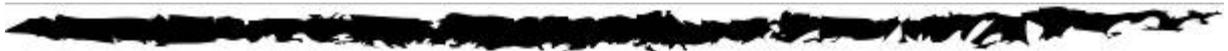




Office of
Environment
& Heritage

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



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Licences will not cease to be issued from 1 July 2014 but, following OEH consultation, they will be based on the special circumstances that will apply to licences issued in the future.

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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. 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 during food shortages.

A number of non-lethal methods may be used to deter flying-foxes (see Appendix 1). Full-exclusion netting is the only completely effective method for protecting fruit crops from damage by flying-foxes.

The installation of full-exclusion netting may not always be feasible. Feasibility considerations for landholders include economic factors and practical limitations due to topography, orchard lay out, tree size, or where the installation of netting represents an unwarranted response to the level of risk. In these circumstances the Office of Environment and Heritage (OEH) may issue licences to harm (by shooting) a limited number of adult flying-foxes.

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 to 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 will be phased out over three years and from July 2015 will only be issued in special circumstances.

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 of commercial crop damage by flying-foxes
- provide a set of consistent and transparent procedures to license growers to 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 licences are issued in accordance with the requirements of the Standard Operating Procedure, particularly animal welfare provisions.

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 netting is not feasible, for example, as a result of economic or practical limitations, including topography, orchard lay out, tree size or where the installation of netting would represent an unwarranted response to the level of risk
- 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 licences to harm flying-foxes (by shooting).

Relevant legislation

The following legislation is relevant to this policy:

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

Legislative basis for the licensed shooting of flying-foxes

Licences to harm grey-headed flying-foxes are 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. A licence may be issued where damage by flying-foxes can be established and where it is likely that further damage will occur if no protective measures are taken.

Generally, a section 120 licence will be issued to include all species of flying-fox. This is the most appropriate option, given all three species forage and roost on common sites and it is unlikely that shooters will be able to easily identify the species of a flying-fox prior to shooting.

Licences to harm little red flying-foxes and/or black flying-foxes only, may be issued under section 121 of the NPW Act, as these species are not listed as threatened under the TSC Act. Section 121 licences will not be issued in locations where grey-headed flying-foxes are or may be present.

Policy and framework

OEH recognises that flying-foxes can cause damage to commercial fruit crops. This policy makes provision to issue licences to growers to kill a limited number of flying-foxes by shooting where flying-fox damage to commercial crops can be demonstrated, and where the grower states that netting is not feasible. Examples where netting may not be immediately feasible include economic and practical limitations such as topography, orchard lay out, tree size, or where the installation of netting represents an unwarranted response to the level of risk. From July 2011 to June 2016 commercial growers may be eligible for a subsidy to cover up to 50 per cent of the cost of installing full exclusion netting. For more information on the netting subsidy visit: www.raa.nsw.gov.au/assistance/flying-fox-netting

OEH maintains that shooting is not a sustainable crop management strategy. Licence applicants will be required to complete an application form stating that the property cannot be netted for economic, logistic or other reasons. Licences will not cease to be issued from 1 July 2014 but, following OEH consultation, they will be based on the special circumstances that will apply to licences issued in the future.

Management strategies

A number of 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 Appendix 1.

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.

OEH 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 pest species. Hail netting may be used.

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 species Vulnerable to extinction, the policy implements a quota. The State quota is fixed at 3040 adult animals which is approximately 0.95 per cent of the accepted minimum national population estimate of the species. The national population estimate forms the basis for the quota due to the migratory nature of flying-foxes.

Strict adherence to this quota is the responsibility of OEH. To manage this, regional quotas may be allocated as subsets of the state quota.

OEH acknowledges that there has been no recent count of flying-foxes, and will continue to engage with researchers to address this.

Animal welfare

All persons who are issued a licence to harm flying-foxes (by shooting) are required to comply with the Standard Operating Procedure (Appendix 3), with specific reference to the listed Animal Welfare Considerations.

Compliance

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

Inspection audits will be undertaken by OEH staff throughout the licensing season.

Research

OEH will continue to monitor advances in non-lethal deterrents, in cooperation with Queensland and Victorian authorities. OEH will contribute to and engage in, where possible, research relating to flying-fox population counts and population dynamics.

A number of flying-foxes carry thumb bands attached to the animal's wing as part of a tracking program. Should a banded animal be shot, the licensed shooter is requested to contact their local National Parks and Wildlife Service (NPWS) office so that information about the animal can be collected for research purposes.

Procedural guidelines

Procedure for landholders

A fact sheet on how landholders can protect commercial crops and apply for licences is provided in Appendix 2. 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:

www.environment.nsw.gov.au/wildlifelicences/s120Licence.htm

A section 120 General licence application form (Form 1), section 120 General licence variation form (Form 2), sample licence, including licence conditions (Form 3) and a Flying-Fox Record Sheet (Form 4) are available in Appendix 4. The Standard Operating Procedure is available in Appendix 3. These documents are also available on the OEH website at the above link.

Procedures for OEH staff

Procedures for OEH staff are available on the OEH intranet.

Occupational health and safety provisions

Occupational health and safety (OH&S) provisions are detailed in the Standard Operating Procedure, which is available from the NPWS regional or area offices or can be obtained online at www.environment.nsw.gov.au/wildlifelicences/s120Licence.htm

Related policy

- Flying-fox Camp Management Policy

Policy review

The Conservation Policy Unit within the Landscapes and Ecosystems Conservation Branch of OEH is responsible for coordinating the review of this policy.

A review of this policy will be undertaken at the end of three years, or earlier if changes in legislation, policies or other areas require the amendment of this policy. The next scheduled review is due in June 2015.

Contacts for further advice

Senior Team Leader, Ecosystems and Threatened Species
Office of Environment and Heritage
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Senior Team Leader, Wildlife and Biodiversity
Office of Environment and Heritage
Phone: 02 9585 6566

References

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

Appendix 1: List of crop protection strategies

Table 1: List of crop protection strategies¹

Technique	Method	Success/comments
Netting – full exclusion netting	Netting held firmly in place by a rigid structure of poles and tensioned cables over the entire orchard.	Very high. Method is expensive and may be damaged by cyclones, high wind and hail.
Netting – tunnel netting	A series of light frames connected by wires erected at intervals along the row to support netting. Nets are reusable, placed over the frame only once fruit has matured, and removed after harvest.	Less successful than full-canopy. Often suitable, where full exclusion netting is not, due to ease of set up. Fruit touching the net can be damaged by flying-foxes on the outside of the net. Initial outlay may be less expensive than full-exclusion, however set-up time must be repeated each year.
Bags	Fruit protection bags placed over fruit.	Reasonably successful. Has been used on banana crops. Labour intensive and costly. Not feasible for most commercial farmers.
Sound	Replaying recorded sounds including loud sudden noises, natural predator calls or sonic sounds.	Reports of medium success in the short-term. However flying-foxes may become accustomed to the sound if no danger presents. May be more successful if combined with other methods such as light and radar detection systems.
Lights	Flashing strobe lights and bright light grids over orchards; long wavelength lasers.	Medium success in the short-term. However flying-foxes can become accustomed to the sound if no danger presents. May be more successful if combined with other methods.
Scaring devices	Birdfrite 12 gauge cartridges fired from shotguns produce a loud noise and bright flash without causing injury. Models of birds of prey (hawks, kites) in the orchard. Reflective metal strips/silver paper streamers attached to balloons, branches or nets. Stationary scare/gas guns.	Most methods will be initially successful, however flying-foxes may become used to devices if no threat appears. Most methods are labour intensive. Birdfrite is expensive.
Radar detection systems	May be combined with other methods to detect flying-fox presence.	May improve the success of other methods. May be expensive.
Decoy trees or natural species plantations	Planting of preferred species or alternative food source for flying-foxes.	Unknown.
Shooting	Licensed shooting of a small number of flying-foxes to establish a clear threat.	Effective with low numbers of flying-fox. Less effective with larger numbers. Less expensive than most alternatives.

¹ Based on the Queensland Government's *Flying-fox Control Methods Research Findings* available at www.dpi.qld.gov.au/documents/BusinessAndTrade_BusinessDevelopment/Flying-fox-control-methods-research.pdf

Appendix 2: Landholder fact sheet



Protecting commercial crops from flying-fox damage

For landholders

Flying-foxes are nomadic mammals found mainly along northern and eastern Australia. They are important to native Australian ecosystems as they spread seeds and pollinate native plants.

Three species of flying-fox are found in NSW. They are the grey-headed flying-fox, the black flying-fox and the little red flying-fox.



All three are protected native species. The grey-headed flying-fox is also listed as Vulnerable to extinction under the *Threatened Species Conservation Act 1995*.

Flying-foxes have a slow reproductive cycle, with adult females birthing only one pup per year. Flying-foxes are unable to increase their population numbers rapidly, so the impacts of habitat loss and shooting place a significant threat to the sustainability of these populations.

Protecting commercial crops

Full-exclusion netting is the most effective method for protecting fruit crops from flying-fox damage.

The Queensland Department of Employment, Economic Development and Innovation has published guidelines and information on netting. See *To Net or Not to Net* at www.dpi.qld.gov.au/documents/BusinessAndTrade_BusinessDevelopment/Orchard-Netting-Report.pdf

The NSW Rural Assistance Authority (RAA) administers the Flying-fox Netting Subsidy Program. Commercial orchardists in the Sydney Basin and Central Coast regions may be eligible for 50 per cent of the cost of installing full exclusion netting, up to June 2014. See www.raa.nsw.gov.au/assistance/flying-fox-netting

The NSW RAA also offers low interest loans under a Special Conservation Scheme for the netting of commercial crops to protect them from flying-fox damage. See www.raa.nsw.gov.au/assistance/scs.

Other non-lethal methods to protect crops include the use of tunnel netting, flashing strobe lights, scare guns (e.g. birdfrite cartridges), recorded sounds and loud noises, decoy trees or

reflective strips/balloons/plastic bags placed in trees. Options should be discussed with your local area or regional National Parks and Wildlife Service (NPWS) office, and should only be used to protect commercial crops. None of these methods will be as effective as full-exclusion netting.

Shooting flying-foxes to mitigate commercial crop damage may be licensed in NSW under the *National Parks and Wildlife Act 1974*.

Documents to download

www.environment.nsw.gov.au/wildlifelicences/s120Licence.htm

- Policy and procedural guidelines for the mitigation of commercial crop damage by flying-foxes, including the:
 - application for a Section 120 General licence to harm flying-foxes in New South Wales
 - application for a Section 120 General licence variation
 - Section 120 General licence conditions (sample General licence)
 - Standard operating procedure for the shooting of flying-foxes in NSW
- Victorian Department of Sustainability and Environment publication *Bird and Flying-fox Damage to Orchard Fruit* may be useful if you are unsure what is causing damage to your fruit.
- NSW Flying-fox Licensing Review Panel report 2009
- annual reports on licences issued

Contacts and further information

For more information on flying-foxes:

- website: www.environment.nsw.gov.au/flyingfoxes
- phone Environment Line: 131 555 or (02) 9995 5550, or
- visit www.environment.nsw.gov.au/contact, to find your local OEH office.

Section 120 General licence procedure for landholders

Note that the following steps are a guide only, and do not constitute licence conditions.

Obtaining a licence

Landholders affected by flying-fox damage should discuss their options with the local NPWS office. If no non-lethal management alternatives are feasible, a s.120 General licence may be applied for.

A link to the s.120 General licence application form is above. Forms are also available from NPWS offices. Licences can be submitted in person or by fax, email, or post.

The application form should include a statement that the property cannot, at the time of signing, be netted due to economic, logistic or other considerations.

Only one application per property is required to license up to five shooters to shoot a strictly limited number of flying-foxes. However, only two shooters are permitted to operate on the property on any given night. All potential shooters must be identified on the application form, including personal details and signatures.

Property inspection

Before an application is approved, a property inspection must be undertaken by NPWS staff to confirm damage by flying-foxes. Where this is not possible within 48 hours, an interim licence may be issued. Landholders should contact their local NPWS office for information.

Animal welfare

Shooters should have sufficient experience and be proficient at accurately shooting moving targets with a shotgun. No shooting is to proceed until the relevant licence has been approved and received by the landholder.

The landholder and licensed shooters should ensure they are familiar with, and adhere to the licence conditions, including the number and species of adult flying-fox allowed to be killed (by shooting), the Standard Operating Procedure and the requirements to fill in and return Flying-fox Record Sheets (FFRS). Shooters should ensure they are able to accurately identify the different flying-fox species.

Failure to comply with licence conditions may result in prosecution. The success of future licence applications is subject to previous adherence to licence conditions.

Commencing shooting

Prior to the commencement of shooting, the landholder should ensure neighbouring properties are aware of the licence and intention to shoot flying-foxes on the licensed property.

Where the flying-fox shooting quota has been reached, and damage to flying-foxes is still occurring, a variation to the licence may be sought. This variation may allow for an additional number of flying-foxes to be killed.

Variation requests can be made by submitting a completed s.120 Licence Variation form to the issuing NPWS office and accompanied by a complete FFRS. Clear justification for the variation must be provided. An additional property inspection will take place.

Planning crop management

It is recommended that landholders attempt to net a portion of their crop each year.

Flying-fox safety

Catching a disease from a flying-fox is extremely unlikely; however flying-foxes may carry Australian bat lyssavirus.

- Thick protective gloves should be used when moving dead flying-foxes.
- If you are bitten or scratched by a flying-fox, thoroughly wash the wound, apply an antiseptic solution and see your doctor immediately.
- Live flying-foxes should not be handled.

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Appendix 3: Standard Operating Procedure for the shooting of flying-foxes

Prepared by the Department of Industry and Investment NSW (now NSW Department of Primary Industries) for the Department of Environment, Climate Change and Water NSW (now Office of Environment and Heritage)

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Background

Three species of flying-fox occur in NSW: the black flying-fox (*Pteropus alecto*), the grey-headed flying-fox (*Pteropus poliocephalus*), and the little red flying-fox (*Pteropus scapulatus*). While all three species will forage in fruit crops, it is the grey-headed and black flying-foxes that are most often implicated by farmers. The grey-headed flying-fox is listed as a vulnerable species on Schedule 2 of the NSW *Threatened Species Conservation Act 1995*, and as a Vulnerable Species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Flying-foxes generally roost in camps during the day and forage in nearby food sources during the night but may travel long distances to feed. Shooting is usually conducted as the flying-foxes fly into orchards after dusk to feed.

Flying-foxes can cause significant damage to cultivated fruit crops in NSW. Although flying-foxes mainly feed on the nectar, pollen and fruit of native vegetation they may seek out alternative food sources such as apples, mangoes, lychees, pome fruit, pawpaw, persimmon, and bananas but particularly stone fruit and apples. A number of methods have been used in an attempt to reduce flying-fox damage to crops including scaring devices, olfactory, visual or acoustic deterrents and lethal control such as shooting. The NSW Department of Primary Industries (DPI) and the NSW Office of Environment and Heritage recommend full-exclusion netting as the most effective method to mitigate against crop damage.

This standard operating procedure (SOP), written specifically for NSW, does not replace or override any relevant legislation. Its use is subject to applicable legal requirements (including OH&S) operating under any relevant legislation. Adherence to the SOP is a condition of licences to harm flying-foxes issued under section 120 of the *National Parks and Wildlife Act 1974*.

Application

- Shooting should only be used in a strategic manner as part of a co-ordinated program designed to achieve sustained and effective damage mitigation.
- Shooting can be used as a scaring strategy to deter flying-foxes from a particular location (i.e. the orchard). To generate an avoidance response in the majority of flying-foxes, it is thought necessary to kill some of the group to establish the real danger associated with shooting.
- Shooting of flying-foxes as a crop protection measure must be undertaken in accordance with relevant State and Commonwealth legislation. A general licence, issued under section 120 of the *National Parks and Wildlife Act 1974* to legally harm black flying-foxes, grey-headed flying-foxes and/or little red flying-foxes must be obtained from the Office of Environment and Heritage before any shooting occurs.
- Shooters must conform to all aspects of the general licence to harm flying-foxes, including the completion and submission of the flying-fox record sheet after the shooting program.
- Shooting of flying-foxes must only be performed by skilled operators who have the necessary experience with firearms and who hold the appropriate licences and accreditation. They must be proficient at shooting moving targets with a shotgun.
- Storage, use and transportation of firearms and ammunition must comply with relevant legislative requirements.

Animal welfare considerations

Impact on target animals

- Humaneness of shooting as a control technique depends greatly on the skill and judgement of the shooter. If properly carried out, shooting can be a humane method of destroying targeted animals. On the other hand, if inexpertly carried out, shooting can result in wounding which may cause considerable pain and suffering.
- Flying-foxes are usually shot after dusk when they fly from day camps to foraging areas. Because lighting at this time is poor, shooters target moving animals silhouetted against the evening sky which can result in reduced accuracy and high wounding rates. Poor lighting also makes it difficult to locate animals that are wounded but not killed. For these reasons it is essential that a spotlight is used during shooting to improve shooting accuracy and enable prompt follow-up and euthanasia of any wounded animals.
- Shooting to kill must be conducted in a manner which maximises its effect thus causing rapid death. This requires the use of appropriate firearms and ammunition. A 12 gauge double barrel shotgun, or single barrel with multiple shot configuration, is the most suitable firearm with heavy shot (between BB and no.4 with a shot charge of 32 grms.) to achieve adequate penetration. The pattern of pellet penetration is also critical to achieve sufficient hits in vital areas. Generally, the larger the shot, the poorer the shot pattern but the greater striking energy of the individual pellets. It is the combination of shot size, choke and distance to the target that determines the accuracy and effectiveness of the shot. Firing of two rapid successive shots will also increase the likelihood of achieving rapid insensibility.
- Skill at shot placement is one of the most important factors governing humaneness. The shooter must aim to have either the head (brain) or chest (heart-lung) of the flying-fox in the centre of the pattern at the point of impact.
- Only one flying-fox must be targeted at a time. Shooting with a shotgun at a group of flying-foxes flying overhead often results in welfare problems as the animals aligned with the central cluster of pellets will usually be fatally injured, but those at the perimeter of the volley may only be hit by one or two pellets and stand a good chance of surviving albeit wounded. These animals are likely to experience suffering.
- Wounded flying-foxes must be located immediately and killed as quickly and humanely as possible with either another shot preferably directed to the head (where safe and appropriate e.g. animals in trees) or in restrained or immobile flying-foxes on the ground, a blow to the rear of the skull to destroy the brain. If left, wounded animals can suffer from the disabling effects of the injury, from sickness due to infection of the wound, from pain created by the wound or from thirst or starvation if unable to drink or eat. Wing fractures, which increase the likelihood of being taken by a predator, are common in wounded flying-foxes.

Impact on non-target animals

- Shooting of female flying-foxes can have major negative welfare impacts on any dependent young. The vast majority of flying-fox births occur from October to December which corresponds to, or overlaps with, the fruit harvest season in many parts of NSW.
- After birth, young animals are carried on the ventral surface (chest and belly) of their foraging mothers for 4 to 5 weeks. If the female is shot whilst they are attached, the young may be killed by the initial shot, be wounded from the shot or killed or wounded from the fall to the ground.
- Juvenile flying-foxes (i.e. from 4 to 5 weeks of age) are left in camps whilst their mother forages and are still dependent on the female for milk and other maternal care. If their

mother is shot, these young are orphaned and will most likely die from dehydration/starvation. Young are not fully independent until they are around 5 or 6 months old.

- Where possible, shooting should be avoided at times when flying-foxes are giving birth and/or dependent young are present.
- Shooting can be target specific and does not usually impact on other species. However, there is a risk of injuring or killing non-target animals, including livestock, if shots are taken at movement, colour, shape, sound or, when spotlighting, eye reflection ('eye shine'). Only shoot at the target animal once it has been positively identified. Also, never shoot over the top of hills or ridges as other animals or people may be out of sight beyond the hill within the firearm danger zone.

Health and safety considerations

- Extreme caution must be taken when handling flying-foxes as they may carry Australian bat lyssavirus that can affect humans and other animals. Only experienced flying-fox handlers who have been vaccinated for rabies should attempt to handle or catch injured animals. Personal protective equipment such as puncture-proof gloves, long sleeves, masks and eye protection should be used when handling live animals. Avoid contact with the blood and saliva of flying-foxes. If bitten or scratched, immediately scrub the wound with soap and water and seek medical advice. Where possible, without placing others at risk of exposure, keep the animal and submit for testing to the State diagnostic veterinary laboratory. Wear gloves when handling carcasses and routinely wash hands afterwards. For further information see NSW Health fact sheet on lyssavirus at the following link: www.health.nsw.gov.au/factsheets/infectious/rabiesbatinfection.html
- All participants in the shooting program should stand well behind the shooter when an animal is being shot. The line of fire must be chosen to prevent accidents or injury from stray bullets or ricochets.
- Firearm users must strictly observe all relevant safety guidelines relating to firearm use, ownership and possession.
- Firearms must be securely stored in a compartment that meets state legal requirements. Ammunition must be stored in a locked container separate from firearms.
- Adequate hearing protection should be worn by the shooter and others in the immediate vicinity of the shooter. Repeated exposure to firearm noise can cause irreversible hearing damage.
- Safety glasses are recommended to protect the eyes from gases, metal fragments and other particles.

Equipment required

Firearms and ammunition

- A 12 gauge shotgun (with either double barrel or single barrel with multiple shot configurations) and heavy shot (between BB and no. 4 with a shot charge of 32 grms.) must be used.
- Non-toxic shot (e.g. tungsten-bismuth-tin, bismuth, tungsten-iron, steel, bismuth-tin, zinc etc.) must be used. Lead shot is potentially toxic to a range of species and is illegal in some areas. Animals may be poisoned by lead in one of two general ways:
 - Species such as waterfowl mistake spent shot for food or grit and ingest it from wetland or terrestrial environments.

- Other species, especially eagles and other raptors, and scavengers, ingest pellets when they consume prey that have been shot with shotgun ammunition and are carrying shot pellets embedded in their tissues.
- If intending to use steel shot ensure that it is safe and effective to do so in your particular gun. Steel pellets should only be discharged in modern guns that are capable of withstanding the extra stresses produced.
- To ensure that the shot delivers a dense pattern on the target animal within the specified distance, a tighter choke must be used i.e. ½ to full. Because shot patterns can vary between guns, it is essential to pattern your gun/cartridge/choke combination before shooting to check your accuracy and that the pattern is adequate for shooting flying-foxes. In order for a pattern to be effective it must possess sufficient pattern density to reliably hit the vital areas (brain, heart/lungs) of the target flying-fox and contain pellets capable of delivering adequate energy to penetrate those vital areas at the range you shoot the flying-fox. For further details on shotgun patterning see (for example):
 - www.ssaa.org.au/stories/shotguns-essential-shotgun-patterning.html
 - www.basc.org.uk/en/codes-of-practice/index.cfm
- The accuracy and precision of firearms must be tested against inanimate targets immediately prior to the commencement of any shooting operation.

Other equipment

- A handheld spotlight (minimum 100 watt).
- Lockable firearm box.
- Lockable ammunition box.
- Personal protective equipment (hearing and eye protection).
- First Aid kit.
- Thick, puncture-proof gloves

Procedures

Conduct of shooting

- Shooting is most often conducted at and after dusk when lighting conditions and visibility are poor. To increase accuracy, reduce wounding and enable prompt euthanasia of wounded animals, shooting operations must be conducted by a team of at least two people, one to perform the shooting and another to hold and direct the spotlight onto the target animal and keep it in the beam until it after it has been shot and confirmed as dead.
- Shooting must NOT be conducted in adverse weather conditions where flying-foxes cannot be shot and located/retrieved in a safe and humane manner.
- Flying-foxes must NOT be shot from a moving vehicle or other moving platform. Ensure you are in a firm, safe and stable position before taking a shot.
- Shooting at moving targets requires skill and practice to achieve constant effective results.
- Shooting operations should conform to local council guidelines for the minimisation of noise pollution.

Target animal and point of aim

- A flying-fox should only be shot at when:
 - It can be clearly seen and identified and is safe to do so;
 - It is within the effective range of the firearm and ammunition being used; and
 - A humane kill is highly probable. If in doubt, do NOT shoot.
- Only one flying-fox must be targeted at a time. The shooter should aim to have a single animal in the centre of the shot pattern at the point of impact. Shooting at a group of flying-foxes is not an acceptable practice.
- The objective is to fire at the closest range practicable in order to reduce the risk of non-lethal wounding. Accuracy is important to achieve a humane death. The shooter must fire two rapid, successive shots into the target animal with the aim of achieving instantaneous loss of consciousness and rapid death without resumption of consciousness.
- When using a shotgun, the target flying-fox may be stationary or mobile, but should be no more than 25 metres from the shooter. The pattern of shot must be centred on the top third of the torso to achieve adequate penetration of the brain and/or chest. It is essential that the distance to the target animal is accurately judged. To achieve adequate penetration of shot, the flying-fox must be in effective range of the firearm being used. It is recommended that shooters practice estimating distances before a shooting operation.
- Death of the target flying-fox must be confirmed before moving on to the next animal. Without handling the flying-fox, death of animals can be indicated by observing the following:
 - Absence of movement,
 - Absence of rhythmic, respiratory movements.
- If there is in any doubt that the animal is dead, it should be killed immediately with a blow to the rear of the skull using a hard and heavy blunt instrument (e.g. metal pipe, wooden club etc.) to destroy the brain or alternatively by taking a another shot preferably directed to the head, where safe and appropriate e.g. animals in trees.
- In instances where injured animals have flown into trees, where it is safe to do so, they must either be killed with further shots or retrieved and killed quickly and humanely.
- All animals must be checked to identify any females with dependent young that may still be attached. Note that dependent young can be difficult to see and manipulation of the female carcass may be required to locate them (also see OH&S section re potential biohazards). Dependent young may also be located nearby where shot females have fallen. If alive, they must be quickly and humanely euthanased with a blow to the skull using a hard and heavy, blunt instrument (e.g. metal pipe, wooden club etc.) to destroy the brain. Death must also be confirmed in dependent young.
- Additional searches for wounded animals must be conducted the following morning to locate any animals that may have been missed.
- Killed flying-foxes must be collected and disposed of in an appropriate manner (i.e. buried or incinerated) in accordance with acceptable practices as required by local councils and applicable State or Federal regulations. DECCW officers must be informed of the disposal site on each licence application and site be made available for inspection.

Further information

Contact the relevant Commonwealth or State government agency from the following list of websites:

- Commonwealth Department of Sustainability, Environment, Water, Population and Communities
www.environment.gov.au/
- NSW Office of Environment and Heritage
www.environment.nsw.gov.au/
- NSW Department of Primary Industries
www.dpi.nsw.gov.au

Also refer to:

- Invasive animals Cooperative Research Centre
www.invasiveanimals.com/index.php

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Appendix 4: Standard forms

Form 1: Application form for a Section 120 General licence



**Application to Harm Flying foxes
for Commercial Crop Damage Mitigation**

**Section 120 General Licence
NSW National Parks and Wildlife Act 1974**

Name of applicant (in full): _____

Postal address: _____

Telephone: BH _____ AH _____ Mobile _____

Firearms licence no.: _____ Expiry date _____ Category _____

Additional shooters will need to complete the information provided on page 2 of this application form

Name and address of the property for which the licence is sought if different from above

Area of property (ha): _____ Nearest Police Station: _____

Species of flying-fox for which licence is sought: Grey-headed Black Little Red

Have you previously held a licence to harm flying-foxes in NSW? Yes No

If Yes, provide licence number(s) and the National Parks and Wildlife Service office which issued the licence(s) for the last season you were licensed:

Identify type of crop being damaged: _____

Total area of crop (ha) _____ Estimated area of damage (ha): _____

Have you applied for the NSW Government netting assistance subsidy? Yes No

What % of crop has exclusion netting installed? _____

Please provide details of other crop protection measures being used (e.g. noise, lights) and effectiveness (attach additional sheets as necessary):

Declaration by property owner

I (*name*) _____ being the applicant for this s120 General licence to harm fauna in New South Wales, acknowledge that it is an offence under the *National Parks and Wildlife Regulation 2009* (maximum penalty \$3300) to provide false or misleading information in, or in connection with this application and I state that the information I have provided is true and correct. By signing this application I also acknowledge that I will be required to comply with the conditions of my General licence and any other statutory obligations associated with the proposed control action including the use of firearms on the property (if relevant).

Signature of applicant.....Date.....

Fax.....

The completed application should be delivered to your local National Parks and Wildlife Service office. There is no fee for this licence.

Additional shooters

You can nominate up to five additional persons to assist with shooting on your property. However, only two shooters are permitted to operate on the property on any given night. If you propose to allow other shooters to assist you in shooting flying-foxes on your property, they must **each** provide the following details and sign the declaration statement below.

Only those people who have filled in the required information and signed below will be listed on your licence.

You must apply to your local NPWS office in writing for any variation to the list of shooters identified below prior to their commencement of work. A shooter variation form is provided on the OEH website.

Under s. 120(5) of the National Parks and Wildlife Act 1974 any persons authorised under the licence to do the things authorised by the licence are taken to be licence holders for the purpose of the Act and are bound by the licence conditions in the same way as the licensee.

Full Name	Postal Address	Firearms Licence Number	Expiry Date	Firearms Category
1.				
2.				
3.				
4.				
5.				

NO SHOOTING IS TO PROCEED UNTIL THE APPLICANT HAS RECEIVED THEIR LICENCE

Declaration by Shooters *(if persons other than the general licence holder)*

I, the nominated person who will shoot fauna on behalf of the property owner on the aforementioned property acknowledge that it is an offence under the *National Parks and Wildlife Regulation 2009* (maximum penalty \$3300) to provide false or misleading information in, or in connection with this application and I state that the information I have provided is true and correct. By signing this application I also acknowledge that I will be required to comply with the conditions of the aforementioned General licence and any other statutory obligations associated with the use of firearms on the property.

Signature of nominated shooter (1).....Date.....

Phone Number.....Mobile No.....Fax No.....

Signature of nominated shooter (2).....Date.....

Phone Number.....Mobile No.....Fax No.....

Signature of nominated shooter (3).....Date.....

Phone Number.....Mobile No.....Fax No.....

Signature of nominated shooter (4).....Date.....

Phone Number.....Mobile No.....Fax No.....

Signature of nominated shooter (5).....Date.....

Phone Number.....Mobile No.....Fax No.....

Privacy statement

The personal information* that is provided in the attached s. 120 General licence application form is for the purpose of assessing your application and is required by law.

Your personal information will not be used for any other purpose, and subject to the following, will not be disclosed, without your consent. Information provided in the application may be disclosed to NSW Police for the verification of firearm licence details. You have the right to access and correct any of the personal information once we have collected it at any time. The information will be stored securely in our records management system.

Please note live flying foxes should not be handled. Wear protective gloves when handling dead flying foxes. Further information is provided on the OEH website and Department of Primary Industries Standard Operating Procedures for the shooting of flying foxes.

www.environment.nsw.gov.au/resources/wildlifelicences/110877SOP.pdf

Office use only			
New applicant:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Site inspection undertaken:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	If No (date proposed).....
Species and number of flying foxes permitted to be harmed:			
Species (Common Name)	Number		
1.			
2.			
3.			
Compliance Assessment Undertaken:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
<i>e.g. Did the applicant comply with the conditions of their previous licence or has this new applicant provided all the necessary details.</i>			
<input type="checkbox"/> Application approved <input type="checkbox"/> Application rejected			
Justification.....			
.....			
.....			
General Licence posted to property owner:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SoP posted to property owner:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Approved by (<i>delegated officer</i>):(Signature)(Date)	
(Print name)(Position)	

Form 2: Application for Section 120 General licence variation



Application S.120 General Licence Variation

NSW National Parks and Wildlife Act 1974

1. Name of applicant (in full): _____

Postal address: _____

Telephone: BH _____ AH _____ Mobile _____

Fax _____

Name and address of the property for which this licence variation is sought (if different from above)

2. Licence Number:.....

3. Please specify the reason you are seeking to vary your licence:

- Increase the number of flying foxes permitted to be harmed
- Change the species of flying foxes permitted to be harmed
- Amend shooter details
- Other (list reason).....

3.1 If you seeking to increase the number of animals or change the species of flying fox to be harmed

Identify the species of flying-fox for which this variation is sought (tick): Grey-headed Black Little Red

Specify the number of additional animals to be harmed.....

Attach a copy of your completed flying fox return sheet to this application

3.2 If you seeking to amend the list of persons nominated as shooters on your property

Please enter the details of any new shooter

Full Name	Postal Address	Firearms Licence Number	Expiry Date	Firearms Category

No shooting by the persons nominated above can proceed until approved by a delegated National Parks and Wildlife Officer

4. Declaration

Declaration by property owner

I (*name*) being the holder of a s120 General licence to harm fauna in New South Wales, acknowledge that it is an offence under the *National Parks and Wildlife Regulation 2009* (maximum penalty \$3300) to provide false or misleading information in, or in connection with this application and I state that the information I have provided is true and correct.

Signature **Date** of applicant.....

Declaration by Shooter 1.

I (*name*) being the nominated person who will shoot fauna on behalf of the property owner on the aforementioned property acknowledge that it is an offence under the *National Parks and Wildlife Regulation 2009* (maximum penalty \$3300) to provide false or misleading information in, or in connection with this application and I state that the information I have provided is true and correct. By signing this application I also acknowledge that I will be required to comply with the conditions of both of the aforementioned General licence and any other statutory obligations associated with the use of firearms on the property. I have familiarised myself with the conditions of the licence.

Signature of nominated shooter (1) **Date**
Phone Number (H) **Mobile No** **Fax No**

Declaration by Shooter 2.

I (*name*) being the nominated person who will shoot fauna on behalf of the property owner on the aforementioned property acknowledge that it is an offence under the *National Parks and Wildlife Regulation 2009* (maximum penalty \$3300) to provide false or misleading information in, or in connection with this application and I state that the information I have provided is true and correct. By signing this application I also acknowledge that I will be required to comply with the conditions of both of the aforementioned General licence and any other statutory obligations associated with the use of firearms on the property. I have familiarised myself with the conditions of the licence.

Signature of nominated shooter (2) **Date**
Phone Number (H) **Mobile No** **Fax No**

Privacy statement

The personal information* that is provided in the attached s. 120 General licence variation application form is for the purpose of assessing your application and is required by law.

Your personal information will not be used for any other purpose, and subject to the following, will not be disclosed, without your consent. Information provided in the application may be disclosed to NSW Police for the verification of firearm licence details. You have the right to access and correct any of the personal information once we have collected it at any time. The information will be stored securely in our records management system.

The completed application should be delivered to your local National Parks and Wildlife Service office.

Form 3: Example of a Section 120 General licence (including licence conditions)



Licence number: _____

Section 120 General licence to harm flying-foxes

National Parks and Wildlife Act 1974

Authority is hereby given in accordance with the provisions of Section 120 of the *National Parks and Wildlife Act 1974* for the person(s) stated below, to harm black (*Pteropus alecto*) and/or grey-headed (*P. poliocephalus*) and/or little red (*P. scapulatus*) flying-foxes for the purpose of mitigating crop damage caused by that species, on the land(s) identified below and subject to the conditions listed.

Licence issued to (full name of person): _____

Land(s) specified: _____

Type of crop(s) affected: _____

Other individuals authorised under this licence (full names): _____

Total number of each species that may be harmed:

Black Flying-fox: _____ Grey-headed Flying-fox: _____ Little Red Flying-fox: _____

Maximum TOTAL number of individuals that may be harmed: _____

NB: Harming more than the number of animals specified is an offence.

Licence conditions

1. The licensee and other persons authorised under this licence must use the type of firearm and shot specified in the Standard Operating Procedure to shoot flying-foxes in accordance with this licence.
2. The licensee must inform the relevant National Parks and Wildlife Service (NPWS) office, Police Station and adjacent neighbours at the commencement of the first night of shooting.
3. The licensee and any other person authorised under this licence must have a valid and current firearms licence when shooting black, grey-headed and little red flying-foxes in accordance with this licence. The licensee and other persons authorised under this licence must comply with the provisions of the *Firearms Act 1996* at all times. The licensee and any other person authorised under this licence must inform the issuing NPWS office immediately if their firearms licence is suspended or revoked. This licence does not authorise any person to shoot flying-foxes during any period in which their firearms licence is suspended or revoked.
4. Only the licensee and other persons authorised under this licence are permitted to shoot black, grey-headed or little red flying-foxes pursuant to this licence. Only two shooters are permitted to be operating on the property on any given night.
5. Black, grey-headed or little red flying-foxes must only be shot over the type of crop indicated on this licence, and over the property specified in this licence. Shooters must be on the property specified in this licence when shooting.
6. The number of adult flying-foxes from any one species harmed under this licence must not exceed the number specified for that species above. The total number of flying-foxes of all species harmed under this licence must not exceed the total number of individuals specified above.
7. The licensee must keep a true and accurate record on the Flying-Fox Record Sheet (FFRS) provided by NPWS, of all flying-foxes that are shot. Each animal shot must be recorded immediately and the FFRS must be updated at the conclusion of shooting each evening. The FFRS must be produced for inspection upon request by a NPWS officer at any time.
8. A legible copy of the FFRS must be sent to the NPWS office from which this licence was issued no later than 1 week from the licence expiration date. A licence variation will not be issued unless it is accompanied by a FFRS.
9. The licensee and all persons authorised under this licence must immediately locate each animal that has been shot and immediately alleviate the suffering of any injured flying-fox by gunshot to either the head or chest of the animal or by any other method specified in the Standard Operating Procedure. Dead flying-foxes must be checked for live young, which should be humanely killed; these do not count towards the licence quota. Dead

flying-foxes must also be checked for research thumb bands, attached to the wing. The relevant NPWS office should be notified to come and collect any thumb bands found, or record the details.

10. A flying-fox or part of a flying-fox, alive or dead, must not be removed from the property on which the animal is shot without the prior approval of NPWS.

11. Dead flying-foxes must be collected and placed in a marked and nominated location on the property. Gloves must be worn.

12. The licensee and all persons authorised under this licence must carry a copy of the licence while on any land for the purpose of shooting flying-foxes, or whilst in the possession of flying-foxes, and produce it for inspection on demand by any officer of NPWS.

13. The licensee must provide reasonable access to the property specified in this licence for inspection by a NPWS officer at any time.

14. This licence is not transferable.

15. Any shooting or other actions carried out under this licence must be undertaken in accordance with the Standard Operating Procedure (unless compliance with the Standard Operating Procedure would be inconsistent with a condition of this licence).

16. 'Standard Operating Procedure' means the Standard Operating Procedure for shooting of flying-foxes (October 2010 version) or any later version that is provided to the licensee by NPWS.

Failure to comply with any conditions of this licence renders the licensee and/or other shooters authorised by this licence liable to be issued with cancellation of the licence, infringement notice(s) or to prosecution.

Date licence commences: _____ **Date licence expires:** _____

Date of issue: _____

Signature of Delegated Officer

Form 4: Example Flying-fox Record Sheet

