

An assessment of animal welfare impacts in wild Norway rat (*Rattus norvegicus*) management

Sandra E. Baker\*, Michael Ayers, Ngaio J. Beausoleil, Steven R. Belmain, Manuel Berdoy, Alan Buckle, Christopher Cagienard, David Cowan, Jane Fearn-Daglish, Peter Goddard, Huw D.R. Golledge, Elizabeth Mullineaux, Trudy Sharp, Alick Simmons, Erik Schmolz

\*University of Oxford, Department of Zoology, Oxford, Oxfordshire, UK

[\\*sandra.baker@zoo.ox.ac.uk](mailto:sandra.baker@zoo.ox.ac.uk)

Online Resource 2: Part B Impact Scales (continued overleaf). From Sharp and Saunders (2011)

Impact category	Description of impact	Examples
<b>NO SUFFERING</b>	<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>
<b>MILD SUFFERING</b>	<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 dyspnoea (breathlessness).</p> <p>Mild degree of sickness e.g. vomiting/retching, diarrhoea, lethargy/weakness etc.</p> <p>Does not involve physical handling or restraint.</p>
<b>MODERATE SUFFERING</b>	<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>Moderate dyspnoea.</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>

Impact category	Description of impact	Examples
<b>SEVERE SUFFERING</b>	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>Severe dyspnoea</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>
<b>EXTREME SUFFERING</b>	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>Extreme dyspnoea.</p> <p>Severe internal haemorrhages causing swelling within confined spaces.</p> <p>May involve physical handling and restraint.</p>