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,
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?
Predominantly rocky or sandy uplands

Hopper et al. (2016, Plant & Soil, in press)
An Ocbil (SW Australia)

A Yodfel (Wales)

Hopper et al. (2016, Plant & Soil, in press)
Laterite, ironstone or sandstone hilltop

Wetland (fresh or saltlake)

Sandplain

Granite outcrop

Yodfel

Not whole regions — Ocbils are embedded in a matrix of Yodfels

Hopper et al. (2016, Plant & Soil, in press)
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’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
A diverse herpetofauna (carrying *Salmonella* and other gut pathogens) does occur on SW granite Ocbils.
Noongar people, granite outcrops and reptile husbandry?

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
Wirn boodja (enspirited landscapes, spirit-scapes)

strong ongoing cultural links exist with granite outcrops
“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

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**Temperate Sites plot**

- **Black**, dark grey bars) = closed/rockshelter sites;
- White bars = open sites; combined corrected (pale grey bars)

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Calibrated years before present

post-glacial sea-level rise

Holocene

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5044 radiocarbon dates, 1750 sites
Karda mia slab manufacture?
Lynette Knapp Carol Pettersen Alison Lullfitz Quaranup 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.

Do they inhabit/visit *karda mia*?

Rarely seen.
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

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

• 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 2\textsuperscript{nd} Ocbil prediction - special vulnerability and resilience
(\textit{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*. 
Wilgie gnamma locations 2006-2015
A strictly Noongar innovation?
Typically atop outcrops with extensive viewscapes
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 *yoornda*)

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 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