

Appendix: Assessment of humaneness worksheet

NON-LETHAL METHODS

METHODS WHICH HAVE AN IMPACT ON THE TARGET ANIMAL BUT DO NOT CAUSE DEATH

For example: exclusion fencing, mustering, cage-trapping and translocation, fertility control

Perform Part A of assessment only (assessment of overall welfare impact based on the five domains)

The humaneness score is a single numerical score that can be compared with other non-lethal or lethal methods. Potentially the most humane method would receive a score of 1 whilst the least humane method would score 8.

LETHAL METHODS

METHODS WHICH CAUSE THE DEATH OF THE TARGET ANIMAL

For example: 1080 baiting, pindone baiting, strychnine baiting, fumigation of burrows with phosphine, warren blasting, mustering followed by shooting in yards, leg-hold trapping followed by shooting, cage-trapping followed by overdose of barbiturate, aerial shooting, leg-hold trapping with strychnine cloths, infection with calicivirus

Perform both Part A and Part B of assessment (assessment of overall welfare impact based on the five domains and assessment of killing method based on time to insensibility and level of intensity of suffering)

The humaneness score is obtained by combining the numerical scores from part A and the alphabetical score from Part B. Potentially, the most humane method would receive a score of 1A, whilst the least humane method would score 8H.

Principles for use

1. There are complex processes involved in developing an invasive animal control strategy. The assessment of humaneness should be considered in context with other factors such as target specificity, efficacy, practicality, cost-effectiveness and operator safety etc.
2. Assessment should be performed assuming that 'best practice' or standard operating procedures are applied.
3. Before performing an assessment, it is important to fully understand and state what is being assessed i.e. what is the method, how is it done, where is it done, who is doing it.
4. Where there is doubt or lack of objective knowledge about whether an animal will suffer severely, one should assume it will do so i.e. the 'benefit of the doubt' should be given in favour of the animal.
5. When determining welfare impact, it is important to consider what happens in the majority of situations. Although an assessment cannot include all possible scenarios, it is possible to incorporate the likelihood of a negative event happening when this information is known.
6. When determining the impact in Domain 5, it is important to remember that this impact is usually a cumulative effect of the other four domains and is generally, but not always, equivalent to the most extreme potential impact.

Part A: Assessment of overall welfare impact

Instructions

1. Anticipate the likely impact of the control method on the individual target animal. Information on the physiological, behavioural and pathological responses to a particular method should be obtained from the literature (i.e. experimental studies or review of effects on target species or related species). In some cases extrapolations from human cases may be necessary.
2. Using the impact scales (Boxes 1-5) as a guide, assign a grade (no impact, mild, moderate, severe or extreme impact) to reflect the level of impact of the control method in each of the five domains. This grade should reflect the state of the animal at the time of maximum impact.
3. Determine the overall impact grade (ranging from no impact to extreme impact). The overall grading is usually that assigned to domain 5- mental state. If however, the intensities of anxiety/fear/pain/distress etc. caused by a particular method are not known or cannot be evaluated, the grading of compromise in the known domain(s) would be used to determine the overall impact grade.
4. Determine the duration of welfare impact (immediate/seconds, minutes, hours, days, weeks).
5. Interpret the score for the overall welfare impact from the scoring matrix (Box 6) (scores range from 1 to 8, with 1 being the most humane and 8 the least humane).
6. List the references/evidence used to conduct the assessment.

Part B: Assessment of mode of death

Instructions

1. Anticipate the likely impact of the killing method on the individual target animal based on knowledge of the mode of action and observations of the physiological, behavioural and pathological responses. This information can be obtained from the literature (i.e. experimental studies or a review of the effects on target species or related species). In some cases extrapolations from human cases may be required. In the absence of objective information (especially with regard to assessment of pain, discomfort, distress etc.) the best interest of the animal should guide the grading of impact. Other information to consider includes the age of the animal, how, where and when the technique will be applied, degree of restraint required, technical competence of the operator, suitability of equipment etc.
2. Determine the time to insensibility for the action that causes death. For some methods (e.g. poisons such as 1080, anticoagulants) a lag time would be subtracted from the overall time, provided that the animal does not experience any negative welfare impacts during this interval.
3. Using the impact scale (Box 7) as a guide, determine the level of suffering experienced by the animal after application of the method that causes death but prior to onset of insensibility. Components of suffering include anxiety, pain, fear, distress, apprehension.
4. Interpret the alphabetical score for the action that causes death technique from the scoring matrix (Box 8) (scores range from A to H, with A being the most humane and H being the least humane).
5. List the references/evidence used to conduct the assessment.

A model worksheet is provided at the end of this Appendix.

Impact scales for part A: overall welfare impact

Box I

DOMAIN I: WATER DEPRIVATION, FOOD DEPRIVATION, MALNUTRITION		
Impact category	Description of impact	Examples
NO IMPACT	No effect on food/water intake	
MILD IMPACT	Short-term water or food restrictions that are within usual tolerance levels for the species.	An animal has a few hours without water; in shade conditions. Short-term deprivation of food.
MODERATE IMPACT	Water or food restrictions which cause serious short-term or moderate long-term effects on physiological state or body condition, but such effects remain within the capacity of the body to respond to nutritional variations and allow spontaneous recovery after restoration of a good quality diet.	An animal has a few hours without water; in hot, sunny conditions. Deprivation of food long enough to bring about mobilisation of body fat stores.
SEVERE IMPACT	Severe restrictions on food/water intake that lead to significant levels of debility.	An animal has many hours without water. Deprivation of food for many days resulting in severe loss of body weight.
EXTREME IMPACT	Extreme restrictions on food/water intake that would likely result in the animal dying from dehydration or starvation.	An animal has many days without water and /or food and dies from severe dehydration and/or starvation.

Box 2

DOMAIN 2: ENVIRONMENTAL CHALLENGE		
Impact category	Description of impact	Examples
NO IMPACT	Exposure to environmental challenge is not a feature of or consequence of the mode of action.	Exposure to ambient conditions that are within an animals' thermoneutral range.
MILD IMPACT	Short term exposure to environmental conditions which are outside the normal range encountered by the animal but remain within their physiological adaptive capacity.	Exposure to levels of heat or cold which are outside the thermoneutral range, but which do not lead to debility in the long-term.
MODERATE IMPACT	Marked short-term or moderate long-term environmental challenges that elicit body responses beyond the physiological adaptive capacity of the animal, but where the untoward effects are readily reversed by restoration of normal ambient conditions.	Short-term heat stress caused by exposure to high ambient temperatures combined with exercise (e.g. mustering).
SEVERE IMPACT	Severe environmental challenges that lead to serious physiological compromise or permanent dysfunction, injury or illness.	An animal is exposed to severe heat or cold which could possibly lead to failure of thermoregulation and collapse.
EXTREME IMPACT	Long-term exposure to extremes of heat or cold that bring about the death of the animal from hyper- or hypothermia.	Animals that are left in leg-hold traps, cage traps or yards in extremes of heat or cold and subsequently die from hyper- or hypothermia.

Box 3

DOMAIN 3: INJURY, DISEASE, FUNCTIONAL IMPAIRMENT		
Impact category	Description of impact	Examples
NO IMPACT	Disease, injury or functional impairment is not a feature of or consequence of the mode of action.	
MILD IMPACT	Body responses remain within the homeostatic capacity of the animal to react with no or only minor debility or incapacity.	Minor injuries (e.g. minor skin laceration, oedematous swelling of foot and/or leg, mild mouth injuries). Minor sickness or functional impairment (e.g. mild vomiting/retching, diarrhoea, lethargy/weakness).
MODERATE IMPACT	Disease/injury/functional impairment that results in moderately severe debility or incapacity but from which recovery would normally occur spontaneously.	Moderate injuries (e.g. damage to minor tendon or ligament, amputation of a digit, joint haemorrhage, single tooth fracture, major laceration of mouth or tongue, joint dislocation). Moderate sickness or functional impairment (e.g. moderate vomiting/retching, diarrhoea, lethargy/weakness, slight breathlessness, moderate haemorrhages, convulsions whilst unconscious).
SEVERE IMPACT	Injury/disease/functional impairment that result in severe debility or incapacity and serious physiological compromise and would normally cause permanent disability. Includes injuries that are likely to reduce survival if the animal were to be released.	Severe injuries (e.g. deep and wide lacerations, severed tendons, broken foot and leg bones below elbow or stifle, joint dislocations, amputations). Severe sickness or functional impairment (e.g. severe vomiting/retching, diarrhoea, lethargy/weakness, abnormal breathing, severe haemorrhages, intermittent convulsions).
EXTREME IMPACT	Injury/disease/functional impairment that result in very severe debility or incapacity due to the effects of traumatic injury, infectious agent or toxin.	Extreme injuries (e.g. death caused by excessive blood loss or shock, spinal chord injury, severe internal bleeding, fractures of more than one limb, severe jaw fracture, fractures of limbs above elbow or stifle). Extreme sickness or functional impairment (e.g. extreme persistent vomiting/retching, diarrhoea, lethargy/weakness, laboured breathing, convulsions whilst conscious, blindness, immobility/prostration, excessive and prolonged haemorrhaging).

Box 4

DOMAIN 4: BEHAVIOURAL, INTERACTIVE RESTRICTION		
Impact category	Description of impact	Examples
NO IMPACT	No interference with the behavioural needs of an animal (an animal's behavioural needs being those activities which when thwarted produce untoward physiological or psychological effects).	
MILD IMPACT	Mild interference with the behavioural needs of an animal.	Mild and short-term physical restraint resulting in minor behavioural or interactive restriction.
MODERATE IMPACT	Moderate interference with the behavioural needs of an animal resulting in negative physiological or psychological effects which are readily reversed after restoration of normal conditions.	Restraint that results in agitation from not being able to perform natural behaviour that the animal is highly motivated to perform e.g. feeding, moving, resting, grooming, mating, caring for young.
SEVERE IMPACT	Marked interference with the behavioural needs of an animal leading to physiological or psychological compromise that may cause long-term or permanent negative effects.	Severe abnormal self-directed behaviour e.g. chewing/biting of feet and limbs when restrained. Normal defensive and/or escape reactions to visibility of or presence of predators are prevented.
EXTREME IMPACT	Extreme interference with the behavioural needs of individuals or groups of animals leading to psychotic-like behaviour or to agonistic interactions that result in very severe injury or death.	Restraint that results in extreme abnormal self-directed behaviour; excessive aggression, stereotypy (e.g. severe fighting among incompatible social groups, unfamiliar individuals that are in close proximity). Inability to escape attack by a predator.

Box 5

DOMAIN 5: ANXIETY, FEAR, PAIN, DISTRESS		
Impact category	Description of impact	Examples
NO IMPACT	Anxiety, fear, pain, distress, sickness or greater than normal thirst and/or hunger are not a feature of or consequence of the mode of action.	
MILD IMPACT	Mild discomfort or pain, low-level anxiety or apprehension or mild unsatisfied thirst and/or hunger.	Limited human contact with no physical handling.
MODERATE IMPACT	Moderate anxiety, fear, pain or distress, or moderate unsatisfied thirst and/or hunger.	Moderate level of human contact with minimum of physical handling.
SEVERE IMPACT	Severe anxiety, fear, pain, distress, thirst and/or hunger.	High level of human contact with a degree of physical handling.
EXTREME IMPACT	Extreme inescapable or unrelieved anxiety, fear, pain, distress, thirst and/or hunger which is judged to be at or beyond the limits of reasonable endurance and results in the death of the animal.	Excitement, fear and distress in struggling restrained animals that result in death from capture myopathy.

Scoring matrix for part A: overall welfare impact

Box 6

Overall impact on welfare	Duration of impact				
	Immediate to Seconds	Minutes	Hours	Days	Weeks
EXTREME	5	6	7	8	8
SEVERE	4	5	6	7	8
MODERATE	3	4	5	6	7
MILD	2	3	4	5	6
NO IMPACT	1	1	1	1	1

Impact scale for part B: assessment of mode of death

Box 7

Impact category	Description of impact	Examples
NO SUFFERING	<p>No suffering before death. There is immediate death or immediate loss of consciousness lasting until death.</p> <p><i>Note that components of suffering include (but are not limited to) fear, anxiety, pain, distress, apprehension, sickness, fatigue, thirst, hunger.</i></p> <p><i>Aversion refers to the avoidance or attempted avoidance of unpleasant, noxious stimuli and distressing stimuli</i></p>	<p>Direct destruction/concussion of brain tissue resulting in rapid unconsciousness e.g. accurate shooting in the head.</p> <p>Inhaled vapour with no irritant effect that induces unconsciousness without pain or discernable discomfort.</p> <p>Does not involve physical handling or restraint</p>
MILD SUFFERING	<p>Loss of consciousness is not immediate and there is no or only minimal aversion and no or only mild suffering before death.</p>	<p>Inhaled vapour causing mild irritancy and mild pain and/or distress.</p> <p>Mild degree of sickness e.g. vomiting/retching, diarrhoea, lethargy/weakness etc.</p> <p>Does not involve physical handling or restraint.</p>
MODERATE SUFFERING	<p>Loss of consciousness is not immediate and there is moderate aversion and suffering before death.</p>	<p>Inhaled vapour causing moderate irritancy and moderate pain and/or distress.</p> <p>Moderate degree of sickness e.g. vomiting/retching, diarrhoea, lethargy/weakness etc.</p> <p>May involve physical handling and restraint e.g. to administer an injectable agent via intravenous (IV) or intraperitoneal (IP) route of entry; to apply cervical dislocation; to apply blunt trauma to the head.</p>

Box 7 (continued)

Impact category	Description of impact	Examples
SEVERE SUFFERING	Loss of consciousness is not immediate and there is severe suffering before death.	<p>Inhaled vapour causing severe irritancy and severe pain and/or distress.</p> <p>Convulsions occurring during unconsciousness when animal recovers consciousness prior to death (i.e. muscle spasms with periods of relaxation as in clonic convulsions).</p> <p>Severance of major arteries resulting in rapid blood loss, hypovolaemia and shock.</p> <p>Severe degree of sickness e.g. vomiting/retching, diarrhoea, lethargy/weakness etc.</p> <p>May involve physical handling and restraint e.g. administration of an injectable agent to a non-sedated animal via a difficult-to-access route of entry (e.g. intracardiac, intrahepatic, intrarenal).</p>
EXTREME SUFFERING	Loss of consciousness is not immediate and there is extreme suffering before death.	<p>Inhaled vapour causing extreme irritancy and extreme pain and/or distress.</p> <p>Partial or full paralysis whilst conscious.</p> <p>Convulsions whilst conscious (i.e. prolonged muscle spasm without periods of relaxation as in tonic convulsions).</p> <p>Extreme degree of sickness e.g. vomiting/retching, diarrhoea, lethargy/weakness etc.</p> <p>Intense dyspnoea caused by asphyxia (e.g. during strangulation, smothering, chest compression etc.) or hypercapnia (increased CO₂ level).</p> <p>Severe internal haemorrhages causing swelling within confined spaces.</p> <p>May involve physical handling and restraint.</p>

Scoring matrix for part B: assessment of mode of death

Box 8

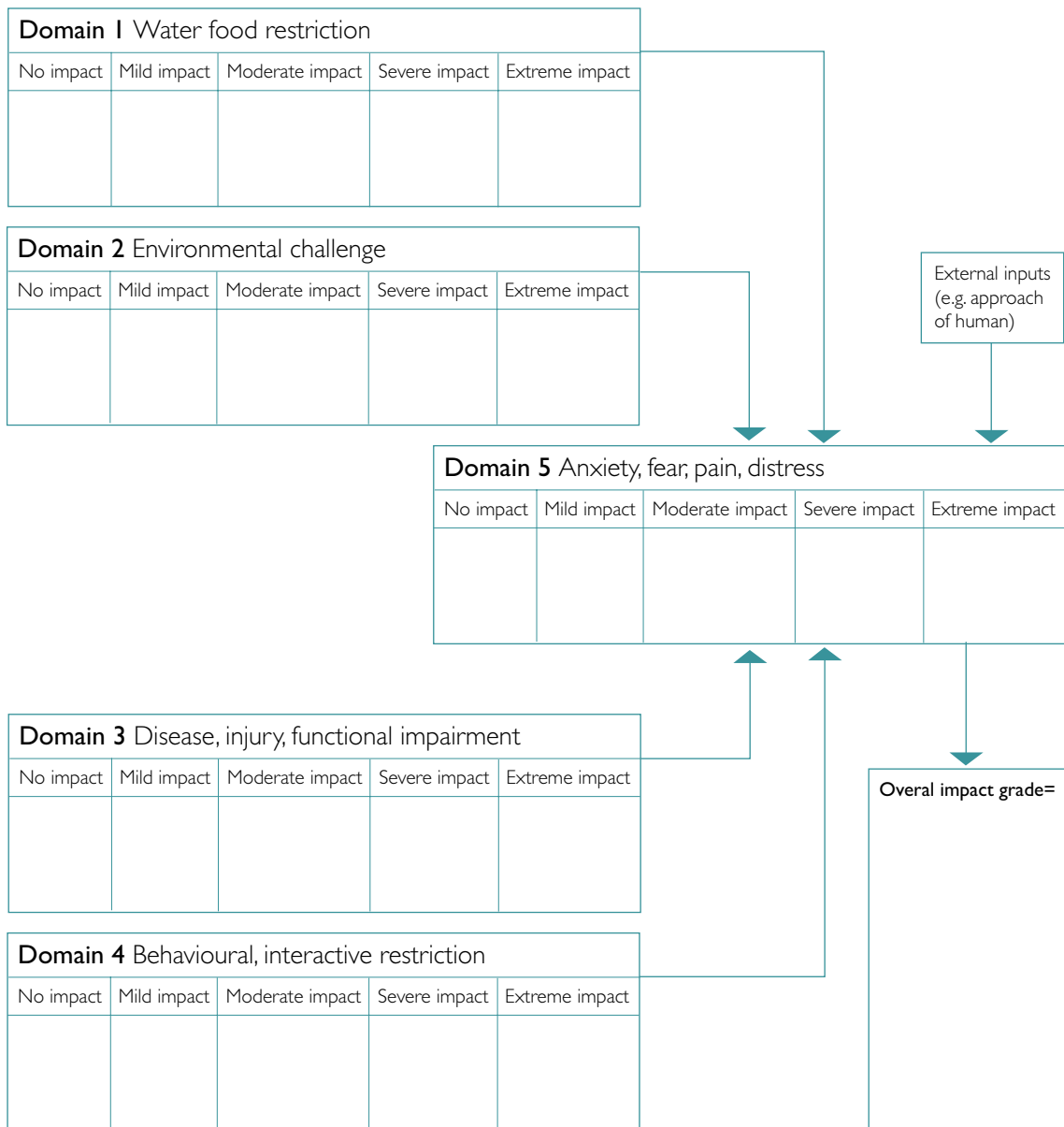
Level of suffering	Time of insensibility				
	Immediate to Seconds	Minutes	Hours	Days	Weeks
EXTREME	E	F	G	H	H
SEVERE	D	E	F	G	H
MODERATE	C	D	E	F	G
MILD	B	C	D	E	F
NO IMPACT	A	A	A	A	A

Worksheet

Part A: Assessment of overall welfare impact

CONTROL METHOD:

Shade area for *range* of potential impact in each domain and place an X in the relevant box to indicate impact for best practice



OVERALL IMPACT GRADE =

DURATION OF WELFARE IMPACT:

Very rapid (immediate) to rapid (seconds)	Minutes	Hours	Days	Weeks

Summary of evidence used to allow interpretation of welfare impact in these domains

SCORE FOR PART A=

Part B: Assessment of mode of death

CONTROL METHOD:

Time to insensibility/unconsciousness (minus any lag time that may occur prior to the onset of clinical signs). This is the duration of suffering caused by action that causes death:

Very rapid (immediate) to rapid (seconds)	Minutes	Hours	Days	Weeks

Level of suffering experienced after application of the method that causes death but before insensibility is achieved (components of suffering includes anxiety, pain, fear, distress, apprehension)

No suffering	Mild suffering	Moderate suffering	Severe suffering	Extreme suffering

Summary of evidence used to allow interpretation of welfare impact in these domains

SCORE FOR PART B=

Summary

CONTROL METHOD:

SCORE FOR PART A=

SCORE FOR PART B=

HUMANENESS SCORE=

Comments