothesis) and plants
- Reduced dispersability, increased local endemism and rarity
- Selection for heterozygosity (the James Effect)
- Prolonged speciation at the margins (Semiarid Cradle hypothesis)
- Nutritional and other biological specialization
- Adaptation to saline soils
- Special vulnerability and resilience

Today



Today's 1st Ocbil prediction – nutritional and other biological specialization

- Relatively infertile Ocbil soils on granite select for animals with specialized and conservative metabolisms (ectotherms e.g. reptiles)
- Specialized husbandry of scarce palatable reptiles on granite Ocbils is predicted as a cultural adaptation



Photos SD Hopper



Photo Sheila Murray

A diverse herpetofauna (carrying *Salmonella* and other gut pathogens)
does occur on
SW granite
Ocbils



Noongar people, granite outcrops and reptile husbandry?



De Sainson 1833
Habitans du Port
du Roi Georges

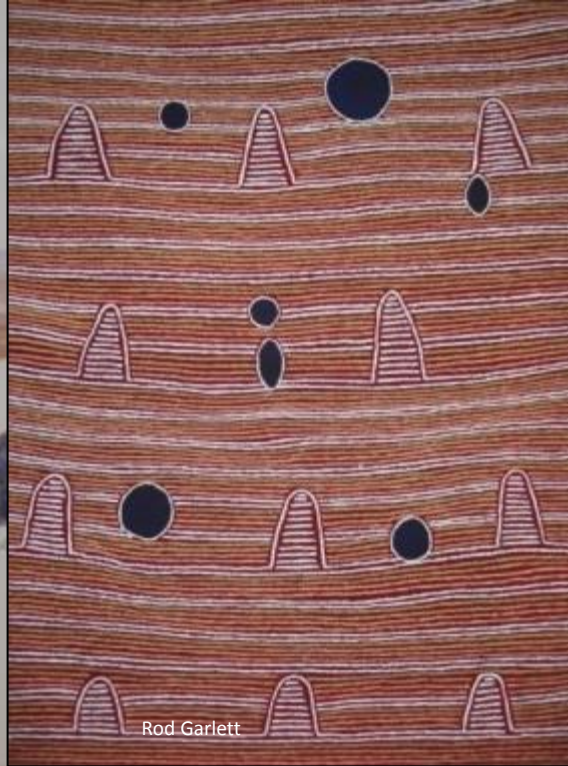


Robert Dale, engraved by Robert Havell, *Panoramic View of King George's Sound, Part of the Colony of Swan River*, 1834, Kerry Stokes Collection, Perth





Bola Garlett



Rod Garlett



Wirn boodja (enspirited landscapes, spirit-scapes)
strong ongoing cultural links exist with granite outcrops



Dan Paris



“Lizard traps”? More appropriately
Karda mia (goanna shelters)

Evidence?



Overlooked and poorly documented

- No mention found in the colonial literature by explorers and settlers, despite some excellent and detailed accounts of the daily lives of Noongars by Collet Barker, Ethel Hassel, Daisy Bates, explorers such as John Septimus Roe and George Fletcher Moore, and biological collectors John Gilbert, James Drummond etc.
- More the business of women and children than men?; involving a food that Europeans regard as unpalatable?
- Occasional mention in today's anthropological literature
- Noongar oral history – abundant recognition of 'lizard traps'
- Precise functioning and use of *karda mia* remain uncertain
- Can science help to elaborate understanding?
- Elders sanctioned and encouraged such research



Unequivocally constructed by people

Torndirrup NP high plateau outcrop Sheila Murray Larry Blight 3 8 2014

Stacked propstones
Gabtoobitch 2012



Dolerite propstone

Old structures – lichen and moss growth

Meekajinda (Mt Walker) 27 8 2013; inset George Gardner's Rock (E Northcliffe) 7 11 2014



Possibly thousands of years old?

Karda mia on Breaksea Island

Photos Ellen Hickman 2014

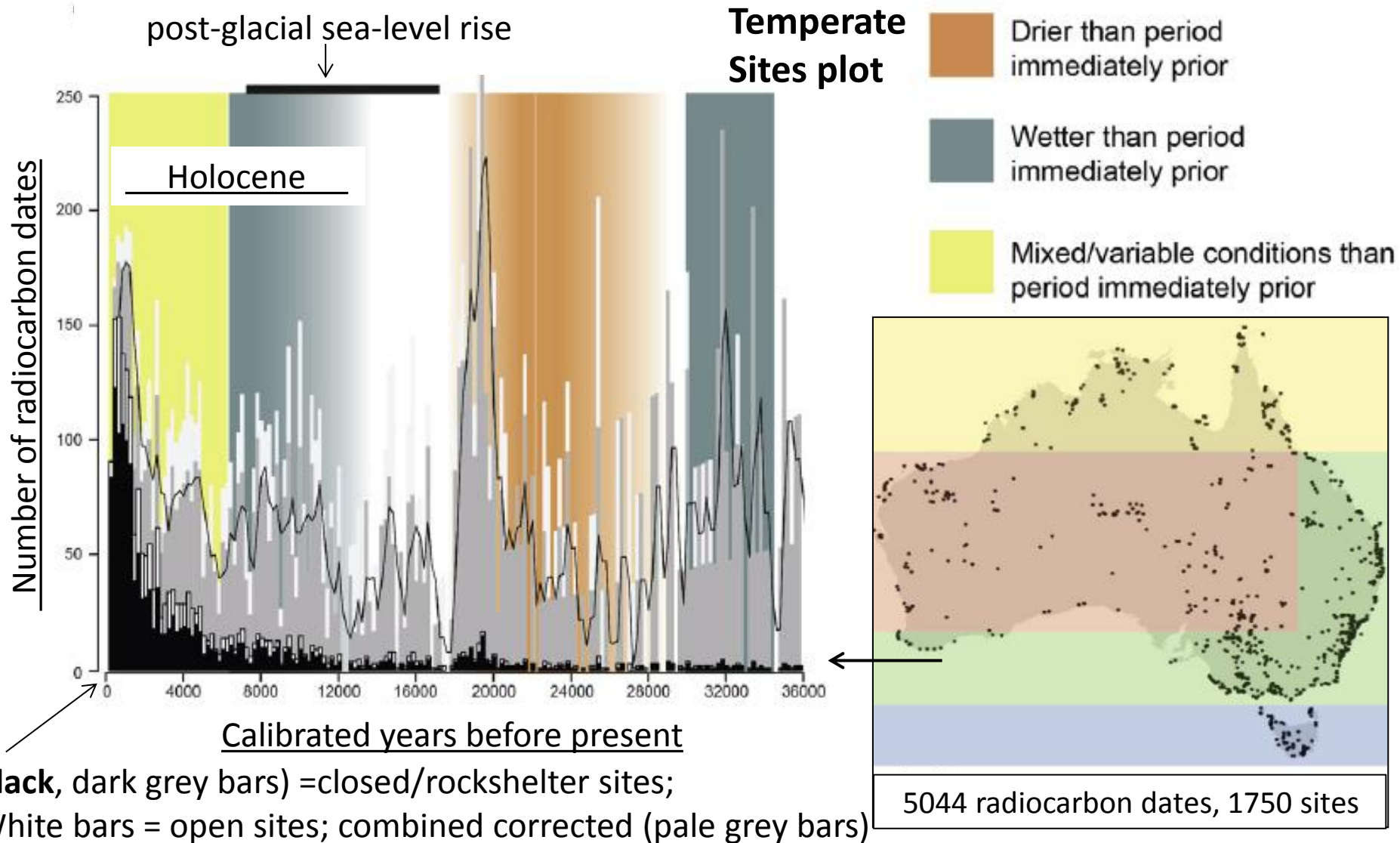


Part of the Holocene 'Golden Age' of Aboriginal innovation and population growth (last 10,000 years)?

Williams *et al.* (2015) *Quaternary Science* 123: 91-112



Backed blade

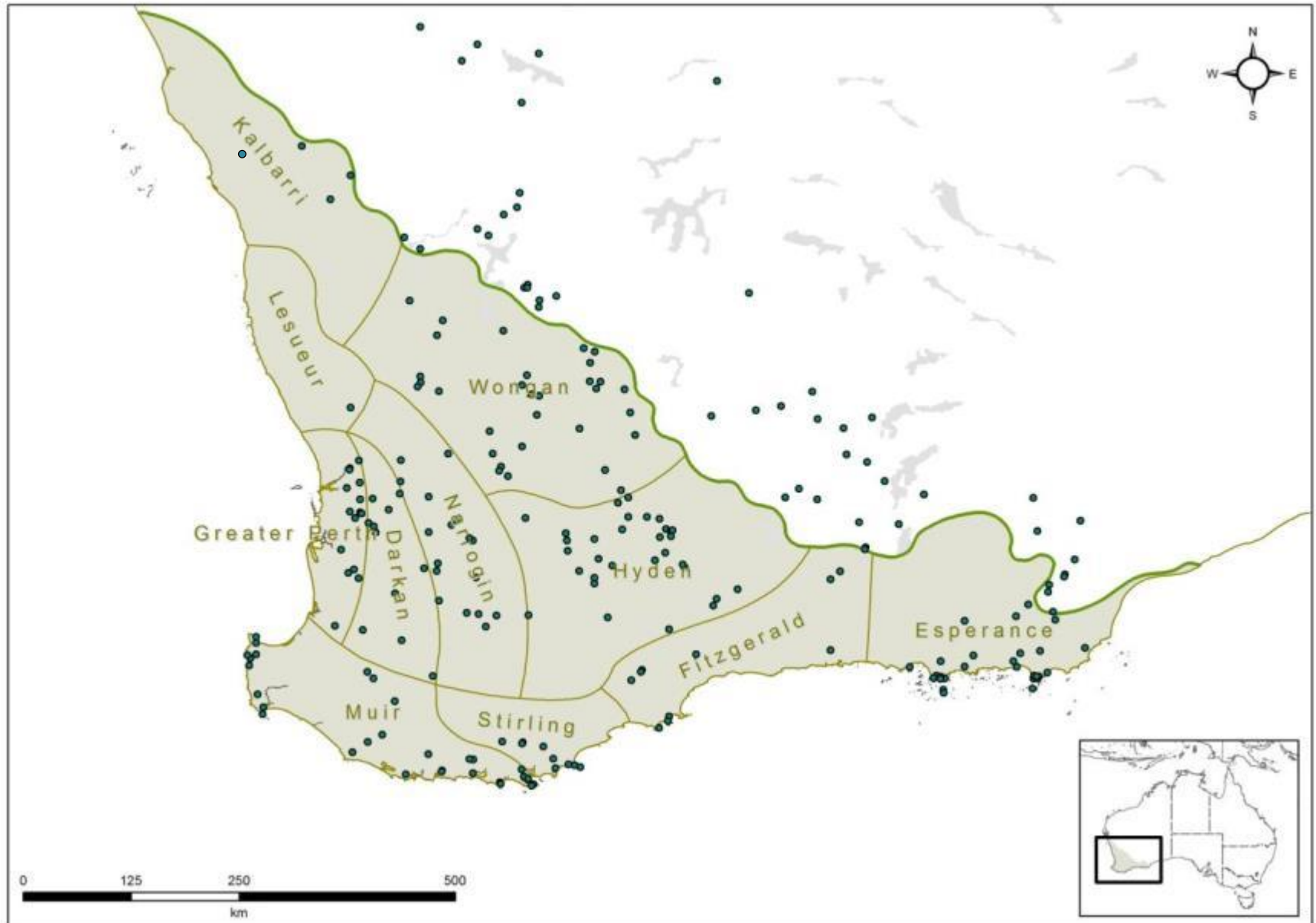


Karda mia slab manufacture?

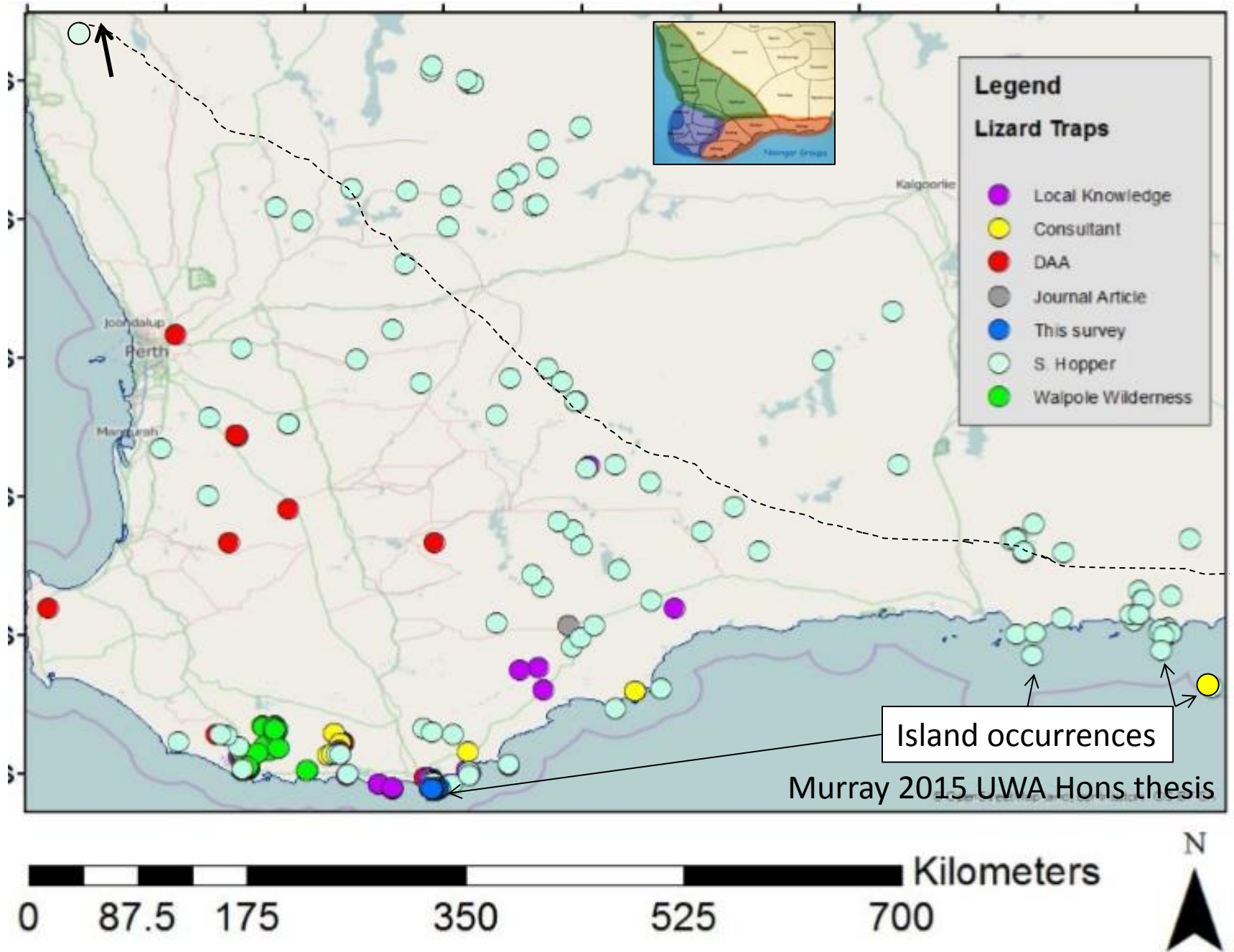
Lynette Knapp Carol Pettersen Alison Lullfitz Quararup Discovery Hill 2 2013, 12 2014



Granite rocks surveyed 1978-2015



Karda mia confirmed locations – Noongar boodja and inland



Colonial accounts
and *Noongar* oral
history indicate that
karda are the
preferred reptile
food.



Photo SD Hopper Billyacatting 3 4 2014

Do they
inhabit/visit *karda*
mia?

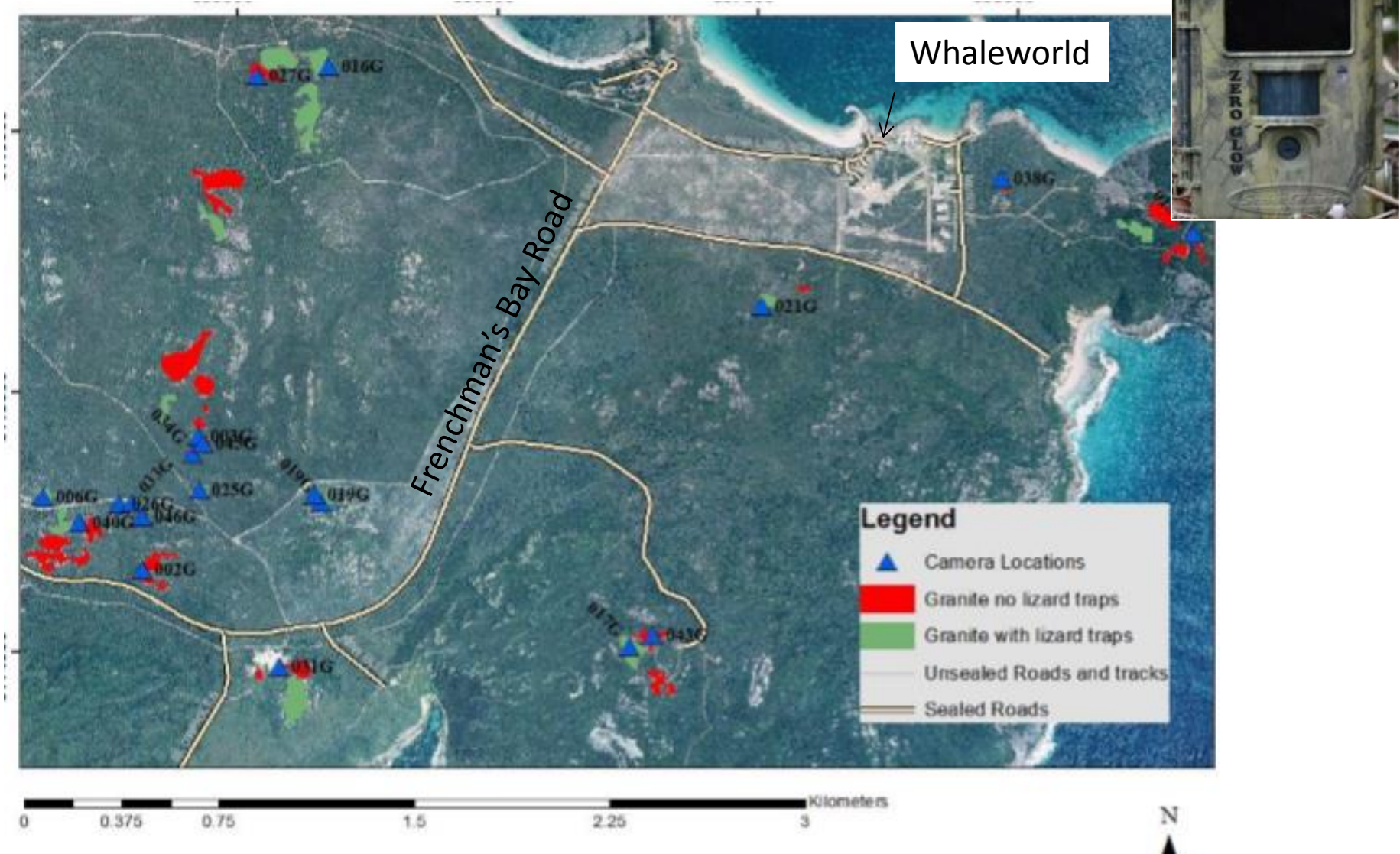
Rarely seen.



Photo Paul Greenfield Mt Adelaide 2012

Motion camera experiment –

Torndirrup National Park Murray (2015 UWA Hons thesis)





Cameras operational

Karda mia:

1920 daylight hours

22 reptile sightings

Controls: 1453 hours

0 reptile sightings





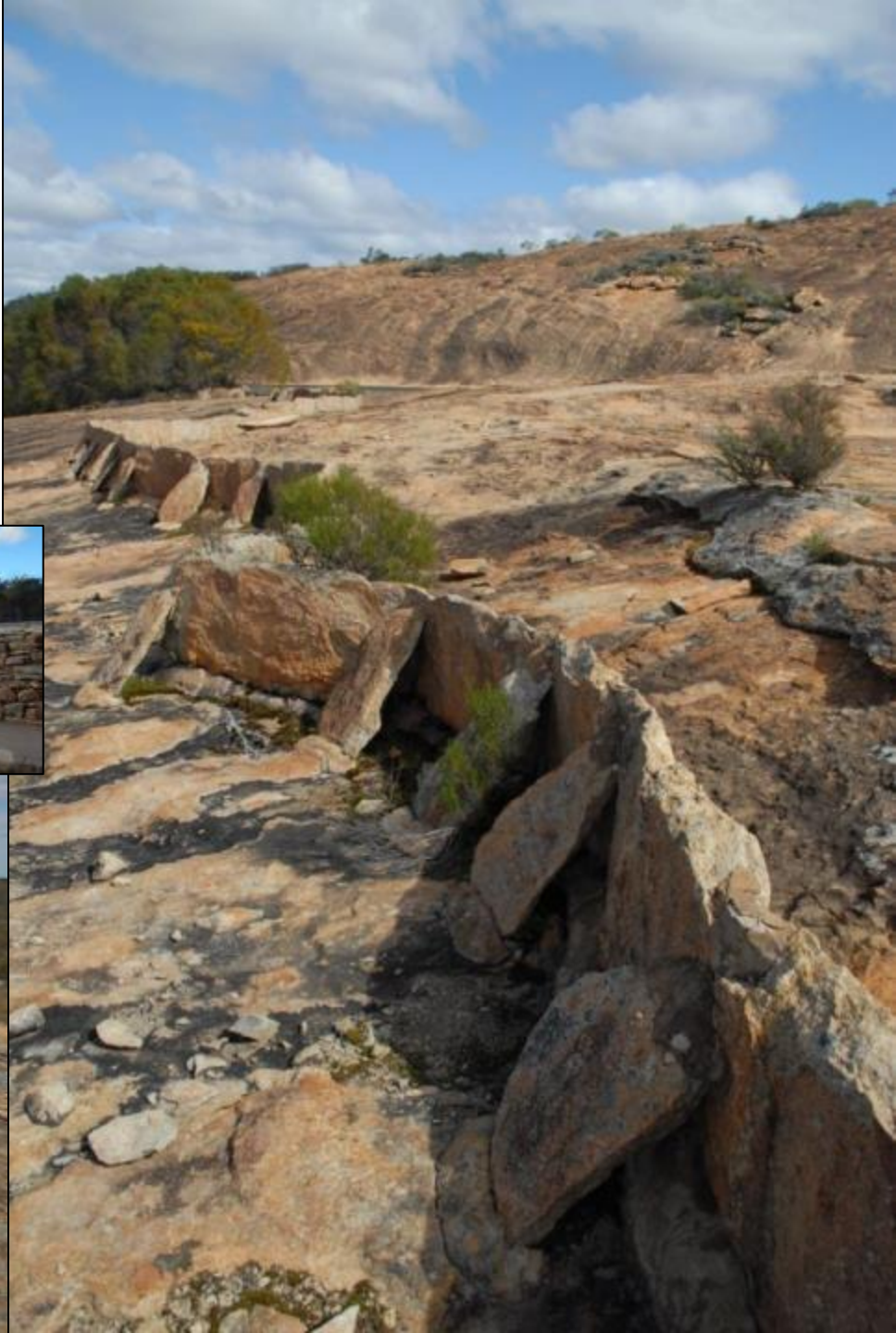
Table 3: Reptile sighting events and estimated minimum number of individuals by Site

Trap ID	Control Sites	Lizard Trap Sites	Lizard Trap Sites	Lizard Trap Sites
	Number of reptile sighting events	Number of reptile sighting events	Minimum number of individuals per site	+  Description, with number of events in brackets, where greater than one.
Flying karda TOR010	0	1	1	<i>Varanus rosenbergi</i>
Track lower TOR021	0	2	1	<i>Egernia kingii</i> (x2)
Sholl's Pate TOR048	0	0	0	NA
Stony Hill TOR074	0	6	2	<i>E. kingii</i> (x5) and <i>C. labillardieri</i>
Salmon Holes TOR080	0	7	2	<i>V. rosenbergi</i> (x6) and <i>C. labillardieri</i>
Springhill Pools TOR085	0	3	2	Two <i>C. labillardieri</i> fighting plus one <i>C. labillardieri</i> emerging from trap
Dolerite prop u. TOR011	0	1	1	<i>Pseudonaja affinis</i>
Dolerite prop l. TOR092	0	2	1	<i>V. rosenbergi</i>
Springhill Two TOR017	0	0	0	NA
Total	0	22		
Average	0		1.11	
Standard error	0		0.61	

Conservation

Karda mia are threatened by mining, damage by vehicles, use of slabs for water catchments, wall and chimney construction, garden landscaping

It's still happening!
What's best to do?



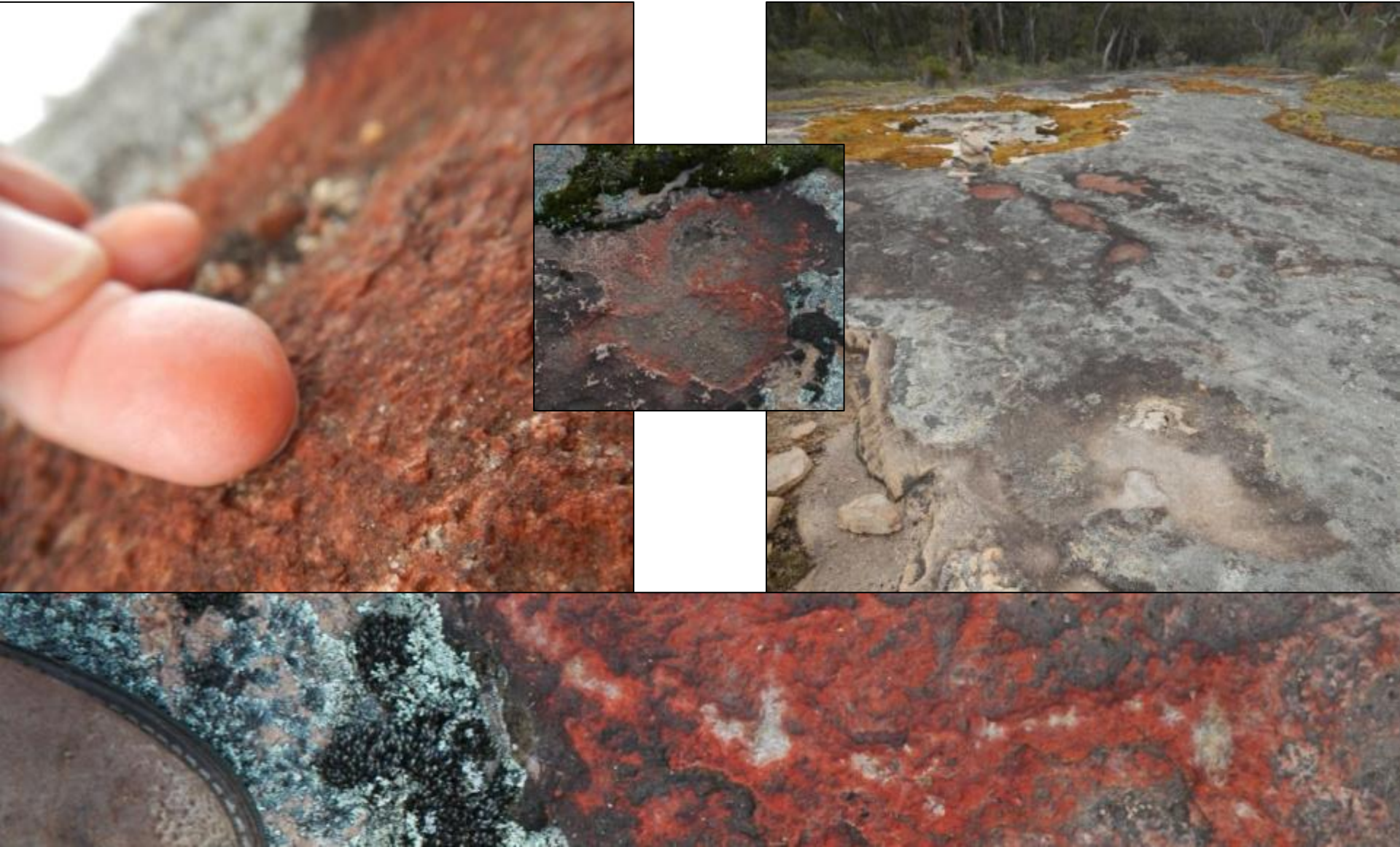
Karda mia conclusions



Photo Sheila Murray

- Science supports and amplifies Noongar oral history in the absence of any colonial records
- Unequivocal evidence exists for purpose-built rock constructions for predicted animal husbandry – a Noongar innovation
- *Karda mia* are widespread in Noongar country and a little beyond (technological transmission through marriage?)
- Potentially 7,000+ years old (island sites isolated by sea level rise)
- Preferred food source (karda) do utilize *karda mia*
- Murray's (2015) study indicates that the construction of *karda mia* increases the likelihood of encountering reptiles on granite outcrops.
- Rare events – *karda mia* are well-suited as occasional food sources on sporadic visits to outcrops
- Unanswered questions exist, amenable to further experimentation

Today's 2nd Ocbil prediction - special vulnerability and resilience
(*Wilgie gnamma* – predicted for resilient Noongar ceremonial rites involved in caring for country, helping enrich socio-cultural life through spirit-scapes)





Cultural markers
on granite Ocbils
are widespread



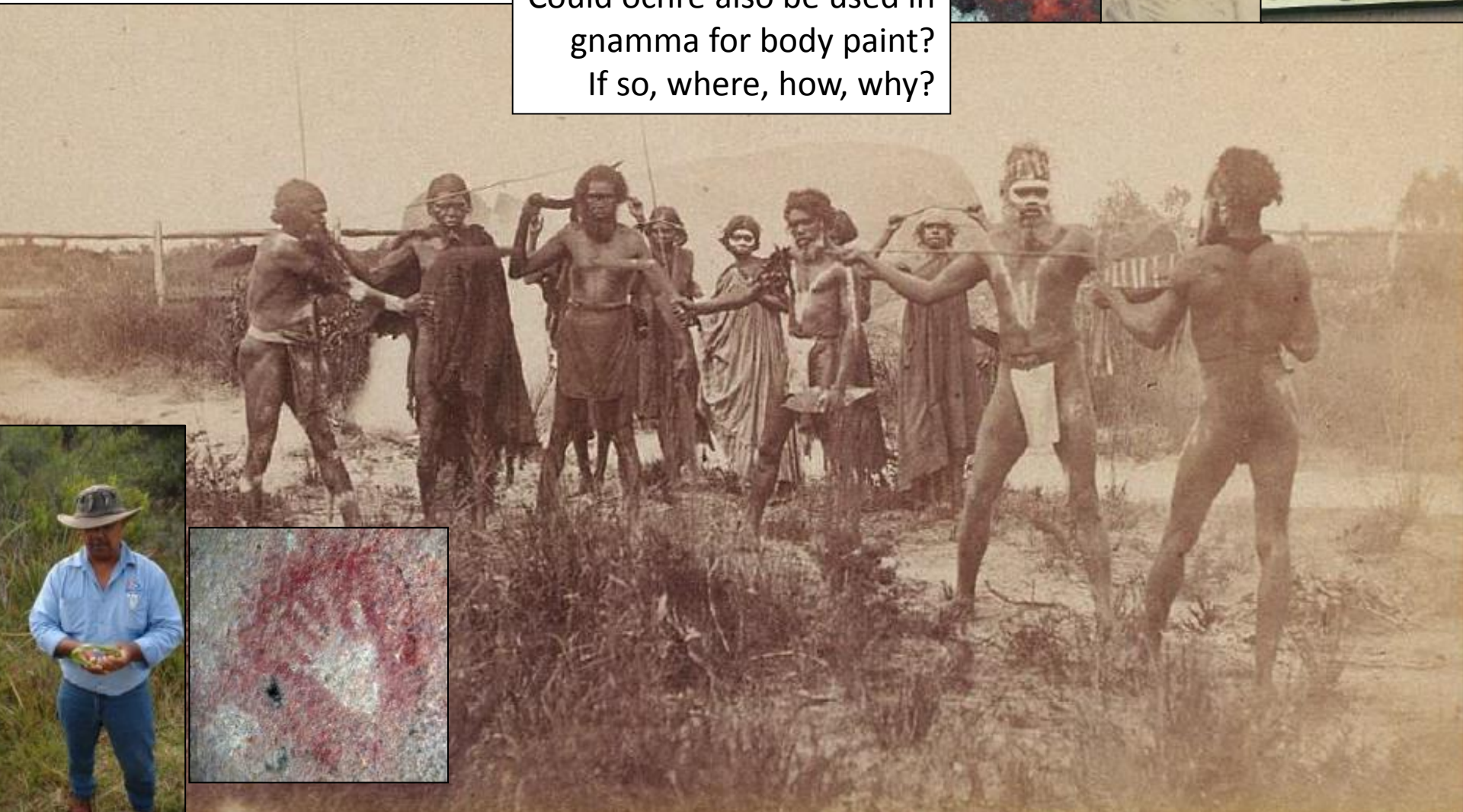
Wilgie /kulbaq – red ochre, widely
used for ceremonial rites
Young River



For spirit and ritual,
already
documented for use in
rock artwork



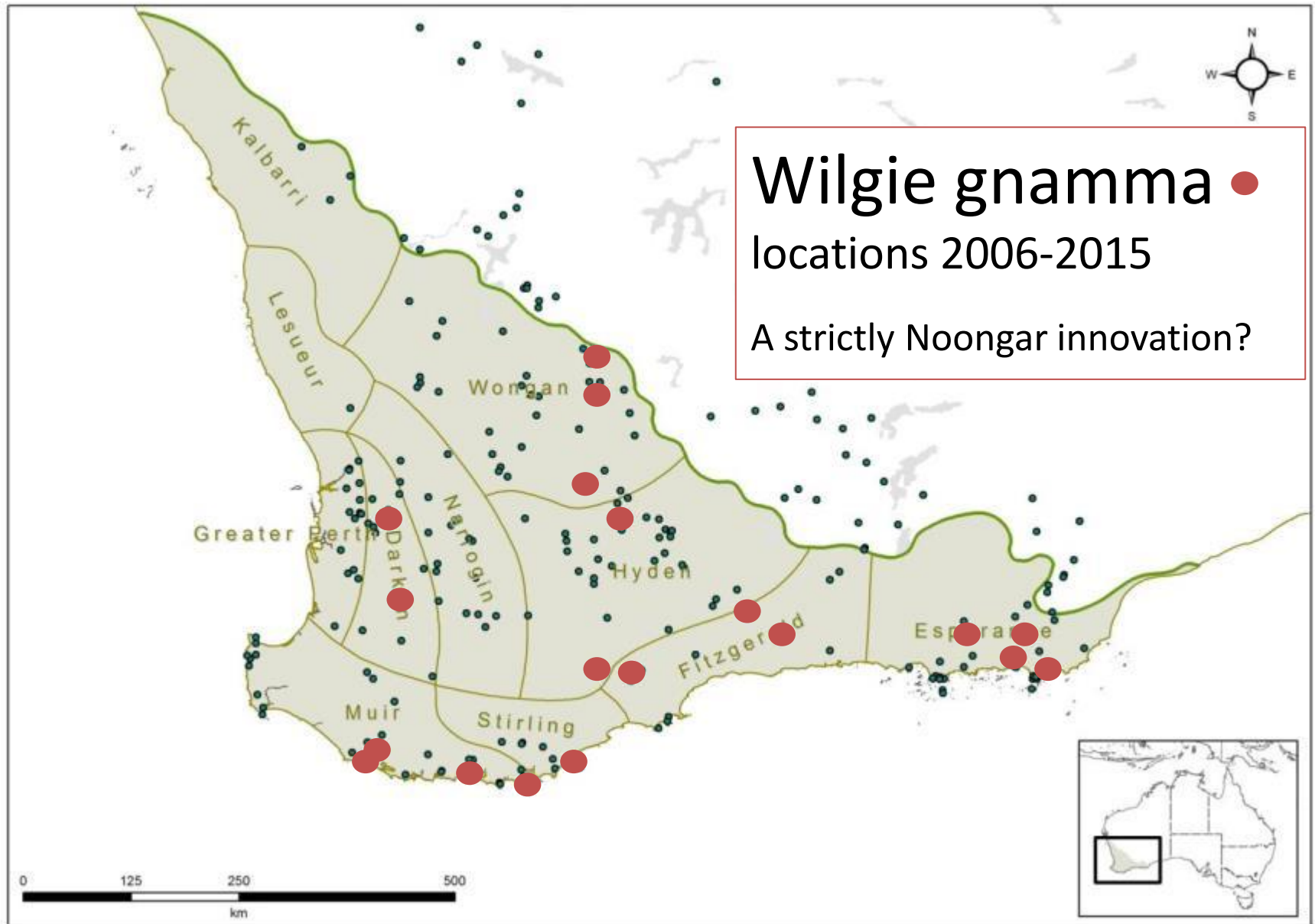
Could ochre also be used in
gnamma for body paint?
If so, where, how, why?



Wheatbelt *Wilgie Gnamma* The Humps 27 8 2006

Unlike for rock art or *gnamma* more generally, there are no records in the literature, nor recent oral history of *Wilgie gnamma*





Typically atop outcrops with extensive views



Jarrah Forest Sullivan Rock 2015



Esperance sandplains Boyatup Feb 2014



Karri forest w of Mt Lindesay



On other rocks – quartzites (Stirling Range atop Mt Toolbrunup)

Photos Libby Sandiford



Much more to learn: Rarely seen yellow ochre (*kandjin* or *yoorn*da)
Badjerin Rock 29 8 2013

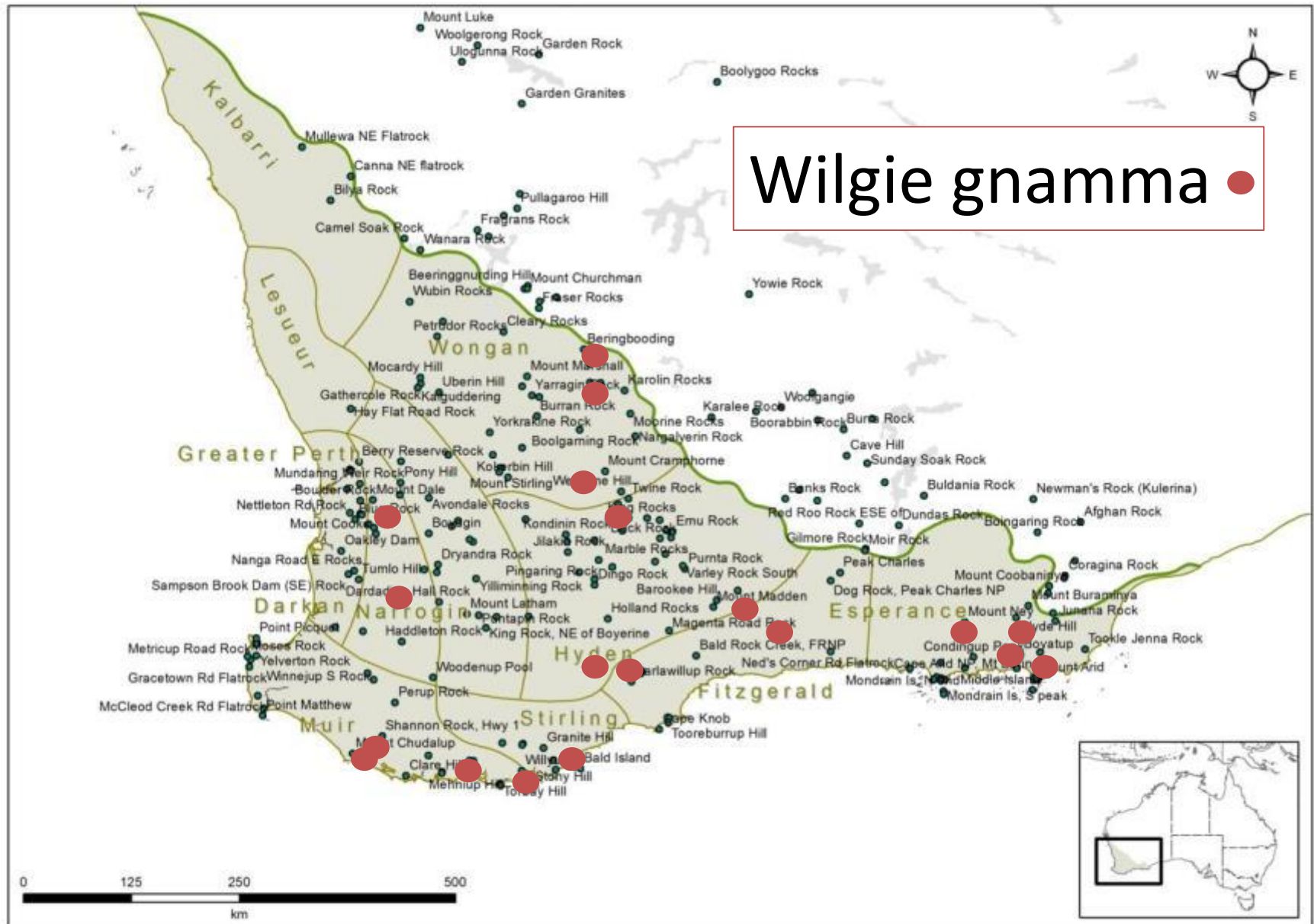


Summary

- *Karda mia* and *Wilgie gnamma* illustrate cultural adaptations predicted from Ocbil theory for living on or with granite outcrops
- Both are Noongar innovations, possibly arising from the 'Golden Age' of Holocene Aboriginal cultural advances, helping people live in enriched socio-cultural circumstances without causing irrevocable damage to their environments or biodiversity
- More research is recommended, but already there are leads here towards devising more sustainable future lifeways on granite Ocbils under rapid global change



Wilgie gnamma •



Wilgie gnamma granite locations

2006-2015

- Chiddarcooping
- Malancobbing
- Merredin
- Chingah
- Sullivan Rock
- Dardatine
- Pantapin
- Nightwell
- Carlawillup
- Pallarup
- Muckinwobert
- Chudalup
- Nelson Rd
- Ochre hilltop E Mt Lindesay
- Pt Possession
- Mermaid Point
- Marbuleerup
- Bronzewing Rd flatrock
- Mt Ney
- Boyatup
- Hydatellaceae flatrock

Stirling Range atop Mt Toolbrunup Libby Sandiford pers. comm. Jan 2016