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Report on Apiary in the Eden CRA Region

A report undertaken for the NSW CRA/RFA Steering Committee

27 February 1998

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REPORT ON APIARY IN NSW

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A report undertaken for the NSW CRA/RFA Steering Committee
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REPORT STATUS

This report has been prepared as a working paper for the NSW CRA/RFA Steering Committee under the direction of the Economic and Social Technical Committee. It is recognised that it may contain errors that require correction but it is released to be consistent with the principle that information related to the comprehensive regional assessment process in New South Wales will be made publicly available.

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This project has been jointly funded by the New South Wales and Commonwealth Governments. The work undertaken within this project has been managed by the joint NSW / Commonwealth CRA/RFA Steering Committee which includes representatives from the NSW and Commonwealth Governments and stakeholder groups.

The project has been overseen and the methodology has been developed through the Economic and Social Technical Committee which includes representatives from the NSW and Commonwealth Governments and stakeholder groups.

i. EXECUTIVE SUMMARY

The purpose of this investigation was to evaluate the NSW apiary industry within the framework of the forest assessment process. Four evaluations were completed, one each for the Eden, Upper Northern, Lower Northern and Southern RFAs. This report, the output of the Eden RFA investigation, includes the following information for the region:

- A profile of apiculture;
- Values generated by apiculture;
- An assessment of the dependency of apiculture on forests;
- The relationship of the apiary industry to other forest uses and users;
- An assessment of the impact of honey bees in native forests; and
- Conclusions on the sensitivity of the apiary industry to change.

The Eden apiary industry is characterised by its mobility, its eucalypt dependency, the variability of production and its relative importance during drought in other NSW regions. The industry, in a non drought year is small and estimated at approximately 24 apiarists, 128 sites with 14,000 hives. Approximately one half of the industry is located on State Forest sites inside the RFA boundaries.

Eden apiary is managed on a family basis, apiarists rely on leaned skills rather than formal education and make a modest income, relying on infrequent good years to replace capital and equipment.

There is a strong demand for apiarists product and Eden honey is not dissimilar to honey produced in other coastal regions. The Eden RFA, on average, supplies approximately 157,000 kg of honey with a wholesale value of $259,000. Wax and other product sales add another $13,000. Value added is equivalent to $104,000 and labour income some $71,000. The Eden industry produces less than one percent of total NSW apiculture production.

The Eden's value to the NSW apiary industry lies not in the value of products generated, but rather, in its value for resting bees prior to their use in pollination, its capacity as a drought reserve and its relative importance at a time when alternative viable eucalypt and non eucalypt resources are in short supply. Opportunities for the Eden apiary industry to relocate to alternative areas are limited and will be further constrained if access to the strategically more important Southern RFA region is restricted.

Apiarists share the Eden forests with a range of other commercial and non commercial users. Potential exists for conflict between apiarists and wood product producers and miners (loss of floral resources) and recreation visitors (bee stings, damage to hives). Co-dependence between apiarists and other forest users includes wood product producers and miners (provision of access roads, suitable bee sites) and scientific researchers (assistance with data collection). A number of other forest users and uses share a neutral relationship with apiarists. Review of the scientific literature on the impact of honey bees in native forest ecology revealed no clear general conclusions.

Conclusions drawn on the sensitivity of the Eden RFA to change indicate that loss of access to the region will impact on the immediate viability of a limited number of apiarists. The Eden RFA has wider importance as a drought reserve and "over wintering" resource, although in its own right, it is not a significant producer of honey and other apiary products.

1. INTRODUCTION

1.1 Purpose of this Study

The Resource and Conservation Assessment Council (RACAC) has been established to review forestry issues in New South Wales and provide advice to the Government for the development of their forestry and conservation policies and reforms. A key activity of RACAC is the forest assessment process.

RACAC are now in the process of conducting Comprehensive Regional Assessments (CRAs) of the implementation of the Government's forestry policy in order to establish Regional Forest Agreements (RFAs) between the Commonwealth and State Government. There are four CRA forest areas: Eden, Upper Northern, Lower Northern and Southern. The CRA process will involve assessing the commercial values (such as timber, grazing, beekeeping) as well as the conservation values (such as species diversity) of the forest and evaluating the socioeconomic and long term ecological impact of the alternative uses of these resources.

The aim of this project is to evaluate the NSW apiculture industry in terms of its nature, size, concentration and economic value within the greater framework of the forest assessment process. The study also involves an analysis of the value of the industry to the regional economy, the relationship between apiarists and other forest uses and users and provides an indication of the sensitivity of the industry, in terms of its future viability, to changes in land tenure and management practices. The results of this study will also feed into the Regional Economic Impact Assessment project to be undertaken in the Eden Area.

1.2 Background

The beekeeping industry has grown rapidly in Australia during the past 50 years, particularly in NSW which produces the largest crop of honey. In New South Wales the industry is represented by a strong and well organised association (NSW Apiarists' Association). The Apiarists' Association has some 400 members. The commercial significance of pollination by honey bees is increasing and makes a significant contribution to Australia's economy. This includes honey and wax production as well as queen bee and packaged bee production, for which there is significant potential for export market development.

Australian beekeepers are dependant on eucalyptus forests for their major nectar flows. In New South Wales the main species that are important to honey production are Yellow Box, Spotted Gum, White Box, Yapunyah, Grey Ironbark, Coolibah, Narrow leaf Ironbark, Silver leaf Ironbark, Mugga Ironbark, Blackbutt, Brown Box, Broad leaf Ironbark, Caley's Iron Bark, Brush Box, Salvation Jane and Clover (Somerville and Moncur, 1997). Any decisions, therefore, on the regulations relating to land tenure and management practices in light of the inclusion of forests in the CRA reserve system and potential exclusion of selected users are likely to have a significant impact on the commercial viability of the apiarists. This report sets out to investigate these impacts.

1.3 Methodology

The project was divided into the following major tasks:

- **Project Familiarisation;** Including a RACAC briefing and collection and review of existing agency and private data.

- **Undertake Evaluation of Apiary Industry in Eden RFA;** Collection of primary data, preparing Eden apiary regional profile, establishing preliminary industry values, determining apiary relationships/sensitivities, mapping apiary sites and auditing all necessary results with an independent industry specialist.

- **Determine the Impact of Exotic Bees on Native Forests;** Obtaining information on the impacts of European bees on native forests, reviewing data from the Tasmanian CRA and summarising current available information on the impact of European honey bees, the displacement of native pollinators and altered pollination patterns.

- **Undertake Evaluation on Apiary Industry in Other RFAs;** Completing evaluation of the apiary industry in the Upper Northern, Lower Northern and Southern RFA's and preparing a final report.

This report, the output of the above process, is structured so that the assessment of apiary in each RFA is its own stand alone investigation. The balance of the report is therefore:

Chapter 2:	Eden RFA;
Chapter 3:	Upper Northern RFA;
Chapter 4:	Lower Northern RFA;
Chapter 5:	Southern RFA; and
Chapter 6:	Conclusions

2. APIARY IN THE EDEN RFA

2.1 A Profile of Apiculture in the Eden RFA

Definition of the Eden RFA

The Eden RFA constitutes three State Forests of NSW (SF) regional districts, they are:

- The whole of the Eden District;
- The Narooma District south of the Bega River including the Murrabrine, Murrah, Bermagui, Mumbulla and Tanja Forests; and
- The eastern part of the Bombala District including a mix of soft and hardwood forest.

Clear Eden RFA boundaries are shown in attached Map E1.

Location of the Apiary Industry within the Eden RFA

Map E1 also details the location of licensed SF bee sites for calendar year 1996 and sites held as Long Term Permits (LTP). Map E2 details the areas of high value to the apiary industry in the Eden RFA while Map E3 shows areas outside the State Forests that are utilised by beekeepers. It is evident from these maps that the major location of bee sites in the Eden is the north east portion of the RFA, north of the Bega River and east of the township of Cobargo.

Nature of the Eden Apiary Industry

The Eden apiary industry is:

- mobile;
- eucalypt dependant;
- subject to variable production; and
- based in an area that is a useful drought reserve.

A characteristic feature of the NSW apiary industry is the mobility of apiarists throughout the regions and environments of NSW, Victoria and Queensland. The Eden region is no exception with apiarists frequently crossing RFA boundaries into and out of Eden in response to the availability of nectar for honey, and pollen, for feeding juvenile bees. When bees are not in the Eden RFA, they could be anywhere in NSW, Victoria or Queensland where there are floral resources.

In NSW, eucalypts account for approximately 70% of honey production (NSW Agriculture and State Forests, 1997) and the Eden RFA region is no exception. When bee keepers in the Eden-Bombala District were surveyed and asked to nominate the most important floral species for honey production, the five most mentioned were:

i. Yellow Stringybark (*E. muelleriana*)
ii. White strigybark (*E. globoidea*)
iii. Yertchuk (*E. consideniana*)
iv. Woollybutt (*E. longifolia*)
v. Cut tail/Brown barrel (*E. fastigata*)

(NSW Agriculture and State Forests, 1997)

A previous survey in the Narooma District nominated the following species as the most important:

i. Yellow Stringybark (*E. muelleriana*)
ii. Spotted Gum (*E. maculata*)
iii. Grey ironbark (*E. paniculata*)

(NSW Agriculture and State Forests, 1995)

In the areas of these districts that constitute the Eden RFA, the three most important species were found to be:

i. Yellow Stringybark (*E. muelleriana*)
ii. Spotted Gum (*E. maculata*)
iii. Woollybutt (*E. longifolia*)

(Doug Somerville, Apiary Officer, NSW Agriculture)

Yellow Stringybark is the single most important species to beekeeping in the Eden RFA. It is regarded as having a high value for honey, pollen and timber production. Yellow Stringybark is widely distributed throughout the Eden and Narooma areas and flowers, on average, once every three years.

Eucalypts in the south east forests do not flower on an annual basis. On average their flowering cycle is once every 2 to 5 years. This means that the Eden RFA, which is dependant on eucalypts for its honey production, will go through periods of both high and low productivity. Flowering events tend to be synchronised and dependent on locally favourable seasonal conditions. For this reason, the single year data captured in green and blue on Map E1 has been supplemented with data for other years and this is shown on the same map in orange.

In discussions with bee keepers, it was highlighted by concerned apiarists that while Eden is a useful source of both eucalypt honey and pollen, its real value was as a drought reserve. This assertion is borne out in an analysis of the demography of beekeepers that use the Eden and Bombala Districts. Apiarists who use these districts are resident throughout both NSW and Victoria (NSW Agriculture and State Forests, 1997).

Further evidence of the value of the RFA as a drought reserve for apiarists was evident, when in financial year 1994/95, drought in many traditional western and tablelands areas saw the south coast as the only source of honey for many beekeepers (NSW Agriculture and State Forests, 1995). In the severe dry period between 1993 and 1995 in inland NSW and Southern Queensland, the far South East and Riverina forests of NSW saved much of the NSW and Victorian apiary industry (Don Nicholson, Operations/Sales Manager, State Forests).

Size of the Eden RFA Industry

Two data sets were interrogated in order to establish the size of the apiary industry in the Eden RFA, they were:

- Regional surveys of apiarists (NSW Agriculture and State Forests, 1995 and 1997); and
- State Forests site records, year 1996.

NSW Agriculture and State Forest surveys categorise beekeepers based on the number of hives they control. These categories are adopted for this study and are shown in Table 2.1:

Table 2.1 Classification of Apiarists by Hive Numbers

Status	Number of Hives
amateur	1-39
part time	40-199
full time (A)	200-400
full time (B)	400+

Data from the NSW Agriculture and State Forest surveys showing both apiarist numbers and hives controlled, adjusted for the Eden RFA boundaries, is summarised in Table 2.2 below.

Table 2.2 Eden Apiary Industry Size (extrapolated from NSW Agriculture and State Forests survey of beekeepers with sites in the Eden RFA ◊)

	Eden Apiarists	Total Hives	Narooma Apiarists *	Total Hives	Total Apiarists	Total Hives
Amateur	2	35	0	0	2	35
Part time	3	380	1	106	4	486
Full time (A)	1	300	2	390	3	690
Full time (B)	9	6,450	4	3,327	13	9,777
Total					**22** #	**10,988**

Source: NSW Agriculture and State Forests 1995 and 1997

◊ Data relates to beekeepers with sites in the RFA not those who are resident in the region (Consultants estimates).

* NSW Agriculture and State Forests figures for 1995 pro rated on a proportional land area basis.

Total sites rented, apiarists not necessarily residents of the RFA. Employment data provided in Section 2.2.

From the survey data presented in Table 2.2 it can be seen that there are 22 apiarists and 10,988 hives in the Eden RFA.

To check the validity of this survey data, State Forest site data for year 1996 was sourced and compiled. From the State Forests data it was possible to ascertain that there was a total of 64 sites within the Eden RFA in State Forests and these were controlled by 12 apiarists. Advice from regional apiarists, State Forests officers and the NSW Agriculture and State Forests surveys indicated that in the RFA the ratio of State Forests sites to private property sites (which are inclusive of Crown Land, National Parks and private property) is approximately one to one. On this basis there would be 128 sites and 24 apiarists in the RFA. In the Eden region apiarists average 110 hives per site (NSW Agriculture and State Forests, 1997), total hive numbers are therefore approximately 14,080.

Figures derived from State Forests site data are somewhat larger than those derived from the NSW Agriculture and State Forest surveys. Possible reasons for the discrepancy include:

- the survey did not include apiarists with only private property sites;
- the use of land area boundaries to pro rata Narooma apiary activity which falls in the Eden RFA, may underestimate beekeeper numbers in Narooma; and
- due to the fact that apiary sites may be renewed 6 monthly, there may have been some sites used that year, that were not rented at the time of the survey.

For these reasons the second data set is adopted. Industry size data provided in the second data set on "private property" can be further divided in the following manner:

- 37% of the sites were on private property;
- 11% in National Parks; and
- 2% on Crown Land.

It is important to note that the years from which both data sets were drawn were largely drought free in NSW and Eden's drought reserve capacity was not called upon. Numbers will be higher during significant drought years.

Socio-Economic Characteristics of Eden Apiarists

Socio-economic data was not collected first hand for this study. It is the authors understanding that the data to complete this analysis is being compiled by the Bureau of Resource Sciences (BRS), Department of Primary Industries and Energy and that this information would be available to the study in mid July 1997. At the time of writing, the BRS data had not become available.

However, from our discussions with beekeepers, regional foresters and the data presented on industry size and values, the following points with regard to socio-economic characteristics are made:

- Enterprises are managed on a family basis;
- There is a general absence of corporate structures at the production level;
- A lack of certainty regarding industry resource access has played a role in discouraging both new investment and young apiarists;
- Income generation is variable and subject to seasonal conditions;
- Apiarists tend to make a modest income from their operations relying on windfall good years to replace capital and equipment;
- Apiarists rely on practical learned skills, rather than formal education;
- Based on current forest site permits, the Eden industry has a significant number (27%) of amateur or part time apiarists who *gross* less than $75,000 per annum (Hassall & Associates estimate); and
- Most production (90%) is generated by large full time producers, and better producers can gross up to $150,000 (Greg Roberts, NSWAA: 800 hives, 300 drums, 295 kg/drum, $1.65 kg) with costs of $92,000 (NSWAA, 1996 for 800 hives excluding operator salary), a net value of $58,000. After operator salary of $45,000 (NSWAA, 1996) a surplus of $8,000 is generated.

Continued productivity improvement will be required along with floral resource access if the industry is to remain viable and attract new producers.

Demand for Apiculture Products from the Eden RFA

Most of the honey produced in the Eden RFA is sold in either Sydney or Melbourne. The major buyers for Eden honey are either Capilano Honey or Windsor Farms. Between them, these two dominant honey processors control over 80% of the NSW honey market (Greg Roberts, President, NSW Apiarists Association).

A small portion of the honey produced in the Eden RFA is retained in the district by two apiarists who bottle and sell their own product (Greg Roberts, President, NSW Apiarists Association).

Capilano Honey indicate that honey produced in the region is graded by colour and blended with honey from other sources. Honey sourced from the Eden RFA has no unique or distinguishing characteristics.

2.2 Values Generated by Apiculture in the Eden RFA

Supply and Value of Production

The apiary industry generates values for the following:

- Honey;
- Wax;
- Queen bee and package bee sales; and
- Pollination fees.

Value estimates are provided below for each product. Total value of production is also split into State Forests and private land estimates.

Honey: To derive a total value of production figure for honey in the Eden RFA the following assumptions were necessary:

- In 1996 there were 14,080 hives in the Eden RFA (see Section 2.1 Size of the Industry);
- The Eden productive season is normally of 4 months duration. At the end of this season hives are relocated to other regions where additional production is generated;
- The flowering pattern of eucalypts in the Eden RFA ensures the area is productive, on average, one year in three, with 90% of hives reaching productive potential. Average annual production is therefore from 4,224 hives (14,080 by 90% divide 3);
- Yellow Stringybark is the dominant honey source, providing 60% of the regions honey, the balance being effectively provided by Spotted Gum and Woollybutt (20% each) **(a)**;
- Hives in Yellow Stringybark and Woollybutt forests yield 34 kg per hive per annum while Spotted Gum forest yields 50 kg per hive per annum; and
- The wholesale price for these honeys is $1.65 kg (Lloyd Smith, Capilano Brisbane, 1996 figures).

Table 2.3 provides estimates of the total value of honey production in the Eden RFA.

Table 2.3 Supply and Value of Honey Production Eden RFA

Floral Resource (a)	Number of Productive Hives	Production per Hive (kg/hive) (b)	Total Production (kg)	Total Honey Value ($)
Yellow Stringybark	2,534	34	86,156	142,157
Spotted Gum	845	50	42,250	69,713
Woollybutt	845	34	28,730	47,405
Total	4,224		157,136	259,275

(a) honey from the Eden RFA is also sourced from a variety of other species, including White Stringybark, Yertchuk, Cut Tail and Bloodwood. On average, these species provide similar yields and returns to the three species listed in the table.

(b) Data for yield from Yellow Stringybark and Woollybutt from NSW Agriculture and State Forests, 1997; data for yield from Spotted Gum from NSW Agriculture and State Forests, 1995.

From Table 2.3 it can be seen that the total average annual value of honey in the Eden RFA is a relatively modest $259,000. This value ignores the value of the region for resting bees and its worth during drought years.

Wax: The following assumptions are necessary for a derivation of wax values:

- Wax production per hive is equal to, on average, 1.7% of the hives honey production;
- Honey production in the Eden RFA averages 157,136 kg (see Table 4.3); and
- The wholesale price for wax is $5.00 kg.

The total average value of wax production is therefore $13,357 (157,136 kg by 1.7% by $5/kg).

Queen Bee and Package Bee Sales: There are no significant queen bee or package bee sales from hives in the Eden RFA (Doug Somerville, Apiary Officer, NSW Agriculture).

Pollination: There is no major pollination industry in the Eden RFA (Doug Somerville, Apiary Officer, NSW Agriculture).

Total Value: From Section 2.1.4, Size of the Industry, it is known that the ratio of State Forest apiary sites to private property sites is one to one and that private property sites include National Park, Crown Land and Private holdings. If this division of sites is applied to allocation of production values then total value of production can be split into production from State Forests and from Private land. Table 2.4 contains this split.

Table 2.4 Value of Apiary Production Eden RFA State Forests and Private Lands

Product	State Forest	Private Lands	Total
Honey	129,638	129,638	259,275
Wax	6,679	6,679	13,357
Queen and packaged bees	0	0	0
Pollination	0	0	0
Total	136,316	136,316	272,632

The total value of production is $273,000, some $136,000 of which is generated in State Forests.

Bee Resting Value

Resting of bees sometimes referred to as over-wintering, has no direct quantifiable value to a region or the apiary industry. It does however, provide the basis of the pollination services operated by apiarists in other regions for many economically significant agricultural and horticultural crops.

Drought Reserve Value

As detailed in Section 2.1 the south coast area provides a reserve in times of drought in traditional western areas and the tablelands. It is not a straightforward exercise to value this drought capacity. However, its worth to the NSW apiary industry, and those who benefit from the industries activities (producers of agricultural and horticultural crops requiring pollination for example), should not be overlooked.

Input Expenditure

Input expenditure items are drawn from the Fourth Mansfield Report (NSWAA, 1996) which provides variable and fixed cost estimates for both a 600 hive and 1,000 hive enterprise for financial year 1995/96. Relevant estimates for the 1,000 hive enterprise are presented below in Table 2.5 and extrapolations made for expenditure incurred in the Eden RFA.

Table 2.5 Input Expenditures per 1,000 Hive Enterprise and Expenditures Incurred in the Eden RFA Area

Item	Expenditure per 1,000 Hives ($ per annum) (a)	Average expenditure per 1,000 Hives incurred in Eden ($ per annum) (b)
Hive maintenance	4,000	1,333
Queen replacement	5,600	933
Labour; Owner	45,000	10,000
Additional	25,000	5,208
Workers compensation	1,600	333
Truck running	26,750	5,573
" " depreciation (15%)	26,000	5,417
Utility running 14/Km	6,300	1,313
" " depreciation (15%)	4,500	938
Extracting Costs & Maintenance	4,500	750
Other plant operation	1,500	333
" " depreciation	1,500	333
Container losses	500	83
Living away & sundry expenses	4,500	1,000
Site rentals	6,000	1,333
Telephone	2,000	444
Postage & Stationary	200	44
Insurance	2,500	556
Land rates	350	78
Hive insurance	650	144
Assoc. Subs & Prof'l expenses	1,000	222
Total Production & Standing Costs	**169,950**	**36,370**

(a) data sourced from Investing in Commercial Honey Production, The Fourth Mansfield Report, NSWAA 1996
(b) expenditure split provided by Greg Roberts, President NSW Apiarists Association. Expenditure split includes adjustments for 1 in 3 year usage of the Eden RFA and expenditures made outside the RFA.

From Table 2.5 it can be seen that total input expenditure in the Eden RFA per 1,000 hives is $36,000. From the previous analysis of honey values it is known that, on average, there will be 4,693 hives in the Eden RFA (14,080 carrying capacity, productive one year in three). Total input expenditures are therefore $169,000 (4.693 by $36,000).

Industry Employment

Labour requirements, vary with the size of the enterprise. Smaller enterprises (up to 600 hives) require hired labour only for honey extraction in the Spring and Autumn, while larger operations (1,000 hives or more) require a permanent employee in addition to the inputs of the owner operator (NSWAA, 1996).

The Fourth Mansfield Report (NSWAA, 1996) estimates labour costs for smaller enterprises (600 hives) at $5,000 pa and larger operations (1,000 hives) at $25,000 per annum.

The portion of labour costs incurred in the Eden RFA is detailed in Table 2.5. From the table it can be estimated that owner labour contributes approximately $46,930 ($10,000 from Table 2.5 by 4.693) or 1.88 full time job equivalents. While hired labour contributes approximately $24,441 ($5,208 from Table 2.5 by 4.693) or 0.98 full time job equivalents.

Total value of Eden industry employment is therefore $71,371 or 2.9 full time job equivalents.

Value to the Regional Economy (incorporating multipliers)

In Table 2.6 the total value of the apiary industry to the region is estimated. From Table 2.6 it is shown that the direct impact represents $273,000 in gross output which comprises $104,000 in value added effects (the equivalent measure of Gross Domestic Product, GDP, that does not double count the cost of inputs and represents the returns to labour, capital, land and management), including payments of $71,000 to 2.9 full time equivalent (FTE) employees. Through the application of multipliers it is shown in Table 2.6 that the total impact (including the direct and indirect, or flow-on, effects to the rest of the regional economy represents $481,026 in gross output which comprises $173,888 in value added effects, including payments of $136,627 to 4.20 FTE employees (CARE, 1997).

Table 2.6 Value of Apiary to the Eden Regional Economy

Value Item	Direct Impact	Type II Multiplier (a)	Flow -on Impact	Total Impact
Gross Output ($)	273,000	1.7620	208,026	481,026
Value Added ($)	104,000	1.6720	69,888	173,888
Labour Income ($)	71,000	1.8539	65,627	136,627
Employment (no.)	2.9	1.4448	1.30	4.20

(a) Multipliers are preliminary estimates based on the apiary sector in the NRAC report (1996) for the Upper North East Region of NSW for 1992-93.
Multipliers for the Eden Region will be incorporated once they are available from the Regional Economic Impacts Study and the flow-on (indirect) and total impact estimated will be appropriately adjusted.

Eden RFA Values in Relation to the NSW Apiary Industry

To provide a comparative value for Eden RFA in relation to the whole NSW apiary industry is not a straightforward matter. Any quantitative measure chosen will exclude non quantified values such as the Eden's importance for resting bees and its industry drought reserve capacity. With this said, it is still important to provide some comparison of relative values between the RFA and the whole NSW apiary industry.

The most readily available comparison is annual receivals at Capilano Honey, of 9.7 million kilograms in 1996 (Capilano Honey together with Windsor Farms accounts for 80% of NSW processing) versus Eden RFA average production 157,000 kilograms. If all Eden RFA honey was processed by Capilano Honey, it would account for 1.6% of the processors' throughput.

2.3 Dependency of Apiary on the Eden RFA

The following needs to be considered when assessing the dependency of the NSW apiary industry on the Eden RFA area:

- Value for resting bees/pollen provision during crop dormancy;
- Drought reserve capacity
- Availability of alternative eucalypt resources outside State Forests in the RFA;
- Availability of alternative non eucalypt resources (supplementary feeding); and
- Relocation to alternative areas.

Value for Resting Bees/Pollen Provision During Crop Dormancy

Honeybees require a pollen and stimulating nectar supply for resting or over wintering purposes, particularly if the colonies have little or no stored honey. Pollen is the feed for the brood, ie. juvenile bees. The build up of the brood is done to ensure the supply of high numbers of strong bees for use during pollination of agricultural and horticultural crops in the Spring. The worker bee may live from six to twelve weeks plus, depending on the dietary intake of quality pollens and the degree of work output by worker bees (Doug Somerville, Apiary Officer, NSW Agriculture).

It is estimated that almost half of the floral resources utilised in the Eden RFA, by beekeepers living outside the Eden region, are done so for reasons of resting or over wintering bees. The Eden region itself does not offer a wide range of agricultural crops for apiarists to utilise as substitutes for pollen supply, and many pollens produced by agricultural crops offer poor nutrition for developing honeybees (Doug Somerville, Apiary Officer, NSW Agriculture). The only significant floral resource in the RFA is eucalypt forest.

The loss of the Eden RFA for over wintering bees while locally significant for resident bee keepers could be offset by greater reliance on alternative south coast regions provided they were not similarly affected by RFA limitations and that suitable sites were available. (Doug Somerville, Apiary Officer, NSW Agriculture, questions the availability of such sites.)

Drought Reserve Capacity

The Eden RFA's importance during drought was highlighted in Section 2.2. Again the extent to which the apiary industry is impacted by any change in access to this resource will be determined by policy in other RFA regions, especially in the Southern RFA. Given a continuation in the status quo in the Southern RFA, the impact of down grading access to the Eden RFA will be largely confined to a small number of local apiarists.

Availability of Alternative Eucalypt Resources

The Eden, Bombala and Narooma forest areas contained within the Eden RFA are primarily hardwood species that range in their pollen and nectar productive capabilities. There are several other species utilised by apiarists, however nearly all of these are only found in quantity in the above mentioned State Forests. Outside of the available State Forests sites, there are increasing areas of the region that have been dedicated as National Parks (with resulting long term access restrictions) or have had their timber harvested removing useful floral resources.

If the Eden RFA were closed to apiarists, approximately half the number of beekeepers operating in the RFA, would lose resources access rights in the longer term (NPWS licenses are not transferable and are surrendered upon death of the licensee).

Availability of Alternative Non-Eucalyptus Resources (supplementary feeding)

A further alternative in the absence of access to eucalypt or crop resources for apiarists who utilise the pollen productive capacities of the Eden RFA is to supplementary feed bees prior to and during pollination and breeding.

Supplementary feeding only becomes necessary in the absence of good quality pollen, fresh stimulatory nectar or honey stores being available for normal brood rearing and hive stimulation. Supplementary feeding can be used to condition hives six to eight weeks prior to moving to a honey crop, or supplementary feeding of carbohydrates and protein to stimulate foraging and brood rearing or replace honey stores while pollinating a crop (Jones, 1993).

Supplementary feeding is most often used in managed pollination, where some crops that require open pollination do not produce enough pollen or nectar in sufficient quality and quantity to sustain colonies for the duration of their pollination contract (beekeepers are paid for their pollination services) (Jones, 1993).

The honeybee uses both carbohydrates to provide energy for colony activities and protein for development and well being. Carbohydrates can be supplemented either in dry form or as a syrup, either inside the hive or outside the hive in prepared feeders. Feeding protein supplements to encourage brood rearing is now becoming a wide spread practice in the beekeeping industry, made easier by collected pollen that has been irradiated to prevent disease transfer and the use of pollen extenders such as yeast (Jones, 1993).

Apiarists indicate that while supplementary feeding provides a marginal technical alternative to the use of Eden RFA eucalypts for over wintering, the science of supplementary feeding is still largely lacking and that research thus far has indicated that only two generations of bees are possible under artificial protein feeding conditions. A naturally occurring pollen supply is far more beneficial and stimulating to a colony of honey bees than any artificial medium thus far developed (Doug Somerville, Apiary Officer, NSW Agriculture).

The economics of the practice, also prevent its widespread adoption in NSW outside of supplementation during the pollination service. For example, glucose which is widely used in supplementary feeding, retails for approximately $5.30 kg while honey, which under this scenario requires substantial glucose inputs, as well as normal harvesting, transporting and processing, retails for a similar amount, $5.80 kg. Furthermore the small differential between gross income and total costs associated with honey production, (see Section 2.1 Socio-Economic Characteristics of Eden Apiarists) indicate that it is not within apiarists financial capacities to absorb the additional costs associated with supplementary feeding, and while some cost savings (site rental, transport) maybe available from “staying home” and artificially feeding, the high cost of supplementary feed and its poorer nutritional value, have limited the uptake of the practice. Apiarists therefore rely on native forests.

Relocation to Alternative Areas

Opportunities for Eden RFA apiarists to relocate to alternative areas are constrained. Viable non State Forest sites within the Eden RFA are largely occupied. Non occupied sites are typically inaccessible. Areas outside the Eden RFA are also being considered for national park or wilderness listing (with resulting long term access restrictions), while the biological control of Patterson's Curse (Salvation Jane) is set to further erode the apiary capacity of agricultural land.

2.4 Relationship of Eden Apiary Industry to Other Forest Uses and Users

Co-dependence/Conflict Between Beekeeping and Other Forest Users

Apiarists share the Eden RFA forests with a number of other commercial and non commercial users. There are both positive (co-dependence) and negative (conflict) interactions between apiarists and other users. These relationships are set out below. Data was collected for this analysis from apiarists, State Forests and NPWS.

Eden RFA forest uses and potential uses identified include:

- Timber production and wood chipping
- Paper production from pine plantations
- Mining
- Grazing
- Collecting seeds and firewood
- Rock gathering
- Bush walking, picnics
- Camping
- Horseriding
- Off-road recreation (4WD, dirt bikes)
- Rally driving
- Educational/scientific activities
- Eco-tourism
- Conserving biodiversity
- Protecting Aboriginal & other sites

Timber production and wood chipping: Co-dependence includes use of roads to access bee sites, maintenance of roads and use of old log dumps as bee sites. State Forest activities include setting aside of some mature and semi mature trees within each area harvested, for seed trees, habitat trees and trees retained for growth (Don Nicholson, State Forests). Conflict results from the logging of trees for timber and chip production which removes mature trees that are important for apiary. Regrowth or plantation forests may not mature sufficiently to provide good pollen and nectar sources before re-logging. Management practices such as burning of the State Forests estate are also considered to be a problem for apiarists. Burning halts apiary production (Ross Ridett & Tony Bee - Eden Apiarists).

Paper production: In some forestry regions there is potential for conflict. This is because paper production utilises softwood forests which have no value to apiarists, and the increase in plantings of softwood plantations are utilising potential hardwood areas. Paper production also utilises hardwood forests which means resources are then lost to apiarists.

Mining: Co-dependence includes use of roads to access sites, maintenance of roads and use of rehabilitated mines as bee sites. Conflict arises when miners clear trees that are resources for apiarists. This impact is relatively insignificant compared to timber, woodchip and paper production.

Grazing: Grazing of agricultural livestock in State Forests has minimal interaction with apiarists. Utilisation of grasses is independent of the harvest of floral resources.

Collecting seeds, firewood and rock: Minimal interactions, although there is some evidence that honeybees assist in the seed setting of eucalypt and acacia species (Moncur, Mitchell, Fripp & Kleinschmidt, 1995) and may result in the greater availability of seed for collecting.

Eco-tourism: Potential conflict due to the possibility of bee stings and disruption of ecosystems by honeybees.

Recreation (bushwalking/picnics/camping/horseriding/4WD/rallying/etc): Despite provision of dedicated bee site areas there still exists the potential for conflict with the public. This includes damage that may be caused to hives by the public and the possible threat of bee stings.

Educational/scientific activities: In the past there has been some co-operation in the Eden region when apiarists have assisted with research on pollination and provided information on migratory patterns of species such as honey eaters and flying foxes. However there does exist the potential for conflict (see Section 2.5 below).

Conserving biodiversity and heritage values: Data on impacts on species inconclusive, see Section 2.5 below. Minimal interaction with heritage sites.

A summary of apiary interactions with other forest users in the Eden RFA is provided in Table 2.7.

Table 2.7 The Relationship of Apiary to Other Eden RFA Users

Uses/Users	Co-dependence	Conflict	Comments
Timber production and wood chipping	✔	✔	substantial interaction
Paper production	*	✔	substantial interaction
Mining	✔	✔	some interaction
Grazing	*	*	minimal interactions
Collecting seeds firewood and rock	*	*	minimal interactions
Eco-tourism	*	✔	some interaction
Recreation	*	✔	substantial interaction
Educational/scientific activities	*	✔	some interaction
Conserving biodiversity	*	*	minimal interactions
Protecting Aboriginal & other sites	*	*	minimal interactions

Key: ✔ denotes interaction, * minimal interaction

The table indicates scope for conflict with a number of other recognised forest users.

2.5 Sensitivity to Change, Eden Apiary Industry

In order to assess the Eden apiary industry's sensitivity to change the following needs to be addressed:

- NPWS policy and its impact on apiarists (loss or resource, inability to capital accumulate);
- Summarise the pressures for structural adjustment (loss of resources outside national parks and wilderness, financial viability, etc); and
- Conclude on financial viability with and without the Eden RFA.

NPWS Policy and its Impact on Apiarists

NPWS policy on beekeeping states that:

- There will be no new sites in areas reserved under the NPW Act;
- All sites current as of 31 December 1989 will be retained for the term of the life of the licensee, or until surrendered;
- Licensed sites cannot be exchanged or traded; and
- Any existing sites which seriously compromise the environmental values of the area will be relocated.

(National Parks and Wildlife Service Manual, Section 2.4, current addition).

Under this policy, the declaration of new parks and wilderness areas will, while recognising existing beekeeping interests and allowing existing sites to continue, prevent the issue of any new or additional apiary site licences for those areas.

Under this policy it is reasonable to expect a gradual reduction in the availability of bee sites in NSW as new lands are declared national parks or wilderness and apiarists retire from the industry without the option to exchange or trade sites. One industry authority (Doug Somerville, Apiary Officer, NSW Agriculture) estimates that there has already been a loss of between 2,000 and 3,000 sites over the last twenty years due to the creation of national park and wilderness areas in NSW.

In addition to the loss of sites from which to generate production, NPWS policy makes it difficult for apiarists to develop their business asset. Good will, which would normally be a major component of a business such as apiary, is forfeited when a lease is surrendered. The capacity of the apiarists business to generate revenue and the value of the business is therefore depleted.

Loss of sites and subsequent loss of business value will have a significant impact on apiary in NSW. This is anticipated to also be the case in the Eden RFA area where one half of the industry (see Section 2.1) is reliant on State Forests which have the potential for inclusion in the reserve system with subsequent tenure change to national park or wilderness.

Pressures for Structural Adjustment

There is a strong feeling in the industry that the viability of beekeepers is diminishing and will continue to decline as the impact of the following effects becomes more intense:

- A reduction in access to coastal forest resources;
- Salinity and die back in Riverina, tablelands and western eucalypts;
- Loss of floral resources due to urban encroachment and land clearing;
- Timber production involving the clearing of viable apiculture resources, replanting and harvesting prior to maturity of the floral resource and replacement with species of no value to apiarists;
- Biological control of Patterson's Curse (Salvation Jane); and
- Economic pressures including increasing costs incurred in order to obtain useful floral resources.

The diversity of flora available, and the scope of resources they provide year round, is the basis of the apiculture industry in NSW. As the prospects of being able to utilise the range of resources diminish, so to does the viability of the industry. The industry believes that these pressures may see many operators exit the industry within the next 10 to 15 years.

Conclusions on Future Viability

Loss of access to the Eden RFA will impact on the immediate viability of a limited number of apiarists. The Eden RFA has wider importance as a drought reserve and over wintering resource for the NSW apiary industry. The Eden RFA is not a significant producer of honey and other apiary products.

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ABBREVIATIONS USED IN THIS REPORT

BRS	Bureau of Resource Sciences
CRA	Comprehensive Regional Assessment
LTP	Long Term Permits for bee keeping in SF
NPWS	NSW National Parks and Wildlife Service
RACAC	Resource and Conservation Assessment Council
RFA	Regional Forestry Agreement
SF	State Forests of NSW