NAWAC GUIDELINE:

Assessing the welfare performance of restraining and kill traps

Contents

1. Introduction

The purposes of this guideline are to:

(a) Promote the standardisation of testing of the welfare performance of traps and;

(b) encourage the continuing development of new and existing traps to improve the effectiveness of kill traps and the welfare of animals caught in restraining traps, including the reduction of injuries and minimisation of suffering.

The Animal Welfare Act 1999 requires the use of animals in research, testing and teaching to be approved according to Part 6. Institutional animal ethics committees are responsible for approving and monitoring testing. Trap testing must be conducted under Animal Ethics Committee (AEC) approval. If you do not have access to an animal ethics committee, contact animalwelfare@mpi.govt.nz for advice. Trap testing should be undertaken using a 3R's (reduce, refine, and replace) approach.

This guideline was developed by NAWAC for those personnel conducting trap testing, to assess the welfare performance of restraining and kill traps. NAWAC considers that the testing results meeting the requirements set out in this guideline may be used to inform animal welfare performance.

Following this guideline is not a statutory requirement, however traps failing to meet the testing requirements of this guideline may inform NAWAC when discharging its functions under section 32 of the Animal Welfare Act 1999 in relation to the making of Orders in Council declaring traps or devices to be prohibited or restricted traps or devices.

Note: This guideline focuses on the assessment of the animal welfare performance of traps, NOT on how effectively the traps capture target animals or how target-selective, mechanically robust or user safe they are. Currently all species targeted by kill traps in New Zealand are mammals. Consequently, recommendations about current or future use of traps should also consider any changes to nominated target species for kill traps, the capture efficiency, target selectivity, mechanical robustness, and user safety. To assist in carrying out these assessments, additional guidelines are provided in Appendix E.

2. Scope

This guideline applies to all types of traps designed to restrain or kill mammals. It does not apply to poison baits.

Under this guideline, traps have an opportunity to pass one of two welfare performance classes (A or B). The Class A thresholds are stricter than Class B, and are intended to distinguish traps with a higher level of welfare performance.

For kill traps, the guideline and specifications were originally designed for mechanical traps that capture and kill the animal through the same action (e.g., trap jaws closing on, or strike bar striking an animal).

Recent advances in trap development have resulted in traps that expose the animal to the killing mechanism (e.g., gas, electricity or mechanical) after capture in a box or container. Throughout this document these are referred to as *kill trap systems with a pre-kill containment period*. It is considered that these traps can meet the specifications of kill traps in this guideline provided the threshold times to loss of corneal reflex are reached from when

the animal is first trapped by the system, rather than from when the mode of killing action begins (e.g., introduction of gas or triggering of subsequent killing mechanism). For systems with a delay between initial capture and subsequent killing action/engagement with the killing mechanism, an alternative assessment of welfare performance is required. Specific details on this can be found in sections 7.5.1, 7.6.1 and 8.1 below.

Note: Gases that are used as the killing mechanism in a trap system are considered vertebrate toxic agents (VTAs) and as such should be approved under the Agricultural Compounds and Veterinary Medicines Act (1997). A separate animal welfare assessment is part of the approval process under the Animal Welfare Act.

3. Definitions

For the purposes of this guideline (including the appendices), the following definitions apply:

Animal ethics committee
: a committee established under Part 6 of the Animal Welfare Act 1999 to consider proposals and monitor animal research, testing and teaching.

Capture efficiency
: the capability of the trap to capture target animals, expressed as a percentage of the total number of trap-nights for which the traps are set (see definition of *Trap-night*).

Captured animals
: all animals caught in traps, plus those identified as having escaped.

Clamping force
: the steady-state force (Newtons) exerted on an animal's limb or body by any mechanically powered trap.

Control trap
: the most commonly used trap of the same trap system and purpose as the test trap for the target animal as determined by the trap-testing agency, used for reference purposes during testing.

Corneal reflex
: blinking reflex invoked by gently touching or blowing air onto the surface of the eye (cornea).

Effective kill
: death of an animal in a trap during which it is rendered irreversibly unconscious with inevitable subsidence into death, within the time limits established by this guideline.

Effective restraint
: the restraint of an animal in a trap during which physical injury remains at or below the trauma thresholds established by this guideline.

Impact momentum
: the force (kg m/sec) delivered to an animal when struck by the striking component(s) of the trap.

Killing effectiveness
: the ability of a trap to produce an effective kill (see above)

Non-target animal
: an individual of any species other than those which the trap is set to capture.

Palpebral reflex
: the blinking reflex invoked by gently touching the eyelid. The palpebral reflex can be used as an alternative to the corneal reflex.

Selectivity
: the capability of the trap to minimise the capture of non-target animals, expressed as the percentage of non-target captures per 100 trap-nights.

Striking component

the part(s) of the trap that strike the animal and deliver the impact momentum and/or clamping force.

Target animal
: an individual of a species which the trap has been set with the intent to capture.

Trap
: the mechanical device used to capture the target animal.

Trap-night
: one trap set for one night (for example, four traps set for four nights equals 16 trap-nights).

Trap system
: includes the trap and how it is set (that is, additional equipment such as covers, and whether the trap is set on or above the ground). In most cases it is the trap system and set that is tested, not just the trap.

Trap-testing agency
: the agency conducting the trap testing under animal ethics committee approval.

Trauma threshold
: the highest allowable trauma level for a trap according to this guideline.

4. Welfare Performance Criteria

4.1 Effective restraint (restraining trap systems only)

The trap system should effectively restrain the target animal when tested in an appropriate manner (current examples are enclosure or field tests) (see Section 6 below).

4.2 Effective kill (kill trap systems only)

The trap system should effectively kill the target animal when successfully tested and evaluated in an enclosure test (see Section 7 below). Field testing should not be undertaken due to the risk of animals struck by the trap escaping with injuries.

5. Trap test preparation

Traps for testing should be prepared in accordance with the following procedure before each test.

5.1 Sampling of traps

The method of selection of individual traps for testing should be at the discretion of the trap-testing agency.

5.2 Preparation of traps

Traps should be prepared according to the manufacturer's and/or national distributor's instructions and, prior to each test, the trap should be activated ten times using a substitute target that will not damage the striking component. This should be undertaken within ten days prior to testing with animals.

5.3 Test personnel

The test personnel should be experienced in the field use of the trap type being tested, and capable of trapping the target species. They should also be familiar with the testing procedures.

5.4 Retesting

A trap system that fails the welfare tests should be excluded from further testing until it has been modified appropriately to address likely reasons for failure.

5.5 Modification of trap systems after testing

Test results apply specifically to the trap system tested. Where subsequent variations or modifications to a tested trap system are made which affect its dimensions, mechanical forces or how animals may be positioned when caught, the test results for the original trap system do not apply. This requirement should be included in all test reports, so trap manufacturers/suppliers are aware of the issue if they modify the trap.

6. Restraining trap welfare performance testing

6.1 Principle

The ability of the trap system to meet the welfare performance criteria is tested by capturing a sufficiently large number of animals to assess the pathology resulting from capture.

6.2 Test procedure

The following test procedure should be undertaken:

(a) Sufficient trapping should be carried out to ensure that at least ten traps each have a capture. The minimum total number of captures required is 25 (see Appendices C (a) and (b)).

(b) Set traps according to the manufacturer's and/or national distributor's instructions.

(c) Check the traps within the time period determined by legislation, or as required under animal ethics approval. Euthanise all captured animals immediately by a method that minimises additional trauma (so as to not obscure damage from the trap where possible) and remove them from the traps.

(d) Record the following data each day when checking the traps:

  (i) date and time

  (ii) trap system

  (iii) site location of the trap

  (iv) status of the trap (fired, not fired)

  (v) species captured (include identifiable escapes)

  (vi) condition of the animal (dead, alive, unconscious, predated)

  (vii) location on body where animal is held by trap (e.g., toes, paw, hindlimb or forelimb, head, neck, upper or lower abdomen, hindquarters, tail)

  (viii) unique identification number for each animal.

(e) Label all target animals captured in the experimental traps (whole carcasses) with the following information:

(i) date of capture

(ii) unique identification number of each animal

(iii) method of euthanasia.

6.3 Pathological evaluation

The following procedure should be undertaken:

(a) Place the labelled carcasses in plastic bags and freeze them. Make sure that the carcasses are not damaged during handling and transport. Keep the carcasses frozen until pathological and/or radiological examination is performed.

(b) All the target animals should be examined, using only the file numbers as identification, by a veterinary pathologist (preferably experienced in the examination of wildlife species). The pathologist should identify the traumas (described in Appendix A) that each animal has sustained (see Annex A for descriptions). The trap-testing agency will then use this information to determine the total trauma class for each animal, using Appendix B.

6.4 Evaluation of the results

Traps have an opportunity to pass one of two welfare performance classes (A or B). For each class, traps should meet both relevant conditions to pass, as outlined below (refer also to Appendix C).

Once the trauma for each captured animal has been scored, count the number of individual animals in each of the four trauma categories (mild, moderate, moderately severe, severe). Note that “mild” also includes no identifiable trauma.

Class A: To qualify as a Class A restraining trap, the following two conditions should be met:

Referring to Appendix C (a) for the selected sample size in both cases:

(i) the maximum allowable number of animals with trauma more severe than *mild* should not be exceeded; and

(ii) the maximum allowable number of animals with trauma more severe than *moderate* should not be exceeded.

Class B: To qualify as a Class B restraining trap, the following two conditions should be met:

Referring to Appendix C (b) for the selected sample size in both cases:

(i) the maximum allowable number of animals with trauma more severe than *moderate* should not be exceeded; and

(ii) the maximum number of individual animals with trauma more severe than *moderately severe* should not be exceeded.

Otherwise, the trap has failed the test to qualify as either a Class A or B restraining trap.

7. Kill trap welfare performance testing

7.1 Principle

The ability of the trap system to effectively kill the target animal is tested by allowing animals to freely approach the test traps in an enclosure.

7.2 Apparatus[1]

Enclosure – The enclosure (or test room)[2] should be of adequate size to allow the target animals to move freely. The enclosure should be equipped with a nest box or equivalent area where the animal is able to rest to allow the animal to interact with the trap in the same manner that it would in the wild. Observation of the animals without their being aware of human presence is required. Ideally, remote observation of the animal's activity should be possible. Observers should be close enough to the trap under observation to confirm death of the animal within the time required.

Traps – Each test animal should be tested with a different trap of the same trap system. At the discretion of the trap-testing agency, the same trap may be reused if the trap is a "prototype".

Visual data recorder – Recommended to allow detailed monitoring and analysis of the test.

7.3 Test Animals

The test animals should be of a size and weight range representative of the species to those found in the areas where the trap will be used. The test animals should have been examined to ensure that they are healthy. The number of animals should be ten or more.

7.4 Conditioning of animals

Wild-captured or captive-raised animals of the target species, and their nest boxes, should be transferred to the test room or enclosure and time allowed for acclimatisation. The acclimatisation period should ensure that animals are familiarised with and sufficiently settled in the test room or enclosure, so that during the test procedure they interact with and trigger the trap in a manner representative of *in-situ* free-ranging wild animals.

Barren enclosures should be avoided as much as possible, and species-appropriate environmental enrichment provided. Food and water may need to be provided depending on the length of the time in the enclosure (including the acclimatisation and test duration).

7.5 Test procedure

Set the traps in accordance with the manufacturer's and/or national distributor's instructions. Monitor the animals as they freely approach and enter the traps, either by observing remotely (e.g., video link/live-streaming) or by direct observation using a standard method to record animal responses.

[1] The AEC approval process should consider the needs of the animals e.g., feed and water.
[2] An enclosure can be a cage or box, providing the animal can move freely and its approach to the trap is not forced or unnatural because of the confinement or the presence of observers.

Animals that are struck by the striking component and escape should be deemed to have exceeded the 5 minutes upper threshold for Class B traps. Where there is any doubt about whether the animal was struck, a careful examination of the animal should be undertaken. Injured animals should be euthanised or otherwise cared for in accordance with the animal ethics approval.

If the impact point is in a vital region (head, neck, thorax, or any combination thereof):

Monitor and record the time to loss of corneal (or palpebral) reflex and the time to cessation of heartbeat of the animal. If corneal (or palpebral) reflex is not lost within five minutes, euthanise the animal immediately using an appropriate method.

Record the precise impact and/or clamping point and the position of the animal in the trap.

Note: Animals are left for five minutes before being euthanised to provide information on how close the trap is to achieving the standards required. Few conscious animals will be subjected to the five-minute time frame. In a test of 25 animals, a maximum of four animals are allowed to exceed the designated time frame (that is, Class A, 30 seconds; Class B, three minutes). For a test involving only ten animals, no animal is allowed to exceed the designated time frame.

Where an animal is captured in a box or container before the killing mechanism (i.e., gas, electricity, or mechanical trap) is triggered, time to loss of corneal reflex starts from when the animal is first trapped by the system (i.e., when the trap system closes/locks upon the animal entering).

If the impact point of the striking component on the animal is not in a vital region:

Animals that are struck and remain captured are euthanised immediately by an appropriate method. The animal should be deemed to have been caught but not killed within five minutes.

7.5.1 Kill trap systems with a pre-kill containment period

The trap system is used during the pre-kill containment period (i.e., from the initial capture and containment to the killing stage). In addition to the requirements of sections 7.1 – 7.4, additional data for each test animal are:

a. The time interval is recorded from when the initial capture component of the trap is first triggered (i.e., when the animal becomes trapped/contained) to the kill mechanism/agent being triggered (i.e., when the animal is subjected to the killing mechanism).

b. The response(s) of the animal from initial capture to the kill mechanism being triggered are recorded. Each type of response and the total duration of each is recorded separately. The assessment should focus on responses that are indicative of pain or distress (or lack thereof) and those that may cause or contribute to physical injury risk. Video recordings may enable this level of observation.

c. Any physical injuries incurred during the pre-kill containment period are recorded. This should be both through observation of the animal during this period and examination of the live or dead animal after the killing mechanism is triggered. Review of video recordings may be required to discern if injuries occurred during the pre-kill period or while subjected to the killing mechanism/agent. Any physical injury

should be evaluated and expressed as trauma class levels from Appendix A and B. If any animal exceeds a trauma level of mild, the trap fails.

The requirement to monitor for escape (i.e., struck by strike component but not caught are deemed caught but not killed within five minutes - see section 7.5) applies to the initial capture stage if the capture mechanism could cause physical injury. Once inside the capture component of the trap and the killing mechanism is triggered, the requirement to monitor for escape, effective strike location (if applicable), and time to loss of corneal reflex is applied (see section 7.5).

Some trap systems may have back-up alerts to remotely report kill mechanism failure when an animal has been recorded as trapped. If the alert is triggered, the animal should be attended to in line with the requirements for live-capture traps. Back-up alert systems may fail, and the reliability of these should be included in the evaluation of the trap.

7.6 Evaluation of the results

Traps have an opportunity to pass one of two welfare performance classes (A or B). For each class, traps should meet both relevant conditions to pass, as outlined below (refer also to appendix D).

Class A: To qualify as a Class A kill trap, the following two conditions should be met:

Referring to Appendix D (a) for the selected sample size in both cases:

(i) the maximum allowable number of animals retaining corneal reflexes after *30 seconds* should not be exceeded; and

(ii) the maximum allowable number of animals retaining corneal reflexes after *three minutes* should not be exceeded.

Class B: To qualify as a Class B kill trap, the following two conditions should be met:

Referring to Appendix D (b) for the selected sample size in both cases:

(i) the maximum allowable number of animals retaining corneal reflexes after *three minutes* should not be exceeded; and

(ii) the maximum allowable number of animals retaining corneal reflexes after *five minutes* should not be exceeded.

Otherwise, the trap has failed the test to qualify as either a Class A or B kill trap.

7.6.1 Kill trap systems with a pre-kill containment period

The recommended considerations for acceptability of the pre-kill containment period assessment results are:

a. The duration of pre-kill containment period must not exceed the typical maximum inspection interval of live-capture traps as required under the Animal Welfare Act (i.e., inspected within 12 hours of sunrise on each day the trap remains set). There should not be any animals where the pre-kill containment period exceeds 12 hours. Trap developers or those commissioning performance evaluations are encouraged to self-impose a containment period time limit much shorter than 12 hours as a pass/fail

criterion prior to beginning the test. It is expected that most systems would have short (<1hr) containment periods.

b. Physical trauma levels in the sample of test animals should not exceed mild. It is expected that trap system designs should ensure infrequent and not more than minor physical trauma occurrence during the pre-kill containment period.

c. The observations of the animal responses and the duration of containment for each animal in the sample should indicate there was no incidence or likelihood of starvation, dehydration, heat exhaustion, hypothermia or other extreme welfare compromises due to the containment.

The evaluation of the killing stage component results is as described in section 7.6.

8. Reporting

Testing reports should describe the details of the trap system and how it was set, the methodology used (including animal species, set-up of the test room or enclosure, acclimatisation period, type of lure, selected sample size for the test), the animal ethics approval number, the final number of animals used, individual animal information including sex, maturity and weight, and the results. The results for each test animal should describe the time to loss of corneal reflex, time to cessation of heartbeat, strike location and any apparent physical trauma.

The report may state if the trap system has met the guideline specification (Class A or Class B) for the selected sample size for the species.

Note: Traps that pass the guideline specifications are not NAWAC approved and may not be referred to as such.

8.1. Reporting on kill trap systems with a pre-kill containment period

In addition to the requirements for testing reports in section 8, the additional assessment and results for the pre-kill containment period should be included. For each of the duration, animal responses, and physical injury assessments, this should include the methods, results, and evaluations.

The report may state if the trap has met the pre-kill containment period acceptability considerations (NAWAC 09 Guideline Appendix C) and the guideline specification (Class A or Class B) for the killing stage with the selected sample size for the species.

9. Marking and instructions

9.1 Marking and packaging

Traps should be marked visibly, legibly, and permanently with the manufacturer's and/or national distributor's name, symbol, or trademark. The trap packaging should include the following information:

(a) The species for which the trap was tested and found to meet the requirements of this guideline;

(b) the class for which the trap meets the requirements (that is, Class A or B); and

(c) instructions for use of the trap system, including any limitations on the operation of the trap.

9.2 Instructions for use

Instructions for use should be provided by the manufacturer and/or national distributor at the point of sale and they should also be available directly from them. The instructions for use should describe in sufficient detail how to set the trap system in a manner consistent with how the trap system was tested (e.g., how the bait is positioned, how the trap is set within the system, placement of the trap system) and include instructions for maintenance, service, and safe operation of the trap system. Traps may degrade over time, requiring maintenance, and trap performance may reduce over time, resulting in poor animal welfare outcomes. It is the responsibility of the user to ensure that the trap is well maintained in accordance with the manufacturer's guideline. The instructions should also provide information on how to set the trap system to reduce the risk of capturing non-target animals.

The instructions should also highlight that traps or trap system components need to be renewed over time (as appropriate for the particular trap system and how it is used) to address degradation and associated reduction in welfare performance. Any limitations on the operation of the trap system and reference to any relevant legislation and code of conduct should be included.

Appendix A: Pathological Observations of Trauma for Restraining Traps

See Annex A for trauma descriptions

1) Mild Trauma

a) No identifiable trauma

b) Claw loss

c) Oedematous swelling or haemorrhage

d) Minor cutaneous laceration

e) Minor subcutaneous soft tissue maceration or erosion (contusion)

f) Major cutaneous laceration, except on foot pads or tongue

g) Minor periosteal abrasion

2) Moderate Trauma

a) Severance of minor tendon or ligament (each)

b) Amputation of one digit

c) Permanent tooth fracture exposing pulp cavity

d) Major subcutaneous soft tissue maceration or erosion

e) Major laceration on foot pads or tongue

f) Severe joint haemorrhage

g) Joint luxation below carpus or tarsus

h) Major periosteal abrasion

i) Simple rib fracture

j) Eye lacerations

k) Minor skeletal muscle degeneration

3) Moderately Severe Trauma

a) Simple fracture at or below carpus or tarsus

b) Compression fracture

c) Comminuted rib fracture

d) Amputation of two digits

e) Major skeletal muscle degeneration

f) Limb ischaemia

4) Severe Trauma

a) Amputation of three or more digits

b) Any fracture or joint luxation on limb above carpus or tarsus

c) Any amputation above the digits

d) Spinal cord injury

e) Severe internal organ damage (internal bleeding)

f) Compound or comminuted fracture at or below carpus or tarsus

g) Severance of major tendon or ligament

h) Compound rib fracture

i) Ocular injury resulting in blindness of an eye

j) Myocardial degeneration

k) Death

Appendix B: Determining Total Trauma Class when an animal receives more than one trauma

Mild = 1 mild trauma

Moderate = 1 moderate trauma

or 2-3 mild traumas

Moderately severe = 1 moderately severe trauma

or 2 moderate traumas

or 1 moderate + 2 mild traumas

or 4-5 mild traumas

Severe = any number or combinations of mild, moderate, or moderately severe traumas that exceed the above trauma levels

Appendix C: (a) Specification for Acceptable Trauma of Class A Restraining Traps

For example, from a sample of 25 animals there should be no more than eight animals with trauma more severe than mild and no more than two with trauma more severe than moderate.

Note: The upper and lower threshold sample sizes are designed to give 90 per cent confidence that traps which pass the test will perform below the lower threshold 70 per cent of the time and below the upper threshold 80 per cent of the time.

Number of animals in test	Maximum allowable number of animals with trauma above the mild and moderate levels		Number of animals in test	Maximum allowable number of animals with trauma above the mild and moderate levels	
	> Mild	>Moderate		>Mild	>Moderate
25	8	2	63	25	8
26	9	2	64	26	8
27	9	2	65	26	8
28	10	2	66	27	8
29	10	2	67	27	8
30	10	2	68	28	8
31	11	2	69	28	9
32	11	3	70	29	9
33	12	3	71	29	9
34	12	3	72	30	9
35	13	3	73	30	9
36	13	3	74	30	9
37	14	3	75	31	10
38	14	4	76	31	10
39	15	4	77	32	10
40	15	4	78	32	10
41	15	4	79	33	10
42	16	4	80	33	10
43	16	4	81	34	11
44	17	4	82	34	11
45	17	5	83	35	11
46	18	5	84	35	11
47	18	5	85	36	11
48	19	5	86	36	12
49	19	5	87	37	12

50	19	5	88	37	12
51	20	6	89	37	12
52	20	6	90	38	12
53	21	6	91	38	12
54	21	6	92	39	13
55	22	6	93	39	13
56	22	6	94	40	13
57	23	7	95	40	13
58	23	7	96	41	13
59	24	7	97	41	14
60	24	7	98	42	14
61	24	7	99	42	14
62	25	7	100	43	14

Appendix C: (b) Specification for Acceptable Trauma of Class B Restraining Traps

For example, from a sample of 25 animals there should be no more than eight animals with trauma more severe than moderate and no more than two with trauma more severe than moderately severe.

Note: The upper and lower threshold sample sizes are designed to give 90 per cent confidence that traps which pass the test will perform below the lower threshold 70 per cent of the time and below the upper threshold 80 per cent of the time.

Number of animals in test	Maximum allowable number of animals with trauma above the moderate and moderately severe levels		Number of animals in test	Maximum allowable number of animals with trauma above the moderate and moderately severe levels	
	>Moderate	>Moderately severe		>Moderate	>Moderately severe
25	8	2	63	25	8
26	9	2	64	26	8
27	9	2	65	26	8
28	10	2	66	27	8
29	10	2	67	27	8
30	10	2	68	28	8
31	11	2	69	28	9
32	11	3	70	29	9
33	12	3	71	29	9
34	12	3	72	30	9
35	13	3	73	30	9
36	13	3	74	30	9
37	14	3	75	31	10
38	14	4	76	31	10
39	15	4	77	32	10
40	15	4	78	32	10
41	15	4	79	33	10
42	16	4	80	33	10
43	16	4	81	34	11
44	17	4	82	34	11
45	17	5	83	35	11
46	18	5	84	35	11

47	18	5	85	36	11
48	19	5	86	36	12
49	19	5	87	37	12
50	19	5	88	37	12
51	20	6	89	37	12
52	20	6	90	38	12
53	21	6	91	38	12
54	21	6	92	39	13
55	22	6	93	39	13
56	22	6	94	40	13
57	23	7	95	40	13
58	23	7	96	41	13
59	24	7	97	41	14
60	24	7	98	42	14
61	24	7	99	42	14
62	25	7	100	43	14

Appendix D: (a) Specification for Acceptable Killing Effectiveness of Class A Kill Traps (including kill traps with a pre-kill containment period)

For example, from a sample of 20 animals there should be no more than three retaining their corneal reflexes after 30 seconds and no more than one retaining its corneal reflex after three minutes.

Note: This table is designed to give 90 per cent confidence that traps which pass the test will perform below the lower threshold 70 per cent of the time and below the upper threshold 80 per cent of the time.

Number of animals*	**Maximum allowable number of animals retaining corneal reflexes after 30 seconds and 3 minutes**	
	30 seconds	**3 minutes**
10	0	0
15	2	0
20	3	1

The choice of how many animals are used should be made by the person submitting the trap, with the understanding that the lower sample sizes have a greater risk of an effective trap being rejected.

* *The number of animals to be tested should be chosen before the test starts, and when the maximum allowable number of failures is exceeded, the trap has failed the test for class A. For example, if a sample size of 20 is chosen and the trap fails to render a second animal unconscious within 3 minutes, then the trap has failed to achieve the class A specification. The trial for the trap to pass the class A level has stopped but depending on the time to loss of corneal reflex there could be opportunity to pass the class B specification level (consult Appendix D(b)).*

Appendix D: (b) Specification for Acceptable Killing Effectiveness of Class B Kill Traps (including kill traps with a pre-kill containment period)

For example, from a sample of 20 animals there should be no more than three retaining their corneal reflexes after three minutes and no more than one retaining its corneal reflex after five minutes.

Note: This table is designed to give 90 per cent confidence that traps that pass the test will perform below the lower threshold 70 per cent of the time and below the upper threshold 80 per cent of the time.

Number of Animals*	**Maximum allowable number of animals retaining corneal reflexes after 3 minutes and 5 minutes**	
	3 minutes	**5 minutes**
10	0	0
15	2	0
20	3	1

The choice of how many animals are used should be made by the person submitting the trap, with the understanding that the lower sample sizes have a greater risk of an effective trap being rejected.

** The number of animals to be tested should be chosen before the test starts, and when the maximum allowable number of failures is exceeded, the trial should be stopped. For example, if a sample size of ten is chosen and the trap fails to render the first animal unconscious within three minutes, then the trial should stop because the maximum allowable number of failures (i.e., 0) has been exceeded.*

Appendix E: Guidelines for Assessing Capture Efficiency, Target Selectivity, Mechanical Robustness and User Safety

1. Capture efficiency

The capture efficiency of a new trap is assessed by comparing the number of captures it achieves per 100 trap-nights with the number of captures achieved using a “control” trap for the nominated target animal i.e., an existing trap that is commonly used and has met this guideline.

Both test and control traps should be set in accordance with the manufacturer’s and/or national distributor’s instructions. Additionally, any treatment (for example, leaving traps in place but left unset) should be applied to both the test and control traps.

Test and control traps should be set out to ensure that the trap systems do not compete with each other and that the sample units (either the line or individual traps) are independent (consult a statistician on appropriate survey design).

Check the traps daily, and euthanise all captured animals immediately and remove them from the traps.

Record the following data each day when checking the traps:

- date and time
- trap system
- site location of the trap
- status of the trap (fired, not fired)
- species captured (include identifiable escapes)
- condition of the animal (dead, alive, unconscious, predated)
- location on body where animal is held by trap
- file number for each animal.

The capture efficiency of the test trap, when used in accordance with the manufacturer’s and/or national distributor’s instructions, should be at least 80 per cent of the control trap’s capture efficiency before the test trap can be considered as a suitable alternative.

2. Target selectivity

Selectivity will vary from site to site because of varying distribution and abundance of non-target animals. However, when assessing capture efficiency in the field, recording the capture of target and non-target animals will provide some information on the trap’s selectivity. For species such as kiwi and weka, specific field trials may be required to test the risk that a trap might pose to these species.

The selectivity of the trap, when used in accordance with the manufacturer’s and/or national distributor’s instructions, should not be less than that of the control trap.

Note: Consideration should be given to whether the actual, and likely, non-target animals are protected animals or other pest species.

3. Mechanical robustness

3.1 Principle

The material and workmanship of the trap are examined to determine the ability of the trap to continue to meet the killing effectiveness, capture efficiency, target selectivity and user safety criteria.

3.2 Examination of material and workmanship

All traps (whether kill or restraining) should be examined and determined to be free from imperfections and defects, and have adequate strength and rigidity to prevent, under normal use, breakage or permanent deformation that would cause performance to rapidly fall outside killing effectiveness, capture efficiency, target selectivity or user safety criteria. This includes considerations of regular trap maintenance and replacement of worn trap components.

If appropriate, the traps should incorporate a means of securing them to their intended place of use in order to prevent removal by captured animals.

The trap material, as well as welding or bonding, should comply with applicable international and/or national standards.

Replacement parts should meet the same specifications as the original parts.

4. User safety

4.1 Principle

The safety of the trap for the users while handling and setting it is inspected and tested.

4.2 Inspection and testing procedure

a. Test whether the trap can be opened using one hand (the feet, and any setting tool supplied, may be used to help open the trap).

b. Note whether the impact momentum and/or clamping force is sufficient to cause serious injury.

c. Apply any integral or accessory safety devices provided with the trap and fire the trap. Note whether the striking component remains in the cocked position if the trigger is activated. Alternatively, if the striking component moves out of the cocked position, note whether it exerts any impact momentum or clamping force.

4.3 Evaluation of the results

A trap should be deemed to pass the safety requirements if the operator has the ability to open the trap as described in 4.2(a) of this Appendix, and if the trap meets one of the following requirements when inspected and tested as specified in 4.2(b) and (c) of this Appendix:

a. the impact momentum and clamping force of the trap are insufficient to seriously injure the operator;

b. the trap can be set in such a way that the operator's limbs do not come within the arc of the striking component; or

c. when fired with safety devices applied as specified in 4.2(c) of this Appendix, the striking component remains in the cocked position or exerts no impact momentum or clamping force if it moves out of the cocked position.

In all other cases, the trap has failed, and further testing should not be conducted.

When appropriate, the instructions for use, as well as the packaging, should carry a warning (see Sections 9.1 and 9.2 above).

Annex A: Description of Pathological Observations and Their Relevance to the Clinical Welfare of the Animal

The following is an attempt to describe the predicted clinical impact on the well-being of a trapped animal of the injuries listed in Appendix A. While the immediate clinical/anatomical assessment of physical trauma by veterinary practitioners on the live animal can be done quite accurately and consistently, the long-term impact of an untreated injury on the other hand is rather difficult to assess and would depend on the type of animal involved, the length of time since the injury was sustained and the expertise of the clinician.

1. Claw loss: Note that this type of injury is common in some animals and is usually not associated with any behavioural change.

2. Oedematous swelling or haemorrhage: Partial impairment of venous and lymphatic return from the tissue distal to a constriction results in plasma leakage and sometimes red blood cell leakage from vessels. The extent is dependent on the length of time and constriction pressure. Consequently, there is always a variation in the amount of oedema.

Relevance: Slight oedema causes no observable discomfort. Severe swelling of tissue, particularly of the distal limbs, will cause temporary disuse or cautious use of the limb. The condition is usually transient, and recovery may be seen as early as half an hour after release. Persistence may indicate infection.

3. Minor cutaneous laceration: This is a cut or tear involving the full thickness of the skin. It is less than half of the width of a distal limb, but lacerations of the body should be judged in relation to total body size. It does not leave an open gap and, while likely to get contaminated and may become infected, is unlikely to become seriously inflamed.

Relevance: Minor cutaneous lacerations are a common injury for free-roaming animals. Apart from momentary avoidance reaction, there are no behavioural changes besides licking of the affected tissue.

4. Minor subcutaneous soft tissue maceration or erosion (contusion): This is a small lesion associated with a small contact area of a retaining device. It is usually the result of blunt impact and not associated with a cutaneous cut. It may involve tissue underlying a tendon or overlying bony prominence. The absolute size of the lesion should be judged in relation to the size of the surrounding soft tissue mass.

Relevance: A limited number of wild animals observed (mammals and birds) do not show any behavioural changes when affected by minor soft tissue lacerations and they are sometimes discovered as incidental findings.

5. Major cutaneous laceration, except on foot pads or tongue: This is a cut or tear involving the full thickness of the skin. The length or extent of the laceration should be assessed in relation to the width or circumference of the affected limb or body part, rather than by an absolute measurement. Several small lacerations next to one another should be assessed as cumulative.

Relevance: This depends very much on the location, and the degree of contamination the laceration has or to which it might be predisposed. A laceration on the metatarsus or carpus is of little consequence, and animals with such cuts show normal behaviour during field activities. Very large lacerations will have the potential to become contaminated, leading to secondary infections. Most of those, however, are open wide enough so that the infected area will drain and heal successfully without problems.

6. Minor periosteal abrasion: This is a small abrasion that does not cause a significant bone abrasion. However, the underlying bone surface may have a rough appearance.

Relevance: This is a painful injury. There is a potential for contamination and secondary infection. This should be judged in conjunction with the location and associated cutaneous laceration.

7. Severance of minor tendon or ligament: Minor tendons or ligaments are defined as those below the carpi or tarsi. These injuries usually involve extensor tendons.

Relevance: Where a tendon or ligament alone is injured, it is likely that there is little if any pain associated with the injury. However, the surrounding tissues including overlying skin may also be damaged, resulting in pain and inflammation.

If several tendons are severed, the inability to extend the digits may interfere with locomotion. This is of temporary impact, as the animal will learn to place the paw accordingly. Severance of three or four tendons will impede the animal temporarily.

8. Amputation of one digit: This is complete severance of a digit. The digit may still be attached by skin or ligaments.

Relevance: This is a painful injury causing temporary disuse of the affected limb, but often heals without visible inflammation through extensive fibrosis.

9. Permanent tooth fracture exposing pulp cavity: This could be a transverse fracture or a longitudinal fracture.

Relevance: A longitudinal fracture may be more severe than a transverse fracture. There is some initial tenderness for several days, but subsequently an animal appears to masticate without any visible problems. The sequel to a tooth fracture is quite variable, in that old tooth fractures with exposed pulp cavities can be seen in animals without any root canal infections and periodontitis. However, others are observed to get impacted and infected root canals that may lead, over time, to inflammation and/or infection of surrounding tissues and chronic pain.

10. Major subcutaneous soft tissue maceration or erosion: This covers a large area of soft tissue, perhaps half or full width of a limb, and possibly the entire thickness of the soft tissue.

Relevance: This causes immediate pain and dysfunction of the affected body part. The animal might use the affected limb during the flight response, although it is likely to display lameness in that limb. It will cause restriction in movement which may particularly affect hunting by predators but will heal well with scar formation.

11. Major laceration on foot pads or tongue: This is a cut or tear involving the full thickness of the skin. The length or extent of the laceration should be assessed in relation to the width or circumference of the affected foot pad or tongue, rather than by an absolute measurement. Several small lacerations next to one another should be assessed as cumulative.

Relevance: Foot pad lacerations cause temporary lameness and heal relatively slowly. A deep laceration involving the length or width of an entire foot pad may take two weeks to heal, during which time the animal will favour the limb and is likely to be hampered during hunting activity. A major tongue laceration may impede feeding and drinking, as well as healing relatively slowly.

12. Severe joint haemorrhage: This is a rarely observed injury which could occur as a secondary injury during struggle. Capillaries may burst during stretching of the joint capsule and ligaments, and in rare cases a large pericapsular vessel may rupture.

Relevance: The clinical signs relate more to the stretching or tearing of the joint capsule or periosteal insertion of the ligament than the actual haemorrhage. The more severe the haemorrhage, the more extensive the ligament injury. Blood-tinged synovial fluid reflects a mild injury and may not have any clinical consequence. Puffed up joints, on the other hand, cause pain resulting in disuse of this joint for many days or even weeks.

13. Joint luxation below carpus or tarsus: This is a misalignment of metacarpal/metatarsal phalangeal joints between the metatarsi and phalanges or interphalangeal joints. The joint capsule is usually ruptured.

Relevance: This is a painful lesion causing disuse of the affected limb. Luxation of the distal phalanx of one or two digits may be overcome by some species but would likely have greater significance in others.

14. Major periosteal abrasion: This is a large abrasion of the periosteum and should be assessed in relation to the size of the bone affected and the size of the animal rather than by absolute measurement. Contamination is likely to be present or to occur. Laceration of the overlying tissue is implied.

Relevance: This is a painful injury. There is potential for contamination, and secondary infection is greater than for a minor abrasion. This should be judged in conjunction with the location and associated cutaneous laceration.

15. Simple rib fracture: This is a partial or complete fracture of the rib without splintering, fragmentation, or broken skin.

Relevance: Some discomfort is present but is usually overcome during activity, particularly if it is a partial fracture. Complete fractures are more painful and carry the danger of injuring the lung. Hunting activity may be reduced, but only for a short time, as many animals are found in good condition showing healed simple rib fractures.

16. Eye lacerations: This is an incising injury of the eyeball. It may involve the cornea and/or the sclera. The injury may be superficial or involve the entire thickness of the cornea or sclera.

Relevance: All types of injury to the eye cause discomfort. Animals respond by excessive blinking or keeping the eye closed. Superficial lacerations of the sclera heal relatively quickly, as do lacerations of the cornea. There may, however, be a pannus formation, which is an invasion of the cornea by non-transparent tissue and vessels. This causes a blind spot and partial impairment of vision of that eye. Tearing is common during the healing phase, and, in some animals, secondary bacterial infection can occur. Deep lacerations with penetration of the full thickness of the sclera or cornea lead to loss of eye fluid and cause considerable discomfort. The animal would keep the eye closed and therefore have impaired vision. Healing will take place unless secondary bacterial contamination has occurred leading to abscess formation. Complete loss of vision could result.

17. Minor skeletal muscle degeneration: This is muscle degeneration attributable to physical exertion and identifiable by gross examination affecting a small amount (less than 10 per cent of the mass) of a muscle group.

Relevance: This causes pain but not impairment of the affected muscle group (that is, sore but functioning) and would be a survivable injury.

18. Simple fracture at or below carpus or tarsus: This is a non-fragmenting fracture of the metatarsi or metacarpi and/or phalanges.

Relevance: Fractures are painful causing disuse of the affected limb. In this area they tend to heal well in normal alignment.

19. Compression fracture: This is a distinct depression in the bone cortex, with relatively sharp edges. The opposite side of the impact has not fractured. This is to be differentiated from cortical bone abrasions, which have gradual shallow angles on the edges.

Relevance: This is a painful lesion causing disuse of the affected limb. It will take several weeks to heal, in which time the animal will show some debilitation. Compression fractures should be evaluated in conjunction with skin lacerations, soft tissue lacerations, tendon severance and the possibility of contamination.

20. Comminuted rib fracture: In this case, the bone is splintered or crushed, with fragmentation.

Relevance: This is a painful injury and may cause secondary problems such as lung lacerations.

21. Amputation of two digits: A complete severance of two digits. The digits may still be attached by skin or ligaments.

Relevance: This is a painful injury causing temporary disuse of the affected limb, but often heals without visible inflammation through extensive fibrosis. Amputation of several digits compounds the length of time the limb is disused.

22. Major skeletal muscle degeneration: This is muscle degeneration (necrosis) attributable to physical exertion and identifiable by gross examination affecting a large amount (greater than 10 per cent of the mass) of a muscle group.

Relevance: This causes excessive pain and probable disuse (loss of function) of the affected muscle group and may not be a survivable injury.

23. Limb ischaemia: Ischaemia means total suppression of blood flow to tissue. This therefore differs from the cause of oedema, where the vascular impairment is of the return flow. Limb ischaemia is observed in paralysed large animals resting for prolonged periods in one position or during surgery in anaesthetised large animals. In these cases, the pressure on the *relaxed* muscle is severe enough to occlude the arteries. Ischaemia results in pale muscle tissue, usually with a sharp demarcation of colour change outlining the area normally supplied by the compromised vessel. Complete limb ischaemia by restraining traps is rare. In many cases, this may need histological confirmation.

Relevance: Tissue injuries caused by ischaemia are time related. They may result in acute muscle fibre degeneration or in more extensive sarcoplasma degeneration with calcium deposition or, eventually, necrosis with break-up of sarcolemmal nuclei. Depending on the degree of damage, there may be uneventful repair, with fibrosis or sloughing of the necrotic muscle. A complicating factor may be gangrene. Ischaemia is very painful in the acute phase and leads to sloughing or permanent loss of function of the affected areas.

24. Amputation of three or more digits: This is a complete severance of the digits. The digits may still be attached by skin or ligaments.

Relevance: This is a painful injury causing temporary disuse of the affected limb, but often heals without visible inflammation through extensive fibrosis. Amputation of several digits compounds the length of time the limb is disused.

25. Any fracture or joint luxation on the limb above carpus or tarsus: “Fracture” for this purpose is defined as a complete fracture of the bone (as compared to a partial fracture or compression fracture); and “joint luxation” is defined as a total dislocation, usually occurring at the hock or elbow joint.

Relevance: Both lesions are painful causing immediate disuse of the limb with little chance of repair. Occasionally, deer are observed with previous fractures of the long bones which have repaired through fibrosis and remineralisation; however, these animals were permanently crippled due to the misalignment of the fracture without surgical intervention.

26. Any amputation above the digits: This is a total transaction of bone and soft tissue; however, the distal portion may still be attached by skin or tendons.

Relevance: This is a painful injury causing disuse of the affected limb. There can be remarkable repair of the stump through fibrosis, and quite a few carnivores have been observed with a well-healed amputated limb which hardly impeded their mobility or ability to hunt.

27. Spinal cord injury: This is usually a crushing injury, but on occasion can be secondary to dislocation and separation of vertebrae.

Relevance: The outcome depends upon the location at which the injury occurs. If the spinal cord injury is at the cervical vertebra 3 or above, it is likely to cause sudden death. Spinal cord injuries below that level cause paralysis of either the entire body and all four limbs, or the hind legs, depending on at which level the injury occurs. Behavioural assessment of pain perception on spinal cord injuries is difficult because of the paralytic effect on the one hand, and the strictly reflex responses on the other hand. A clear severance of the cord is likely to be less painful than crushing of the cord, which would involve damage surrounding soft tissue and bone and which can be assumed to be a very painful injury.

28. Severe internal organ damage (internal bleeding): This is defined as crushing or rupture of heart, lung, liver, spleen, kidney, intestinal tract, or bladder. This is to be differentiated from bruising, which may result in small, localised haemorrhage, particularly on the kidneys or liver.

Relevance: Severe damage to the heart can result in cardiac failure and rapid onset of death. Severe injuries to the lung will result in intrapulmonary and/or extrapulmonary haemorrhage or pneumothorax with increasing impairment of respiration, which in severe cases may result in asphyxiation. Rupture of liver or spleen usually results in severe haemorrhage causing shock. This can also occur secondary to rupture of the kidney if it is near the centre of the kidney where the major blood vessels supply that organ. Death may result if damage to the liver, spleen or kidneys is severe. Where major blood vessels are damaged, this may lead to significant haemorrhage which will also lead to death. Rupture of the intestine or bladder will result in peritonitis.

29. Compound or comminuted fracture at or below carpus or tarsus: In a compound fracture, the opened bone is exposed to the outside, thus involving penetration of the skin, while a comminuted fracture is one in which the bone is splintered or crushed.

Relevance: Any of these fractures are painful causing disuse of the limb. Compound fractures are likely to get contaminated resulting in osteomyelitis, while comminuted fractures usually do not reunite. It should be pointed out, however, that comminuted fracture of one small phalangeal bone will result in initial lameness but will repair sufficiently through fibrosis.

30. Severance of major tendon or ligament: “Major tendons and ligaments” are defined as those above carpi or tarsi, thus being involved in flexing, or extending the entire distal limb.

Relevance: Where a tendon or ligament alone is injured, it is likely that there is little if any pain associated with the injury. However, the surrounding tissues including overlying skin may also be damaged, resulting in pain and inflammation. Severance of a major tendon or ligament causes permanent disuse of the distal limb. Additional injuries will result from the limb dragging, and abrasions.

31. Compound rib fracture: This is a fracture in which a fragment or fragments pierce the skin.

Relevance: This rarely occurs on just a single rib and may involve more than one rib. It is a painful lesion causing changes in respiratory pattern and, consequently, avoidance of respiratory efforts as may be required during running. There is a chance that the bone marrow will become infected. There is also a chance that one of the sharp fragments may pierce the thoracic pleura, causing pneumothorax and/or pulmonary laceration and haemorrhage.

32. Ocular injury resulting in blindness of an eye: Collapse of the globe and secondary to full thickness laceration of the eyeball.

Relevance: Such an injury would result in blindness in the eye and loss of binocular vision. This would affect all functions relying on vision.

33. Myocardial degeneration: Any amount of myocardial degeneration (necrosis) identifiable by gross examination.

Relevance: This is presumed to be painful and is presumed to result in impairment or threat to continuance of cardiac function. It is highly probable that such a lesion is not survivable.

This version of the guideline was approved on 7 November 2023 and based on an original document approved by NAWAC on 27 April 2000. It was subsequently updated on 6 June 2019.

This guideline is not a legal interpretation of the Animal Welfare Act 1999. It is anticipated that this guideline will be updated from time to time as a result of new technologies and in light of experience gained by NAWAC during its deliberations.