



Office of
Environment
& Heritage

Policy and procedural guidelines for the mitigation of commercial crop damage by flying-foxes

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1. Introduction

Three species of flying-fox are found in NSW – the grey-headed flying-fox, the black flying-fox and the little red flying-fox. All three species are protected as native species under the *National Parks and Wildlife Act 1974* (NPW Act). The grey-headed flying-fox is also listed as Vulnerable to extinction under both the NSW *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

This document will use the generic term 'flying-fox' to cover all three species unless otherwise specified.

Flying-foxes traditionally feed on native fruits and blossoms, where they play a crucial role in pollination and seed dispersal. However when native food sources are scarce, flying-foxes may forage in commercial food crops causing damage to tree limbs, foliage and fruiting branches as well as to fruit and buds. Crops typically affected in NSW include stone fruit, apples, pears, mangoes, lychees and persimmons. Coastal areas will more typically be affected. However little red flying-foxes may range much further inland and grey-headed flying-foxes have been seen as far inland as Orange.

A range of non-lethal and lethal methods may be used to deter flying-foxes (see [List of crop protection strategies](#)). Full-exclusion netting is the only completely effective method for protecting fruit crops from damage by flying-foxes, although correctly fitted throw-over netting can provide adequate protection in some circumstances.

The installation of full-exclusion or throw-over netting may not always be feasible. Feasibility considerations for landholders include economic factors and practical limitations due to topography, orchard layout or tree size.

The 2009 report of the *NSW Flying-fox Licensing Review Panel* (DECC 2009), an independent review panel commissioned by the then Department of Environment and Climate Change, found shooting may be effective in reducing levels of crop damage. However, when larger numbers of flying-fox visit orchards, shooting may prove ineffective, thus there is a need for landholders to implement effective long-term crop protection strategies.

In response to the Panel's findings the NSW Government announced in March 2011 that the licensed shooting of flying-foxes would be phased out. From July 2015 licences to 'harm' will only be issued in special circumstances.

2. Objectives

This policy provides for licences to shoot flying-foxes to be issued to prevent flying-fox damage to commercial crops.

Objectives of this policy are to:

- promote non-lethal management strategies in the first instance to protect commercial crop damage by flying-foxes
- provide a set of consistent and transparent procedures to licensed growers so they may harm flying-foxes (by shooting)
- limit and regulate shooting to allow for both the protection of commercial crops and the sustainability of flying-fox populations
- ensure that conditional licences are issued in accordance with the requirements of the [Standard Operating Procedure](#), particularly animal welfare provisions.

3. Scope and application

This policy applies to all three species of flying-fox found in NSW. It:

- recognises that damage to commercial fruit crops by flying-foxes may occur in NSW
- makes provision to issue licences to growers to kill a limited number of adult flying-foxes by shooting where special circumstance conditions are met

- does not provide for licences for damage mitigation to be issued to landholders who are not commercial businesses, or where economic loss cannot be demonstrated
- details the operational procedures for issuing conditional licences to harm flying-foxes (by shooting).

4. Relevant legislation

The following legislation is relevant to this policy:

- *National Parks and Wildlife Act 1974* (NSW) (NPW Act)
- *Threatened Species Conservation Act 1995* (NSW) (TSC Act)
- *Prevention of Cruelty to Animals Act 1979* (NSW)
- *Firearms Act 1996* (NSW)
- *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)

4.1 Legislative basis for the licensed shooting of flying-foxes

Generally, a section 120 licence under the NPW Act will be issued to include all species of flying-fox, given all three species forage and roost on common sites.

Even though grey-headed flying-foxes are listed as threatened under the TSC Act, licences to harm this species are also issued under section 120 of the NPW Act, subject to section 91 of the TSC Act (which allows for the issuing of a section 120 General licence to harm a listed species, only if there is a threat to life or property). Damage to commercial fruit crops is regarded as a threat to property for which a licence may be issued. From 1 July 2015, licences to shoot flying-foxes as a crop protection measure will only be issued where special circumstance conditions are met.

5. Policy and framework

Office of Environment and Heritage (OEH) recognises that flying-foxes can cause damage to commercial fruit crops. While OEH maintains that shooting is not a sustainable crop management strategy, this policy makes provision to issue licences for growers to kill a limited number of flying-foxes by shooting, where special circumstance conditions are met.

Licence applicants will be required to complete an application form demonstrating how the special circumstances apply to their property.

5.1 Special circumstance conditions

Orchardists can only apply for a licence where:

- the orchard was established before 1 July 2011. For orchards established after this date, the orchardist should be aware of potential flying-fox impacts; and
- there is an **unprecedented incursion** (i.e. the flying-foxes are impacting on crop types never previously impacted in Australia); or
- **topographical or physical constraints prevent netting**; or
- the **local council declines a development application** to install netting; or
- the flying-fox impact is **unanticipated and not regular**. A licence for a particular orchard will only be issued for a total of three years or fewer within any ten-year period, calculated from the date of issue of the first licence.

Until 1 July 2020, orchardists may also be granted a licence to harm flying-foxes if they **held such a licence** between 1 July 2001 and 30 June 2014. This acknowledges the medium-term financial challenges faced by some small- to medium-sized orchard enterprises in NSW and the historic role that shooting has played in their management of flying-foxes.

Where **topographical or physical constraints** apply, statements from two netting contractors and photographic evidence are required to support an application under this circumstance.

Office of Environment and Heritage will continue to maintain a register of all licences issued under section 120 general licences of the *National Parks and Wildlife Act 1974* and will publish these on the [OEH website](#).

5.2 Definitions

An **unprecedented incursion** is defined as:

- flying-foxes impacting on a crop type that has never previously been recorded as sustaining flying-fox damage anywhere in Australia, i.e. a crop type not listed in Table 1 below
- photos from the orchardist and a site inspection from OEH staff will be required.

An **unanticipated and not regular incursion** is defined as:

- flying-foxes are present in an orchard impacting on fruit crops (as indicated by shooting licence applications) in **three years or fewer within any ten-year period**, commencing 1 July 2011. The three years may be consecutive or non-consecutive. After a third licence has been issued within a ten-year period for any given orchard, flying-fox damage may no longer be considered as an *unanticipated incursion* for that orchard. OEH may take into account the number of licences previously issued to an orchardist.

Table 1: Crops known to be impacted on by flying-foxes

Crop Type	Scientific Name	Reference
Stonefruit (including peaches, apricots, plums, nectarines, cherries and hybrids)	All <i>Prunus</i> spp.	1998/99 annual report
Apples	<i>Malus</i> spp.	1998/99 annual report
Pears	<i>Pyrus</i> spp.	1998/99 annual report
Australia paradise pear	<i>Pyrus</i> spp.	Ullio (2002)
Nashi	<i>Pyrus pyrifolia</i> (including subsp.)	2005/06 annual report
Bananas	<i>Musa</i> spp.	1998/99 annual report
Grapes	<i>Vitis</i> spp.	1998/99 annual report
Citrus	<i>Citrus</i> spp.	Ullio (2002)
Mulberries	<i>Morus</i> spp.	1998/99 annual report
Guavas	<i>Psidium</i> spp.	1998/99 annual report
Avocados	<i>Persea Americana</i>	2000/01 annual report
Figs	<i>Ficus</i> spp.	1999/00 annual report
Persimmons	<i>Diospyrus</i> spp.	2000/01 annual report
Mangoes	<i>Mangifera</i> spp.	1998/99 annual report
Paw paws (papaya)	<i>Carica papyra</i>	1998/99 annual report

Crop Type	Scientific Name	Reference
Loquats	<i>Eriobotrya japonica</i>	1998/99 annual report
Lychees	<i>Litchi chinensis</i>	1998/99 annual report
Longans	<i>Dimocarpus longan</i>	Ullio (2002)
Rambutans	<i>Nephelium lappaceum</i>	Ullio (2002)
Custard apples	<i>Annona reticulata</i>	Ullio (2002)
Coffee	<i>Coffea</i> spp.	2000/01 annual report
Passionfruit	<i>Passiflora edulis</i>	DECCW (2008)
Mulberry	<i>Morus</i> spp.	DECCW (2008)
Jackfruit/breadfruit	<i>Artocarpus heterophyllus</i>	Lim et al. (1993)
Breadfruit	<i>Artocarpus altilis</i>	Lim et al. (1993)
Starapple	<i>Chrysophyllum cainito</i>	Lim et al. (1993)
Hogs plum	<i>Spondias mombin</i>	Lim et al. (1993)
Cashew	<i>Anacardium occidentale</i>	Lim et al. (1993)
Sapodilla	<i>Manilkara zapota</i>	Lim et al. (1993)
Bactris (peach palm)	<i>Bactris gasipaes</i>	Lim et al. (1993)
Waterapple	<i>Syzygium samarangense</i>	Lim et al. (1993)

5.3 Non-lethal management strategies

Office of Environment and Heritage advocates full-exclusion netting as the most effective method to protect crops. Full-exclusion netting has the additional benefit of protecting crops against bird damage and a number of other pest species. Hail netting may be used. Throw-over netting with an aperture size no larger than five millimetres can provide adequate protection from flying-foxes and is better suited to some orchards. To maximise animal welfare, reduce incidental damage to wildlife and reduce damage to fruit and trees, netting must be properly fitted and maintained.

A number of other non-lethal management strategies are available to affected growers. These include physical barriers, acoustic and visual deterrents such as scare devices, motion activated strobe lighting, predator sounds and physical signs of predators. A list of management strategies that could be considered by growers is shown in [List of crop protection strategies](#).

The effectiveness of each method will vary according to crop type, geographic region and topography. Choice of method will be influenced by these factors, as well as a range of socio-economic factors such as proximity to neighbours and financial constraints.

Commercial growers may be eligible up until June 2016 for a subsidy to cover up to 50 per cent of the cost of installing full exclusion netting or throw over netting. For more information on the netting subsidy visit: [Flying-Fox Netting Subsidy Program](#).

5.4 Ecological sustainability

To ensure that the total impact of all licences issued in NSW does not constitute a serious threat to the long-term survival of grey-headed flying-foxes, a threatened species potentially vulnerable to extinction, the policy implements an annual state-wide quota. In 2002 the state-wide allowance of the national quota for permitting harm to grey-headed flying-foxes was set at 3,040 adult animals, which was approximately 0.95 per cent of the accepted minimum national population estimate of the species at that time. The national population estimate forms the basis for the quota due to the migratory nature of flying-foxes. The total number of black and little red flying-foxes killed each year is monitored through annual permit returns.

Strict adherence to this quota is the responsibility of OEH, working across regions to manage the state-wide quota.

A national census of flying-foxes was established in 2013, and continues on a quarterly basis. Office of Environment and Heritage will continue to work with researchers to establish more certainty around the national population estimate for grey-headed flying-foxes.

5.5 Animal welfare

All applicants who are issued a licence to harm flying-foxes (by shooting) are required to comply with the [Standard Operating Procedure](#), with specific reference to the listed animal welfare considerations.

5.6 Compliance

Office of Environment and Heritage will undertake measures to reduce the incidence of illegal shooting of flying-foxes and ensure compliance with the licence conditions.

Property inspections are undertaken with landholders before licences to harm can be issued. During these inspections non-lethal deterrent methods are discussed and licencing obligations are detailed including the requirement to complete accurate and timely 'Harm Fauna Activity Reports' and 'Flying-Fox Record Sheets'. Inspection audits may also be undertaken by OEH staff throughout the licensing season.

5.7 Research

Office of Environment and Heritage will continue to monitor advances in non-lethal deterrents, in cooperation with other authorities and institutions. Office of Environment and Heritage will contribute to and where possible engage in research relating to flying-fox population counts, population dynamics and other relevant research.

A number of flying-foxes carry thumb bands attached to the animal's wing as part of a national banding program. Should a banded animal be shot, the licensed shooter is requested to contact the Australian Bird and Bat Banding Scheme (ABBBS) on (02) 6274 2407 or abbbs@environment.gov.au so that information about the animal can be collected for research purposes.

6. Procedural guidelines

The following guidelines outline the procedural steps that orchardists may take in cases of damage by flying foxes:

- Orchardists will notify their local National Parks and Wildlife Service Area Office that fruit trees (including fruit and/or branches and twigs) have been damaged by flying-foxes or that damage is imminent. Orchardists will need to demonstrate this actual or imminent damage.
- OEH may issue shooting licences on the grounds that topographical constraints prevent netting installation where the slope of the land exceeds 20° and after two netting contractors have inspected the property and submitted signed statements declaring they are unable to net.
- OEH will only issue shooting licences on the grounds that power lines, pipes or other infrastructure prevent netting if two contractors have inspected the property and submitted signed statements that no options for netting exist, e.g. raising lines, throw over netting or lowering net heights. OEH may accept that power lines prevent netting installation where the minimum clearance distance between the top of

the netting structure and the power lines is less than three metres. Licences may be issued for the area affected by the infrastructure, e.g. the power line easement.

- Licences to shoot flying-foxes on the grounds that topographical or physical infrastructure constraints prevent netting will be issued to orchardists for up to three years from the date of the first application. This provides orchardists with additional time to acquire funds to meet extra costs associated with resolving issues associated with installing nets on difficult terrain or modifying their orchards to enable nets to be erected.
- OEH may issue shooting licences on the grounds of unprecedented incursion for un-netted crop types not previously recorded as sustaining flying-fox damage (refer to Table 1).
- If a licence application is received for an unprecedented incursion, the crop type and date of application will be added to Table 1 and published on the [OEH website](#). OEH may issue the orchardist with a shooting licence for that crop type for a maximum of three years within any ten year period from the date of their first application (consecutive or non-consecutive years). This 'three year in ten' condition may only be considered for orchardists who planted this crop type before it was added to Table 1.
- If a local council declines a development application for installing full exclusion netting, a letter from council detailing the reasons must accompany the licence application.
- Until 1 July 2020, orchardists may also be granted a licence to kill flying-foxes if they held such a licence between 1 July 2001 and 30 June 2014. An application for a licence under this special circumstance must be accompanied by details of previous licence(s) held. Licences issued under this special circumstance will only be issued to the same named person (or persons) as the previous licence was issued to for the same property.

A fact sheet on how landholders can protect commercial crops and apply for licences is provided in [Protecting commercial crops from flying-fox damage](#). It is also available online or by contacting a NPWS regional or area office. A copy will be provided to all landholders issued with a licence. See: [Protecting commercial crops from flying-fox damage](#)

A [section 120 General licence application form](#), [section 120 General licence variation form](#), [sample licence](#), including licence conditions, [Flying-Fox Record Sheet](#) and [Netting Contractor Statement Template](#) are available. The Standard Operating Procedure is available in [Standard operating procedure for the shooting of flying-foxes](#). These documents are also available on the [OEH website](#).

6.1 Procedures for Office of Environment and Heritage staff

Procedures for OEH staff are available on the OEH intranet.

6.2 Work health and safety provisions

Work health and safety provisions are detailed in the Standard Operating Procedure, which is available from the NPWS regional or area offices or can be obtained online at [Protecting commercial crops from flying-fox damage](#)

7. Related policy

[Flying-fox Camp Management Policy 2015](#)

8. Policy duration

These guidelines are current until replaced.

9. References

DECC 2009, NSW Flying-fox Licensing Review Panel, *Report to Landscapes and Ecosystems Conservation Branch*, Department of Environment and Climate Change NSW, Sydney.