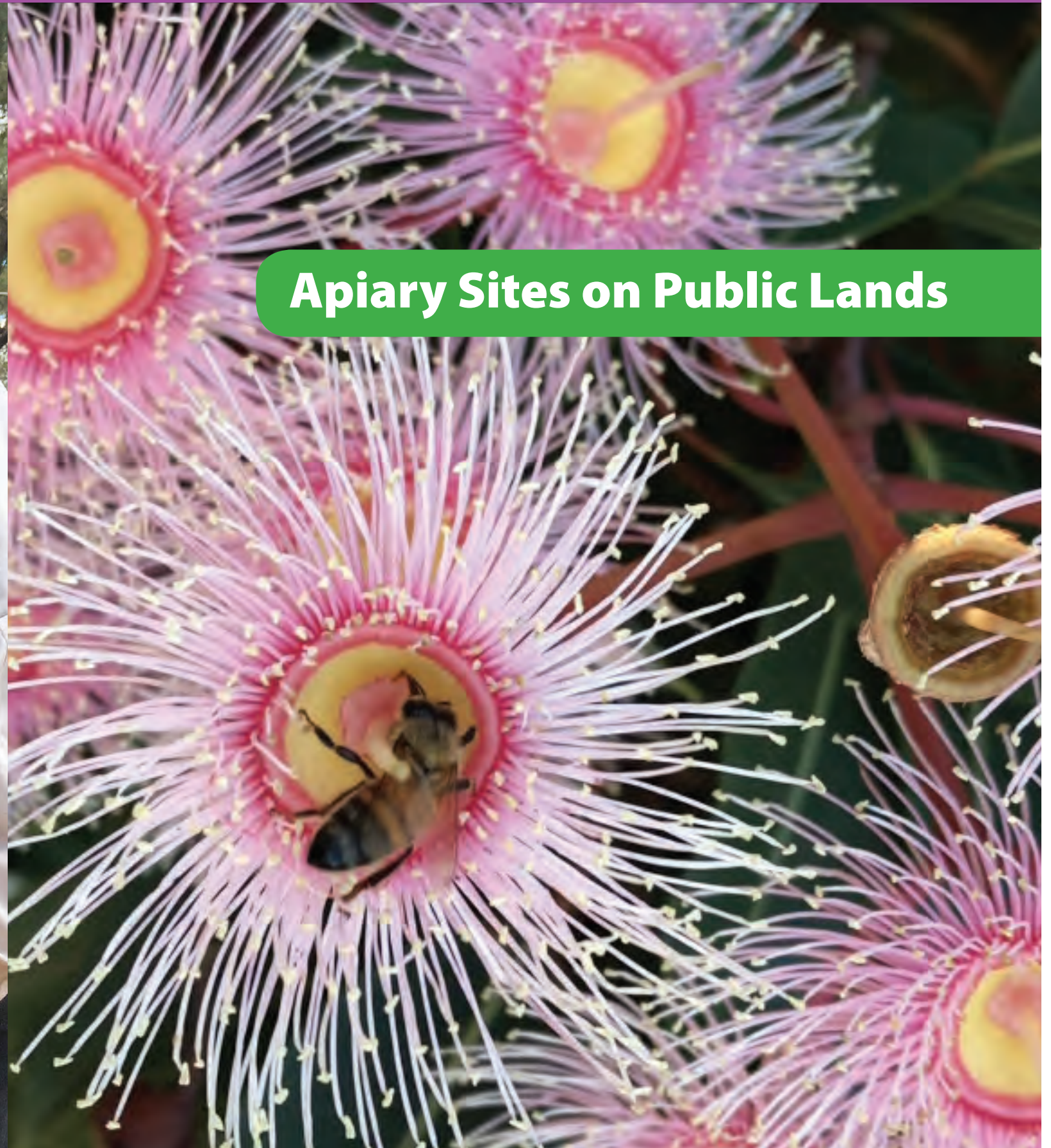




A New South Wales Apirists' Association position paper



Apiary Sites on Public Lands



NSW Apiarists' Association Inc.

Apiary sites on public lands – A NSW Apiarists' Association position paper

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The NSW Apiarists' Association requests the NSW government to:

1. Provide a whole of government approach to dealing with apiary sites on government land tenure through a single entity.
2. Provide a single plain English policy on beekeeping from the appropriate NSW government agency for the management of lands traditionally utilised by beekeepers for apiary sites.
3. Provide a consistent set of standard terms and conditions for apiary site use across all government land tenures.
4. Grant access to any government lands for apiary sites where this does not cause public risk or undue damage to the area in the process of gaining access.
5. Endorse the "National Best Management Practice Guidelines for Beekeeping in the Australian Environment".
6. Provide security of tenure through licensing in place of permits.



► References

Australian Honey Bee Industry Survey 2006–07. Rural Industries Research and Development Corporation, Canberra 2008.

Australian Honey Bee Industry: 2014–15 survey results. Australian Bureau of Agricultural and Resource Economics and Sciences. 2016

Keeping Bees on Forested Lands. A Code of Practice. Prepared for the NSW Apiarists' Association Inc. By F.S. Benecke [undated, circ. 1997].

Law B, Mackowski C, Schoer L, Tweedie T (2000). *Flowering phenology of myrtaceous trees and their relation to climatic, environmental and disturbance variables in northern New South Wales.* Austral. Ecology 25, 160–178.

NSW Department of Primary Industries Beekeeper Registration Statistics Report as at 11 October 2019.

Rosenfeldt R, Cokcetin N (2019). *The Low Down on Honey* – unpublished.

Somerville D (1999). *Floral Resource Database for the NSW Apiary Industry.* Rural Industries Research & Development Corporation. Pub. No. 99/174.

Somerville D (2007). *National Best Management Practice for Beekeeping in the Australian Environment.* The Australian Honey Bee Industry Council.

Somerville D (2010). *Forestry Plantations and Honey Bees.* Rural Industries Research & Development Corporation. Pub No. 10/076.



► Government agencies

Wherever a government department manages a parcel of land, there is a possibility of it being utilised as an apiary site.

As stated in the earlier section of this document “Importance of apiary sites in a complex system”, possibly 40% of the apiary sites utilised by commercial beekeepers are contained on public lands. This represents a massive reliance on access to public lands by beekeepers to retain the future security of their business.

Wherever a government department manages a parcel of land, there is a possibility of it being utilised as an apiary site. The NSWAA wants to see this possibility turned into a reality.

Of course, there are parameters on what determines the suitability of a site for an apiary. A few of the major considerations are:

- ▲ floral resource value
- ▲ truck or vehicle access
- ▲ proximity to the public
- ▲ suitability as a set-down site for bee hives
- ▲ access to water

The NSWAA welcomes the recent developments initiated by the NSW Department of Primary Industries that aim to create a whole of government policy framework for the management of apiary sites on public lands. This NSW DPI initiative can only benefit from a greater involvement of the NSWAA as a worthwhile and respected partner in the development of such a policy. Further potential exists through ongoing developments that will identify additional available sites to strengthen and grow this vital agricultural industry.

Apiary Sites on Public Lands in NSW, the NSWAA Position:

The NSWAA acknowledges that NSW lags behind other Australian State’s in the way it is supported by the NSW Government and its many agencies. The beekeepers national body, the Australian Honey Bee Industry Council (AHBIC) identifies Tasmania and Victoria as the state jurisdictions that are closest to what may be regarded as floral resource access best practice and these jurisdictions provide a framework for the further development of floral resource access onto public lands.

The following framework outlines a best practice approach, this is what the NSWAA need in NSW.

1. A single public land beekeeping policy that is tenure blind.
2. A bipartisan approach from Government on public land policy and beekeeping.
3. Recognition within a statement from Government that recognises the importance of the honey bee industry in land management planning with explicit recognition of the link between public land access and pollination.
4. One Minister as the key contact for beekeeping on public lands.
5. Unambiguous plain English policies on
 - ▲ Government support and encouragement of beekeeping on public land
 - ▲ Collaboration and coexistence between forest use activities
 - ▲ Efficient administration with a one stop shop
 - ▲ Affordable public land apiary sites
 - ▲ An appropriate financial return to the State.
6. Security of tenure
 - ▲ offered for a minimum of 10 years on sites and renewable
 - ▲ no sunset clauses on sites
 - ▲ annual fee increases are tied to the CPI
 - ▲ bee sites can be transferred when a beekeeper’s business is sold to another beekeeper. Public land apiary sites require transferability between beekeepers that enables the creation of a capital asset for finance collateral.
 - ▲ bee sites can be transferred on a short-term basis (e.g. 8 weeks) to maximise the use of a limited resource for a small fee.
 - ▲ beekeepers to transfer from a permit-based system to a licensing system across all land tenures.
7. Land management

The development of Apiary Management Guidelines for Public Lands in NSW that is drafted on the understanding that beekeepers are granted access to any government lands for apiary sites where this does not cause public risk or undue damage to the area in the process of gaining access.



► Foreword

A very significant proportion of our major agricultural and horticultural industries are reliant on the pollination function of foraging honey bees.

Without honey bees, food security will be severely compromised.

This revised document has been commissioned by the NSW Apiarists' Association Inc. (NSWAA) Executive to provide a background as to why and how the commercial beekeeping industry operates in the NSW landscape and its immediate need to grow, prosper and support pollination dependant agricultural industries.

Its aim is to be solution focused with beneficial outcomes for NSW and its regions, economy, community and environment.

The NSWAA is the peak industry body for NSW's 852 commercial apiarists and has provided over a century of service to its members. NSW is the nation's leader with its ownership of hives and in production of honey and its ownership of hives accounts for 40–45% of the national honey crop. NSW provides the greatest number of commercial pollination hives that service the nation's 35 agricultural industries dependant on honey bees for their production. The NSWAA lists as key priority number 1 in its current business plan "fair and secure access to essential floral resources held within public lands". This position is consistent with the national bee body, the Australian Honey Bee Industry Council's (AHBIC), strategic plan 2018–2023 that lists as number 1 high priority issue "improving floral resource access".

Arguably, floral resources are more significant to commercial beekeepers than any other issue – including biosecurity. Without access to a range of flowering species capable of delivering floral rewards in the form of nectar and pollen, a honey bee colony will stagnate and decline.

The beekeeping industry has been identified by a range of studies and reports as being vital to the survival and growth of Australian agriculture. The role of honey bees as pollinators of a very large range of economically important flowering crops is well documented. A very significant proportion of Australia's major agricultural and horticultural industries are reliant on the pollination

7. Incorporate best management practice to reduce the incidence of swarming.
8. Maintain swarm traps in and around apiaries, particularly during the spring period.
9. Prevent the spread of soil pathogens such as phytophthora and weed seeds by vehicle movements. Clean footwear/shoes and vehicles after inspecting potential sites in high risk areas.
10. Regularly maintain and service vehicles according to manufacturer's recommendations.
11. No travelling on access tracks where there is a high likelihood of damaging the track.
12. Only the immediate area of the apiary is to be cleaned of combustible vegetation.
13. Only camp on site with approval of the property owner or manager. All presence of the camp site to be removed once the camp is finished with.
14. All fire warnings and restrictions are to be strictly adhered to and local fire codes should be taken into consideration whenever working bee hives.
15. Whenever the opportunity arises, provide information on the value of nectar and pollen producing flora to highlight the value of specific floral species.
16. Locate apiaries with consideration of the general public and livestock movements. Stocking rates in urban areas should be appropriate to the circumstances.
17. Keep records of flowering events.
18. Consider the most energy efficient manner in which the beekeeping operation is conducted.
19. Store, use and dispose of chemicals in the most appropriate manner, according to state, MSDS and label requirements. Keep chemical use to a minimum.

For a full copy of this document refer to the Australian Honey Bee Industry Council – www.honeybee.org.au



► National Best Management Practice for Beekeeping in the Australian environment

The Australian beekeeping industry has long recognised the ideal of minimising any impact of their activities on the broader environment.

The formalising in 2007 of a set of national best practice guidelines for beekeeping in the Australian environment was drafted to demonstrate to the whole community the commitment that the Australian beekeeping industry has to ensure that it is doing everything in its power to have minimal footprint on the whole Australian environment.

The guidelines were funded by the Federal government and were a product of the collaboration of a range of government agencies and beekeeping industry representatives from all states. Contributing workshops were conducted in Queensland, New South Wales, Victoria, Tasmania, South Australia and Western Australia.

The goal of the guidelines was to minimise any impact of beekeeping activities on the greater environment. The 19 elements identified in the workshops as being important to achieve this goal were listed but not ranked as follows: -

1. Respect for heritage and areas of interest to indigenous Australians.
2. Display warning signs in appropriate places to announce proximity of an apiary to the public.
3. Maintain stocking rates to the floral conditions prevailing. Ensure colonies have adequate stored honey.
4. Ensure that the appropriate authorities have been notified of the arrival and departure of apiaries and they have the beekeeper's address and contact details.
5. Keep the area of the apiary clean and tidy.
6. Ensure appropriate availability of water when required.

function of foraging honey bees. Without honey bees, food security, regional development and prosperity would be severely compromised.

This association has historically interacted and worked with the various government agencies who manage tracts of land utilised by beekeepers. In fact, it could be argued that this has been the NSWAA core role for many years – to secure access for beekeepers to government lands.

Over time one of the major frustrations for the NSWAA has been the extreme variability between NSW government departments and corporations in their view of commercial beekeeping and their willingness to work with our association. The lack of consistency that has existed within departments and between departments, in relation to a "government" view of beekeeping has made our job extremely difficult. A need exists from the agencies responsible for public lands for a greater degree of communication and consultation with commercial apiarists. Formal consultation with commercial apiarist representatives through the NSWAA will derive benefit from the day to day assessment of forest health and observation of logging practice and forestry operations. The unexploited potential for such assessments combined with policy and research findings input from the Australian Honeybee Industry Council's Natural Resource Committee will aid in achieving ecologically sustainable development outcomes for the benefit of the current and future generations of NSW.

For the future of beekeeping in NSW the industry requires the NSW government to provide a degree of assurance that access by beekeepers to public lands is secure and through a collaborative process a greater share of this public resource will be made available.

Stephen Targett
President, NSW Apiarists' Association Inc.



► Executive Summary

The very survival of any beekeeping enterprise is greatly dependent on the beekeeper's ability to move bee hives to locations that will meet the nutritional needs of the colonies.

The NSW government could do a lot to alleviate one major area of concern – that of apiary site access onto public lands.

This document undertakes to comprehensively outline the position and behaviour of NSW's honey bee industry's reliance on floral resource access. The very survival of any beekeeping enterprise is greatly dependent on the beekeeper's ability to move bee hives to locations that will meet the nutritional needs of the colonies.

Access to government land including forests, parks and travelling stock routes has become a vital resource for the continuing function of commercial beekeeping within NSW. The commercial beekeepers of NSW in the interest of operational efficiency and effectiveness need to work through a single desk for all their commercial and legal transactions with the State. This will aid in maximum use of a limited resource.

In an environment of declining floral resources, access to public lands in NSW is essential, such access provides a diverse range of flora that are unique in their capability to be highly productive in terms of nectar and pollen resources for honey bees. This high level of resource production with its species diversity allows honey bees to develop strength, vigour and health before and after pollination events. It also provides honey that is vital for cash flow to maintain beekeeping businesses during the gaps that exist between pollination events and thus ensure beekeeping businesses remain viable.

Beekeeping businesses are geographically spread across rural NSW. The importance of these businesses in small local communities is significant, but the growing role of honey bees as 'paid' pollinators of a range of economically important crop species makes the value of commercial beekeeping business far more valuable to regional NSW and the State's economy than just honey production.

6. Security of tenure

- ▲ offered for a minimum of 10 years on sites and renewable.
- ▲ no sunset clauses on sites.
- ▲ annual fee increases are tied to the CPI.
- ▲ site fees are set through a competitive process.
- ▲ bee sites can be transferred when a beekeepers business is sold to another beekeeper. Public land apiary sites require transferability between beekeepers that enables the creation of a capital asset for finance collateral.
- ▲ Public land bee sites to transfer from a permit based system to a licensing system.

7. Land management

The development of Apiary Management Guidelines for Public Lands in NSW that is drafted on the understanding that beekeepers are granted access to any government lands for apiary sites where this does not cause public risk or undue damage to the area in the process of gaining access.



► Floral resource access best practice for beekeeping in NSW

The NSWAA acknowledges that the NSW honey bee industry lags behind some of the other State's in the level and success of its interactions to date with the NSW Government and its many agencies.

AHBIC identifies Tasmania and Victoria as the state jurisdictions that are closest to what may be regarded as floral resource access best practice and they provide a framework for the further development of floral resource access onto public lands.

The following framework outlines a model of a best practice approach.

1. A single public land beekeeping policy that is tenure blind.
2. A bipartisan approach from Government on public land policy and beekeeping.
3. Recognition within a statement from Government that recognises the importance of the honey bee industry in land management planning with explicit recognition of the link between public land access and pollination.

The NSW Government to actively encourage and support the expansion of the honey bee industry on public lands to meet both current and predicted crop pollination and food security requirements through increased access to public lands where such access does not interfere with other conserved land values.

4. One Minister as the key contact for lobbying.
5. Unambiguous plain English policies on
 - ▲ Government support and encouragement of beekeeping on public land
 - ▲ Collaboration and coexistence between forest use activities
 - ▲ Efficient administration with a one stop shop
 - ▲ An appropriate financial return to the State.

A workshop in July 2019, initiated by AHBIC, that involved Australia's beekeeping bodies, was convened for the purpose of identifying strategic actions, opportunities and potential policy changes relevant to improving floral resource access. This workshop established that NSW is lagging behind other states in respect to resource access best practice for commercial beekeepers. Currently Tasmania and Victoria are regarded as closest to floral resource access best practice for commercial beekeepers. Both these states provide a framework from which a national policy could be drafted.

NSW, Australia's premier beekeeping state, needs to implement the relative changes to policies and procedures consistent with national floral resource access best practice to better serve the State's commercial beekeepers.



► Overview of industry value

The annual gross value of production of honey and associated bee products in Australia in 2014 / 2015 was estimated to be \$101 million.

Honey bees (*Apis mellifera*) were successfully introduced to Australia in 1822. They have become a vital component of the food producing landscape within our country. Unfortunately, for a range of reasons, the future of honey bees and beekeeping is under threat.

The annual gross value of production of honey and associated bee products in Australia in 2014 / 2015 was estimated to be \$101 million. The majority of beekeeping income came from honey sales, 85 per cent of cash receipts with paid pollination accounting for 11 per cent of receipts.

The greatest value of honey bees to Australia is in their value as a plant pollinator of a very significant list of agricultural and horticultural crops. Various estimates put the net benefit derived from honey bees in the order of \$4 to \$6 billion per year. This contribution is debated continually with some estimates in the range of \$ 8–12 billion. What is known is that the contribution will rise in line with the increase in value of horticultural and agricultural crops.

Table 1 provides a list of many of the economically important horticultural and agricultural crops and the degree to which the interaction of honey bees benefits the final yield of that crop.

The role of honey bees in the pollination of legume species within improved pasture grazing management systems is highly significant. The various clovers and lucerne which make up a very large proportion of the valuable nitrogen fixing legume mix in improved pastures benefit from the visits of honey bees to pollinate these plants. Thus, the livestock agricultural industries are by implication also partially reliant on the valuable pollination contribution provided by honey bee foraging behaviour.

NSW is ideally located to capitalise on the growth of paid pollination services that has significant benefits to regional economies and the State. To meet predicted demand from one horticultural industry, the almond industry that is completely dependent upon honey

Beekeepers usually pay for these sites in kind with honey. Given the nature of the free market, there is nothing legally stopping another beekeeper approaching private property owners and offering them two buckets of honey where a site is currently identified as belonging to another beekeeper. There is no legal right to any private property site by the honey payment system.

What normally happens within the beekeeping industry is that once a beekeeper establishes that a private property already has a relationship with an existing beekeeper, the new beekeeper thanks the property owner for their time and removes themselves from the property. Thus, security of sites on the private property tenure is strongly recognised by commercial beekeepers where the culture of the industry is one that respects existing agreements.

Another aspect of site security is having a working knowledge of the biosecurity issues surrounding certain areas or regions. There are a number of pests and diseases of honey bees which have the potential to cause major economic loss to any beekeeping business.

Not all businesses are equal in their ability to manage and control certain diseases, with particular reference to the fatal bacterial brood disease, American foulbrood where the biosecurity risk is further exacerbated by the fact that it is easily transferred by bees over distance of up to 4 kilometres. Wherever this is prevalent, many beekeeping operations will make a conscious decision to avoid such areas. This knowledge, again, is built up over time and experience by individual beekeepers working certain apiary sites.

Knowing who your beekeeping neighbours are is of major benefit when it comes to security in the biosecurity management area. Any actions that detract from this security increase the difficulty of maintaining a high level of biosecurity within individual beekeeping businesses.

Thus, any policy or actions by a government department, private property owner or corporation to remove 'long' term apiary site tenure will undermine the stability of beekeeping businesses and substantially reduce long term investment security within the commercial beekeeping industry. To continue to grow and thrive and meet the needs of pollination dependant industries NSW beekeepers need greater access to public lands.



➤ Secure tenure of apiary sites

Commercial beekeepers build up a “working” knowledge of specific apiary sites within their operational range over many years.

The management of risk is as applicable in beekeeping as in any other agricultural industry. Site location and long held knowledge of the floral resources present and proximity to other beekeepers whose biosecurity status is known are elements that aid in the mitigation of risk.

Commercial beekeeping is a long-term investment and participants tend to be involved for decades and are often intergenerational. Knowledge on the flowering cycle of melliferous flora is often passed down from generation to generation or is hard won by experience. There is very little published on the honey and pollen potential for different floral species, and the information that is available is of a general nature.

Commercial beekeepers build up a “working” knowledge of specific apiary sites within their operational range over many years. This compounding knowledge base allows the individual beekeeping business the ability to increasingly make informed decisions over time on where and when to move apiaries to new locations to maximise the benefit to the bee colonies.

This knowledge base allows the individuals within the beekeeping business to invest with confidence in capital and the bee hives themselves. A beekeeping business needs to invest in trucks, extracting plant, storage facilities, workshop and bee hives. This amounts to a substantial financial investment by individuals.

An intimate knowledge of bees and highly developed bush craft and floral resource knowledge combine to make this a unique industry. Long term investment in commercial beekeeping is strongly correlated to secure access to reliable flowering species. Long term, in this context, may in fact relate to generational time periods.

The largest group of apiary sites exist within private property tenure.

bees, will require the placement of 270,850 hives in almond orchards by 2025 or 60 % of Australia’s current total number of commercial hives. The almond industry’s value of production was approximately \$750 million from February 28, 2018 to March 1, 2019 (2). Almond exports in the 2017 / 2018 marketing year accounted for \$ A 429 million (3).

NSW is the largest producer of honey products within Australia, with an estimated annual honey crop of 14,000 tonnes in a normal season. Climatic influences have a major impact on the nectar and pollen produced by flowering plants. Rainfall has a major impact on the growth and bud initiation of all flowering plants.

NSW production varies from 40 to 45% of the total honey crop of Australia. NSW honey production and associated bee products such as queen bees, package bees, beeswax, propolis and honey comb is estimated to be worth \$36 million annually.

Honey has an age-old reputation for use in cosmetics and health. Honey has antimicrobial qualities depending upon the source of the nectar and it works against a very wide range of microbes that cause infections, even antibiotic-resistant super bugs. Under strict guidelines honey is increasingly being used in medical and surgical applications and it has additional therapeutic qualities, including anti-inflammatory, antioxidant, and pre-biotic properties. Given the communities demand for proven natural remedies the recognition of honey’s value in medical applications could enhance prospects for a much greater value and return to beekeepers based in regional NSW in the future.

Table 1: Pollination responsiveness of selected crops (as percentage of yield)

Tree crops		Ground crops		Vine crops		Seed production	
Commodity	Reponsiveness (%)	Commodity	Reponsiveness (%)	Commodity	Reponsiveness (%)	Commodity	Reponsiveness (%)
Almond	100	Peanuts	10	Blueberry	100	Beans	10
Apple	100	Broadacre crops		Cucumber	100	Broccoli	100
Apricot	70	Canola	15	Kiwi	80	Brussel sprouts	100
Avocado	100	Cotton	10	Pumpkin	100	Cabbage	100
Cherries	90	Soybeans	10–60	Rockmelon	100	Canola seed	100
Citrus	0–80	Sunflower	30–100	Squash	10	Carrot	100
Grapefruit	80			Watermelon	70	Cauliflower	100
Lemon & lime	20					Celery	100
Macadamia	90					Clover	100
Mandarin	30					Lucerne	100
Mango	90					Mustard	100
Nectarine	60					Onions	100
Orange	30						
Papaya	20						
Peach	60						
Pear	50–100						
Plum & prune	70						

Source: Pollination Aware: The Real Value of Pollination in Australia (RIRDC Pub. No. 10-081, August 2010)



► Beekeeping industry structure

A full-time apiarist may have a family structured business where one individual may carry out most of the beekeeping functions in that business, or the structure may be more complex.

In NSW there are 839 beekeepers registered whose status is "commercial" and 8,600 registered beekeepers who are "recreational" or "other". The total number of commercial bee hives registered is 257,072 (NSW DPI Beekeeping Registration System, 11th October 2019).

A commercial apiarist may be considered part-time, deriving only part of their main income from managing bee hives, or full-time. A full-time apiarist may have a family structured business where one individual may carry out most of the beekeeping functions in that business, or the structure may be more complex.

There are numerous examples of larger beekeeping businesses incorporating many family members, i.e., brothers, sons, nephews, daughters or employing persons in various roles within the business. With the increase in demand for pollination services a trend has emerged where some family businesses have grown considerably to become significant employers and owners of in excess of 4,000 hives.

Beekeeping is a very physically demanding industry with the removal of honey boxes and the manipulation of bee hives. This aspect has probably restricted the industry to a largely male dominated working environment.

For a person to be a successful commercial beekeeper they would be required to possess a very high degree of knowledge and understanding on a range of management issues associated with keeping honey bees. Briefly, these may include:

- ▲ A comprehensive knowledge of the various pests and diseases that may afflict honey bees.
- ▲ A very good understanding of the flowering cycle of key melliferous flora in a safe travelling range from the beekeeper's base.

- ▲ Logging practices that change the species mix of the forest.
- ▲ Hazard reduction burn timing that change the species mix of the forest.
- ▲ Hardwood chips for landscaping.
- ▲ Increase in insecticide intensive crops such as cotton.
- ▲ Lack of willpower / legislation for EPA to prosecute land managers who use insecticides incorrectly that result in mass bee kills.

The beekeeping industry has a clear objective of preserving native flora. The beekeeping industry stands for and depends on the preservation of native flora and hence has much in common with those in the community whose values support nature conservation and the establishment of conservation reserves. The NSWAA has provided detailed feedback in 2018 and 2019 focussing on ecologically sustainable development in submissions addressing Regional Forestry Agreements, Integrated Forestry Operations Approvals and the Provisions of the Forestry Legislation Amendment Bill 2018 in respect to forestry operations on those public lands where bee sites exist.

The NSWAA has lobbied for

- ▲ the retention of feed and habitat trees at levels with the necessary age, genetic and species diversity to support their persistence while contributing to the maintenance of a healthy biodiversity in local landscapes.
- ▲ intervals between logging operations that allow for the middle and lower stories of forests to recover.
- ▲ exacting management of pre and post harvest burns including the recording of burn events, the intervals between burns and the intensity of burns to assist in the recovery of under and middle storey plants and that they do not impact adversely on mature standing trees. This will enable regeneration and recovery from previous burns thereby enhancing forest diversity.
- ▲ ease of access to licensed sites and forest tracks amenable to beekeepers' vehicles that is essential for the conduct of their business.
- ▲ against the creation of sterile monocultures in forest plantings.

The feedback provided through lobbying efforts further emphasizes the responsible stewardship role exemplified by commercial beekeepers. Despite this characteristic no formal consultation or collaboration at the decision-making level between Government and commercial apiarist representatives exists. Agencies responsible for native forests on public lands stand to benefit from input from NSWAA representatives whose knowledge, skills and experience in the development of policy and procedures would make ecologically sustainable development a reality.



► Threats to floral resource availability

The beekeeping industry has a clear objective of preserving native flora.

An extensive number of threats, past and present, have been identified by the beekeeping industry in respect to all external factors. They are as follows:

- ▲ land clearing for agriculture
- ▲ forestry activities that remove flowering trees
- ▲ replacement of felled trees with pine and low pollen and nectar yielding eucalypt plantations
- ▲ fires, including hazard reduction and natural bushfires
- ▲ reduced and unseasonal flooding of river red gum forests
- ▲ reduction in vehicle access to quality apiary sites
- ▲ firewood harvesting
- ▲ salinity affecting the health of the available flora
- ▲ droughts, which reduce flowering and interrupt growth cycles
- ▲ dieback of eucalypt species
- ▲ agricultural practises that reduce the abundance of flowering weed species
- ▲ biocontrol of flowering weed species that are of major benefit to honey bees, e.g. *Echium plantagineum* (Patersons curse)
- ▲ pesticide use on flowering crops that are attractive to foraging honey bees
- ▲ newer varieties of agricultural crops that are not as beneficial to honey bees
- ▲ urban sprawl and rural subdivisions removing mature vegetation and reducing the number of apiary sites. This also has safety concerns
- ▲ loss of access to native forests due to changes in land tenure between government departments
- ▲ reduced access to native flora on private lands because of a perception by some landholders that honey bees are harmful to the ecosystem and a threat to personal safety.

- ▲ Food handling requirements of the market and a thorough understanding of the processes to produce a high-quality product under today's stringent quality assurance environment.
- ▲ An understanding of the bee requirements to pollinate a range of pollination-dependent commercial, agronomic and horticultural crops and the risks associated with pesticide use on these crops. Also, the nutritional impact of the pollen and nectar produced by these crops to honey bees.
- ▲ The ability to manipulate the nutritional inputs from targeted flowering events to maximise colony populations. Colonies of honey bees need a range of pollens and stimulating nectar to promote bee breeding. Honey crops only occur as a result of maintaining strong populous colonies and access to nectar producing plants.
- ▲ Business and financial skills appropriate to an extremely variable income stream. Beekeeping businesses have historically been based on honey production. This income is extremely variable due to climatic factors and the flowering behaviour of the nectareous flora on which beekeepers rely, in the various geographic regions.

Restrictions to beekeeping businesses include developed knowledge of the flora in a given region, the impact of biosecurity threats to their bees and the physical limitation of the number of bee hives which can be managed by each practising beekeeper within the business. The most significant restriction is the availability of sites within a floral resource area.



► Apiary movements and reliance on site choice

The difference in the Australian mainland context is due to the sporadic flowering of eucalypt species.

To provide security to each beekeeping business, each operation requires access to a network of sites with a range of floral species represented. The Australian mainland commercial beekeeper is nomadic. Virtually all the rest of the commercial beekeeping scene around the world is based on a migratory model. Nomadic movement is dependent on what is in flower in any particular year, i.e., there is not an annual pattern in place. On the other hand, a migratory beekeeper will move their bee hives at roughly the same time each year to roughly the same geographic location, sourcing the same floral event to benefit their honey bee colonies.

The difference in the Australian mainland context is due to the sporadic flowering of eucalypt species. A paper produced by Brad Law (2000) illustrates the gaps that can occur, measured in years, within the one species of eucalypt. This study was based on data collected by the then NSW Forestry Commission and clearly illustrates the degree of variability of flowering events even in a geographic region of NSW that is traditionally considered as having a regular and reliable rainfall pattern.

In another study (Somerville 1999) 51 floral species were identified as being of primary importance to commercial beekeeping interests. Of these, 37 were *Eucalyptus* or closely related *Corymbia* or *Angophora* species. Table 2 lists the frequency of flowering. This comprehensive list demonstrates the variability in flowering events and the associated difficulty in planning hive placement and the valuing of forest sites.

What has happened since this 1999 study is the increased movement of commercial beekeeping businesses to target paid pollination services as a significant component of their income structure. In 1999 only 19% of the beekeepers responding to the survey indicated that they obtained any income from the provision of pollination services. This is now estimated to be 50 % or greater.

Since then there has been a steady growth in the demand for paid pollination services provided by commercial beekeepers. The growth in the area planted to almonds within Australia now places Australia as the world's second largest producer of this crop. Almonds are 100% reliant on honey bee assisted pollination. Other areas of increasing demand for paid pollination include apples, pears, cherries, blueberries, melons and seed canola.

Now beekeepers consider the provision of paid pollination as a significant proportion of their income. There are no studies to state to what extent this has happened.

Beekeepers have periodically utilised forested lands as a refuge from the widespread use of pesticides. Placing apiaries away from agricultural lands in years when plague locusts are an issue removes bees from the threat of pesticides used to control these pests.

Historically the NSWAA believed that the importance of forested land to their operations was such a high priority that a code of practice for keeping of bees on forested lands was developed in 1997 for its members.



➤ Importance of apiary sites in a complex system

This is a very complex question as the species mix varies from one region to the next, even from one apiary site in a particular forest to the next site.

What is apparent when viewing or analysing the commercial beekeeping industry is the need for ‘long term’ reliable access to a range of floristic species that have the opportunity to benefit honey bees within an economic travelling range of the beekeeper’s home base.

There is only one published document that has estimated the number of sites in each land tenure (Somerville, 1999). The following table is reproduced from this study.

Table 3. Total number of apiary sites for each form of land tenure and an adjusted total to include estimates for non-respondents

Land Tenure	Figure from Census	Adjusted Figure To include non respondents
State Forests	4,226	5,365
National Parks & Wildlife Service (NP&WS)	333	412
Crown Land	569	749
Rural Lands Protection Boards	2,349	2,972
Private Property	11,039	13,981
Total	18,516	23,479

This data in Table 3 is now 20 years old. It is difficult to obtain current bee site data, but it is believed that the number of apiary sites in NP&WS land tenure has increased, the number of sites that Local Land Services are responsible for has probably remained static and the number of sites on Crown Land has possibly declined. Crown Land includes the Roads and Maritime Services and the Water Board. There is no reason to believe that the use of private property sites has decreased due to the loss of Paterson’s Curse as a floral resource.

Table 2. Frequency of flowering of important *Eucalyptus* and related species to commercial beekeepers in NSW (units in years)

Species	Common name	Most Likely	Possible
		Flowering frequency in years	
<i>Eucalyptus paniculata</i>	Grey ironbark	2-3	up to 10
<i>Corymbia maculata</i>	Spotted gum	3-5	up to 10
<i>Eucalyptus macrorhyncha</i>	Red stringybark	3-4	up to 10
<i>Eucalyptus camaldulensis</i>	River red gum	2-4	up to 10
<i>Eucalyptus sideroxylon</i>	Mugga ironbark	2-3	up to 6
<i>Eucalyptus albens</i>	White box	2-3	up to 5
<i>Corymbia gummifera</i>	Red bloodwood	2-3	up to 6
<i>Eucalyptus pilularis</i>	Blackbutt	2-3	up to 10
<i>Eucalyptus acemenoides</i>	White mahogany	2-3	up to 7
<i>Eucalyptus dealbata</i>	Hill gum	2-3	up to 10
<i>Eucalyptus fibrosa</i>	Red ironbark	3-4	up to 10
<i>Eucalyptus largiflorens</i>	Black box	3	up to 6
<i>Corymbia trachyphloia</i>	Pilliga bloodwood	2-3	up to 5
<i>Eucalyptus bridgesiana</i>	Apple box	3	up to 5
<i>Eucalyptus microtheca</i>	Coolibah	2-3	up to 5
<i>Eucalyptus crebra</i>	Narrow leaved ironbark	3-4	up to 10
<i>Eucalyptus microcarpa</i>	Western greybox	2-3	up to 10
<i>Eucalyptus blakelyi</i>	Blakely’s red gum	3-4	up to 10
<i>Eucalyptus tereticornis</i>	Forest red gum	2-3	up to 7
<i>Eucalyptus melanophloia</i>	Silver leaved ironbark	3	up to 6
<i>Eucalyptus caliginosa</i>	Broad leaved stringybark	3	up to 5
<i>Eucalyptus muelleriana</i>	Yellow stringybark	3-4	up to 8
<i>Eucalyptus viridis</i>	Green mallee	3	up to 6
<i>Eucalyptus viminalis</i>	Ribbon gum	3-4	up to 6
<i>Eucalyptus globoidea</i>	White stringybark	3	up to 6
<i>Angophora floribunda</i>	Black apple	2-5	up to 10
<i>Eucalyptus moluccana</i>	Grey box	2-4	up to 7
<i>Eucalyptus saligna</i>	Sydney blue gum	3	up to 5
<i>Eucalyptus andrewsii</i>	New England blackbutt	2-3	up to 5
<i>Eucalyptus laevopinea</i>	Silver – topped stringybark	2-5	up to 6
<i>Eucalyptus socialis</i>	Christmas mallee	3	up to 10
<i>Eucalyptus punctata</i>	Grey gum	3-4	up to 5
<i>Eucalyptus species (stringybark)</i>	Stringybark	2-3	up to 5
<i>Eucalyptus pauciflora</i>	Snow gum	3	up to 5
<i>Eucalyptus caleyi</i>	Caleys ironbark	3	up to 6
<i>Eucalyptus resinifera</i>	Red mahogany	3	up to 4



Pollen provides to a honey bee colony the protein, amino acid, fatty acid/lipid, mineral and vitamins it requires.

These vary in quantity and quality dependent on the individual floral species and the abundance of the species from which bees collect pollen and the seasonal conditions which may or may not promote the production of pollen and/or nectar.

What is very apparent in Table 2 is that none of the species flower on an annual basis. The average flowering frequency is three years. Commercial beekeepers may not move their apiaries onto any one of these species for two to five years and even up to ten years. This depends on a range of variables such as the degree of budding of the trees in question, alternative choice of flowering species elsewhere, distance from their base and the nutritional requirements and status of their bees at any particular point in time. All will influence the decision process on what flowering event to move bees to.

Drought, bushfire and flood events are also major factors influencing site utilisation. Season and proximity of follow-on flowering events will also influence site selection.

Apiary movement is strongly dependent on the nutritional requirements of the colonies at any particular time of the year. A colony of bees requires access to ample quantities of both nectar and pollen. These nutritional rewards are not necessarily obtained from the one flowering event. In fact, the norm is that they are often not collected from the same species.

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If beekeepers target a particular floral species due to its reliability in producing nectar, but the conditions prevailing at the time are not good for pollen, then a colony's population may and often does

decline. This colony is then not in a suitable condition in relation to its population to be moved onto another nectar flow with little or no pollen available.

Thus, beekeepers need to manage their colonies to ensure nutritional shortfalls are balanced and colonies are maintained in the best possible condition with the necessary strength, health and resilience of the bees to target the pollination events that are likely to produce the best financial outcome.

In summary, commercial beekeepers require a range of apiary sites that contain different floral species with the potential to produce nectar and/or pollen over a 12-month period. This will allow the beekeeper to have a choice of where to move apiaries, given most flowering events may only extend for six weeks. Some winter flowering events may extend over 12 weeks or longer.