Control method: Trapping of pest birds using net traps

Assumptions:	▪ Best practice is followed in accordance with BIR002. ▪ Birds captured in net traps are removed quickly. Birds removed from traps later will experience more stress than birds removed earlier. ▪ Trap size and design will vary depending on the species of bird being trapped. ▪ Handling will reduce the humaneness of the killing method. ▪ This method includes net traps such as pull nets (also known as single clap nets or book traps). It does not include mist nets which are used to capture birds for research rather than as a control method.

PART A: assessment of overall welfare impact

DOMAIN 1 Water or food restriction, malnutrition				
No impact	Mild impact	Moderate impact	Severe impact	Extreme impact

DOMAIN 2 Environmental challenge				
No impact	Mild impact	Moderate impact	Severe impact	Extreme impact

DOMAIN 3 Disease, injury, functional impairment				
No impact	Mild impact	**Moderate impact**	Severe impact	Extreme impact

DOMAIN 4 Behavioural or interactive restriction				
No impact	Mild impact	**Moderate impact**	Severe impact	Extreme impact

DOMAIN 5 Anxiety, fear, pain, distress, thirst, hunger				
No impact	Mild impact	**Moderate impact**	Severe impact	Extreme impact

Overall impact
Moderate

DURATION OF IMPACT				
Immediate to seconds	**Minutes**	Hours	Days	Weeks

SCORE FOR PART A:	**4**

Summary of evidence:

Domain 1 — No impact in this domain.

Domain 2	No impact in this domain.
Domain 3	There is a risk of injuries such as wing breaks as birds can get entangled in the net. Birds also have to be directly handled to be removed which increases the risk of injury.
Domain 4	Bird movement is restricted by the net. The birds are also being restrained during handling as they are removed from the net.
Domain 5	Captured birds are likely to experience fear and distress whilst in the net and especially during handling. With this method all trapped birds would be removed from the net within minutes.

PART B: assessment of mode of death – Carbon dioxide (CO_2) (with handling)

Time to insensibility (minus any lag time)				
Very rapid	Minutes	Hours	Days	Weeks
Level of suffering (after application of the method that causes death but before insensibility)				
No suffering	Mild suffering	Moderate suffering	Severe suffering	Extreme suffering

SCORE FOR PART B:	**CO_2 with handling - D**
Summary of evidence:	Note: Compressed CO_2 gas in cylinders is the only recommended source of CO_2 because the inflow to the chamber can be regulated precisely[1].
Duration –	The time to loss of consciousness depends on how the carbon dioxide is administered. If the birds are placed in a chamber that is pre-filled with a high concentration of CO_2 (above 50%), loss of consciousness will be quicker (around 38 seconds) than placing the animals in a chamber and then increasing the concentration of CO_2 (by 20% chamber volume per minute), (around 156 seconds), however placing animals in a pre-filled chamber causes pain, which is potentially severe[2]. Handling will also increase the duration of the method.
Suffering –	If animals are placed in a chamber containing a high concentration of CO_2 (above 50%) they will experience at least 10-15 seconds of pain in the mucosa of the upper airways before they lose consciousness. This method is therefore not recommended. If the rising concentration technique (i.e. introducing the CO_2 into the top of the chamber at a flow rate of 20% chamber volume per minute) is used there should not be any pain but the animals will find it aversive at a certain level and may experience distress, discomfort and dyspnoea ('air hunger') [2]. This method involves physical handling so birds will also suffer from some fear and distress.

PART B: assessment of mode of death – Carbon dioxide (CO_2) (without handling)

Time to insensibility (minus any lag time)				
Very rapid	Minutes	Hours	Days	Weeks

Level of suffering (after application of the method that causes death but before insensibility)				
No suffering	Mild suffering	Moderate suffering	Severe suffering	Extreme suffering

SCORE FOR PART B:	**CO_2 without handling - C**
Summary of evidence:	Note: Compressed CO_2 gas in cylinders is the only recommended source of CO_2 because the inflow to the chamber can be regulated precisely[1].
Duration –	Overall duration will be less than with handling. The time to loss of consciousness depends on how the carbon dioxide is administered. If the birds are placed in a chamber that is pre-filled with a high concentration of CO_2 (above 50%), loss of consciousness will be quicker (around 38 seconds) than placing the animals in a chamber and then increasing the concentration of CO_2 (by 20% chamber volume per minute), (around 156 seconds), however placing animals in a pre-filled chamber causes pain, which is potentially severe[2].
Suffering –	If animals are placed in a chamber containing a high concentration of CO_2 (above 50%) they will experience at least 10-15 seconds of pain in the mucosa of the upper airways before they lose consciousness. This method is therefore not recommended. If the rising concentration technique (i.e. introducing the CO_2 into the top of the chamber at a flow rate of 20% chamber volume per minute) is used there should not be any pain but the animals will find it aversive at a certain level and may experience distress, discomfort and dyspnoea ('air hunger') [2].

PART B: assessment of mode of death – Carbon monoxide (CO) from petrol engine (with handling)

Time to insensibility (minus any lag time)				
Very rapid	Minutes	Hours	Days	Weeks
Level of suffering (after application of the method that causes death but before insensibility)				
No suffering	Mild suffering	Moderate suffering	Severe suffering	Extreme suffering

SCORE FOR PART B:	**CO from a petrol engine (with handling) - D**
Summary of evidence:	
Duration –	Handling increases the duration of the gassing procedure. The time to insensibility will be variable depending on the sources of the CO (i.e. type of engine, size of engine, date of manufacture) and also the chamber size. Data from common mynas and common starlings indicates that time to recumbency can range from 7-180 seconds[3]. With a larger engine (see below for type) and a small chamber the duration is likely to be seconds.

Suffering –

This method involves physical handling so birds will suffer from some fear and distress.

Commercially compressed carbon monoxide induces loss of consciousness without pain and minimal discernable discomfort[1]. However the humaneness (and also efficacy) of gaseous euthanasia with carbon monoxide sourced from a petrol engine is highly dependent on the type of engine used:

a) *Carbon monoxide sourced from the cooled exhaust of non-vehicular petrol engines without a catalytic converter* (e.g. 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[4, 3]. Some literature suggests that contaminants such as hydrocarbons in the fumes can be irritating to the eyes and airways[5, 6] however it is unknown if this irritation occurs in the short time before insensibility is induced[4].

b) *Carbon monoxide sourced from the cooled exhaust of vehicular petrol engines with a catalytic converter* i.e. 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 (i.e. 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[7, 8].

c) *Carbon monoxide sourced from the cooled exhaust of older vehicles without catalytic converters* may produce a lethal concentration of CO and would therefore be acceptable[9]; however there are still welfare concerns due to a high variability in the age and condition of engines and presence of contaminants which could potentially cause some irritation to the eyes and airways.

PART B: assessment of mode of death – Carbon monoxide (CO) from petrol engine (without handling)

Time to insensibility (minus any lag time)				
Very rapid	Minutes	Hours	Days	Weeks
Level of suffering (after application of the method that causes death but before insensibility)				
No suffering	Mild suffering	Moderate suffering	Severe suffering	Extreme suffering

SCORE FOR PART B:	**CO from a petrol engine (without handling) - C**

Summary of evidence:

Duration –

The time to insensibility will be variable depending on the sources of the CO (i.e. type of engine, size of engine, date of manufacture) and also the chamber size. Data from common mynas and common starlings indicates that time to recumbency can range from 7-180 seconds[3]. With a larger engine (see below for type) and a small chamber the duration is likely to be seconds.

Suffering –

Commercially compressed carbon monoxide induces loss of consciousness without pain and minimal discernable discomfort[1]. However the humaneness (and also efficacy) of gaseous euthanasia with carbon monoxide sourced from a petrol engine is highly dependent on the type of engine used:

a) *Carbon monoxide sourced from the cooled exhaust of non-vehicular petrol engines without a catalytic converter* (e.g. 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[4, 3]. Some literature suggests that contaminants such as hydrocarbons in the fumes can be irritating to the eyes and airways[5, 6] however it is unknown if this irritation occurs in the short time before insensibility is induced[4].

b) *Carbon monoxide sourced from the cooled exhaust of vehicular petrol engines with a catalytic converter* i.e. 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 (i.e. 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[7, 8].

c) *Carbon monoxide sourced from the cooled exhaust of older vehicles without catalytic converters* may produce a lethal concentration of CO and would therefore be acceptable[9]; however there are still welfare concerns due to a high variability in the age and condition of engines and presence of contaminants which could potentially cause some irritation to the eyes and airways.

PART B: assessment of mode of death – cervical dislocation

Time to insensibility (minus any lag time)				
Very rapid	Minutes	Hours	Days	Weeks
Level of suffering (after application of the method that causes death but before insensibility)				
No suffering	Mild suffering	Moderate suffering	Severe suffering	Extreme suffering

SCORE FOR PART B:	**Cervical dislocation - C**

Summary of evidence:

Duration –

This method does not have a concussive effect and therefore insensibility may not be immediate[10, 11]. Data from chickens suggests that electrical activity in the brain can persist for 13 seconds following cervical dislocation[10].

Suffering –

This method involves physical handling so birds will suffer from some fear and distress. A study in turkeys found that reflexes persisted for 43 seconds in broilers killed by cervical dislocation[11]. During this time the birds were gasping due to hypoxia and were likely to be distressed before death. To ensure that loss of consciousness is induced as quickly as possible this technique requires mastering of technical skills by the operator.

Summary

CONTROL METHOD:	**Trapping of pest birds using net traps**
OVERALL HUMANENESS SCORE:	**CO_2 (with handling) – 4D** **CO_2 (without handling) – 4C** **CO from petrol engine (with handling) – 4D** **CO from petrol engine (without handling) – 4C** **Cervical dislocation – 4C**
Comments	

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