Annual Review of the *NPWS Policy on Flying-fox and Mitigation of Commercial Crop Damage* for the 2001 - 2002 Fruit Growing Season

August 2002

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Acknowledgements

This report was prepared by Ron Haering, Wildlife Management Unit, Biodiversity Research and Management Division, with the assistance of numerous Regional and Head Office staff. Regional staff from the South Coast, Sydney South, Sydney, Sydney North, Blue Mountains, Central Coast/Hunter Range, Hunter, North Coast, Northern Tablelands and Northern Rivers have provided the data presented in this report.

This document should be cited as follows:

NSW National Parks and Wildlife Service (2002). Annual review of the NPWS Policy on Flying-fox and Mitigation of Commercial Crop Damage for the 2001 - 2002 Fruit Growing Season. Prepared by R. Haering. NPWS.

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1. Introduction

This report forms the 2001-2002 annual review of the draft NPWS policy and procedures for the mitigation of commercial crop damage by flying-foxes. It presents a statewide summary of licensed activity over the last fruit-growing season and draws comparison with previous seasons to further enhance understanding of flying-fox distribution and the impact, both on the farming community and on the flying-fox population. Recommendations are made to amend the policy where necessary.

Three species of flying-fox are known to occur in NSW. They are the Black Flying-fox (BFF) *Pteropus alecto,* the Little Red Flying-fox (LRFF) *Pteropus scapulatus* and the Grey-headed Flying-fox (GHFF) *Pteropus poliocephalus*. All three species have been protected under NSW legislation since 1986. The BFF and GHFF are also listed as vulnerable species under the *Threatened Species Conservation Act 1995* (TSC Act). In addition, the Grey-headed Flying-fox was listed in 2001 as a vulnerable species under the Commonwealth *Environment Protection and Biodiversity Conservation Act (EPBC Act) 1999*. The term 'flying-fox' in this report will refer to all 3 species except where specified.

The NPWS policy and procedures for the mitigation of commercial crop damage by flying-foxes (NPWS 2001a) is a component of a broader conservation and management strategy for these species. Under this policy, the NPWS advocates that full exclusion netting is the only reliable method for protecting fruit crops. However, provisions are made for licences to be issued under s120 of the *National Parks and Wildlife Act 1974* (NPW Act) to harm a limited number of flying-foxes as an incidental result of using gunshot to scare animals away from fruit crops. The GHFF is the species most implicated in the damage of commercial fruit and is subject to the majority of s120 licence applications. Licences are issued by NPWS Area offices in accordance with a statewide quota of 1% of the most recent minimum population estimate of GHFF i.e. 320,000 animals. The NPWS policy allows for each licence issued to harm a maximum of 50 flying-foxes. A second licence to harm an additional 50 flying-foxes may be issued on request subject an inspection by NPWS staff.

An essential part of the licensing system is the provision of information by licensees on the species and number of animals likely to be harmed, the type and area of fruit crop susceptible to damage and the number, sex and species of animal harmed during the course of the licence. The NPWS has been collating and reporting annually on this information for the last three fruit seasons (NPWS 1999, 2000, 2001b).

2. Review Summary

A statewide summary of s120 (General) licences issued during the 2001/2002 fruit-growing season is provided below. Information is given on the number of licences issued, the number and species of flying-fox permitted to be harmed and the number actually harmed according to return sheets provided by licensees and the type of crop and area damaged as specified in the initial licence application. A tabular summary of information by Region and State is presented in Table 1.

Although accurate information is available on the number of licences issued and the number of flying-foxes allowed to be harmed. Not all return information requested of licensees was supplied either on the original application (e.g. type and area of crop) or on the flying-fox record sheet (e.g. number, gender and species of flying-fox harmed). Thus, numbers applying to actual counts and estimates of animals harmed and crops damaged should be considered as minimum estimates.

2.1 State-wide Results 2001/02

2.1.1 Licence numbers

- A total of 70 s120 licences were issued to 54 growers between September 2001 and March 2002. Fourteen growers were issued with second licences and two growers a third licence. These 70 licences authorised the shooting of a maximum of 1852 flying-foxes. One applicant subsequently cancelled their licence.
- Sydney North Region, Central Directorate, issued more licences (29) than any other Region (41% of all licences) which accounted for 32% of the total number of animals authorised to be harmed State-wide.

2.1.2 Affected Crops

- The s120 application form requests information on the area of total fruit crop potentially vulnerable to flying-fox damage and on the area damaged. 45 growers (85% of licensees) reported a total of 362.7 hectares of fruit trees susceptible to damage.
- 49% (22) of these 45 applicants had 5 ha or less of fruit crops. The largest crop area identified was 40 hectare, and the smallest was less than one hectare.
- In all, 45 growers reported a total of 144.3 hectare of damage on first application (39.8% of the reported crop area).
- 89% (40) of these 45 applicants reported crop damage of 5 ha or less at the time of their 1st licence application.
- 9% (4) of these 45 applicants reported less than or equal to 10% of crop damage, 58% (26) reported between 11-50% crop damage and 33% (15) greater than 50% crop damage at the time of their first licence application.
- The fruit crops identified as damaged were stonefruit (including nectarine, peaches, plums, loquot, apricots and cherries), guava, lychee, persimmon and apple.
- Statewide damage per crop was reported by 42 growers, but is difficult to assess due to mixed crop estimates. Areas include stonefruit (104.3 ha), guava (8 ha), lychee (9 ha) and stonefruit mixed with other fruits (16ha).
- The largest area of crop identified as damaged, under a single licence was 18.5 ha, and this amount of damage was reported for 1 stonefruit crop. The minimum area of reported damaged was 0.5 ha for stonefruit.

2.1.3 Licensees – Flying-fox Record Sheet (FFRS)

- 76% (53) of FFRS were returned.

2.1.4 Flying-foxes harmed

- Under the authority of 70 s120 licences, 1852 flying-foxes were licensed to be harmed.
- This consisted of 1650 (GHFF); 158 (LRFF) and 44 (BFF).
- In total, 1160 flying-foxes were shot.
- This consisted of 1058 GHFF, 38 LRFF, 15 BFF and 49 unspecified but presumably GHFF.
- Of the 1058 GHFF killed, this consisted of 154 males and 113 females. Sex of the remainder was not recorded.

2.1.5 Section 120 Licence Duration

- The maximum duration of a licence was 263 days.
- The minimum period was 43 days.
- 45 of first licences (90%) were issued for greater than 2 months (62 days).
- 35 (73%) of first licence applications were made in October and November 2001.
- The earliest licence issued was on 11 September 2001 (issued in Central Directorate) and latest licence issued was 11 March 2001 (issued in Northern Directorate).

2.2 Regional Results 2001/02

2.2.1 NPWS Northern Directorate

- 3 Regions and 3 Areas of Northern Directorate issued licences under this Policy. Overall, 8 licences were issued. No second licences were issued.
- A total of 71 ha of fruit crop were covered by the 8 licences and 22.5 ha (31.7% of total) were reportedly damaged at the time of first application.
- Regional totals for area of crop (ha) and (area damaged in ha) by crop type are estimated as stonefruit 14 ha (5.5ha) (note incomplete data), guava 16 ha (8ha), and lychee 41 ha (9ha). Areas for Mango were not provided.
- Lychee, mango and guava crops were unique to Northern Directorate.
- The largest area of crop identified as damaged at the time of a licence application were 40 ha of lychee and the minimum area was 1 ha also of lychee.
- 4 FFRS (50%) were returned.
- Licences were issued to harm up to 315 flying-foxes (i.e. 133 GHFF; 138 LRFF and 44 BFF).
- FFRS indicated 95 flying-foxes were shot (43 GHFF; 37 LRFF; 15 BFF).
- 63% (5) of 8 applicants had a total of 5 ha or less of fruit crops.
- The average duration of a s120 licence was 79 days with a range of 62 to 111 days.

2.2.2 NPWS Central Directorate

- 6 Areas from 5 Regions in Central Directorate issued licences. Overall, 60 s120 licences were issued to 44 properties (14 second and 2 third licences were issued).
- 3 applications for s120 licences were accompanied by a Threatened Species Property Plan.
- Information on crop area and area of damage was provided (sometimes incompletely) by 44 licensees.
- Approximately 280 ha of fruit crop were covered by the 44 licences and 109.8 ha of damage were reported on first application. 46% (17) of respondents who returned data had a total of 5ha or less of fruit crops.
- Regional totals for area of crop (ha) and (area damaged in ha) by crop type were approximately stonefruit 200.7 (ha) (86.8ha); stonefruit mixed with apples or loquots 31 ha (16ha); Persimmon 4 ha (4ha).
- Persimmom, loquot and apples were unique to Central Directorate
- 42% (15) licensees reported greater than 50% damage to their crop.

- The largest area of crop identified as damaged at the time of a licence application were 27 ha of stonefruit; and the minimum area was 2 ha of stonefruit.
- Licences were issued to harm a maximum of 1497 flying-foxes all 1497 GHFF
- 48 FFRS (80%) were returned.
- FFRS indicated 1065 were shot (1015 GHFF (145 Male and 104 Female), 1LRFF, 49 unspecified but presumably GHFF)).
- 85% of first licence applications occurred in October and November 2001.
- The average duration of a s121 licence was 136 days, range 43-219 days.

2.2.3 NPWS Western Directorate

- One licence was issued this season to one property.
- The licensee indicated the total area (ha) of crop was 12 ha. Damage to fruit crops from flying-foxes was estimated as 12ha (100% of crop).
- The crop type was stonefruit.
- A Licence was issued to harm 20 LRFF.
- FFRS reported 0 flying-foxes harmed.
- Duration of licence was 70 days

2.2.4 NPWS Southern Directorate

- One licence was issued this season to one property.
- No details on nature of crop were provided.
- FFRS not returned.
- Licence was issued for 20 GHFF.

Table 1 Summary of information from licence applications and licences issued for the 2001/02 fruit season by NPWS Regional offices.

Directorate	Region & Area	Date 1st s120 Lic issued	Date last s120 issued	Average licence duration (days)	No s120 Licences issued	No 2nd s120 issued	FFRS returned	Max.Nos licensed to harm	Total No. Shot*	GHFF shot (est)	LRFF shot (est)	BFF shot	Total crop area (ha)	Total area damaged (ha)-1st lic.	% licences with info on crop
NORTHERN	**Northern Rivers**														
	Richmond River	13/09/01	11/3/02	107	5	0	3	250	89	37	37	15	59.5	18.25	80
	North Coast														
	Coffs Coast	24/10/01	NA	68	1	0	1	10	6	6	0	0	3.0	1.0	100
	Northern Tablelands														
	Walcha	19/11/01	21/11/01	62	2	0	0	55	?	?	?	?	8.5	3.25	100
Sub Total		**13/9/01**	**11/3/02**	**79**	**8**	**0**	**4**	**315**	**95**	**43**	**37**	**15**	**71**	**22.5**	
CENTRAL	**Central Coast-Hunter**														
	Yango	11/09/01	5/11/01	208	10	3	10	616	392	363	0	0	54	19.5	70
	Sydney North														
	Lower Hawkesbury	16/10/01	6/3/02	114	22	7	25	590	435	434	1	0	143.7	36.3	96
	Sydney														
	Cumberland North	16/11/01	15/12/01	43	1	1	2	21	27	27	0	0	7.0	3.0	100
	Sydney South														
	Nattai	31/10/01	11/12/01	134	4	2	4	155	118	118	0	0	57	31.5	100
	Blue Mountains														
	Hawkesbury	?	?	?	5	3	6	80	73	73	0	0	7	3.5	20
	Upper Blue Mtns	29/11/01	1/6/02	184	2	0	1	35	20	0	0	0	11	16	50
Sub Total		**11/9/01**	**6/3/02**	**136**	**44**	**16**	**48**	**1497**	**1065**	**1015**	**1**	**0**	**279.7**	**109.8**	
WESTERN	**Central West**														
	Macquarie	22/11/01	31/1/02	70	1	0	1	20	0	0	0	0	12	12	100
Sub Total		**22/11/01**	**31/1/02**	**70**	**1**	**0**	**1**	**20**	**0**	**0**	**0**	**0**	**12**	**12**	
SOUTHERN	**South Coast**														
	Ulladulla	24/10/01	1/6/02	220	1	0	0	20	?	?	?	?	?	?	0
Sub Total		**24/10/01**	**1/6/02**	**220**	**1**	**0**	**0**	**20**							
STATE TOTAL				***146***	***54***	***16***	***53***	***1852***	***1160***	***1058***	***38***	***15***	***362.7***	***144.3***	

*Note, figures here are estimates, based on information provided in the licence application and the Flying-fox return sheets. Note 49 flying-foxes were not identified to species (20 in NPWS Upper Blue Mountains and 29 in Yango areas).

3. Review Discussion

3.1 Comparison over the past three fruit growing seasons

The fruit growing season typically occurs between September and June, depending upon the crop and success of the growing season. The seasons covered by this review are September to June 1998/99, 1999/00, 2000/01 and 2001/02.

3.1.1 Licence numbers

An average of 68 licences (range 44-92) has been issued each season to an average of 58 properties (range 38-80). Most licences have been issued to NPWS Central (180 licences issued over four seasons) and Northern Directorates (84 licences), with the remaining few issued to Southern (4 licences) and Western Directorates (5 licences). The distribution of licences remains consistent with the known distribution of flying-foxes, particularly the GHFF, the species most subject to licence applications, which is typically found east of the Great Escarpment in NSW (Eby 1995).

The pattern of licence distribution across NSW from the 1998-1999 season to date is generally consistent from year to year, with some variation in the total number of licences issued (Figure 1). This variation is usually attributed to the quality of the fruit growing season and the availability of native food resources (M. Smith pers. comm. NPWS; NPWS 2000).

The number of licences issued for the season 2001-2002 is within the annual range and is not strongly inconsistent with trends experienced in previous years. However, Northern Directorate experienced a marked decline (68%) in licence applications, based on the average for the last three fruit seasons. This Directorate usually has a consistent, relatively higher number of licensees (average is approximately 25) in accordance with expected higher levels of damage to fruit crops, particularly lychees and is within the range of all three flying-fox species. Central Directorate, in contrast, issued its largest number of licences (60) since the 1998-1999 season representing an increase of 35% on the previous year. This variation is characteristic of Central Directorate and may be attributed to the sporadic availability of natural food resources and/or seasonal native food shortages in the northern part of the state (NPWS 2001b).

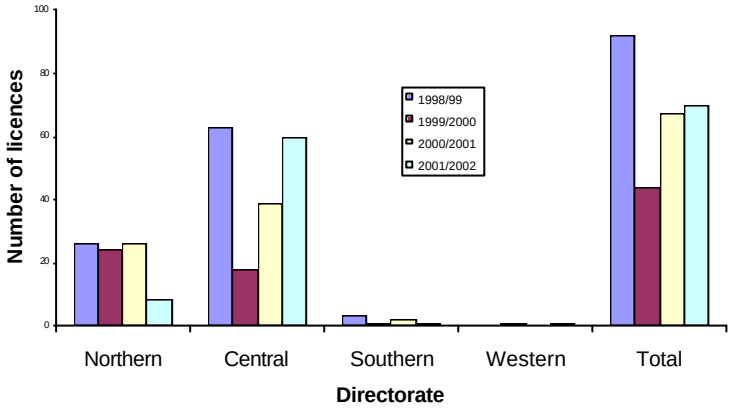
Peggy Eby (pers. comm.) states that in regard to the 2001-2002 season, large numbers of GHFF migrated in early spring to central coastal NSW as a response to the flowering of native food sources such as Turpentine. However, natural foods declined at about the time commercial fruits were starting to mature. This resulted in a large number of licence applications, including second licenses, in Central Directorate, particularly NPWS Central Coast Hunter and Northern Sydney Regions during late October early November.

Overall, results from this season and from previous seasons suggest that only a small proportion of fruit growers suffer significant damage from flying-foxes. That is, while an average of 68 licences have been issued each year since 1998, to an average of 58 growers, the Australian Bureau of Statistics (ABS) (1999) Year Book indicated that in NSW there were 222 pome fruit, 461 stone fruit and 1839 unclassified fruit growing establishments. Thus, either a low percentage of orchards are affected each year, or not all growers seek licences for flying-fox damage mitigation.

In the past a number of growers have operated outside the NPWS licensing system which has likely resulted in a high, yet unquantifiable, annual mortality of flying-foxes on fruit crops (Richards 2000, Antcliff 1998, Wahl 1994). Antcliff (1998) further noted that the 1997 moratorium on flying-fox licences by NPWS was ineffective because growers continued to use this mode of deterrence to protect their crops. While unlicensed activity is one explanation for the low number of licences issued each year, other explanations include an

increase in the number of properties that have been netted and the quality of both the fruit growing season and available native food sources (NPWS 2001b). Phil Wilks (NSW Agriculture pers. comm.) for instance states that up to 85-90% of stonefruit and lychee growers in northern NSW and southern Queensland have netted their properties and that a number of non-viable farms have closed business.

Figure 1 Total number of licences issued from NPWS Directorates over the last four fruit growing seasons.



3.1.2 Licences - Flying-Fox Record Sheets

Compliance with the licence condition that growers return a FFRS is continuing to increase from the initial 41% in 1998/1999, 44% in 1999/2000 and 67% in 2000/2001 to 76% in the most recent season. As per previous years the information most likely to be omitted from a FFRS are the gender of animals killed and number of flying-foxes in the crop per night.

The improvement in returns may be linked to amended policy procedures in 2000 requiring submission of a FFRS to be taken into account when determining any future licence application. It is likely that this policy requirement, coupled with efforts on the part of NPWS staff to retrieve FFRS and increased cooperation of growers has led to improved compliance in the 2000/2001 season.

Whilst there has been an increase in the return of FFRS to NPWS in terms of an overall summary of activity over the duration of a licence. Licences issued to growers stipulate that a FFRS should be returned to NPWS on 1 January, 1 March and 1 June of that season. This enables NPWS to gauge the severity of the season in terms of damage to crops and ongoing impact on flying-foxes. This licence condition does not appear to be met on a regular basis.

3.1.3 Flying-foxes harmed

A comparison of the number of flying-foxes harmed over the last four seasons is provided in Table 2. The average number of flying-foxes allowed to be harmed since 1998 is approximately 2135. The majority of these (74%) have been GHFF, with a further 17% for LRFF. The number of animals reported killed since 1998 is 3299, the majority of which were GHFF (81%). Since 1998, the percentage of animals reported shot has been less than the percentage allowed. However, there has been an increase in the percentage of animals actually harmed each season. This is likely to be a function of improved reporting i.e. an increase in the number of FFRS returned to NPWS. Overall, the number of flying-foxes allowed to be harmed and those actually harmed each season has not exceeded the 1% quota of 3200 animals specified in the draft NPWS policy (NPWS 2001a).

The 2001-2002 season showed a decrease in the number of GHFF and LRFF licensed to be harmed and an increase in the number of BFF. The numbers of GHFF actually reported harmed though increased by 23%, which is again likely to be a function of more accurate reporting by growers. The number of unspecified animals fell dramatically. This is also likely to be a result of improved administration of the licensing system and more accurate reporting by growers.

Table 2. The number of flying-foxes licensed to be harmed and the number reported harmed according to flying-fox return sheets (FFRS) received by NPWS from 1998-2002.

Species	**1998/1999**		**1999/2000**		**2000/2001**		**2001/2002**	
	Allowed	Harmed	Allowed	Harmed	Allowed	Harmed	Allowed	Harmed
Grey-headed	1959	516	895	202	1793	864	1650	1058
Little Red	420	105	500	93	430	88	158	38
Black-headed							44	15
Unspecified	180	31	120	78	40	169	0	49
Total	**2859**	**652**	**1515**	**373**	**2263**	**1121**	**1852**	**1160**
% of total allowed actually harmed	**23**		**25**		**48**		**63**	
FFRS received (%)	**41**		**44**		**67**		**76**	

3.1.4 Affected Crops

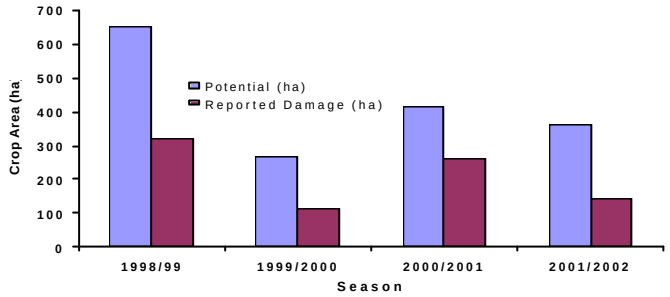
The predominant variety of fruit crop grown by orchardists requesting a licence continues to be stonefruit. For the purpose of this report stonefruit is defined as nectarines, peaches, cherries, plums, loquot and apricots. Other crop types reported by growers as affected by flying-foxes in the 2001-2002 season include lychee, guava, mango, apple, persimmon and mango. Approximately 73% of the total area of fruit trees potentially damaged by flying-foxes in this last season was for stonefruit crops.

In the 2001-2002 season, approximately 49% of growers reported a crop area of five hectares or less. This compares to 61% in 2000/2001 and 42% in 1999/2000. NPWS (2001b) states that the increase in farms of less than five hectares applying for a licence may be a reflection of the cost involved in implementing other management options such as netting. 88.9% of respondents reported less than 5ha of damage to their crop figure, which likely reflects the large number of small holdings applying for licences. Overall, in the 2001-2002 season 18 growers (40% of those responding to this question on the licence application) reported damage of up to 30% to their fruit crop and 15 growers (33%) reported greater than 50% damage.

Since 1998, growers have reported an average of 211 ha of damage (range 115-320 ha) to 415 ha of available crop (range 269-651 ha)(Figure 2). These areas are relatively small in comparison to the 38,000ha of orchard and tropical fruit statewide identified in 1994 (McLennan 1996). This information suggests that either only a small proportion of fruit growers are impacted by damage from flying-foxes or growers are operating outside of the NPWS licensing system. While a maximum of 92 licences has been issued in any one year, (1998-1999 season) there are over 2000 fruit growers in NSW (Australian Bureau of Statistics, 1999). It is difficult not to conclude that while the cost to individual growers, particularly small holdings can be high, the impacts of flying-foxes on the fruit growing industry at a regional and state level are minimal (NPWS 2001b). This may explain the lack of ongoing interest and financial support from agricultural industry bodies for deterrent research beyond netting (NPWS 2001b).

Although a large number of licence applicants answered questions related to fruit type, area of crop and estimated size of damage, there continues to be some gaps in the information provided. NPWS should continue to ensure all requested information is provided prior to presentation of a licence.

Figure 2. Area of crop (ha) with the potential to be damaged and reported damaged at the time of licence application for the past 3 seasons.



3.1.5 Section 121 Licences

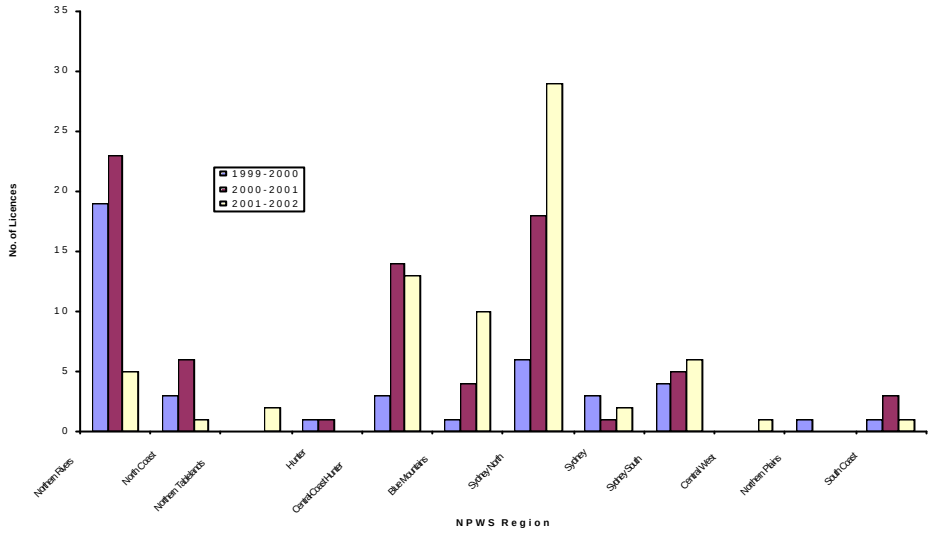
No s121 (Occupier's licence) were issued in the 2001-2002 season. The NPWS now issues licences for all three flying-fox species under s120 of the *National Parks and Wildlife Act 1974* (NPWS 2001a).

3.2 NPWS Directorate Comparison for 2001-2002

NPWS Central and Northern Directorates processed most licence applications in 2001-2002, which is consistent with previous years. From a regional perspective, NPWS Northern Rivers Region had a substantial decline in licence applications in comparison to previous seasons while Sydney North Region and to a lesser extent Blue Mountains Region showed an increase in licence applications (Figure 3). Central-Coast Hunter Region has maintained a consistently high number of licence applications over the last two seasons. More precisely, the major activity of flying-foxes i.e. GHFF in 2001-2002 has occurred predominantly in the NPWS Lower Hawkesbury, Hawkesbury and Yango areas. This correlates with the total areas estimated by growers as damaged for those areas (75.3 ha) in comparison to (18.25 ha) Northern Rivers Region in the north of NSW.

Licence applications to harm BFF were unique to Northern Directorate (comprising 13% of flying-foxes licensed to be harmed), which generally reflects the more northerly range of these species. Similarly, applications to harm LRFF were confined to Northern Directorate and a single licence application in Western Directorate. This species comprised approximately 47% of the total number of flying-foxes specified in Northern Directorate licence applications. Central Directorate processed applications entirely for GHFF. However, one LRFF was reported killed in a FFRS for Sydney North Region.

Figure 3. Number of licences issued for each NPWS Region for the last three fruit growing seasons.



Note: Number of licences includes S121 licences (1999-2001) and licence variations i.e. second licences.

The timing of first application licences was variable between Directorates. Central Directorate issued the first licence of the season on 11 September 2001. It was the only licence issued in September for that Directorate. Northern Directorate issued two licences in September, a single licence in October, with a further two in November and December followed by a late application in March by a guava grower. This Directorate can often receive licence applications up to three months earlier than other Directorates due to the ripening of tropical fruits (NPWS 2001b). Eighty two percent of first licence applications in Central Directorate were made in October and November 2001, which is likely to be commensurate with the arrival of GHFF to these areas. There were also two late applications from persimmom growers in this Directorate in March 2002.

The percentage of licence applications with small holdings of five or less hectares in Northern Directorate was 71% (5 licensees of 7 who responded), which is an increase from 37% in 1998-1999 and the 63-64% recorded in 1999/2000 and 2000/2001 (NPWS 2001b). This may suggest that increasingly larger and/or more commercially viable growers are netting crops in this Directorate. In Central Directorate the percentage of licensees having a total of 5ha or less of fruit crops in 2001/2002 also increased to 46% (17 licensees of 37 who responded) from 36% in 2000/2001, but decreased from 52% in 1998/1999. This may reflect the higher incidence of flying-fox impact on fruit crops this season in this Directorate, with 88% of licensees reporting greater than 50% damage to their crops.

The average duration of licences was longer in Central Directorate (136 days) in comparison to Northern Directorate (79 days)(Table 1), which is in accordance with previous years results (NPWS 1999, 2000, 2001b) and is likely to be a result of the longer fruit season in these areas.

The return rate of FFRS is not consistent between Directorates, nor is the pattern consistent over time (Table 3). However, the number of FFRS returned overall has increased over the last four growing seasons.

Table 3. Percentage of FFRS returned each season by each NPWS Directorate.

Directorate	1998/1999	1999/2000	2000/2001	2001/2002
Northern	42	25	69	50
Central	44	61	54	78
Southern	66	100	100	0
Western	NA	100	N/A	100

4. Management context 2001-2002

Following are the main management issues that have emerged during the 2001/2002 season.

4.1 National Conservation Status

In December 2001, the GHFF was listed as a vulnerable species under the Commonwealth EPBC Act. The rationale for the listing was the ongoing threat to the long term survival of the species which has experienced a decline of 30% in abundance in ten years predominantly due to ongoing habitat clearance, resulting in a loss of foraging and roost habitat.

Under the EPBC Act, listed species are considered to be a matter of National Environmental Significance. It is an offence for any person to undertake an action that is likely to have a significant impact on a matter of National Environmental Significance without approval from the Commonwealth Minister (www.ea.gov.au).

Consequently, an activity that is likely to have a significant impact on the GHFF will require assessment and approval under the EPBC Act. This means that the action may be carried out only in accordance with an approval from the Commonwealth Minister. Assessment and approval under the EPBC Act does not remove the need to obtain any necessary State authorisations to undertake actions (www.ea.gov.au).

The listing of the GHFF also requires the Commonwealth Minister for the Environment ensure a recovery plan for the species is put in place within prescribed timeframes.

In May 2002, a workshop was held in Coffs Harbour NSW for state agencies, including NSW NPWS and the Commonwealth to discuss the implications of the listing and initiate a consistent national approach to the management of GHFF. The meeting agreed on the following outcomes

- The total number of Grey-headed flying foxes to be taken in accordance with State permits in the 2002/2003 fruit season should not exceed 1.5% of the agreed national population estimate of the species. NSW gave in principle support to reducing its share of the national quota from 1% to 0.95%. Queensland also gave in principle support to maintain its' existing 0.4% quota and Victoria will introduce a 0.15% quota.
- States will continue to be responsible for the management of their permitting processes and that growers operating under a valid state permit to control flying-foxes would not need to refer their activity to the Commonwealth.
- Non-lethal control methods were supported as the only viable long term means of managing Grey-headed flying foxes in the long term and
- Annual population counts are essential to ensure government decisions on the management of the species are based on the best available knowledge.

4.1.1 Implications of national listing for NSW policy on flying-foxes

The listing of the GHFF as a Commonwealth threatened species and the agreed outcomes of the national workshop will have the following implications for the management of the species in NSW:

- NPWS will reduce its annual quota for the coming 2002/2003 season from 1% of the most recent minimum population estimate of GHFF population size to 0.95%. In effect this will result in a reduction of the maximum number of GHFF allowed to be harmed from 3200 to 3040 (160 animals in total). The reduction in the state quota is in accordance with the NPWS intent to promote non-lethal methods of crop protection (Royal Zoological Society of NSW 2001).
- NPWS will continue to manage flying-fox impact on growers through its existing licensing arrangements and approval given by NPWS under the NPW Act to harm GHFF will constitute an approval under the EPBC Act.
- NPWS will maintain its commitment to implement best practice management strategies for GHFF through ongoing support and promotion of alternate crop damage prevention methods, reliable and accurate population counts and participation in recovery planning for the species.

4.2 Population Assessment

NPWS is participating in a national count of GHFF. The aims of the project are:

- to produce an estimate of abundance and relative distribution of Grey-headed Flying-foxes (GHFF) in July 2002 and April 2003 to assist with monitoring the conservation status of the species
- to standardise the methods used to count GHFF throughout their range and
- to generate data needed to assess counting error

The current population size of GHFF is estimated to be between 320,000 and 340,000 based on past Australian Bat Society counts (P. Eby pers. comm.). The NPWS will continue to support the undertaking of these counts, as this information is vital to the development of a conservation strategy for the species and assessment of the policy's effectiveness on damage mitigation.

4.3 Crop Damage Mitigation

4.3.1 Exclusion Netting

The only reliable protection for fruit crops from damage by flying-foxes, is full exclusion netting as recommended by NSW Agriculture. This also prevents significant damage caused by birds and hail storms. Although the uptake of netting by growers statewide is difficult to estimate, Phil Wilks Department of Agriculture (pers. comm.) states that between 80-95% of stonefruit and lychee growers in northern NSW and southern Queensland have implemented full or partial netting on their property. This may explain in part the reduction in growers requesting licences in this part of NSW. To assist in the uptake of netting, the NPWS has prepared draft best practice netting guidelines for both growers and backyard fruit growers (NPWS, 2002a,b). These guidelines are currently being reviewed by the NSW Flying-fox Consultative Committee (FFCC) members and other industry experts.

4.3.2 Other Non-lethal Deterrents

The Service is aware that some growers have trialed different deterrent mechanisms but is not aware of any systematic deterrent studies for flying-foxes being undertaken in orchards over the last year. However, the Sydney Royal Botanical Gardens has employed a number of deterrent techniques for roost sites in the gardens, including the use of a sound emitting

devise called a Pheonix Wailer, which was mostly unsuccessful and water sprinkler devises which have had limited success.

4.4 Legal Action

No legal action relating to the licensing of flying-foxes was taken against the NPWS during the 2001-2002 season. However, in 2001 Humane Society International submitted a request under the *Freedom of Information Act 1989* for details of licences issued to harm flying foxes over the past growing season. No subsequent legal action was taken.

4.5 Other Issues

4.5.1 Flying-Fox Consultative Committee

The NSW Flying-fox Consultative Committee (FFCC) was established in August 2001. The committee, which has now met on four occasions (with additional two telephone conferences), has provided a forum for Government, community and industry consultation on flying-fox conservation and management in NSW. The status of the committee is ongoing.

4.5.2 Property Management Plans

A trial was run by the NPWS on the use of Property Management Plans (PMPs) as a mechanism for authorising the harm of flying foxes. NPWS held a series of grower workshops using a trained facilitator and draft guidelines were prepared for the preparation of a PMP for flying fox orchard damage. Following this NPWS received 3 draft PMP's submitted for review by growers. Following review of these PMP's licences were issued to harm flying foxes for 2 orchards on the basis of a demonstrated threat to property in the PMP. In the third case further information was sought prior to a licence being approved NPWS met up to 50% of the cost of preparing property map overlays for the properties which prepared PMP's in this trial.

It is proposed to continue the trial for one further season for the existing three property owners. Further work in this area will be evaluated when a detailed review of flying fox policy is done prior to the current three-year flying fox licensing program expiring.

4.5.3 Reporting

The Coordinator, Wildlife Management is currently responsible for the statewide annual compilation and reporting of flying-fox licensing data. Accurate and prompt reporting is contingent on the collection and return of FFRS and other licensing data initially from the licensee and then from NPWS Area Offices. Although, overall the percentage of FFRS returned to NPWS has increased the presentation and quality of data provided to the Coordinator, Wildlife Management is variable and should be standardised.

It is therefore recommended that each NPWS Office that issues a s120 Licence this season, submit, at the end of each season (ie on June 1) a summary spreadsheet of all relevant licensing data to the Co-ordinator Wildlife Management. A template will be provided at the commencement of each season.

4.5.4 Camp Management Policy

NPWS is currently drafting a policy to address issues associated with the protection and appropriate management of flying-fox camps on and off NPWS managed lands. A background paper has been prepared and consultation with stakeholders including the NSW Flying-fox Consultative Committee (FFCC) initiated. A draft policy is expected October 2002.

4.5.5 Research

Roost site mapping

The NPWS has coordinated a roost site mapping project undertaken by Dr Peggy Eby to map all known GHFF roost sites in NSW. This information may be used by relevant Government agencies such as Local Councils in environmental planning and assessment processes and assist with targeting annual count surveys. The project is ongoing and is being expanded to include BFF sites.

Funding proposal

NSW Department of Agriculture in collaboration with NPWS and the NSW FFCC made a detailed submission to NSW Treasury in January 2002 seeking funding of $1.5 million dollars over three years for programs necessary to achieve thorough conservation and management strategies for flying-foxes. NSW Treasury rejected the funding proposal. NSW Agriculture will resubmit an amended proposal on behalf of the FFCC in September 2002.

Recommendations

It is recommended that:

- The draft NPWS policy and procedures for the mitigation of commercial crop damage by flying-foxes be amended to reflect the reduced annual quota from 1% to 0.95%.
- The amended draft NPWS policy and procedures for the mitigation of commercial crop damage by flying-foxes be endorsed for implementation this season (2002-2003).
- NPWS Area offices in addition to providing the Coordinator Wildlife Management with a duplicate of the licence application and FFRS of each licensee submit a summary spreadsheet of licensing activities to the Coordinator Wildlife management.

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