Bushfire Recovery Plan:
Understanding what needs to be done to ensure the honey bee and pollination industry recovers from the 2019–20 bushfire crisis

by Michael Clarke
July 2020

Australian Honey Bee Industry Council

AgriFutures
Honey Bee & Pollination
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AgriFutures Australia is the new trading name for Rural Industries Research & Development Corporation (RIRDC), a statutory authority of the Australian Government established by the Primary Industries Research and Development Act 1989.
Foreword

During the 2019-20 Bushfire Crisis an estimated 15.6 million hectares of native Australian forest was destroyed, severely compromising the viability of the honey bee industry and the plant industries that rely on critical pollination services.

As the pre-eminent pollinator in Australia, honey bees need access to the floral diversity found in healthy forests to stay healthy themselves. Any limitation on or disturbance to honey bees’ access to floral resources has a negative impact on not only local honey production but the ability of honey bees to provide pollination services to Australian broadacre crops and horticulture.

Industry experts suggest honey production across Australia is down 50% since the 2019-20 bushfires with a significant proportion of hives lost across New South Wales, Queensland, South Australia and Victoria. This environmental loss has put under threat $138 million in gross value of production to the Australian economy from honey and hive productions and a $14.2 billion per year contribution to the Australian economy from essential pollination services to crops and horticulture.

There is also a risk that the 2019-20 bushfires, on top of years of severe drought, has many beekeepers contemplating exiting the industry unless they receive assistance.

The objective of this research was to understand the extent of the impact of the crisis on beekeepers and the pollination industry and find out how government can support the industry’s recovery. Hearing firsthand from people in the industry about the bushfire crisis and how to best coordinate government support to the industry was a crucial part of the research. This was done through a series of interviews with individual beekeepers and supply chain partners, which together with a review of discussion papers informs the preparation of this report Bushfire Recovery Plan: Understanding what needs to be done to ensure the honey bee and pollination industry recovers from the 2019-20 bushfire crisis.

Through industry-wide consultation this report brings together a combination of short-term support measures and longer-term industry change initiatives. It requires Australian and state government cooperation to implement. Several themes were identified for the Plan to follow: immediate recovery, future industry viability, improved hive husbandry and health research, development and extension (RD&E), forest management and beekeeper access, and improved floral resource diversity.

Floral resource access and measures to maintain industry viability are considered the highest priority given the risks faced from sustained reduction in honey production following the 2019-20 bushfires. This report has helped to inform the development of a six-point plan to support the beekeeping industry’s recovery over the next five years. These steps include: 1. direct hive feeding and pollination support, 2. fee waivers, 3. levy supplements, 4. industry sustainability research, 5. communication initiatives, and 6. industry outreach and engagement. To ensure the industry’s recovery considerable collaboration is required between the honey bee and pollination industry and government and non-government agencies.

I would also like to take the opportunity to thank the Australian Honey Bee Industry Council and the 15 commercial beekeepers and industry participants for their time and generosity contributing to this Plan.

Trevor Weatherhead
Chair
Australian Honey Bee Industry Council
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ABARES</td>
<td>Australian Bureau of Agricultural and Resource Economics and Sciences</td>
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<td>AHBIC</td>
<td>Australian Honey Bee Industry Council</td>
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<tr>
<td>DAWE</td>
<td>(Australian Government) Department of Agriculture, Water and Environment</td>
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<td>DBCA</td>
<td>(WA Government) Department of Biodiversity, Conservation and Attractions</td>
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<td>DAF</td>
<td>(QLD Government) Department of Agriculture and Fisheries</td>
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<td>DPI</td>
<td>(various state government) Departments of Primary Industries</td>
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<tr>
<td>GP</td>
<td>General practitioner</td>
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<td>GRDC</td>
<td>Grains Research and Development Corporation</td>
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<td>GVP</td>
<td>Gross value of production</td>
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<td>IBC</td>
<td>Intermediate bulk container</td>
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<td>KI</td>
<td>Kangaroo Island</td>
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<td>MLA</td>
<td>Meat and Livestock Australia</td>
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<td>NSW</td>
<td>New South Wales</td>
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<td>NSWAA</td>
<td>NSW Apiarists Association</td>
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<tr>
<td>pa</td>
<td>Per annum</td>
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<tr>
<td>QLD</td>
<td>Queensland</td>
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<td>RFA</td>
<td>Regional Forestry Agreement</td>
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<td>RDC</td>
<td>Research and Development Corporation</td>
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<td>RD&amp;E</td>
<td>Research, Development and Extension</td>
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<td>RIRDC</td>
<td>Rural Industries Research and Development Corporation</td>
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<td>SA</td>
<td>South Australia</td>
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<td>STT</td>
<td>Sustainable Timbers Tasmania</td>
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<td>USDA</td>
<td>United States Department of Agriculture</td>
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<td>VIC</td>
<td>Victoria</td>
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<td>WA</td>
<td>Western Australia</td>
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Executive summary

The honey bee is the pre- eminent pollinator in Australia. If they are to maintain sound health, honey bees need access to the floral diversity found in healthy forests. Any negative impact on the amount of public land available to beekeepers will in turn have a negative impact on the ability of honey bees to provide pollination services to Australian broadacre crops and horticulture.

In 2008, a House of Representatives Inquiry\(^1\) concluded that a failure or even a part failure of the honey bee industry would put at risk billions of dollars’ worth of crops in Australia. In 2014, a Senate Inquiry\(^2\) reiterated these findings.

The 2019-20 bushfire crisis has severely compromised the viability of eastern state commercial beekeeping businesses and, in turn, their ability to provide pollination services to Australian broadacre crops and horticulture. This report details a recovery plan developed by beekeepers that requires Australian and state government funding and cooperation to implement. The report was prepared with funding support from the AgriFutures Australia, Honey Bee & Pollination Research, Development and Extension (RD&E) Program.

In the 2019-20 bushfires, the honey bee and pollination industries most affected were in NSW, SA (especially Kangaroo Island), QLD, and VIC. Western Australia and TAS also lost hives and essential floral resource.

The importance of native forest to the industry

- The 2019-20 bushfires destroyed an estimated 15.6 million hectares of native forest.
- This native forest provides nectar and pollen essential to healthy honey bee colonies and the Australian honey industry (GVP $138 million\(^3\)). RIRDC (2007)\(^4\) estimated that South-eastern Australia contains about 80% of the nation’s hives and 80% of its beekeepers.
- Floral resources are also critical to maintaining healthy honey bee populations that support pollination services. Measured by number, 65% of agricultural and horticultural crops introduced to Australia since European settlement require honey bees for pollination\(^5\). In Australia, this service is valued at $14.2 billion per year\(^6\).

The importance of commercial beekeeping to the agricultural sector

- The commercial beekeeping sector will also play a crucial role in the National Farmers Federation goal of developing an agriculture and horticulture sector worth $100 billion by 2030\(^7\).
- Honey bees need to produce honey for their health as well as for the economic health of the beekeeper. Pollination service income is not enough to provide a strong, viable honey bee business that is ready for the time when the pollination service is required. Beekeepers need to produce honey to make the business viable.
- The 2019-20 bushfires have compromised the viability of the honey bee industry and plant industries that rely on critical pollination services.


\(^4\) RIRDC (2007) Commercial Beekeeping in Australia


\(^7\) NFF 2019, 2030 Roadmap: Australian agriculture’s plan for a $100 billion industry.
**Forest recovery time**
Time needed for recovery of apiary values in burnt native forest is dependent on rainfall and species; intervals of between three years and 25 years or more are likely. Ten-plus years may be required for the recovery of Eucalypts that have had their crowns burnt. Eucalypts account for 70% of Australian honey production (RIRDC 2007). Longer time intervals will be needed for coastal heath that produces ‘active’ Manuka honey, that is Manuka honey that has been tested and proven to contain bioactive compound, methylglyoxal. Large areas of ‘active’ coastal heath were destroyed by the bushfires, especially in the NSW Northern Rivers.

**Industry risk**
The Australian honey bee and pollination industry has about 1,800 commercial beekeepers. It is characterised by highly skilled individuals who are more than 65 years of age, with a deep understanding of honey bee husbandry, ecology, and the flowering patterns of Australian native forests. After years of severe drought, the 2019-20 bushfires have beekeepers contemplating leaving the industry. There is a lack of floral resource to support their beekeeping endeavours. Unassisted, they do not have the energy to experiment with, and learn, forest replacement supplementary feeding. The real ‘crunch’ for pollination will come in 2021 when financial reserves and human reserves are depleted.

**Understanding what needs to be done**
Industry consultation identified short-term support measures as well as longer-term initiatives to facilitate industry adjustment. The overall focus is on industry self-help and self-reliance after an initial short-term recovery phase has been delivered. This has been structured around five themes and has informed the development of a six point plan.
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<tr>
<td>Coordination of recovery efforts.</td>
<td>Government cover forecast shortfall in biosecurity levy.</td>
<td>Understand honey bee nutrition with less forest resource.</td>
<td>Public estate vegetation management that better recognises apiary values.</td>
<td>Research pastures and legumes for farms that provide optimal nectar and pollen.</td>
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<tr>
<td>Building partnerships with non-government fund providers.</td>
<td>Optimise industry’s levy base by introducing a new pollination levy.</td>
<td>Explore sophisticated hive management technology after bushfires.</td>
<td>Public estate forest management that is consistent across jurisdictions, and enshrines apiary access.</td>
<td>Work with Landcare and others to communicate the importance of planting native vegetation pollination corridors.</td>
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<td>Provide sugar and pollen subsidies.</td>
<td>Upskill and expand the small and aging beekeeper base.</td>
<td>Understand the honey bee biosecurity implications of less forest resource.</td>
<td>Investigate the legal status of public land sites, i.e. what property rights are attached.</td>
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<td>Relief from state government fees and charges.</td>
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<td></td>
<td>Improve beekeeper access to public lands.</td>
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Floral resource access and measures to maintain industry viability are the highest priorities. Industry relies on income from honey levies for biosecurity, research, and industry representation. It is not a rich or well-resourced industry. With a sustained reduction in honey production following the 2019-20 bushfires\(^8\), there is a distinct possibility that the industry will cease to effectively service its biosecurity, research, and industry representation responsibilities. If a significant biosecurity incident were to occur under these circumstances (e.g. *Varroa destructor* incursion), the honey bee and pollination industry would not have the capacity to respond.

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\(^8\) The Honey Packers & Marketing Association points to a 2019-20 crop that is 51% of the long-term average.
Introduction

Background

The 2019-20 bushfire crisis has severely compromised the viability of eastern state commercial beekeeping businesses and, in turn, their ability to provide pollination services to Australian broadacre crops and horticulture. This report details a recovery plan that was developed by beekeepers; it needs Australian and state government funding and cooperation to implement.

Project objectives and approach

The project was originally envisaged as a two-day workshop hosted by the Australian Honey Bee Industry Council (AHBIC) with funding support from AgriFutures Australia. The workshop was to take place in Canberra, 23 and 24 March 2020, and would be attended by beekeepers, policymakers and Ministerial advisors.

The workshop’s objectives were:

1. To hear firsthand from beekeepers and the pollination industry about the impact of the bushfire crisis on their lives, their business, and their essential industry.
2. Learn what government can do to support beekeepers with the recovery and rebuilding of their businesses.
3. Determine how best to coordinate government recovery support to the industry.

After restrictions on meetings were imposed to control coronavirus (COVID-19), the project was restructured. The revised project included a series of interviews completed with affected beekeepers and supply chain partners, a review of discussion papers prepared to inform the workshop, and the preparation of this report Bushfire Recovery Plan: Understanding what needs to be done to ensure the honey bee and pollination industry recovers from the 2019-20 bushfire crisis.
Industry overview and bushfire impact
The following overview was prepared by outgoing AHBIC Chair, Peter McDonald.

Economic contribution of the honey bee industry
Honey and hive products such as beeswax and honey bee sales contribute $147 million in gross value of production (GVP) to the Australian economy (ABARES 2019). However, pollination services delivered by managed honey bees are essential to multimillion-dollar horticultural crops, and are important to the generation of economic yields in many other horticultural enterprises and broadacre crops. Collectively, these pollination services contribute $14.2 billion per year to the Australian economy (Karasinski, 2018). The honey bee and pollination services industry has a vital role in delivering the National Farmers Federation vision for an agricultural sector with a GVP of $100 billion by 2030.

Magnitude of the bushfire loss
Current estimates are that 15.6 million ha of forest was burnt over the 2019-20 bushfire season. This native forest produces nectar and pollen required for healthy honey bees. Most of the Australian honey crop is generated in eucalypt forests. Honey bees overwinter in safe, chemical-free forests, build hive strength, and are then transported to pollinate food crops.

Importance of floral resources
In NSW there are 4,000 apiary sites in public native forest. These forest sites are estimated to produce 70% of the NSW industry’s GVP for honey, and supply 200,000 hives for the pollination of food crops. Data collected by the NSW Apiarists Association indicate 9,800 hives were destroyed by fire, and 89,000 hives lost field bees and will die in the absence of an intensive husbandry effort (NSWAA, workshop presentation, Appendix 3).

In QLD, there are 6,500 apiary sites in public native forest. These forest sites are estimated to produce 80% of the QLD industry’s GVP, and supply 45,000 hives for the pollination of food crops. Preliminary data indicates 1,000 hives were destroyed by fire, and an unknown number of hives lost field bees.

In SA, there are 2,100 apiary sites in public native forest, including sites on Kangaroo Island (KI). In the 2019–20 bushfires, about 60% of KI was burnt, and 1,100 of its 4,000 hives were destroyed. Consequently, the internationally significant pure strain of Ligurian bees found on KI are at risk. In VIC, there are 4,000 apiary sites in public forest. These forest sites generate 70% of the industry’s GVP; 650 hives were lost in the 2019-20 bushfires. Western Australia and TAS also lost forest sites and hives in these bushfires.

Forest recovery time
Time needed for recovery of apiary values in burnt native forest is dependent on rainfall and species; intervals of between three years and 25 years or more are likely. Ten-plus years may be needed for the recovery of eucalypts that have had their crowns burnt. Eucalypts are the mainstay of Australian honey production. Longer time intervals will be needed for coastal heath, which produces ‘active’ honey of the same style and value as New Zealand Manuka Honey. The bushfires destroyed large areas of ‘active’ coastal heath, especially in the NSW Northern Rivers.

Industry risk
The Australian honey bee and pollination industry has about 1,800 commercial beekeepers. It is characterised by highly skilled individuals who are more than 65 years of age, and who have a deep understanding of honey bee husbandry, ecology, and the flowering patterns of Australian native forests. After years of severe drought, the 2019-20 bushfires have beekeepers contemplating leaving the industry. There is a lack of floral resource to support their beekeeping endeavours. Unassisted, the beekeepers are less inclined to experiment with forest replacement supplementary feeding.
Bushfire Recovery Industry Consultation

Industry consultation identified short-term support measures as well as longer-term initiatives to facilitate industry adjustment. The Plan’s overall focus is on industry self-help and self-reliance after an initial short-term recovery phase has been delivered. This is structured around five themes:

**Theme 1: Immediate recovery**

**Theme 2: Future industry viability**

**Theme 3: Improved hive husbandry and health RD&E**

**Theme 4: Forest management and beekeeper access**

**Theme 5: Improved floral resource diversity**

Each action in each theme is described in terms of the problem it will address, priority, investment timeframe, and responsibility for implementation.
### Theme 1: Immediate recovery

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<th>Action</th>
<th>Problem Addressed</th>
<th>Priority</th>
<th>Investment Timeframe</th>
<th>Responsibility</th>
</tr>
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<tbody>
<tr>
<td>Coordinate recovery efforts, including communication and upskilling.</td>
<td>Peak industry body AHBIC survives on voluntary contributions from industry, which will have less capacity to contribute for years. Without another source of funding, AHBIC will not be able to lead industry’s bushfire recovery efforts.</td>
<td>High</td>
<td>Immediate for 2 years</td>
<td>Aust Govt Minister for Agriculture, Drought and Emergency Management</td>
</tr>
<tr>
<td>Understand and contribute to bushfire recovery plans.</td>
<td>Develop a thorough understanding of current local, state, and national bushfire recovery institutional arrangements, and develop governance arrangements. Maximise leverage from existing institutional arrangements and current support programs, providing input to create new support programs (e.g. Resilience NSW ‘Roadmap to Recovery’) and develop partnerships to augment support programs at local, state, and national scales.</td>
<td>High</td>
<td>Immediate for 2 years</td>
<td>AHBIC in collaboration with the state-based beekeeping organisations</td>
</tr>
<tr>
<td>Build partnerships with non-government funders of bushfire recovery efforts, e.g. Wheen Bee Foundation, Mallesons Solicitors.</td>
<td>Other sources of honey bee and pollination industry funds are available, and investment needs to be coordinated to avoid overlap and maximise beneficial outcomes.</td>
<td>High</td>
<td>Immediate for 2 years</td>
<td>AHBIC in collaboration with the state-based beekeeping organisations</td>
</tr>
<tr>
<td>Provide sugar and pollen subsidies.</td>
<td>Needed until the end of 2021 to ensure build-up of hives for spring honey flows and paid pollination services. Funding in 2021 will be even more important because beekeeper financial reserves will have been exhausted in 2020 from bushfire recovery costs and a reduced honey crop. NB: pollen subsidies are not currently in place.</td>
<td>High</td>
<td>Immediate for 2 years</td>
<td>State govt (via direct approach to Ministers for Agriculture); Aust Govt (via National Bushfire Recovery Agency and, where relevant, Minister for Employment, Skills, Small and Family Business)</td>
</tr>
<tr>
<td>Gain relief from state government fees and charges.</td>
<td>Beekeepers have smaller incomes and higher cash costs. Wavers on site fees (other than a small admin charge to ensure ownership records are kept up to date), beekeeper licences and vehicle registration. Wavers on vehicle registration costs are particularly valued because beekeepers travel to identify new floral resources.</td>
<td>High</td>
<td>Immediate for 2 years</td>
<td>State govt (via direct approaches to the Ministers for Agriculture, Environment, Treasury and State Revenue Offices)</td>
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## Theme 2: Future industry viability

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<th>Problem Addressed</th>
<th>Priority</th>
<th>Investment Timeframe</th>
<th>Responsibility</th>
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<tr>
<td>Government covers forecast shortfall in biosecurity levy.</td>
<td>Lower levels of honey production, forecasted to be 30% to 50% lower for 5 years(^9), put at risk industry contributions to the National Bee Pest Surveillance Program (total industry contribution of $100,000 pa) and the National Bee Biosecurity Program (total industry contribution of $500,000 pa).</td>
<td>High</td>
<td>Immediate for 4 years</td>
<td>Aust Govt Minister for Agriculture, Drought and Emergency Management</td>
</tr>
<tr>
<td>Government covers forecast shortfall in research levy.</td>
<td>Lower levels of honey production, forecast to be 30% to 50% lower for 5 years, put at risk industry’s research program (total industry contribution of $300,000 pa). NB: other high-priority research activities identified in this Recovery Plan as a result of the 2019-20 bushfire crisis further strain current funding capacity.</td>
<td>High</td>
<td>Immediate for 4 years</td>
<td>Aust Govt Minister for Agriculture, Drought and Emergency Management</td>
</tr>
<tr>
<td>Optimise industry’s levy base with introduction of a new pollination levy.</td>
<td>Industry levies cover only honey production, which has been in decline for 20 years. Industry growth is in paid pollination. A levy needs to be established to cover biosecurity and research. NB: with a pollination levy in place, Aust Govt contributions to biosecurity and research could be discontinued after 2 years, saving about $450,000 pa.</td>
<td>High</td>
<td>Immediate for 2 years</td>
<td>Aust Govt Minister for Agriculture, Drought and Emergency Management</td>
</tr>
<tr>
<td>Upskill and expand the small and aging beekeeper base.</td>
<td>The commercial beekeeper population is small and aging. Young beekeepers need to be encouraged into the industry, and skills need upgrading through business planning workshops, succession management workshops, and industry self-assessment tools.</td>
<td>Medium</td>
<td>Needed over the next 4 years</td>
<td>Aust Govt Minister for Agriculture, Drought and Emergency Management; Aust Govt Minister for Employment, Skills, Small and Family Business; also State Govts (via direct approach to Ministers for Agriculture)</td>
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\(^9\) NSWAA estimates a 10-year recovery period (Appendix 3).
## Theme 3: Improved hive husbandry and health RD&E

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<th>Priority</th>
<th>Investment Timeframe</th>
<th>Responsibility</th>
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<tr>
<td>Understand the honey bee biosecurity implications of less forest resource.</td>
<td>Less forest resource will force managed honey bees into fewer spaces, raising the risk of pest and disease spread. Research is needed to understand which policy changes (e.g. inspection frequency) and/or technology (e.g. remote sensing) is needed to mitigate a major industry risk.</td>
<td>High</td>
<td>Immediate for 1 year</td>
<td>Aust Govt (via National Bushfire Recovery Agency and, where relevant, Minister for Employment, Skills, Small and Family Business). Implementation via AgriFutures Australia</td>
</tr>
<tr>
<td>Research, document and communicate best practice supplementary feeding.</td>
<td>This practice has not been routine in Australia but with diminished floral resources and more competition for remaining sites, beekeepers will need to become supplementary feeding experts. If done incorrectly, hive numbers will decline further. This action will draw upon AgriFutures publication <em>Fat bees, skinny bees</em>, comparative studies of commercial supplementary feeding, and cost-benefit analysis of honey bee feeding response. Outputs might include online course content, fact sheets and industry videos.</td>
<td>High</td>
<td>Needed in next 2 years</td>
<td>Aust Govt (via National Bushfire Recovery Agency and, where relevant, Minister for Employment, Skills, Small and Family Business). Implementation via AgriFutures Australia</td>
</tr>
<tr>
<td>Understand honey bee nutrition with less forest resource.</td>
<td>Research knowledge gaps in the nutritional requirements of bees and how nutrition is best substituted outside the forest system. Honey bees that are fed sugar and pollen in Australia decline in the medium term -- which other nutrients are missing from an artificial diet?</td>
<td>Medium</td>
<td>Needed in next 3 years</td>
<td>Aust Govt (via National Bushfire Recovery Agency and, where relevant, Minister for Employment, Skills, Small and Family Business). Implementation via AgriFutures Australia</td>
</tr>
<tr>
<td>Explore sophisticated hive management technology after bushfires.</td>
<td>Review established and emerging technologies, including low-cost sensors and software to monitor hive safety and health, and reduce risk of hive loss to bushfire, pests/diseases and theft.</td>
<td>Medium</td>
<td>Needed within next 4 years</td>
<td>Aust Govt (via National Bushfire Recovery Agency and, where relevant Minister for Employment, Skills, Small and Family Business). Implementation via AgriFutures Australia</td>
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## Theme 4: Forest management & beekeeper access

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<th>Investment Timeframe</th>
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<tr>
<td>Implement public estate vegetation management that better recognises apiary values.</td>
<td>There is an urgent need to review silvicultural practices (thinning in state forests) and controlled burn practices (on all public land) that diminish apiary values. Managing fuel loads will be a gov’t and community priority after the 2019-20 bushfires. Traditional Owner ‘cool burn’ land management practices may be integrated into revised fuel load management programs. Public land managers should be encouraged to further incorporate apiary values when revising RFA agreements and integrate into forest certification schemes (e.g. Forest Stewardship Council and Responsible Wood [formerly Australian Forest Standards]).</td>
<td>High</td>
<td>Immediate for 6 months</td>
<td>State Govts (via Ministers for the Environment and Ministers for Forests), working groups with agencies (Forest Corp NSW, VicForests, STT, DBCA, DAF QLD), and professional associations e.g. the Australian Forest Products Association, Institute of Foresters of Aust, Aust Forest Growers. Aust Govt – engage with Assistant Minister for Forestry and Fisheries – relevant to RFA variations or changes to Forest Standards.</td>
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<td>Implement public estate forest management that is sympathetic to apiculture.</td>
<td>Beekeepers are often the forgotten commercial forest users. Simple routine initiatives, e.g. retaining log dumps for apiary sites, track maintenance and lower rollover humps that permit access by beekeeper vehicles, would facilitate honey production and, in turn, the delivery of pollination services.</td>
<td>High</td>
<td>Immediate for 1 year</td>
<td>As above for State Govts and Aust Govts, noting that simple routine initiatives would be the responsibility of local or regional plans of management processes.</td>
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<tr>
<td>Implement public estate forest management that is consistent across jurisdictions and enshrines apiary access.</td>
<td>Current beekeeper access to public lands and management of apiary sites within pubic land differs between states (Clarke, 2019). A consistent position must be established to recognise ‘all values and uses in perpetuity’ (as in East Gippsland through a bee site-specific Special Management Zone, and in WA through similar arrangements in the Moore River National Park). Most urgently, the threat to remove managed honey bees from QLD national parks that were state forests must be addressed. NB: the Action Plan is well aware of the difficulty of consistency, and notes entrenched inconsistency between states and even between regions in a single state.</td>
<td>High</td>
<td>Immediate for 1 year</td>
<td>State Govts (via Ministers for the Environment and Ministers for Forests), working groups with agencies (Forest Corp NSW, VicForests, STT, DBCA, DAF QLD), and professional associations e.g. the Australian Forest Products Association, Institute of Foresters of Aust, Aust Forest Growers. Aust Govt – engage with Assistant Minister for Forestry and Fisheries – relevant to RFA variations or changes to Forest Standards.</td>
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<tr>
<td>Investigate legal status of public land sites, i.e. rights attached to a permit, an authority, a licence, and a lease.</td>
<td>Beekeeper viability depends on public land apiary sites, of which the tenure status is unknown. Until property rights are understood and/or clarified, the ability of beekeepers to make a living may be dependent on the whim of a relevant Minister.</td>
<td>High</td>
<td>Immediate for 1 year</td>
<td>AgriFutures Australia research project in consultation with state govt (via Ministers for the Environment and Ministers for Forests).</td>
</tr>
<tr>
<td>Improve beekeeper access to public lands.</td>
<td>With the loss of so much floral resource to fires, native vegetation clearing and urban encroachment, there is a need to reconsider the management of public land removed from beekeeper access.</td>
<td>High</td>
<td>Immediate for 1 year</td>
<td>State Govts (via Ministers for the Environment and Ministers for Forests), working groups with agencies (Forest Corp NSW, VicForests, STT, DBCA, DAF QLD), and professional associations e.g. the Australian Forest Products Association, Institute of Foresters of Aust, Aust Forest Growers.</td>
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## Theme 5: Improved floral resource diversity

<table>
<thead>
<tr>
<th>Action</th>
<th>Problem Addressed</th>
<th>Priority</th>
<th>Investment Timeframe</th>
<th>Responsibility</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Research pastures and legumes for farmland that provides optimal nectar and pollen for honey bees and are profitable for farmers.</td>
<td>Medium</td>
<td>Needed in next 4 years</td>
<td>Aust Govt (via National Bushfire Recovery Agency and, where relevant, Minister for Employment, Skills, Small and Family Business); Implementation via AgriFutures Australia.</td>
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<td></td>
<td>With the loss of so much floral resource to fires, native vegetation clearing and urban encroachment, there is a need to develop other sources of nectar and pollen. RD&amp;E projects might develop new pasture and legume varieties in partnership with other RDCs (e.g. MLA, GRDC).</td>
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<td></td>
<td>Develop and communicate region-specific floral resource planting guides.</td>
<td>Medium</td>
<td>Needed in next 5 years</td>
<td>Aust Govt (via National Bushfire Recovery Agency and, where relevant, Minister for Employment, Skills, Small and Family Business); Implementation via AgriFutures Australia.</td>
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<td></td>
<td>Land cleared of native vegetation can be replanted with species mixes that have limited value to apiarists, or locally indigenous species mixes that have high nectar and pollen value. Regionally specific planting guides that emphasis high-value indigenous species will provide a long-term boost to an industry that is constrained by a lack of floral resources.</td>
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<td>Work with state Landcare organisations and local Landcare groups, Greening Australia and other organisations involved in regeneration and or replanting (such as NSW Biodiversity Conservation Trust, Great Eastern Ranges Inc) to communicate the importance of planting native vegetation pollination ‘corridors’.</td>
<td>Medium</td>
<td>Needed in next 5 years</td>
<td>Aust Govt (via National Bushfire Recovery Agency and, where relevant, Minister for Employment, Skills, Small and Family Business); Implementation via AgriFutures Australia.</td>
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<td>Links are needed to increase the area and effectiveness of current vegetated areas for both managed and wild pollinators. Knowledge of preferred plant species (planting guides) would help deliver outcomes for the pollination of all flowering plants.</td>
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Bushfire impact on individual beekeepers

Beekeepers were interviewed to provide a spread of geography and business models. Most were from NSW because this state suffered the greatest loss from the 2019-20 bushfires.

Wayne Fuller, Beekeeper, Honey and Pollination Services, North Coast NSW

Wayne Fuller, who has a large Grafton-based business, has 40 years beekeeping experience. Wayne, together with his wife, brother, and staff manage 3,000 hives for honey production, and 1,300 nucleus hives; they also provide paid pollination services. Because Wayne’s operation is certified organic by the USDA, he is required to maintain a 5-km buffer between his honey bee hives and agricultural land. Wayne provides pollination services to large listed company Costa Farms for their blueberry and raspberry operations, as well as paid pollination services to regional macadamia crops.

Forested land used
Wayne has native forest apiary sites in the Nymboida, Kangaroo River, Ramornie, Newfoundland, Candole, Gibberagee and Banyabba State Forests, as well as Bundjalung and Yuraygir National Parks and the Sherwood Nature Reserve.

Losses incurred
The 2019-20 bushfires destroyed 540 of Wayne’s 600 public land apiary sites; 1,300 of 3,000 hives were lost immediately (incinerated, part incinerated, or water-bombing damaged). After the fires, a further 30 to 40 hives have died per week up to the data of interview in April 2020, and most hives are operating in a weakened state. Wayne attributes subsequent losses to heat stress, and loss of field bees from disorientation, smoke, and incineration. Hives were moved up to five times to avoid ever-changing fire fronts. Heavy blanketing with smoke has affected subsequent generations of worker bees, weakened queen bees, and now hives are unable to fertilise new queens after the colony self-culled its drone population.

The total cost of the fires to Wayne’s business is $6.5 million. His 2019-20 gross loss of income is $2.5 million, of which $1.2 million has been lost in honey production, with only 12 Intermediate Bulk Containers (IBC) produced against a long-term average of 150 IBC loads. His next worst year was during the Millennium Drought when he had a single year that produced only 36 IBCs. The balance of his loss has been in hives, pollen, fuel, and husbandry-related labour costs. Hives cost $1,600 each to replace. Pollen has been fed to bees at the rate of 20 kg/day throughout 2020. After the bushfires, each hive has been manipulated up to five times to replace queens and restructure the colony. Wayne’s business has bought new vehicles, water tanks and transport equipment to ‘fireproof’ future operations and to scout for hive agistment opportunities as far away as Broken Hill NSW and Thargomindah QLD.

Personal impact of the bushfires
The fires have had a profound impact on Wayne, his family and staff. His brother suffered stress-related health issues and was hospitalised. All employees worked 20-hour days throughout the bushfire crisis and were offered counselling when it was over. All team members were shocked by the extent of forest devastation and, on returning to the forest, were appalled by the vast numbers of dead and dying native animals they saw. The forest is a silent, unpleasant place to work. Staff have been actively providing water to bees and wildlife, and euthanising those deemed too injured to recover. All are strongly of the opinion that they would not stay in the business if a similar event were to occur in the next few years.
Priorities for government assistance

High priorities identified by Wayne Fuller for assistance to help the industry recover were:

- Understanding and addressing the honey bee biosecurity implications of less forest resource.
- Upskilling and expanding the small and aging commercial beekeeper base.
- Government funding support to cover the shortfall in the honey bee and pollination industry’s biosecurity levy base, R&D levies and to keep AHBIC ‘afloat’.
- Establishment of a mechanism for collection of levies from pollination services.
- Better forest access for beekeepers – establishment of a forum with state governments to develop consistent access policies and to address the threat of further beekeeper exclusion.
- Communication with Landcare and similar groups on the importance of planting pollinator corridors for honey bee and native pollinators.
- Exploration of sophisticated hive management software, including remote sensing to monitor hive safety and health.
- Research to better understand sustainable and profitable forest stocking rates.
- Opportunities to smooth and facilitate government assistance processes, including those used by the Rural Assistance Authority in NSW.
Neil Bingley, Beekeeper, Honey and Pollination Services, South Coast NSW

Neil Bingley is a Sutton-based beekeeper who operates 1,800 hives plus 300 nucleus hives. The operation supports four families. Neil is a honey producer who supplies hives for paid pollination services on an ad hoc basis. Last spring, Neil supplied 600 hives for almond pollination in Griffith.

Forested land use
Neil has native forest apiary sites in the Currowan, Shallow Crossing, Brooman, Mogo, Glenbog, Dampier, Bodalla, Wanadera, Termeil, Flat Rock, Yadboro, Boyne, Nullica, Yuramie and Yambulla State Forests, as well as Eurobodalla, Murrarang and Biamanga National Parks. Neil also has apiary sites on the Bakers Flat and Shallow Crossing Travelling Stock Reserves.

Losses incurred
The 2019-20 bushfires affected 75 of Neil’s 107 public land apiary sites. Of 1,800 hives, 40 were incinerated, and a further 1,200 hives had flame pass over them as tree canopies burned. These 1,200 hives were moved multiple times to avoid fire, but they lost field bees and now survive in a weakened state.

As of April 2020, Neil’s loss of income is estimated at $500,000 in honey production from a normal gross of $1.5 million (honey sales and pollination services). Together with weak colonies, the loss of spotted gum from his native forest apiary sites will also reduce his income in 2020-21. Neil carted water for bees all through the summer, and bought pollen and supplements at $16,000/t ($50,000 in total). Neil also bought 20,000 L of sugar syrup at $700/100 L. The NSW Government met half the cost of sugar syrup. These purchases have been necessary to replace nutrient and stores that would normally be sourced from his native forest apiary sites.

Commercial pollen products are suitable for honey bee colony maintenance but do not build bee numbers for nectar gathering or paid pollination services. Lightly burnt apiary sites will take about five years to recover, while heavily burnt sites may take more than 20 years to generate pollen and nectar in commercial quantities. At this stage, Neil will not supply hives for almond pollination in the spring of 2020.
Personal impact of the bushfires

Neil is philosophical about the bushfires but notes that recovery will be slow, especially on the native forestry apiary sites he leases that had high fuel loads and burnt at high temperature. The damage is cumulative, coming on top of an extended drought that had already reduced his family’s income. On a positive note, native forest apiary sites are 1.5 km square, and not all of every site was severely burnt. Soaking rains at the beginning of March 2020 will have saved a lot of trees that would otherwise have died.

Priorities for government assistance

High priorities Neil Bingley identified for assistance to help the industry recover were:

- Relief from state government fees and charges, including site fees and vehicle registration.
- Understanding and addressing the honey bee biosecurity implications of less forest resource.
- Government funding to cover the shortfall in industry’s biosecurity levy base, with less honey production from native forests for the next five years. Levies are set c/kg on honey sold.
- Government funding to cover the shortfall in industry’s research levy and keep AHBIC afloat.
- State governments to consider access to previously lost sites – utility corridors, Water Board land.
- Research to support development and adoption of bee-friendly pastures and legumes, i.e. those that produce nectar and pollen.
- Development and extension of region-specific planting guides for bee-friendly species to replant forests, including bushfire-affected forests (Somerville guides already available).
- A freeze on charges levied by government until the industry recovers.
Kershaw family, Beekeeper, Honey and Pollination Services, South Coast NSW

The Kershaw family of Therese, Laurie and their son James are fourth- and fifth-generation beekeepers who trade as Sterling-Kershaw & Co. The Kershaws operate 2,500 hives plus 500 nucleus hives from their base in Gundaroo NSW. The Kershaws are honey producers who supply hives for paid pollination services of almonds (Griffith), canola seed and lucerne seed.

Forested land use
The Kershaws have native forest apiary sites in the Yambulla, Moruya, Wandera, Termeil, Mogo, Bago, Tallaganda, Bodalla, South Brooman, Boyne, Yadboro, Flat Rock, Clyde, Shallow Crossing, Dampier, Yadboro, Bolaro, Buckenbowra, McDonald and Currowan State Forests, as well as the Deua and Gourek National Parks.

Losses incurred
The 2019-20 bushfires affected 110 of the Kershaws’ 124 public land apiary sites; 16 hives were incinerated, and a further 2,250 hives were moved three times to avoid fire, they lost field bees and survive only as small colonies in single boxes. In the breeding nucleus hives, 200 queens were destroyed. The nucleus hives died from dehydration due to the heavy smoke from the Dunns Road bushfire and extreme heat over many days. Bees were not able to fly out for water.

Expenses incurred and income lost include:
- $60,380 on pollen to replace burnt coastal forest. Required for breeding bees, and the first time the Kershaws have ever had to buy protein.
- $729 for an IBC of sugar syrup; NSW DPI granted 12 further IBCs to the Kershaws.
- $18,826 for top feeders to feed out sugar syrup.
- $2,796 in freight to travel to 17 separate locations between Bredbo and Gunning to feed bees every four days.
- $445,600 to replace burnt bee boxes and livestock.
- $22,000 for 200 nucleus hives to replace those burnt.
- $26,000 in site fees for burnt forestry sites; no income anticipated from these sites for 10 years.
- $660,000 in lost honey production from November 2019 to March 2020.
- $217,000 potential loss for almond pollination fees in the 2020-21 year.

The Kershaws estimate that it will be at least 10 years before burnt state forests and national parks provide resources for their honey bees. Their site fees paid to the NSW Government over this time will be $260,000. The Kershaws estimate that the 2019-20 fires will cost their business more than $9 million through to 2029-30.

In addition to their own losses, public infrastructure, e.g. culverts and bridges, needed to access forestry sites were also lost.

After inspecting some of their affected burnt apiary sites, the Kershaws noted noticeable damage in Flat Rock and Nelligen Forests where excessive timber harvest practices occurred. The unused debris created a more intense fire than in other forests.

Personal impacts of bushfires
The family has never seen forests burnt so harshly. They were silent – not a bird, a kangaroo or even a lizard on a rock remains. Firefighting and emergency movement of bees was extremely stressful. The family is somewhat numb after the event.
Priorities for government assistance
High priorities the Kershaws identified for assistance to help the industry recover were:

- Sugar and pollen subsidies to ensure hive survival and build up for spring pollination.
- Relief from state government fees and charges, e.g. sites fees, vehicle registration.
- Documenting and communicating best practice supplementary feeding.
- Understanding honey bee nutrition with less forest resource; addressing knowledge gaps in the nutritional requirements of bees and how nutrition is best managed outside the forest system.
- Understanding the honey bee biosecurity implications of less forest resource.
- Upskilling and expanding the small and aging beekeeper base.
- Government funding support to cover the industry’s lost biosecurity levy base.
- Government funding support for research levy and AHBIC with a reduced levy base.
- Collection of a levy from pollination services.
- In partnership with Traditional Owners and public land managers, review thinning and controlled burn practices that reduce apiary values.
- Beekeeper-friendly forest management initiatives, e.g. retention of log dumps, track maintenance and lower rollover humps.
- Establishing a forum with state governments to develop consistent access policies and address threats to further exclude beekeepers from forests.
- Consider access to new apiary site areas, such as utility corridors, and Water Board land.
- Expanding post-bushfire floral resources for beekeepers – research to support development of pastures and legumes that are bee-friendly and provide optimal nectar and pollen.
- Developing region-specific planting guides for bee-friendly species to replant forests, including bushfire-affected forests.
- Communicating with Landcare groups on the importance of planting pollinator corridors for managed and wild pollinators.
- Campaigns to educate chemical users on the need to moderate their use of herbicides; there is value in weeds for beekeepers, and not all weeds need to be poisoned.
- R&D and extension to encourage the use of waterlilies on farm dams – useful pollen-producing plant that helps keep stored water clear and prevents evaporation.
Graeme Manns, Beekeeper, Honey and Pollination Services, Tumbalong NSW

Graeme Manns is a second-generation Tumbalong-based beekeeper who operates 1,500 hives with his son. Graeme supplies all 1,500 hives for almond pollination.

Forested land use
Graeme Manns has native forest apiary sites in the NSW South Coast in Bago, Boyne, Clyde, Currowan, Maragle and Wingello State Forests as well as Murramarang, Morton and Monga National Parks. Graeme has apiary sites on Travelling Stock Reserves.

Losses incurred
The 2019-20 bushfires affected 80 of Graeme’s 100 public land apiary sites; of 1,500 hives, 408 were incinerated, and another 400 hives had flame pass over them as tree canopies burned. Graeme moved his hives twice on the South Coast to avoid bushfire before shifting them inland to Batlow where they were destroyed by bushfire.

Graeme has access to private forest bee sites that were not burned by the 2019-20 bushfires. He estimates that he has lost about 50% of his total floral resource base, and between 40% and 50% of his income in 2019-20. Graeme will not replace the 408 hives destroyed by fire. There is no floral resource to place them on, and recovery of native forest sites will take at least five years.

Paid pollination services will help offset some of Graeme’s losses from forest-generated honey. To further mitigate his 2019-20 losses, Graeme will sugar feed his hives, and harvest remaining honey from them. Graeme has been sugar feeding at his own expense. He chose not to apply for NSW Government sugar subsidies, preferring to remain financially independent.

Personal impacts of bushfires
Graeme is 60 years old. He has a leadership role with his local Rural Fire Service and was on active duty in the Gundagai District throughout the 2019-20 season. In breaks between local responsibilities, Graeme would travel to the South Coast to move his honey bees from the path of bushfires. He reports that it was a highly stressful period of his life that affected him both personally and professionally.

Priorities for government assistance
High priorities Graeme Manns identified for assistance to help the industry recover were:

- Relief from state government fees and charges, especially vehicle registration.
- Understanding the honey bee biosecurity implications of less forest resource.
- Funding support to cover the shortfall in industry’s biosecurity and R&D levy base.
- Review of forest thinning and burning practices in partnership with land managers and Traditional Owners.
- Consider access to new areas, such as utility corridors and Water Board land.
- Research to support the development of pastures and legumes that are bee-friendly.
Craig Klingner, Beekeeper, Honey and Pollination Services, Glen Innes NSW

Craig Klingner is a third-generation Glen Innes-based beekeeper who operates 2,000 hives and supplies hives for almond pollination in Hillston NSW and avocado pollination in Childers QLD.

**Forested land use**
Craig has native forest apiary sites in northern NSW in Ewinga, Bulldogs, Kangaroo Creek, Boundary Creek, Nymboida, Buccarumbi and Torrington State Forests, and in Gibraltar Range National Park. He also has apiary sites on large areas of private forestry land.

**Losses incurred**
Craig estimates that 50% of his business’s floral resource base was destroyed by bushfires in 2019-20. While no hives were destroyed by fire, 1,200 hives had fire pass over them and they lost field bees. Craig has incurred significant costs from sugar feeding his hives, re-queening and manipulating colonies. He has been on the road finding short-term replacement floral resources, and shifting hives to Bourke NSW and then to Castlemaine VIC. Normally, these hives would be located close to home on productive country. Shifting bees to remote locations has kept them alive but has generated little honey. From November 2019 to January 2020, Craig estimates additional costs, on top of those already incurred for drought, were $250,000, and the total loss for the full financial year is simply unknown. Resource recovery will take at least 10 years.

Craig points out that 20 years ago beekeepers had access to many more floral resources, including weed species and greater areas of public and private native forest. Subsequently, the industry has become high risk with few resource alternatives. As recently as six years ago, Craig’s coastal country that was burnt in the 2019-20 fires was the option of last resort. Now it is used every second year. After its loss, Craig will need to travel more widely and/or introduce artificial feeding.

**Personal impact of bushfires**
Craig notes that the bushfires were stressful. At one point, he was fighting bushfires on three sides of his family’s home block and simply couldn’t get away to check or move his honey bees. The bushfires have had a compounding impact after consecutive years of drought.

**Priorities for government assistance**
High priorities Craig Klingner identified for assistance to help the industry recover were:

- Relief from state government fees and charges, e.g. sites fees, vehicle registration.
- Understanding the honey bee biosecurity implications of less forest resource – high priority.
- Government funding support to cover the industry’s lost biosecurity levy base.
- Government funding support for research levy and AHBIC with a reduced levy base.
- Collection of a levy from pollination services.
- In partnership with Traditional Owners and public land managers, review of thinning and controlled burn practices that reduce apiary values.
- Beekeeper-friendly forest management initiatives, e.g. retention of log dumps, track maintenance and lower rollover humps.
- Establishing a forum with state governments to develop consistent access policies and address threats to further exclude beekeepers from forests.
- Consider access to new apiary site areas, such as utility corridors and Water Board land.
- Expanding post-bushfire floral resources for beekeepers: research to support development of pastures and legumes that are bee-friendly and provide optimal nectar and pollen.
- Exploring sophisticated hive management technology after bushfires: review established and emerging technologies, including remote sensing to monitor hive safety and health.
Casey Cooper, Beekeeper, Honey and Pollination Services, Tingha NSW

Casey Cooper is a northern NSW-based beekeeper who operates 1,000 hives. He is also a honey producer who supplies 800 hives for pollination of almonds in VIC, and avocado (Bundaberg) and apples (Stanthorpe) in QLD.

Forested land use
Casey has a diverse set of coastal and inland native forest apiary sites across northern NSW, including Toppers Mountain, Clive and Pilliga State Forests, Chaelundi National Park, and the Travelling Stock Reserve at Ebor. However, most of his apiary sites are on private native forestry.

Losses incurred
The Ebor bushfire of 2019-20 destroyed 60 of Casey’s 1,000 hives. Losses were mitigated early when Casey moved bees from forest country into open grassland. Four valuable stringybark sites were burnt. Stringybark flowers in April and builds hives before almond pollination. Because of the stringybark loss, Casey has doubled the stocking rate of his remaining country, which will stop him from generating a honey crop but will keep bees in appropriate condition for almond pollination. Private forest apiary sites were also lost at Kempsey. Casey estimates that the 2019-20 bushfires have cost him about 20% of his income. It will take at least 10 years for burnt forest to recover its apiary values.

Personal impact of the bushfires
Casey maintains that his personal loss was not extreme and that many others were much worse off. The bushfires will force him to redesign his enterprise by moving away from honey production and increasing pollination services as a source of income. Casey did not apply for government bushfire recovery assistance because of the anticipated paperwork load.

Priorities for government assistance
High priorities Casey Cooper identified for assistance to help the industry recover were:
- Sugar and pollen subsidies to ensure hive survival and build up for spring pollination.
- Relief from state government fees and charges, e.g. sites fees, vehicle registration.
- Documenting and communicating best practice supplementary feeding.
- Understanding honey bee nutrition with less forest resource: addressing knowledge gaps in the nutritional requirements of bees and how nutrition is best managed outside the forest system.
- Understanding the honey bee biosecurity implications of less forest resource.
- Upskilling and expanding the small and aging beekeeper base.
- Government funding support to cover the industry’s lost biosecurity levy base.
- Government funding support for research levy and AHBIC with a reduced levy base.
- Collection of a levy from pollination services.
- In partnership with Traditional Owners and public land managers, review thinning and controlled burn practices that reduce apiary values.
- Beekeeper-friendly forest management initiatives, e.g. retention of log dumps, track maintenance and lower rollover humps.
- Establish a forum with state governments to develop consistent access policies and address threats to further exclude beekeepers from forests.
- Consider access to new apiary site areas, such as utility corridors, Water Board land.
- Expanding post-bushfire floral resources for beekeepers: research to support development of pastures and legumes that are bee-friendly and provide optimal nectar and pollen.
- Developing region-specific planting guides for bee-friendly species to replant forests, including bushfire-affected forests.
- Communicating with Landcare groups on the importance of planting pollinator corridors for managed and wild pollinators.
Brian Woolfe, Beekeeper, Honey and Pollination Services, NSW and South East QLD

Brian Woolfe is a Glen Innes-based beekeeper who operates 1,400 hives. He is also a honey producer who supplies hives for paid pollination of almonds in southern Australia, and avocado in Bundaberg and Childers QLD.

Forested land used
In NSW, Brian has native forestry apiary sites in Kangaroo Creek, The Grange, and Moogem State Forests, as well as Nymboida and Barool National Parks. In QLD, his apiary sites are in Western Creek, Boondandilla and Coominglah State Forests. Brian has a total of 95 public land apiary sites: 55 in NSW and 40 in QLD.

Losses incurred
The 2019-20 bushfires destroyed 20 of Brian’s 55 NSW public land apiary sites. These sites in the Coffs Harbour and Grafton region are valuable to his business. In the 2018 drought, 80% of Brian’s honey crop was sourced from these forests. Over the last 10 years, these forests contributed a long-term average of 30% of the business’s honey crop.

Brian’s honey income will be down 30% in 2019-20, and his overall income will be down 20% after pollination receipts are included. The bushfire-affected Coffs Harbour and Grafton public land apiary sites will take at least five years to recovery their apiary values.

Personal impact of the bushfires
Brian has indicated that this year’s bushfire season was highly stressful for him and his family. He did not seek NSW Government bushfire recovery assistance.

Priorities for government assistance
High priorities Brian Woolfe identified for assistance to help the industry recover were:

- Sugar and pollen subsidies to ensure hive survival and build up for spring pollination.
- Relief from state government fees and charges, e.g. sites fees, vehicle registration.
- Documenting and communicating best practice supplementary feeding.
- Understanding honey bee nutrition with less forest resource; addressing knowledge gaps in the nutritional requirements of bees and how nutrition is best managed outside the forest system.
- Understanding the honey bee biosecurity implications of less forest resource.
- Government funding support to cover the industry’s lost biosecurity levy base.
- Government funding support for research levy and AHBIC with a reduced levy base.
- Collection of a levy from pollination services.
- In partnership with Traditional Owners and public land managers, review thinning and controlled burn practices that reduce apiary values.
- Beekeeper-friendly forest management initiatives, e.g. retention of log dumps, track maintenance and lower rollover humps.
- Establishing a forum with state governments to develop consistent access policies and address threats to further exclude beekeepers from forests.
- Consider access to new apiary site areas, such as utility corridors, Water Board land.
- Expanding post-bushfire floral resources for beekeepers; research to support development of pastures and legumes that are bee-friendly and provide optimal nectar and pollen.
- Explore sophisticated hive management technology after bushfires; review established and emerging technologies, including remote sensing to monitor hive safety and health.
Murray Arkadieff, Beekeeper, Honey and Pollination Services, South East QLD

Murray Arkadieff is a second-generation South East QLD-based beekeeper who operates 1,200 hives. Murray’s business, Farm Gate Honey, produces honey and supplies pollination services to almond, kiwifruit, avocado, citrus and apple growers.

Forested land use
Murray has native forest apiary sites in public forests and national parks within a 500 km radius of Brisbane. He also has access to private forested sites within this zone. Murray’s floral resource base has contracted as Brisbane and the Gold Coast have grown and sites are required for environmental offsets and urban subdivision.

Losses incurred
The 2019-20 bushfires destroyed 75 of Murray’s 200 public land apiary sites; 200 hives lost field bees and survive now as small, weakened colonies. The 2019-20 season will not produce a honey income for Murray. The combined effect of bushfires and drought has meant that he has been feeding bees throughout the year. Murray has spent about $200,000 on sugar syrup, replacement queens, diesel and labour. Last year, and before the bushfires, Murray supplied 1,500 hives for paid pollination. After the bushfires, he is hoping that he will have 700 hives strong enough to make the grade for pollination.

Personal impact of the bushfires
The bushfires in South East QLD are on top of a difficult year managing bees through drought. This, together with loss of resource and a decision to exclude managed honey bees from QLD national parks in 2024, has all added to pressure on Murray and his business.

Priorities for government assistance
High priorities Murray Arkadieff identified for assistance to help the industry recover were:

- Sugar and pollen subsidies to ensure hive survival and build up for spring pollination.
- Cash support to assist primary producer recovery.
- Relief from state government fees and charges, e.g. sites fees, vehicle registration.
- Further assistance with diesel rebates from the Australian Government.
- Documenting and communicating best practice supplementary feeding.
- Understanding honey bee nutrition with less forest resource; addressing knowledge gaps in the nutritional requirements of bees and how nutrition is best managed outside the forest system.
- Understanding the honey bee biosecurity implications of less forest resource.
- Government funding support to cover the industry’s lost biosecurity levy base.
- Government funding support for research levy and AHBIC with a reduced levy base.
- Collection of a levy from pollination services.
- In partnership with Traditional Owners and public land managers, review thinning and controlled burn practices that reduce apiary values.
- Beekeeper-friendly forest management initiatives, e.g. retention of log dumps, track maintenance and lower rollover humps.
- Consider access to new apiary site areas such as utility corridors, Water Board land.
- Explore sophisticated hive management technology after bushfires; review established and emerging technologies, including remote sensing to monitor hive safety and health.
Stephen Fewster, Beekeeper, Honey and Pollination Services, Western Australia

Stephen Fewster operates 1,800 hives at Gingin north-east of Perth. He produces honey, and supplies hives for paid pollination of almond orchards in WA.

**Forested land use**
Stephen’s hives are located in and around the Moore River National Park, which includes a beekeeper’s nature reserve.

**Losses incurred**
Stephen did not lose any native forestry sites or hives to bushfire in 2019-20 but was fighting a bushfire on a neighbouring property when contacted in April 2020.

**Personal impact of the bushfires**
There were few losses in WA during the 2019-20 bushfire season.

**Priorities for government assistance**
High priorities Stephen identified for assistance to help the national industry recover were:

- Relief from state government fees and charges, e.g. sites fees, vehicle registration.
- Documenting and communicating best practice supplementary feeding.
- Understanding honey bee nutrition with less forest resource; addressing knowledge gaps in the nutritional requirements of bees and how nutrition is best managed outside the forest system.
- Understanding the honey bee biosecurity implications of less forest resource.
- Government funding support to cover the industry’s lost biosecurity levy base.
- Government funding support for research levy and AHBIC with a reduced levy base.
- Collection of a levy from pollination services.
- In partnership with Traditional Owners and public land managers, review thinning and controlled burn practices that reduce apiary values.
- Beekeeper-friendly forest management initiatives, e.g. retention of log dumps, track maintenance and lower rollover humps.
- Consider access to new apiary site areas, such as utility corridors, water catchment land.
- Explore sophisticated hive management technology after bushfires; review established and emerging technologies, including remote sensing to monitor hive safety and health.
Lindsay Bourke, Beekeeper, Honey and Pollination Services, Tasmania

Lindsay Bourke operates 4,000 hives in Tasmania. He produces honey and value-added honey products, and supplies hives for paid pollination of tree crops, fodder species, brassicas and vegetable seeds.

**Forested land use**
Lindsay’s hives are in the public forest estate and national park system of Tasmania. His honey production includes leatherwood, stringybark and leptospermum/manuka styles.

**Losses incurred**
Lindsay did not lose any native forestry sites or hives to in the bushfires of 2019-20. However, he was severely affected by bushfires and drought in 2018-19. Lindsay attributes recovery of his honey production and pollination operation to a highly productive partnership with the Tasmanian Government.

**Priorities for government assistance**
Based on recent bushfire recovery experience, Lindsay identified the following as high priorities for the national industry:

- Sugar and pollen subsidies to ensure hive survival and build up for spring pollination.
- Relief from state government fees and charges, e.g. sites fees, vehicle registration.
- Documenting and communicating best practice supplementary feeding.
- Understanding honey bee nutrition with less forest resource; addressing knowledge gaps in the nutritional requirements of bees and how nutrition is best managed outside the forest system.
- Understanding the honey bee biosecurity implications of less forest resource.
- Upskilling and expanding the small and aging beekeeper base.
- Government funding support to cover the industry’s lost biosecurity levy base.
- Government funding support for research levy.
- Collection of a levy from pollination services.
Ben Hooper, Beekeeper, Honey and Pollination Services, South Australia, and Kangaroo Island

Ben Hooper is a South Australian beekeeper operating 1,800 hives, of which 1,600 are at Tintinara and 200 on KI with his father. Ben is a honey producer who supplies hives for paid pollination of seed crops, including canola, lucerne, carrot, and field beans. He also supplies bees for almond pollination.

**Forested land use**
About 60% of KI was burnt in the 2019-20 bushfires. This portion of the island is most heavily forested and of highest value to beekeepers. About 50,000 ha was burnt on the mainland where Ben lost 25% of the forest he normally accesses. Losses on the mainland were on top of key public land apiary sites destroyed by bushfire in 2014. A return to apiary sites burnt in 2014 is being hampered by the need to secure a native vegetation clearance licence to use site access tracks.

**Losses incurred**
Hooper Honey lost five hives to bushfire in 2019-20, all on KI. However, the balance of hives on KI have suffered moderate damage, and will be missing field bees and lacking hive strength. Ben estimates that income lost due to the 2019-20 bushfires will be between $200,000 and $300,000, depending on the extent of subsequent rainfall. This loss will include other expenses associated with buying sugar and pollen, and leasing irrigated agricultural land to grow canola to provide nectar and pollen for bees. Losses will also include opportunities foregone to capitalise on nectar flows and the subsequent reduction in honey sales from bushfire-affected country. The business has also lost its in-forest overwintering capacity.

**Personal impact of the bushfires**
The 2019-20 bushfires were highly stressful and challenging for Ben and his family. The family was torn between firefighting responsibilities on Tintinara and KI. Ben and his father spent three weeks fighting bushfires on KI in January 2020. With firefighting resources and decision-making responsibilities focused on Adelaide, locals were forced to make decisions independently. Areas of KI, including a Conservation Reserve, were lost to controlled burn. This and other forced decisions created ongoing feelings of stress and uncertainty. In April 2020, Ben is unable to access KI due to coronavirus control travel restrictions.

**Priorities for government assistance**
High priorities Ben Hooper identified for assistance to help the industry recover were:
- Documenting and communicating best practice supplementary feeding.
- Government funding to cover the shortfall in industry’s research levy and keep AHBIC afloat.
- In partnership with land managers and Traditional Owners, review forest thinning and burning practices.
- Beekeeper-friendly forest management initiatives, including retention of log dumps for apiary sites, track maintenance and rollover humps that allow access by beekeeper vehicles.
- Establish a forum with state governments to develop consistent access policies and address threats to further exclude beekeepers from forests.
- State governments to consider access to previously lost sites, e.g. utility corridors, Water Board land.
- Research to support development and adoption of bee-friendly pastures and legumes, i.e. those that produce nectar and pollen.
- Communicate with Landcare groups on the importance of planting pollinator corridors for managed and wild pollinators.
Danny Le Feuvre, Beekeeper, Honey and Pollination Services, South Australia, and Kangaroo Island

Danny Le Feuvre is a South Australian beekeeper operating 2,000 hives in the Adelaide Hills region and KI. Danny is a honey producer who supplies hives for paid pollination of almonds, apples, pears, cherries, avocados, berries and small seed crops, including canola, clover, lucerne, carrot and onion. In total, Danny provides honey bees for the pollination of about 30 different crops.

**Forested land use**
It was the proportion of KI that is most heavily forested and of highest value to beekeepers that burnt in the 2019-20 bushfires. Danny’s mainland losses were less severe – red and blue gum were lost in the Adelaide Hills along with an apple orchard that was a source of pollination income for 100 of Danny’s hives.

**Losses incurred**
In the 2019-20 bushfires, Danny had 40 hives completely destroyed and a further 500 with field bee loss. In the Adelaide Hills, 200 hives lost field bees, and on KI, 300 lost field bees. Danny has invested in sugar syrup to strengthen his hives and hopes to be in a position to pollinate crops in the spring of 2020. As of April 2020, Danny has forfeited about $40,000 in honey income on KI and a similar amount on the mainland in honey and pollination income. Vegetation on the mainland will recover quickly. On KI, where recovery will be years away, Danny will incur ongoing expenses for sugar syrup and potentially for pollen supplement to maintain his bees.

**Personal impact of the bushfires**
The 2019-20 bushfires were stressful. Because KI is remote, Danny felt helpless not being able to act while the fires were out of control. Since the fires, Danny has worked on behalf of his industry through South Australian Apiarists Association securing government assistance and significant donations for other beekeepers. At the time of interview, government assistance had still not been received.

**Priorities for government assistance**
High priorities Danny Le Feuvre identified for assistance to help the industry recover were:

- Sugar and pollen subsidies to ensure hive survival and build up for spring pollination.
- Government funding support to cover the industry’s lost biosecurity levy base – very high priority.
- Government funding support for research levy and AHBIC with a reduced levy base – very high priority.
- Collection of a levy from pollination services – very high priority.
- In partnership with Traditional Owners and public land managers, review thinning and controlled burn practices that reduce apiary values.
- Establish a forum with state governments to develop consistent access policies and to address threats to further exclude beekeepers from forests.
- Consider access to new apiary site areas, such as utility corridors, Water Board land.
- Explore sophisticated hive management technology, including remote sensing to monitor hive safety and health.
- More sophisticated registration system to view where hives are and when for bushfire and biosecurity purposes.

The highest priority for the industry is a set of measures to maintain its viability. Industry relies on income from honey levies for biosecurity, research and industry representation. It is not a rich or well-resourced industry. With a sustained decrease in honey production after the 2019-20 bushfires, there is a distinct possibility that the industry will cease to operate in a collaboratively and cohesively. If a significant biosecurity incursion were to occur under these circumstances (e.g. *Varroa destructor*), the honey bee and pollination industry would not have the capacity to respond.
Ian Cane, retired beekeeper, AHBIC Resource Committee, Victoria

Ian Cane is a retired Victorian beekeeper who operated 1,200 hives. Ian is active in the industry, mentoring the young beekeeper who bought his business, as a member of the Victorian Apiarists Association, and as Chair of the AHBIC Natural Resources Access Committee.

Forested land use

With long-term experience working with various government departments and the forestry sector on resource management, Ian estimates that east coast forests that burned in 2019-20 will take 10 years or more to recover if there was structural diversity before the fires, and 50 to 100 years or more if structural diversity is absent. He attributes recovery time to pre-bushfire timber harvesting prescriptions.

Priorities for government assistance

High priorities Ian Cane identified for assistance to help the industry recover were:

- Sugar and pollen subsidies to ensure hive survival and build up for spring pollination.
- Relief from state government fees and charges – site fees, beekeeper licences and vehicle registration.
- Documenting and communicating best practice supplementary feeding.
- Understanding the honey bee biosecurity implications of fewer public land floral resources: less forest will force managed bees into fewer spaces, increasing the risk of disease spread; research to determine what policy or technology is needed.
- Upskilling and expanding the small and aging beekeeper base. For example, business planning support, develop plans for the next 10 years (long term).
- Government funding support to cover the industry’s lost biosecurity levy base.
- Government funding support for research levy and AHBIC with a reduced levy base.
- Collection of a levy from pollination services.
- Public land management practices (resource security). Currently, excessive timber harvesting is diminishing or reducing the value of bee sites for decades. Controlled burning can have similar results. Develop management prescriptions that deliver outcomes so ‘all values and uses are recognised in perpetuity’. With Traditional Owners, explore new opportunities in land management, particularly fuel reduction burning, and have apiary industry values in forest certification.
- Public land management practices (access/policies): beekeeper-friendly forest management initiatives, e.g. retention of log dumps, track maintenance and lower rollover humps.
- Public land management practices (resource security): quality and quantity of resource on all bee sites and resource access (policies and SOPs); establish a forum with state governments to develop appropriate resource security outcomes for all bee sites and consistent access policies and SOPs across all states. The key objective of this forum would be to have all public land bee sites categorised as ‘special management zones’, highlighting the importance of the industry to food production.
- Public land management practices (resource security). Expand post-bushfire resources for beekeepers. Excessive timber harvesting has created regeneration failures and species mix change, which has been accentuated by the 2019-2020 fires. Develop forest restoration programs to restore all these areas to their pre-harvested and or pre-bushfire status. Develop region-specific planting guides to achieve this.
- Public land management practices (access/policies): consider access to new bee sites, such as utility corridors, disused roadways, Water Board land. Often these were apiary sites before policy or land use (rather than legislative) change.
- Expand post-bushfire floral resources for beekeepers on private land: research to support development of pastures and legumes that are bee-friendly and provide optimal nectar and pollen.
• Expand post-bushfire floral resources for beekeepers: restore forest ecosystems to their pre-harvest or pre-bushfire status. Develop region-specific planting guides for bee-friendly species to replant forests, including bushfire-affected forests.

• Expand post-bushfire floral resources for beekeepers on private land: communicate with Landcare groups on the importance of planting pollinator corridors for managed and wild pollinators.

• Explore sophisticated hive management technology, including remote sensing to monitor hive safety and health.

Public land resource security models and access are the highest priority for industry, followed by supplementary feeding, innovation, biosecurity and training.
Trevor Monson, Pollination Broker and Honey Producer, Victoria

Trevor Monson is Australia’s largest pollination broker, working with commercial beekeepers to aggregate between 115,000 and 120,000 hives in August and September each year for almond pollination. Trevor also brokers hives for the pollination of avocado, canola and watermelon.

When interviewed in April 2020, Trevor had received a positive response from commercial beekeepers who normally supply hives for pollination. Many have been affected by widespread east coast bushfires but indicated they would be able to supply their usual number of hives for spring 2020 pollination. Trevor indicated that bushfire-affected beekeepers have invested heavily in temporary measures to revive their hives, including pollen, sugar, replacement bees and new hive woodwork. However, Trevor is concerned about beekeeper capacity to supply him with hives in 2020-21.

Bushfire-affected beekeepers have drawn heavily on their reserves and government support to fund this year’s pollination effort. Similar reserves will not be available next year, nor will the floral resource on which they rely. The health of honey bee hives supplied for paid pollination depends on bees sourcing a wide variety of pollens from a mix of floral resources. Without large swaths of native forest to supply a variety of pollens, new colony building methods must be put in place. Beekeepers will need to develop a better understanding of the costs of supplying hives for pollination, as well as better business analysis skills to understand whether paid pollination is profitable. Trevor is concerned that the extra cost of hive preparation after bushfires may make paid pollination unprofitable.

Priorities for government assistance

High priorities Trevor Monson identified for assistance to help the industry recover were:

- Sugar and pollen subsidies to ensure survival and build-up of hives for spring honey flows and paid pollination services.
- Understanding honey bee nutrition with less forest resource; addressing knowledge gaps in bee nutrition and how nutrition is best substituted outside the forest system.
- Understanding and addressing the honey bee biosecurity implications of less forest resource.
- Upskilling and expanding the small and aging beekeeper base – the highest priority. Government support for business planning workshops, succession management workshops and industry self-assessment tools.
- Government funding to support shortfalls in the funding base and industry capacity to contribute to biosecurity, R&D and maintenance of its peak body.
- In partnership with public land managers and Traditional Owners, review thinning and controlled burn practices that reduce apiary values and develop new systems.
- Beekeeper-friendly forest management, including retention of log dumps, access tracks and smaller rollover humps.
- Consideration of access to new areas, such as utility corridors and Water Board land.
Ben McKee, Honey Packer

Ben McKee is Chair of the Honey Packers and Marketers Association, and Chief Operating Officer of Hive and Wellness (Capilano). He has been a commercial beekeeper in his own right; Capilano has recently bought a large beekeeping operation. Capilano has a role in managing the Hive Aid bushfire recovery program.

Losses incurred
Capilano sources honey from over 600 commercial beekeepers Australia-wide; 60% of its honey supply is sourced from NSW, the state most affected by the 2019-20 bushfires. Capilano’s 10-year average supply of raw Australian honey is between 11,000 and 12,000 tonnes. Before the bushfires, the 2019-20 crop was drought-affected and forecast at less than 10,000 tonnes of raw honey. In April 2020, after the bushfires and discussion with east coast suppliers, Capilano revised its forecast to 5,884 tonnes. Raw honey will need to be sourced from other Australian beekeepers wherever possible.

The longer-term impact of the 2019-20 bushfires on Capilano’s business is unclear. NSW Northern Rivers heath country that produces the most active Manuka honeys for Capilano has been fire affected. This is an ongoing annual loss of 100-plus tonnes of high-value product. Ben estimates that about 2,200 tonnes may be lost for the medium to long-term from Capilano’s NSW supply base (total supply of 11,000 tonnes by 60% sourced from NSW, and by 33% production base decline).

The 2019-20 bushfires have been so extensive that beekeepers have lost management/honey production options. With large areas of the coast destroyed and inland areas at capacity, beekeepers will not have access to seasonal options for building their hives and producing honey. We may see the industry restructure to a system based on permanent supplementary feeding. Certainly, beekeepers will incur extra costs through supplementary feeding and/or higher vehicle costs associated with pursuit of scarce forest resources that once supported fewer bees and generated a honey crop for the beekeeper. They will now be more likely to simply keep bees alive before sending them for paid pollination. This creates ongoing husbandry and vehicle cost for beekeepers, and limited revenue return from sales of surplus honey production.

Priorities for government assistance
High priorities Ben McKee identified for assistance to help the industry recover were:

- Document and communicate best practice supplementary feeding.
- Understand honey bee nutrition with less forest resource; address knowledge gaps in the nutritional needs of bees and how nutrition is best substituted outside the forest system.
- Government support to replace lost research levies and AHBIC funding.
- In partnership with Traditional Owners and public land managers, review thinning and controlled burn practices that reduce apiary values.
- Beekeeper-friendly forest management initiatives, e.g. retention of log dumps, track maintenance and lower rollover humps.
- Establish a forum with state governments to develop consistent access policies and address threats to further exclude beekeepers from forests.
- Consider access to new apiary site areas such as utility corridors, Water Board land.
- Expand post-bushfire floral resources for beekeepers; research to support development of pastures and legumes that are bee-friendly and provide optimal nectar and pollen.
- Communicate with Landcare groups on the importance of planting pollinator corridors for managed and wild pollinators.
References


Securing Pollination Rural Research and Development for Profit (2020) – Project Summary.

Appendices

Appendix 1: Photos of bushfire damage
My family has never seen the forests burnt so harsh ever!

Decades before the forest natural bush regenerates
LHS photo shows damaged hive in which field bees have been lost. The honey bee colony will die without expensive supplementary feeding and husbandry measures, such as requeening.

Photo credits: Therese Kershaw, Sterling-Kershaw & Co
Appendix 2: Honey Bee and Pollination Industry Questionnaire

With funding support from AgriFutures Australia, the Australian Honey Bee Industry Council (AHBIC) is preparing an industry Recovery Action Plan and is seeking information from beekeepers on the impacts of the recent bushfires on their businesses and their priorities for government assistance.

(phone call introduction, questionnaire emailed, completed over phone when convenient to beekeeper)

Contact Details:
Name:
Name of business:
Do you give permission to include your name and information in a public report: yes/no?
(A draft of your response will be provided to you for comment/correction prior to report preparation)

Bushfire Impact:
1. How many honey bee hives do you normally operate?
2. How many hives were destroyed by bushfire, how many lost field bees?
3. Do you supply pollination services in addition to honey production yes/no?
4. If so, which crops are pollinated?
5. Will you be in a position to pollinate these crops in spring?
6. Which public land forests do you use (e.g. Bendalong State Forest, South Coast NSW)?
7. How many apiary sites do you have these forests?
8. How many sites were bushfire affected?
9. What percentage of your floral resource base was lost (sites lost to total sites)?
10. What impact does this have on your business (share of income lost)?
11. What impact has the bushfires had on you personally, your family and employees?
12. How long will it take your business to recover, why?

Preferred Assistance Measures:
I understand that state governments have already made assistance available to beekeepers in the form of sugar and pollen subsidies and relief from some state charges.

13. Have you been able to access existing assistance measures: yes/no?
14. If not, why haven’t you accessed assistance?
15. Please rank the following measures as either a HIGH, MEDIUM of LOW priority for government assistance.

<table>
<thead>
<tr>
<th>Assistance Measure</th>
<th>Priority</th>
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<tbody>
<tr>
<td>Sugar and pollen subsidies</td>
<td></td>
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<tr>
<td>• To ensure survival and build-up of hives for spring honey flows and paid pollination services. Currently provided by state governments.</td>
<td></td>
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<tr>
<td>Relief from state government fees and charges</td>
<td></td>
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<tr>
<td>• Site fees, beekeeper licences, vehicle registration, etc.</td>
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<tr>
<td>Documenting and communicating best practice supplementary feeding</td>
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</tr>
<tr>
<td>• This practice is not routine in Australia, if done incorrectly further decline in hive numbers will occur</td>
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<tr>
<td>Understanding honey bee nutrition with less forest resource</td>
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<tr>
<td>• Address knowledge gaps in the nutritional requirements of bees and how nutrition is best substituted outside the forest system</td>
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<tr>
<td>Understanding the honey bee biosecurity implications of less forest resource</td>
<td></td>
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<tr>
<td>• Less forest will force managed bees into fewer spaces increasing risk of disease spread - research to determine what policy or technology needed</td>
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<tr>
<td>Upskilling and expanding the small and aging beekeeper base</td>
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<tr>
<td>• Government support for business planning workshops, succession management workshops and industry self-assessment tools</td>
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<tr>
<td>Government funding to cover shortfall in industry’s biosecurity levy base</td>
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<td></td>
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<tr>
<td>• Lower levels of honey production will mean industry is unable to fund its current biosecurity measures and commitments</td>
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<tr>
<th>Government funding support for other industry functions covered by levies</th>
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<tbody>
<tr>
<td>• Reduced honey production will also impact levies available for research and funding of the industry’s peak bodies (AHBIC, state associations).</td>
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<thead>
<tr>
<th>Collection of a levy from pollination services</th>
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<tbody>
<tr>
<td>• Honey production is in decline. Pollination services are growing but don’t pay research or biosecurity levies</td>
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<tr>
<th>Forest management practices</th>
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<tbody>
<tr>
<td>• Review of thinning and controlled burn practices that reduce apiary values (esp. heath) in partnership with Traditional Owners, public land managers. Explore new initiatives such as apiary values in forest certification.</td>
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<tr>
<th>Forest management practices</th>
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<tbody>
<tr>
<td>• Beekeeper-friendly initiatives, e.g. retention of log dumps for apiary sites, track maintenance and lower rollover humps that permit access by beekeeper vehicles.</td>
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<tr>
<th>Forest access for beekeepers</th>
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<tr>
<td>• Establish a forum with state govts to develop consistent access policies and address threats to further exclude beekeepers from forests. ‘all values and uses in perpetuity’, ‘Special Management Zones’ for bee sites.</td>
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<tr>
<th>Forest access for beekeepers</th>
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<tr>
<td>• Consider access to new areas such as utility corridors, Water Board land. Often these were apiary sites prior to policy (not legislative) change.</td>
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<tr>
<th>Expansion of post-bushfire floral resources for beekeepers</th>
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<tbody>
<tr>
<td>• Research to support development of pastures and legumes that are bee-friendly and provide optimal nectar and pollen.</td>
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<tr>
<th>Expansion of post-bushfire floral resources for beekeepers</th>
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<tr>
<td>• Develop region specific planting guides for bee-friendly species to replant forests, including bushfire-affected forests.</td>
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<tr>
<th>Expansion of post-bushfire floral resources for beekeepers</th>
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<tr>
<td>• Communication with Landcare groups on the importance of planting pollinator corridors for managed and wild pollinators.</td>
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<tr>
<th>Exploration of sophisticated hive management technology post bushfires</th>
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<tr>
<td>• Review established and emerging technologies include remote sensing to monitor hive safety and health.</td>
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<th>Other measure 1</th>
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<th>Other measure 3</th>
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**Thank you for your assistance with this questionnaire.**
Appendix 3: NSWAA Bushfire Impact/Resources Workshop Presentation

**Bushfires**  NSW had over 5 million ha of mainly forests burnt in the 2019/2020 spring/summer. 68% of the NSW coastal National Parks (NP) were burnt. The majority of the remainder forests burnt were in State Forests. 9,800 beehives were burnt and over 89,000 hives lost their field bees during the bushfires.

To say this was devastating for the bee industry is an understatement. Some of these burnt forests will not recover within 15 years. It is estimated that honey production in NSW will be 30% below historical averages for at least 10 years. This will result in younger beekeepers leaving the industry. It will also make it hard for young new entrants to enter the industry.

**National Parks & Biodiversity Banks**  NSW apiarists are also losing resource to NP and Biodiversity banks. Currently the industry loses bee sites from private lands that become National Park. We are working with NP to hopefully overcome this. We can retain bee sites that are in State Forests that become a National Park or are added to a National Park.

**Clearing laws**  We are also losing resource with the current land clearing laws in New South Wales. Over 30,000 ha of forests/woodlands were cleared in 2018.

**Climate change**  Climate Change is also removing resource. Research has proven that the trees dying near Cooma NSW are as a result of Climate Change. Most of these trees are apple box (*Eucalyptus bridgesiana*), which is a very good autumn bee tree.

**Forest logging**  Forest logging regimes are not sustainable and are leaving very few mature trees after logging an area. This is also a loss of resource.

**Paterson's Curse**  Historically, Paterson's Curse was 45% of NSW honey crop. This resource is no longer reliable and is now less than 5% of NSW honey crop. Another resource lost.

**Cotton farms**  The cotton industry is expanding into areas that historically they did not use. These new areas are along rivers where River Red Gum, Black Box and Yellow Box grow. These are all good bee trees. Cotton farmers use a lot of chemicals that kill every insect within drift range of the area sprayed. Many bee kills have occurred because of this. In NSW about 1,000 hives are killed most years. Therefore, a lot of these cotton-growing river areas are not safe for beekeepers to work the above trees. This is a loss of safe access to resource.

**Poor management practices in NP**  After a flood, the river red gum seeds germinate profusely. Naturally, these would have been thinned out with naturally occurring fire. Due to NP policy of no fires, there is no thinning of this massive germination. There are too many young trees per ha for any of the trees to grow to maturity and provide habitat for fauna. Mature trees are much more reliable nectar producers than younger trees. A greatly reduced resource for beekeepers.
Potential resources

**NSW Public Lands** NSWAA has had meeting with ministers re access to unburnt National Parks. Under current legislation that will not happen. National Parks are willing to temporarily relocate bee sites from burnt areas to unburnt areas in the same National Parks.

We have also asked for access to Water Board land and Snowy Hydro lands. Sydney Water has large tracts of mainly forested land. We are waiting on ministerial responses.

**Resources the industry should have:**

**Agronomists** Pollinated crops are nearly 25% of Australia’s total agricultural output yet agronomist do not cover pollination, bees, bees and chemicals or Safe passage of bees through the crop. This needs to change if the Federal Government aim of $100 billion of Agriculture by 2030 is to be met.

**Plant Health Australia** ‘The purpose of PHA is to coordinate strong industry and government partnerships that minimise plant pest impacts on Australia, boosting industry productivity and profitability and enhancing market access.’

Improved pollination is a proven factor in improving many agricultural crops productivity and profitability yet there are no bee experts or bee pollination expert at PHA. This is a resource we are missing.

**Integrated Pest Management** PHA mission ‘Minimise plant pest impacts on Australia’ but their 2019 report makes no mention of Integrated Pest Management (IPM) anywhere. IPM reduces costs to farmers and improves the health of bees providing pollination due to less use of chemicals.

**Carbon farming** Currently in NSW, carbon farming has been by planting Blue Mallee. This plant has minimal rewards for bees and other fauna (bats, gliders, butterflies, native bees, etc. that are nectivores or require pollen). Carbon farming could be using other mallees that provide pollen and nectar and are just as good as carbon sinks. Bees can passively use this resource without affecting the carbon.

**Summary**

Beekeeping in the eastern part of NSW will be challenging for the next decade. Agriculture is increasing its demand for pollination services at a time when the beekeeping has lost a large part of their resource and is continually losing resource over time. The NSW and Australian Government want to grow agriculture for rural employment and food security that require more honey bees for pollination. State policies do not reflect this increase for honey bees with their current native forest and land clearing policies.

It is impossible for the NSW beekeeping industry to grow without increased access to resources.
Appendix 4: AHBIC Resource Committee Policy Statement

The following statement was prepared by Ian Cane, AHBIC Resource Committee:

The beekeeping industry is heavily dependent on the public land estates for floral resources and honey production and, most importantly, for beehive health prior to and after servicing the many honeybee pollination-dependent crops. The fires of 2019-20 have destroyed unprecedented areas of floral resources. The recovery of these floral resources will take 10 years in some instances and decades in others and creating a long-term resource deficit.

Many of our industry’s businesses will struggle, and some will no longer be viable as a result of the long-term floral resource losses attributed to these fires.

For decades, the industry has advocated for a fair and equitable share of these public land resources including the ‘More Than Honey Report’ that came out of a Parliamentary Inquiry back in 2007 that stated that the securing of Floral Resource for the Australian honey industry and pollination-dependent industries was important, if not billions of dollars’ worth of crops that rely on honey bee pollination will be at risk.

It is critical to long-term industry stability and that of the pollination-dependent industries that states and territories develop a fair and equitable resource security models for all public land bee sites. These ‘models’ must achieve equitable co-existence between any competing resource use.

Every beekeeping business will be under significant financial stress for the next 10 years or so, therefore it is imperative these businesses have resource security going forward and certainly when the public land estates’ floral resources recover to a point they are of value to the honeybee and pollination-dependent industries.

The AHBIC Strategic Plan number one issue is ‘resource security’ and that was before the 2019-20 fires.
Bushfire Recovery Plan:
Understanding what needs to be done to ensure the honey bee and pollination industry recovers from the 2019-20 bushfire crisis

by Michael Clarke
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