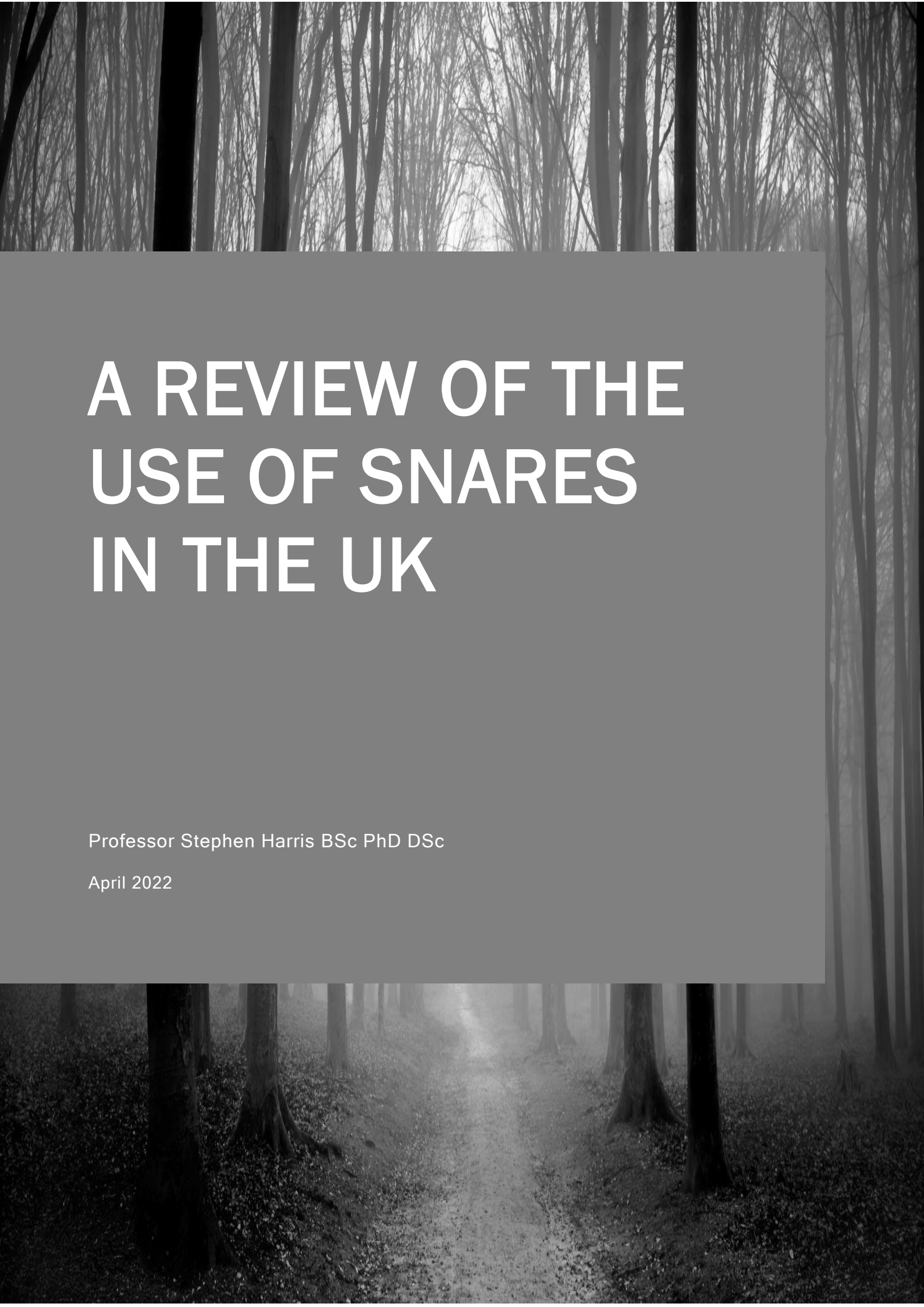

A REVIEW OF THE USE OF SNARES IN THE UK

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My instructions

I was instructed by the National Anti Snaring Campaign to assess:

- The need to use snares to control the numbers of foxes and rabbits in Britain, with particular emphasis on England
- The animal-welfare aspects of snaring
- Any animal-welfare improvements associated with the use of breakaway snares, especially those designed by the Game and Wildlife Conservation Trust

and

- The report published by the Department for Environment, Food & Rural Affairs in 2012 [1] following a contract issued to the Central Science Laboratory and the Game and Wildlife Conservation Trust entitled *Determining the extent of use and humaneness of snares in England and Wales* [2].

I outline the key issues in section 1, discuss fox snaring in section 2, rabbit snaring in section 3, and present my overall conclusions in section 4.

Executive summary

1. Snaring foxes was not included in the 1951 governmental review into cruelty to wild animals. Fox snares only came into use in the 1960s with the development of small-diameter steel cables. Despite a government-appointed Independent Working Group (set up in 2004) to 'address issues surrounding the use of snares' and a Defra-funded study (the contract was issued in 2008) to determine the scale of use of snares in England and Wales, there is still remarkably little information on how widely snares are used in the UK, how many snares are used by different user groups and why, and how many target and non-target animals are caught each year.

2. The lack of clarity in the Defra-funded study makes it difficult to reconcile different estimates of the numbers of foxes and rabbits, and non-target species, snared each year. While foxes and rabbits are widely portrayed as agricultural 'pests', the Defra-funded study showed that fox and rabbit snares in England and Wales are more likely to be used on landholdings where gamebirds are shot, and significantly more snares are set by gamekeepers than farmers. While the shooting industry claims that it is essential to snare foxes to protect ground-nesting birds, there is no evidence that this is necessary or successful.

3. The Defra-funded study found that both fox and rabbit snares are used on significantly fewer landholdings than had been anticipated, and that both fox and rabbit snares are only used on a minority of the landholdings where any form of fox or rabbit control is undertaken. While 97% of snaring in Britain is targeted at foxes, this still only contributes a very small proportion of the total number of foxes killed each year.

4. Both foxes and rabbits have undergone significant population declines since the late 1990s, and these declines appear to be continuing. Fox numbers across the UK have declined by 44% since 1996, rabbits by 64%. The decline in fox numbers is linked to the decline in rabbit numbers and the spread of sarcoptic mange. The decrease in rabbit numbers is linked to the arrival and spread of rabbit haemorrhagic disease. Any adverse or economic impacts that either species may have had in the past are no longer relevant.

5. The vast majority of livestock in Britain are reared in intensive units where they are not vulnerable to predation, and the trend towards increasing numbers of large intensive systems is increasing. The main production system where foxes might have an economic impact is sheep rearing in hill and upland areas because ewes lamb in the open. However, even in these landscapes, overall losses to foxes are low, and higher losses are linked with poor management.

6. There is no evidence that foxes cause significant economic losses to agriculture. Of two analyses undertaken at the turn of the century (when both fox and rabbit numbers were significantly higher than at present), one concluded that, at worse, foxes were economically neutral by reducing economic loses to rabbits, and the other suggested that foxes were of significant economic benefit to agriculture. There are no data to support claims that it is essential for farmers to be able to use snares to reduce economic loses to foxes and rabbits.

7. It is difficult to assess the economic significance of fox predation on released gamebirds. Only a third of the gamebirds released each year are shot. Many of the 'surplus' gamebirds die from disease or

shooting injuries, and several million are killed on the roads. There are no data on which to undertake a cost/benefit analysis to determine whether killing foxes on gamebird-shooting estates is either necessary or justifiable. Nor are there any data to suggest that snaring is an essential tool for gamekeepers. When increased levels of regulation were introduced in Scotland, many gamekeepers switched from snaring to using more modern methods of killing foxes. These have significantly fewer welfare issues.

8. There are no data to support claims that snaring foxes is an essential conservation tool. Nor is there any evidence that snaring foxes has benefited populations of ground-nesting birds. Where it is necessary to reduce fox numbers locally for the benefit of species of conservation concern, a variety of other techniques are available that have significantly fewer welfare issues.

9. Fox snares catch large numbers of non-target species. The average non-target capture rate across a range of studies is around 70%, which is substantially higher than the 40% non-target captures which the government's Independent Working Group on snares suggested might be an achievable target. High levels of non-target captures may have a significant impact on populations of species of conservation concern.

10. A wide range of birds and mammals are caught in snares. Improvements in snare design, and the introduction of Codes of Practice, training courses and good-practice guidelines, have not led to a reduction in the proportion of non-target captures. There is no evidence that rates of non-target captures are lower when snares are set by highly-experienced professional operators.

11. Snares should be humane, i.e., they should hold animals with the fewest injuries and a minimum of stress. When applied to animals, the term humane is generally taken to mean inflicting the minimum of pain. However, few studies have evaluated the humaneness of neck snares, and it is not possible to assess the welfare impacts of snares under routine use, or how frequently severe problems occur. Most assessments of the welfare issues associated with the use of snares have simply looked at the number and types of injuries recorded on target and non-target captures, whereas it is important to integrate these data with physiological and behavioural measures. The available data suggest that whether a snare is legal or illegal does not influence the welfare outcome for a captured animal, and there is no evidence that there has been an improvement in the welfare of animals caught in snares over the last few decades.

12. Non-target species caught in snares are routinely released because they 'appear' to be uninjured. However, there are no data on the welfare and survival of these animals, and this is likely to be a significant welfare issue. It is not possible to assess the injuries to an animal in the field. Deeper injuries may not be apparent through an animal's fur, internal injuries will not be detectable, and tissue necrosis and capture myopathy may not become apparent for several days.

13. Snaring in Britain is most intense during the breeding seasons of foxes and rabbits, as well as non-target species. It leads to large numbers of dependent offspring dying from hypothermia and/or starvation and is a significant welfare issue. This is incompatible with British animal-welfare standards. It is anomalous that badgers, and brown hares in Scotland, have specified close seasons but substantial numbers are still killed each year in fox snares set during their breeding seasons.

14. There are no data on the effects of adverse weather conditions on the welfare of

animals caught in snares. Nor are there any data on the fear of predation on animal welfare, although this is likely to be substantial. There are significant levels of predation on both rabbits and brown hares caught in snares.

15. Attempts to develop foot-hold and breakaway snares are based on the premise that current levels of snare performance, and the welfare of snared animals, are unacceptable. Pen trials of a leg-hold snare showed that it was ineffective and only held 41% of foxes. Two breakaway snares are currently available in Britain. There appear to be no test data for one, and the majority of the non-target captures in the other did not manage to open the breakaway device. This is probably because of the considerable force that a captured animal has to exert on the snare to cause the breakaway device to fail. This force has to be exerted through a 2-mm-diameter wire cable that is wrapped around an animal's neck, thorax, thorax and foreleg, or abdomen. There are no data on the welfare, or survival, of animals that manage to open the breakaway device. Attempts to design improved snares have not addressed the fundamental concerns about snaring.

16. While both fox and rabbit snares are described as restraining traps, a significant proportion of snare users set their snares with the intention of killing captured foxes and rabbits. Mortality rates in both types of snare are high: mortality rates in excess of 50% are common, especially for rabbits. Mortality rates in fox snares are comparable to mortality rates for killing neck snares used to catch furbearers in North America. It is unclear why neck snares are portrayed as restraining traps in the UK.

17. Levels of compliance with legal requirements, Codes of Practice and best-practice guidelines are low. According to the Defra-funded study, more gamekeepers than farmers had actually read the Code of Practice and attended training courses, but in 2009 the majority of operators in England and Wales (approximately 4500) were using snares without any formal training. There are no data for other user groups. Snare users see little or no value in improved snare designs, since existing snares catch target animals, albeit in an inhumane manner, and the concern of most operators is to set snares where foxes are most likely to be caught rather than worry about the risks of entanglement and injury, or the risk of non-target captures.

18. The perception that catching and killing foxes and rabbits is more important than their welfare may in part be driven by the UK government and farming and shooting organisations, who continue to portray particular species as 'pests' or 'vermin'. The use of value-laden terminology when discussing the use of snares in the UK defines animals in terms of how they can be treated and killed. This is contrary to the animal-welfare standards generally applied in the UK. The use of value-laden terminology is counter-productive to efforts to improve animal welfare and perpetuates animal pain and suffering on an enormous scale.

19. There is no evidence that a significant improvement in the uptake of a Code of Practice or making formal training mandatory would improve animal welfare. In Scotland, where training is now mandatory, only 0.1% of people failed to pass the training course. So people who attend a training course are virtually guaranteed to pass, there is no requirement to attend refresher courses, even when legislation changes, and operators who have attended a training course receive accreditation for life. Some of the people who have received accreditation in Scotland have subsequently been found guilty of snaring

offences. Moreover, it is inappropriate to focus on the illegal/improper use of snares, since the legal and 'proper' use of snares leads to unintended suffering and death on a large scale.

20. The continuing widespread abuse and misuse of snares (as well as spring traps and cage traps) show that improvements in regulations, Codes of Practice and/or best-practice guidelines produced by professional organisations do not lead to higher levels of compliance or an improvement in animal welfare. Irrespective of any regulations which may be in place, snares are used on private land, generally away from public access, where poor practice and malpractice can pass unnoticed. It is not possible to ensure that recommendations made during training courses will be put into everyday practice.

21. Animals caught in snares should be killed humanely, i.e., the welfare of the animal should be good at the onset of the killing procedure, and any method used to kill captured animals should result in insensibility to pain and distress within a few seconds. However, there is no legal guidance on how to kill snared foxes and rabbits, or non-target captures. Many of the methods used to kill snared animals are associated with significant levels of suffering, and would not be acceptable if applied to the same species in other captive circumstances. The way that snared animals are killed reflects the low animal-welfare standards generally applied to wild mammals and the widespread use of value-laden terminology. Species that have an economic impact suffer the same adverse outcomes of poor welfare as other sentient species.

22. Snaring rabbits is a marginal activity and, at best, makes a minor contribution to the total number of rabbits killed in Britain each year. Only 3% of snare use is to catch rabbits and it is the least important method used to kill rabbits on arable landholdings in Britain. In 2009, although rabbits were killed on 51% of landholdings in England and Wales, snares were only used on 2.4% of those where rabbits were being killed. Since then, rabbit numbers have declined to such an extent that their rarity is of conservation concern, and efforts are being made to boost rabbit numbers in some agricultural landscapes.

23. Rabbit snares capture a wide range of non-target species and appear to pose a significant risk to small mustelids, domestic and feral cats, and pet dogs. They also catch juvenile and adult foxes. Of particular concern is the risk that rabbit snaring might pose to attempts to reintroduce pine martens to England.

24. Significant welfare issues are associated with snaring rabbits: a high proportion of captured rabbits are strangled. Studies on rabbits placed in snares in pens show that, despite a protracted death and a range of behavioural issues indicative of high levels of stress, physical assessment of any injuries are inadequate to assess the welfare issues associated with the use of snares. A range of predators prey on rabbits captured in snares; the distress calls made by snared rabbits attract predators. Breakaway rabbit snares do not address these fundamental welfare issues.

25. In 1951 the Committee on cruelty to wild animals concluded that significant welfare issues are associated with snaring rabbits but could not recommend a ban on the use of snares because of the economic losses attributed to rabbits. However, the Committee stated that, should humane alternatives become available, the use of rabbit snares should be banned. Two types of live-capture rabbit traps are now available that are highly efficient, and have fewer associated welfare issues than rabbit snares.

26. Unsubstantiated statements and anecdotal reports from interest groups have been taken at face value to justify the continued use of snares, and given equal credence as scientific investigations. Wild-animal welfare policy in the UK should not be based on unsubstantiated assertions. Proponents of a particular means of capturing and killing wild animals should be required to demonstrate the necessity of using that technique, including a cost/benefit analysis as recommended by the Independent Working Group on snares. However, wild-animal welfare legislation in the UK invariably places the burden of proof on opponents rather than users.

27. The Independent Working Group concluded that the lack of available data on snaring is a serious problem when trying to make cost/benefit assessments about when the use of snares is justifiable. Nearly 20 years later, the data are still not available to undertake such a fundamental analysis. The Independent Working Group concluded that procedures that have the potential to harm the welfare of animals should not be used unless there is a good reason to do so, and that this should outweigh the welfare cost. There is no such evidence to justify the continued use of snares.

28. The use of snares does not pass any of the 7 ethical standards for wildlife control established by an international panel of 20 experts. Some methods used to kill wild animals have such extreme effects on their welfare that, regardless of the potential benefits, their use is never justified: snaring is one such method.

29. All the available data show that it is impossible to monitor the use of snares, or enforce legal requirements, Codes of Practice or best-practice guidelines. The only way to stop extremely high levels of non-target captures, illegal use and misuse of snares, address animal welfare concerns, and recognise that wild animals are sentient beings, is to prohibit the use of snares. Only a few European countries still allow the use of neck snares. There are increasing moves to ban their use around the world because it is impossible for snaring to achieve acceptable welfare standards.

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1. Introduction

In this review I focus on the following issues.

1.1. Does UK legislation address the welfare issues associated with the use of snares?

The first piece of animal welfare legislation enacted in Britain was the Cruel Treatment of Cattle Act 1822, which was followed soon after by the Cruelty to Animals Act 1835 and thereafter a succession of legislation which progressively improved the welfare of captive animals. In contrast, legislation addressing the welfare of wild mammals has developed in an idiosyncratic and erratic manner [3], and the regulation of wild mammal welfare has lagged a long way behind that applied to captive animals [4].

In 1949, after a series of campaigns to improve the welfare of wild mammals that lasted nearly a century, the government appointed the *Committee on cruelty to wild animals to enquire into practices or activities which may involve cruelty to British wild mammals and to make recommendations as to such legislative measures as may seem to them to be desirable in relation to the practices and activities into which they have enquired*. The Committee's report led to two improvements in the welfare of wild mammals:

- The Pests Act 1954 prohibited the use of gin (leg-hold) traps in England and Wales from July 1958 (their use remained legal in Scotland until April 1973)
- The Deer Act 1963 prohibited the use of snares to catch deer and introduced closed seasons for most species of deer

While the Committee identified significant concerns about the cruelty associated with snaring rabbits (at the time, snares were rarely used to catch foxes (section 2.1)), they concluded that the economic arguments for snaring rabbits outweighed any welfare considerations [5].

Thirty years later the Wildlife and Countryside Act 1981 introduced a *Prohibition of certain methods of killing or taking wild animals*. Section 11 of the Act stated that:

(1) *Subject to the provisions of this Part, if any person –*

(a) *sets in position any self-locking snare which is of such a nature and so placed as to be calculated to cause bodily injury to any wild animal coming into contact therewith*

(b) *uses for the purpose of killing or taking any wild animal any self-locking snare, whether or not of such a nature or so placed as aforesaid …*

he shall be guilty of an offence

(2) *Subject to the provisions of this Part, if any person –*

(a) *sets in position any of the following articles, being an article which is of such a nature and so placed as to be calculated to cause bodily injury to any wild animal included in Schedule 6 which comes into contact therewith, that is to say, any trap or snare …*

(b) *uses for the purpose of killing or taking any such wild animal any such article as aforesaid, whether*

or not of such a nature and so placed as aforesaid …

he shall be guilty of an offence

(3) *Subject to the provisions of this Part, if any person –*

(a) *sets in position any snare which is of such a nature and so placed as to be calculated to cause bodily injury to any wild animal coming into contact therewith; and*

(b) *while the snare remains in position fails, without reasonable excuse, to inspect it, or cause it to be inspected, at least once every day,*

he shall be guilty of an offence

(6) *In any proceedings for an offence under subsection (2)(a) it shall be a defence to show that the article was set in position by the accused for the purpose of killing or taking, in the interests of public health, agriculture, forestry, fisheries or nature conservation, any wild animals which could be lawfully killed or taken by those means and that he took all reasonable precautions to prevent injury thereby to any wild animals included in Schedule 6*

Although the Wildlife and Countryside Act 1981 prohibited the use of self-locking snares, there was no legal definition of what constituted a self-locking snare, and free-running snares may become self-locking without regular maintenance or if they become twisted or entangled (sections 2.10 and 2.11).

Schedule 6 included badger, hedgehog, otter, pine marten, polecat, red squirrel and wildcat. However, a defence for snaring these species is that they were caught accidentally as part of a lawful activity and that all reasonable precautions were taken to avoid snaring a Schedule 6 species (sections 2.10 and 2.11).

The first piece of legislation dealing directly with cruelty to all species of wild mammals was the Wild Mammals (Protection) Act 1996. An offence is committed *if any person mutilates, kicks, beats, nails or otherwise impales, stabs, burns, stones, crushes, drowns, drags or asphyxiates any wild mammal with intent to inflict unnecessary suffering*. However, an offence is only committed if the intent was *to inflict unnecessary suffering*, and Section 2 Exemptions from offence include the following:

(b) *the killing in a reasonably swift and humane manner of any such wild mammal if he shows that the wild mammal had been injured or taken in the course of either lawful shooting, hunting, coursing or pest control activity*

(d) *any act made unlawful by section 1 if the act was done by means of any snare, trap, dog, or bird lawfully used for the purpose of killing or taking any wild mammal*

So the Wild Mammals (Protection) Act 1996 includes similar caveats as the Wildlife and Countryside Act 1981 and used value-laden terminology (section 2.10).

According to the UK government, *The Animal Welfare Act 2006 contains protection for animals under the control of man to help prevent unnecessary suffering and covers any animal held in a snare* [6]. However, it is unclear what constitutes suffering in a wild mammal: the RSPCA's Prosecution Department relies on the dictionary definition, i.e., *pain that is caused by injury, illness, loss etc, physical, mental or emotional pain; feelings of pain* [7].

What constitutes *unnecessary suffering* is even less clear. Section 4 (Unnecessary suffering) of the Animal Welfare Act 2006 states that:

(3) *The considerations to which it is relevant to have regard when determining for the purposes of this*

section whether suffering is unnecessary include –

(a) *whether the suffering could reasonably have been avoided or reduced*

(b) *whether the conduct which caused the suffering was in compliance with any relevant enactment or any relevant provisions of a licence or code of practice issued under an enactment*

(c) *whether the conduct which caused the suffering was for a legitimate purpose, such as –*

(i) *the purpose of benefiting the animal, or*

(ii) *the purpose of protecting a person, property or another animal*

(d) *whether the suffering was proportionate to the purpose of the conduct concerned*

(e) *whether the conduct concerned was in all the circumstances that of a reasonably competent and humane person*

I discuss the exemptions that refer to *compliance with any relevant enactment or any relevant provisions of a licence or code of practice issued under an enactment* in sections 2.10 and 2.11. A factor to be considered when determining whether any suffering was unnecessary was whether *the conduct that caused the suffering was for a legitimate purpose, such as – protecting … another animal*. The use of both fox and rabbit snares is associated with rearing gamebirds (sections 2.1 and 3.1). A further relevant consideration was *whether the conduct concerned was in all the circumstances that of a reasonably competent and humane person*. I discuss this proviso in section 2.10.

In this report I discuss: (i) whether existing animal welfare legislation offers effective protection for animals caught in snares; (ii) whether improved snare designs can improve the welfare of target and non-target species caught in snares; (iii) whether improved snare designs improve selectivity; (iv) whether improved Codes of Practice and best practice guidelines are likely to improve the welfare of animals caught in snares, or can be enforced; and (v) whether improved training can improve the welfare of animals caught in snares.

1.2. The welfare of animals caught in snares

When assessing the welfare of animals caught in snares, it is important to integrate behavioural and physiological measures with physical effects [8]. However, there is currently no established scoring system for restraining traps that integrates physical injuries with behavioural and physiological responses (Table 1).

A key part of any assessment is to determine whether the capture process itself is *humane* and whether *humane killing* standards are achieved once the animal is found and dispatched by whoever set the snare. When applied to animals, the term humane is generally taken to mean *inflicting the minimum of pain* [9]. The term *humane killing* means that the welfare of the animal just prior to the initiation of the killing procedure is good, and that the procedure itself results in insensibility to pain and distress within a few seconds [8,10].

Table 1. Measures that should be used to evaluate the welfare of animals in restraining traps [8]

Measure	Examples
Health	Extent of body damage (physical injuries), effects of exposure (e.g., freezing of extremities)
Behaviour	Activity levels, immobility, postural changes, vocalization, digging, pacing, chewing, lunging, self-mutilation, other escape behaviours and behaviours indicative of anxiety, distress, fear, pain and other negative feelings
Physiology	Levels of cortisol and other hormones in the blood, levels of muscle enzymes in the blood, levels of blood cells as markers of the stress response (e.g., neutrophils), markers of the inflammatory response (e.g., acute phase proteins), markers of exposure or food and water deprivation (e.g., changes in haematocrit or blood proteins), heart rate, body temperature

In this report I discuss: (i) whether snaring inflicts the minimum of injury, pain and distress on a captured animal; (ii) whether the welfare of the captured animal is good up to the point where it is killed; and (iii) whether the captured animal is rendered insensible to pain and distress within a few seconds of discovery.

1.3. Humane trapping standards

Animal traps are expected to be humane, efficient and selective. Since the late 1980s, there has been a proliferation of studies designed to evaluate injuries caused by traps, as well as trap capture efficiency [11]. Trappers tend to focus on efficiency. However, it is essential that traps also meet high welfare standards and that they are selective, i.e., avoid the capture of non-target species [12]. So when evaluating whether a capture technique is humane, it is important to consider the impacts on both target and non-target species [8,13,14].

It is also important to consider the welfare of animals which escape, particularly their behaviour and survival. For instance, neck snares designed to kill furbearers in North America do not render animals unconscious quickly, and animals that escape usually die from infection and/or starvation hours or days after escaping [15]. In fact some of the worst welfare is associated with animals that escape from a restraining trap and then take several days or weeks to die [10]. So the probability of animals escaping from snares needs to be assessed as part of any approval process [16].

An EU project, led by the government's Food and Environment Research Agency, aimed to *identify the best possible standards for killing and restraining trapping methods both from an animal welfare and efficiency angle*. The study compared three widely used trapping standards produced by the International Organization for Standardization (ISO), the Agreement on International Humane Trapping Standards (AIHTS), and New Zealand's National Animal Welfare Advisory Committee (NAWAC) [17]. The aspects of these standards that are most relevant to this report are summarised below.

1.3.1. ISO/TC 191 standards

The ISO published a draft humaneness standard for restraining traps based on injures that were believed to cause pain, and produced categories of injuries that were *potentially acceptable* and *unacceptable*, with potentially acceptable injuries being allowed in a range of combinations. A scoring system established an *injury threshold value*, and a restraining trap met the welfare standards if 80% of captures were below the injury threshold value [17].

A review of best management practices for trapping furbearers in the United States provided the largest and most standardised trap-injury database in the world for 19 species of mammals (including red foxes) captured in a wide variety of restraining traps (but not neck-hold snares). It concluded that the ISO scoring system provided a sound, objective, and repeatable approach for trap-testing studies [18].

A draft trap selectivity standard was also published by the ISO. For this, trap selectivity is calculated as the number of captured target animals divided by the total number of captured animals. However, the ISO definition of trap selectivity only provides a simple capture proportion and so does not represent trap selectivity. Also, indices of relative trap selectivity cannot be extrapolated to other studies unless species assemblages and relative species abundances are consistent from one place to another [15].

The other problem is that the standard does not specify a minimum acceptable percentage of selectivity. So the ISO trap selectivity standard is misleading, and legal approval may be inadvertently granted for a trap that is in effect non-selective. This occurred in Spain when the use of traditional snares for foxes accounted for the largest proportion of recorded mortality in the endangered Iberian lynx [16].

1.3.2. AIHTS standards

The key purpose of the AIHTS standards is to facilitate trade rather than promote animal welfare [19]. Furthermore, neither foxes nor rabbits are included in the list of species covered by the AIHTS, and neither killing nor restraining neck snares are included in the standards. It is unclear why killing neck snares were excluded since they have a significant impact on the welfare of captured animals, comparable to that of steel leghold traps, which have been judged unacceptable at the international level [20].

The AIHTS recognises two behavioural indicators – self-mutilation and unresponsiveness – and a number of injuries or physiological symptoms as indicators of poor welfare for restraining traps. These indicators are notably lacking in comprehensive behavioural and more subtle physiological indicators [19] and, unlike the ISO TC_{191} standards, they are not given a value on a trauma scale [4], although there is a list of injuries *recognised as indicators of poor welfare in trapped animals.* At least 80% of trapped animals must show none of these injuries if the trap is to pass. However, the AIHTS scheme cannot cope with the compound welfare impacts of a number of lesser injuries [17]. Under the current AIHTS standards for restraining taps, 43% of captured animals may suffer unacceptable welfare conditions [16].

Although the AIHTS suggests that field testing of traps should include an assessment of trap selectivity, they provide no guidance on how this should be done. This is a significant problem since non-target captures may experience pain, distress or death, and may be permanently handicapped if released [16].

How a trap is used is also crucial to the welfare impact it has on the target species, to the non-target risk it poses, and to its efficiency. Even apparently innocuous changes in the way a

trap is used can have a large effect on the outcome. A criticism of the AIHTS is that it concentrates too heavily on the trap itself and does not deal sufficiently with issues such as trap efficiency, non-target risk, and the training and registration of trappers [17].

It is also unclear why species such as the red fox, which are widely trapped for their pelts as well as other reasons, are not included on the list of species covered by the AIHTS [16].

1.3.3. NAWAC standards

Under the NAWAC trap approval system, each injury sustained by an animal caught in a restraining trap is classified into one of four trauma categories, and the number of each of these trauma categories are then combined to produce an overall trauma class for each animal. This scale addresses the problem of multiple and diverse injuries [17]. However, the NAWAC give no guidance on measuring selectivity other than saying that *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*.

The EU project concluded that, despite all the potential complications, comparative studies measuring changes in behaviour and physiology in combination with assessments of trap effectiveness and selectivity should be completed for restraining traps [17].

A subsequent review concluded that mammal trapping standards should be revisited to: (i) include all trapped species of mammals regardless of why they are captured; (ii) expand on animal-welfare indicators and injuries to detect poor animal welfare in animals captured in retraining traps; (iii) improve trap-testing procedures; (iv) develop protocols for the handling and dispatching of captured animals; and (v) develop protocols to assess capture efficiency and species selectivity. The review also concluded that the development of better trapping standards should not be hampered by conceptual views about human–wildlife relationships. The maintenance of outdated standards and delays in implementing state-of-the-art technology simply perpetuate animal pain and suffering on an enormous scale [16]. Furthermore, any method approved for trapping wild mammals should present robust analyses and comprehensive documentation showing how the welfare of target and non-target species was assessed, and the impacts on target and non-target animals [21].

In this report I discuss: (i) whether neck snares are selective; (ii) whether the welfare impacts on target and non-target animals have been adequately assessed; (iii) whether the population impacts of snares on target and non-target species have been adequately assessed; (iv) whether the need to use snares has been adequately justified; and (v) whether the welfare assessments used to justify the use of neck snares are adequate.

1.4. Are neck snares restraining traps?

The Defra-funded study stated that *Snares are commonly used in the UK for the restraint of certain mammal species, prior to despatch* [1]. While neck snares are portrayed as restraining devices in the UK, there is no clear definition of what constitutes a restraining, as opposed to killing, trap.

Since there are no guidelines to determine whether neck snares are restraining devices, it is important to understand the meaning of the word *restrain* as in common use. According to *The concise Oxford dictionary of current English*, the term implies a restriction on physical movements, and that adverse/damaging behaviours and stress are also kept within acceptable limits [9]. So, to be described as a restraining trap, neck snares should hold animals alive with the minimum of injury and stress [22]. An important corollary of this definition is that injuries sustained during capture in a restraining trap, and mortality rates, are both end-points of poor welfare [23].

In this report I discuss whether neck snares should be described as restraining traps, using the commonly accepted understanding of the word 'restrain', and the mortality rates reported for 'killing neck snares' used to catch furbearers in North America.

2. Snaring foxes

2.1. Background

The *Committee on cruelty to wild animals* found that snaring *is used mainly for rabbits, but also, to a lesser extent, for catching hares, deer and other animals*; the Committee made no mention of using snares to catch foxes [5]. In the same year the Ministry of Agriculture and Fisheries (now Defra) reported that *foxes are destroyed … by hunting, shooting, trapping and gassing*; there was no mention of snaring [24]. Two essays written in the late 1950s comparing the cruelty associated with foxhunting and other methods used to kill foxes also made no mention of snaring [25,26]. The ban on the use of gin traps in England and Wales in 1958 did not lead to a greater use of fox snares [27], and there is no evidence that fox numbers increased.

Fox snares only came into widespread use in Britain during the 1960s after *small diameter flexible steel cable, manufactured for bicycles, aeroplanes, etc.*, became available for snare construction [28].

In the late 1960s the Humane Traps Panel Scotland asked the Forestry Commission, in collaboration with the Department of Agriculture for Scotland, to assess the efficacy and cruelty of using snares as an alternative to gin traps. Equal numbers of free-running and self-locking snares were deployed in 8 Scottish forests. Neither type of snare proved significantly more efficient or less cruel than the other: while self-locking snares caused more visible damage, *post mortem* analyses showed no significant difference between the 2 types of snare [29].

Both free-running and self-locking snares were in widespread use in the 1970s [30]. The use of self-locking snares was made illegal in Britain

by the Wildlife and Countryside Act 1981, and in Northern Ireland by the Wildlife (Northern Ireland) Order 1985. However, there was no legal definition of what constituted a self-locking snare, and no legal requirement to use stops on free-running snares.

Over the next 25 years it remained unclear how frequently fox snares were used in the UK, who used them, and why. So in October 2004 Defra asked Dr James Kirkwood *to form and Chair an Independent Working Group* (IWG) *to address issues surrounding the use of snares.* Defra's objectives for the Group were:

- *to seek agreement on good-practice guidelines*
- *to produce a code of good practice*
- *to advise Defra on the next steps including approximate costs of each proposal*

The IWG's remit opened with the statement that *The use of snares … is an effective tool for the management of pests* [31]. So their report is based on two presumptions: (i) foxes and rabbits are pests, and (ii) snaring is an effective management tool. I return to both of these issues later.

According to the IWG, snares were *widely used in the UK to restrain animals for despatch rather than as killing devices*, and that there was *a limited variety of other methods for the capture or killing of species* caught in snares [31]. The IWG provided no evidence to support either assertion.

Thereafter, snaring continued to be portrayed as an essential means to 'manage' 'pests'. For example, a joint briefing from six Scottish organisations (including BASC Scotland, the Scottish Gamekeepers Association, NFU Scotland and the Scottish Countryside Alliance) claimed that *Snares are an essential tool used by Scotland's wildlife and conservation managers to manage certain predators and pests in the countryside … Snaring is one of the most widely used methods of rabbit control* [32]. Similarly, the Countryside Alliance claimed that *Without snares, foxes and rabbits would be an increased threat to vulnerable populations of wildlife, biodiversity and habitat conservation. They would also cause significantly greater damage to a diverse range of economic activities including shooting, agriculture, forestry and eco-tourism, which all rely on a managed countryside* [33]. No data were included to support these assertions, which were made when fox and rabbit numbers were undergoing significant declines (sections 2.2 and 3.2).

The IWG recommended that there should be a survey of the use of snares in the UK, covering all their uses. They stated that the *lack of data available on the use of snares, and particularly on their welfare impact, is a serious problem both in making cost/benefit assessments about when the use of snares is justifiable* … and *in developing guidelines about good practice* [31].

In 2008 Defra issued a contract to the Central Science Laboratory (CSL) and GWCT to, among other things, *Determine the scale of use of snares in England and Wales* [1]. While GWCT was the lead contractor [34], unusually the contract report was published anonymously, and so I refer to it as the 'Defra-funded study'.

In their specification for the Defra-funded study, CSL and GWCT stated that *fox snares will be used on approximately 25% of farms* [2]. However, of 115,436 landholdings in England with an area >5 ha, fox snares were only used on 4695 (4.1%: 95% confidence intervals 3755 - 5635), i.e., only 16% of what was predicted.

While the Defra-funded study found that some form of fox control was undertaken on 43% of landholdings in England and Wales [1], snares were only used on 10% of the landholdings where any form of fox control was undertaken. This is reinforced by a GWCT study which found that snaring contributed only 3%, 13%

and 9% of the total fox cull in mid Wales, east Midlands and west Norfolk respectively [35].

The Defra-funded study estimated that fox snares were used by 3291 gamekeepers and 2692 farmers in England [1]. However, they are not the only people who use snares. Of the 11 people charged by the Scottish Society for the Prevention of Cruelty to Animals (SSPCA) with snaring offences between 1 April 2013 and 31 March 2016, five were gamekeepers, four were unemployed, one was a mole catcher, and one was an oil worker, who was charged on three separate occasions [36]. The number/diversity of 'other' users of fox snares was not quantified in the Defra-funded study.

Snare use [in England and Wales] *was more likely on landholdings … if there was a gamebird shooting interest … The number of fox snares set by gamekeepers* (median 35, range 2 to 700) *was significantly higher than the number set by farmers* (median 5, range 1 to 300). The *average number of fox snares in use at any one time in each month ranged from approximately 60 to 130 per actively snaring gamekeeper, and from approximately 1 to 18 for farmers* [1].

According to the Defra-funded study, *between 62,800 and 188,300 fox snares were in use in England at any one time*. However, the authors failed to explain what this meant, and so the data are open to misinterpretation. The way the data are presented in the report suggests that this term refers to the number of snare nights on each day in a particular month (a snare night is one snare set for one night). Assuming that is correct, the number of snare nights in England in 2009 would have been around 42.2 million (Table 2).

Agricultural land constitutes 62.8% of England (8.32 million ha; 83,200 km^2) and forest, open land and water 21.0% (2.78 million ha; 27,800 km^2) [37]. So there is roughly 111,000 km^2 of rural land in England where fox snares could potentially be used. Based on an estimated 42.2 million snare nights in England (Table 2), this would mean that there would be 380 fox snare nights per km^2 per year across all of rural England, or roughly one snare set every night on each km^2 of rural land.

Table 2. Number of fox snare nights (a snare night is one snare set for one night) in England in 2009, based on information from [1]*

Month	No. of days in month	Mean number (±SE) of fox snares in use at any one time in England	Total no. of snare nights per month in England
January	31	65,382 (±7062)	2,026,842
February	28	170,863 (±11,689)	4,784,164
March	31	188,283 (±11,689)	5,836,773
April	30	168,034 (±11,819)	5,041,020
May	31	157,829 (±11,419)	4,892,699
June	30	124,586 (±8143)	3,737,580
July	31	121,200 (±7977)	3,757,200
August	31	105,181 (±7963)	3,260,611
September	30	83,909 (±7701)	2,517,270
October	31	78,663 (±7771)	2,438,553
November	30	64,203 (±7071)	1,926,090
December	31	62,823 (±7062)	1,947,513
Total		1,390,956	42,166,315

*Data taken from Table 2.16 of the Defra-funded study which shows the estimated total number of fox snares set in England at any one time

According to the Defra-funded study, the maximum recorded density of fox snares set by gamekeepers at any one time was 432 per km^2, and 247 per km^2 by farmers [1], so at first sight this might appear plausible. A GWCT study reported that, of 34 gamekeepers in southern England, *the average number of* [fox] *snares set at any one time by an individual operator was 31 (range 1-391)* [38].

It is impossible to reconcile these figures with other data published by the GWCT. For instance, 18 animals were caught in 211 fox snare nights by a highly-experienced GWCT staff member: only three were foxes. In a second study by the same person, 1704 fox snare nights at several locations in southern England caught 44 animals: 14 were foxes [1]. So a highly-experienced GWCT employee caught 62 animals, i.e., 1 per 30.9 snare nights, 27% of which were foxes and 73% were non-target species. This suggests that 1.4 million animals would be caught in 42.2 million fox snare nights in England, and around 1 million would be non-target species.

The lack of clarity in the Defra-funded study led LACS to conclude that 1.7 million animals are caught in snares in England and Wales each year, or almost 200 animals every hour [39]. While this interpretation of the Defra-funded study is entirely logical, the extrapolations are implausible based on estimates of the populations of foxes, badgers and brown hares in England and Wales [40].

If the Defra-funded study really meant the total number of fox snare nights each month in England (i.e., 1,390,956 snare nights per annum) rather than the *total number of fox snares set in England at any one time*, using the same catch rates achieved by the GWCT employee would suggest that around 12,350 foxes and 32,650 non-target animals were caught in fox snares in England each year.

Even this estimate is difficult to reconcile with other published data. In 1995, the GWCT estimated that gamekeepers only snared around 9500 foxes in the whole of the UK [41], so the number snared in England would have been significantly lower.

In another analysis, the GWCT estimated that the number of foxes killed on UK shooting estates was 120,000 (110,000 - 130,000: 95% confidence intervals) in 2004, 66,000 (59,000 - 73,000) in 2012 and 89,000 (76,000 - 100,000) in 2016 [42]. Since the GWCT reported that 20% of the foxes killed by gamekeepers were taken in snares [43,44], this would suggest that around 24,000 foxes were snared in the UK in 2004, 13,200 in 2012, and 17,800 in 2016. Since just over 80% of the British fox population is in England [45], these figures are at odds with other estimates of the number of foxes snared by gamekeepers in England.

In another study, the GWCT enlisted 34 gamekeepers in southern England. Median fox capture rate (including foxes that escaped) was 6.6/1000 snare nights (range 1 - 95/1000 snare nights). Median badger capture rate was 0.73/1000 snare nights (range 0 - 39). Median hare capture rate was 8.53/1000 snare nights [38]. Assuming that the total number of snare nights in England is actually 1,390,956 (Table 2), these capture rates suggest that approximately 9200 foxes (including escapes) were snared in England each year in 2007/2009, 1000 badgers and 11,900 brown hares.

Even though Defra issued a contract to the CSL and GWCT in 2008 to establish how frequently snares were used in England and Wales, it is still not possible to establish how widely snares are used, the number of foxes and non-target animals that are caught each year, or the importance of snaring for gamekeepers, farmers and other users. The only realistic interpretation of the available data is that the number of foxes snared forms a small, probably very small, proportion of the total number of foxes 'culled' each year.

2.2. Fox population trends in the UK

The Breeding Bird Survey (BBS), a joint project between the British Trust for Ornithology, the Royal Society for the Protection of Birds (RSPB), and the Joint Nature Conservation Committee [46,47] was established in 1995. It is the only structured mammal monitoring scheme covering the UK [48]. The BBS uses standardised recording techniques, randomly-selected sites and a stratified sampling approach, all of which have huge advantages in terms of data quality [46].

The BBS has shown that fox numbers in the UK declined by 44% between 1996 and 2018, and by 49% in England. The decline was most marked in the decade 2008 to 2018, and appears to be continuing [49].

Two factors probably contributed to this decline. First, the BBS showed that rabbit numbers declined by 64% over the same period that foxes declined by 49% [50]. The pattern, and timing, of the changes in rabbit numbers is broadly reflected in the numbers killed on shooting estates. Few rabbits were killed in the 1960s, following the arrival of myxomatosis in 1953 [51]. Thereafter, the number of rabbits killed increased 16-fold as resistance to the virus developed, reaching a peak in the mid-1990s [52]. Over the next 15 years the number of rabbits killed declined by a third, appeared to stabilise, and then declined by another third during the past ten years. The first decline corresponded with the emergence of rabbit haemorrhagic disease (RHD1), which reached southern England in 1992 and Scotland by 1995. A more pathogenic variant (RHD2) reached Britain around 2010, tying in with the second decline in the number of rabbits killed on shooting estates [52].

Rabbits were a major component in the diet of foxes during the second half of the 20th century: foxes consumed between 11 million and 64 million rabbits each year [53, 54]. Foxes were so heavily dependent on rabbits as a food source that their levels of predation could regulate rabbit numbers [55]. There is a great deal of literature on the inter-relationships between fox and rabbit numbers in Britain and elsewhere. So a parallel decline in fox and rabbit populations following the arrival of RHD was unsurprising.

The second factor likely to have depressed fox numbers in England over the past 30 years is an outbreak of sarcoptic mange that started in the 1990s. There is a great deal of literature from across the northern hemisphere on the impacts of this disease on fox populations. In Bristol the arrival of sarcoptic mange in 1994 led to a decline in fox numbers of over 90% within 2 years, with foxes entirely disappearing from some parts of the city [56,57]. The disease can persist at low population densities and the Bristol fox population took 20 years to recover [58].

The current epizooty of sarcoptic mange originated in south-east England, where fox numbers started to decline in the 1990s [59]. The epizooty spread north and west [60], and the current epicentre is now in central and northwest England [61]. Subjective estimates have confirmed that fox populations typically take 15 to 20 years to recover after the arrival of the disease [60].

So there is a substantial amount of peer-reviewed literature to show that fox numbers have declined this century and that the probable causes were (i) a substantial decline in their key prey base, and (ii) an epizooty of sarcoptic mange that has been spreading northwards across Britain since the 1990s.

However, there is no evidence that killing foxes has a long-term impact [59,62], and several studies have shown that this leads to a local increase, rather than decrease, in numbers because several foxes move in to contest a vacant territory [62-64]. Field and modelling studies have shown that this occurs within 3.5

to 5 days [56,65]. So any population gains from killing foxes are, at best, short-lived.

Reducing overall fox numbers is neither feasible nor practical at landscape scales unless immigration from outside is low or can be controlled [66], which is not practical. Killing foxes is likely to enhance immigration, since the distance moved by dispersing foxes is negatively associated with population density [67]. A recent study by the GWCT reinforced these conclusions: the population impacts of killing foxes were measured against the perceived carrying capacity on 22 shooting estates (size range 2 to 36 km^2). Even with intensive culling over relatively small areas, gamekeepers only managed to reduce pre-breeding fox densities by around half [68,69].

Fox numbers have been declining in Britain since the end of last century, probably in response to a decline in rabbit numbers and the spread of sarcoptic mange. There is no evidence that killing foxes contributed to this decline. Reducing overall fox numbers is neither feasible nor practical at the landscape scale, and killing foxes has, at best, short-term benefits locally and may be counterproductive.

2.3. The economic impact of foxes on agriculture

The main argument presented to justify snaring foxes is that they pose a serious risk to farm stock, e.g. [70], and that snaring is an important tool to have 'in the arsenal' to reduce livestock losses. The image that foxes are a 'pest' is promulgated by the shooting lobby: for instance, a snares consultation meeting organised by BASC highlighted the need to maintain the *problematic image of the fox* in the media [71].

However, this is a recent portrayal of foxes. Even when virtually all livestock was free-range, losses to foxes were minimal. The first study of fox food habits, undertaken during World War II when levels of gamekeeping and other forms of fox control were low [51], found that the commonest food item was rabbits, followed by 'sheep', small birds and insects. It was unclear what proportion of the 'sheep' was obtained by scavenging [72]. Fox predation on free-range poultry was such a minor issue that, in 1955, the British Field Sports Society (BFSS, the forerunner of the Countryside Alliance) stated that *it is probably true to say that not 5 per cent of all the foxes in Christendom ever taste domestic poultry* [73]. The BFSS repeated this statement 12 years later [74] and their position remained the same into the mid-1980s, when they stated that *Except in some sheep farming areas and where game are managed, the fox is generally harmless and is probably beneficial to forestry* [75].

Today the vast majority of farm stock is reared intensively. Free-range and organic chicken only account for just over 3% and 1% of the total market for chicken meat; 95% is produced indoors where there is no risk of predation by foxes. The number of intensive farms in the UK (the majority of which are used to rear chickens) rose by 26% between 2011 and 2017, and this trend is continuing [76]. Similarly, only 3 to 4% of meat pigs in the UK are reared entirely outdoors in free-range or organic units [77].

The best (and only) quantified data on the economic impact of foxes on free-range poultry in Britain are from the late 1990s, when fox numbers were twice as high as at present (section 2.2). This analysis used data supplied by the farming industry: losses to predation were generally low in free-range poultry flocks. A positive association between losses to 'other' causes and losses to foxes suggested that poor husbandry was a significant factor

contributing to predation losses and that changes in farm management, rather than greater fox control, would be the most cost-effective means of reducing economic losses [78].

Similarly, an analysis of the data produced by outdoor pig producers showed that 38% reported <1% loses of piglets to foxes, with a median loss of 1.5%: these predation losses may have been overestimated. Predation on piglets was not associated with fox density, and fox predation was not a significant enough problem to warrant fox control efforts on many farms [79].

When assessing the impact of fox predation on lambs, Gwyn Lloyd, a government scientist studying foxes in mid-Wales, noted over 40 years ago that *lambs are more susceptible to losses than poultry, since they are very numerous and widely dispersed, and in some areas they suffer from poor husbandry and are exposed to severe climatic conditions … As I have found in my study areas in upland and sheep-rearing areas, not all farmers or shepherds will agree that the fox is an inveterate killer of lambs … there are so many variables – ranging from the extent of winter supplementary feeding to* [sheep] *population density – that one single factor, the predatory activities of foxes, should not wittingly or unwittingly be evoked to explain disappointing results everywhere … There is no doubt that foxes are well provided with carrion in hill areas in the cubbing seasons in any year and may not need to take viable lambs* [30].

Lloyd also stated that *Where long-established traditions of sheep rearing are maintained, and where as much attention is given to flock performance as is given by dairy farmers to the breeding and performance of milking cows, there is every chance that all requirements for a high productive performance will be met. On such holdings complaints about lamb losses to foxes should be taken seriously, but where there is no great pride in the flock complaints against foxes should be regarded with some scepticism, since so many features associated with mismanagement can cloud the picture* [30].

A random survey of 8% of all holdings in Radnorshire, Breconshire and Montgomeryshire undertaken by the Ministry of Agriculture, Fisheries and Food (MAFF: the precursor of Defra) in 1967 showed that, of those rearing sheep, 21% reported losses to foxes: the mean loss was 0.53% [30].

Despite claims that foxes cause significant lamb losses, all quantified studies over the subsequent half-century have produced comparable results. A study on two Scottish hill farms in the mid-1990s found that the maximum annual losses for each flock due to fox predation were 1.5% and 0.6% [80]. A questionnaire study of 2000 members of the National Sheep Association in England, Scotland and Wales in the late 1990s reported that lamb losses to fox predation were generally low [81] and additional fox control was not worthwhile on most farms [82]. Contemporaneous data collected by veterinary students showed that poor management was a significant factor that increased perinatal and postnatal mortality on UK sheep farms [83].

Quantified studies of free-range livestock production systems reveal a number of common trends:

- Husbandry and management practices have a significant influence on the levels of fox predation
- There is a lack of data linking predator abundance and livestock losses
- It is not economically worthwhile for producers to eliminate predation losses completely and that losses should be tolerated to a certain extent

Estimates of the overall economic costs and benefits of foxes to British agriculture reinforce these conclusions. My own calculations at the turn of the century suggested that, at worse, foxes were economically neutral through their impact on rabbits, which caused significant

agricultural loses. Another analysis stated that a farmer who is *about to kill a young fox just recruited into the rabbit-eating population, might pause to consider whether doing so is worth the £156 - 886 of saved rabbit grazing that he thereby may forfeit* [84]. It should be remembered that both these calculations were made when numbers of foxes and rabbits were significantly higher (sections 2.2 and 3.2): the current economic gains of fox predation on rabbits are not known.

There have been extensive reviews on alternative methods of reducing fox predation on livestock e.g. [85,86], and the economic case for snaring foxes to reduce agricultural loses has never been made.

While foxes are portrayed as a major pest of agriculture, most livestock in Britain is produced in intensive systems and not vulnerable to predation. Overall losses to foxes in free-range production systems are low, and higher losses are associated with poor husbandry practices. Data on the economic losses to foxes at the turn of the century showed that, at best, foxes were economically neutral to agricultural interests and may well have been beneficial. There is no evidence to support claims that snaring is an essential tool to protect agricultural interests.

2.4. The economic impact of foxes on the shooting industry

The Defra-funded study reported that snares are particularly used on landholdings with a gamebird-shooting interest, and that significantly more snares are set by gamekeepers than farmers [1].

Each year the shooting industry releases substantial numbers of non-native ring-necked pheasants and red-legged partridges. According to the GWCT, there are around 50 million pheasants in Britain in late summer. Roughly 15 million (30%) are shot and around 40% predated by foxes; the rest die of a variety of other causes, such as road deaths, disease and shooting injuries. Around 10 million red-legged partridges are also released each year, of which around 4.6 (46%) million are shot: few pheasants or partridges survive to the next breeding season [47].

Thus the shooting industry releases substantially more gamebirds than they shoot. The economics of releasing large numbers of surplus gamebirds are unclear, as are the economic benefits, and welfare costs, of snaring foxes to protect non-native gamebirds. Seventeen years ago, the IWG highlighted that this *is a serious problem* when trying to make *cost/benefit assessments about when the use of snares is justifiable* [31]. The situation has not changed.

Nor is it clear that fox control has economic benefits for shooting estates. A survey of gamekeepers from across Britain found that 36% reported no fox predation on birds in their release pens, although some reported losing up to 13% of their birds. Shoots that spent more on their release pens and associated preventative measures did not experience lower losses to foxes. The same was true for expenditure on fox control, suggesting that spending money on fox control was not cost effective [79]. There are no data on the economic benefits of fox control after pheasants become free-living.

Nor are there any data to suggest that snaring is an essential tool for gamekeepers. As of December 2016, 2578 people had successfully completed snare training in Scotland but only 1502 had registered with the Police and received a snaring identification number [87]. *These numbers are considerably lower than the estimated 5,000 users predicted by the sport shooting bodies at the time of the WANE*

[Wildlife and Natural Environment (Scotland) Act 2011] *Act* [36].

One reason for this disparity is that snares are not an essential tool for gamekeepers, even in upland areas of Scotland, and that, following increased regulation on the use of snares, many gamekeepers switched to using thermal imaging/light intensifiers to shoot foxes [87]. This change is likely to lead to a significant improvement in animal welfare: the most frequently used and effective control methods for foxes*, which were most acceptable to practitioners and public alike,* are various forms of shooting [88].

Each year the shooting industry releases large numbers of surplus gamebirds. However, there are no data to enable a cost/benefit analysis of the need to use fox snares on landholdings with gamebird-shooting interests. In Scotland, when higher levels of regulation were required, many gamekeepers switched to other methods of killing foxes, which are more acceptable to both practitioners and the public.

2.5. The impact of foxes on species of conservation concern

In recent years game-shooting organisations have increasingly portrayed the use of snares as an essential tool to protect ground-nesting birds and other species of conservation concern [32,33].

No data have been produced to support such assertions, and there is no evidence that killing foxes, let alone by snaring, has made a significant contribution to the conservation of ground-nesting birds. In the 23 years to 2018, fox numbers in the UK declined by 44% [49], and this decline is continuing (section 2.2). Despite this long-term decline in fox numbers, curlew numbers declined by 48% and lapwing numbers by 43% [50] over the same period that fox numbers declined by 44%. So at the population level there is no evidence that reducing overall fox numbers is of conservation benefit to ground-nesting birds.

Nor is there any evidence that the use of snares to catch foxes is an essential conservation tool.

There is no evidence that snaring is an essential conservation tool. Where there is evidence that fox control is necessary to support declining populations of ground-nesting birds, other methods of killing foxes are available.

2.6. Non-target captures in fox snares

According to the GWCT, *Fox-snares are an imperfect tool. They have the potential to catch non-target species, and to cause tremendous suffering* [89]. The Defra-funded study found that the proportion of farmers who had never caught a non-target species was significantly higher (51%, n = 70) than gamekeepers (27%, n = 56). This may be because gamekeepers use more snares [1]: the median number of snares set at any one time by operators who had never caught a non-target species (n = 51) was 5, compared to 28 by operators who had caught non-targets [1].

This problem has long-been recognised in Britain and elsewhere, e.g. [8,15,90], and numerous studies have highlighted the diversity and numbers of non-target captures (Table 3). Thirty years ago the RSPB did not use snares on their Abernethy Reserve because of the risk of catching badgers, capercaillie, hares, mallard, otters, pets, pine martens, roe deer and wildcats [91] and, in the 1990s, the Forestry Commission concluded that *It is impossible to exclude non-target species from snares* [92].

While the IWG concluded that *it may be difficult in some environments to reduce the overall proportion of non-target animals caught in fox snares to below about 40%* [31], all of the post-2000 studies listed in Table 3 reported >40% non-target captures; those with reasonably sample sizes reported substantially higher proportions of non-target captures.

Of the studies in Table 3 that presented data on all captures (5 by scientists/professional operators, 5 using data from members of the public), the average non-target capture rate was 65%. The average non-target capture rate by scientists/professional was 59%. However, this was heavily influenced by one study in west Wales over 50 years ago [30]: the average non-target capture rate for the other studies was 71%. The average non-target capture rate based on reports from members of the public was 72%. This does not support GWCT's claim that *Experience of snares among RSPCA inspectors and vets is heavily skewed to cases that have already gone wrong, where careless or irresponsible snare use has resulted in the capture of pets or injury to wild animals* [41].

The studies summarised in Table 3 highlight that:

- A wide diversity of species of birds and mammals are caught in snares
- Changes this century to snare design and the introduction of training courses and a Code of Practice have not reduced the proportion of non-target captures in snares
- High rates of non-target captures are not only made by non-professional snare users. For instance, the GWCT staff member who undertook the field trials for the Defra-funded study had *20 years* [sic] *experience as a field-based wildlife biologist, working almost entirely on projects requiring the detection, capture, handling, tracking or humane dispatch of mammalian predator species. He has considerable experience of using snares to catch foxes for radio-tagging studies and … provides input into industry recognised best practice guidelines, training and other educational material on fox snaring* [1]: 73% of his reported captures were non-target species.

Table 3. Examples of the species caught in snares set in Britain; only foxes and rabbits were considered to be target captures, since snares are rarely set to catch other species [1]

Date	Location, snaring protocol and species caught	Source
1960s-1999	Scotland. 17 incidents involving the deaths of 46 capercaillie in fox snares were considered to be the tip of the iceberg	[93]
1968-1969	South and east Scotland. 287 animals were caught in 37,735 snare nights: 155 foxes, 50 brown hares, 30 mountain hares, 21 roe deer, 11 rabbits, 6 sheep, 4 badgers, 3 dogs, 3 wildcats, 2 pheasants, 1 feral cat, 1 grouse 46% were non-target captures	[29]
Pre-1980	Breconshire. 30 snares set for 48 nights to catch foxes for research caught 11 badgers, 4 foxes, 1 dog; 3 other badgers and 1 fox escaped with the snare attached 75% were non-target captures	[30]
Pre-1980	Pembrokeshire. 270 fox snares set for 60 days to catch foxes for research caught 102 foxes, 14 badgers: 4 of the badgers were dead 12% were non-target captures	[30]
2004-2007	Scotland. Of 269 snared animals reported to the SSPCA, 99 were badgers, 47 foxes, 31 cats, 28 hares, 26 deer, 16 rabbits, 14 dogs, 2 hedgehogs, 2 pine martens, 1 otter, 1 owl, 1 squirrel, 1 livestock 77% were non-target captures	[94]
2009	England. During the Defra-funded study, 3 foxes, 2 badgers and 2 brown hares were recorded during site visits to 16 operators 57% were non-target captures	[1]
2009	Southern England. 211 fox snare nights by a GWCT staff member caught 13 brown hares, 3 foxes, 2 badgers 83% were non-target captures	[1]
2009-2010	Southern England. 1704 fox snare nights by a GWCT staff member caught 14 badgers, 14 foxes, 7 hares, 3 deer, 3 animals that escaped, 2 pheasants, 1 dog 68% were non-target captures	[1]
2011-2016	UK. 127 snaring incidents reported by the public involved 46 cats, 25 badgers, 25 dogs, 18 foxes, 4 hares, 4 otters, 3 deer, 1 rabbit, 1 pet 85% were non-target captures	[95]
2011-2021	UK. 253 snaring incidents reported by the public involved 88 cats, 51 foxes, 50 dogs, 42 badgers, 6 rabbits, 5 hares, 4 deer, 4 humans, 2 lambs, 1 horse 77% were non-target captures	[96]
2017-2020	England and Wales. 10 badgers, 8 foxes, 1 otter injured in snares were taken to RSPCA wildlife hospitals 58% were non-target captures	[97]
2017-2021	England and Wales. Of 505 snaring incidents attended by the RSPCA, 178 involved foxes, 123 cats, 72 badgers, 21 dogs, 17 deer, 13 rabbits, 11 unidentified wild mammals, 10 feral pigeons, 7 mute swans, 5 grey squirrels, 4 unidentified birds, 3 brown hares, 3 Canada geese, 3 grey herons, 3 hedgehogs, 3 muntjac, 2 horses, 2 sheep, 1 blackbird, 1 buzzard, 1 chicken, 1 coot, 1 cow, 1 domestic duck, 1 greylag goose, 1 kestrel, 1 magpie, 1 pheasant, 1 bird of prey, 1 wood pigeon 62% were non-target captures	[98]

Studies over the last 60 years have shown that the proportion of non-target captures in snares has not declined, despite legislative changes, the introduction of training courses and Codes of Practice. While the IWG suggested that it may be difficult to reduce the overall proportion of non-target animals caught in fox snares to below about 40%, the actual figure is around 70%, and there is no evidence to indicate that this can be reduced, even by highly experienced operators.

2.7. The welfare impacts of fox snares

2.7.1. Assessing the welfare of animals caught in snares

Restraining traps should be humane and hold animals with minimum injury and stress [22]. However, few studies have evaluated the humaneness of neck snares in the same way as has been done for other types of traps [14]. The IWG noted that *it is not currently possible to assess the welfare impact of snares under routine use or how frequently severe problems occur* [31]. Little has changed: as the Climate Change, Environment and Rural Affairs Committee of the Welsh Government recently reported, there are considerable gaps in the data available to understand the scale, efficacy, and humaneness of snare-use in Wales [99].

Most welfare assessments of the use of snares have focussed on the proportion of non-target captures (sections 1.2 and 2.6), the injuries to captured animals, and the number of fatalities (Table 4). However, when comparing different types of trap used to catch red foxes in Australia, physiological measures did not support previous conclusions that similar injury scores showed that foot snares and leg-hold traps produced equivalent welfare outcomes. Using physiological indicators to monitor stress is important because it is the only way to compare the relative potential for different capture techniques to cause pathological and pre-pathological states [23].

The studies summarised in Table 4 suggest that: (i) whether a snare is legal or illegal does not influence the welfare outcome of the captured animal; (ii) that both target and non-target species experience significant levels of injury and poor welfare outcomes following capture in a fox snare; and (iii) there has been no improvement in animal-welfare outcomes for animals caught in snares.

2.7.2. Releasing animals from snares

Animals that remain calm in a snare and appear to be uninjured may be *inactive due to distress, shock, injury or pain* [15], so it is important to consider the fate of animals that escape from a snare or are released simply because they *appear* to be unharmed. The Defra-funded study did not monitor the welfare/survival of animals released during their snare trials because they *appeared* to be unharmed.

The late Les Stocker, Britain's most experienced wildlife rehabilitator, advised that a snared *fox should not be released until it has been monitored for several days in case of pressure necrosis at the site of the injury* [105]. It is not possible to assess an animal in the

Table 4. Examples of the injuries to, and mortality rates of, foxes and other animals caught in neck snares in Britain and elsewhere

Date	Location and impacts on captured animals	Source
1968	Scotland. A trial by the Forestry Commission to compare the efficacy and cruelty of free-running and self-locking snares found that, although *external inspection of carcasses suggested that locking snares did more damage, post-mortem examination showed no significant difference in damage caused by the two snare types*	[92]
1975-1976	Texas, USA. Of 65 coyotes caught in killing neck snares, 59% were caught by the neck, 20% the flank, 11% the front leg and neck, and 10% the foot: only 52% were dead in the morning: some of those still alive were moribund	[100]
1994-1995	Britain. In the Joint Snares Trial by BASC and the Game Conservancy Trust (as it was then), 75% of 32 captured badgers were alive and appeared uninjured, 3% were alive and injured, 22% were dead. Of 76 brown hares, 46% were alive and appeared uninjured, 5% alive and injured, 49% were dead	[8]
1999-2002	Utah, USA. 21 foxes were captured in snares positioned to hold them by the abdomen to *further reduce chance of severe injury or death to the animal.* 2 (9.5%) had fatal injuries and were euthanized; 19 had no *visible* injuries and were fitted with radio collars and released; 1 was found dead a month after release, apparently from malnourishment. Most estimated home ranges did not encompass the snare location	[101]
2004-2007	Scotland. 153/269 snared animals (57%) reported to the SSPCA had fatal injuries, i.e., 58/99 badgers, 28/47 foxes, 4/31 cats, 22/28 hares, 19/26 deer, 11/16 rabbits, 5/14 dogs, 2/2 pine martens, 1/2 hedgehogs, 0/1 otters, 1/1 owls, 1/1 squirrels, 1/1 livestock	[94]
2005-2006	Ireland. Of 343 badgers caught in snares with stops set at 28 cm, 51.3% were caught by the thorax (two had a forelimb caught in the snare), 40.5% by the abdomen, 8.2% diagonally from the shoulder to the axilla. Physical injury due to stopped snares was low	[102]
2006	Spain. Unstopped snares set in 36 locations for 238 nights caught 13 foxes, 3 dogs, 2 stone martens, 1 mongoose, 1 wild boar. 77% of foxes were caught by their neck, 23% by the abdomen. ISO-selectivity was 65% and negative specific selectivity 50%. Mortality of target and non-target captures was >80%	[103]
2007-2009	England. Of 315 foxes caught by 34 gamekeepers, 5% were dead on inspection, 4% were alive with evident injuries, and 91% had no obvious injuries. Of 67 badgers, 16% were dead, 11% were injured and killed, 73% were released with superficial/no apparent external injuries. Of 457 brown hares, 23% were dead, 11% were alive with evident injuries, 67% were alive with no obvious external injuries	[38]
2009	England. Site visits to 16 snare operators by the GWCT found that, of 3 foxes, 1 was caught by the neck, 1 the chest and shoulder, 1 the abdomen; all appeared uninjured. Both captured badgers were entangled in fence-lines. 1 was caught by the chest and shoulder and appeared uninjured; however, the snare was not cut within the noose, and the badger ran off with the snare around its chest and shoulder. The other badger was caught by the abdomen: it had a broken leg and the snare had restricted its abdomen, so was shot on welfare grounds. Both brown hares were caught by the abdomen. One appeared uninjured and was released; the other had been killed by a predator	[1]

Date	Location and impacts on captured animals	Source
2009	Southern England. Of 13 brown hares, 3 foxes, 2 badgers caught by a GWCT staff member with 20 years' experience of setting snares, 5 hares escaped, 3 were severely injured/dead, 3 were alive and uninjured, 2 were predated. Two foxes were alive; 1 escaped with the snare still attached. Both badgers escaped with the snare attached, one after it had been held by the snare for 5 hr 48 min	[1]
2009-2012	Ireland. Of 18,596 badgers, 56% were snared round the thorax, 41% the abdomen, 2.7% across the shoulders, neck and/or forelimb. 84% showed no impact or superficial hair loss/compression. Injury severity was influenced by season, age class, gender, weight and the body position where the badger was captured: badgers caught around the thorax had a greater risk of injury	[104]
2011-2016	UK. Nearly 25% of the animals reported to *SnareWatch.org* were dead in the snare. Over half those still alive were visibly injured: 10% died of their injuries, 6% had to have a limb amputated. Of 72 pets, 10 died in the snare or later of their injuries; 7 cats and dogs had to have a limb amputated. There was little difference in the condition of animals trapped in legal and illegal snares	[95]

field since internal injuries will not be detectable, tissue damage due to pressure necrosis may not be evident for several days, and deeper injuries may not be apparent through an animal's fur [8].

Capture myopathy is a pathological condition commonly seen in animals caught in snares [105], and a long restraint time is a risk factor [106-108]. It follows extreme muscular exertion and stress, and can develop over a period of days: death can occur up to 2 weeks later [8]. A (possibly significant) proportion of the animals which are released/escape from snares may develop capture myopathy.

The welfare impacts of releasing animals from snares because they have 'no apparent injury' is demonstrated by data from Tiggywinkles Wildlife Hospital. Four of 12 foxes rescued from snares died; the other 8 were released after an average stay in the hospital of 34 days. Of 11 badgers, 2 died, 9 were released after an average stay of 100 days. Two hedgehogs were released after an average stay of 26 days, and 1 hare after a 2-day stay [109].

The other problem is that neck snares offer few cues for avoidance [38]. The GWCT reported that *it's possible to catch foxes in snares several times over … In one study, we caught the same dog fox on five occasions* [89]. Of 26 coyotes that escaped from unstopped snares, 4 were subsequently recaptured in snares [100]. Since being caught in a snare does not appear to prevent an animal from being recaptured, and locally snare densities can exceed 100 per km^2 (section 2.1), there is a significant risk that animals that are released/escape from a snare will be recaptured. So sooner or later an animal is likely to suffer serious injuries or die in a snare.

Data from elsewhere in the world highlight these problems. In America, of 21 foxes caught in snares fitted with a swivel and a stop to prevent the snare from closing to a diameter ≥10 - 12 cm, the snares caused deep damage to the throats of 2 foxes, and another was found dead a month later (overall mortality 14%) [101]. Most of the moose caught in wolf snares either died at the capture site or subsequent to release [110,111].

Of 107 pumas caught 209 times in leg-hold snares, life-threatening injuries occurred in 5 (2.4%), 4 of which subsequently died [112]. The mortality of non-target captures of adult female

cougars in foothold traps was similar to hunting mortality; non-target capture decreased survival directly through injuries that subsequently proved fatal and indirectly by increasing susceptibility to other causes of mortality [113].

2.7.3. Snaring animals during their breeding season

Fox snares are used most intensively in March [1]. This is a significant welfare issue: fox births peak in mid-March, and so all lactating vixens captured and killed in fox snares will leave orphaned cubs to die from hypothermia and/or starvation. Furthermore, the dog fox is a significant provider of food for both the cubs and the vixen [114]. So snaring both dog foxes and vixens between February and July (the onset of the main birth period until when the cubs are largely self-sufficient) is a significant welfare issue. As both the IWG and Defra-funded study stated, this can only be addressed by not snaring when the target species is breeding [1,31].

Many British mammals have close seasons, as do foxes in most of Europe [115]. It is incompatible with British animal-welfare principles to leave the dependent offspring of a sentient species to die from hypothermia and/or starvation [116].

This principle is recognised in Defra's guidance to Natural England when issuing licences to kill or take badgers for the purpose of preventing the spread of bovine TB under section 10(2)(a) of the Protection of Badgers Act 1992 [117]. Defra states that the following close seasons should be applied:

- 1 December to 31 May for cage-trapping and shooting badgers
- 1 February to 31 May for controlled shooting
- 1 December to 30 April for cage-trapping and vaccination

Fox snaring is most intense during the badger's breeding season [1,89]. It is unclear why, when licences to trap and/or shoot badgers are not issued during their breeding season, setting snares that carry a significant risk of catching and injuring/killing badgers is still permitted.

In Scotland, under the Wildlife and Natural Environment (Scotland) Act 2011, the close season for brown hares is from 1 February to 30 September. It is an offence to intentionally or recklessly kill, injure or take a brown hare in its close season without a licence [118]. While there is no close season in England and Wales, under the Hares Preservation Act 1892, brown hares cannot be offered for sale between 1 March and 31 July; this is *to provide for their protection during the breeding season*. BASC advises that organised hare shoots in England *should not take place after the end of February other than in exceptional circumstances*, and that from *1 March to 31 July hares should only be killed if they are actually causing serious crop damage (as opposed to them being a potential source of risk).* This is to prevent *the orphaning of dependent young during the hare's main breeding season* [119].

Fox snaring is most intense during the breeding season for brown hares [1,89]. It is unclear why, when they have a close season in Scotland and some protection from shooting in England and Wales, setting snares that carry a significant risk of injuring/killing brown hares during their breeding season is still permitted.

From 1 March 2021 mountain hares were included on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and so anyone who intentionally or recklessly kills, injures or takes a mountain hare without a licence will be acting unlawfully [120]. How this affects the use of fox snares in areas with mountain hares is unclear.

2.7.4. Weather effects on the welfare of snared animals

Animals can legally be left in snares for up to 24 hours, exposing them to the elements, thirst, hunger, further injury and attack by predators.

Weather conditions can have a significant effect on the welfare of snared animals, although there is little quantified information on this issue. The survival of young brown hares is negatively affected by precipitation, and death by hypothermia is a serious risk during heavy rain [121,122]. Soaked fur does not insulate properly, and wet leverets will eventually freeze even at temperatures well above frost due to the increased energy demands for thermoregulation [123]. The short-term impacts of rain on adult hare survival are less clear but, in the long-term, hare numbers, body size and reproduction are adversely affected by rainfall [121,124].

2.7.5. Predation and the fear of predation

I discuss the risks of attack by predators, and the fear of predation, in relation to rabbits caught in snares, where predation risks are substantial (section 3.4). However, there is also a significant predation risk for brown hares caught in fox snares (Table 4).

There is probably also a significant level of fear and distress experienced by foxes and badgers because, when held in a snare, they cannot escape to cover, and make extensive efforts to escape: see the Defra-funded study for photographs of the amount of digging and areas of flattened vegetation at capture sites [1].

A wide range of issues should be considered when assessing the welfare of snared animals. Snaring poses a significant risk of mortality, and captured animals are likely to experience extensive injuries. Animals released, or which escape, from snares are likely to experience significant adverse welfare impacts and a heightened risk of mortality. Snaring during the breeding season of both target and non-target species is incompatible with British animal-welfare principles. There is no evidence that the welfare outcomes of snared animals have improved over the last few decades.

2.8. Foot-hold and breakaway snares

There have been a number of attempts to reduce the welfare issues associated with target and non-target captures in conventional snares.

2.8.1. Foot- and leg-hold snares

Snares *can be designed or deployed to capture animals by the neck, torso, leg or foot.* Foot/leg-hold snares are widely used to catch furbearers in North America because they reduce the risk of damage to the pelt. Typically there is some form of power activation, so that when an animal pushes, pulls or steps on a

triggering device, *a throwing arm or other mechanism raises or closes the snare over the animal's foot or leg* [125].

At the turn of the century, one such device, the Rose fox cuff, was being developed for use in the UK. This was a spring trap, so was submitted for approval as required by the Pests Act 1954. On 23 April 2002, the Game Conservancy Trust (GCT, the forerunner of the GWCT) presented a snares consultation meeting with a protocol to test this device. The GCT identified a number of potential pitfalls with the trial and only decided to go ahead after *very careful thought* [71].

However, these field trials never proceeded because preliminary pen trials commissioned by Defra showed that only 7/17 foxes were held by the Rose fox cuff for the target period of 8 hrs; the other ten escaped, half in ≤5 mins, even though the snare was placed manually in the ideal position around each animal's leg [126].

Field trails designed to catch badgers with the Rose fox cuff also demonstrated its low efficacy: only 1 badger was caught in 193 snare nights, well below what might reasonably be expected using cage traps [126].

2.8.2. Breakaway snares

Neck snares with breakaway devices were developed in North America. The basic concept is that they hold the desired animal but release larger animals that are stronger and can exert more force [90]. The design of a breakaway snare is, of necessity, a compromise between allowing non-target species to escape while maintaining acceptable efficiency for the target species.

Bobcats, coyotes, red foxes and wolves are the main furbearers targeted in snares in North America. With snares set for foxes (typical weight range 3.5 – 7 kg), bobcats (4 - 8 kg) and coyotes (7 – 20 kg), the non-target species of concern are white-tailed deer (typical weight range 55 – 100 kg) and mule deer (45 – 150 kg), whereas with snares set for wolves (typical weight range 35 – 80 kg) the main non-target species of concern is moose (270 – 600 kg). Since these non-target species are significantly larger and more powerful than the target species, the concept underpinning the use of breakaway snares is practicable.

In North America there are also specified trapping seasons for furbearers: while these vary between States (USA) and Provinces (Canada), snaring is confined to a short period in the winter when furs are 'prime'. So by the onset of the snaring season, young-of-the-year deer are significantly heavier than the target species.

There are two key differences in the UK:

- The commonest non-target captures (badgers, brown hares) and domestic pets (cats, dogs) are either lighter than foxes or only slightly heavier, and there are no data on the force each of these species exerts when caught in a snare compared to foxes
- In Britain snaring is carried out throughout the year: gamekeepers use fox snares most frequently in spring and summer [1], when many wild non-target captures will be juveniles and significantly lighter than adult foxes

A multi-strand steel cable with a stop that prevented the noose from closing to a diameter less than 8 cm, and another that included two swivels, a break-away S-hook, and a stop that prevented the loop from closing below 6.54 cm diameter (similar to the UK recommendation at the time) were compared in Spain. Injuries were similar for both types of snare, and 35% of foxes were caught round the body rather than neck, suggesting that the addition of swivels and break-away devices did not improve snare performance [8,127].

Two breakaway fox snares are currently available in Britain. The designer of the Glenn Waters Breakaway Snare claims to have *developed the first breakaway rabbit and fox snares in the UK*, which have improved animal welfare *immensely by allowing non target species to activate the breakaway link and free themselves* [128]. However, there appear to be no published data on selectivity (section 1.3), the proportion of target and non-target captures that escape, injury rates, or how welfare issues such as predation on captured animals and the stress associated with snaring (sections 2.7.5 and 3.4) have been addressed.

The other breakaway snare (the DBsnare) was developed by the GWCT [129] and field-tested in southern England by 34 gamekeepers, who compared it with equal numbers of commercially-available or home-made snares. Fox capture rates in the breakaway and other types of snare were similar (6.6 captures/1000 snare-days). So the DBsnare did not improve selectivity, i.e., reduce the number/proportion of non-target species that were caught (section 1.3). Of the captured badgers, 39% escaped from the breakaway snares, and 14% from the other snares. For brown hares, comparable figures were 33% and 18% with a loop size of 21.5 cm, but this increased to 68% when the loop size was increased to 26 cm. With the breakaway snare, 31% of captured badgers, 10% of captured hares, and 6% of captured foxes escaped by opening the breakaway device, i.e., 69% of badgers and 90% of brown hares did not manage to open the breakaway device. There was also a significant injury rate for brown hares: the probability of being alive without apparent injury was 0.33 with entanglement and 0.62 without entanglement [38].

While the GWCT is promoting the use of the DBsnare [130], there are a number of scientific and technical concerns with this study:

- The trials were not representative: while nearly half of all snare users are farmers [1], none were included in the trial
- Since species assemblages and relative abundance vary between areas, trap testing must be conducted at the regional level to ensure that traps are successful at capturing target species without affecting non-target species [16]
- In theory, the GWCT breakaway snare might improve animal welfare by reducing how long non-target animals are held, and possibly reduce the number/extent of their injuries [20]. However, there are no data on the length of time that non-targets are held, the impact this has on their injuries, or the effect on their long-term survival
- Breakaway snares do not resolve the welfare issues associated with snaring target and non-target species during their breeding season
- Snares are minimalist devices with functionally inter-dependent components, and small changes affect performance [38]. The GWCT study provided no data on how small changes to the design of their breakaway snare affected performance. This is particularly important because it is impossible to ensure that breakaway snares used in the field meet the GWCT's technical specifications. Only breakaway snares manufactured to the GWCT's exact specifications are *known to have the field performance described* and the *GWCT is unable to monitor market products or to carry out quality control* [131]
- The GWCT *used a titanium clip with a nominal 80lb (36kg) breaking strain* in their field trials, whereas the DBsnare uses stainless steel clips because they are much cheaper and *purchasers should bear in mind that snares with steel breakaways are not exactly what was tested* [132]

- The testing protocols used in the GWCT field study did not conform to best-practice guidelines [21,22]

These concerns are reflected in an internal Defra review of the GWCT study, which concluded that: (i) the presentation of the results was difficult to untangle; (ii) key data were not included, particularly on injury rates; (iii) data on death and injury rates were not presented in a way that allowed comparisons between snare designs; (iv) the paper over-played the benefits produced by breakaway snares; (v) while breakaway snares let more animals go, this was not obviously linked to a reduction in the numbers killed or injured; and (vi) there were few substantial differences between the snare designs or trials [133].

The need to develop breakaway snares recognises the fundamental problems associated with the use of snares:

- There is a significant risk of injury/mortality for animals caught in neck-hold snares
- Contrary to the Wildlife and Countryside Act 1981, snares are non-selective and there is a significant risk of catching, and injuring or killing, protected species such as badgers. The Protection of Badgers Act 1992 section 1(1) states that *A person is guilty of an offence if, except as permitted by or under this Act, he wilfully kills, injures or takes, or attempts to kill, injure or take, a badger*. The 1992 Act consolidated the provisions of the Badgers Act 1973, the Badgers Act 1991, and the Badgers (Further Protection) Act 1991: a fundamental precept underpinning these pieces of legislation was to enhance badger welfare. It is hard to see the difference, in welfare terms, between a wilful or deliberate action and simply accepting that a significant number of badgers will be taken, injured or killed in neck-hold snares. The GWCT states that, if a badger is seriously injured, *you may feel that rapid dispatch of the animal is the more humane option, but this may expose you to prosecution for illegally killing (as well as catching) a protected species* [134]
- Similar issues are associated with catching mountain hares in fox snares. The GWCT advised that the *deliberate or accidental capture of mountain hares is a grey area of legislation because of European protection for this species; the intention of the legislation is clearly to protect the conservation status of the mountain hare, but precisely how this affects the use of fox snares is unclear in advance of case law. In the spirit of legislation, we suggest that fox snares should never be used in such numbers that they could significantly impact the local abundance of mountain hares* [134]. Since that was written, anyone who intentionally or recklessly kills, injures or takes a mountain hare without a licence commits an offence (section 2.7.3)

The other problem is that there is no standardised method for measuring breakaway force, which is particularly important when breakaway devices are required by law or a Code of Practice [90,125]. The technical specifications for the GWCT breakaway snare do not specify the force an animal needs to exert to open the breakaway device. According to the GWCT, the mean breaking load of the breakaway device itself is 33.51 kg ± 4.05 (SD), measured to a force of 0.329 kN [131]. Independent tests of the breakaway device in the DBsnare found a mean breaking load of 35.3 kgf (30 tests, range 33–38 kgf) [135].

However, any breakaway device has to be included within the loop of the snare, and this is wrapped around the animal's neck, thorax, thorax and foreleg, or abdomen. The load

necessary to cause the breakaway device to 'fail' has to be put on the whole snare assemblage, i.e., a captured animal pulls on the snare itself, not the actual breakaway device.

To determine the pull that has to be exerted on the snare to cause the breakaway clip to fail, TTI Testing Ltd used an INSTRON 5967 tensile testing machine with a 30 kN load cell and the snare looped around a plastic spool designed to approximate the diameter of an animal's neck [135]. For these trials, any slack was removed and the snare was then loaded at a rate of 0.5 mm/s until it was unable to support any further increase in load. In these trials:

- The weak link in a single Glen Waters breakaway snare failed at a load of 949.3 N (96.7 kgf) [136]
- Tests on four DBsnares produced very consistent results: the average breaking load was 730.6 N (74.5 kgf) [135]

According to the GWCT, *captured animals might force open the breakaway device either by muscle strength while stationary or by accelerating to the furthest end of the snare* [38]. However a captured animal opens a breakaway device, it has to exert the above forces through a 2-mm-diameter 7 x 7 strand wire cable that is tightly wrapped around its neck, thorax, thorax and foreleg, or abdomen [1]. Furthermore, the tests by TTI Testing Ltd were *loaded at fairly low rates. They were also loaded in a very specific manner, i.e., straight or positioned over the spool. So the results do not assess the effect of any dynamic loading which might be experienced by the animal struggling to free itself, or indeed any effect on performance should the snare become entangled in (for example) vegetation* [135]. GWCT's trial of their breakaway snare reported *15% of held animals entangled* [38].

It is perhaps unsurprising that most non-target captures do not manage to open the breakaway device included in the DBsnare.

Attempts to design improved snares have not resolved the fundamental concerns about snaring, i.e., the lack of selectivity, the number of protected species that are captured, or the welfare issues for both target and non-target captures. There is no evidence that the use of foot-hold snares would improve animal welfare, and a considerable force is required for an animal to free itself from the two breakaway snares available in Britain. There are no data on the welfare, or survival, of target and non-target captures that manage to free themselves from breakaway snares.

2.9. Are fox snares killing or restraining traps?

In North America, both manual- and power-killing snares are used to catch furbearers. With manual-killing snares *the animal provides the energy necessary to tighten the noose and strangle itself*, these snares are usually *equipped with a one-way locking tab that only allows the noose to close … In power killing snares, 1 or 2 springs provide the energy necessary to tighten the noose … No locks are needed because the clamping force is supplied by the spring(s) pulling on the snare* [15].

Nearly 40 years ago, the *Federal Provincial Committee for Humane Trapping Studies … concluded that killing neck snares could not be condoned as humane trapping devices for foxes* [15]. Killing neck snares *have a significant impact on the welfare of captured animals, and this is similar to that of steel leghold traps, which have been judged unacceptable at the international level. It is therefore difficult to understand how killing neck snares became*

an exception in AIHTS's standards [20]. The neck snares used in the UK have comparable welfare issues.

The Defra-funded study found that 76% of users (n = 126) set snares with the intention of restraining the fox, whereas 19% intended the snare to kill the fox and 5% used both approaches. Among farmers, 67% (n = 70) set snares with the intention of restraining the fox, 27% intended the snare to kill the fox, and 6% used both approaches. Equivalent figures for gamekeepers were 88%, 9% and 4% respectively [1]. So approximately a quarter of fox snare users routinely or periodically set snares with the intention that captured animals should die in the snare.

The mortality rates reported in killing neck snares used in North American are comparable to those reported for the 'restraining' snares used in the UK, where badger and fox mortality rates were up to 60%, and hares up to 80% (Table 4).

It is hard to differentiate between the mortality rates in neck snares described in the UK as 'restraining traps' and those used to kill furbearers in North America. With significant mortality rates of both target and non-target captures, it is unclear why the fox snares used in the UK are portrayed as restraining devices.

2.10. Do Codes of Practice and training courses improve animal welfare?

The first *Code of Practice on the use of snares in fox and rabbit control* in England and Wales was issued by Defra in 2005: it was neither written nor designed as a set of specific rules that had to be followed but *as a package of advice leading to 'good practice'.* Different levels of obligation were signalled using the verbs 'must', 'should' and 'may' [1]. Although the IWG recommended that the Code of Practice should *be reviewed in three years in the light of research results and data collected in the interim on the use of snares* [31], this was not done until 2016.

However, the Code of Practice was not based on best practice or current levels of knowledge. The *stop position* [for foxes] *is approximately 23 cm and was based on the BASC (1994) Code of Practice for snaring. There is no documented evidence that this is the appropriate position for a stop for foxes* [1]. Both the stop position recommended in the Code of Practice and the comment in the Defra-funded study are surprising. Thirty years earlier, Gwyn Lloyd (the senior scientist employed by MAFF to investigate methods of fox control) reported that the neck circumference of adult foxes weighing between 4.5 kg and 9 kg ranged from 175 mm to 280 mm and that stops on fox snares should be fitted 280 mm from the end [30]. Of 141 snares examined in the field during the Defra-funded study, all but one had the stop set at less than 28 cm and, for 18%, the stop position varied between 15 and 21.5 cm. Eight other snares had no stops, and 1 had a stop that was not fixed in position [1].

Levels of awareness and compliance also appear to be low. In 2009 a *significantly higher percentage of gamekeeper users were aware of the* [Code of Practice] *(95%) and had formal training in the use of fox snares (38%), compared to farmers* (64% and 3%, respectively) [1]; the great majority of snare users (approximately 4500 in England and Wales) were using fox snares without any formal training [1]. While 23 (68%) of 34 gamekeepers in southern England selected by the GWCT for an experimental snaring study in 2007 and 2009 were aware of the Code of Practice, only 16 (47%) had actually read it [38]. The Defra-funded study provided no

information on the number of other groups of snare users who had received formal training.

Experience has shown that many trappers see little or no value in improved snare designs since existing snares catch the target animals anyway, albeit in an inhumane manner [20]. Data from England and Wales reinforce this conclusion. Over 40 years ago, the concern of most snare operators was to set snares in places where foxes were most likely to be caught, rather than worry about the risks of injury and entanglement, or non-target captures [30]. The situation had not improved 30 years later: the Defra-funded study found that *No fox snare operator visited was fully compliant* with the Code of Practice*. Only 2 out of 16 operators visited set 75% or more of their snares at sites where entanglement was not possible* [1].

The continuing perception that capturing a fox is more important than its welfare may at least in part be influenced by the UK government and industry bodies, which still portray foxes as 'pests' (section 2.10). The use of value-laden terminology is counterproductive to efforts to improve animal welfare [137,138], and these attitudes perpetuate animal pain and suffering on an enormous scale [16].

While the Defra-funded study suggested that a significant improvement in the reach of the Code of Practice could only be achieved by making formal training mandatory for snare users [1], there is little evidence to support this statement. In Scotland, for instance, new measures that came into effect in April 2013 required that: all snare users must be officially trained and on a register; all snares must have numbered tags; and that all operators should keep full records of when snares were checked and any captures.

However, *despite the requirement for snare users to complete training courses, to learn 'best practice' … the quality of this training is not monitored and is variable. Every offence involving a tagged snare involves an operator who has undertaken the training. There is no requirement for a convicted snare operator to undertake further training. Once trained, snaring accreditation lasts a lifetime* [139].

According to the SSPCA, their inspectors (who are experienced in gathering evidence of wildlife crimes), said that *the requirements for snares to be tagged* [in Scotland] *has facilitated enforcement to some extent, but in some cases snare operators have successfully denied responsibility of an illegal snare (saying, for example, that the snare was de-activated and must have been re-set by another person)* [36].

A key problem is that training, tagging and technical changes cannot alter the fact that snares are primitive and fundamentally inhumane. Even legally-set snares become twisted and kinked due to the prolonged and desperate struggling of the trapped animal, so that they no longer run freely [36]. Irrespective of past captures, simply using snares reduces their performance due to surface rust and accumulation of dirt [140]. While the use of self-locking snares is no longer legal in the UK, free-running snares effectively become self-locking if twisted or entangled in vegetation. In Ireland, 61.7% of the snares that caught a badger had some degree of twisting, unravelling or fraying: damaged snares had an increased risk of injury [102].

Operators are highly variable in their competence, and the use of snares requires significant operator input. The Defra-funded study used a technician fully competent in the use of snares because this *focuses on the device as operated according to best practice (because it is difficult and unethical to emulate bad practice)*. In 211 snare nights in familiar areas, this technician caught 18 animals: 3 foxes, 13 hares, and 2 badgers. Five hares, 2 badgers and 1 fox escaped: 1 fox and 1 badger escaped with the snare attached. Three hares were severely injured/dead and 2 hares were predated. Both foxes that were held had haemorrhages on their necks extending into the deeper muscle [1]. Although the snares were placed so as to avoid

entanglement with fences or woody shrubs, three of the snares were entangled with non-woody vegetation [1]. Assuming that the animals that escaped with the snare attached suffered significant adverse welfare impacts, 7/18 captures (39%) were severely injured, dead or predated; just 2 target species (11% of captures) were held and killed [1]. Since this operator was highly experienced, and the snares were *operated according to best practice*, it is reasonable to assume that the general level of operator competence is lower; Table 4 suggests that it may be significantly so.

At the turn of the millennium, when reviewing the use of snares, the National Federation of Badger Groups pointed out that *It is a somewhat simplistic approach to assume that all problems with snares are simply a result of the 'misuse' of snares and 'bad practice', resulting from a lack of guidance and training. It is abundantly clear that 'proper' and legal use of snares is also causing unintended suffering and death on a large scale* [141]. A questionnaire study of the different methods used to catch/kill foxes, red deer, brown hares and mink revealed that practitioners (including farmers and gamekeepers) and the public regarded snaring as one of the least acceptable means of population control [88].

Observations of operators who were willing to be accompanied in the field revealed high levels of non-compliance with the Code of Practice: compliance levels by other operators are unknown. Further improvements to any Code of Practice, training requirements, or best-practice guidelines will not address the fundamental welfare issues associated with the use of snares.

2.11. Compliance with the law, Codes of Practice, and best-practice guidelines

Examples of past levels of compliance with legal requirements, a Code of Practice, and/or best-practice guidelines applied to snaring and trapping in Britain are summarised in Table 5. I have included cage and spring traps because there are more quantified data on their use and misuse than snares.

Table 5 shows that the widespread abuse of cage traps, spring traps and snares continues irrespective of improvements to regulations, a relevant Code of Practice and professional training. *The RSPB is increasingly concerned about the lack of consistent enforcement action in relation to these reports* [146]. As highlighted by the Defra-funded study, snares are used on private land, generally away from public access, where poor practice or even malpractice can pass un-noticed, and there is no guarantee that recommendations made during general training will be put into everyday practice [1].

Irrespective of legal and other requirements that specify how different sorts of snares and traps must/should be used, it is not possible to enforce snaring and trapping standards in Britain, and failure to comply with legal requirements, a Code of Practice and/or best-practice guidance is widespread.

Table 5. Examples of levels of compliance with legal requirements, a Code of Practice, and/or best-practice guidelines applied to snaring and trapping in Britain

Date	Location and levels of compliance with the law, a Code of Practice, and/or best-practice guidelines in operation at the time	Source
1985-1997	Scotland. 198 protected species (73 buzzards, 25 fieldfares, 23 kestrels, 15 golden eagles, 13 ravens, 13 sparrowhawks, 9 barn owls, 9 tawny owls, 4 blackbirds, 3 finches, 3 unidentified owls, 2 goshawks, 2 short-eared owls, 1 hen harrier, 1 red kite, 1 rough-legged buzzard, 1 wheatear) were found in corvid cage traps: many were dead	[142]
1998-2004	Scotland. Of 186 birds found in corvid cage traps, 40 (13 kestrels, 9 buzzards, 2 cuckoos, 2 mistle thrushes, 2 short-eared owls, 2 sparrowhawks, 2 starlings, 1 barn owl, 1 blackbird, 1 long-eared owl, 1 mallard, 1 merlin, 1 pied wagtail, 1 tawny owl, 1 unidentified passerine) were protected species: 74 (40%) were dead - 53 target species (which may have included 'call birds'), 21 protected species	[143]
2005-2007	Southern England. Of 34 professional gamekeepers selected by the GWCT for their snare trials, 80% reported entanglement in at least one capture; 15% of captured foxes and badgers, and 10% of captured hares, were entangled	[38]
2007-2009	Southern England. Of 34 professional gamekeepers selected by the GWCT for their snare trials, 16 (47%) had received formal training in the use of snares, 23 (68%) were aware of the Defra Code of Practice, but only 16 (47%) had actually read it	[38]
2009	England. 26/181 (14%) of (mostly fox) snares inspected in the field were old or had been misshapen by previous captures to the extent that their free-running nature was in doubt	[1]
2009	England. 1/16 fox snare operators set snares to kill rather than restrain foxes. 1/16 fox snare operators set snares with a lever with the intention of suspending the fox off the ground. Fox snares were anchored using metal stakes (40%), drags (21%), trees (18%), fence-wire (8%), fence-post (4%), wooden stakes (6%) and other (3%); many of these pose a high risk of entanglement	[1]
2009	England. None of 16 operators (178 snares inspected) complied fully with all 13 aspects of Defra's 2005 Code of Practice for all the snares they set	[1]
2009	England. Only 2/16 operators avoided cluttered environments where entanglement was likely to arise for 75% or more of snares set	[1]
2009	England. 82% of fox snare users interviewed for the Defra-funded study used stopped snares, 10% unstopped snares, 3% mixed, 5% didn't know. Of 13 users of unstopped snares, 9 (69%) were farmers	[1]
2009	England. Most fox-snare users did not set their snares at or above the recommended minimum height of 15 cm (which reduces the risk of catching badgers); only 3/16 operators (19%) set at least 75% of their snares at or above this height	[1]
2011-2016	UK. Of 159 snares reported to SnareWatch, 59 (37%) were illegal	[95]
2013-2016	Scotland. Of 316 snares recovered during 71 investigations by the SSPCA, 233 (74%) were illegal, i.e., self-locking or set where the animal could become suspended. 275 snares (87%) were not tagged	[36]

Date	Location and levels of compliance with the law, a Code of Practice, and/or best-practice guidelines in operation at the time	Source
2013-2016	Scotland. Of 11 people charged by the SSPCA with snaring offences between 1 April 2013 and 31 March 2016, 4 were trained operators	[36]
2015	East Lothian. 47 unstopped, self-locking snares were set along a 300-metre fence-line	[36]
2018-2019	Scotland. 12/72 fox snares (17%) found on Scottish grouse moors were not tagged	[144]
2018-2019	Scotland. None of 712 rail traps on Scottish grouse moors conformed to best-practice guidelines: for 619 (87%) the mesh on the tunnel was too large, for 511 (72%) the tunnel was too short, for 709 (virtually 100%) the excluder was too large	[144]
2018-2019	Scotland. Of the carcasses found in rail traps on Scottish grouse moors, 61% were target species, 39% non-target/protected species: 17% of all captures were birds	[144]
2018-2019	Scotland. Of 216 tunnel traps on Scottish grouse moors, 70 (32%) appeared to have no excluder, for 113 (52%) the excluder appeared to be too large, for 15 (7%) it was not clear whether the excluder was of the recommended size. Only 18 (8%) had an excluder that appeared to conform to best-practice guidelines	[144]
2018-2019	Scotland. Of 66 snares on Scottish grouse moors, 20 posed a risk of entanglement. Of 38 snares registered to one operator, 14 posed a risk of entanglement. Of 13 untagged snares, 6 posed a risk of entanglement	[145]

2.12. Killing animals caught in fox snares

The repeated portrayal of foxes as 'pests' (section 2.10) influences how operators handle and kill captured animals. The GWCT states that a *captured fox should be killed swiftly without alarming it unduly … Where it is possible to get a long view of a captured fox, a rifle can be used at a distance without the fox being aware of the operator's presence … in general, we favour a shotgun at a distance of no more than 20 metres, and aimed deliberately at the head or chest* [134]. However, 4% of gamekeepers (n = 56) and 7% of farmers (n = 70) killed foxes with a blow to the head, and 1% of farmers used dogs to kill captured foxes [1].

Similar problems arise with the dispatch of non-target captures. A significant number of brown hares are injured in fox snares. According to the GWCT, if *you choose to release a hare* [from a snare]*, you must accomplish it quickly because once alarmed by your close presence the hare can do itself a lot of damage by jumping around … Quickly decide whether the hare is fit for release. If it is obviously injured in some way, you may decide to dispatch it now, by dislocating its neck* [134]. The welfare issues associated with trying to dislocate a hare's neck are considerable because both species of hare *are highly athletic animals with massive leverage in their hind legs* [134]. Neck dislocation is not even recommended for adult rabbits, which are considerably smaller and less powerful than hares (section 3.7).

The methods used to kill animals caught in fox snares are not regulated, and do not conform to best-practice guidelines for killing animals that are under human control. It is not possible to monitor the techniques used to handle and kill animals caught in snares.

3. Snaring rabbits

3.1. Background

In 1951, the *Committee on cruelty to wild animals* reported that rabbits were abundant, that they caused significant agricultural losses, and that snares were used *to obtain an occasional rabbit for food* [5]. While the Committee raised significant concerns about the cruelty associated with snaring rabbits, they concluded that this was *so necessary under present conditions* that they could not recommend any restriction on the use of rabbit snares [5].

The Committee also reported that *the 4-inch gin trap* was *most commonly used for catching rabbits*, and at least 3 million to 3.5 million were available for use at any one time, although the real number may have been substantially higher [5]. The Committee concluded that *The gin trap is a diabolical instrument which causes a great deal of suffering* and recommended that its sale and use should be made illegal *within a short period of time* [5].

It was surprising therefore that, of the two rabbit traps that the Committee considered to have significant welfare concerns, they recommended a ban on the use of gin traps but that snaring should be allowed to continue because of the agricultural impact of rabbits. There are no data on how many people used rabbit snares pre-myxomatosis. The 4-inch gin trap was the mainstay of an extensive rabbit trapping industry, particularly in west England and west and north Wales. From 1950 to 1953 an average of 40 million rabbits were harvested each year for their meat and pelts. However, this trade had no detectable impact on rabbit numbers [147].

A survey by the CSL in 1998 and 2000 when rabbit numbers were higher than today (section 3.2), found that shooting was the most common form of rabbit control on arable landholdings in Great Britain; fencing, gassing and ferreting were also widely used. Snaring was only used on 4.5 ± 1.4% (SE) of arable farms (n = 460), 0% of hop growers (n = 24), 1.4 ± 0.8% of orchards (n = 112), 3.9 ± 2.1% of outdoor vegetable producers (n = 128), and 1.0 ± 0.7% of soft fruit producers (n = 42); pure livestock holdings were excluded from the study [148].

In 2005 the IWG *found almost no information about the welfare impacts, or rates of non-target capture, associated with the setting of snares to catch rabbits. It seems to be commonly believed that snares often kill rabbits rapidly by breaking their necks. However, we have found no data with which to confirm or refute this and are unaware of any data on the clinical or pathological effects of snares on rabbits or on causes of death* [31].

In 2008 Defra issued a contract to the CSL and GWCT to *Determine the scale of use of snares in England and Wales* [2]. The Defra-funded study was intended to advance our understanding of the use of snares and the associated welfare implications [1]. It reinforced the earlier CSL study: in 2009, rabbit snares were not widely used in England and Wales. Of 139,219 landholdings >5 ha, it was estimated that rabbit snares were used on 1682 (1.2%), which was markedly less than

the 4% predicted in the specification for the contract [2]. In 2016 the GWCT reported that 97% of snare use in the UK targeted foxes: the use of snares to catch rabbits was marginal [149].

In contrast, rabbit control (not necessarily involving snaring) took place on 51% of landholdings >5 ha and *was more likely on landholdings* with *a gamebird shooting interest* [1]. The Defra-funded study did not explain why it was more important to kill rabbits on landholdings where gamebirds were reared for shooting, or why rabbits had a greater economic impact on landholdings used to rear gamebirds.

The Defra-funded study estimated that, in England, rabbit snares were used on 1567 holdings (866 - 2270: 95% confidence intervals), with between 2 and 55 (average 12) snares set *at any one time* on each of these holdings [1]. The term *at any one time* was not defined in the report (section 2.1). Since there are no data on how many nights per year each operator set rabbit snares, and how many were set each night, it is not possible to estimate the number of rabbit snare nights per year.

The GWCT calculated that, using all forms of rabbit control (i.e., shooting, ferreting, etc., as well as snaring), the number of rabbits killed on UK game-shooting estates were 590,000 (530,000 - 650,000: 95% confidence intervals) in 2004, 520,000 (470,000 - 570,000) in 2012, and 350,000 (260,000 - 470,000) in 2016 [42]. The declining numbers of rabbits killed on game-shooting estates mirrors the overall decline in rabbit numbers (section 3.2). Since the GWCT did not include any information on the contribution of different methods used to kill rabbits on game-shooting estates, this limits interpretation. However, since snaring rabbits was a marginal activity [149], it is reasonable to assume that snaring contributed an insignificant proportion of the total number of rabbits killed on game-shooting estates.

In 2009 rabbit snaring was only used on 1.2% of landholdings in England and Wales, and the available data showed that it was a marginal activity and did not make a significant contribution to controlling rabbit numbers.

3.2. Changes in rabbit numbers in Britain

The perception that rabbit snaring is important to reduce agricultural losses has persisted over the 70 years since the *Committee on cruelty to wild animals* reported [5], even though the situation today is very different.

The GWCT's data show that few rabbits were killed on game-shooting estates in the 1960s, following the first outbreak of myxomatosis in 1953. As resistance to the *Myxoma* virus developed, the numbers of rabbits killed increased 16-fold, reaching a peak in the mid-1990s [52]. Over the next 15 years, the number of rabbits killed on shooting estates declined by about a third, appeared to stabilise, and then declined by another third during the next ten years.

Long-term population monitoring data by the BTO show that rabbit numbers in the UK declined by 64% between 1996 and 2018, with the decline being most marked in the decade 2008 to 2018; the decline in rabbit numbers has shown no signs of slowing [50]. While there are no estimates of the current agricultural losses to rabbits, these cannot be anywhere near those experienced pre-RHD levels.

Furthermore, rabbits are important ecosystem engineers, and their decline in some areas, such as the Brecklands of East Anglia, has been so precipitous that habitat-creation projects are being undertaken on agricultural

land to boost rabbit numbers to try to protect both habitats and endangered species [150]. The current conservation issues mirror those experienced when rabbit numbers declined following the introduction of myxomatosis [151].

It is surprising therefore that the Defra-funded study stated that rabbits were *widespread and common, and their ecological status is not at risk. Where snares are used as part of an effort to control numbers, the intention is clearly to have an impact of ecological significance* [1]. This statement was not accurate in 2010 (when the report was submitted; it was only released in 2012) on two accounts. First, the GWCT's data had shown a significant, and continuing, decline in rabbit numbers following the arrival of RHD. Second, the low level of rabbit snare use identified in the Defra-funded study could not achieve *an impact of ecological significance*.

In 1951 the Co*mmittee on cruelty to wild animals* concluded that the *snaring of rabbits is ... so necessary under present conditions that we cannot recommend any restriction on their use for catching rabbits*. However, the situation is very different today. Rabbit numbers have declined by two-thirds since the arrival of RHD in 1992, and this decline is continuing. Rabbits are a keystone species and their current population decline is of conservation concern. There is no economic argument to continue to snare rabbits to reduce agricultural losses, and snaring rabbits cannot achieve an impact of ecological significance.

3.3. Non-target captures in rabbit snares

There are few data on the number of non-target species caught in rabbit snares [8]. The Defra-funded study provided little new information: while 5/17 (29%) of the operators interviewed stated that they had caught cats in their snares, and one had caught polecat(s), the study provided no quantified data on the frequency of non-target captures, or the species most at risk [1].

Examples of the diversity, and frequency, of non-target captures are included in a recent book on professional rabbit snaring [128]:

- Even stoats *occasionally falls victim to a pegged rabbit snare or a fenceline snare*
- Occasionally big fox cubs are caught*. They don't appear to have the sense to bite through the snare cable or the twine and they can't pull the 8" peg free especially out in grass fields as the peg takes a tremendous grip*
- *At times adult foxes will be caught and held in the rabbit snares especially if they are caught around the muzzle and can't bite the snare wire. Also large adult dog foxes who get caught around the top of the head in front of the base of the ears and tight up under the throat at the larynx. They expire quickly as they fight the snare, on occasions the wire breaks and the fox is lying dead three or four feet away from the broken snare*
- *With a cat in permanent residence your catch rate is sure to be limited once the snares have been set out … the fourth morning* [after three days of catching nothing in 60 snares set each night], *there in the snares sat three feral cats*

- *Whilst checking their snares at first light* [two friends] *came across a very large feral cat in a snare, awaiting them in another snare further down the line was a Jack Russell dog sitting quite happily wagging his little tail to them after the little rascal had killed all the other rabbits and chewed them up*

Of particular concern is the risk that rabbit snaring poses to attempts to reintroduce pine martens. Both pine and stone martens are caught in fox snares set in Scotland and Europe (Tables 3 and 4), and the capture of American martens in snares set for snowshoe hares (which are similar in size to rabbits) poses a significant threat to their survival. This is because martens cannot escape conventional neck snares and it is not possible to avoid capturing martens by setting the noose at a particular height or diameter. Since snared American martens behave differently to snared snowshoe hares, a snaring system was developed that allowed the martens to escape but held the hares [152]. However, for this to work, no snare components could be eliminated or changed without affecting system efficiency, and the set had to be identical to the published design [152]. This makes it extremely difficult to monitor whether such snares are set correctly in the field.

A diversity of non-target species are caught in rabbit snares, even when set by highly experienced operators. Rabbit snaring poses a particular risk to a range of small carnivores and appears to pose a particular risk to mustelids the size of pine martens.

3.4. Welfare issues associated with snaring rabbits

Rabbit snaring is most common between February and March, and least common between April and September [1]. In high-density rabbit populations, the breeding season runs from January/February to June [40], so snaring rabbits poses a significant risk of leaving orphaned youngsters to die (section 2.7.3). *All methods of control that target adults and are used during the breeding season are likely to leave dependent young to die from starvation. This is a welfare cost that should be considered in any robust risk assessment of wildlife management methods* [1]. The Defra-funded study concluded that the welfare costs to dependent offspring can be minimised by not snaring during the target species' breeding season [1].

Of three professional users of rabbit snares who were monitored for one day during 2009 as part of the Defra-funded study, all three used snares that were *unstopped and were therefore not CoP-compliant*, even though they were aware of Defra's Code of Practice and collectively had >50 years of experience snaring rabbits [1]. Observations of 416 rabbit snare nights by these 3 professional operators recorded 50 captures: 23 rabbits (46%) were alive, 27 (54%) dead, with six (12%) having evidence of predation [1]. None of the rabbits that died in these unstopped snares died from cervical dislocation; *post mortem* examinations suggested that they died of strangulation [1]. Similar high mortality rates have been reported in other studies, e.g., of 374 snowshoe hares caught in live-capture stopped snares, only 51% were alive when the snares were inspected [153].

There is no evidence to show that stopped rabbit snares have fewer welfare problems than those fitted with a stop. In the 1950s, the

government scientist who studied rabbit biology and control for the Infestation Control Division of MAFF (now Defra) stated that while *It is claimed that a snare with a knot or button* [i.e., a stop] *is more humane … This is not always so, for a rabbit so caught is more likely to struggle and may either exhaust itself or break the wire* [147]. Over half-a-century later, the Defra-funded study reinforced these observations (section 3.5).

The three professional snare operators observed as part of the Defra-funded study collectively had >50 years of experience snaring rabbits. One was training others how to snare and another made snares to sell to other operators [1]. So it is reasonable to assume that the data presented in the Defra-funded study indicate the highest welfare standards that are likely to be achieved when snaring rabbits, and that mortality rates, and other welfare issues, may be higher with less experienced operators. The caveat included by another professional operator at the start of his book on rabbit snaring warns that, due to differences in *individual skills … the author and publisher cannot be responsible for any injuries, losses and/or other damages that may result from the use of the information in this book* [128].

The fear of predation, as well as predation *per se*, are key welfare issues associated with snaring rabbits [1,128]. A snared rabbit is vulnerable to both aerial and terrestrial predators and the fear of predation is a significant welfare issue [1]. However, this welfare issue is not included in any of the three international standards used to assess the humaneness of restraining devices [1], and the Defra-funded study provided little detailed information on this issue.

Examples in a book recently published by a professional operator with a lifetime's experience of snaring rabbits illustrate the extent of the problem [128]:

- Predators either *stumble across the snaring field during their nocturnal ventures or are drawn to the snaring field by the squeals that the captured rabbits make upon being snared and the sudden shock of their freedom being severely restricted by the wire noose around their neck … The fox is just a confounded nuisance when he appears on a snareline wreaking nothing but constant havoc with the catch*
- *… the fox can be the most destructive predator on the snareline at any time of the year many times being alerted to the snaring location by the squeals of the captured rabbits*
- *The fox plunders the snareline on a nightly basis and is a confounded nuisance at times as he goes about his nefarious activities throughout the hours of darkness on is* [sic] *nightly travels, leaving nothing at times but sheer carnage on the snareline*
- *The most common visible sign of a fox causing damage on the snareline is seen when checking the snares after first light in the morning and finding only rabbit heads in the snares. Another indication is seeing rabbits lying dead in snares with elongated necks caused by the fox gripping the rabbit and trying to tug it free from the snare. On occasions it will succeed in pulling the securing peg free from the ground therefore losing rabbit and snare altogether*
- *I have had between seventy and eighty rabbits in a straight line right along a field and over thirty of the rabbits are lying stretched out dead. Every one of them has the rib cage crushed in and smashed by the fox gripping them and biting them across the back of the shoulders, with flecks of fur all around each carcase where the rabbit has been darting around with the fox trying to grab it. After the snares have been emptied and reset, the same fox*

comes back in the darkness looking for all the rabbits he has previously killed the morning before and lo and behold he finds another catch of freshly caught rabbits and does exactly the same again

- *I set sixty snares along a rough on a golf course. In the morning on checking the snares I had 44 rabbits, half of which were dead killed by the fox along with another twelve heads which were minus the bodies*
- *A dozen rabbits were all killed and ripped out* [by a fox] *of a catch of 30 in total. There was more damage the following morning*
- *At times you will have both cat and fox working your snareline. I have had this on numerous occasions, the cat caught in one snare along with other snares containing rabbit heads and smashed rabbits with their ribs all crushed in*
- *The most rabbits I have had destroyed by two feral cats in one morning was eight*
- *Although the fox and the feral cat are the main two ground predators that cause the most damage to my snareline, on occasions I suffer from the predation from the badger who occasionally eats a rabbit or two for a meal*
- *The stoat really causes no real damage to the rabbit trapper except to kill an odd rabbit or two captured in snares*
- *… I have seen large hen sparrowhawks killing half grown rabbits in snares and eating the heads off their victims … the same scenario happens along the thick hedgerows at times*
- *Gulls do excessive damage to the snared rabbits; they pick holes into the base of the belly and back leg area and extract all the innards before stripping all the flesh from the carcass before leaving nothing but a whole skin and bones as a reminder of their presence to the trapper*
- *… snare line damage is minimal by crows as they make an entrance hole into the belly to extract the soft innards. They also attack the anal region*. The term *minimal damage* appears to refer to the loss of carcass value rather than welfare concerns
- *The main problem on the snareline with magpies is that they pick the eyes out of the dead rabbits*

This operator highlights that the distress calls of rabbits caught in snares are likely to attract predators, and that predation on snared rabbits is widespread. An SSPCA survey of snare use in Scotland in 2007 found that 11/16 (69%) rabbits caught in snares had fatal injuries and that, of 167 rabbits captured in unstopped snares over the course of ten nights, 14% were dead the following morning: 8% had probably been killed by a predator [8].

While there have been some attempts to improve the design of rabbit snares, these have failed to address the fundamental issues. One practitioner claimed that his snare design (the G.S.W. Breakaway rabbit snare) is *The most advanced humane rabbit snare in the UK* because his *snare system has practically eliminated 100% of all the problems associated with rabbit snaring over the years … by allowing non target species* [from domestic cats upwards] *to activate the breakaway link and free themselves* [128]. However, the stress and predation of snared rabbits cannot be resolved by improvements in snare design or training. The fear associated with being caught in a snare and the lack of control over interactions with the environment or predators are significant welfare problems for snared animals: *pest animals, however undesirable their impact on man, have welfare like any other animal* [10].

The *Committee on cruelty to wild animals* [5] drew a number of conclusions on the welfare

issues associated with the use of rabbit snares which are just as relevant today. These include:

- *If the snare is not set properly, or the rabbit does not enter head first, the noose will pull tight and may hold the animal by a limb or round the body*
- *Rabbit snares are capable of causing a great deal of suffering, especially when used by people who do not have the necessary skills to set them correctly*
- *A captured rabbit is easy prey for foxes and other predators and is also liable to be attacked by birds*
- *Both free-running and knotted (stopped) snares cause considerable suffering to captured rabbits and, while stopped snares cause less suffering, the difference between the two types of snare does not justify legislation to prohibit one type of snare but not the other*

Over the last 70 years the welfare aspects of snaring rabbits have, at best, been a secondary consideration on the grounds that rabbits cause significant agricultural losses. There is no evidence that snared rabbits die of cervical dislocation: most of the rabbits that die in snares are either predated or die of strangulation. The stress and predation risk experienced by snared rabbits cannot be improved, let alone resolved, by improving the design of snares, Codes of Practice, or operator training.

3.5. Behaviour of rabbits held in snares

There is very little information on how wild-caught rabbits behave when caught in a snare, although one operator has described how their distress calls attract predators [128]. While the most comprehensive data comes from the Defra-funded study, these were studies of rabbits that had been captured elsewhere and transferred to a small unfamiliar pen. There are a number of limitations with assessing the welfare standards of snares using this approach, such as:

- The impacts on non-target animals cannot be established
- In the Defra-funded study a snare noose was placed over the head of each rabbit and the snare drawn carefully until the noose was either up to the stop or tight around the rabbit's neck. This was done at the full reach of the snare wire. In the wild, rabbits would run or hop into the snares, probably at speed, coming to an unexpected stop when the full extent of the snare was reached. It is likely that this would increase the chance, and number, of injuries
- Captive wild animals in pen trials are a poor model for the field situation, which influences an animal's physiological and behavioural responses to being held in a snare, and altering the pen environment surrounding the position of the snare can have profound influences on an animal's behavioural responses to capture [1,2]

Another practical problem with the trials in the Defra-funded study was that the Code of Practice in operation at the time recommended a stop position of 14 cm for rabbits, although there was no documented evidence to support this requirement. For the

pen trials, it was decided to set the stop at 11 cm, which corresponds to the average circumference of a rabbit's neck [1].

Twenty-four wild-caught rabbits were used in the Defra-funded study (12 for 16 hours, 12 for 24 hours). Half the rabbits had a stopped snare set with a circumference of 11 cm, half had unstopped snares. One rabbit in an unstopped snare died. External palpable indentations were found in 19 rabbits (79%) at the position of the snare and subcutaneous neck oedema was found in 21 (88%). Rabbits in unstopped snares were significantly more likely to have tears in the subcutaneous adventitia, some of which completely encircled the neck. Intramuscular haemorrhages were found in 7 (29%) rabbits: there was no effect of snare type on neck haemorrhage. Twenty-three (95%) rabbits had lung oedema or haemorrhage and 23 (95%) had some type of oedema on the head or neck above the position of the snare [1]. So the placement of stops at the average neck circumference was not sufficient to prevent a range of injuries, even in pen trails where the rabbits were carefully placed in the snares.

Behavioural observations of these pen trials showed that the rabbits in stopped snares spent a higher proportion of time with the wire taut and significantly more time grooming and pulling on the snare but significantly less time sitting down. Rabbits in the 16-hour trials spent proportionately more time with the snare wire taut.

While it is hard to ascribe motivation to these observations, the contractors suggested that rabbits may learn to prevent negative emotions, such as pain, caused by the snare restricting their movements [1]. They also suggested that rabbits inflict some level of injury upon themselves, probably while trying to escape from the snare, and that the level of injury caused by unstopped snares after initial capture may be proportionate to the level of motivation to escape [1]. Since rabbits might be expected to try to escape from a snare, it is unclear why such injuries could be considered to be self-inflicted.

As an example of the behaviour of snared rabbits, this is a summary of the behaviour of the rabbit that died during the trials in the Defra-funded study:

- 14:19 rabbit placed in snare; panted quite heavily during the first half hour, then breathing appeared more normal and movements calmer
- 18:00 began to gasp, heavily for 19 mins and then less pronounced until 18:35
- 20:00 began to move again and snare wire became wrapped around right hind leg
- 20:26 and 20:50 snare wire may have become more entangled as rabbit moved about, often in small circles
- 21:22 rabbit began to move again after having freed its right hind leg; then began a bout of pulling
- 21:25 bout of shallow panting
- 22:30 snare tangled around rabbit's left hind leg; a few serious bouts of pulling on the snare resulted in several minutes of gasping
- 22:45 lots of pulling on the snare for 20 secs and 'flipping' as the end of the snare wire was reached, followed by 2 mins of shallow gasping
- 23:40 another bout of pulling; snare wire was wrapped around the left hind leg. More gasping followed for 6 mins
- 00:14 rabbit may have become more entangled in snare; followed by another 2 mins of shallow gasping, with occasional small movements
- 01:01 rabbit also had snare wire caught around its front left paw as a result of more pulling on the snare
- 01:18 further movement may have untangled front left paw

- 01:35 left hind leg became more entangled as rabbit did several turns, almost on the spot
- 01:48 another serious bout of pulling on snare caused rabbit to fit while lying on its side. This slowed after 40 secs; rabbit sat back up 1 min later, still gasping for breath
- 01:55 gasping became much deeper and the tongue seemed to be protruding from rabbit's mouth
- 02:00 gasping became shallower but with moments of deeper gasping after any movements made by the rabbit. Movements were mostly small and calm movements until 04:55
- 04:55 another stint of pulling on the snare resulted in a fitting episode lasting 90 secs and rabbit remained lying on its side for a further 6 mins
- 05:04 another fitting episode lasting 25 secs was followed by rabbit lying on its side gasping for 3 mins
- 06:13 rabbit collapsed onto its side from a standing position, continuing to breathe very heavily. It showed very little activity as movements resulted in its breathing becoming more laboured
- 06:27 onwards a series of fitting episodes
- 07:08 rabbit twitched intermittently for 3 mins, followed by another fit, followed by intermittent twitching
- 07:15 rabbit died

Despite its protracted death, and a series of behavioural indicators suggesting significant welfare issues, the necropsy of this rabbit only identified an external indentation at the point where the snare was around its neck, congestion in the windpipe and oedema [1]. This reinforces earlier studies which concluded that a simple *post mortem* examination is inadequate to assess the welfare aspects of restraining traps [8,31]. Furthermore, pen trials do not replicate what happens in the wild. For instance, 54% of a sample of wild rabbits caught by three professional operators were found dead in the snares, compared to just one (4%) in the pen trials, most probably because the speed at which free-living rabbits enter the snare, and the sudden stop, increases the chance of neck, and other, injuries [1].

Even though there were significant welfare issues associated with the rabbits held in snares for the pen trials undertaken for the Defra-funded study, their injuries are likely to be less severe than those experienced by wild-caught rabbits. Pen trials do not replicate the conditions under which free-living rabbits are snared.

3.6. Are rabbit snares killing or restraining traps?

The basic concept of a restraining trap is that it holds captured animals alive. However, 54% of the rabbits caught by three professional operators died before the snares were inspected [1]. Of the 17 rabbit snare users interviewed as part of the Defra-funded study, 53% set snares with the intention that the rabbit would die in the snare: 59% set stopped snares, 35% unstopped, 6% didn't know. The proportion of rabbits killed in snares did not differ between those snares set to kill rabbits and those designed to catch them alive [1]. While 80% of gamekeepers and 93% of farmers were aware of the Code of Practice, only 80% and 33% of each user group had read it. For rabbit-snare users generally, awareness did not appear to translate into uptake of the Code of Practice, the most

notable deviation being the use of unstopped snares [1].

Clearly, rabbit snares are killing, not restraining, traps [8]. There is very little information on how rabbits die in snares, but it is likely to involve a considerable amount of suffering (section 3.5). One expert on trapping noted that a *wildlife biologist who remains passive towards the use of killing neck snares is a disgrace to the profession* [15].

While there is no clear definition of what constitutes a restraining trap, a significant proportion of captured rabbits die in snares, and some/many operators set rabbit snares with the intention that the snare will kill any rabbits that are caught. Rabbit snares should not be described as restraining traps.

3.7. Killing snared rabbits

The welfare aspects of killing snared rabbits have largely been ignored. It has long been recognised that the *regulations protecting wild animals are not as strict as those for farm animals or pets* [154]. Different welfare standards are applied to rabbits depending on whether they are kept as pets [155], farmed for meat [156], used in laboratories [157], reared and killed for personal consumption [158], or are free-living.

The Defra-funded study reported that the most common methods employed by gamekeepers to dispatch snared rabbits were *to stretch the neck (cervical dislocation) or to use a shotgun*, whereas for farmers the preferred methods were *cervical dislocation or a blow to the head,* although some used a rabbit punch [1]. A rabbit punch is generally understood to mean a sharp chop with the edge of the hand to the back of a rabbit's neck. This also appears to be the preferred dispatch method for amateur snare users [128]. Of the three operators accompanied as part of the Defra-funded study, one killed captured rabbits by cervical dislocation, one with a blow to the head with a blunt metal object, and one by shooting them in the head with an air rifle [1].

All of these techniques, other than using a shotgun, have significant welfare issues and would not be acceptable under other circumstances. For instance, under the Animals (Scientific Procedures) Act 1986, cervical dislocation is only approved to kill rabbits up to 1 kg in weight, and then only with the prior use of a sedative or anaesthetic for rabbits weighing over 150 g [157]. Cervical dislocation should only be used for immature rabbits if *the personnel performing cervical dislocation have been properly trained and consistently apply it humanely and effectively*. To ensure competence in the technique, *Personnel should be trained on anaesthetized and/or dead animals to demonstrate efficiency*. The *muscle mass in the cervical region makes cervical dislocation more difficult* with larger rabbits [159]. It is unclear why cervical dislocation (or rabbit punching) is an acceptable method for untrained personnel to use to dispatch snared rabbits, particularly larger rabbits.

A study of slaughter techniques applied to commercial meat rabbits found that *blunt force trauma resulted in an unacceptably high failure rate, particularly in mature rabbits* [160]. Blunt force trauma appears to be widely used to dispatch snared rabbits. In contrast, rabbits raised for food must be stunned and then bled out (or otherwise killed) immediately: a blow to the head is only a stunning technique [161].

Similar rules apply to rabbits reared for personal consumption. *If you kill an animal to eat on your own property, you need to know how to:*

- *restrain, stun and kill the animal humanely and quickly*

- *avoid causing the animal any unavoidable pain, distress of suffering*

The law requires that people killing rabbits that they have reared are always stunned before being killed using a technique such as bleeding. Approved stunning techniques include a blow to the head for rabbits that weigh 5 kg or less, after which *you must immediately cut both arteries in the neck, so they bleed quickly. They must remain unconscious until death* [158].

In their review of the slaughter of rabbits for human consumption, the European Food Safety Authority (EFSA) identified ten welfare consequences that result from the hazards that rabbits can be exposed to during slaughter: consciousness, animal not dead, thermal stress (heat or cold stress), prolonged thirst, prolonged hunger, restriction of movements, pain, fear, distress and respiratory distress [162]. Exactly the same welfare problems are associated with catching and killing snared rabbits.

EFSA also stressed that, to spare rabbits from severe welfare consequences such as pain and fear, they should not be shackled while conscious [162], which is exactly what snaring does.

There is no scientific basis to apply different welfare standards to the same species depending on circumstances. There are no approved techniques to kill rabbits caught in snares, the methods currently in use would not be permissible in different circumstances, and the people who use these techniques are not trained in their use or their competence assessed.

3.8. Alternatives to snaring rabbits

Because of their concerns about the welfare issues associated with the use of rabbit snares, the *Committee on cruelty to wild animals* stated that *if an efficient approved rabbit trap comes into general use it may become practicable to prohibit the use of snares* [to catch rabbits] *because of the cruelty involved* [5]. Since the Committee reported, two alternatives for live-capturing rabbits have been shown to have high capture rates, low injury rates, and low losses to predators. Any non-target captures are alive and can be released with significantly fewer welfare problems, and the traps can be set in fencelines and rabbit-proof fences without risk of entanglement.

3.8.1. Cage traps

These are widely used by researchers to catch rabbits and mountain hares, and by practitioners to try to reduce rabbit numbers; they may or may not be baited. For instance, between October 1983 and March 1986, Tomahawk cage traps (85 x 25 x 25 cm) were set in well-defined mountain hare runs as they passed through an ineffectively rabbit-proofed deer fence; the traps were open at both ends and not baited. They were set in the afternoon and checked at least twice prior to midnight and again the following day. Of 565 captures in 1514 trap nights (i.e., 1 mountain hare per 2.68 trap nights), two hares in an emaciated condition but with no apparent injuries were found dead in the traps and two had suffered broken legs and were euthanized, i.e., 0.7% trap mortality. There was no detectable post-release mortality due to trapping [163].

In another study, 329 rabbits were caught in 416 trap nights (i.e., 1 rabbit per 1.26 trap nights) in Scotland using single-ended baited rabbit traps with a treadle [164]. In Fife, baited treadle traps measuring 66 x 23 x 23 cm (the number of trap nights and number of captures was not specified) were used to catch rabbits in 1975 and 1976: while 13 died in the traps, 8 had been losing weight in the previous 3 months [165].

Rabbit cage traps appear to combine high capture rates with low injury and mortality rates, and have the added benefit of providing a level of protection from predators, although they do not protect from the fear of predation or weather [166].

3.8.2. Drop boxes/drop traps

Drop boxes are long-term multiple-catch live traps that work in conjunction with rabbit-proof fencing, and come in various sizes, ranging from small portable garden boxes to permanent heavy duty agricultural boxes capable of holding large numbers of rabbits. Basically, the traps allow rabbits to pass through a fence via a manufactured tunnel system over a buried holding box, with a trap door in the tunnel. The trip weight on the trap door enables even small rabbits to be caught [167].

Permanently sited drop boxes *can be an effective method of capturing rabbits where fences are newly erected and where rabbits are passing through holes in established fences* [166]. The traps should be operated intermittently, such as one night per week, since good catches rely on the ability of quantities of rabbits to move through the fence/wall to feed [168]. Once the trap-door system is set, up to 50 rabbits can be caught in a single trap per night [169], although such high captures require that a trap is checked at regular intervals [170]. While the initial outlay for drop boxes is high compared to other capture methods, the catch rate is such that the costs are quickly recouped [168].

A variety of non-target species can be caught, such as feral/farm cats, feral ferrets, hedgehogs, pheasants, pine martens, polecats, rats, stoats and wildcats [163,168,171]. However, non-target captures are rare and can easily be released [170]. Injuries seem to be rare: one operator reported no obvious injuries to rabbits in more than 20 years of professional use [170]. Another user reported no unusual or extreme injuries in a few thousand captures, although a few very small rabbits were dead in fuller traps [168]. Similarly, no mortality or significant injuries were recorded when catching rabbits for a translocation study [163]. However, when a predator is caught in the same drop box as a rabbit(s), the rabbit is likely to be killed, although such occurrences are rare.

Overall, when properly implemented, drop boxes are more humane than snaring, spring trapping or night shooting, and much more effective in reducing rabbit numbers than ferrets, and more cost-effective [168]. However, there are few quantified data on the use of cage traps and drop boxes to catch rabbits. Data on the welfare issues and non-target captures for both types of trap should be obtained from quantified studies in different habitats in Britain.

Where rabbits need to be live-captured, both cage traps and drop boxes appear to be highly efficient, cost-effective and have significantly fewer welfare problems than snaring. In 1951 the *Committee on cruelty to wild animals* concluded that, if an efficient rabbit trap comes into general use it may become practicable to prohibit the use of snares to catch rabbits because of the associated welfare issues. Two such traps are now available.

4. Conclusions

4.1. Background

The major concerns about the use of snares highlighted in this review were identified 70 years ago by the *Committee on cruelty to wild animals* [5] and reiterated more than 50 years later by the IWG [31]. Yet despite these two independent reviews by government-appointed bodies, the fundamental concerns about the use of snares have not been addressed.

The IWG recommended that research should be carried out in the following areas:

- *A survey of the use of snares in the UK, covering all their uses*
- *An assessment of the welfare impact of snares, based on investigation of their physical (clinical and pathological), physiological and behavioural effects* [31]

These data are not available.

The IWG stated that:

- *Snaring is not an ideal capture method because it carries risk of poor welfare and of non-target captures*
- *Procedures that have the potential to harm the welfare of animals should not be used unless there is a good reason to do so that 'outweighs' the welfare cost*
- *If it is decided that a certain procedure should be used, steps should be taken to, as far as practicable, minimise the risks of adverse welfare impacts*
- *Pest control is undertaken mostly for human benefit and society has therefore an obligation to seek humane methods where existing methods fall short of the ideal*
- *Our review would be incomplete without reference to the possibility of (i) refining existing other methods that might be used instead of snares and/or (ii) developing novel and better methods of pest control* [31]

No quantified assessment has been undertaken to establish the need to continue to use snares, alternatives to snaring, or how to minimise the associated welfare issues associated with the use of snares.

The IWG suggested that:

- *For a research or wildlife control programme at the national level we suggest it would be important that these matters are considered by a group and that soundly-reasoned, ethically defensible decisions are reached collectively*
- *Defra encourages and is open to applications for support for novel approaches* [31]

These suggestions have not been acted upon.

While the IWG recommended that proponents of a particular means of catching and killing wild animals should be required to demonstrate the necessity of using that technique, its effectiveness and humaneness [31], interest groups continue to make unsubstantiated statements on the need to use snares, and particularly their need for conservation purposes. The Countryside Alliance, for instance, stated that: (i) snaring is a vital management tool in the countryside, which benefits wildlife conservation and a range of economic activities from shooting and agriculture to forestry and eco-tourism; (ii) for most land managers there is no functional replacement for snares at crucial times of the year; and (iii) snaring, used properly, is a humane and effective form of fox control [33].

Despite such assertions, snaring is not a vital management tool, more humane methods of killing foxes, including the use of night-vision equipment, are now in widespread use, and more humane live-catch traps have been developed for rabbits.

Over the last 70 years, proponents of snaring have failed to produce data to support their claims that it is necessary to continue to snare wildlife in the UK. Efficient and humane alternatives to snaring foxes and rabbits are now in widespread use.

4.2. Cost/benefit analyses of snaring

Seventeen years ago the IWG concluded that the lack of data on the use of snares is a serious problem when trying to make cost/benefit assessments about when the use of snares is justifiable [31]. The IWG stated that *The greater the scale of possible adverse impacts on animal welfare, the greater the need for formality and rigor in cost/benefit analysis*, and that *Where a programme that involves capture or culling of wild animals using snares is being considered both the potential impact on the welfare of the snared animals and the merits of the proposed programme should be evaluated* [31].

Possible costs identified by the IWG are:

- *injury and pain associated with capture and restraint by the snare*
- *distress associated with restraint*
- *risk of cold and heat exposure associated with restraint*
- *thirst and hunger associated with restraint*
- *fear associated with presence of humans or predators whilst restrained*
- *possible failure to despatch the restrained animal humanely*
- *prevalence and severity of injuries amongst escapees*
- *prevalence of non-target species capture* [31]

Possible social benefits identified by the IWG include:

- *control of unwanted or excess number of animals*
- *control of unwanted predators*
- *disease control*
- *control of animals that can compete with humans for food resources*
- *control of animals that can cause damage to property*
- *control of animals that are can* [sic] *be a human safety hazard*
- *control of animals that can create social disturbance or nuisance* [31]

Possible national benefits identified by the IWG include:

- *support for the agriculture, forestry, aquaculture and horticulture industries*
- *biodiversity/conservation of species*
- *heritage or maintaining traditional pastimes*
- *trade access, tourism and rural economy through disease or pest control* [31]

Possible recreation benefits identified by the IWG include:

- *economic benefits*
- *employment opportunities* [31]

All these issues need to be considered in a cost/benefit analysis of the need to use snares. No such analysis has been undertaken.

> Even though the IWG reported that the lack of data on the use of snares, and in particular their welfare impact, is a major problem when trying to make cost/benefit assessments about when the use of snares may be justifiable, interest groups have still not provided the basic data needed to justify their claims that the use of snares is essential. Since both fox and rabbit snares are only used on a very small proportion of landholdings, it seems reasonable to assume that any benefits from using snares are, at the best, minimal.

4.3. Current trapping standards

Current mammal trapping standards perpetuate the use of inhumane trapping technology [172]. Trapping standards developed by the International Organization for Standardization (ISO) in the 1990s, the Agreement on International Humane Trapping Standards (AIHTS) in 1997, and the USA Best Management Practices are industrial standards designed to save the fur industry from trade bans [16,172], and traps that have been repeatedly found to be unacceptable for decades are still in widespread use. As the world's leading expert on trapping standards concluded, the list of injuries associated with outdated trapping devices shows that the concerns of animal welfare groups are neither exaggerated nor overemotional [172].

Another fundamental problem is deciding if, or when, a neck snare is a restraining trap. This problem has long been recognised: while user groups describe neck snares as restraining devices, when *the International Standards on trap testing were developed, snares were specifically excluded from consideration, as there was disagreement among delegates as to whether they were restraining or killing devices* [2]. The data presented in this report highlight that many UK operators intend that their snares act as killing traps, and the mortality rates in snares described as 'restraining' traps in the UK are comparable to mortality rates in 'killing' neck snares used to catch furbearers in North America.

In their recent review on the use of snares, New Zealand's National Animal Welfare Advisory Committee (NAWAC) concluded that *there are likely to be unacceptable welfare impacts on snared animals in New Zealand. Codes of Practice guidelines could be developed for snare use. However, the likelihood of them being observed and their effectiveness in ensuring better welfare outcomes is debateable … even with good practice guidance in place it is very difficult to minimise the risk of adverse welfare impacts resulting from snare use. Key issues include the indiscriminate nature of snares and the pain and suffering caused to animals* [173].

These are the same issues highlighted in this report.

Current trapping standards have little, if any, relevance to the use of snares in the UK. There are no welfare standards that apply to the use of 'restraining' neck snares, and, whatever guidance is in place, it is very difficult to minimise the risk of adverse welfare impacts resulting from snare use. Key issues include the indiscriminate nature of snares and the pain and suffering caused to animals.

4.4. Overview of the current situation in the UK

4.4.1. England

The Wildlife and Countryside Act 1981 made the use of self-locking snares illegal. However, there is no clear legal definition of what constitutes 'self-locking'. Nor is there any clear definition of what constitutes a 'free-running' snare [174]. Even when a snare is intended to be free-running, dirt, kinks, corrosion and entanglement, even with non-woody vegetation such as grass [1], will cause it to become self-locking.

In November 2015 the Law Commission for England and Wales published its review of wildlife protection law [175]. It concluded that the ban on the use of self-locking snares should continue and that *the operation and inspection of snares may benefit … from additional regulations prescribing how relevant snares should be operated and inspected*. However, the Law Commission did not resolve the ambiguity as to when a snare is self-locking and when it is free-running. While it concluded that the use of snares should be more tightly regulated, it did not express a view on banning them [175].

On 21 July 2016 the House of Commons debated a motion by the Backbench Business Committee calling on the government to implement a full ban on the manufacture, sale, possession and the use of snares at the earliest opportunity [176]. It was resolved *That this House notes the indiscriminate and cruel nature of snares, the failure of previous attempts at voluntary and self-regulation amongst operators, and the continued suffering caused to thousands of animals every year by these traps; and calls on the Government to implement a full ban on the manufacture, sale, possession and use of snares at the earliest opportunity* [177].

However, later that year, in answer to question UIN 47342 as to whether the Government will bring forward legislative proposals to ban the manufacture, sale, possession and use of animal snares, Defra stated that *The Government has no plans to ban the use of all animal snares. The Government has sought to improve the welfare of snared animals through research to improve snare deployment and design and by working with users who are producing new guidance on best practice* [6]. This statement is surprising since the Defra-funded study showed that the welfare of snared animals is not influenced by whether the operator had been on a training course, and that a significant proportion of users were unaware of the Code of Practice and/or had not read it [1].

In response to the latest petition to *prohibit the sale, use and manufacture of free-running snares under the Wildlife and Countryside Act 1981*, on 25 June 2021 the Government stated that they *will launch a call for evidence on the use of snares*, as part of their policy paper *Action Plan for Animal Welfare* [178]. The Action Plan also said that *The government considers it timely to open this call for evidence to make sure it has the very latest understanding on this issue*. The call for evidence has not yet been made.

4.4.2. Wales

In 2017, the Climate Change, Environment and Rural Affairs Committee (CCERAC) of the National Assembly for Wales reported *that there are considerable gaps in the data available to understand the scale, efficacy, and humaneness of snare-use in Wales* [179], even though the Defra-funded study included Wales and a key objective of that contract was to supply these data [2]. CCERAC also concluded that, given the lack of clarity about the number of snares being used that are, and are not, compliant with the Code of Practice, it is difficult to see how the Welsh Government can assess the efficacy of its policies [179].

Because of the lack of quantified data on the use of snares in Wales, CCERAC recommended that the Welsh Government prepared draft legislation so that it was able *to act immediately should the combined efforts of government, the industry and landowners fail to deliver the ambitions* of the *Code of best practice on the use of snares in fox control* [179,180]. While this code was issued under Section 14 of the Animal Welfare Act 2006, CCERAC highlighted that it was effectively voluntary and levels of compliance were unknown, not least because it is impossible to monitor snare use on private land [179].

On 21 September 2021, the Welsh Government published a White Paper in which they proposed to *bring forward legislation to amend the Wildlife and Countryside Act 1981 to ban the use of snares and glue traps* [181].

4.4.3. Scotland

In 2008 petition 1124 called for *the Scottish Parliament to urge the Scottish Government to amend the Nature Conservation (Scotland) Act 2004 to introduce provisions to ban the manufacture, sale, possession and use of all snares*. In their response to written submissions, the petitioners stated that *Claims that snaring makes an indispensable contribution to conservation and biodiversity come almost exclusively from the shooting industry*. However, *evidence is not given to support these claims and there is a danger of exaggerating the importance of snaring. Put simply, Scotland's shooting and agricultural industries and the rural economy will not collapse if the use of snares is made illegal* [139].

Subsequent regulations applied to snaring in Scotland are more restrictive than elsewhere in the UK. The Wildlife and Natural Environment Act (Scotland) 2011 included a requirement that snares have a fitted stop to prevent the snare tightening beyond a certain circumference, and that the snare is firmly anchored to prevent the trapped animal from being able to drag itself away while caught in the snare [176].

The Snares (Identification Numbers and Tags) (Scotland) Order 2012 required that snare users in Scotland have approved accreditation and, as of 1 April 2013, it has been illegal to set a snare in Scotland without a personal identification number being attached [176]. The Snares (Training) Scotland Order 2015 made *it an offence to set a snare in Scotland unless a person has successfully completed a snaring course run by an approved body* [176]. While the number of people operating snares prior to the enactment of Section 13 of the Wildlife and Natural Environment Act (Scotland) 2011 is unknown, it appears that a *proportion of operators may have discontinued using snares rather than undergo training and*

registration, even though only 0.1% of attendees fail the course [87].

A 2017 review of the use of snares by Scottish Natural Heritage (SNH) simply considered the *status quo*, not the animal welfare issues associated with snaring. SNH stated that *The primary objective of the changes to snaring legislation* [in Scotland] *was to better assure that practices were not causing unnecessary suffering*, and that *It is not within the scope of this review to assess whether that degree of suffering is acceptable* [87]. While training and the need for practitioners to register with the police in Scotland seems to have led to a decline in the reported incidents and prosecutions for the illegal use of snares [87], the fundamental welfare issue remains with the use of snares, not their abuse or misuse. It is *a somewhat simplistic approach to assume that all problems with snares are simply a result of the 'misuse' of snares and 'bad practice', resulting from a lack of guidance and training. It is abundantly clear that 'proper' and legal use of snares is also causing unintended suffering and death on a large scale* [141].

In answer to a question in the Scottish Parliament about the scope of their forthcoming review of snaring, the Scottish Government said on 16 December 2021 that *A statutory review as required by section 11F of the Wildlife and Countryside Act 1981 is currently underway which will be complete early in 2022*. They went on to say that *We are also currently developing the scope for a wider review of aspects of snaring including the question of a ban. Details of this review will be announced in due course. The Scottish Government is committed to upholding the highest standards of animal welfare and we shall, of course, engage widely with stakeholders as part of this work* [182].

4.4.4. Northern Ireland

The use of snares in Northern Ireland is regulated by the Wildlife (Northern Ireland) Order 1985. This was amended by the Wildlife and Natural Environment Act (NI) 2011, which introduced new controls over the use of snares. These are broadly similar to the regulations governing the use of snares in England and Wales [176].

In October 2015 the Snares Order (Northern Ireland) 2015 introduced additional restrictions on the use of snares: these included the need to check each day that a snare remained 'free-running' and to remove or repair it if it was not; to ensure all snares were fitted with permanent safety stops and swivels; to prohibit the use of drag snares; and to prohibit the use of snares where there is a risk that the animal is likely to become fully or partially suspended, or at risk of drowning.

In November 2015 the Northern Ireland government decided that it would 'put a hold' on the Order while further consultation was conducted, due to the strength of public feeling on the issue. The Order came into effect in 2017 and was accompanied by a new Code of Practice that was drafted by the Northern Ireland Snaring Working Group.

On 28 October 2021 the Minister of Agriculture, Environment and Rural Affairs stated that *I have no immediate plans to reform the legislation to ban the sale, manufacture and use of restraints* [snares] *in Northern Ireland. I understand that, although not widespread, there is still a need to retain snares to control pest species in the countryside. For example, some landowners use them to reduce the impact of foxes on endangered species such as ground-nesting birds also on new born lambs during the lambing season. Gamekeepers also use them periodically to reduce the destruction of game birds by foxes at certain times of the year* [183].

This statement perpetuates the use of value-laden terminology and unsubstantiated claims about the impact of foxes and the necessity to continue to use snares, particularly for conservation purposes.

The legislation relating to snaring in the UK is currently being reviewed in each member country. There is a growing awareness that there is no effective protection against unnecessary suffering for either target or non-target captures, and that user-groups have failed to produce any quantified data on the scale of use, efficacy and humaneness of snares.

4.5. Is it possible to monitor the use of snares?

A number of studies have suggested that mammal trapping standards need to be revisited to include (among other things): (i) all trapped mammal species regardless of the reason for which they are captured; (ii) expand on animal-welfare indicators and injuries to detect poor animal welfare in animals captured in retraining traps; (iii) improve trap testing procedures; (iv) develop protocols for the handling and dispatching of captured animals; and (v) develop protocols to assess capture efficiency and species selectivity [16].

However, this ignores the fundamental issue: is it actually possible to ensure that legal requirements, Codes of Practice and best-practice guidelines are implemented and lead to improved standards of animal welfare? As I have highlighted in this review, it is impossible to monitor snare use on private land. This is a fundamental concern since the abuse and misuse of snares *carry high risks of very poor welfare* [184].

The inability to monitor snare use on private land also explains why there are no quantified data on the scale, efficacy, and humaneness of snare-use in the UK. Obtaining such data would require substantial sample sizes because of the great variability in the condition of individual animals caught in snares, both target and non-target species, and the variability between operators and their levels of compliance with legal and other requirements. This sampling problem was highlighted in the Defra-funded study [1].

It is also impossible to collect objective data from operators. As the contractors stated in the specification for the Defra-funded study, *Experience has shown that field sports participants tend to record what they wish they did, rather than what they actually achieve, and may thereby exaggerate the extent of snare use. During detailed studies of snare users, actual intensity of use was considerably lower than had initially been suggested by participants. Users may also perceive the method to be under threat, and seek deliberately to exaggerate its use* [2].

The agreement between Defra and the contractors for the Defra-funded study stated that the 2005 Code of Practice *is intended to lessen or avoid some of the recognised problems of snare use, it is based on expert opinion, and the benefits of adhering to the provisions have not been scientifically validated* [2]. The situation remains the same today: the lack of data on the extent of snare use, and any associated welfare problems, has made it impossible to improve the welfare of animals caught in snares, or to determine whether changes in the law, updating Codes of Practice or the release of best-practice guidelines by industry bodies has led to any improvement in animal welfare. As noted in the Defra-funded study, the difficulty is determining whether poor welfare occurs if *snares are operated according to the* [Code of Practice], *and to what extent failure to observe*

the [Code of Practice] *increases the risk of poor welfare* [2].

So any future changes to the laws relating to snaring would be unenforceable, other than a complete ban on the use of snares.

> It is not possible to monitor the use and abuse of snares in the UK, and any changes in legal requirements, Codes of Practice or best-practice guidelines will be unenforceable.

4.6. Does snaring achieve acceptable welfare and ethical standards?

The welfare standards applied to wild animals in the UK fall a long way behind those in much of the rest of Europe, especially with regard to close seasons and the use of snares. It remains unclear why markedly different welfare standards continue to be applied to animals depending on whether they are captive or free-living.

The Animal Welfare (Sentience) Bill, sponsored by Defra, makes *provision for an Animal Sentience Committee with functions relating to the effect of government policy on the welfare of animals as sentient beings* [116]. Sentience is not dependent on an animal's surroundings, and there is no scientific rationale to apply different welfare standards to an animal depending on whether it is captive or free-living.

Value-laden language has dominated earlier reviews of snaring in the UK. The Wild Animal Welfare Committee has highlighted the issue of negative labels being applied to particular species. *Value-laden language* [such as the terms 'pest' and 'vermin', which are widely used by proponents of snaring] *defines and categorises animals and can indirectly impact on the welfare of animals, primarily by classifying some as undeserving of protection … Value-laden language … may define animals in terms of how they are to be killed, taken or treated, and risks 'hiding' the extent of welfare harms inflicted upon animals* [138].

In this report I suggested that the standards of animal welfare against which to assess the use of snares should be:

- Does snaring inflict the minimum of pain?
- Is the welfare of the captured animal good up to the point where it is killed?
- Is the captured animal rendered insensible to pain and distress within a few seconds?

Snaring fails in all three respects.

A number of scientific studies have highlighted the need to improve welfare standards for wildlife control. The most comprehensive assessment to date was by an international panel of 20 experts: they summarised the principles for ethical wildlife control in 7 questions which should be asked in sequence when making decisions about human-wildlife conflict:

- Can the problem be mitigated by changing human behaviour?
- Are the harms serious enough to warrant wildlife control?
- Is the desired outcome clear and achievable, and will it be monitored?
- Does the proposed method carry the least animal welfare cost and to the fewest animals?
- Have community values been considered alongside scientific, technical, and practical information?

- Is the control action part of a systematic, long-term management program?
- Are the decisions warranted by the specifics of the situation rather than negative labels applied to the animals? [137].

Snaring does not pass any of these 7 ethical standards for wildlife control.

Britain is one of only five European countries where it is still acceptable to use neck snares [185]. As the government scientist who undertook some of the early trials on the use of fox snares noted over 40 years ago, *snaring is responsible for a considerable amount of suffering … Snaring, even with stopped snares, is also indiscriminate. … it is only a matter of time before public awareness of the suffering that snares cause will promote a clamour for their banishment* [30].

The use of snares in the UK does not meet acceptable standards of animal welfare or any of the principles for ethical wildlife control established by a committee of international experts. Some methods used to kill wild animals have such extreme effects on their welfare that, regardless of the potential benefits, their use is never justified: snaring is such a method. All the available data show that the only way to stop extremely high levels of non-target capture, illegal use and misuse of snares, address animal welfare concerns, and recognise that wild animals are sentient beings, is to prohibit the manufacture, sale, possession and use of snares in the UK.

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