

BUZZ OFF?

An historical analysis of the emergence of commercial beekeeper resource insecurity on public lands in the southwest of WA

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Introduction

'Good' policy making is likely if a holistic understanding of the system is developed from multiple sources of evidence from stakeholders representing a range of perspectives. The policy 'problem' of commercial beekeeper resource insecurity is a context dependant phenomenon emerging from complex social-ecological system interactions in a multi-functional environment. This research focusses on the case study population of Western Australia's commercial migratory beekeepers that utilise native vegetation on public lands in the south-west floristic region – a global biodiversity hotspot – as an important forage resource to produce honey. The industry in this region faces declining access to apiary sites that have sufficient quantity and quality of melliferous floral resources (referred to here as 'apiary site values') to sustain livelihoods. This situation threatens the industry's future ability to produce highly valued honey and pollination services to emerging agricultural and horticultural industries. The research aim was to understand how interactions between the commercial beekeeping industry, disturbance regimes, resource management and competing industries have impacted apiary site values and apiary site access through time, leading to the emergent phenomenon of beekeeper resource insecurity.



Karri forest before European disturbance regimes were introduced c. 1901 (SLWA BA12914 – Karriade)

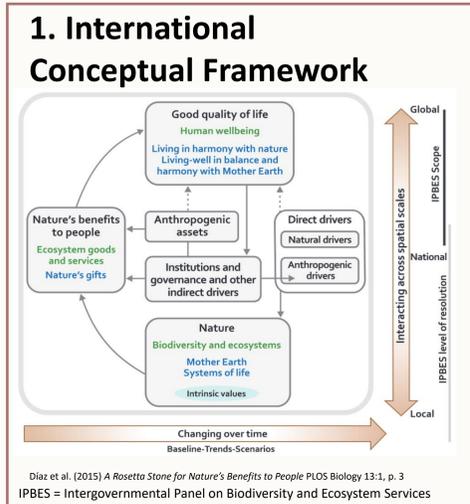


Joseph Lycett c. 1817 Aborigines using fire to hunt kangaroos (Trove ID 2962939)

Resource Manager: Indigenous Community **1788**

Indigenous belief system of 'Caring for country' stewarded the biodiversity of the south-west's unique flora

- 1829 Colonisation disrupted indigenous land management practices
- 1846 European honeybee introduced and swarmed
- Jarrah timber new colonies major export
- Large trees in Forests and Woodlands heavily exploited by settlers for construction
- Fire exclusion policy enforced through legislation
- 1935 first major migration of commercial beekeepers to karri honey flow.



Diaz et al. (2015) A Rosetta Stone for Nature's Benefits to People PLOS Biology 13:1, p. 3
IPBES = Intergovernmental Panel on Biodiversity and Ecosystem Services

2. Methods

Data collection:

- 57 one-on-one interviews, 38 conducted in the field
- 60 focus group discussions in the field

Participants:

- 19 commercial beekeepers
- 6 government stakeholders
- 4 systems experts

Fieldwork:

97 Photovoice field sites: 27 Coastal, 33 Forests, 37 Woodlands

Data preparation: all audio-recordings transcribed, combined with field photographs and time series of satellite images

Data analysis: Thematic coding in NVIVO. Review of archival, scientific and grey literature to build a rich historical picture. Systems analysis (using kumu.io) undertaken at each of the identified representative time periods to illustrate factors contributing to issue emergence:

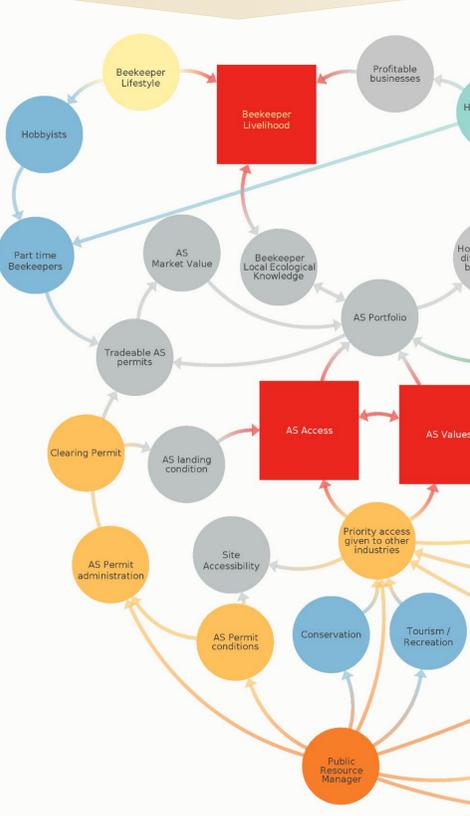
- 1950: a year representative of the system that existed before beekeeper resource insecurity was considered an issue
- 1985: the year when the phenomenon was first identified and dealt with formally by beekeepers and the public resource manager
- 2020: the present day when resource insecurity is an increasingly pressing concern

3. What are Apiary Site Values?

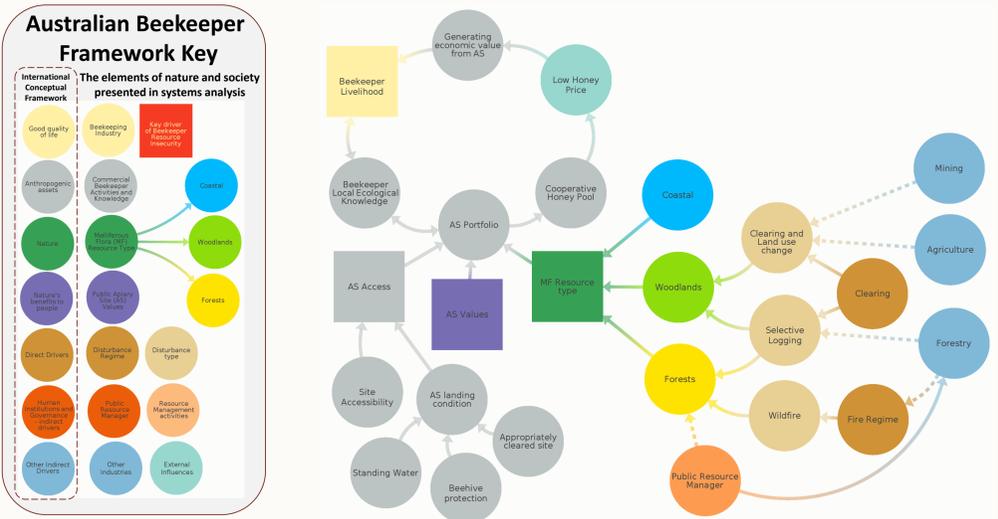
Apiary site (AS) values are the tangible but unquantifiable characteristics of an apiary site that beekeepers mention as influencing a site's potential to produce nectar and pollen. Characteristics of melliferous flora assessed as likely to improve productivity include the density, health, reproductive maturity and biodiversity of the flora along with how reliable its flowering patterns are. The thickness of the litter layer is indicative of soil health and moisture availability. Beekeepers also assess the availability of water at a landscape level by observing surface water bodies and seasonal rainfall patterns. Active birdlife is a good indication of nectar flow.

External drivers

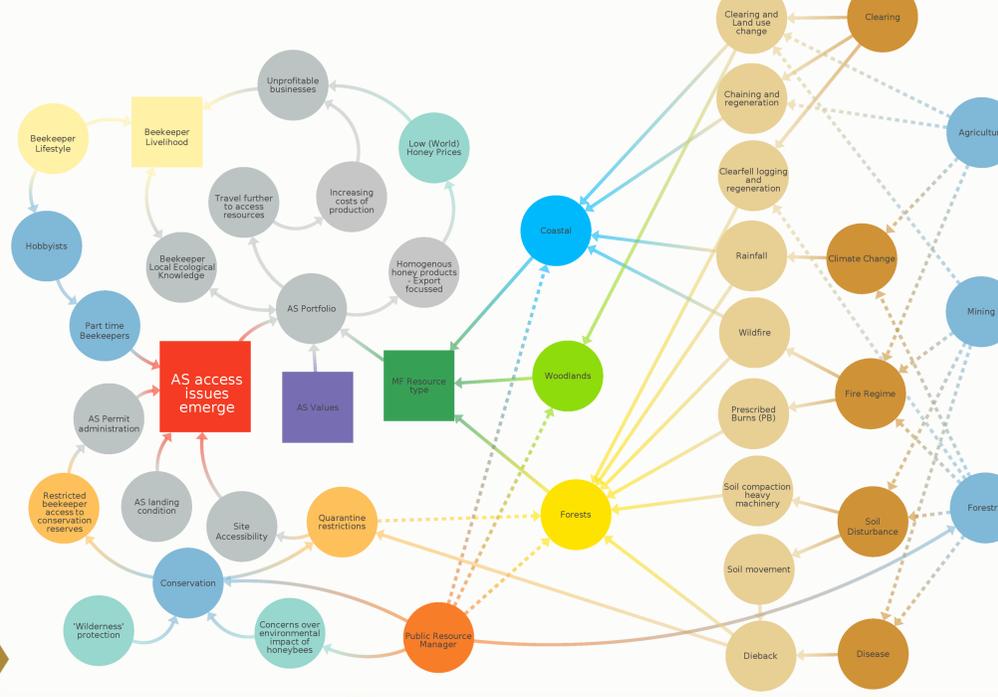
- Climate change:** Globalization, Biodiversity crisis, Public awareness: Save the Bees



4. Results: Beekeeper resource insecurity emerges over time



MF = melliferous (honey producing) flora
AS = apiary sites (on public land)



Public Resource Manager: Forests Department **1950**

Few beekeeper resource security concerns

- Pioneering and emerging industry
 - Productivity high due to limited regulations and plentiful resources
 - No apiary sites permits required
 - Industry organised cooperative honey pool utilised by majority
 - Export markets developed for bulk homogenised honey product
- Beekeeping industry statistics:**
600 Beekeepers - 30,000 hives
- Key Beekeeping Resources:**
Coastal heath, Banksia, Wandoo, Yate, Karri, Marri
- Drivers of Change:**
- Development focus results in mass clearing of Woodlands for agriculture and Forests clear-felled for woodchip markets
 - Globalisation of markets
 - Prescribed burning implemented to mitigate wildfire effects
 - Increasing environmental awareness results in pressure for conservation of resources. Identification of dieback in Forests.
 - Climate change starts to impact rainfall and temperature patterns
 - Apiary Site Permits implemented through legislation (Beekeepers Act 1963) but no formal trading allowed. Limited conditions.

Public Resource Manager: Department of Conservation and Land Management (CALM) **1985**

Emerging beekeeper resource security issues focus on loss of access

- Poor profitability of industry due to combination of:
 - Low world honey price for homogenised product
 - Increasing costs due to extensive clearing resulting in decreasing resource availability and increased travel
 - Honey easily obtained from available resource
 - Industry considered by government to be mature
 - Workshop between Beekeepers and CALM discusses resource security issues. Apiary site access key issue raised
- Key Beekeeping industry statistics:**
164 Commercial Beekeepers (>40 hives) - 37,000 hives
- Key Beekeeping Resources:**
Coastal heath/Banksia, Wandoo, York Gum, Karri, Marri, Jarrah
- Drivers of Change:**
- Regional Forest Agreement assesses Forest resource. Allocates areas for conservation and logging. Operationalised by decade long Forest Management Plans
 - Prescribed burning target set at 200,000 ha. Target of 45% of public land to be 6 years or less since last burnt
 - CALM policy for Beekeeping on Public Lands increases conditions on permits and allows trading
 - Differentiation of honey products and marketing of unique qualities results in increased honey price and industry profitability
 - 'Save the Bees' campaigns increases profile of industry
 - Surge in numbers of registered beekeepers
 - Increasing public apiary site market value due to demand from new entrants seeking resource access to grow businesses

Public Resource Manager: Department of Biodiversity, Conservation and Attractions (DBCA) **2020**

Increasing competition for fewer resources with declining values threaten viability of commercial beekeeper livelihoods

- Industry expanding rapidly with benefit of diversified products
 - Honey much more difficult to get from available resource
 - Livelihood practices changing: new technology, innovation, increased distances travelled
 - Beekeepers perceived as ecological stewards. Vested in interest in ecological health of sites.
 - Result of 200 years of disturbances being manifested in degraded apiary site values
 - Policy and landscape outcomes required to secure future livelihoods
- Key Beekeeping industry statistics:**
3,400 Registered beekeepers. 129 Commercial beekeepers (>40 hives) – 51,000 hives
- Key Beekeeping Resources:**
Coastal heath/Banksia, Jarrah, Karri, Marri, Wandoo, Yate, Great Western Woodlands

Conclusion

What is beekeeper resource insecurity?
Sustainable beekeeper livelihoods are threatened by a combination of insecure access to apiary sites, degrading apiary site values and limitations on resource availability.

Why are apiary site values important?
Valuable apiary sites are those with secure access to healthy biodiverse mature reproductive ecosystems. These values are expressed in the nectar and pollen productivity of the apiary site which translates to honey production and healthy bee stocks. Apiary sites values are monitored by beekeepers as a collection of sites forming their business apiary site portfolio. The extent of resources accessed in the portfolios of experienced multi-generational beekeepers reach across the southwest of WA and include sites covering Coastal, Forest and Woodland resources. As individuals and an industry they provide broadscale coverage of the public resource and can attest to the effect of disturbances at a local and landscape scale across the region.

Why is resource insecurity an escalating issue that needs to be addressed at a policy level?
As demonstrated in this poster, the type, frequency, intensity and scale of disturbances imposed predominantly by humans on the southwest landscape over the last 200 years are impacting apiary site values across all resource types. Disturbances that remove mature elements from ecosystems make those ecosystems more vulnerable to future disturbances. Climate change is causing there to be a slower recovery from disturbance due to reduced water availability. Beekeepers are the 'canary in the coalmine' witnessing through livelihood practice and local ecological knowledge the impacts of these disturbance regimes.

What can be done about it?
The public resource manager has responsibility for planning and implementing human imposed disturbances and also administering apiary site permits. Beekeepers bear witness to the impacts of disturbance regimes on ecosystems. To progress, policy settings should be reworked to support constructive positive interactions between beekeepers and the public resource manager that have the dual benefits of supporting biodiversity conservation and sustainable livelihoods.