Annual Review of the

NPWS Policy on Flying Fox and Mitigation of Commercial Crop Damage

for the

1998 - 1999 Fruit Growing Season

Acknowledgments

This report was prepared by Fiona Mandelc, Wildlife Management Unit, Operations Unit, Field Services Division, NPWS.

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Introduction

There has been conflict between flying foxes and fruit growers since Europeans began growing fruit trees in Australia (Tiddeman *et al.*, 1997). A range of techniques have been used by growers to deter flying fox over the years, at different localities for a variety of crops and in other circumstances (Hall and Richards 1987, Turner 1994, Oldfield, 1993; Vardon *et. al*., 1997). The NPWS - *Policy on Flying Fox and Mitigation of Commercial Crop Damage* was developed and implemented for the first time in 1998/99. The Policy applies to two of the three flying fox species known to occur in NSW, the Grey-headed Flying fox, *Pteropus policephalus* and the Little Red *P. scapulatus*. The third species, the Black Flying fox *P. alecto* is listed as Vulnerable in NSW under the *Threatened Species Conservation Act, 1995* (TSC Act). The Policy states, that a statewide report is to be prepared after the completion of the fruit growing season and that the Policy should be reviewed annually in consultation with key stakeholders. This Policy is proposed to be a component of a broader Conservation and Management Policy on Flying Foxes which will consider, for example roosting site management on and off Service estate and the integration of foraging habitat conservation in environmental planning and assessment processes.

Policy development context

The NPWS published a consultancy report in October 1995 on *The Biology and Management of flying foxes in NSW* (Eby, 1995). This report indicated the potential for a recommendation to be made to list the Grey-headed Flying fox (GHFF) on the then Schedule 12 of the *National Parks and Wildlife Act, 1974* (NPW Act). The current conservation status of the GHFF has been identified as Vulnerable in the recently released national Action Plan for Australian Bats (1999). At this time however, it remains a protected species under the *National Parks and Wildlife Act, 1974* (NPW Act) in NSW and is not listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999.* The 1995 report noted that if changes in the conservation status occurred this would force the cessation of lethal on-crop management practices, which would potentially disadvantage fruit growers. The report thus urged that research into the development of exclusion and deterrent techniques be undertaken and a transition for the phasing out of lethal techniques be negotiated with fruit growers.

NPWS undertook a series of consultative meetings with industry and other interested groups between March - May, 1996 to discuss the issues raised as a result of the 1995 report. NPWS reviewed the then system of issuing section 121 (s121) licences for shooting flying foxes with the aim of developing more stringent procedures. NPWS, at that time, recommended that harming GHFF should continue to be licensed for crop damage mitigation purposes during the 96/97 and 97/98 fruit growing seasons while further aspects were investigated, such as:

* encouraging netting or the use of other mitigation techniques; and
* assessment of the impact of the NSW *Firearms Act, 1996*.

The then Minister approved the proposed interim arrangement for the issue of s121 licences.

In August 1997 NPWS undertook a review of licencing documentation and procedures and commenced discussion with representatives from NSW Agriculture and NSW Farmers. The 1997/98 fruit growing season commenced at the beginning of September but in November the then Minister introduced a suspension on the issue of s121 licences by NPWS, partly in response to a threatened legal challenge to the Service's ability to issue these licences. The legal advice subsequently provided by the Crown Solicitor removed any doubt of the legality of issuing such licences. Field advice at the time indicated that the impact of the suspension of s121 licences was severe for some but not all fruit growers. This local variation in the level of impact of flying foxes on fruit crops relates to, among other factors, the location and variable nature of native food resources for flying foxes, as well as the extent and type of damage mitigation options available to growers.

In July 1998 members of the Australian Bat Society (ABS) coordinated the first attempt to systematically assess the size of the GHFF population since the 1920's. The total abundance of GHFF in NSW was estimated at 85,400, which varied substantially from recent estimates of the NSW population, of one million animals (Eby *et al*. 1998). Eby *et. al* (1998) also estimated the species abundance to be 390,400 based on estimates from QLD and Victoria undertaken at a similar time. Eby *et. al* (1998) noted that counting methods used in these states differed from NSW nor did they include an estimate of error, and therefore that the population estimate could only be considered indicative. The authors concluded however that the population has declined substantially since the time of European settlement (Ratcliffe, 1932).

In August 1998 NSW Farmers prepared a submission to the Government on *Flying Foxes in NSW* based on a survey distributed to over 700 NSW stone and pome (e.g. apples, pears) fruit growers. Only 165 growers responded (24%) to the NSW Farmers survey but of these 85% suffered damage to their fruit crops from flying foxes. The survey indicated damage included: fruit being eaten, bite and claw marks, tree damage, faeces contamination and urine scald. The report made a series of recommendations relating to: Damage Mitigation Licences; Research and Investigation; and Exclusion Netting.

In October 1998 the Government determined that the issuing of s121 licences to harm GHFF and Little Red flying foxes (LRFF) would be reinstated for the 1998/99 fruit growing season where there was a proven significant threat of crop damage. In response to these circumstances the NPWS - *Policy on Flying Fox and Mitigation of Commercial Crop Damage* was developed and implemented in 1998/99.

Review Summary

Table 1 is a summary of information derived from, s120 licences (General licence, to shoot), s121 licence applications, s121 licences (Occupier's licence) and returned Flying Fox Record Sheets (FFRS) from the 1998/99 fruit growing season. These application and licence forms were developed in conjunction with the implementation of the Policy, to standardise and increase the collection of relevant information from applicants and licensees.

It should be noted that many of the numeric totals presented below are based on incomplete documentation that was hand written, hence these figures should be regarded as indicative only. Caution should also be exercised in interpreting these figures, particularly as they are derived from only one year.

State-wide

Licence numbers

- A total of 92 s121 licences were issued to 80 growers that is, 12 growers were issued with second licences (13%). These 92 licences authorised the shooting of a maximum of 2859 FF.
- Of these 92 licences, 33% were issued from North Metropolitan District in Sydney, which represented 28% of the total number of animals authorised to be harmed.
- In 1997/98 few licences were issued due to a suspension on the issue of licences.
- In 1996/97 65 s121 licences were issued, to shoot 2379 animals in NSW.
- Of these 65 licences, 40% were issued by North Metropolitan District in Sydney, which represented 43% of the total number of animals authorised to be harmed.

Affected Crops

- The area of total fruit crop potentially vulnerable to FF damage identified by 74 of the 80 applicants on their licence application form was 621 ha statewide.
- 50% (37) of the 74 applicants had 5 ha or less of fruit crops.
- The area of crop identified as damaged by 74 of the 80 applicants at the time of the licence application (1st) was 327 ha statewide.

- The area of crop identified as damaged by the 11 second licence applicants, at the time of the licence application was 73 ha statewide.
- 47% (36) of the 76 applicants had crop damage of 2 ha or less at the time of the licence application.
- The fruit crops identified as damaged were: stone fruit, nectarine, guava, mango, paw paw, peach, plum, loquat, cherry, mulberry, pear, grape, banana, lychee and apple.
- For the 73 licensees that indicated the total area damaged per crop, the area per crop statewide (ha) was approximately: stone fruit=63, nectarine=78, guava=12, mango=2, paw paw=2, peach=56, plum=7, loquat=0.1, cherry=3, banana=24, lychee=83 and apple=32. (Please note where multiple crops were listed and a single area given, that was greater than 1.0ha, the area has been divided equally between the crops.)
- The largest area of crop identified as damaged, under a single licence was 40ha of lychee; and the minimum area was 0.03 ha of stone fruit.

FF Record Sheet (FFRS)- Licence Condition No 5.
- 48% (44) of growers returned their FFRS.

FF harmed
- Under the authority of 92 licences approximately 2859 FF were licensed to be harmed
- This consisted of GHFF=1959; LRFF=420 and 180 of either GH &/or LR
- 651 FF were shot as reported in the 44 FFRS returned
- This consisted of GHFF=516; LRFF=105

S121 Licence Duration
- The maximum duration of a licence was 152 days
- The minimum period was 20 days
- 50% of licences were issued for 2 months (62 days) or less
- The earliest licence issued was on 6/11/98 and latest licence issued was 15/4/99 (both were issued in the Central Directorate)
- 62% (56) of licences were issued in the month of November

Shooters Licences (s120 licences)
- 35% (32) of the s121 licences issued (92) were accompanied by shooters licences
- 54 s120 licences were issued to shoot FF on 25 s121 licenced properties
- the number of shooters licences issued per s121 licence ranged from 0-7
- there is low statistical correlation between the number of shooters licences issued per s121 licence and the:
    * total area of crop potentially vulnerable to damage;
    * total number of flying fox licensed to be harmed; and
    * total number of flying fox reported to have been shot.

Random unannounced patrols/property inspections
- based on advice from NPWS officers a minimum estimate of 85 unannounced inspections were undertaken, as well as general orchard area patrols.

Regional

NPWS Northern Directorate
- 26 licences issued (inc. 4 second licences)
- 20 licensees indicated the total area damaged per crop, the Regional totals (ha) were approximately: stone fruit=31, nectarine=5, guava=12, mango=2, paw paw=2, banana=24 and lychee=83
- 5 of the 7 (77%) fruit crop categories identified were unique to Northern Directorate and these 5 represent 84% (123ha) of the total area indicated as damaged in the Region (159).

- The largest area of crop identified as damaged, at the time of a licence application was 40ha of lychee; and the minimum area was 0.75 ha of stone fruit and lychee.
- 11 FFRS returned (42%)
- licences issued for 940 FF (i.e. GHFF=545; LRFF=395)
- FFRS indicated 148 shot (16%) (i.e. GHFF=31+; LRFF=105+)
- 9 s121 licensees requested 16 shooters
- 37% (9) of 24 applicants had a total of 5 ha or less of fruit crops
- the average duration of a s121 licence was 47 days
- 38% of s121 licences were issued in November
- 41% of s121 licensees had s120 licences issued for use on their properties
- the number of shooters licences issued per s121 licence ranged from 1-4
- **a minimum estimate of 3 unannounced inspections were undertaken**

NPWS Central Directorate
- 63 licences issued (inc. 8 second licences) representing 68% of licences statewide.
- 52 licensees indicated the total area damaged per crop, the Regional totals (ha) were approximately: stone fruit=32, nectarine=71, peach=55, plum=6, loquat=0.1, cherry=3 and apple=32.
- 4 of the 7 (57%) fruit crop categories identified are unique to Central Directorate and these 4 represent 21% (41.1ha) of the total area indicated as damaged in the Region.
- Central Directorate has 87% (158ha) of the total area of stonefruit, nectarines and peaches indicated as damaged across the 3 Directorates (182ha).
- The largest area of crop identified as damaged, at the time of a licence application was 40ha of nectarine; and the minimum area was 0.23ha of plums.
- 31 FFRS returned (49%)
- licences issued for 1660 (i.e. GHFF and/or LRFF= 180; GHFF=1520)
- FFRS indicated 450 shot (27%) (i.e. all GHFF)
- 14 s121 licensees requested 34 shooters
- 52%(27) of 52 applicants had a total of 5 ha or less of fruit crops
- the average duration of a s121 licence was 76 days
- 83% of s121 licences were issued in November
- 30% of s121 licences had s120 licences issued for use on their properties
- the number of shooters licences issued per s121 licence ranged from 1-7
- **a minimum estimate of 83 unannounced inspections were undertaken**

NPWS Southern Directorate
- 3 licences issued
- only 1 of 3 licensees indicated the total area (ha) damaged per crop, this was: peach=1.5, nectarine=1.5
- 2 FFRS returned (66%)
- licences issued for 59 (i.e. all GHFF)
- FFRS indicated 54 shot (92%)
- 2 s121licensees requested 6 shooters
- 50%(1) of 2 applicants had a total of less than 5 ha of fruit crops
- the average duration of a s121 licence was 102 days
- 33% of s121 licences were issued in November
- 66% of s121 licences had s120 licences issued for use on their properties
- the number of shooters licences issued per s121 licence ranged from 2-4
- a minimum estimate of 1 random unannounced inspection was undertaken

Discussion

The above statewide summary suggests that only a small proportion of fruit growers suffered significant damage from flying foxes statewide during 1998/99. That is, while a total of 80 growers

were issued with licences by NPWS a NSW Agriculture report (Ullio,199?) indicated that in 1990 there were some 690 stonefruit and 611 pome fruit producers statewide.

The total amount of crop indicated by these growers, assuming this was all potentially vulnerable to damage, was also relatively small (i.e. 546 ha) given there was some 8,300 ha of stonefruit (2,955 ha) and pome fruit (5,345 ha) statewide in 1990 (Ullio, 199?). The total area of crop, indicated by licence applicants coincides with the estimate of NSW Agriculture officers of around 500 ha of commercial orchards that need exclusion netting (Minister for Agriculture, 1999). However, as 49% (34) of the 69 applicants indicated they had a total of 5 ha or less of fruit crops it may be that a significant number of these small growers involve non-commercial plantings.

The only reliable protection for fruit crops from damage by flying foxes at this time, is full exclusion netting as recommended by NSW Agriculture. This also prevents significant damage caused by birds and hail storms. The two primary reasons stated for not using this mechanism is cost and in some instances topography.

Since April 1999 growers can take out a low interest loan for netting to prevent crop damage from flying foxes. The NSW Rural Assistance Authority (RAA) administers the scheme and a number of conditions apply. Quotes on the cost per hectare vary from $16,000 (Slack & Reilly, 1994) to $30,000 (NSW Farmers, 1998). The availability of the RAA low interest loans now allows for eligible growers to borrow up to $100,000 for exclusion netting at a 4.5% interest rate approximately. The criteria for these loans include: the farming enterprise must provide at least 51% of total gross income of the applicants; and the applicant must be in working occupation of the farm and be of moderate means (net assets of up to $1.2 million). Other than for particular orchards with topographic restrictions, it will be small, non-commercial growers who will not be able to access the RAA loans. These matters relate to industry restructure and often urban expansion, and are not NPWS accountabilities or area of expertise.

Only 48% (44) of growers returned their FFRS and only approximately 22% (20) completed all entries (although some records were incomplete because the forms provided by NPWS were incomplete photocopies). Given the return of FFRS is a licence condition consideration needs to be given by NPWS to this aspect of non-compliance.

Unfortunately, there is a perception that even when such documentation is submitted, little reliability can be put on such figures. In QLD it has been noted that farmers rarely admit if they shoot more than they are allowed while those who shoot fewer sometimes say they have shot more to ensure they get a permit for the same number the following year (Garnett *et. al,* 1999). In the analysis of documentation for this review it was apparent that the number of flying foxes licensed to be harmed, did not relate, necessarily to the number indicated as shot on the FFRS. As suggested above, the direction of any trend in exact numbers harmed, up or down from the licensed number, can not readily be identified. It is recommended below (see No 7) that an information pamphlet be produced by NPWS to assist growers in completing these forms; to acknowledge the contribution such information can make to understanding the impact if accurately completed; and to promote recognition that obtaining a licence to harm native wildlife necessitates certain responsibilities.

The majority of flying foxes harmed were GHFF. The issue of licences to harm commenced later in 1998 than this year, as a result of the suspension on licensing. While only 28% of s121 licences issued were accompanied by shooters licences, the number of shooters licences issued per s121 licence ranged from 0-7. Seven licences appears excessive given there is low statistical correlation between potentially relevant factors such as the size of crop requiring protection.

The level of law enforcement monitoring varied across the state but in the Districts where larger licence numbers were issued a significant effort was undertaken.

The above figures indicate significant regional differences in:

- the number of licences issued;

- the timing of the issue of licences;
- the species licensed to be harmed;
- the crops affected;
- the number of shooters per s121 licence; and
- the number of licensees with 5ha or less of apparently vulnerable crop.

Any future policy development should recognise, where necessary, these differences. It should be noted that the 1995 consultancy report recommended the phase out of lethal crop protection methods using a tiered approach, which reflects aspects of this regional variation. The report stated:

a) …Initially licensing should be terminated on low chill stone fruit and tropical fruit crops for which full exclusion netting is a viable option without financial assistance, e.g. high value crops in the Lismore, Grafton and Dorrigo NPWS Districts. The Department of Agriculture's financial modelling package for fruit crop netting should be used to resolve grievances (Slack, 1990). These actions should be introduced as soon as practicable, e.g. after one years notice has been provided to the grower.
b) Over a longer period (e.g. five years) licensed culling of flying foxes should be phased-out on lower value crops in the remainder of the state for which full exclusion netting is technically feasible, and where recoupment of the cost of netting will be over a longer period than in a)
c) The government should be encouraged to provide financial assistance such as interest free loans to growers not in a financial position to net their orchards.
d) The cessation of licensing for culling on crops which are not suitable for netting should occur in response to the development of alternative control techniques, so long as this work proceeds expeditiously.

Given the availability of the RAA loans, the above categories are no longer relevant however a successive approach to the cessation of licences that authorise lethal crop protection mechanisms is still appropriate, wherever possible. There are significant concerns about the conservation status of one of the species currently shot to protect fruit crops from damage, as indicated by the GHFF listing as Vulnerable in the Commonwealth Bat Action Plan. If this species is identified as Vulnerable in NSW it can be expected that the issue of licences to authorise lethal harm will cease. It should also be noted that the illegal harming of a threatened species, the Black Flying Fox is currently possible in the Northern Directorate as a result of the issuing of licences to harm the two protected species. Therefore, it is timely for all parties to commit to an agreed timetable and process for the cessation of lethal crop protection mechanisms.

It is **recommended (1)** that in order to progress an agreed strategic approach to the management of flying fox damage on fruit crops a NSW Flying Fox Consultative Committee should be established.

The forum should determine, amongst other matters:

- a minimum negotiated time frame for the cessation of licences to shoot flying foxes, for all growers with orchards and crops that can be netted and have access to the RAA loans to erect full exclusion netting;
- a negotiated time frame for small, non-commercial growers which do not have access to the RAA loans to cease the use of lethal crop protection mechanisms; and
- an agreed process for growers with access to the RAA loans to erect full exclusion netting but which can not be erected because of features of the particular orchard.

A QLD Consultative Committee was established in 1999 and is chaired by the QLD Department of Primary Industry (DPI). The Committee includes representatives from the DPI, National Parks, industry associations, conservation and animal welfare organisations, the scientific community and NSW Agriculture. It is proposed that developing an equivalent NSW Committee will encourage information exchange and the development of complimentary research and management strategies. Given that the two species implicated in crop damage in NSW both have ranges that extend into NSW, this approach offers considerable benefits to all parties.

Conclusion

The 1999/00 fruit growing season has commenced and NPWS have issued licences to harm flying foxes under the existing Policy and management procedures. It is recommended that, if the proposed refinements to the Policy aimed at improving procedures and accountabilities are endorsed, that for the remainder of the1999/00 season any further licences be issued under the new Policy and the associated revised documentation.

Subsequent to this season the proposed NSW Consultative Committee on Flying Foxes should determine, amongst other matters:

- a minimum negotiated time frame for the cessation of licenses to shoot flying foxes, for all growers with orchards and crops that can be netted and have access to the RAA loans to erect full exclusion netting;
- a negotiated time frame for small, non-commercial growers which do not have access to the RAA loans to cease the use of lethal crop protection mechanisms; and
- an agreed process for growers with access to the RAA loans to erect full exclusion netting but which can not be erected because of features of the particular orchard to manage crop protection.