

## **Licensing the control of badgers (*Meles meles*) to prevent the spread of bovine tuberculosis in cattle**

### **Advice provided under the Protection of Badgers Act 1992 and Wildlife & Countryside Act 1981 (as amended)**

1. Pursuant to section 10(6) of the Protection of Badgers Act 1992 and section 16(10)(b) of the Wildlife and Countryside Act 1981 (as amended), Natural England offers the Secretary of State the following advice as to the circumstances in which licences should be granted
  - to kill badgers (issued under the 1992 Act) and
  - to use prohibited methods to take or kill badgers (issued under the 1981 Act)to prevent the spread of the disease bovine tuberculosis (TB) in cattle in England.

### **Scope**

2. This advice relates to the proposals announced on 15 September and described in the document '*Bovine Tuberculosis: the Government's approach to tackling the disease and consultation on a badger control policy*' (Ref 35/10). This is not a response to the consultation, but is advice on the proposals described therein.

### **Natural England's role**

3. Natural England has two roles that are relevant to this topic: that of statutory conservation advisor, and that of wildlife licensing authority in England.
  - a. Natural England is the UK conservation body responsible for advising government relating to conservation matters in and relevant to England <sup>i</sup>
  - b. Natural England is authorised to issue licences on behalf of the Secretary of State under the following relevant sections of the 1981 and 1992 Acts by a Part 8 Agreement <sup>ii</sup> under section 78 of the Natural Environment and Rural Communities Act 2006 and does so in accordance with government policy:
    - Section 10 (2)(a) of the 1992 Act '*for the purpose of preventing the spread of disease, to kill or take badgers, or to interfere with a badger sett, within an area specified in the licence by any means so specified*'
    - Sections 16 (3)(g) of the 1981 Act '*for the purpose of preventing the spread of disease*' to use methods of killing or taking (such as cage traps and spot-lamps to illuminate targets at night) prohibited by section 11(2) of that Act.
4. This advice is given without prejudice to our licensing function (specified in paragraph 3.b above).

### **General advice on licensing**

5. Applications for licences under wildlife legislation should be assessed according to the principles set out below <sup>iii</sup>. These principles have underpinned the wildlife licensing Natural England has undertaken on behalf of the Department since 2007, and are derived from conditions and concepts embedded in European and domestic wildlife legislation and international conventions, such as the Bern Convention. The principles are:

- (i) There is a genuine problem to resolve or need to satisfy for which a licensing purpose is applicable;
  - (ii) There are no satisfactory alternatives;
  - (iii) The licensed action will contribute to resolving the problem or meeting the need;
  - (iv) The action to be licensed is proportionate to the scale of the problem or need, and
  - (v) The licensed action will not have an adverse effect on the conservation status of any species or habitat.
6. The conduct of licensing should be in accordance with the '*Agreement on Natural England's discharge of Wildlife Management Functions*'<sup>iv</sup>.
7. A policy may apply in the generality of cases, but it is a basic principle of administrative law that the licensing authority must still consider each individual application for a licence and be open to the possibility of making an exception.

### **Specific advice on proposal to permit badgers to be killed under licence to prevent the spread of bovine TB**

#### *Introduction*

8. Bovine TB is a serious infectious disease of farmed cattle in England and there are within both the 1981 and 1992 Acts suitable licensing purposes to permit the killing of badgers to control disease (or damage to livestock; licensing principle i). Combating infectious disease in livestock is not, however, the purpose for which either of these Acts was specifically designed.

#### *The evidence*

9. The main body of evidence available to inform the policy is provided by the Randomised Badger Culling Trial (RBCT) and is published in the report of the Independent Scientific Group (ISG)<sup>v</sup> and in subsequent publications,<sup>vi vii viii ix</sup> which include analysis of data collected after completion of the trial (licensing principles ii, iii and iv).

#### The Randomised Badger Culling Trial (RBCT)

10. A key finding of the ISG report on the RBCT, published in June 2007, was that simple epidemiological models, which predict a decrease in disease incidence in cattle as the density of a wildlife reservoir population (badgers) is reduced, do not apply in this case. Other factors appear to play a role and some approaches to badger culling may make things worse, rather than better.
11. Proactive badger culling, over areas of about 100 km<sup>2</sup>, as carried out over the time-scale of the RBCT, resulted in both positive and negative effects. Overall incidence of confirmed cattle herd breakdowns was 23.2% lower in the 100km<sup>2</sup> proactively culled areas, but 24.5% higher in the 83.5km<sup>2</sup> 2km-wide surrounding area, compared with survey-only (no cull) areas – giving a very marginal overall net benefit when taking into account the larger cull area, compared to the surrounding area. This benefit is equivalent to a total of 14 cattle breakdowns saved by proactive culling over all 10 cull areas (1000 km<sup>2</sup>) for five years.
12. Considered in terms of the proposed policy, this benefit would equate to 2.1 fewer TB herd breakdowns per 150 km<sup>2</sup> following five years culling. To achieve this benefit it would

be necessary to kill about 1300 badgers over each 150 km<sup>2</sup>, which is an average of 636 badgers for each breakdown prevented <sup>v</sup>.

#### Updated analyses of effects in RBCT areas

13. Estimates of the effects of badger culling in the RBCT areas have been revised following further analysis<sup>vi vii viii ix</sup> and include cattle herd breakdown data for the 5 years since the last culls. Extrapolating from pooled data up to 30 months into the post-trial period (overall estimate at the time; 28.7% reduction in breakdowns inside cull areas and 11.7% increase outside) gave a 95% probability of achieving a net benefit with a cull area of 141 km<sup>2</sup>. The most recent analysis by Donnelly et al (2010), using data up to 2 July 2010, indicates an overall benefit in the post-trial period of 34% reduction in breakdowns within culled areas and a 5.6% reduction in surrounding areas. Pooling the results from the during-trial and post-trial periods, the figures are 28.3% lower inside cull areas and 9.0%<sup>1</sup> higher in the surrounding 2km-wide area.
14. There are a number of ways of interpreting these findings and some examples are given in Annex B of Defra's consultation document. Extrapolating for a hypothetical 150km<sup>2</sup> cull area (as proposed under the policy), with a 99km<sup>2</sup> surrounding area, and the same background incidence of confirmed new cattle breakdowns (CNIs) per year (0.1 CNI/km<sup>2</sup>), suggests an overall net benefit of 12.4%<sup>2</sup>. This is the net effect over the total affected area (249km<sup>2</sup>). In the consultation document, an example is also given, using different estimates of CNIs within and surrounding a cull area. In this case, the overall benefit over a 5 year cull period and 4 year following period, is an estimated reduction in confirmed breakdowns of 16%<sup>3ix</sup>. This assumes a 50% higher background incidence of CNIs inside the cull area than outside (0.15 and 0.1 CNI/km<sup>2</sup>, respectively), said to be consistent with the Veterinary Laboratory Agency's recent estimates of incidence in the worst TB affected areas. This is the example that is given in the main consultation document.
15. Whilst the assumptions concerning levels of background breakdown incidence in the second example may be appropriate in relation to the RBCT areas they may not apply to licence application areas, where the area and boundaries will be proposed by the applicant. In any event, the data suggests that, depending on background incidence of CNIs, on average, the estimated overall net benefit for the entire area affected is likely to be around 12.4 to 16%.
16. Considered in terms of the proposed policy, the updated analysis (using the 16% reduction figure) equates to 46.8 fewer TB herd breakdowns per 150 km<sup>2</sup> following five years culling and a further four years without culling. The total number of badgers killed to achieve this benefit remains 1300 over 150 km<sup>2</sup>, but this now equates to 29 (rather than 636) badgers for each breakdown prevented <sup>ix</sup>.

#### *The practicalities of delivering disease control through culling badgers*

17. The RBCT was coordinated and delivered by government, whereas under the current proposals it is envisaged that culling will be undertaken by groups of farmers and landowners, possibly using contractors. Natural England is concerned that any moves

---

<sup>1</sup> Confidence intervals for figures presented here are given in the relevant published reports.

<sup>2</sup> 95% Confidence Intervals: 3.1% to 21.8%.

<sup>3</sup> 95% Confidence Intervals: 7.9% to 24.2%.

away from the evidence provided by the RBCT will reduce confidence in the success of culling and could erode the benefits observed during the trial. The ability of farmers and landowners to deliver an effective cull is unknown (there are no suitable comparisons), and there are a number of serious practical challenges.

- a. **Size of the area:** The coordination of culling – of sufficient intensity and within a short period of time (up to 11 days in the RBCT) - over 70% of an area of at least 150 km<sup>2</sup> is a significant logistical challenge. There is no evidence to support any other (i.e. less onerous) approach. Moreover, evidence from the RBCT suggests that low intensity or opportunistic culling could heighten the risk of perturbation and may increase disease spread.
- b. **Intensity and duration of cull:** To deliver a net benefit culling needs to be carried out at a sufficient intensity (i.e. removing > 70% of badgers from > 70% of the area) for at least four years. This is a major undertaking for a group of individual farmers and landowners to coordinate and deliver. Unlike other areas of licensing, failure to deliver the licensed action fully and effectively could make the disease situation the licence was issued to resolve significantly worse; worse not just for the participants, but potentially also for their neighbours. The evidence for this is provided by the RBCT<sup>5</sup>. For example, the detrimental effects of culling on disease incidence dominate initially, and it is only after the fourth annual cull the number of breakdowns prevented exceeded the number induced by culling. Failure to sustain culling for the full duration of the licence could, therefore, lead to a net negative effect on disease incidence. Risks to effective coordination and delivery include:
  - i. Changes to land ownership or land-use.
  - ii. Withdrawal of support. Applications are likely to rely – in part - on access to land belonging to people without livestock. The support of this group of people may be particularly sensitive to opposition from others to culling.
  - iii. Withdrawal of participation: A tail-off in commitment of participants may occur for various reasons, including the high costs of control (particularly if shooting proves less effective than envisaged), the practical difficulties of killing badgers at the intensity required, or as a reaction to local opposition to culling.
  - iv. Free-shooting proves ineffective. Culling by free-shooting is estimated to be about 10-fold less costly than by cage trapping and shooting. The method is unproven and should it prove less effective than anticipated then an increased reliance on cage trapping will increase costs of control which could, in turn, impact on the effectiveness of the cull and on participant commitment.
- c. **Oversight of the cull:** The critical importance of achieving an effectively delivered cull and thus a net benefit for disease control presents a significant challenge to the licensing authority. While the Protection of Badgers Act does include legally enforceable licence conditions (although the Wildlife and Countryside Act does not) neither statute was intended to compel people to control wildlife so there are no suitable provisions for accessing land or recovering costs should intervention be needed to ensure a cull is completed as agreed. There are also practical difficulties in evaluating effectiveness reliably:
  - i. In the absence of accurate baseline data on badger populations in each area it will be very difficult to judge the effectiveness of culling (or set accurate targets) which will make it difficult to decide when it is appropriate (and fair) to intervene.

- ii. It is likely that there will be significant delay between initial identification of failings in delivery, debate and negotiation over improving cull level, and eventual intervention to ensure the cull is 'completed' as agreed. A delay of two culling seasons is not unreasonable, which means any intervention will mean re-starting a 4 year programme from the beginning. In addition, this will do nothing to redress the negative impacts that may have been accrued in the initial failed culling period.

### *Conclusion and recommendation*

18. The scientific evidence shows that culling badgers following the approach adopted by the RBCT can in principle deliver a reduction in disease incidence in cattle. It is a matter of judgement whether this estimated outcome predicts a sufficiently substantial benefit that the expectation of achieving it would justify killing large numbers of badgers (approximately 1300 for each 150 km<sup>2</sup> area, which is equivalent to 29 badgers per breakdown saved; licensing principle iv).
19. More critical are the practical challenges. While it is reasonable to assume that replicating the RBCT approach would deliver similar benefits in a future cull, it is far from certain that these benefits could be delivered via the farmer and landowner led approach that has been proposed. If all the measures required to effect a cull that would represent what has been judged to be a significant contribution to the prevention of the spread of bTB are not put in place, [REDACTED]  
[REDACTED]
20. Natural England's general position on badgers and bovine TB is given in the attached Annex.

### *Licensed badger culling permitted*

21. If it is decided to proceed with a policy permitting farmers and landowners to cull badgers, along the lines set out in the consultation document, then we offer the following advice to maximise the likelihood that the potential benefits demonstrated in the RBCT are realised.
  - a. **Design of culling regime:** Culling could be carried out differently to the way it was done in the RBCT, but there is no other scientific evidence applicable in Britain to support the view that other culling regimes would be more effective (or less likely to cause perturbation). For this reason, the policy should seek to replicate, as far as possible, the approach followed during the RBCT.
  - b. **Satisfactory alternatives:** To authorise an otherwise unlawful activity (such as killing badgers) under a licence it is first necessary to demonstrate that there are no satisfactory alternatives that do not require the protection given to a species to be derogated (licensing principle ii and Bern Convention<sup>4</sup>). Applications to cull badgers to prevent disease will need to demonstrate that other approaches to controlling bovine TB in cattle, such as enhanced biosecurity and cattle measures, or vaccination of badgers, do not, without culling, provide a suitable alternative.

---

<sup>4</sup> The Standing Committee of the Bern Convention published new advice on interpreting the "no satisfactory alternative" test in October 2010, and Defra has since advised Natural England that licences must be compatible with the terms of the Convention (November 2010).

c. **Mitigating the effects of perturbation:** Steps should be taken to minimise the risk that perturbation of badger social groups following licensed control action leads to an increased TB incidence in cattle. Measures to mitigate this risk include:

- i. The boundary of each culling area should be selected so that the risk of badgers spreading the disease to neighbouring areas following culling related perturbation is minimised. There are a range of means by which this can be achieved, including aligning the edge of each culling area with physical barriers that will limit badger movement (e.g. coast or major rivers), and/or using buffer zones of at least 2 km width where, for example, badgers have been vaccinated or there are no vulnerable livestock.
- ii. The key features required for successful disease control as set out in the ISG Final Report (taking account of more recent analyses of the data<sup>vi vii viii ix</sup>) should form the basis for the criteria for determining licence applications. These key features are:
  1. Size of area: each area should be at least 150km<sup>2</sup> in area and should also be as compact, in shape, as possible to maximise the ratio of area:boundary.
  2. Intensity of culling: At least 70% of badgers need to be removed, and the population must be maintained at this reduced level for the duration of the cull, whilst ensuring that local populations are not eradicated. Culling should be carried out over 70% or more of the area (with the expectation that badgers will be removed over > 80% of the area)
  3. Duration: The evidence provided by the RBCT shows that a net benefit for disease control in cattle is only likely to be achieved after 4 years of badger culling<sup>v</sup>. It is imperative, therefore, that once started, culling needs to continue at sufficient intensity (i.e. to remove > 70% of the population and keep it suppressed) for the full four years proposed under the policy. Measures to ensure this happens will be critical to the success of the policy and the justification of licenses issued.
- iii. Culling should be concluded simultaneously throughout each area (culling was carried out over an 8-11 day period during the RBCT). This is the only approach that is known to work. Permitting culling over significantly longer periods would prolong the period of perturbation and could, as a result, lead to an increased incidence of TB in cattle (and thus diminish the net benefit of culling).

d. **Methods of control and badger welfare:**

- i. The evidence from the RBCT should be used to inform the period over which culling is permitted (for each method used) to protect the welfare of culled badgers (and because the 'cruel ill-treatment' of badgers cannot be authorised under a Protection of Badgers Act licence).
- ii. Free-shooting was not a method used during the RBCT and there is limited evidence on its applicability to badgers<sup>xii</sup>. In view of this, we recommend against issuing licences that permit culling to be carried out by free-shooting alone. We also recommend that its use is monitored and evaluated; if there are concerns regarding badger welfare or efficacy then its use should be reconsidered.
- iii. All persons culling badgers should have appropriate training and experience in the methods to be used and their application to badgers.

- e. **Treatment of non-participants:** It is unlikely, based on the experience of the RBCT, that all farmers and landowners with cattle (or other vulnerable animals, including wildlife sites with badgers) within the area affected by culling (i.e. up to 2 km from the perimeter of the culled area) will participate or support a cull but could be affected by it. For example, some livestock farmers are expected to suffer TB breakdowns as a result of culling related perturbation. Furthermore, the geographical scale over which licensed action proposed under this policy is unprecedented. We therefore recommend that:
- i. Licensees are required to implement reasonable and practicable measures (e.g. biosecurity advice, buffers etc) to protect non-participants with vulnerable livestock (or relevant interests), and
  - ii. People living within the potential affected area of each application (i.e. up to 2 km from the perimeter of the culled area) are provided with the opportunity to express their views on each application to the licensing authority before a decision is taken. This could take a similar approach to a planning notice. This approach will ensure that the interests of non-participants (as well as participants) are taken into consideration by the licensing authority before it arrives at its decision.
- f. **Ensuring licence compliance and enforcement:** The licence will be issued (and thus justified) on the basis that it is expected to contribute (and ideally make a substantial contribution) to disease control (licensing principle iii). The RBCT showed that to achieve a net benefit culling must be carried for at least 4 years. It is imperative, therefore that provisions are made to ensure that, once commenced, effective culling is carried out for four consecutive years at the required intensity. These provisions must be enforceable for the cull to be effective. Ensuring that the licence conditions are enforceable will involve resolving a number of novel and contentious matters including ensuring access to the whole area is available in the event of a default; determining whom is going to take over the cull in the event of a default, and whom will then pay for the cull to be completed. We would suggest that legally robust mechanisms for recovering the costs of completing the cull in the event of a default need to be identified. We would anticipate that the government will also wish to consider the role that it will take in these circumstances and whether it will be prepared to use other powers it may have to complete the cull, for example, those set out in the Animal Health Act..

#### *Protected species and habitats*

22. The badger is a common and widespread native British species and is not at present a species of conservation concern. Any policy of licensed control should be so designed and conducted that it does not lead to the species becoming a conservation concern. This includes taking such measures as are necessary to avoid the local disappearance of, or serious disturbance to, badger populations (Bern Convention<sup>x</sup> and licensing principle v). The Convention does not define 'local', nor is there clear evidence upon which to make a judgement of what might constitute 'local' in respect to English badger populations. Nevertheless, for the purposes complying with the Convention, and of being proportionate in our requirements of individual applicants, we advise that measures are taken to ensure that the badger population within each 150km<sup>2</sup> area is not completely eradicated.
23. While there are no immediately apparent reasons to suspect that the lethal control of badgers will have a detrimental impact on other protected species or protected habitats, the policy should include appropriate safeguards to prevent incidental harm occurring

(licensing principle v). This requirement can be met by following existing licensing policy, which is to consider impacts on protected species and habitats on a case by case basis.

### *Monitoring*

24. It is vital that any culling policy is monitored and that the results of such monitoring are used to review and, if necessary, amend the policy or its implementation. Particular attention should be given to monitoring and assessing those elements that deviate from the approach followed during the RBCT. The four principal issues that should be monitored are:
- a. TB incidence in cattle: To assess the benefits of the policy and to provide an early warning of unexpected perturbation effects, TB incidence in cattle should be tested annually and monitored within each area subject to culling and in the surrounding countryside (i.e. within 2 km of the culled area to examine perturbation effects and, for comparison, beyond 2 km).
  - b. Status of badger population: It is important to be able to demonstrate that badgers have not been eradicated from the culled areas.
  - c. Welfare of culled badgers: The effectiveness of novel methods, such as the use of frangible ammunition and free-shooting, should be evaluated under field conditions..
  - d. Delivery of licensed action and compliance with licence conditions: Performance and compliance with the terms and conditions of licences will need to be monitored closely and action taken if concerns are identified.

Natural England  
December 2010

- 
- <sup>i</sup> Natural Environment and Rural Communities Act 2006 (in particular s32); the Protection of badgers Act 1992 and the Wildlife and Countryside Act 1981
  - <sup>ii</sup> Part 8 Agreement is published at:  
[www.naturalengland.org.uk/Images/signedpart8agreement092006\\_tcm6-4392.pdf](http://www.naturalengland.org.uk/Images/signedpart8agreement092006_tcm6-4392.pdf)
  - <sup>iii</sup> These principles are included in published guidance produced by Natural England:  
[www.naturalengland.org.uk/ourwork/regulation/wildlife/policyandlegislation/authoritytoissuelicences.aspx](http://www.naturalengland.org.uk/ourwork/regulation/wildlife/policyandlegislation/authoritytoissuelicences.aspx)
  - <sup>iv</sup> The Agreement on Natural England's discharge of Wildlife Management Functions is published at:  
[www.defra.gov.uk/wildlife-pets/wildlife/management/documents/wma.pdf](http://www.defra.gov.uk/wildlife-pets/wildlife/management/documents/wma.pdf)
  - <sup>v</sup> Bourne, F. J., Donnelly, C., Cox D., Gettinby, G., McInerney, J., Morrison, I. & Woodroffe, R. (2007) Bovine TB: The Scientific Evidence, A Science Base for a Sustainable Policy to Control TB in Cattle, An Epidemiological Investigation into Bovine Tuberculosis. Final Report of the Independent Scientific Group on Cattle TB. London: Department for Environment, Food and Rural Affairs.
  - <sup>vi</sup> Jenkins HE, Woodroffe R, Donnelly CA (2008) The effects of annual widespread badger culls on cattle tuberculosis following the cessation of culling. *Int. J. Infectious Disease* 12: 457-465
  - <sup>vii</sup> Jenkins HE, Woodroffe R, Donnelly CA (2010a) The Duration of the Effects of Repeated Widespread Badger Culling on Cattle Tuberculosis Following the Cessation of Culling. *PLoS ONE* 5(2): e9090. doi:10.1371/journal.pone.0009090
  - <sup>viii</sup> Jenkins HE, Woodroffe R, Donnelly CA (2010b) Analysis of further data on the impacts on cattle TB incidence of repeated badger culling. *PLoS ONE* 5(2) supplementary information (posted 14 May 2010).



<sup>ix</sup> Donnelly CA, Jenkins HE, Woodroffe R (2010) Analysis of further data (to 2 July 2010) on the impacts on cattle TB incidence of repeated badger culling. PLoS ONE 5(2) supplementary information (posted 22 July 2010).

<sup>x</sup> In particular, Articles 7 and 8 of the Bern Convention  
<http://conventions.coe.int/treaty/en/treaties/html/104.htm>

<sup>xi</sup> Bovine Tuberculosis; The Government's approach to tackling the disease and consultation on a badger control policy. Defra Consultation September 2010. Annex B

<sup>xii</sup> Shooting as a potential tool in badger population control. Report to Defra by the Game Conservancy Trust, August 2006.

## Annex

### Natural England's general position on badgers and bovine tuberculosis (TB)

- Natural England acknowledges that bovine TB is a serious infectious disease of farmed cattle, causing economic hardship and emotional distress to significant parts of the farming community, and that it needs to be controlled.
- We accept that badgers are a disease reservoir and their role in transmitting TB to cattle cannot be ignored. In the absence, to date, of an effective cattle vaccine, all measures that minimise cross-infection between cattle and badgers must form part of any disease control strategy.
- Past control strategies based on culling badgers proved ineffective at controlling the rising incidence of the disease in cattle. We believe that a long-term solution which involves an integrated and multi-faceted approach provides the best hope of effectively controlling the disease. This should include a programme of vaccination in badgers, combined with the diligent application of existing cattle-based measures, including surveillance, pre-movement testing, improving the ability to diagnose *M. bovis* in cattle and herd biosecurity. Cattle vaccination, though still some way off, will also be important.
- The Independent Scientific Group final report (published in 2007) of the Randomised Badger Culling Trial (RBCT) concluded that culling of badgers can exacerbate the spread of the disease in cattle through perturbation of the badger population, and that culling will contribute to disease control only where the risk of this is effectively mitigated, for example in circumstances where the scale of the area covered is sufficiently large, the intensity and duration of culling, is sufficiently high and there are adequate geographic buffers or barriers to limit badger movement at the periphery of the culled area.
- The benefits of culling on TB incidence in cattle persisted after the RBCT concluded and the latest analysis of breakdowns in the trial areas (published in 2010) has revealed that so far, culling has reduced herd breakdowns by about 12.4-16%. If badger culling is to be undertaken in future for disease control purposes then the policy needs to be based closely on the evidence provided by the RBCT to be confident of replicating these benefits.