area which provides warmth or shade to allow recovery before release. Honeyeaters and heat stressed birds will drink sugared water while they are being held in the hand.
    - Birds that are unable to fly may be suffering from a slight strain to the wings. Place them on a perch in good cover and they will usually recover rapidly.
    - Birds with treatable minor injuries that cannot be immediately released or those failing to recover from thermal stress should be presented to a veterinarian or a registered wildlife carer for treatment.
    - Birds that have injuries which are untreatable or which would compromise their survival in the wild should be euthanased using one of the techniques described below in the Procedures section.

Health and Safety Considerations

- Care must be taken when handling birds (especially pest species) as they may carry diseases such as psittacosis (chlamydiosis), aspergillosis, erysipelas, yersiniosis and salmonellosis that can affect humans and other animals. Routinely wash hands after handling all birds. Personal protective equipment, especially face masks, are recommended when handling birds to reduce the risk of contracting disease.

- Operators need to be wary of the potential for injury when handling birds. Some species of birds can deliver painful bites and scratches. For example, parrots (e.g. cockatoos, galahs, corellas) have large, heavy beaks and strong jaws that are capable of inflicting serious injury. Raptors, if encountered as non-target species, are ferocious and can use their feet as weapons. Protective gloves can be used if required for handling large birds, although these may hinder dexterity. A towel is useful to place over the birds head or to give raptors something alternative to grip.

- Operators must be protected by tetanus immunisation in case of infection of scratches and bites.

- During set-up of traps and handling of gas cylinders, operators should be wary of the risks of injury from lifting heavy items.

- Use of carbon dioxide:

    - Carbon dioxide should be used in a well ventilated place.
    - Carbon dioxide is non-flammable, non-explosive and poses minimal risk to personnel when used with properly designed equipment. However, inhalation of significant concentrations of CO_2 can cause narcosis and/or asphyxia.
    - If CO_2 is inhaled, remove patient from the contaminated area to allow them to breathe in fresh air. Early signs of exposure are headache and shortness of breath. If patient is not breathing, make sure airway is clear and apply artificial resuscitation. Keep warm. Oxygen may be given but only under the supervision of a trained person.
    - Although prolonged exposure to low levels of CO_2 (up to 1.5 % in inhaled air) are well tolerated, chronic health effects can result.
    - For further information refer to the Material Safety Data Sheet (MSDS), available from the supplier.

EQUIPMENT REQUIRED

Traps

- The traps used should be specific for the target species. Several trap designs exist, including the following:

- *Walk-in cage traps* operate by attracting birds into a cage with a lure including food or other birds. A trap door is then activated closing the bird inside the cage. The use of lure-birds is applicable for flocking birds such as starlings. Simple designs can capture a single bird at a time; more elaborate designs can capture multiple birds and include holding catches for lure birds. Traps must be checked regularly to prevent attacks from predators.
- *Clap and sprung traps* rely on a spring to throw a net over an area or close a door on a cage. Some traps can be triggered by a bird, while others rely on a person to trigger the spring. Captured birds have to be quickly removed from these traps.
- *The Modified Australian Crow (MAC) Trap* has a V-shaped upper entrance and is commonly used for trapping corvids. The same design with a modified entrance can be used for smaller species, such as starlings, mynas and sparrows. The trap can capture and hold a large number of birds, providing that there is adequate shade, food and water. Requires less maintenance than other traps, therefore they may only need to be checked every 2 days.
- *Two-stage roost trap* has been developed at the Australian National University for common mynas (Acridotheres tristis). The design is a large (0.8 W x 0.8 L x 1.9m H) mesh trap with two compartments. The lower compartment has two walk-in funnel entrances (First stage); the upper compartment has a oneway entrance leading upwards (Second stage) and is also where the lure birds are housed. This trap has provision for housing so may only need to be checked every 2 days.
- *Mist nets* are fine nylon or polyester nets which are suspended between two upright poles. Birds fly into the net and remain caught until released. They are mostly used by researchers and are commonly used for small to medium-sized birds. Mist nets require continual monitoring, expert handling of caught birds and result in and increased likelihood of non-target capture. Users of mist nests must hold an authority from the Australian Bird and Bat Banding Scheme and a separate permit from the relevant state/territory fauna agency.

- Details of trap specifications and construction can be obtained from relevant state/territory pest control officers.

Bait material

- Bait material suitable to the species being trapped should be used. For example:
  - Mynas and starlings: chick starter pellets, bread, sultanas, fruit, pet food
  - Corvids: offal, meat, animal carcasses.
  - Galahs, cockatoos, long-billed corellas: wheat or other grain

Carbon dioxide equipment

- Compressed CO2 in cylinders
- Gas regulator/s
- Large canvas or heavy duty plastic bags for enclosing traps
- Chamber/container for birds that are gassed outside the trap

Other equipment

- Hand held nets
- Calico bird-bags

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- First aid kit

PROCEDURES

Trapping of birds

- An ideal trap site is where the birds are already feeding, but traps can also be placed near roosts and along the route from the roosting area to the feeding ground.
- Traps may need to be tied down in the event of windy weather.
- A period of free-feeding using bait appropriate for the target species is recommended prior to the commencement of trapping, to both limit non-target captures and to improve trap success.
- Regular checking of traps ensures provision of clean food, water and shade. Some traps will need to be checked more regularly than others i.e. traps that hold only small numbers of birds need to be checked daily. The frequency of trap monitoring will depend on a number factors including trap success, presence of predators, number of lure birds, or if lure birds are observed not to be eating, or appear unwell or stressed eg through feather loss, lethargy etc. Initially, all large traps should be checked daily, then gradually less often if birds and the enclosure remain in good condition. The frequency should increase when many birds are being captured.
- Remain quiet when checking traps so as not to frighten birds that are in or near the trap.
- To reduce panic and injury to birds, always approach the traps slowly, particularly when there are birds inside. When free-feeding, ensure that birds inside the trap are able to leave it without panic.
- When removing non-target birds from the trap, always remove the larger birds first as their movements can injure the smaller ones.
- Animals such as dogs and cats and non-essential personnel must be kept away from the area whilst the trap is in operation.

Euthanasia of trapped birds and disposal of carcasses

Acceptable methods of euthanasia for trapped pest birds are:

- This technique requires mastering of technical skills to ensure that loss of consciousness is rapidly induced.
- Carefully remove birds from the trap by hand or using a hand held net.
- Dislocate the neck by taking the birds legs in the left hand (if right handed) and the head between the first two fingers of the right hand with the thumb under the beak. A sharp jerk with each hand, pulling the head backward over the neck will break the spinal cord and carotid arteries.
- Cervical dislocation is not suitable for birds larger than 3 kg as it is difficult to pull the neck quickly. Most pest birds will be below 3 kg in weight. For example, average weights for some species are:
    - starlings – 50 to 80 g
    - sulphur crested cockatoos – 1 kg
    - corellas – 565 g
    - galahs – 330 g
    - ibis – 2.5 kg
    - ducks – 1 to 2 kg

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NATSOP-BIR002 NATIONAL STANDARD OPERATING PROCEDURE:

TRAPPING OF PEST BIRDS Inhalation of carbon dioxide (CO_2) gas

- Compressed CO_2 gas in cylinders should be used so the inflow to the chamber can be regulated precisely.
- Birds can either be: (1) removed from the trap and placed into a container pre-filled with CO_2 , or (2) remain in holding cages, which will be enclosed within a material or plastic sack.
- A continuous inflow of CO_2 should then be allowed to flow into the sack. A constant level of CO_2 should be maintained for at least 3 minutes and anaesthesia will occur within 60 seconds.
- With birds inside the chamber, an optimal flow rate should displace at least 20% of the chamber volume per minute.
- Carbon dioxide used in a sealed environment is suitable for animals up to 3 kg.
- Carbon dioxide is heavier than air so incomplete filling of a chamber may permit some birds to fly up to avoid exposure to the gas.
- Care must be taken to limit the number of birds in a chamber at any one time so as to maintain a constant CO_2 concentration.
- Each bird must be verified as dead before removing it from the chamber. If the bird is not dead CO_2 narcosis must be followed with cervical dislocation.

Overdose of barbiturate

- Usually given by the intraperitoneal route in smaller birds. For larger birds such as cockatoos, the intravenous route is preferred.
- Barbiturates should only be administered by an appropriately qualified person e.g. a veterinarian.
- Birds killed by this method may contain potentially harmful residues and should be disposed in a manner that will prevent them from being consumed by predatory/scavenger animal species.
- Death of euthanased birds should always be confirmed by observing the following:
    - absence of movement
    - absence of rhythmic, respiratory movements
    - absence of heart beat – feel the chest between thumb and forefinger
    - absence of eye protection reflex (corneal reflex) or ‘blink’.
- If death cannot be verified, a second method should immediately be used to kill the bird. Carcasses should only be discarded once death has been established.
- Bird carcasses should be collected and disposed of in an appropriate manner in accordance with acceptable practices as required by local councils and applicable federal, state or territory regulations.

Euthanasia of nestlings and destruction of eggs

- The most suitable methods of euthanasia for chicks and nestlings are:

    - *Inhalation of carbon dioxide*: may need a longer time for death (at least 10 minutes), increase CO_2 concentration to 100%.
    - *Cervical dislocation:* effective and humane
    - Decapitation: the instrument used must be sharp and well maintained. In larger chicks the method should be performed after a blow to the head to render the bird unconscious.
    - *Concussion (stunning):* a blow on the head will usually be sufficient to render the bird insensible. To ensure death stunning must be followed by another method eg decapitation or exsanguination (bleeding-out).

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- It is believed that in avian embryos greater than half of the way to hatching, the neural tube has developed sufficiently to allow perception of pain. Therefore, it is preferable that eggs are destroyed by cooling or freezing them to <4oC for at least 4 hours. However, under field conditions quickly breaking the eggs and decapitation or crushing of the embryo may be a humane and more practical alternative. Information on the use of carbon monoxide for the euthanasia of trapped birds The humaneness and efficacy of carbon monoxide as a gaseous euthanasia agent is highly dependent on the source of the gas. There are currently four ways of delivering carbon monoxide. These are:
- Carbon monoxide from a *commercially compressed cylinder* is acceptable because it induces loss of consciousness without pain or discernable discomfort and death occurs rapidly if the right concentration is achieved. However, carbon monoxide cylinders are NOT readily available for such use due to OH&S issues.
- Carbon monoxide sourced from the *cooled exhaust of non-vehicular petrol engines without a catalytic converter* (eg lawn mower, whipper snipper engine or purpose-built carbon monoxide generator) appears to be acceptable since the level of carbon monoxide remains high and results in a rapid death. However, the literature suggests that contaminants such as hydrocarbons in the fumes can be irritating to the eyes and airways which makes the efficiency of delivery important.
- Carbon monoxide sourced from the *cooled exhaust of vehicular petrol engines with a catalytic converter* (ie from cars less than approximately 10 years old) is not acceptable on the basis of all current information. For example, research has shown that the levels of carbon monoxide drop off very quickly after the engine has started, leaving only a small window where concentration is adequate for a rapid death (ie for up to approx 60 seconds after a car has been cold started). It is also likely that the level of potential irritants e.g. carbon, are highest during this short time.
- Carbon monoxide sourced from the *cooled exhaust of older vehicles without catalytic converters* may be acceptable but would still have welfare concerns due to a high variability in the age and condition of engines and presence of contaminants.

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TRAPPING OF PEST BIRDS FURTHER INFORMATION

Contact the relevant federal, state or territory government agency from the following list of websites:

- Australian Department of Sustainability Environment and Energy http://www.environment.gov.au/
- Australian Department of Agriculture and Water Resources http://www.agriculture.gov.au/
- ACT Territory and Municipal Services Directorate http://www.act.gov.au/browse/topics/environment
- NSW Department of Primary Industries http://www.dpi.nsw.gov.au/
- NT Department of Environment and Natural resources http://lrm.nt.gov.au/
- Qld Department of Agriculture and Fisheries http://www.daff.qld.gov.au/
- Biosecurity SA, SA Department of Primary Industries and Regions http://www.pir.sa.gov.au/biosecuritysa
- Tas Department of Primary Industries, Parks, Water and Environment http://www.dpiw.tas.gov.au/
- Vic Department of Primary Industries http://www.dpi.vic.gov.au/
- WA Department of Agriculture and Food http://www.agric.wa.gov.au

Also refer to:

- Centre for Invasive Species Solutions https://invasives.com.au/

Reference me as: Trudy Sharp, 2012. Trapping of pest birds. Standard Operating Procedure. PestSmart website. https://pestsmart.org.au/toolkit-resource/trapping-of-pest-birds