

Bovine TB

Badger control policy: value for money analysis

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Background

The 2011 assessment of the value for money of piloting badger culling found that the costs were likely to marginally outweigh the financial benefits but with considerable uncertainty. This was particularly the case with policing costs where the weight given to such considerations was a matter of judgement for Ministers.

At the time no alternative option offered better value for money in the short to medium term, against a situation where the incidence of TB in cattle continues to rise, along with the costs to both Government and farmers of dealing with it.

Piloting the method of controlling TB in badgers was considered worthwhile to test assumptions around the effectiveness, humaneness and safety of culling and to improve our understanding of the potential long term cost-effectiveness of the approach.

Following two years of culling in Gloucestershire and Somerset we have gained valuable evidence to inform decisions on next steps for the policy. Extending to one additional area this year, before deciding on extending badger control to a wider number of areas, will further strengthen our evidence base and maintain momentum.

Costs and benefits of extending the current approach to a further area

- The future direct costs to Government are estimated at around £1.18m per new area for licensing and monitoring, training and guidance, and purchase of equipment, over four years.
- Industry costs are uncertain and have been estimated at around £0.71m per area over four years. *[Redacted – Commercially sensitive]*
- If the benefits of culling are in line with the reduction in cattle TB observed over ten years in the RBCT, they would be between £0.40m and £3.24m per area with around half falling to Government (central estimate of £1.93m).
- These ranges suggest the current approach to culling could yield a net quantified benefit with benefits greater than costs in the central case.

Uncertainties

- The need for policing has been a feature of the policy to date due to protesters and the need to maintain public safety. It is likely that extending to a new area will require a similar level of policing at least in its initial year. Based on experience in the existing cull areas this could increase the costs to government by around £2.66m per area over 4 years. However, it is a shared goal of Defra and the Home Office that policing should become business as usual for local police forces and attract no additional costs. Over time, following further successful culls without security incident, we expect any policing costs to disappear.
- The costs to Government and industry presented here are lower than those observed in the two cull areas to date. Costs to Government have fallen largely due to reductions in humaneness monitoring and policing. Costs to industry are expected to fall as lessons learnt over the last two years lead to efficiencies and improvements in operational delivery.
- The range in the quantified benefits takes account of scientific uncertainty around the impact of an effective cull in line with the randomised badger control trial. Any changes to the way culling is delivered, the size of the culling area, density of cattle or the baseline levels of TB will add further uncertainty which could mean greater or lower quantified benefits than those estimated here.

Analysis of the costs and benefits of extending badger control in 2015

Defra's 2011 impact assessment set out the expected costs and benefits of piloting badger culling to reduce TB in cattle. During 2013 and 2014 badger culling took place in areas of Gloucestershire and Somerset using a combination of controlled shooting and cage trapping and shooting. Based on this experience, this annex sets out an assessment of the direct costs and benefits of extending culling to a new area in 2015.

The benefits of badger culling

The benefits of badger culling are the net reduction in the level of TB in cattle herds within and around culling areas. They are estimated based on the impact of culling observed in the randomised badger culling trial (RBCT) over 11 years from the commencement of

culling¹. These benefits are valued by the savings in disease control costs to farmers and Defra (i.e. taxpayers) through avoided cases of TB in cattle (breakdowns²).

Table 1: Estimated impact of badger controls on baseline number of confirmed new incidents of TB in cattle within culling areas and up to 2km² away

% change in confirmed new breakdowns	central	optimistic	pessimistic
within during	-23.2%	-32.7%	-12.4%
within post	-25.9%	-38.4%	-10.9%
outside during	+24.5%	-0.6%	+56.0%
outside post	-6.8%	-31.2%	+26.4%

The main control actions involve restricting movements of cattle from the herd, whole herd testing of cattle, slaughter of any cattle that react to the test and repeated testing and slaughter until the herd is cleared. The estimated average cost of a breakdown used in this assessment is £24k split roughly equally between farmers and government. In practice there is a wide range in the scale, duration and cost of breakdowns. Many are minor but a small proportion are major, costly to farmers and government, and extremely disruptive to farm businesses. This assessment uses the average cost of a breakdown, but we recognise the range that exists.

Table 2: Estimated average cost of a confirmed new TB breakdown in the high risk area

	Farmers	Government	Total
Slaughter costs	£7,600	£7,500	£15,100
Restrictions	£600	£0	£600
Isolation	£200	£0	£200
Testing and admin	£3,700	£3,900	£7,600
Admin	£0	£300	£300
Total	£12,100	£11,700	£23,800

If the benefits of culling in a new area are in line with the reduction in cattle TB observed over 11 years in the RBCT, they would be between £0.40m and £3.24m split equally between farmers and Defra. The central estimate is £1.93m.

¹ Evidence on the effect of removing badgers on the incidence of TB in cattle from the two licensed areas is not yet available to inform this assessment.

² This assessment considers only confirmed cases of TB and excludes unconfirmed incidents because analysis of data from the RBCT did not identify any significant effect of badger culling on unconfirmed incidents

These estimates are based on culling taking place over an area of 230km²³ in the high risk area (HRA) of England with a rising baseline of new TB incidents of 1.1% per year. Each incident prevented due to culling is valued according to the average cost of a breakdown in the HRA. Physical values on the duration and size of breakdowns are taken from the Animal and Plants Health's (APHA) annual surveillance report. Costs to Defra are taken from appropriate financial sources in APHA whilst costs to farmers are estimated using a methodology established by Reading University⁴, inflated using appropriate price indices. All values expressed are in 2015 prices. See table 5 for a list of the main assumptions and sources used.

The quantified benefits presented here are lower than those estimated in 2011. This is the result of a number of changes to the underlying assumptions. Reductions in the area over which culling takes place, the baseline incidence of TB and the cost of TB breakdowns have all served to lower the estimated quantified benefits.

Qualitative evidence suggests that bovine TB can cause significant stress and ill health among the farming population. However, the impact of such stress is difficult to quantify or value. Studies looking at the social impacts of bovine TB have found self-reported stress among farmers. For example, from a sample of 50 farmers interviewed in the south-west, 30 said their farm's TB breakdown had affected their own daily life, 20 that of their family or household, 10 their employees. Evidence suggests that a long period of time under movement restrictions is a significant contributor to stress across all farming groups. A standard questionnaire designed to identify psychiatric ill health found that farmers that have been under TB movement restrictions for a long period of time showed significantly higher levels of stress than farmers who had not experienced a TB herd breakdown.

The costs of badger culling

The main costs of badger culling to farmer-led companies are surveying, preparation and coordination which includes communication, planning, support, management and administration; and delivery of culling through a combination of controlled shooting and cage trapping and shooting which includes equipment and manpower.

Based on experience of culling over two years [*Redacted – Commercially sensitive*] the total cost to farmers of culling over four years is estimated at £0.71m per area.

[*Redacted – Commercially sensitive*] These figures are subject to uncertainty.

[*Redacted-Commercially sensitive*]

³ Based on the estimated size of the proposed cull area in Dorset

⁴ <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=10137>

The main costs of badger culling to Natural England (a Defra agency) are licensing of cull areas which includes scrutiny of applications and monitoring of compliance; the main costs to APHA (a Defra agency) relate to training and mentoring and advice; and local police forces incur costs in relation to maintaining public order and safety. All of these costs are met by taxpayers.

Costs to Natural England are based on the total cost of their licensing team, divided by the expected number of licensed areas per year. Total costs are estimated at £0.55m per area over four years.

Costs to APHA are based on estimates of the time needed to provide training and mentoring to a new area in 2015 and further support in 2016. These costs are expected to fall by around 25% in the second year of culling and remain constant for the remainder of the cull period. The total cost of advice is divided by the number of areas expected to be licensed in any year. Total costs to APHA are estimated at £0.37m per area over four years.

Defra incurs additional costs related to equipment such as cage traps and administration. Taken together these are expected to cost £0.26m per area over four years.

Table 4: Estimated cost to government of culling per area

	Year 1	Year 2	Year 3	Year 4	Present Value
Natural England	£350,000	£120,000	£60,000	£40,000	£500,000
APHA	£170,000	£90,000	£70,000	£60,000	£400,000
Defra (equip and admin)	£70,000	£70,000	£70,000	£70,000	£300,000
Total	£580,000	£270,000	£200,000	£170,000	£1,200,000

Total costs and benefits of extending to an additional area

The total quantified benefits are estimated at £0.40m to £3.24m per area over four years, based on the impact of culling as observed in the RBCT. This compares with an estimated direct cost of £1.89m over four years of extending to one additional area.

In the central case direct costs are expected to roughly equal the quantified benefits, but with considerable uncertainty.

Should the benefits be at the upper end of those observed in the RBCT then they would exceed the estimated costs by £1.35m, yet costs would exceed benefits by £1.49m should benefits be at the lower end of those observed in the RBCT.

Sensitivity analysis

This analysis of the costs and benefits of extending badger control to an additional area in 2015 is subject to a number of uncertain assumptions. The following sensitivity analyses

have been carried out to test the dependence of the overall economic assessment to the key assumptions made.

Policing

The need for policing has been a feature of the policy to date due to protesters and the need to maintain public safety. It is likely that extending to a new area will require a similar level of policing at least in its initial year. However, it is a shared goal of Defra and the Home Office that policing should become business as usual for local police forces and attract no additional costs. Over time, following further successful culls without security incident, we expect any policing costs to disappear. Based on experience in the existing cull areas, policing costs of £700k per area per year could increase the costs to government to £3.84m per area over 4 years. This would lead to a net cost of £2.62m in the central case.

Costs to farmers

[Redacted – Commercially sensitive] Using the same methodology as the 2011 impact assessment to calculate expected farmer costs of extending culling to an additional area would estimate total farmer costs at £0.69m per area over four years. This would lead to an overall net benefit of £0.06m in the central case.

Basing future costs to farmers of extending to an additional area on the average cost per area in 2014 would estimate total farmer costs at £1.94m per area over four years. This would lead to a net cost of £1.19m in the central case.

Costs to farmers could increase through greater use of cage trapping and shooting, however there may be offsetting savings from reduced use of controlled shooting such as airwaves and security.

Extending badger control to a wider number of areas

Increasing the number of licensed areas in any year provides opportunities for economies of scale. For some activities, e.g. licensing, the costs per area are lower the greater the number of areas licensed. Therefore assumptions over future extension of badger control can affect the costs per area.

Halving the assumed trajectory of extending badger control to a wider number of areas would increase the costs to government to £1.36m per area over four years. Overall this would lead to a net cost of £0.14m in the central case.

Cost of breakdowns

There is a wide range in the scale, duration and cost of TB breakdowns. Many are minor but a small proportion are major, costly to farmers and government, and extremely

disruptive to farm businesses. The average cost used in this assessment is lower than in 2011 mainly due to lower levels of cattle slaughtered.

Increasing the estimated average cost of a breakdown by 10% would increase the quantified benefits to £2.10m per area. This would lead to an overall net benefit of £0.21m in the central case.

Conversely, reducing the estimated average cost of a breakdown by 10% would decrease the quantified benefits to £1.76m per area leading to an overall net cost of £0.13m in the central case.

Baseline incidence of TB

Future levels of TB in the absence of badger controls are uncertain. Previous analysis assumed a rising baseline incidence of 3% per annum based on epidemiological modelling by APHA (then VLA). However, latest statistics suggest signs that the disease situation is improving, perhaps due to the effect of stricter cattle measures introduced over the last 5 years.

Assuming no changes to the incidence of TB in the absence of culling (the baseline) would reduce the quantified benefits to £1.80m per area. This would lead to a net cost of £0.90m in the central case.

Increasing the annual increase in the incidence of TB in the baseline to 2% would increase the quantified benefits to £2.04m per area. This would lead to a net benefit of £0.15m in the central case.

Increasing the annual increase in the incidence of TB in the baseline to 3% (as per the 2011 assessment) would increase the quantified benefits to £2.17m per area. This would lead to a net benefit of £0.28m in the central case.

Perturbation

The impact of perturbation is uncertain, with the central case using evidence of its effect from the RBCT. However, hard boundaries, low cattle herd densities and biosecurity measures on farms around the licensed area could mitigate any negative effect.

Assuming no perturbation effect leads to an increase in the quantified benefits of culling to £2.04m per area. This leads to an overall net benefit of £0.15m in the central case.

Table 5: Key assumptions and sources

Description	Value	Source
Costs		
Training and mentoring costs to APHA per area	n/a	APHA advice based on experience to date
Natural England licensing and monitoring costs per area	n/a	Natural England accounts, divided by number of areas licensed in a given year
Equipment	n/a	Based on volumes and unit costs observed in licensed areas to date.
Policing per year	n/a	Average cost of policing per area in 2014
<i>[Redacted-commercially sensitive]</i>	<i>n/a</i>	<i>[Redacted-commercially sensitive]</i>
<i>[Redacted-commercially sensitive]</i>	<i>n/a</i>	<i>[Redacted-commercially sensitive]</i>
Benefits		
Area size	230km ²	Assumption based on proposed area in Dorset
Per annum change in TB breakdowns (baseline)	1.1%	Average annual % change of OTFW/100 herd years at risk HRA, 2011-13
Breakdowns per km ² in culling area (2014)	0.15	2011 impact assessment
Breakdowns per km ² surrounding culling area (2014)	0.10	2011 impact assessment
Average cattle slaughter per breakdown	8	England TB surveillance report, 2013
Average days under restriction per breakdown	318	England TB surveillance report, 2013
Average net cost to government per slaughtered cattle	£900	Calculated based on APHA financial data
Average cost to farmer per slaughtered cattle	£900	Calculated based on Reading 2004
Average cost of herd test to government	£600	Calculated based on APHA financial data
Average cost of herd test to farmer	£700	Calculated based on Reading 2004

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