

Explanatory Memorandum to the Badger (Control Area) (Wales) Order 2011.

This Explanatory Memorandum has been prepared by the Office of the Chief Veterinary Officer and is laid before the National Assembly for Wales in conjunction with the above subordinate legislation and in accordance with Standing Order 24.1

Minister's Declaration

In my view, this Explanatory Memorandum gives a fair and reasonable view of the expected impact of the Badger (Control Area) (Wales) Order 2011 and I am satisfied that the benefits outweigh any costs.

Elin Jones

Minister for Rural Affairs

8 March 2011

1. Description

The instrument confers the necessary powers on Welsh Ministers to enable them to undertake the destruction of badgers within a specific Intensive Action Area (IAA) in order to achieve the policy of eradicating bovine tuberculosis (bovine TB) in Wales.

2. Matters of special interest to the Constitutional Affairs Committee

A map showing the location of the proposed Intensive Action Area (IAA) is available on the Welsh Assembly Government website at: www.wales.gov.uk/bovinetb

3. Legislative background

The instrument is made under sections 1, 21(2), (4) and (5), 72 and 86(1) of the Animal Health Act 1981. The instrument follows the negative resolution procedure.

4. Purpose & intended effect of the legislation

Bovine tuberculosis (TB) is one of the biggest threats to cattle farming in Wales. In 2009 over 11,500 cattle were slaughtered because of this debilitating disease that impacts on thousands of Welsh farms and farming families. Many have lost entire herds built up over a lifetime and a recent survey by Farm Crisis Network suggests that farmers affected by bovine TB can suffer high levels of stress. The emotional impact of a bovine TB outbreak can spread throughout the farming family resulting in strained relationships.

Since 2000, almost £120m has been spent on compensating farmers for cattle slaughtered because of bovine TB in Wales. Compensation does not cover all the costs, and the consequential losses associated with undergoing a bovine TB breakdown are met by the cattle keepers. Maintaining a control and testing regime, research and enforcement add to this further.

The consequences of bovine TB in Wales are recognised by the Welsh Assembly Government as unacceptable and unsustainable and as such the One Wales Coalition Government is committed to vigorously pursue a programme of TB eradication. This programme, which was introduced by the Minister for Rural Affairs on 8 April 2008, takes a comprehensive approach to disease eradication nationally, regionally and locally, affecting change down to an individual farm level.

The Welsh Assembly Government has put in place a comprehensive programme aimed at tackling all sources of the infection. The measures implemented as part of the programme have been, and will continue to be, introduced progressively to address the known routes of bovine TB transmission. The majority of the measures introduced so far are aimed at tackling the disease in cattle. Cattle are now being tested more often and we have stricter movement rules in place. We have also

consulted on proposed legislative arrangements for managing and preventing incidents of bovine TB in non-bovine animals, specifically camelids, goats and deer.

It is accepted that a further major source of infection is via wildlife, and in particular badgers. The Krebs Review on Bovine TB in Cattle and Badgers reported in 1997 and concluded that there was “*compelling*” evidence that badgers were involved in transmitting infection to cattle. The Independent Scientific Group's final report (2007) explicitly states that badgers contribute significantly to the disease in cattle. They also confirm that there is a dynamic cycle of infection between cattle and badgers, identifying that in the circumstances where TB in cattle is not being routinely controlled (e.g. during the Foot & Mouth Disease – FMD - outbreak in 2001) there was a rise in TB prevalence in both species.

This Instrument will provide that Welsh Ministers may implement a Government-managed cull of badgers, alongside additional cattle measures, in an Intensive Action Area in west Wales.

If the legislation is not made the Minister will be unable to directly manage a badger cull in Wales and would need to rely on existing powers in the Protection of Badgers Act 1992 to issue licences to individual farmers to pursue the eradication of bovine tuberculosis in Wales. This is Wales only legislation.

5. Consultation

An RIA has been completed below at Part 2. Details of the consultation on the Badger (Control Area) (Wales) Order 2011 are included in the RIA.

PART 2 – REGULATORY IMPACT ASSESSMENT (RIA)

OPTIONS FOR BADGER INTERVENTION

This RIA considers the options for badger intervention to address the infection that exists within the population and specifically its transmission to cattle herds, in endemic areas. The responses to the consultation on The Badger (Control Area) (Wales) Order 2010 have been considered in drafting this section. These interventions need to be considered as part of an overall comprehensive approach - as they would not, if carried out in isolation, eradicate TB from the cattle population. Similarly cattle interventions would not, if carried out in isolation; eradicate TB from the cattle population whilst a source of infection exists in the badger population.

Option 1: BADGER VACCINATION

Vaccinating badgers is seen as one potential intervention which may contribute to the control of bovine TB. The principle of badger vaccination is to raise immunity against bovine TB within the badger population which over time should lead to decreased prevalence and weight of infection, therefore reducing opportunity for badger to cattle transmission.

Option 2: COMBINED TEST, VACCINATE AND CULL STRATEGY

Adding selective culling into a program of vaccination of badgers might be beneficial in two ways. Animals with a positive TB test result are likely to represent the greatest risk of transmitting infection to cattle so their removal may reduce this risk. Vaccination of clear/negative tested badgers may then help to build a level of immunity in the badger population. A combined approach such as this might, therefore, have the benefit of high risk badgers being removed, and a large proportion of the remaining population being vaccinated.

Option 3: NON-SELECTIVE CULLING

Culling to reduce host population density is recognised as a potential tool for disease control. The aim is reducing it to a level at which transmission of the disease is impaired (e.g. reducing the number of opportunities for contact between individuals in the host species and other susceptible populations), usually by reducing the host population below some threshold density required for the persistence of infection. In the case of TB, the host species being badgers and susceptible population being cattle.

Option 3a: PROACTIVE CULLING

During the Randomised Badger Culling Trial (RBCT) annual proactive culling over 4-7 years (interrupted during the 2001 Foot and Mouth disease outbreak) showed an estimated 23.2% decrease (95%CI: 12.4% decrease to 32.7% decrease) in confirmed herd breakdowns inside culled areas when compared with survey-only areas. Proactive culling was also associated with an estimated 24.5% increase (95%CI: 0.6% decrease to 56.0% increase) in confirmed herd breakdowns in the surrounding 2km area around the culling area when compared with survey-only areas.

From the start of the 'post-trial period' to 2 July 2010, incidence of confirmed herd breakdowns in the proactive culling areas was an estimated 34.1% lower (95%CI: 23.0% decrease to 43.6% decrease) than in survey only areas, and in the 2km area outside proactive trial areas was an estimated 5.6% lower (95%CI: 31.0% decrease to 29.1% increase) than outside survey-only areas. Therefore the positive impacts on confirmed herd breakdowns of proactive culling were maintained over a period of time while the early negative effect on confirmed herd breakdowns on surrounding land disappeared relatively quickly.

There is practical field evidence, from previous policies and studies, that proactive culling of badgers can have a substantial and sustained effect on TB in cattle. This also highlights the necessity of culling or some other effective intervention, in endemic areas, to deal with infection in badgers.

Option 3b: REACTIVE CULLING

Reactive localised culling of badgers geographically associated with cattle breakdowns in specific areas in the RBCT was stopped by Defra Ministers 4 November 2003 as early interim results from the reactively culled areas showed an increase in new confirmed herd breakdowns when compared with survey only areas, most likely as a consequence of social perturbation. This led the ISG to conclude that there is convincing evidence that reactive culling of badgers, in the form and time span implemented in the RBCT, does not offer a beneficial effect large enough to make it useful as a practical policy option and that indeed there is evidence of an adverse effect of that reactive culling strategy.

Option 4: IMMUNOCONTRACEPTION

The principle of immunocontraception is the targeting of a population to reduce the potential for reproduction and therefore future population density. The theory is to reduce the population density to a level at which transmission of the disease is impaired (e.g. reducing the number of opportunities for contact between individuals in the host species and other susceptible populations) usually similar to the impact of culling

The use of immunocontrceptives has recently been discussed by the TB Eradication Programme Board. They recognised that large scale use of immunocontraceptives in badgers is some time off. However as a number of respondents to the consultation saw this as a potentially viable alternative, it is being reconsidered in this section.

SUMMARY

It is essential that we break the cycle of infection between badgers and cattle if we are to eradicate bovine TB from the cattle population in endemic areas of Wales. Cattle measures alone cannot achieve eradication.

The options for badger interventions presented all aim to do this by reducing opportunities for cattle to come into contact with infected badgers. Unfortunately the “science” is incomplete, as the four options have not all been tested to the same degree in the field, and certainly not in a balanced control field trial against each other.

On the other hand, badger culling has been applied in a range of ways from the Irish work and early studies in England, which have been criticised by some on the basis that they were not controlled, balanced studies, to the larger scale and more balanced RBCT.

In conclusion, we have considered the four options for badger interventions.

The impact that vaccination of badgers could have on TB in cattle is unproven in the field. Any anticipated benefits have been derived from modelling work based on a number of fundamental assumptions, and the actual outcome may differ from that expected. There is limited evidence of the value of badger vaccination BCG on the proportion of badgers that test positive to one or more TB tests from one field trial, but it did demonstrate a reduction in the severity and progression of future infection in some badgers. The current Badger Vaccine Deployment Project in England is looking at the practicality of vaccinating badgers in the field and not the impact on TB in cattle. According to our best estimates approximately 27% of badgers in endemic areas could be infected with bovine TB. We have no reason to believe that vaccination can have any beneficial effect on infected badgers, nor that it will provide total protection against TB in badgers that are uninfected at the time of vaccination. Veterinary opinion is that the widespread vaccination of badgers is unproven to have an effect on bovine TB in cattle. If achievable, then any benefits in reducing the number of confirmed herd breakdowns from vaccinating badgers would take longer than widespread, effective and efficient culling.

There is no field trial evidence to suggest that the combined test vaccinate and cull approach would provide a positive reduction in the number of confirmed herd breakdowns. Modelling of the approach indicated that size of the remaining badger population, the level of infection remaining in that population and their disturbance (perturbation) could result in an increase (10 – 20%) in the number of infected badgers and the number of confirmed herd breakdowns.

There are no known immunocontraceptives currently licensed as being safe for use in wild badgers and the effect of this approach on TB incidence is not known.

Culling has been proven in the field; a number of trials and culling operations that have demonstrated a substantial reduction in the number of herd breakdowns. The veterinary view is that while there is greater uncertainty in the likely effect of proactive culling on unconfirmed herd breakdowns relative to confirmed herd breakdowns, taking into account the disease situation in endemic areas and the basis on which a new breakdown is defined as confirmed or unconfirmed, it is concluded that, the effect of proactive badger culling in endemic areas on unconfirmed herd breakdowns is

unlikely to be zero but it is impossible to predict the degree to which it would approach that seen in confirmed herd breakdowns.

It is expected that the combination of badger culling and cattle measures will optimise the benefit in terms of the number of herd breakdowns prevented and also other parameters such as the scale of breakdowns (number of cattle removed and slaughtered), the length of breakdowns (time taken to clear up infection from a herd) and the survival rate (time between breakdowns for individual herds).

It can be seen from the above that the option of vaccinating badgers is not supported by sufficient evidence to show that it can reduce or eliminate TB in cattle. The option of combining the testing, culling or vaccination of badgers has been shown above to involve significant risk of increasing the number of TB confirmed herd breakdowns. The option of immunocontraception is also not recommended for the reasons provided above.

Culling should not be carried out in isolation but should include the continuation of additional cattle controls and improved biosecurity. Only by applying a combination of all measures, aimed at tackling all sources of infection, will eradication of bovine TB be achieved. Following eradication the benefits need to be protected by ongoing cattle surveillance and improved biosecurity measures.

RECOMMENDED OPTION: Option 3a: PROACTIVE CULLING is the preferred, recommended option. For further information and analysis on why this is so and analysis of all these options available as put to the Minister for decision please see a full analysis at Annex B.

COSTS & BENEFITS

The IAA has 309 cattle herds which accounts for 2.4% of the total number of herds in Wales (13,146 source National TB Statistics October 2010). The total amount of compensation paid to TB breakdown herds within the IAA in the last full year (2010) accounted for 11.1% of the total TB compensation paid for cattle slaughtered across Wales.

Year	All Wales (£) (Source: WAG finance system)	IAA (£) (Source TBIS Animal Health)	IAA as a % of All Wales
2004	8,862,898	166,510	1.9%
2005	13,307,126	1,732,455	13.0%
2006	11,845,000	1,926,212	16.3%
2007	14,512,885	2,138,096	11.1%
2008	21,970,865	4,125,020	18.8%
2009	22,104,670	2,158,230	9.8%
2010	12,805,324	1,427,504	11.1%

Figure 1: Comparison of compensation paid for cattle slaughtered due to bovine TB 2004 to 2010.

When looking at TB data it is important to note that a small number of large breakdowns within an area can impact the overall figures quite dramatically as was

seen in 2008 where the number of cattle and associated compensation costs were substantially higher than the previous and subsequent year.

The average cost per confirmed herd breakdown in the IAA has been calculated (based on the assessment at figure 2) as £53,759. This is higher than other reported costs e.g. Defra estimate £30,000 (Defra 2010 Consultation) as it is a reflection of the cattle industry and disease situation specific to the IAA. For example the average valuation for cattle slaughtered in the IAA is £2,124 compared to the Wales average of £1,682. The average cost per unconfirmed herd breakdown in the IAA has been calculated (based on the assessment at figure 3) as £12,728.

This average cost is an estimate based on a number of assumptions which will change over time and as an average is not representative of all farms. Although this financial analysis includes general assumptions on the main direct costs of bovine TB, such as the slaughter of individual animals, cost of testing etc it fails to represent a true figure with other known, but as yet un-quantified costs, for example loss of genetic breeding, not having been included.

Activity	Assumption	Unit cost (£) to		Total cost (£) to		Total
		Farmer	Gov't	Farmer	Gov't	
Slaughter	17.8 animals	320	2124	£5,696	£37,807	£43,503
Restrictions	149 animals in herd for 415 days	0.02	0	£1,237	£0	£1,237
Isolation	17.8 animals for 16 days	2	0	£570	£0	£570
Testing	149 animals in herd with 5.3 herd tests	3.2	7.5	£2,527	£5,923	£8,450
Total cost within herd				£10,029	£43,730	£53,759

Figure 2: WAG estimated cost analysis of confirmed herd breakdown in the IAA. A confirmed herd breakdown is a TB breakdown where *M.bovis* has been isolated from at least one animal in the herd or pathological changes (lesions) typical of infection with *M.bovis* are detected at post mortem examination in at least one reactor taken from a herd.

Activity	Assumption	Unit cost (£) to		Total cost (£) to		Total
		Farmer	Gov't	Farmer	Gov't	
Slaughters	2.3 animals	320	2124	£736	£4,885	£5,621
Restrictions	149 in herd for 220 days	0.02	0	£656	£0	£656
Isolation	2.3 animals 16 days	2	0	£74	£0	£74
Testing	149 in herd for 4 herd tests	3.2	7.5	£1,907	£4,470	£6,377
Total cost within herd				£3,372	£9,355	£12,728

Figure 3: WAG estimated cost analysis of unconfirmed herd breakdown in the IAA. An unconfirmed herd breakdown is a TB breakdown where no TB lesions are detected during the post mortem examination of reactor cattle and all laboratory examinations fail to isolate *M.bovis*. In infected cattle, gross pathological changes (development of visible lesions) often take longer to develop than positive responses to the tuberculin test. Veterinary opinion is that an unconfirmed breakdown normally means that the disease has been identified at an earlier stage before lesions become visible. It does not normally mean that the cattle were not infected or infectious.

The estimated cost of culling badgers has been reduced to £3,460 per km² per year compared to the previously reported figure of £4,220. This is because we are now assuming that the cull will only be carried out over 80% of the area (the remaining 20% is estimated to be land not colonised by badgers or where culling is unlikely to be undertaken for example along public rights of way). On this basis, the cost of delivering a cull of badgers for 5 years in the IAA is estimated to be £4,990,000.

Some respondents to the consultation were of the view that the projected cost of culling badgers in the IAA does not truly represent the full costs as it does not include such issues as policing costs and loss of tourism income. It is possible that there will be other consequential costs such as policing, but these are likely to be proportionate to other factors that cannot yet be accounted for. We do however recognise the risk that the eventual cost of a cull of badgers in the area may be higher than that predicted here.

Using the calculations for all herd breakdowns, between 115.0 to 207.9 herd breakdowns are estimated to be prevented as a consequence of culling.

The expectation is that culling badgers in the IAA will prevent at least 115 herd breakdowns. This would provide a saving of at least £6,182,285, which would increase to £7,364,716 if 207.9 herd breakdowns are prevented.

Estimated benefit (herd breakdowns prevented)	Savings in Confirmed herd breakdowns prevented	Savings from Unconfirmed herd breakdowns prevented	Total
115.0	115.0 x £53,759	0 x £12,728	£6,182,285
207.9	115.0 x £53,759	92.9 x £12,728	£7,364,716

Figure 4: source Welsh Assembly Government

The costs and benefits identified in the 10-year cull period have been discounted using HM Treasury's central discount rate of 3.5%. Once discounted, the present value of the costs and benefits are £4.7million and £5.2 million - £6.2 million respectively. On this basis, the Net Present Value (NPV) of a badger cull in the Intensive Action Area is between £0.5 million and £1.5 million.

It is recognised that both the costs and benefits of culling alone have been based on a number of assumptions that could vary over time and the results in this assessment have been sensitive to changes in these assumptions. Accepting this variability, the culling of badgers alone as undertaken in the RBCT is expected to represent a cost saving, 10 years from the start of culling, or earlier if the outcomes from culling in the RoI or other trials are achieved.

In addition to the direct costs and benefits outlined above there are also a number of wider socio-economic impacts which can not be quantified but which may be significant and should be considered.

The Socio-Economic Impact of Bovine Tuberculosis

Much of the analysis of the impact of bovine TB has concentrated on immediate short-term costs that are readily quantifiable and have in the main been accounted for above. Fewer studies have focussed on the longer term impacts largely because they are often very difficult to measure and stretch beyond the period of a TB breakdown.

In agreeing that the IAA has a high incidence of bovine TB which needs to be dealt with, some respondents highlighted the stresses that cattle keepers in bovine TB endemic areas have to deal with.

Various studies by social scientists of the long term and intangible effects of TB have been completed and these are summarised below.

Farmer Well-being

Farmers' well-being to be affected by the impact of bovine Tuberculosis. Research shows that farmers in areas of TB high incidence have become despondent and fatalistic about their ability to do anything about TB. This can lead to reduced compliance to testing regimes, illegal activity (unlicensed destruction of badger), less desire to implement voluntary control measures (e.g. biosecurity) and a general sense of despondency (Enticott, G. (2008), Defra (2009) Final Research Report – SE3039).

Evidence from the IAA suggests that farmers have low confidence either in terms of their ability to do anything about avoiding TB or their prospects of avoiding restrictions in future (Welsh Assembly Government, Annual Report 2010).

Evidence from a survey by the Farm Crisis Network (2009) suggests that 20% of farmers were either panicked or been devastated by the news of their latest outbreak and a further 50% were upset or worried by the news. Farmers' reported how the emotional impact of a TB outbreak was spread throughout the farming family resulting in strained relationships (Farm Crisis Network (2009)).

Recent research by Defra suggests that dairy and beef suckler farmers affected by TB can suffer high levels of stress. These levels are higher than farmers unaffected by bovine TB, higher than what would be expected amongst the general public, and as high as experienced during the 2001 Foot and Mouth Disease epidemic (Defra (2010) Final Research Report SE3120).

The socio-psychological impacts of TB undoubtedly have financial implications but it is difficult to measure what these are. There is also a general under-reporting of these illnesses by farmers and use of mental health facilities (Defra (2010) Final Research Report SE3120, Institute of Rural Health and University of Glamorgan (2003)). Improved mental health services need to be provided for farmers to access them (M. Mort *et al.* (2005)).

Some of the cattle keepers that responded to the consultation provided first-hand accounts of how bovine TB has affected them these included “...*Bovine TB has changed our lives, It has exhausted us. I find this e-mail difficult to write as I have talked about TB, written about it non stop for two years..*” and “...*Last year my pedigree stock bull was tested and classed inconclusive and then passed the second test 60 days later. People need to know the stress I was under for those 60 days....*”

One respondent stated that *“these burdens are added to by the vitally important and often overlooked emotional and physical stress placed on farming families dealing with trauma following the tragic losses incurred as the disease moves through their herd”*

Long-term Economic Costs

Recent research of the long-term impact of bovine TB suggests that on TB affected dairy farms, milk production is lower; farmers and their spouses work longer hours; and cash income and farm family income is lower. Beef suckler herds show similar trends: on TB affected farms, output is lower, income is lower, and longer hours are worked. Overall, the data suggest that farms with a TB breakdown perform less well than those without (Defra (2010) Final Research Report SE3120).

Genetics and other industry impacts

In addition to the obvious loss of an animal to a breeding herd, and records will show that many of the UK's finest breeding stock have been lost through TB, there are 'knock-on' effects as well.

When a bovine female is slaughtered because of bovine TB, in many cases the animal will be carrying a calf (in some cases a valuable implanted embryo) which compounds the loss to the farmer. Genetic improvement is a long term process. Each mating is planned with certain goals for improvement in mind. For example, it might be for improved milk quality or yield in a dairy cow or about improved weight gain or conformation in a beef animal. Thus when a calf is denied life because her mother is slaughtered – a generation is lost.

When a farmer loses a freshly calved animal they are losing possibly £2000 of milk in addition to the calf. These consequential losses are not accounted for in the valuation of a TB reactor in Wales.

Buyers of breeding stock look for consistency and successive generations of above average performers i.e. several generations of high yielding dams behind a dairy animal or successive producers of show or fat stock winners in the pedigree of a beef animal. When a young animal – for instance a fresh calved Holstein heifer is slaughtered before she has the chance to prove herself or be type classified, there will be a 'gap' in the pedigree of future relatives and her own offspring. This will devalue the pedigree considerably as the lineage is broken for ever.

When a herd suffers a TB breakdown, there is a significant risk of that herd being devalued because buyers will be wary of purchasing stock from a herd with a history of TB. There is already a divide in stock values as we see breeders reluctant to buy from areas with high incidence of TB. Even if they go clear of TB, farmers often face lower values for their cattle as buyers know their herd and area health history.

In 2010 the Carmarthen Regional Board commissioned a paper on the “Social and Economic Impacts of bovine TB in West Wales”. The report analysed the social and economic costs of bovine tuberculosis. Reservations had been expressed about the accuracy of published DEFRA figures and the failure to account for the social impact

of TB. The purpose of the report was to analyse the methodology used to calculate these costs and suggest additional costs where appropriate.

Evidence was drawn from 13 interviews with farmers in West Wales with additional data drawn from an Animal Health database of TB incidents in Wales. Findings were meant to be illustrative rather than representative: further research will be required to establish robust figures for some of these costs.

Some of the key issues were:

- Findings suggest that the social costs of TB can be conceptualised as the effects of presenteeism – lack of productivity due to working whilst suffering from stress.
- Much of the stress experienced by farmers stems from the loss of control over how to farm (in part by the additional legislative restrictions that apply to herds under TB restriction) rather than their ability to complete aspects of their job. Initial results suggest that this could potentially cost farmers about £2000 a year.
- Estimates of the economic costs to farmers need to account for time spent preparing for the test in the week before. Overall, the cost of testing for those farmers interviewed was less than currently used in calculations by Defra.
- Strategies to replace reactor cattle varied, but assuming a minimum gap of 2 weeks, the cost of milk losses would amount to £67 per reactor.
- Milk losses and costs are also likely to arise by an increased reliance on less productive heifers in the milking herd, and keeping less productive older cows as a safeguard against further cattle losses.
- Finally, a significant proportion of reactors also appear to be found in autumn. This will exacerbate the cost of milk losses for some milk contracts which are based on comparisons between spring and autumn milk production.

The Socio-Economic Impact of Culling Badgers

Several respondents to the consultation on the Badger (Control Area) (Wales) Order raised concerns regarding detrimental effects on tourism and the wider community which would be experienced as a consequence of delivering a cull within the IAA. Some thought that people from outside Wales would not wish to visit an area where badger culling was to take place, and that would reduce the number of visitors. Others thought that visitors would be deterred by seeing images of protestors and demonstrators in the press and media and that the local disagreement would have the potential to divide the local community.

Tourism

Responses to the consultation from the tourism industry highlighted that they are currently witnessing a growth in conservation and green tourism, either as the main reason for visiting or as part of the reason to visit Wales and other destinations. Their

responses have asked that the Welsh Assembly Government ensure that it "allows for mitigation measures" for any negative fallout for the tourism industry that may occur.

The Standard Operating Procedures for a cull would detail what activities take place when. For example they will specify what trapping can and cannot take place around any public rights of way and will prescribe the timing of when traps will be laid, baited and checked. The majority of all activities will be undertaken in the late evening or the early morning. The Standard Operating Procedures will be designed to minimise the visibility of the work such that most people will be unaware of it happening. These steps should help ensure that detrimental effects on visitor numbers or the visitor experience from the badger culling operation are minimised.

We are not aware of any specific evidence that assesses the impact of a badger culling operation on tourism or the local community from the RBCT or other badger culling operations such as in the Republic of Ireland. It is however clear from the consultation responses that any decision to cull badgers will receive public opposition. The extent of this opposition is difficult to predict. It is even less clear how far this would lead to action by animal rights activists and other that are opposed to culling in attempts to disrupt any culling operation either by legal or non legal methods. The RBCT did face some disruption by activists, but the ISG argued that this was not significant enough to impact on the efficiency of their culling operations.

Protests could lead to additional burden on police resources during any culling activity; however if there was an attempt to disrupt legitimate culling activity this would need to be balanced against the Welsh Assembly Government stance on domestic extremism. The involvement of the police to enforce legitimate culling activity would lead to an increased profile in the news media, which would continue to publicise the culling operation and possibly extend it to a wider audience.

Community concerns

The weight and content of the responses to the consultation clearly demonstrate the substantial range of views associated with this emotive issue. Several of the respondents highlighted the goodwill and mutual support that exists in rural areas such as the IAA. They expressed concern that culling of badgers would threaten the general sense of shared interests and cohesion that existed in these areas. It is possible that this could occur on an individual basis and should a sustained campaign be made, in favour or against culling badgers, could expand further to affect relationships in the community.

To meet these concerns, we suggest that officials continue dialogue with tourism organisations and landowners in the region to develop procedures that have no discernable impact on tourism and the wider community within the county. This could, for example, include looking at minimising any potential impact on the events in the area, minimising work during the height of the tourism season. It could also appropriate and timely communication, through channels such as local papers and by making a helpline available to answer any particular concerns from operators or the public. Any decision to enforce the legitimate culling of badgers in the area would be would made based on the circumstance at the time.

The impact of any protests or illegal activity on tourism and the wider community is unknown. It may be that images of protest and demonstrations will put people off from visiting Wales. We have no knowledge whether such protests and demonstrations will take place, their size and number or the extent to which they will be reported. It is possible that there may be an effect on tourism from such demonstrations. The scale of any impact is expected to be, in part, a reflection of the level of media coverage, as the majority of activities will be undertaken in relatively remote locations. The opportunity for visitors and locals to witness activities, without prior information, would therefore be limited.

Advice on the exercise of discretion

Some respondents, were of the view that the benefits of culling outweigh the harm caused to the badger population in the IAA, these included; the continued culling of cattle without addressing the wildlife reservoir of disease; costs to government, and; the human health risk.

Others were of the view that the benefits of culling do not outweigh the harm caused to the badger population in the IAA and gave various reasons for their answers, these included; the cost-benefit of culling (over other measures); ecological impacts; impacts on tourism and other industries, both inside and outside the IAA, and; the impact on those individuals who are against badger culling.

With regard to the overall impact of culling on cattle herd breakdowns we recommend that the benefits likely to be observed in the IAA outweighs the potential harm that may be caused in the surrounding area.

We accept that the culling of approximately 1610 badgers in the IAA will greatly reduce their number in that locality. However, set against the population of Wales as a whole (35,000 - British Trust for Ornithology Research Report No 462 February 2006), we do not consider this reduction in numbers to be a danger to their survival. Ecologists have advised that, in the IAA, the number of badgers will return to their pre cull numbers within 5-10 years of the end of the cull (Ecological Impact Assessment). The harm to the badger species in Wales will, in short, be temporary and relatively short lived.

With regard to the impact of culling on the environment, we are confident that you can exclude, on objective evidence, the risk of a significant effect on Natura 2000 sites which would otherwise make a decision to proceed with a cull unreasonable.

With regard to the cost of undertaking a cull, we expect that the cost will be recouped through savings from the expected reduction in compensation paid to cattle keepers in the IAA. In our view, the benefits are likely to exceed predictable costs.

Consultation

A public consultation was carried out under the title "*Consultation on Badger Control in the Intensive Action Area*" a draft of the proposed Badger (Control Area) (Wales)

Order 2011 was included. The consultation lasted from 20 September 2010 until 17 September 2010.

Although this was a broad public consultation and copies of it were made available on-line and through local libraries, a number of specific organisations and groups were solicited directly for their views and opinions of the proposed policy and legislation. These organisations are considered to be key stakeholders and interest groups and represent a broad swathe of opinion including the farming Industry, animal welfare and the wider rural community.

A summary of the outcome of the consultation is attached at Annex C.

Equality Impact Assessment

An Equality Impact Assessment has been carried out for this policy (and legislation) it suggests that it is likely that there will be low relevance to issues of equality and Human Rights as a result of the pursuit of the policy, please see screening assessment at Annex D. The assessment has been sent to Equalities, Diversity and Inclusion Division who have cleared the screening assessment and will publish it.

The policy will be reviewed in March 2012 (12 months time). The review period provides an opportunity to look again at the existing evidence, consider new evidence and emerging findings from the monitoring of policy implementation. This will help to evaluate whether the policy or practice has generated new adverse or negative impacts or insufficiently addresses the effectiveness of the policy or practice in meeting our equality duties.

Competition Assessment

It seems unlikely that the regulation will affect the competitiveness of either farming or tourism within the IAA (competition assessments are attached at Annex E).

Post implementation review

The Intensive Action Area forms part of the Welsh TB Eradication Programme. The Programme is monitored on a regular basis. The IAA, as part of the Eradication Programme, is covered in an Annual Report from the Minister to the National Assembly for Wales.

References

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OPTIONS FOR BADGER INTERVENTION

1. This section considers the options for badger intervention to address the risk of disease transmission to cattle herds, in endemic areas.
2. As previously discussed these interventions need to be considered as part of an overall comprehensive approach - as they would not be expected to eradicate bovine TB from the cattle population if carried out in isolation.
3. Cattle interventions would not, if carried out in isolation; be expected to eradicate bovine TB from the cattle population whilst a source of infection exists in the badger population. A reduction in the number of breakdowns that are the result of cattle-to-cattle transmission will, in the absence of a parallel reduction in the number of breakdowns that are the result of badger-to-cattle transmission, necessarily result in an increase in the proportion of all breakdowns caused by transmission to cattle from badgers. Thus any policy that successfully targets only the cattle source of infection will leave an increasing proportion of breakdowns resulting from badger-to-cattle transmission unaddressed. Changes in the proportion of incidents attributable to cattle influences the level of reduction that can be achieved from a badger intervention.

BADGER VACCINATION

4. Vaccinating badgers is seen as one potential intervention which may contribute to the control of bovine TB. The principle of badger vaccination is to raise immunity against bovine TB within the badger population which over time should lead to decreased prevalence and weight of infection, therefore reducing opportunity for badger to cattle transmission.
5. The wider potential use of vaccination as part of the continued development of a Wales wide eradication programme is currently being taken forward by a sub group of the Wales TB Eradication Programme Technical Advisory Group (TAG). The group consists of members that have been identified because of expertise in a particular subject (e.g. epidemiology, immunology).
6. The key requirements for a vaccination programme to be successful are the existence of an effective vaccine, an effective method of delivery, an ability to vaccinate a sufficient proportion of the population to result in a decrease in transmission of infection from badgers to cattle. The prevalence of infection in the population prior to vaccination will have an effect on any potential transfer of benefits to cattle i.e. where prevalence of infection in the badger population is high, vaccination will be of less immediate benefit.
7. The principle of vaccinating wildlife to control disease in a host population has been previously applied in practice with consultation responses highlighting the rabies vaccination campaigns of red foxes in Europe and wolves in Ethiopia. These examples demonstrate the ability to deliver effective wildlife vaccination programmes through a sustained and effective programme where an appropriate licensed vaccine is available.

8. The following sections consider the existence of an effective vaccine for badgers, the method of delivery and the ability to vaccinate a sufficient proportion of the population to be effective in relation to its potential use within a specified area.

Existence of an effective vaccine

9. A review of the effectiveness of Bacille Calmette Guérin (BCG) vaccine in animals reported that in cattle, “vaccination decreased infectiousness of infected animals (rather than by preventing infection) by reducing the size of lesions and the burden of mycobacteria” (Suazo *et al.* 2003).
10. This also appears to be true for BCG vaccination of badgers. Vaccination reduced the progression and severity of disease and excretion of *M. bovis* in laboratory studies with captive badgers (Corner *et al.* 2008; Lesellier *et al.* 2009; Lesellier *et al.* 2006; Mahmood *et al.* 1987; Southey *et al.* 2001; Stuart *et al.* 1988).

Injectable vaccine

11. The only TB vaccine currently available for field use in badgers is the 'BadgerBCG' (a vaccine containing *M. bovis* Bacille Calmette Guérin (BCG) Danish Strain 13310) which received a Limited Marketing Authorisation (LMA) for use via intramuscular injection from Veterinary Medicines Directorate (VMD) on the 24th March 2010, and is valid for 5 years.
12. One respondent to the consultation was of the view that the evidence presented to you in September 2010 understated the results of the most recent badger vaccine research. These papers were not available until November 2010 after the start of the consultation. They were publicised when available and are now included within the evidence being considered.
13. The dossier of evidence used to gain the LMA was published on the Defra website in November 2010 including information on the Badger Vaccine Study (BVS) ('Field trial to assess the safety of Bacillus Calmette-Guérin (BCG) vaccine administered parenterally to badgers') and in an article 'Bacillus Calmette-Guerin vaccination reduces the severity and progression of tuberculosis in badgers'.
14. Respondents who were of the view that the vaccination of badgers provides a viable alternative to culling drew attention to this recent research as justification that a vaccine is available and effective.
15. These studies demonstrated that there was no evidence of shedding of the vaccine 'badgerBCG' from vaccinated animals, and that repeated vaccination does not produce any adverse effects and therefore demonstrates that 'BadgerBCG' is safe for use in badgers.
16. They also demonstrated that:
 - The vaccination of non infected badgers with BCG is associated with a reduction in the severity and progression of future infection in some badgers.

- It was not possible to estimate the efficacy (how effective it is) of BCG vaccination in this study as the decision was taken by Defra not to subject study badgers to post-mortem determination of infection. Three tests were employed in this study (IFN γ EIA, Stat-Pak, culture) in live animals as surrogate measures of vaccine efficacy. The proportion of newly infected badgers (incident cases) within a social group was consistently reduced in the vaccinated group relative to the non vaccinated group (control group). All tests showed a trend for a reduction in the proportion of newly infected badgers within a social group, but were only statistically significant (at the 95% significance level) for the Stat-Pak test and the combination of the Stat-Pak and culture tests. Due to the relatively small number of animals included in the analysis of the study, it was not expected that any results would be statistically significant. The fact that some were is surprising and suggests that greater confidence can be attributed to the trend for reduction of incidence cases to all tests. This shows some evidence that vaccination would provide a level of protection from TB to some but not all non infected badgers.
- BCG vaccination does not prevent infection in all animals as demonstrated by a positive response to the tests within the vaccinated group (See figure 4 below).

Test	Total number of badgers in vaccinated group	New incidence in vaccinated group		Total number of badgers in control group	New incidence in control group	
		No	(%)		No	(%)
All 3			31.1			41.5
IFNγ only	178	50	28.1	80	28	35.0
StatPak only	179	8	4.5	82	14	17.1
Culture Only	179	11	6.1	83	7	8.4
StatPak & Culture	179	15	8.4	83	18	21.7

Figure4: Summary of overall incidence of positive results to diagnostics tests for TB in BCG vaccinated and non vaccinated (control group) badgers in the clinical field study.

17. Further analyses of the data generated by these studies, including analysis to determine whether vaccination may inhibit the progression of disease in badgers that are already infected at the time of injection, are ongoing and will be reported in the future.

Oral vaccine

18. An oral vaccine requires a formulation which can protect the vaccine in the acidic gastrointestinal tract of the badger, and ensure its absorption through the gut wall. It also requires a bait which encourages uptake by the badger but minimises uptake by non target species.

19. Some respondents to the consultation considered an oral bait vaccine to be more practical for the future widespread vaccination of badgers as part of a multi-factorial approach to TB eradication.
20. A licensed oral badger vaccine, is at an earlier stage of development than a bovine TB vaccine for cattle. It is therefore not expected to be available until 2015 at the earliest. Officials in Great Britain and the Republic of Ireland Department of Agriculture, Fisheries and Food (DAFF) are cooperating on research particularly on oral delivery system for vaccine.
21. As there is no formulation yet agreed for an oral vaccine there is no evidence that an oral vaccine is safe to use. One of the main issues regarding its safety will be the possible impact on other (non target) species.
22. Research from the Republic of Ireland has shown that vaccination of badgers with oral BCG in a lipid formulation can generate a protective effect in badgers when hand delivered to the back of the throat (Corner et al. 2010). This was a scientific trial which was not designed to test the delivery method as an oral bait for practical use in the field.
23. In summary, a licensed vaccine for intramuscular use in badgers is available, it is safe to use and has been demonstrated to reduce the severity of infection in uninfected badgers that then become infected. To deliver the vaccine requires badgers to be cage trapped. Not every uninfected badger vaccinated, would be protected against TB. Some would remain susceptible to TB and could pass it on if they became infected. There would also be a proportion that would be protected only to the extent of reducing their infectiousness. That is, they could still become infected with TB and would still be able to infect others. The true efficacy of the vaccine is not known. Research is ongoing to determine if there are any protective effects from vaccinating an already infected animal.

An effective method of delivery

24. The 'BadgerBCG' is being used in a Badger Vaccine Deployment Project (BVDP) in England to examine the practicalities of delivering a vaccination programme over 5 years. Fera officials on behalf of Defra have completed one season of the vaccination of badgers in one area of Gloucestershire through cage trapping and injection. (This project was scaled back from initial plans for 6 areas). The project involves training operatives to use the vaccine in the field and seeks to increase confidence in the use of injectable badger vaccine while looking at the practicalities of the vaccination process. During the first season a total of 553 badgers were vaccinated within the 100km² area. The project has not been designed to demonstrate an impact on the incidence of TB in cattle.
25. Vaccination of badgers through non government intervention is possible since the Veterinary Surgery (Vaccination of Badgers against Tuberculosis) Order 2010, came into force, 6 April 2010. This permits people who are not veterinary surgeons to vaccinate badgers by injection against tuberculosis, subject to the conditions set out in the Order. Any lay person wanting to vaccinate badgers in Wales would need to be trained, supervised by a veterinary surgeon and licensed (under the

Protection of Badgers Act) to trap badgers. A similar protocol would need to be deployed to that being tested in the BVDP.

26. The "BadgerBCG" vaccine is a prescription only medicine and can be used only under prescription by a veterinary surgeon.

An ability to vaccinate a sufficient proportion of the population

27. It is currently believed and agreed in general by respondents that vaccination needs to occur before exposure to *M. bovis* to have beneficial effect for an individual badger (before it is infected) . The prevalence of bovine TB within a badger population and the introduction of additional susceptible individuals (e.g. cubs) could impact on the rate at which you can build up sufficient group immunity through badger vaccination.
28. It is difficult to determine the precise prevalence of bovine TB in badgers in an area without culling large numbers and examining them post mortem. However, evidence from previous studies suggests that the prevalence of infection in badgers in areas in which TB is endemic in cattle could be as high as 45% (WAG 2007, Crawshaw et al 2008, Murphy et al 2010 and Moore S.J. 2009). The true prevalence of bovine TB in badgers in an endemic area of Wales is likely to be in the region of 27% .
29. The majority (approx 60% on average) of badger cubs born do not survive to adulthood (Cheeseman et al 1987). Those that do, generally live for between 3 to 5 years (Rogers et al 1997; MacDonald & Newman 2002) with few exceeding 6 years old (Cheeseman et al 1987). Some individuals may live considerably longer although this is rare. Estimates of the proportion of badger deaths arising from *M.bovis* infection, based on post-mortem investigations from high-density populations in Gloucestershire, vary considerably and include 5.2% (Clifton-Hadley et al. 1993), 12.8% (Cheeseman et al. 1988), and 39% (Gallagher and Nelson 1979). Similarly, evidence of the survival times of infected badgers is variable, with a period of 6 months up to 3.5 years following initial detection being reported (Clifton-Hadley et al. 1993 Cheeseman et al. 1988 Wilesmith et al. 1982), with the majority surviving more than a year.
30. Female badgers have been reported as lactating despite being infected with *M.bovis*, as confirmed by clinical sampling and microbiological culture (Cheeseman et al. 1988, Clifton-Hadley et al. 1993) which implies that despite being infected with *M.bovis* they can still reproduce and raise cubs. In order to target badger cubs for vaccination to reduce the risk of infection, it is suggested that for the first 5 years annual vaccination of the population would be the minimum required. Transmission of disease may occur from an infectious mother to her cubs although the exact mechanisms for this are not known, it is assumed to be due to a high level of close contact in the sett (possibly before vaccination could take place).
31. Modelling has been used as the primary tool to assess the suitability of vaccinating badgers for TB control purposes. The most recent models have suggested that vaccination could produce a reduction in the number of TB infected badgers and prevalence of TB in badgers by 20% to 50% within 5 years (Central Science

Laboratory (2009) (d); Fera 2010). Previous models (White & Harris 1995, Wilkinson et al. 2004) have suggested a different range of results including vaccination of 70% of the healthy population being predicted as resulting in eradication in 20 to 30 years (Wilkinson et al. 2004).

32. Current best practice followed by Fera in delivering the Badger Vaccine Deployment Project (BVDP) in England, and recommended by Natural England, is that any badger sett is trapped for a maximum of two consecutive nights. This is because the number of new individuals caught falls dramatically after two nights trapping and also for welfare reasons. Data from the first season of the BVDP has indicated that less than half as many badgers are trapped on the second night as on the first (428 trapped on 1st night, 208 on 2nd night). Of those trapped on the second night 41.8% (87) were re-captures (Judge, communications to WAG 2011).
33. The ability to capture new animals to vaccinate them is likely to reduce over successive trap nights, with previously trapped animals re-entering traps on subsequent nights potentially reducing the number of traps available to capture new animals, although enough traps should be deployed at each sett to ensure this is not an issue.
34. The number of healthy badgers that are trapped as a proportion of the healthy badger population in the area is unknown and unlikely to be determined in advance of a vaccination programme, if the BVDP protocol is followed.
35. In summary, Fera have developed a methodology that can be scaled, resource permitting, to the relevant population size i.e. to ensure that a significant proportion of the population are captured. What is indeterminable in advance is the prevalence of bovine TB in that population and the proportion of healthy badgers in the population captured. These would impact on the rate at which you can build up sufficient group immunity with badger vaccination.

To achieve a benefit in cattle

36. Much of the information on the effects of BCG vaccination on badger infection comes from computer modelling exercises (Wilkinson *et al.* 2004; Central Science Laboratory 2009 (d) Fera 2010) which have also been used to determine what if any effect a vaccination strategy for badgers might have on bovine TB in cattle.
37. The most recent model (Fera 2010) of control strategies in England has predicted that vaccination of badgers in a high incidence area (17% TB prevalence in the badger population, 70% trapping efficacy and 70% sero-conversion probability of the vaccine to give full protection:) could produce a reduction in confirmed herd breakdowns. In a 150km² area, the model estimated vaccination could reduce confirmed cattle herd breakdowns by 9% by the end of five years during vaccination operations and an overall reduction in confirmed cattle herd breakdowns of 19% over 10 years within the core area, compared with 34% for a cull and 40% for a cull with ring vaccination.

38. The report by Fera recognises that great care must be taken not to over-interpret the outputs of such models or to extrapolate the results beyond the limitations imposed by the method or data. In common with other models, a number of assumptions are made. For example:

- Badger parameter data were mostly derived from a single study population in Gloucestershire (Woodchester Park). Cattle parameters were based on means from an area of six counties in the South West of England (Avon, Cornwall, Devon, Gloucestershire, Hereford and Worcester, and Wiltshire) derived from a number of national datasets including the 2004 UK June Census, the Cattle Tracing Scheme (CTS) and the Animal Health VetNet database. This model assumed that these data were representative of the situation in hypothetically proposed areas for badger control.
- Sensitivity analysis of the model indicated that some parameters had a large uncertainty associated with them, and this may impact on the outcome.
- The model assumed that the background rate of confirmed herd breakdowns, farm size, herd size and cattle management do not change over the 10-year period over which the strategies are compared.

39. Despite this, modelling offers a useful tool with which to advance our understanding of the relative performance of the three badger control strategies that the model investigates.

40. Previous modelling work carried out by researchers at Food and Environment Research Agency (Fera) (CSL 2009 (d)) indicates that the length of time that it will take for a reduction in disease levels in cattle to occur would depend on a range of factors which may vary locally:

- efficacy of the vaccine in large scale field use
- proportion of the badger population that is vaccinated
- the number of vaccinated animals that were already infected
- time taken to achieve immunity in the population;
- the relative contribution of badgers to the disease in cattle in the area; and
- effectiveness of the cattle controls in preventing cattle to cattle spread.

41. Many of the respondents in support of the use of a vaccine for badgers highlighted the fact that it is not expected to cause social perturbation of the badgers population and is not expected to have any risk of increasing the level of disease in cattle.

42. In summary, modelling suggests that with the right conditions and a sufficiently long timescale, vaccinating badgers could have a positive impact on reducing transmission from badgers to cattle and therefore TB incidence in cattle i.e. reducing incidence. There is no suggestion that vaccinating badgers could make the situation worse.

43. Despite there being data on the effects of vaccination in badgers from laboratory and clinical field trial studies, we do not know how deployment of the vaccine in the field would affect TB incidence in cattle.

Veterinary advice

44. As raised by consultation respondents, it is accepted that vaccination of badgers would not cause social perturbation, would be publicly more acceptable and is not expected to negatively impact on the level of disease in badgers. But BCG vaccination is believed only to protect uninfected animals and enough uninfected badgers need to be vaccinated to develop an immunity in the population (which takes time). Vaccination does not provide complete protection against infection; rather it reduces the risk of infection, the progression of disease in badgers vaccinated prior to infection, and onward transmission of disease. For the reasons outlined above, it is difficult to predict the scale or timing of any impact on the transmission of infection from cattle and ultimately in the number of confirmed herd breakdowns that were prevented.

45. Unlike culling, large scale field trials of the efficacy of BCG in badgers at reducing cattle TB incidence have not been conducted.

46. In conclusion, the vaccination of badgers is unproven for large scale field use and particularly in demonstrating a change in the number of confirmed cattle herd breakdowns. It is therefore recommended that a strategy of vaccinating badgers for bovine TB is not suitable as the principle intervention to deal with the weight of infection that exists in badgers in endemic areas of Wales, and the transmission of that infection to cattle at this time.

COMBINED TEST, VACCINATE AND CULL STRATEGY

47. In theory, adding selective culling into a programme of vaccination of badgers might be beneficial in two ways. Animals with a positive result are likely to represent the greatest risk of transmitting infection to cattle so their removal may reduce this risk. Vaccination of clear/negative tested badgers may then help to build a level of immunity in the badger population. A combined approach such as this could therefore have the benefit of high risk badgers being removed, and a high proportion of the remaining population being vaccinated.

48. Selective culling in combination with vaccination may therefore have the potential to contribute to bovine TB eradication, whilst minimising the impact of any negative effects associated with culling. However, the success of such an approach would depend on being able to take blood samples from trapped badgers, availability of a sufficiently accurate and practical test, an effective vaccine, the ability to capture and test a sufficient proportion of the badger population, the proportion of the badgers already infected and the level of social disruption (perturbation) that may be caused.

49. There are a number of tests for bovine TB in live badgers. Bacteriological culture of samples, gamma interferon and ELISA tests, can take up to three days for results to be available making them unsuitable for use in this context as badgers would

either have to be held captive until the results were available or tested, marked and released then recaptured in the future. The Stat-Pak test is the most promising test for use in a combined vaccination and selective cull strategy. The test is relatively simple to perform, although blood sampling would require badgers to be anaesthetised. The test produces a results within 20 - 30 minutes, and has a sensitivity (the ability to identify infected badgers) for detection of bovine TB of 49.2% meaning that half of the truly infected badgers would test negative (and therefore be assumed to be uninfected, vaccinated and released).

50. A combined test, vaccinate and cull strategy would aim to remove infected badgers from the population and confer a degree of protection to those individuals vaccinated and released back into the population. The number of badgers that would be removed from the population and the proportion of those remaining that would need to be vaccinated in order to deliver benefits in cattle TB are uncertain. However, estimates based on the number of infected individuals per social group and the efficacy of the vaccine, as discussed above, are available from modelling.

Potential Outcomes

51. There is no evidence of the effects of this strategy in the field as it has never been implemented before. Therefore, the only information available on the potential effects of a combined strategy is from the modelling exercises completed by CSL and commissioned by the Welsh Assembly Government (CSL (2009) (b)). These models predict that if no social perturbation occurs in a control area of 100km², with a control duration of 5 years, 70% trap efficiency, 60% vaccine efficacy and a land access of 80%, a minimum of 40% of healthy badgers need to be vaccinated for there to be any effect on the confirmed incidence of bovine TB in cattle.
52. However, the report suggests that the size of the remaining badger population, the level of infection remaining in that population and their disturbance (perturbation) could result in an increase in contact between badgers and between badgers and cattle causing a sustained increase in confirmed herd breakdowns. The incidence of confirmed herd breakdowns was reported as increasingly steeply with the ultimate consequence being a 10-20% increase above that which would otherwise have been observed.

Veterinary Advice

53. There is no practical evidence to suggest that the combined test, vaccinate and cull approach would provide a positive reduction in the number of confirmed herd breakdowns.
54. The modelling of potential outcomes from the combined test vaccinate and cull approach indicated that size of the remaining badger population, the level of infection remaining in that population and their disturbance (perturbation) could result in an increase in the number of infected badgers and the number of confirmed herd breakdowns.
55. As it is unproven in field trials, and modelling has been identified the potential for this approach to make the situation substantially worse, the combined test vaccinate and cull approach is not recommended as being suitable for endemic areas.

NON-SELECTIVE CULLING

56. Culling to reduce host population density is recognised as a potential tool for disease control with the aim of reducing it to a level at which transmission of the disease is impaired (e.g. reducing the number of opportunities for contact between individuals in the host species and other susceptible populations) (Delahay *et al.* 2008 (a)).
57. A non-selective cull of badgers involves would reduce the local badger population in a specific area for a required time period to reduce opportunities for transmission of infection from badgers to cattle through direct and indirect contact.

58. Some respondents pointed to the successes achieved by culling of wild or feral species in other countries such as, Ireland, New Zealand and Australia in the eradication of bovine TB.

Effect on Cattle

59. Some respondents to the consultation believed that culling badgers would achieve a reduction in bovine TB incidence in cattle and referred to previous trials as evidence of this. In contrast, other respondents pointed to the results of the same trials, particularly the conclusion of the ISG on the RBCT, as evidence of why they believe badger culling will not work.

60. In both the UK and the Republic of Ireland (RoI), a number of badger culling strategies have been implemented to control TB in cattle or to assess the effects of badger culling on TB in cattle.

61. The gassing of badger setts between 1975 and 1981 from a 104 km² area of high cattle TB incidence (endemic area) around Thornbury in Gloucestershire was followed by a period of 10 years with no herd breakdowns. (Clifton-Hadley *et al.* 1995).

62. There were no herd breakdowns for seven years following the live-trapping and shooting or gassing of badgers from a farm of 12 km² at Steeple Leaze in Dorset between 1975 and 1979, which had previously experienced repeated breakdowns since 1970 (Wilesmith *et al.* 1982).

63. Herd breakdown rates declined from 15% to 4% after badger removal over 62 km² near Hartland in North Devon in 1984 (Krebs *et al.* 1997).

64. The culling of badgers from a 740 km² area in East Offaly, Republic of Ireland over six years was followed by significantly fewer confirmed herd breakdowns in the removal area than in a surrounding area in which no systematic badger removals had taken place (Ó Máirtín *et al.* 1998; Eves 1999).

65. The Four Areas Trial in Ireland compared the effects of two different badger culling strategies on TB infection in cattle and was carried out in four counties in the Republic of Ireland between 1997 and 2002 (Griffin *et al.* 2005). Badgers were culled throughout four 'removal areas', which varied in size between 188 and 305 km². The incidence of TB in cattle in the removal areas was subsequently compared with that in four nearby 'reference areas' (varying in size from 199-275 km²) where badgers were locally culled in response to herd breakdowns. Results indicated that the probability of a confirmed herd breakdown was significantly lower, and the time between two TB breakdowns in one herd was significantly longer, in areas where badgers were proactively culled than in paired 'reference areas' where badgers were not culled.

66. While these operations provide compelling evidence that badger culling influences the risks of infection in cattle, a lack of replication and strict experimental controls in some of these studies means that the confidence with which the results would be attributable to the culling is limited.

67. The Randomised Badger Culling Trial (RBCT), which was overseen by the Independent Scientific Group on cattle TB (ISG) was designed as a controlled field experiment to try and overcome some of the difficulties of previous trials. The RBCT was conducted between 1998 and 2005 (ISG (1998), Bourne *et al.* 2007) in 30 areas of high cattle TB risk in England, each measuring approximately 100 km². The core aim of the trial was to present English Ministers with a range of scientifically-based policy options for badger culling. The 30 areas were grouped into ten 'triplets', each comprising three areas randomly allocated to one of three experimental treatments. These were: proactive culling – badger culls conducted annually when possible on all accessible land; reactive culling – localised culling of badgers geographically associated with cattle TB outbreaks; survey-only – experimental control areas where no culling was carried out.
68. The survey-only-areas provided a baseline of confirmed herd incidence against which the results from the proactive and reactive culling areas were compared using log-linear Poisson regression. The analysis on the outcome of culling for the RBCT and IAA presented later on in this submission is based on this comparison and is expressed as the estimated impact of culling badgers on confirmed herd breakdowns as against the estimated number that would have been expected in the absence of culling.
69. There were no additional cattle measures implemented in the RBCT trial areas. Many of the responses to the consultation on The Badger (Control Area) (Wales) Order 2010 quoted the Independent Scientific Group final report (2007) summary of the RBCT which said "...we conclude that badger culling cannot meaningfully contribute to the future control of cattle TB in Britain." (ISG chairman's overview, para 9). It should be noted that this conclusion was based on the approach taken by the RBCT and the outcome of the trial at that time. Since then there has been regular further analysis of the RBCT data by Imperial College London and alternative scientific views on the findings of the ISG.
70. The effect of the badger control treatments in the RBCT was evaluated by consideration of the incidence of TB in cattle expressed as the number of new confirmed herd breakdowns. It did not consider other aspects of bovine TB parameters, for example the duration of breakdowns, survival times between breakdown or the scale of breakdowns.

Confirmed and Unconfirmed Herd Breakdowns

71. A confirmed herd breakdown is a TB breakdown where *M.bovis* has been isolated from at least one animal in the herd or pathological changes (lesions) typical of infection with *M.bovis* are detected at post mortem examination in at least one reactor taken from a herd.
72. An unconfirmed herd breakdown is a TB breakdown where no TB lesions are detected during the post mortem examination of reactor cattle and all laboratory examinations fail to isolate *M.bovis*. In infected cattle, gross pathological changes (development of visible lesions) often take longer to develop than positive responses to the tuberculin test. It is also the case that the majority of post mortem

examinations of TB reactors takes place within the abattoir and is for this reason less detailed than would be the case within a laboratory situation, and less likely to identify lesions, particularly if these are small. Veterinary opinion is that an unconfirmed breakdown normally means that the disease has been identified at an earlier stage before lesions become visible. It does not normally mean that the cattle were not infected or infectious.

73. A very small proportion of unconfirmed herd breakdowns may be due to genuine false positive cross-reactions to bovine tuberculin tests (even in the endemic TB areas where the RBCT took place). We would therefore expect to find a low background level of unconfirmed herd breakdowns, that remain unaffected by any reduction in the number and prevalence of *M. bovis*-infected badgers but would correlate with the frequency of herd testing.
74. As part of the RBCT, confirmed herd breakdowns were measured in the area where culling took place ('culling area') and an approximately 2km wide area just outside the cull area where no culling took place (2km area).
75. The ISG primary analyses considered only those herd breakdowns that were confirmed (Bourne 2007 pg 93). It is worth noting that a more in depth, laboratory based post mortem examination was carried out on reactor cattle slaughtered during the RBCT. This may have resulted in an overall greater proportion of confirmed herd breakdowns within the RBCT areas compared with standard current abattoir based post mortem examination.
76. To investigate the apparently smaller impact of proactive culling on all breakdowns (as compared with confirmed herd breakdowns) the ISG also examined analyses of unconfirmed herd breakdowns only. They found no apparent effect of proactive culling on unconfirmed breakdowns and on this basis they concluded that there was no evidence of an impact of proactive culling on unconfirmed herd breakdowns within trial areas and they therefore focused their attention on the analyses based on confirmed breakdowns only.
77. Analysis conducted by the ISG identified that there was "considerable over-dispersion" in the unconfirmed breakdown data from inside trial areas. The former deputy chairman of the ISG (Donnelly, C, personal communication, 2011) is of the view that this over-dispersion does not explain the apparent absence of effect on unconfirmed breakdowns. The ISG were unable to determine, from the data, why there was no apparent effect of proactive culling on unconfirmed herd breakdowns (Bourne 2007 pg 95) but believe that the data point towards a biological explanation. However they remain unable to identify such an explanation. In the absence of a biologically plausible explanation the situation remains that the reason for this apparent difference remains unknown. It is unlikely that additional analyses will be able to resolve this situation.
78. The distinction between a confirmed herd breakdown and unconfirmed herd breakdown is, made on the basis of further tests carried out after slaughter (post-mortem examination and bacterial culture) that are less sensitive than the skin test..In areas of high incidence and prevalence of TB (endemic areas), there is a high degree of confidence that the unconfirmed herd breakdowns are caused by

M.bovis. It follows that estimates of incidence or prevalence in such areas, that are defined in terms of confirmed herd breakdowns, are underestimates.

79. The veterinary view of the RBCT data is that there remains some uncertainty in the likely effect of proactive culling on unconfirmed herd breakdowns. Taking into account the disease situation in endemic areas (i.e. that the majority of unconfirmed breakdown herds are genuinely infected with *M.bovis*) , it is concluded that an effect of proactive badger culling in endemic areas on unconfirmed herd breakdowns should be expected.

Proactive Culling

80. The RBCT was interrupted by the Foot and Mouth Disease epidemic of 2001 which meant that the number of successive culling operation in each triplet varied - between four and seven years. The effect across the proactive culling areas was an estimated 23.2% decrease (95% CI: 12.4% decrease to 32.7% decrease) in confirmed herd breakdowns inside culled areas when compared with survey-only areas. Proactive culling was also associated with an estimated 24.5% increase (95% CI: 0.6% decrease to 56.0% increase) in confirmed herd breakdowns in the surrounding 2km area around the culling area when compared with survey-only areas.

81. The ISG hypothesised that the increase in confirmed herd breakdowns observed in the 2km area was a result of changes in badger behaviour brought about by the dispersion of social groups as a consequence of culling. Badgers typically live in social groups of 4-7 animals, with defined territorial boundaries. Disruption of the organisation of these social groups causes surviving badgers to range more widely than they would normally and come into contact more often with other animals (including both cattle and other badgers). This behaviour is referred to as “perturbation”.

82. Regular 6 monthly analysis of data downloads from the proactive badger culling areas has been carried out by Jenkins *et al.* (2010 (a,b & c)) from one year after completion of the last proactive cull.

83. From the start of the ‘post-trial period’ to 2 July 2010, incidence of confirmed herd breakdowns in the proactive culling areas was an estimated 34.1% lower (95%CI: 23.0% decrease to 43.6% decrease) than in survey only areas, and in the 2km area outside proactive trial areas was an estimated 5.6% lower (95%CI: 31.0% decrease to 29.1% increase) than outside survey-only areas. Therefore the positive impacts on confirmed herd breakdowns of proactive culling were maintained over a period of time while the early negative effect on confirmed herd breakdowns on surrounding land disappeared relatively quickly. We cannot be sure exactly when this happened, but the first data-point in the post-trial period is calculated from cattle herd breakdown incidence data from 12-18 months after proactive culling stopped and shows no detrimental effect.

	First cull to one year after the last proactive cull	One year after the last proactive cull to 2 July 2010	First proactive cull to 2 July 2010 (during- and post-
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			trial periods combined)
Inside 100km ² proactively culled trial areas	-23.2% (-12.4% to -32.7%)	-34.1% (-23.0% to -43.6%)	-28.3% (-35.0% to -20.9%)
Adjoining lands ≤ 2km outside culled trial areas (not culled)	+24.5% (-0.6% to +56.0%)	-5.6% (-31.0% to +29.1%)	+9.0% (-15.5% to +40.7%)

Figure 5 Comparison of estimates of overall effects of proactive badger culling on the incidence of confirmed herd breakdowns on lands inside and up to 2km outside trial areas derived from successive analyses of RBCT data reported in July 2010 (95%CI in brackets).

84. From the first proactive cull to 5 years after the last cull (i.e. up to July 2010) there was an estimated 28.3% reduction in confirmed herd breakdowns in culling areas when compared with survey-only areas. The author reports (Jenkins et al 2010 (c)) that confirmed herd breakdowns in the 2km area around the culling area was an estimated 9% higher compared with the 2 km ring around the survey area. Figure 5 describes the effects of culling on confirmed herd breakdowns seen both during the culling period, for 5 years after the last cull and from the first cull to 5 years after the last cull.

85. Using the most up to date figures from the RBCT post-trial analyses (Jenkins *et al.* 2010 (c))(i.e. up to 2 July 2010, see figure 5),

86. Until further analyses are conducted, it is not possible to say whether the beneficial impact of the RBCT that have been achieved to date will continue at the same level, or whether there would be an improvement or deterioration. It would be reasonable to assume that the benefits would reduce over time unless measures were in place to protect those benefits achieved for example through increased cattle controls. Analysis of further data from the RBCT is expected in March 2011 which will determine if any additional benefits have been identified.

87. Some respondents to the consultation suggested that science clearly shows that killing badgers to control the spread of bovine TB does not work. However there is practical field evidence, from previous policies and studies, that proactive culling of badgers can have a positive effect on TB in cattle as expressed by a reduction in the number of new confirmed herd breakdowns. This also highlights the necessity of culling or some other effective intervention in endemic areas and for protecting any benefits achieved to reduce disease transmission between badgers and cattle.

Reactive Culling

88. In the RBCT, reactive localised culling of badgers geographically associated with cattle breakdowns was stopped by Defra Ministers 4 November 2003 as early interim results from the reactively culled areas showed an increase in new confirmed herd breakdowns when compared with survey only areas, considered

most likely to be as a consequence of social perturbation. This led the ISG to conclude that there is convincing evidence that reactive culling of badgers, in the form and time span implemented in the RBCT, does not offer a beneficial effect large enough to make it useful as a practical policy option and that indeed there is evidence of an adverse effect of that reactive culling strategy due to the small scale of the culling operation and the level of social perturbation.

89. Further analysis of the results of the reactive culling are expected soon. Early indications are that this is expected to support the original conclusions of the ISG (personal communications). We would therefore not currently recommend a reactive culling approach within a specified area.

Technique of culling badgers

90. A number of techniques identified as potential tools for culling badgers were considered by the Programme Board, which free shooting and cage trapping with shooting identified as the only potentially available options at this time. These methods are summarised below.

Free Shooting is a technique already widely used to control populations of free ranging wildlife. In considering its appropriateness in Wales, the option of shooting badgers was included within the proposed Badger (Control Area) (Wales) Order 2010.

Some of the responses to the consultation highlighted the un-predictability of free shooting, its unreliability as the principle mechanism for control and the risk its use would present to countryside users. Others suggested that free shooting would be difficult to regulate and would not allow activities to be concentrated or coordinated.

These difficulties are recognised and as such shooting free-moving badgers is not recommended as a principle method of culling due to current uncertainty about its ability to deliver an effective large scale cull. However, it could be useful as an additional method to cull badgers following on from earlier culling operations or in particular circumstances where trapping is not appropriate. Shooting of wild animals is commonly practised and in the main following codes of practice such as The British Association for Shooting and Conservation's 'Code of Practice - Lamping (Night Shooting)' to reduce potential risks to the welfare of animals and the wider environment including public safety. It is recommended that shooting free-moving badgers is retained as a technique for culling and that Standard Operating Procedures are developed to mitigate the risks.

Cage trapping with shooting has been demonstrated (by the RBCT) to be a reliable and humane method of capturing badgers. It is recommended that cage trapping and killing by shooting is used as the primary culling technique if a decision to cull badgers is made.

91. The breeding season for badgers is variable but normally begins towards the end of January and ends around the beginning of May. During this time it would be prudent to stop culling badgers (via either method) because there is a risk of depriving dependant cubs of their mothers.

92. Respondents to the consultation recognised the necessity of a closed season. Some went on to recognise that the duration and timing of the closed season needs to balance the welfare requirements for badger intervention against the disease control requirements. The longer the season, the less time for control. As recommended by CCW, in their consultation response, the closed season for any culling strategy should be agreed with CCW to reflect the environmental conditions and evidence available at that time.

Strategy for Delivery

93. There is risk of badger culling having no effect on cattle breakdowns or even making the situation worse was raised as a major concern by a number of respondents to the consultation. As part of the investigation into effective culling, the Central Science Laboratory (CSL, now part of the Food and Environment Research Agency or "Fera") was commissioned to analyse the effect of different badger culling strategies in Wales. They created a model based on the most acceptable option of cage trapping and included data from the RBCT as reported by Jenkins *et al.* (2008) and cattle data specific to Wales (CSL (2009) (c)).

94. The CSL culling modelling work highlighted several important factors which are considered below.

- *Control duration:* Unless badger culling lasts longer than the period of greatest social disruption to the badger population, there is likely to be an increase in the total number of infected badgers and an increase in the total number of cattle herd breakdowns over the first few years of the policy.
- *Control efficacy:* If badger-culling efficacy is 50% or less, this could lead to an increase in the number of infected badgers, due to social perturbation, in the period following the start of a cull.
- *Control area:* The size of the control area is one of the factors that influence the scale of consequences in cattle incidence as a result of badger culling. Modelling recommended control areas greater than 200 km² for the benefits of control to outweigh the disadvantages of social perturbation. More recent reports of analysis of the RBCT data post culling (Jenkins *et al.* 2010 (a)) has reduced the minimum cull area to 141 km².
- *Control Staging:* The model tested the potential impact of the organisation and timing of a cull of badgers through different delivery strategies i.e. simultaneously (all control applied in one month), staged scattered (farms divided equally and randomly to four control months) and staged blocks (farms divided randomly into four contiguous blocks of approximately equal area and randomly allocated to four different months). The analysis found there to be no important differences between the three staging strategies tested in the model in terms of confirmed herd breakdown rates.

One respondent raised an issue that "... the consultation documents fail to specify how the cull would take place – for the RBCT results to be remotely

applicable, the entire 288km² would have to be culled in the space of two weeks, which I frankly doubt could be done. Failing to do so could lead to significant perturbation within the IAA, with unknown results."

The majority of the culling operations within the RBCT were undertaken simultaneously (all initial culling episode and 37 of the 41 follow up culling episodes). The other 4 culling episodes were completed in sectors. Post cull modelling of the RBCT results suggested that "sector based culling" is likely to result in a higher prevalence of infection in badgers (Woodroffe et al 2006).

The variation in timing and scale of the sector based culling as conducted in the RBCT together with the limited number that were delivered this way have been suggested as reasons why an alternative approach could be possible. With limited data available it is recognised that simultaneous culling operations as undertaken for the majority of the RBCT badger culling episodes is likely to provide the greatest confidence of achieving the positive outcomes in terms of the number of confirmed herd breakdowns as achieved in the proactive culling areas.

- *Land access compliance:* The modelling identified that land access in excess of 60% is required to ensure an immediate reduction in the number of infected badgers. Land access of 80% or more gave an immediate reduction in confirmed herd breakdowns rates, although the difference between 70% and 100% compliance is small.
- *Control edge permeability:* As the permeability of the edge of the control area reduces, so the recovery rate (i.e. change in prevalence over time) of infection within the badger population reduces. In addition, the confirmed herd breakdown incidence reduces. With no permeable boundary, and thus no badger immigration or social perturbation outside the control area we would expect to see a more significant reduction in confirmed herd breakdowns within the control area.

95. It is important that any organisation charged with delivering a badger control strategy is able to demonstrate beneficial effects for bovine TB control while ensuring that any strategy is carried out humanely and efficiently. It is conceivable that a group of farmers or contractor, working on their behalf might, with sufficient resources, deliver an effective cull of badgers. However, to provide the greatest assurance, it is recommended that the Welsh Assembly Government is used as the principal body for delivery, retaining responsibility for managing and delivering a badger cull.

96. Some of the consultation respondents emphasised the importance of any badger cull being carried out humanely by properly trained personnel, the implementation of a closed-season and that all activities should be properly monitored. This is in line with an approach where the Welsh Assembly Government retained responsibility.

97. Operations will need to be carried out with the support and assistance of land owners, the farming industry, and contractors to ensure the delivery of the cull of badgers contributes positively to the control of bovine TB in cattle.

98. Section below considers how the control edge permeability of a boundary and other factors such as improved biosecurity have the potential to mitigate for the effects of perturbation.

Strategies to mitigate for the effects of perturbation

99. Data from the RBCT have shown that while proactive culling reduced the incidence of confirmed cattle herd breakdowns within the area culled, the surrounding area experienced an increase in breakdowns during culling. This detrimental effect of proactive culling has been attributed to increases in badger movements caused by social perturbation. Several suggestions have been made (principally in King *et al.* (2007) & Bourne *et al.* (2007)) of ways to mitigate against the detrimental effect of perturbation which are discussed below.

100. *Soft boundaries with no cattle/low cattle TB risk* – Positioning the area to border areas of lower cattle densities may reduce any negative effects of social perturbation in badger populations in the surrounding area, through the reduction in the number of susceptible animals and opportunities for transmission.

101. *Increased biosecurity on farms* - Increased biosecurity in the form of exclusion measures can be used to prevent badgers coming into direct or indirect contact with cattle within the farmyard and farm buildings. Such measures can be relatively inexpensive to install and effective in reducing entry by badgers into farm buildings if properly used and maintained but are limited in the field.

102. *Impermeable boundaries* - It has been suggested that areas that have impermeable landscape features on some or all boundaries may suffer less detrimental effects of perturbation than those where all boundaries are permeable to badger movement (Griffin *et al.* 2005, Bourne *et al.* 2007). The ISG suggested that impermeable boundaries may include coastlines, mountains, medium to large rivers, motorways and urban conurbations, although the extent to which these features restrict badger movement is limited. Recent analysis by Frantz *et al.* (2010) reported that “a large, wide river represented a barrier to badger dispersal and found evidence that a motorway may also restrict badger movement. Conversely, we did not find any evidence for small rivers and roads interfering with badger movement.”

103. *Ring Vaccination* - Recent modelling of potential control strategies in England has suggested that if at least a two farm width (approximately 2 to 3 km) ring buffer is vaccinated around a 150km² cull area potential effects of badger perturbation can be partly mitigated. The result was quicker (in time until a reduction in cattle incidence is observed) and greater (in terms of the reduction in cattle herd breakdowns) benefit. However, if the cull efficacy or land access rates were much below 70% there may be no overall benefit of this approach even after five years of control (Fera 2010).

104. Spatial modelling has shown that there are no areas in Wales sufficiently isolated for impermeable barriers to form the perfect boundary (i.e. impermeable to badger movements) to an area in a bovine TB endemic region, although some areas are less exposed than others. In the absence of impermeable barriers, positioning the culling area next to areas of low badger population density, or habitats that are less susceptible for badgers to establish territories, e.g. low-lying marshy areas and high altitude regions (Delahay *et al.* 2008 (b)), may reduce the effects of social perturbation.

Effects on Badgers Population

105. The estimated impact of an effective non selective cull on the badger population is based on experiences of culling badgers for disease control purposes in the UK and RoI.

106. To be effective a cull of badgers must achieve the destruction of at least 50% of the population and we expect to achieve 70% in line with the experiences of the RBCT. This means that 30% of the badger population could survive. We estimate that, in the IAA there are between 1650 and 2300 badgers (Welsh Assembly Government Sett Survey - correspondence) and for the purposes of this part of the submission, we will advise you on the basis of the upper estimate this means that approximately 1610 badgers will be removed with about 690 remaining.

107. With regard to the repopulation of the area after culling has ended, we expect the pre-cull population level of badgers to recover naturally within 5-10 years of the end of culling, in the absence of any artificial control of their re-population (Welsh Assembly Government 2009).

108. A regular concern of those opposed to culling was that culling would increase the prevalence of bovine TB in badgers, whilst others suggested that it would simply decrease the net number of infected badgers. A model for the interactions between repeated culling and the permeability of trial area boundaries in the RBCT showed that successive culls led to increased prevalence only in less geographically isolated areas (Woodroffe R. *et al.* 2006). There is not expected to be a significant change in the prevalence of bovine TB in the badgers that remain following culling, if the cull areas are relatively isolated.

Veterinary Advice

109. A proactive, non-selective badger cull is expected to reduce the level of confirmed herd breakdowns within the culling area from the first year (Jenkins *et al.* 2010 figure 5) by reducing opportunities for infection to be transmitted between badgers and cattle i.e. breaking the cycle of infection by reducing the wildlife reservoir of infection. These reported benefits of the RBCT, which was a relatively well delivered cull, were sustained throughout the culling period. Furthermore these benefits have continued to accrue in the years post-trial which will continue to be monitored.

110. While there is greater uncertainty in the likely effect of proactive culling on unconfirmed herd breakdowns relative to confirmed herd breakdowns, taking into

account the disease situation in endemic areas (i.e. that the majority of unconfirmed breakdown herds are genuinely infected with *M.bovis*) it is concluded that an effect of proactive badger culling in endemic areas on unconfirmed herd breakdowns should be expected.

111. If a cull of badgers cannot be carried out with the required trapping efficiency, land access compliance or duration there is the potential for the benefits to be less or even for the disease to become more widespread.
112. Measures to mitigate the potential effects of social perturbation caused by culling have been discussed above. The mitigation measures with the likelihood of reducing perturbation effects in areas surrounding a cull are making best use of the benefits of boundaries and improving farm biosecurity. It is likely that a combination of these measures will have a greater effect than one measure in isolation.

IMMUNOCONTRACEPTION

113. The principle of immunocontraception is the targeting of a population to reduce the potential for reproduction and therefore future population density. The theory is to reduce the population density to a level at which transmission of the disease is impaired (e.g. reducing the number of opportunities for contact between individuals in the host species and other susceptible populations) usually similar to the impact of culling.
114. Immunocontraceptives in badgers need to be able to overcome the badgers' natural population control strategies of delayed implantation and infanticide. It is reasonable to assume that if some of a social group are infertile (such as the alpha sow), other animals will reproduce to compensate.
115. The use of immunocontraceptives has recently been discussed by the TB Eradication Programme Board. They recognised that large scale use of immunocontraceptives in badgers is some time off. However as a number of respondents to the consultation saw this as a potentially viable alternative, it is being reconsidered in this section.

Current position

116. There are no known immunocontraceptives currently licensed as being safe for use in wild badgers.
117. Modelling has been conducted to look at the effect of immunocontraception in badger populations. Cowen and Massei (2008) conclude that "modest levels of induced infertility should have significant (badger) population consequences, although these effects take a relatively long time to be realised". Swinton and colleagues modelled the relative effects of fertility and lethal control and concluded that both can act to reduce the number of badgers from a population, hence decreasing transmission rates.
118. Defra, through the Environmental Stewardship and Wildlife Management research programme, is funding research to look at the effect of the USA-licensed

GnRH vaccine in wild boar, urban badgers and parakeets. To date, Fera has vaccinated 14 sows from 3 social groups and the preliminary immune responses are promising. It is unlikely that any impact at the population level will be detected until at least the second year after vaccination. This work is due to complete 31st March 2011. Future monitoring of that work should give an indication of whether fertility control could contribute to a strategy for controlling bovine TB in badgers, by reducing the proportion of susceptible animals in the population. But further years of observation are required before the potential benefits, in terms of changes in population size and structure, can be quantified.

Veterinary Advice

119. Whether fertility control of badgers could contribute to a strategy for controlling bovine TB in cattle, by reducing the number of badgers in the population (and thus reducing the opportunity for transmission to cattle) is not known. Further years of observation are required before the potential benefits, in terms of changes in population size and structure and the time it might take for those benefits to materialise, can be quantified.
120. For these reasons it is not considered a viable alternative to culling badgers in an endemic area.

SUMMARY

121. It is essential that we break the cycle of infection between badgers and cattle if we are to eradicate bovine TB from the cattle population in endemic areas of Wales. Cattle measures alone cannot achieve eradication.
122. The options for badger interventions presented all aim to do this by reducing opportunities for cattle to come into contact with infected badgers. Unfortunately the “science” is incomplete, as the four options have not all been tested to the same degree in the field, and certainly not in a balanced control field trial against each other.
123. On the other hand, badger culling has been applied in a range of ways from the Irish work and early studies in England, which have been criticised by some on the basis that they were not controlled, balanced studies, to the larger scale and more balanced RBCT.
124. In conclusion, we have considered the four options for badger interventions.
125. The impact that vaccination of badgers could have on TB in cattle is unproven in the field. Any anticipated benefits have been derived from modelling work based on a number of fundamental assumptions, and the actual outcome may differ from that expected. There is limited evidence of the value of badger vaccination BCG on the proportion of badgers that test positive to one or more TB tests from one field trial, but it did demonstrate a reduction in the severity and progression of future infection in some badgers. The current Badger Vaccine Deployment Project in England is looking at the practicality of vaccinating badgers in the field and not the impact on TB in cattle. According to our best estimates approximately 27% of

badgers in endemic areas could be infected with bovine TB. We have no reason to believe that vaccination can have any beneficial effect on infected badgers, nor that it will provide total protection against TB in badgers that are uninfected at the time of vaccination. Veterinary opinion is that the widespread vaccination of badgers is unproven to have an effect on bovine TB in cattle. If achievable, then any benefits in reducing the number of confirmed herd breakdowns from vaccinating badgers would take longer than widespread, effective and efficient culling.

126. There is no field trial evidence to suggest that the combined test vaccinate and cull approach would provide a positive reduction in the number of confirmed herd breakdowns. Modelling of the approach indicated that size of the remaining badger population, the level of infection remaining in that population and their disturbance (perturbation) could result in an increase (10 – 20%) in the number of infected badgers and the number of confirmed herd breakdowns.
127. There are no known immunocontraceptives currently licensed as being safe for use in wild badgers and the effect of this approach on TB incidence is not known.
128. Culling has been proven in the field; a number of trials and culling operations that have demonstrated a substantial reduction in the number of herd breakdowns. The veterinary view is that while there is greater uncertainty in the likely effect of proactive culling on unconfirmed herd breakdowns relative to confirmed herd breakdowns, taking into account the disease situation in endemic areas and the basis on which a new breakdown is defined as confirmed or unconfirmed (ie the majority of confirmed breakdown herds are genuinely infected with *M.bovis*), it is concluded that, the effect of proactive badger culling in endemic areas on unconfirmed herd breakdowns should be expected.
129. It is expected that the combination of badger culling and cattle measures will optimise the benefit in terms of the number of herd breakdowns prevented and also other parameters such as the scale of breakdowns (number of cattle removed and slaughtered), the length of breakdowns (time taken to clear up infection from a herd) and the survival rate (time between breakdowns for individual herds).
130. It can be seen from the above that the option of vaccinating badgers is not supported by sufficient evidence to show that it can reduce or eliminate TB in cattle. The option of combining the testing, culling or vaccination of badgers has been shown above to involve significant risk of increasing the number of TB confirmed herd breakdowns. The option of immunocontraception is also not recommended for the reasons provided above.
131. Culling should not be carried out in isolation but should include the continuation of additional cattle controls and improved biosecurity. Only by applying a combination of all measures, aimed at tackling all sources of infection, will eradication of bovine TB be achieved. Following eradication the benefits need to be protected by ongoing cattle surveillance and improved biosecurity measures.

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Summary of the Responses to the Consultation on Badger Control in the Intensive Action Area

1. The Consultation Exercise

- 1.1 The consultation exercise sought views on legislation under the Animal Health Act 1981. The Badger (Control Area) (Wales) Order 2010 would allow for a Government-managed cull of badgers, alongside additional cattle measures, in the Intensive Action Area (IAA), in order to pursue the eradication of bovine tuberculosis (TB) from that area. The consultation exercise ran from 20 September until 17 December 2010.
- 1.2 This document provides a representative summary of the responses and is not an exhaustive record of all the issues raised. The responses can be viewed on request by contacting the Assembly Library and Publication Services (see section 6.3).

2. Publicising the Consultation Exercise

- 2.1 It was important to make sure that people had access to information about our proposals and the reasons behind the Minister for Rural Affairs' provisional decision. To make sure that people had an opportunity to give us their views a communication plan to publicise the consultation exercise was put in place. The plan aimed to:
- Make it easy for people to find the consultation and to respond
 - Ensure that the process was fair and balanced
 - Explain and clarify our proposals
 - Encourage responses from those directly affected by our proposals
 - Make it easy for people across Wales to respond to the consultation online in order to cut down on the processing and administration of responses

Information in relation to the consultation process distributed externally is listed at Annex B.

- 2.2 The consultation document and supporting evidence was available on the Welsh Assembly Government's website and in the public spaces of the Welsh Assembly Government's regional office in Aberystwyth. Consultation documents were also available on request by contacting the Welsh Assembly Government and at the Welsh Assembly Government's stand at the 2010 Dairy Event and the 2010 Winter Fair.
- 2.3 It was important to us that individuals affected by our proposals; landowners and the community in the IAA, were aware of the proposals outlined in the consultation document and had the opportunity to respond. We appreciate that not all households have access to the internet; we therefore supplied the supporting evidence to libraries throughout Pembrokeshire, Carmarthenshire

and Ceredigion, including mobile libraries. Members of the public could make an appointment to view the supporting evidence at one of these libraries.

- 2.4 As part of the activity to publicise the consultation exercise a leaflet was sent to 26,000 addresses in the area to raise awareness of the consultation exercise. Unfortunately the leaflet contained an error. As soon as the error was noticed the leaflet was withdrawn and a further piece of communication was sent to all original recipients to draw their attention to the incorrect information. A letter was also sent from the Chief Veterinary Officer for Wales to local papers highlighting the error. We consider that it is unlikely that this error will have misled anyone.

3. Responding to the Consultation Exercise

- 3.1 Respondents were given the opportunity of responding to the consultation exercise using an online form, by e-mail (to a mailbox specifically set up for bovine TB consultations) or in writing to the TB Team. Additionally, on 18 October, a response form was made available online, which respondents could print off, complete and post back to the TB Team. The response form was also included with hard copies of the consultation document that were sent out.
- 3.2 All responses posted to the right postal address, e-mailed to the right e-mail address, handed in at Government offices or to Government officials, or given online were accepted. Please see Annex A for information on how the consultation responses were analysed. All comments or information received in response to the consultation exercise have been read and considered by officials.

4. The Consultation Questions

- 4.1 Respondents were asked to consider seven specific questions in their response:

Question 1: Do you object to the culling of any wildlife for the purposes of controlling disease in farm animals? If yes, please explain why?

Question 2: In view of the fact that a licence for an injectable vaccine for badgers is now available, do you think that vaccination of badgers in bovine TB endemic areas is a viable alternative to culling *to prevent disease transmission*? If yes, please explain why?

Question 3: Do you believe that culling badgers can achieve a reduction in bovine TB incidence in cattle, to justify its use? If no, please explain why?

Question 4: Do you agree that the Intensive Action Area has a high incidence of bovine TB in cattle which needs to be dealt with? If no, please explain why?

Question 5: Do you believe that access to land for culling badgers should be enforced? If not, why not? Please give reasons for your answer.

Question 6: On balance, do you think the benefits of culling outweigh the harm caused to the badger population in the Intensive Action Area? Please give reasons for your answer. Would you include other factors in the balance of harm and benefits? If so why?

Question 7: Do you agree with the prohibitions under the draft Badger (Control Area) (Wales) Order 2010? If not, why not?

4.2 Respondents were also given the opportunity to comment as they pleased on any other issues they considered appropriate.

5. Ministerial Briefing 20 December 2010

5.1 In addition to this summary document, a briefing on the consultation responses was provided to the Minister for Rural Affairs on 20 December 2010. The nature of the briefing was as an interim update by showing the Minister some of the responses received. This briefing did not address any of the issues raised by respondents. Attached to the briefing were a number of consultation responses. These included responses from Assembly Members, organisations and individuals which were considered representative (although not complete) of the responses received. For the purposes of the briefing the personal details of the individual respondents were blackened-out. A copy of the briefing can be seen at Annex C.

6. Next Steps

6.1 This document and the consultation responses will be presented to the Minister for Rural Affairs as part of her decision on whether to proceed with a Government-managed cull of badgers in the IAA.

6.2 As well as this summary document, all consultation responses received will be published, with the exception of the details of those respondents who have requested that their details be treated as confidential.

6.3 Consultation responses can be viewed on request by contacting the Assembly Library and Publication Services:

Assembly Library & Publication Services
Welsh Assembly Government
Cathays Park
Cardiff
CF10 3NQ

or

e-mail: Assembly-publications@wales.gsi.gov

7. Responses to the Consultation Exercise

- 7.1 There was considerable interest in this consultation exercise with 13,431 responses being received, from organisations, businesses, groups and individuals. Among the organisations that responded were those with agricultural, wildlife and tourism interests.
- 7.2 The majority of responses received were from individuals. Many of these were in the form of pre-populated pro forma. For example, 1144 identical Viva! postcards were received. Not all respondents answered every question; during the last two days of the consultation exercise, 4973 e-mails were received from a single e-mail address, passed on by the Badger Protection League, which only answered the first question. These e-mails are not referred to below except in relation to question 1.
- 7.3 Three Petitions were also received. Two were submitted by individuals and had a total of 338 signatures. In both these petitions signatories expressed their opposition to badger culling. A third, submitted by the Wildlife Trust of South and West Wales had 2707 signatures. This petition was in response to the now annulled Tuberculosis Eradication (Wales) Order 2009 and not the draft Badger (Control Area) (Wales) Order 2010. As well as urging the Welsh Assembly Government to cease implementation of a badger cull, the Wildlife Trust petition also called for the application of improved farm biosecurity in conjunction with the vaccination of badgers.
- 7.4 Some respondents asked that their personal details not be published. The responses received from these are described below as “anonymous”.

8. Question 1: Do you object to the culling of any wildlife for the purposes of controlling disease in farm animals? If yes, please explain why?

- 8.1 During the last two days of the consultation exercise 4973 e-mails were received in which the respondent only answered this question. In all of these responses the respondent expressed their opposition to badger culling.
- 8.2 As well as the above, 4789 respondents said they objected to the culling of wildlife for the purposes of controlling disease in farm animals. 2328 respondents said that they did not object to the culling of wildlife for the purposes of controlling disease in farm animals. 1341 respondents did not answer this question.
- 8.3 A number of respondents said they objected to the culling of wildlife for the purposes of controlling disease in farm animals unless that disease posed a serious risk to human health. Some respondents pointed to the results of previous studies as evidence that badger culling will not work. The following are examples of comments from respondents who do not believe that the culling of badgers in the IAA is justified:

'Yes, unless the disease carries an immediate life-threatening risk to humans and culling is the only solution. Bovine TB does not carry such a risk in this country and alternative measures are available.' (Anonymous)

'Under very specific circumstances and with tight criteria, culling of wildlife may be an appropriate solution or part-solution to controlling disease in farm animals. However the appropriateness of such an approach would depend on a great many interacting factors, including high risk to human health, the conservation status of the wildlife species, whether the wildlife species is native, and the relative contribution of that species and other factors contributing to the epidemiology of the disease concerned. However, I DO object to the culling of badgers in the manner proposed by the current consultation as these criteria are not met. All the existing evidence suggests that the methodology proposed will not work.' (Anonymous)

'The proposed cull shifts the focus of disease control from better cattle management to wildlife management and promotes the idea that a reduction in bTB can only be achieved through a badger cull. This is simply not the case. All of the experiments to date have highlighted the importance of frequent and accurate testing and proper cattle movement and contact controls.' (League Against Cruel Sports)

'Killing members of native wildlife species will sometimes be justified when not to do so will put at risk the wellbeing, health and survival of members of our own species or, indeed, the survival of other wildlife species. This perspective is represented in European species legislation: the Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979) protects a number of animal species, including the badger. Under this Convention, badgers can be killed to prevent serious harm to livestock, but only where there is no other satisfactory solution, and where control measures will not be detrimental to the overall survival of the species population. Therefore, there must be high confidence that the action, such as the proposed badger cull, will prove effective in achieving its aim; and, moreover, it should be clear that there is no alternative option that could deliver a similar outcome in terms of disease control in cattle. We do not believe that these conditions are met in the case of the proposed WAG culling of badgers.' (RSPB Cymru)

'Sometimes culling is necessary in particular when non-native wild animals such as mink are involved. However I do object to the badger cull as I feel that there is not sufficient scientific evidence to support its efficacy.' (Douglas Dickinson)

'The science clearly shows that killing badgers to control the spread of TB will not work.' (Staffordshire Badger Conservation Group)

'The WAG is obviously well aware of the results of the Randomised Badger Culling Trial but has chosen to ignore the published conclusions.' (Dr C L Cheeseman)

'In my opinion the culling of wildlife for the purpose of controlling disease in farm animals should be based on science and be known to work. As in this case it

has been said by the Independent Scientific Group (2007) 'that badger culling cannot meaningfully contribute to the control of cattle TB in Britain' Therefore I object to badger wildlife being culled to try and control bovine tb disease in farm animals.' (Michael Sharratt)

'Paras 32-34 of Section 4.3 are not sound scientific reasoning; the Donnelly and Hone figure of 3.4% as the expected level of herd breakdown in the absence of infection from badgers does not show that the remaining cattle infection is caused by transmission from badgers. The use of the Donnelly and Hone data in the manner set out in para 33, applied to the levels of confirmed herd breakdown in Wales (which are currently below 3.4%) would indicate that there is no challenge from infected badgers. Re-infection seems more likely to result from failure to detect and remove all infected cattle as the sensitivity of the skin test is poor when used to assess individual cattle.' (Pembrokeshire Against the Cull)

- 8.4 We considered Question 1 to be relevant to the consultation exercise and its intention was to encourage people's thinking about their motives and reasoning behind their response. However, some respondents questioned the relevance of this question to the subject on which we were consulting:

'I do not understand the relevance of this question, as the Order relates only to badgers, a protected species.' (Anonymous)

'I would point out that this is a highly loaded question. Every species case is different, and the proposed badger cull is different in many ways from any previous culling order for any species.' (Dr Felix Padel)

'Your question suggests a fantastic misunderstanding of the rationale of those who oppose the badger cull. (You would not seek an understanding of those who oppose whale hunting by asking if they oppose all hunting).' (David Hodgson)

'This is too generalised a question to be given a sensible answer.' (Nigel Moss)

'This question is irrelevant since the only wildlife you are intending to kill are badgers in the mistaken belief that this will reduce the spread of Bovine TB in cattle, and this is the only disease you are trying to control.' (Mrs Sandra Dudley)

- 8.5 Some respondents expressed their concerns over a precedent being set for badger culling in other areas of Wales in the future, or illegal culling, should a badger cull in the IAA go ahead:

'Authorising a cull of wildlife in an attempt to control bovine TB would set a bad precedent that might then be used to justify further culls. I believe that the principles of maintaining biodiversity and encouraging wildlife conservation should not be subverted for the sake of domestic animal health, especially not for the marginal gains in disease control anticipated by this cull. If further widespread culls were implemented, based on this precedent, we could end up

with a severely depleted badger population yet with only minimal benefits in terms of reduced incidence of bovine TB.’ (Mick Baines)

‘An official cull would set a bad example and may provide a spurious justification for individuals to carry out unofficial, unauthorised culls. This would inevitably lead to cases of animal cruelty, increase the possibility of inadvertently spreading bovine TB, and risk public safety.’ (Mick Baines)

- 8.6 Some respondents suggested that the Welsh Assembly Government should focus more on cattle measures to eradicate bovine TB and that *‘bad farming practices and agricultural mismanagement’* were to blame for the spread of the disease. Other similar comments included:

‘The problem is not being caused by badgers or other wildlife. It is being caused by ineffective management of farms and livestock by farmers. The money and effort would be better spent on an education programme for farmers to improve their methods.’ (Janice Carr)

‘The major transmission route for bTB is cattle to cattle. Therefore, WAG’s main focus should be; enforcement of measures to improve herd husbandry and diminution of cattle movements (not just "advice"), more accurate cattle testing for bTB, reducing intensive farming, which will mean educating the public to pay more for their food.’ (Mrs. C.A. Hydes)

‘Improved farming practices, good animal husbandry and vaccination of livestock are much more effective and better long term cost solutions.’ (Alison Norris)

- 8.7 Of the 2328 respondents who do not object to the culling of wildlife for the purpose of controlling disease in farm animals, some were in agreement with the views of the Minister for Rural Affairs, in that all reservoirs of disease need to be tackled if eradicating bovine TB is to become a reality. Some pointed to the successes achieved by culling of wild or feral species in other countries in the eradication of bovine TB. A selection of comments are given below:

‘Bovine TB is an infectious disease that causes significant suffering in both cattle and in badgers. Wales desperately needs an eradication programme that removes the disease from both populations.’

Cattle that have been infected are culled. To achieve the goal of healthy cattle and healthy badgers in Wales it is also appropriate to carry out a managed cull of wildlife, this will not only help to control and eventually eradicate the disease in farm animals but will also help to reduce the suffering in wildlife populations.’ (Ian G Robinson)

‘Culling wildlife in order to control disease incidences is carried out routinely worldwide and has been an important tool for doing so for many years. Since the 1970s, culling wildlife and feral animals has been shown to be an effective method of controlling bTB in cattle in the UK, Ireland, New Zealand, Australia and other areas of the world. Controlling bTB reservoirs in wildlife is also a

requirement under the relevant EC Directive relating to the control of bTB.'
(Nicholas Fenwick)

'Yes, cattle that have been infected are culled. It therefore makes no sense not to control the infection in wildlife populations. We need to follow a strategy that removes the disease from both populations.' (Anonymous)

'Diseases where a reservoir of infection exists, both within farm animals and wildlife necessitates action to reduce the disease burden from all of its sources. Failure to accomplish this will lead to opportunities for cross species re-infection to hamper efforts to eradicate the disease from farmed animals. In the absence of a proven practical alternative that can be deployed in endemic disease areas, (such as vaccination of badgers) culling of wildlife should be considered for the purposes of controlling disease in farm animals.' (Will Haresign, Deputy Director, Institute of Biological Environmental and Rural Sciences)

'Whilst we regret the killing of any wildlife species, unfortunately, in some instances culling is required to contain the spread of a disease. BVA and BCVA have long argued that bTB cannot be controlled without measures to tackle the disease in both cattle and wildlife. With the current absence of other proven effective methods, the control of badgers through culling is necessary in the interests of public and animal health to contain the spread of bTB to cattle from infected badgers. The number of cattle that have to be culled as a result of bTB, and the impact of the disease in both cattle and badgers, are considerations which we have taken into account in our decision to support a badger control policy.' (British Veterinary Association & British Cattle Veterinary Association)

- 8.8 Some of those in agreement emphasised the importance of any badger cull being carried out humanely by properly trained personnel, the implementation of a closed-season and that all activities should be properly monitored. This is in line with the approach we have always said we would take in the IAA. Comments included:

'Measures should be put in place to ensure that culling is carried out in a humane manner and a closed season should operate to protect dependent cubs and to safeguard the welfare of badgers trapped in cages in inclement weather.' (British Veterinary Association & British Cattle Veterinary Association)

'Authorised officers carrying out the cull should be sufficiently skilled and accredited, with standard operating procedures and an audit process established.' (British Veterinary Association & British Cattle Veterinary Association)

- 9. Question 2: In view of the fact that a license for an injectable vaccine for badgers is now available, do you think that vaccination of badgers in bovine TB endemic areas is a viable alternative to culling to prevent disease transmission? If yes, please explain why?**

- 9.1 In view of the fact that a license for an injectable vaccine for badgers is now available, 5016 respondents believe that vaccination of badgers in bovine TB

endemic areas is a viable alternative to culling to prevent disease transmission. 2111 respondents do not believe that vaccination is a viable alternative. In addition 1144 identical Viva! postcards were received, and while not directly answering the question, the respondents objected to culling and stated that *'restricting cattle movements, improving the welfare of farmed cows and vaccinating badgers would help control this disease further'*. 187 respondents did not answer this question.

- 9.2 Respondents who were of the view that the vaccination of badgers in bovine TB endemic areas does provide a viable alternative to culling to prevent disease transmission gave various reasons for their answers. Some stated what they considered to be the advantages of vaccination over culling, amongst other things pointing to reduced perturbation risk, sustainability and increased public acceptance, while also accepted that a vaccine is unlikely to benefit already infected badgers. Responses included:

'Vaccination avoids the key risk of culling-induced perturbation increasing the risk of cattle herd breakdowns and therefore we believe vaccination has a wider potential role to play than badger culling.' (RSPCA Cymru)

'Although it will not cure badgers already infected with bovine TB, it will prevent the spread of the disease in the badger population, and therefore reduce the risk of transmission back to cattle. It will also avoid the 'perturbation effect' that would be caused by a cull of badgers.' (Martin Bailey)

'Yes, vaccination is a viable alternative, reducing the prevalence of TB in badgers without the negative effects of culling. Economically it makes more sense and modelling carried out by FERA indicated that vaccination would produce a reduction in TB incidence more quickly than culling.' (Anonymous)

'.....we believe the use of the available, injectable badger vaccine, in conjunction with enhanced controls on the movement of cattle, holds the potential to offer a satisfactory alternative to badger culling that is both sustainable and publicly acceptable.' (RSPB Cymru)

'It's logical environmentally to keep the natural ecology in balance and the badgers social networks intact.' (R J Bowen)

'I do believe this is a viable option. While the vaccine would not work on already infected badgers, over time those badgers would naturally die out and those vaccinated would pose no risk to cattle or other badgers. There would be no risk of spreading the disease due to badgers vacating if there was a cull, and no side effects on the local ecosystem. Furthermore, vaccination of badgers would prevent the need for forced access to land of opponents of the cull. Also of vital importance is that there would be no public outcry of the culling of wild and healthy badgers, which are one of the nation's favourite wild animals.' (Lisa Hall)

'Disease transmission to cattle from badgers does occur but the evidence concerning the contribution of this route to epidemiology in cattle is very varied.'

However, regardless of the contribution of this mechanism to disease prevalence in cattle, the transmission from badgers to cattle could be reduced or prevented either by reducing contact between badgers and cattle, or by reducing the prevalence of TB in the badger population.

Studies by FERA have shown biosecurity and mechanisms to separate badgers and cattle to be 100% effective, yet such measures have not been thoroughly applied in the IAA.

Reducing the PREVALENCE of TB in the badgers (and hence reducing transmission) can ONLY be achieved sustainably in the long term by vaccination. The vaccine is licenced and available, has been shown to have no adverse effects and is well understood with a long history of application in TB control. There are good precedents for the use of vaccines to control diseases in wildlife, such as rabies in red foxes in Europe.

The greatest advantage of vaccination is that it carries no risk of worsening the TB status in the cattle population, it can only help. There is no minimum efficiency or duration required to be sure of avoiding detrimental consequences. It is also very likely to be cheaper than the culling as proposed for the IAA, because the most expensive part (trapping) is the same, because there is no need to autopsy, and additional costs such as policing and dealing with objections would be vastly reduced.

Most significantly, whilst culling may reduce the net number of infected badgers in the IAA in the short term, it risks increasing the prevalence of TB in the future badger population. This occurs through perturbation at the IAA boundary OR within the IAA if the cull is not synchronized. This makes vaccination less effective as an exit strategy. To be sure of a perturbation-free long term, sustainable strategy, a combination of tighter cattle measures (tighter even than those already applied in the IAA, and including greater on-farm biosecurity) and badger (and hopefully cattle) vaccination should be applied.' (Anonymous)

- 9.3 Some respondents who were of the view that the vaccination of badgers does provide a viable alternative to culling drew attention to recent research results in their response. Comments included:

'YES, it is a viable and much preferable alternative. The BCG vaccine is already available and licensed and has been shown to prevent disease transmission. Vaccination is a tried and tested method of reducing disease transmission and incidence both in humans and animals. A particularly relevant example is the use of vaccination to treat rabies in red fox in Europe. This approach was successful after culling had been tried and abandoned as it caused the disease to spread, presumed to be as a result of perturbation of the fox population.

Vaccination has many advantages over culling. It does not involve killing animals, and will therefore have far more public support. It does not carry the same risk of causing perturbation as culling, and therefore increasing the prevalence of TB in badgers.

The BCG vaccine for badgers has undergone trials in the field. Two new scientific papers on vaccination have been released in recent months both of which demonstrate the benefits of badger vaccination as an alternative to

culling. One showed substantial (73.8%) reductions in the incidence of TB in wild badgers as a result of vaccination (Chambers et al 2010). The other showed that oral vaccination of captive badgers could provoke immunity to TB challenge.

It is frequently stated by those promoting culling as a necessary measure that vaccination will not affect any badgers that are already infected and therefore won't reduce the incidence of disease. This presupposes a much higher percentage of infected badgers in the Intensive Action Area than is borne out by the data contained in the annexes - which show approximately 5% of badgers were found to have TB in north Pembrokeshire. Neither does it recognise that infected badgers will die anyway and have a reduced lifespan. Modelling and evidence in the field show that vaccination could work quickly to reduce the incidence of the disease. It is also a much more sustainable and long term measure than culling, without the many disbenefits of culling.

It is regressive and upsetting that the Welsh Assembly Government proposals for the Intensive Action Area do not include any options for vaccination. As landowners in the IAA we would support a vaccination programme as a viable, sustainable and acceptable alternative. There would be no need to enforce access to land.' (Anonymous)

- 9.4 One respondent was of the view that the evidence presented to the Minister for Rural Affairs in September 2010 (which can be viewed on the Welsh Assembly Government's website at: www.wales.gov.uk/bovinetb), understated the results of recent badger vaccine research:

'In our view the submission made by officials to the Minister understates the results of recent research into the effect of BCG vaccination on bovine tuberculosis in badgers and presents an unduly negative view of badger vaccination.' (RSPCA Cymru)

- 9.5 A view shared by others was that:

'The demand for badgers to be killed has diverted attention away from the many serious health problems faced by intensively-reared cattle'. (M G Lloyd Hughes)

- 9.6 Respondents who were of the view that the vaccination of badgers in bovine TB endemic areas is not a viable alternative to culling to prevent disease transmission gave various reasons for their answers. Many highlighted what they saw as the limitations of a vaccine. Others said there is a lack of evidence on the effects of vaccinating badgers on bovine TB incidence in cattle. Comments included:

'At the current time there is no evidence to suggest that vaccination of badgers is associated with any reduced incidence in bTB in cattle. In contrast to this, the ongoing analysis of the RBCT proactive cull areas has demonstrated that culling can be associated with significant and sustained reductions in the incidence of bTB in cattle in the absence of badger vaccination. We therefore do not believe that at this time vaccination of badgers can offer a viable

alternative to culling to prevent disease transmission in areas of the country experiencing high and persistent levels of bTB in cattle.’ (British Veterinary Association & British Cattle Veterinary Association)

‘The Independent Scientific Group stated that "a vaccine for badgers would need to be delivered by the oral route, in the form of a bait, in order to be practical and economically viable." Injecting badgers and releasing them is likely to be more costly and less effective than culling, as the number of animals trapped will not decrease over time, and animals already infected with bTB will be vaccinated, possibly repeatedly, with no positive effect.’ (Anonymous)

‘I believe that at present there are a number of issues that need to be addressed before vaccination can be proven to be effective in field conditions.’ (Anonymous)

‘The injectable vaccine currently licensed aims to generate an immune response in the vaccinated badgers but will not be seen in badgers already infected with bovine TB. As a consequence there is a high probability that little positive effects of lower disease transmission will be seen in an area such as the Intensive Action Area (IAA) where the proportion of badgers infected by the disease is likely to be high. We do not therefore consider vaccination to be a viable alternative to culling within disease endemic areas such as the IAA.’ (Will Haresign, Deputy Director, Institute of Biological Environmental and Rural Sciences)

- 9.7 Whilst of the opinion that badger vaccination is not suitable for endemic areas, some respondents thought that badger vaccination could, in the future, play an important role in the eradication of bovine TB:

‘.....farmers more than anyone would dearly wish for a vaccine to be available that could be used as part of a package of measures to rid this disease from the countryside. NFU Cymru welcome the commitment of the Minister in setting up a working group to develop a vaccination policy for Wales, however the facts are that we remain some time away from being in a position where vaccination can genuinely be considered as part of a TB eradication strategy for Wales.’ (NFU Cymru)

‘In the longer term vaccination will no doubt have an important role to play in helping to eradicate bovine TB from Wales.’ (Ian G Robinson)

‘We do not believe that vaccination is yet a viable alternative but that, as it is developed, so it could be used in a supporting role in the overall aim to eradicate TB.’ (Central Association of Agricultural Valuers)

‘Whilst a badger vaccination policy should be considered if there is robust scientific evidence available to support its use, HCC concurs with the Welsh Assembly Government view that a strategy of vaccinating badgers for bovine TB is not suitable as the principle intervention to deal with the weight of infection that is expected to exist in badgers in endemic areas of Wales, and the transmission of that infection to cattle.’

HCC believe that a vaccination policy should be kept under review once the disease is under control and that careful consideration should be given to how a blanket vaccination policy of badgers could be implemented successfully in Wales.’ (Hybu Cig Cymru – Meat Promotion Wales)

‘The College lends its strong support to the vaccination of badgers and considers that this should form an integral part of any long-term approach to tackle bTB. Evidence suggests that the vaccination of badgers does not disrupt social groups and therefore as an approach to tackling the disease it does not suffer from the risks associated with perturbation. Consequently, vaccination may have a role to play in creating buffer zones around highly infected areas, which could be used to assist in controlling the spread of bTB and could be used to reduce the risks of perturbation caused by culling through the ring-fence vaccination of an area prior to culling. The College notes, however, that the boundary of the Intensive Action Area has been defined so as to take advantage of natural geographic boundaries and as such the risk of badger perturbation is likely to be reduced.’ (Royal College of Veterinary Surgeons)

- 9.8 Some respondents considered an oral bait vaccine to be more practical for the future widespread vaccination of badgers:

‘There is little doubt that the best hope for a successful mass vaccination strategy for wildlife rests with oral bait; however the use of an oral bait vaccine for badgers is still some years away and it is currently estimated to be 2015 before an oral vaccine may become available, it will be some time after that before it can be proven to be effective. Whilst we sincerely hope that oral vaccination will one day be part of a multi-factorial approach to TB eradication, the industry in Wales cannot afford to wait any longer before embarking on a TB eradication programme that deals with the infection in badgers as well as in cattle.’ (NFU Cymru)

‘The College strongly supports continued research to develop an oral bait vaccine for badgers. Such a vaccine could significantly improve the cost-effectiveness of vaccinating badgers as well as increasing the speed at which large numbers of badgers could potentially be vaccinated.’ (Royal College of Veterinary Surgeons)

‘Vaccination of badgers by injection is a more humane alternative to culling, but not a solution. Injection is distressing, and not all animals will be vaccinated. Money should be invested in developing an orally administered vaccine that farmers and landowners can use. This will be a far better solution both in terms of effectiveness and also in terms of cost from a long term perspective.’ (Alison Norris)

- 9.9 Some respondents suggested that the Welsh Assembly Government should consider trialling badger vaccination. Comments included:

‘However we suggest that the bovine TB eradication programme should proceed to consider the possibility of undertaking a parallel trial area where badgers are vaccinated. To be considered, such an area should be an area of

Wales where badger bovine TB prevalence is considered low, but given other factors, for example: proximity to current bovine TB endemic area with a current high density of badgers, might be considered an area at risk of higher prevalence in the future. Such a strategy would signal that the bovine TB eradication programme has tangible benefits to offer both to cattle and their owners but also to wildlife affected by this disease and stakeholders with interest in their welfare.' (Will Haresign, Deputy Director, Institute of Biological Environmental and Rural Sciences)

- 9.10 Some respondents did not see the merit in vaccinating badgers at all, suggesting that we should focus solely on dealing with the disease in cattle. Comments included:

'Again its blind intervention, badgers are sustaining their own population at a level and we have no idea what removing this disease will do, maybe we will end up with an overpopulation of badgers, its the cows we should concentrate on, we are so far into monocultures in farming innoculating the cows would be a more obvious way to go surely.' (Anonymous)

10. Question 3: Do you believe that culling badgers can achieve a reduction in bovine TB incidence in cattle, to justify its use? If no, please explain why?

- 10.1 2110 respondents believe that culling badgers can achieve a reduction in bovine TB incidence in cattle, to justify its use. 5035 respondents do not believe that culling badgers is justified while 169 respondents did not answer this question. In addition, 1144 identical Viva! postcards were received, and while not directly answering the question, the respondent stated that they *'strongly disagree with killing wildlife to control TB as the science has shown it will not work. The largest ever study into bovine TB found that killing badgers made no meaningful contribution to the control of the disease.'*

- 10.2 Respondents who believe that culling badgers can achieve a reduction in bovine TB incidence in cattle pointed to previous trials and eradication programmes from other countries as what they saw as proof that it can work:

'It would appear that evidence from other bovine TB eradication programmes from all of the world do actually show that when TB is present in cattle and wildlife populations then the disease can only be successfully controlled by a managed cull of wildlife alongside cattle measures.' (Anonymous)

'It is categorically true that culling badgers can achieve a reduction in bTB incidences, and this has been confirmed in numerous scientific papers following badger culling in Ireland and the UK. Those who believe that badger culling does not reduce bTB incidences in cattle are, by definition, wrong in holding such a belief.' (Anonymous)

'I fully endorse the introduction of a new TB Eradication order which will also include the opportunity to manage the badger population within a defined area of West Wales. In supporting the need to exercise the cull of Badgers it is

patently obvious that the current regime of not being able to cull the ever expanding population is not sustainable in providing a healthy Badger or Bovine population.’ (John T Davies)

- 10.3 Some respondents explained why they believe the IAA should achieve better results than the Randomised Badger Culling Trials (RBCT) in England. Comments included:

‘We do believe that culling badgers can achieve a reduction in bTB incidence in cattle. The benefits of a proactive cull as conducted during the RBCT’s were sustained well beyond the cessation of any culling activity, with the most recent data indicating a 28% average reduction in the incidence of bTB over the total culling and subsequent analysis period without any apparent negative effects in the perimeter. These benefits were seen without the use of ‘hard boundaries’ in the original RBCT’s.

The proposed policy is designed to gain the maximum benefit from this approach whilst at the same time incorporating additional measures both in terms of delivery of a cull, additional cattle controls over and above those in use during the RBCT’s and additional controls in other species also affected by bTB.

As such it is reasonable to conclude that the proposed policy will achieve the expected reductions in the incidence of bTB in cattle and with the additional measures may well exceed those predictions.’ (British Veterinary Association & British Cattle Veterinary Association)

- 10.4 In contrast, some respondents pointed to the results of previous trials, including the RBCT, as evidence of why they believe badger culling will not work. Some were of the opinion that the requirements of the RBCT for a cull to be successful are not being met within the IAA. Comments included:

‘I do not believe that the science proves culling to have enough benefits to justify either the wide scale killing of a native apex predator species or the significant breaches of civil liberties necessary to force access to land for a cull. Any reduction achieved through culling is at the expense of increased TB breakdowns in boundary areas and increased TB prevalence in badgers due to perturbation – increasing the risk of TB spread.’ (Anonymous)

‘Under the current plans, all the requirements from the RBCT are not being met effectively- TB is still present outside the IAA and the boundary is known to be permeable to badgers, with the exception of the coast. There is also no exit strategy: at best levels of TB in badgers will not change, and in fact are likely to increase due to perturbation (including as a result of culling in a non-synchronised way). Culling makes no contribution to the elimination of TB in the badger population, it simply decreases the net number of infected badgers in one area for a limited time. Significant reductions could still be achieved by better cattle controls and on-farm biosecurity, and by regulating trading between farms on the basis of their TB status. Such measures, in combination with a controlled injectable vaccination programme, would be a preferable approach until 2015 when an oral vaccine should be available, and TB can be reduced in

the badger population- providing a viable exit strategy. Should all the requirements of the RBCT have been met, culling could produce some reductions in TB in cattle in a limited area and in the short term, but even then it is still totally unjustified as a strategy, on the basis of cost-benefit analysis, failure to address impacts on other industries, lack of exit strategy (in fact detrimental impacts on the preferred exit strategy), the fact that a less risky and less damaging solution is already available.' (Anonymous)

'Scientific research has shown that culling does not produce a significant reduction in bTB. Scientific research has shown that an insignificant reduction may manifest short term. However, the perturbation effect means that the problem is exacerbated long term.' (Alison Norris)

'I would concede that a badger cull may produce a reduction in TB in cattle, but I would qualify that it also may fail to do so. Indeed it may increase the prevalence of TB in cattle if carried out poorly – something that I believe to be a real risk from my own experience of the badger survey carried out earlier this year. Most critically the consultation documents fail to specify how the cull would take place – for the RBCT results to be remotely applicable, the entire 288km² would have to be culled in the space of two weeks, which I frankly doubt could be done. Failing to do so could lead to significant perturbation within the IAA, with unknown results.

Even in the best case, I do not feel that the evidence suggests that a simultaneous 2 week cull will produce enough of a reduction to justify this draconian cull, with forced entry onto land and criminalising opponents, especially if the benefits of the cull are measured compared to the next best alternative, namely vaccinating badgers, as opposed to a strawman alternative of doing nothing.

Nor do I agree that the benefit should be measured solely by the incidence of TB in cattle. To eliminate this disease we do indeed need to address the TB in badgers, as the minister has claimed, yet the proposed cull will not do so. Indeed it is likely, if anything, to increase TB in badgers and to spread TB to currently TB free farms in the IAA, such as my own.' (Dr Gavin Wheeler)

'The proposal is not sustainable and has no exit strategy.' (The Wildlife Trust of South and West Wales)

'If the size of the Intensive Action Area and its geographical boundaries are such as to reduce the risks associated with badger perturbation then any recovery of the badger population is, as suggested by the impact assessment, likely to be at upper end of the estimated timescale i.e. about 10 years. We question whether such a long lasting impact on badgers is justified.

However, a recent study (Frantz et al 2010) showed that small rivers and roads did not interfere with badger dispersal. Therefore, in the IAA, rivers such as the upper reaches of the River Teifi and tributaries such as the River Cych may not present a barrier to badger movements. This has implications not only for the recolonisation rate but also aspects such as culling induced perturbation, impact on disease risk in herds in adjoining area and TB prevalence levels in the badger population affected by culling.' (RSPCA Cymru)

- 10.5 Some respondents were of the opinion that the IAA-specific cattle controls should be monitored first, before badger culling is considered:

'.....we would recommend that adequate time be given to assess the impact of the IAA cattle control measures – ie, increased frequency of cattle testing, stricter control on cattle movements and veterinary advice to farmers on biosecurity - before resorting to the culling of badgers. It was, after all, the conclusion of the ISG that more effective cattle control measures – in the absence of badger culling – are 'likely to reverse the increasing trend in cattle disease incidence', and that cattle-to-cattle disease transmission was a 'very important' factor alongside badger transmission, and indeed the 'main cause' of transmission to new areas.'

Any benefits from the enhanced cattle control measures will also, of course, obscure the impacts of culling on the incidence of cattle TB. This would become a major difficulty for the Assembly Government in assessing the benefits of the cull should it propose at a later date to introduce culling as a principal bovine TB eradication measure elsewhere in Wales.'

We recognise, however, that restrictions on the movements of cattle can be only one part of an overall approach to bovine TB control; nevertheless, it would be of value to the industry to have some measure of the extent of TB reduction that could be achieved by this means alone.' (RSPB Cymru)

- 10.6 In their response to this question, one respondent went into some detail about current cattle controls and surveillance, highlighting what they perceived as the inadequacies of the current system:

'In 1990, there were 173 recorded outbreaks of bTB in cattle herds but by 2007, that had increased to 2,229 with 27,598 individual cattle slaughtered (3). This followed the rapid re-stocking of farms after the 2001 foot and mouth disease (FMD) epidemic. Under EU regulations cattle must be routinely tested for bTB, with infected animals slaughtered and movement restrictions placed on the farms. During the 2001 FMD outbreak, most TB testing was suspended and in breach of EU regulations, Defra failed to impose movement restrictions on those herds not tested (10). Despite several highly-contagious diseases among UK cattle, over 13 million cattle movements take place every year as farmers buy and sell stock. Closely mirroring the recent rise in bTB cases is the rise in cattle movements, with 619,107 more cattle moved in 2006 than 2005 (40). Cattle movements have quadrupled between 1999 (3,373,646) and 2008 (13,445,566 – latest complete figures) and have involved around 137 million animals (39). The ISG report also made clear that present methods of control – surveillance, testing and slaughter – are not working. The evidence shows that tests are highly inaccurate, missing around one third of all infected animals, leaving them to re-infect other cattle (35). The report went on to say that better farming practices and not 'culling' were likely to reverse the increase in bTB (25). Even former Defra Minister, Ben Bradshaw, highlighted the near irrelevance of badger slaughter by admitting that 80 per cent of bTB outbreaks are caused by cattle (11). Movement of cattle in the periods between routine herd bTB tests has long been recognised as a cause of new infections, even in

relatively disease-free areas. Unbelievably, animals taken to agricultural shows do not have to be pre-tested. Mixing animals from many different areas has the potential to spread TB easily among them and then back to their farms. In 2009, the final report on bTB by the Bovine TB Advisory Report highlighted this as a risk (56).’ (M G Lloyd Hughes)

11. Question 4: Do you agree that the Intensive Action Area has a high incidence of bovine TB in cattle which needs to be dealt with? If no, please explain why?

11.1 6900 respondents agree that the IAA has a high incidence of bovine TB in cattle which needs to be dealt with. 182 respondents did not agree while 1376 respondents did not answer this question.

11.2 In agreeing that the IAA has a high incidence of bovine TB which needs to be dealt with, some respondents highlighted the stresses that cattle keepers in bovine TB endemic areas have to deal with:

‘The Intensive Action Area has one of the highest rates of bTB in the northern hemisphere, and this needs to be dealt with in order to minimise the risk to other mammals, including humans, both for disease control reasons, and in order to comply with EC law.’ (Anonymous)

‘The figures show that this area is particularly hit by bovine TB. We see countless instances of the emotional and financial stress and hardship that farmers must deal with in having bovine TB on their farms. It needs to be dealt with effectively.’ (Anonymous)

‘At present farmers are culling infected cattle in an attempt to rid their herds of bovine TB. The stringent measures in place on tackling the disease on cattle holdings are stressful and challenging. Herd breakdowns can be extremely emotional when cattle are lost to this awful disease and there can be severe financial implications on those contending with continuous herd breakdowns. There must be an eradication programme which seeks to gain control of the disease in both cattle and wildlife, and a managed cull of wildlife alongside cattle measures will be of benefit to both populations in the long term.’ (Anonymous)

‘The impact of TB in the IAA on farming families is extremely significant and clearly should be recognized and dealt with appropriately.’ (Anonymous)

11.3 Many respondents, who were opposed to culling but agreed that the IAA has a high incidence of bovine TB that needs to be dealt with, pointed to what they considered the main reasons for this and suggested that the Welsh Assembly Government should focus more on cattle measures:

‘Yes, the IAA has a high incidence of TB for many reasons, including high cattle numbers, predominance of dairy herds and high number of cattle movements. The disease must first and foremost be dealt with in cattle, through testing, biosecurity measures and ultimately vaccination. It has been observed that

reducing TB in cattle is mirrored by reductions in the badger population. There are other measures that could yet be applied, such as introducing a system akin to the accredited herd system. Legal systems to support cattle vaccination should also be prioritized.' (Anonymous)

'Certain areas of the country have a high incidence including areas of south-west Wales such as the location of the ITA. Responsible and reasonable strategies to address this are required. Evidence is overwhelming that cattle-to-cattle transmission is a major cause of these high levels - effective strategies to reduce this route should be applied. Unfortunately, only relatively recently have more comprehensive cattle measures been applied in Wales - delays having resulted from farmer opposition to stringent testing and movement control. Biosecurity measures are very likely to reduce both cattle-to-cattle and badger-to-cattle transmission (as well as cattle to badger transmission) yet evidence is (eg see WAG study Enticott et al, 2008) that such measures have not been extensively applied. Rate of bTB transmission depends on susceptibility to infection of cattle and changes in husbandry over recent decades have likely contributed to increased susceptibility (eg increased herd size, reduced stockman levels, high incidence of co-infection with mastitis and laminitis and excessive selection for high yield). Strategies to achieve a long-term reduction in bTB are likely to best include increased focus on herd health, increased application of biosecurity, and vaccination of badgers.' (David Grimsell)

- 11.4 Some respondents complained that IAA-specific statistics for bovine TB incidence in cattle were not available:

'The impact of TB in the IAA on farming families is extremely significant and clearly should be recognized and dealt with appropriately. However Dyfed is only one area in Wales where TB levels are high. In other areas, where TB rates are equal or higher, there has been no attempt even to introduce cattle measures. It is also not possible to comment specifically on TB levels in the IAA as the data released are normally either over a wider area or averaged over such a long time period that details cannot be drawn out. The effect of the cattle movement restrictions that have already been placed in the IAA will be an important feature to draw out of the recent local trends in cattle TB, to inform TB control strategies in other areas.' (Anonymous)

'It is impossible to answer the question properly as the figures specific to the IAA are not available and without these it is hard to be accurate. There is probably a high incidence of bovine TB in the IAA as this is an area being targeted by the Welsh Assembly Government.' (Carol Carter)

'It is not possible to answer this question with any authority as figures specific to the IAA are not available, only data to the resolution of the Dyfed area. The raw data for the IAA given in the evidence submitted to the Minister is largely averaged over the period 2004-2010 and therefore not enough to inform an opinion on the present status. If you take Dyfed to be representative, then bovine TB in cattle is at high incidence & this may be for a number of reasons including high cattle numbers, predominance of dairy herds and high number of cattle movements.' (Carol Carter)

11.5 Information on the IAA-specific cattle measures can be seen in the publication 'Pilot Area – Cattle Controls Guidance' which is available on the Welsh Assembly Government's website.

11.6 Some respondents did not agree that the IAA has a high incidence of bovine TB compared to other areas in Wales. Comments included:

'I do not accept that the Intensive Action Area has a higher need for bovine TB to be dealt with than other areas of Wales. The problem is significant throughout Wales proportionate to the number of cattle in that area. Bovine TB is a problem for the farming community and the tax payer; both the farming community and the tax payer deserve a proper well thought out plan that will yield a long lasting solution. The plan would not involve culling, which has been shown, through scientific research, to be ineffective.' (Alison Norris)

"The CVO's Submission to the Minister (Section 4.1.10-21, 'Bovine TB Problem in Wales') is fundamentally flawed: data on the numbers of herds suffering TB breakdowns, cattle being slaughtered and rising costs of compensation are presented, but there is no information about the database from which the numbers are taken. No information is given on the prevalence of TB in cattle, or whether infection levels are rising or falling. Although various parameters are said to be increasing (e.g. paras 11, 12, 15, 18, 21) the crucial parameter of prevalence among cattle and cattle herds, as evidenced by the proportion of herds or cattle tested proving positive, is not mentioned. Yet these data are readily calculable from National Statistics and show that, with the notable exception of 2008, the proportions of herds tested that are confirmed positive has been falling since 2005.

The Submission takes evidence from a single, anomalous year, 2008, to reinforce the assertion that TB is increasing. Yet elsewhere (para 16) the Submission warns against taking a narrow view of statistics.

iv. It is only since 2008, when increased efforts were made to provide the more accurate picture of TB that annual testing of all herds would give (the TB Health Check Wales) and only since 2009 that the whole National Herd has been tested annually. It is only since then that there has been an accurate picture of the disease, as para 14 acknowledges.' (Pembrokeshire Against the Cull)

'...We therefore question the assumption by WAG that they can extrapolate bTB incidence from other bTB endemic areas of the UK to assume an incidence rate in IAA badgers of 30% (as cited in the consultation document but with no referenced sources for the data). We accept the evidence for movement of Mycobacterium bovis within and between populations of both cattle and badgers and in all directions, but the evidence about the relative contributions of these mechanisms is, at best, contradictory ..' (South and West Wales Wildlife Trust)

12. Question 5: Do you believe that access to land for culling badgers should be enforced? If not, why not? Please give reasons for your answer.

- 12.1 2085 respondents believe that access to land for culling badgers should be enforced. 5037 respondents do not believe that access to land for culling badgers should be enforced. In addition 1144 identical Viva! postcards were received, and while not directly answering the question, the respondent stated that *'forcing landowners who disagree with this policy to allow access to their land is authoritarian and is liable to infringe basic human rights.'* 192 respondents did not answer this question.
- 12.2 Those respondents who believe that access to land for culling badgers in the IAA should be enforced gave various reasons for their response. Comments included:

'Yes, an effective strategy would require Welsh Assembly Government to have the power to enter land and destroy wildlife.' (Anonymous)

'This is a public health issue. Land ownership and occupation already imposes duties in the public interest (e.g. allowing access on public paths, complying with compulsory purchase orders, complying with planning law etc) and the importance of this cull proving effective, is too great for the individual's preferences to override public policy.' (Anonymous)

'Refused access by landowners during the RBCT had a significant adverse impact on the results of those trials. Enforced access will therefore increase the positive benefits of badger culling.' (Anonymous)

'The cull has to be complete therefore access must be given.' (David Jones)

'The negative effects of perturbation would be increased if the cull is less than complete.' (Paul Rodgers, Allen & Partners)

'If the policy is to be government led as is proposed and the maximum effect and understanding of such a widespread bTB control policy including cattle measures and badger culling is to be achieved, the provision for access to all land within the IAA is necessary.' (British Veterinary Association & British Cattle Veterinary Association)

'In order to achieve the aims of Wales' TB Eradication Programme in terms of badger culling, it would seem necessary that there are powers to take access to land to ensure the policy is effective.' (Central Association of Agricultural Valuers)

'To maximise the efficacy of culling operations, access to the maximum proportion of land in the cull area is paramount.' (Will Haresign, Deputy Director, Institute of Biological Environmental and Rural Sciences)

'The consultation document points out that Section 22(3) of the Animal Health Act 1981 gives authorised officers of the WAG the power to enter land to destroy wildlife for the purposes of disease prevention. Whilst NFU Cymru agree that the Animal Health Act does provide the powers of entry to authorised officers to access land it is our belief that the Badger (Control Area) (Wales)

Order 2010 should also expressly outline these powers to assist with the implementation of the eradication programme.’ (NFU Cymru)

- 12.3 Not all respondents who agree that a cull of badgers is necessary believe that access to land for culling badgers should be enforced:

‘In demonstrating my support I would however exercise caution to the need to enter all land within the pilot area especially land without the support and consent of the landowner. I would suggest in the interest of civil cohesion and community wellbeing that further thought is given to the assessed need to enter all land irrespective of the risks involved.’ (John T Davies)

- 12.4 Those respondents who do not believe that access to land for culling badgers should be enforced gave various reasons for their answer. Some said it breached peoples civil liberties. Others had concerns over what enforced access would mean for community relations, specially designated sites and other businesses. Responses included the following:

‘Wild animals are not state or individual property. A right to enter land should remain confined to those officers of the law with a legal purpose based on an investigation of crime or suspected crime. Such a move to allow compulsory access would also be divisive within local communities, especially if landowners and farmers are forced to allow slaughter regardless of their own opinions.’ (League Against Cruel Sports)

‘This infringes a basic human right to peaceful enjoyment of a home, chosen way of life and individual beliefs. The proposal to enforce access is not acceptable in a democratic society. Lots of people enjoy the badgers; many farmers oppose culling and for some operating in tourism badgers underpin their business success. People should be given the right to opt out of any cull and elect to vaccinate badgers instead.’ (Anonymous)

‘In addition, enforced entry can significantly impact on other businesses (e.g. tourism) and WAG has made it clear that there would be no compensation for these impacts, so whilst they are committed to helping the farming community, they are damaging other industries that bring in more income into Wales.’ (Anonymous)

‘I believe that enforced access to my property in such circumstance infringes my basic human rights and is undemocratic. I have a tourist business that in large part relies on the promotion and preservation of wildlife and a peaceful, picturesque environment for the enjoyment of ourselves and our visitors, including the possibility of watching that most iconic of native wildlife species, the badger. The proposals have already had a detrimental effect on my business, for which I will receive no compensation, and if the killing starts this will only get worse.’ (David Gillett)

‘Surely, a person has a right to deny right of access if they so wish? There is also no right to protest or stop this access, so this denies law abiding citizens in the UK to protect their property. I thought it was against the law to allow just

anyone to walk on to your land. Or will the law be changed and the rights of the citizens of the UK once again denied? The Order allows access to areas with special protection status such as SSSIs, NNRs and SACs. This makes the idea of conservation and the protection of certain areas and their wildlife seem unimportant to the Welsh Assembly Government when it suits them. Why bother to protect habitats and their wildlife when there will be less resistance if a vaccination programme for badgers is introduced.' (Carol Carter)

- 12.5 One respondent questioned the need for enforced access pointing to previous statements by the Welsh Assembly Government on land access in the IAA:

'According to the Welsh Assembly Governments own claims during the previous abortive cull, they do not need access to all the land for a cull to work, and they further claimed that they had been granted voluntary access to the vast majority of the land with only a tiny proportion of landowners dissenting. Therefore breaching civil liberties to force access to the remaining, allegedly tiny proportion of the land would not be justified.' (Dr Gavin Wheeler)

- 13. Question 6: On balance, do you think the benefits of culling outweigh the harm caused to the badger population in the Intensive Action Area? Please give reasons for your answer. Would you include other factors in the balance of harm and benefits? If so why?**

- 13.1 2067 respondents think the benefits of culling outweigh the harm caused to the badger population in the IAA. 5049 respondents do not think the benefits of culling outweigh the harm caused to the badger population in the IAA. 1342 respondents did not answer this question.

- 13.2 The reasons given by respondents, who are of the view that the benefits of culling outweigh the harm caused to the badger population in the IAA, included; the continued culling of cattle without addressing the wildlife reservoir of disease; costs to government, and; the human health risk. Some stated that badgers are not endangered. Responses included:

'.....the evidence suggests that a policy of badger culling will help to reduce the incidence of bTB in cattle in the I.A.A, and help contain the spread of the disease. Ultimately the badger population itself should regenerate over five to ten years and should benefit from an appropriately managed cull and disease control strategy which will hopefully reduce bTB within the population. We believe that these benefits outweigh the harm caused to the badger population by culling.' (British Veterinary Association & British Cattle Veterinary Association)

'I want us to be in a position where we have a healthy cattle and wildlife population. Infected badgers are a threat to their own species; infected badgers would do more harm to the badger population in the long term than would a short term managed cull.' (Anonymous)

'We cannot continue with a situation whereby infected cattle are being culled yet there is a reservoir of disease in wildlife which is left untouched. I want to

see both a healthy cattle and wildlife population in Wales so we have to deal with this disease with an efficient and effective eradication programme.' (Anonymous)

'The badger population is in no way endangered, as confirmed in the Krebs report more than a decade ago, and, viewed objectively, there is no difference between culling badgers and culling deer, foxes, or any other mammal, as occurs routinely throughout the UK for a variety of reasons. It is unlikely that all badgers in the area will be culled, and the main impact is likely to be positive in terms of other species, given that there is significant evidence indicating that the escalation in badger numbers has had an adverse impact on other animals due to predation, many of which are endangered.' (Anonymous)

'The balance of scientific evidence and opinion (including the correctly interpreted RBCT) shows that culling badgers will significantly reduce TB in cattle. This in turn will allow the more stringent cattle control measures in IAA to be effective. At a time of economic crisis economic cost of TB to government cannot be allowed to continue. There is a high environmental cost to culling cattle before they have had a chance to be productive. There is an ongoing economic and social cost to farmers and their families in high TB areas. In North Pembrokeshire this includes a threat to a rural, welsh speaking way of life. As a veterinary surgeon I cannot accept that TB in the badger population should not be controlled. Although many badgers can carry TB with no apparent ill effects, a significant number show drastic changes in behaviour. In my opinion this shows they are suffering. My experience of controlling disease indicates that removal of infected populations is an important measure in an eradication strategy.' (Paul Rodgers, Allen & Partners)

'Whilst the public health risks of bTB are well controlled and there is no evidence that bTB is currently a significant health risk, we do have concerns about the public health implications of this zoonotic disease agent spreading to other species, particularly in view of the long latent period of the disease in the many susceptible species including humans.' (British Veterinary Association & British Cattle Veterinary Association)

- 13.3 Those respondents who do not think the benefits of culling outweigh the harm caused to the badger population in the IAA gave various reasons for their answers, these included; the cost-benefit of culling (over other measures); ecological impacts; impacts on tourism and other industries, both inside and outside the IAA, and; the impact on those individuals who are against badger culling. Responses included:

'The harm caused to the badger population and long-term disruption to our communities, is not outweighed by the meagre benefits in herd breakdown reduction. Badgers are a native apex predator species with a significant role in the ecology and the effects of such a large cull are highly unpredictable. We should also consider the harm caused to landowners who disagree with this cull and will be severely distressed and affected for many years by this forcible intrusion onto their homes, as well as the distress caused to other residents and visitors.' (Anonymous)

'The benefits of culling do not outweigh the harm. In as little as 10 years by WAG's own evidence, the badger population could have recovered and will most probably have elevated TB levels, as well as having had major impacts on the ecology of the area (most likely affecting populations of fox, hedgehog, hare, rabbit and chough as well as many invertebrates and other less understood species). Such impacts will be varied (some positive, some negative), all will disrupt the local ecosystem severely, and some will have impacts on internationally protected designated sites and economic activities of local residents. Culling is also not cost-effective, because unlike vaccination it is not sustainable and because all additional costs should have been included such as the impacts on tourism, increased policing etc. A full risk analysis should be undertaken: there are significant risks associated with culling (from the practical risks of use of firearms right through to the potentially negative impact on TB levels), and these outweigh the benefits.' (Anonymous)

'Badgers are now an apex predator in the UK: that is, they are at the top of the food chain. British mammals are part of complex ecosystems, with complex interrelationships with many other species. Interactions among predators and removal of a species such as the badger will have a profound top-down influence on the whole ecosystem.' (The Wildlife Trust of South and West Wales).

'A successful cull would depend on 100% extermination of badgers in the IAA. This could not be achieved, so the perturbation effect would ensue leading to a likely increase in infection rates outside the IAA. Within the IAA a long term reduction is unlikely to be achieved, and this does not justify the killing of the majority of individuals of a native species, especially when it is farmers and farming that have caused the problem in the first place.' (Martin Bailey)

'I do not think that the impacts on the local community and the tourist trade have been fully considered. Many communities are divided on this issue and tourists will stay away from these areas. In these bad economic times an impact on an area so reliant on tourists shows a total disregard for people's livelihoods.' (Carol Carter)

'With regard to question 6, we are concerned that the proposed cull of badgers does have potential to cause harm, possibly significantly, to the tourism industry in the affected Intensive Action Area, where visitors will holiday, and also in the rest of Wales, where visitors may be discouraged from holidaying by the actions or may be unclear about whether they are visiting an area where the cull may be taking place.' (Wales Tourism Alliance)

'In their previous consultation response CCW were concerned that the removal of a predator such as the badger from an ecosystem has the potential to have far-reaching consequences whether from reduced predation pressure on the badgers' prey species or from decreased competition with other predators such as foxes. They said that the 'release' of predators such as the fox could in turn result in impacts on other prey species such as ground nesting birds, brown hares and rabbits. The Ecological Impact Assessment considered potential

adverse effects on nationally important species such as the chough. Neither the consultation document nor the Minister's statement refer to such aspects in relation to potential harms and benefits.' (RSPCA Cymru)

'Tourism's huge contributions to the economy of Wales, to protecting local communities and to spreading the word about Welsh culture, language and local products must be factored into the 'balance of harm and benefit' as a major consideration. WTA urges the Welsh Assembly Government to ensure it allows for mitigation measures for any negative fallout for the tourism industry that may occur from the bovine TB eradication proposals.

Furthermore, it is vital that the industry has an input into any government measures that affect businesses and livelihoods in any part of Wales; we suggest that any set of measures that have an impact on our industry are devised in association with the tourism industry in advance of consideration of implementation and with a view to mitigating any economic or other damage.' (Wales Tourism Alliance)

'The impact on landowners who object has not been given sufficient consideration in balance to the impact of TB on the farming community. The submission to the Minister contains a section (8.1.2.4) on the socio-economic impact of bTB, but nothing on the socio-economic impact of culling on other industries.' (Anonymous)

'Only the IAA has been considered, not the impacts on the peripheral region where the effect of culling is likely to be highly detrimental due to perturbation.' (Anonymous)

- 13.4 One respondent expressed their concern over the *'impact on public attitudes towards badgers and wildlife in general'*, and went on to say:

'By officially sanctioning a cull, we would risk branding the badger as a disease-carrying vermin species and thereby encourage its unofficial persecution.' (Mick Baines)

14. Question 7: Do you agree with the prohibitions under the draft Badger (Control Area) (Wales) Order 2010? If not, why not?

- 14.1 2094 respondents agreed with the prohibitions under the draft Order. 4995 respondents did not agree with the prohibitions while 1369 respondents did not answer this question.

- 14.2 Article 4 of the draft Badger (Control Area) (Wales) Order 2010 lists the following prohibitions which would apply to the "Badger Control Area 2010" (the IAA).

4. No person may —

- (a) take into captivity, harbour, conceal or otherwise protect wild badgers with intent to prevent their destruction;

- (b) in any other way obstruct or interfere with anything which has been, is being or is to be done or used in connection with that destruction; or
- (c) aid, abet, counsel or procure another person to commit such an act.

14.3 Respondents who were in agreement with the Prohibitions set out in the draft Order gave, amongst others, the following reasons for their answers:

'Obstructions by landowners and individuals during the RBCT had a significant adverse impact on the results of the trials. Minimising such disruption by specifically making such actions illegal will therefore increase the positive benefits of badger culling.' (Anonymous)

'....access to the maximum proportion of badgers within the IAA is paramount for a cull to successfully decrease cattle bovine TB prevalence. Any action that jeopardises that aim should be prohibited under the Badger (Control Area) (Wales) Order 2010. We support the prohibitions stated in the draft order.' (Will Haresign, Deputy Director, Institute of Biological Environmental and Rural Sciences)

14.4 While in agreement with the Prohibitions, one respondent did express some concern over the wording of the Order:

'NFU Cymru would like to point out that section 4 of the draft order does not provide clarity as to what sanctions are created in terms of the prohibited activities. The current draft does not create a civil redress for the WAG i.e. the ability to apply for an injunction, nor does it create criminal offences. In our view the Order should create a criminal offence and section 21(5) of the Animal Health Act 1981 gives the Minister powers to create offences within an order.

The Order should include the necessary measures to enable the eradication plan to be effectively carried out. Powers of entry and criminal offences for preventing culling or obstructing or interfering with the operation of the cull are absolutely necessary to a successful eradication programme. The WAG needs the power of criminal law in carrying out this operation to ensure the practical implementation of the eradication programme.' (NFU Cymru)

14.5 Respondents who did not agree with the Prohibitions set out in the draft Order gave various reasons for their response, including the following:

'They constitute an excessive use of power. They are an infringement of civil liberties and will be very divisive in our communities. Communities that until this worked well together are already being put under huge pressure to take sides on a matter that science does not support, and for which the finances do not add up. They encourage the wrong attitude to wildlife in general giving licence to the very brutality that the Badger Act was implemented to stop.' (Anonymous)

'As with the enforced access these are completely unacceptable in a democratic society. They effectively criminalise ordinary and formerly law abiding individuals who are caught up in this programme simply on the basis of where they live or work.' (Anonymous)

'It is a matter of grave concern that the Welsh Government aims to make it a criminal offence for anyone to 'counsel' someone else in relation to interfering with the cull. This constitutes an assault on free speech concerning what is bound to be a highly contentious policy whatever decision is taken, and moreover would be virtually impossible to enforce.' (League Against Cruel Sports)

'The fundamental assumption provided in the introduction to the Order is untenable and all other provisions relating to this cannot then be supported. This assumption is embedded in the statement in the Order : 'being satisfied that destruction of wild members of the badger species in that area is necessary in order to eliminate or substantially reduce the incidence of tuberculosis in animals of any kind in that area'. The scientific evidence is not consistent with the need to destroy badgers and other more effective and appropriate strategies which are most likely to lead to sustained reductions in cattle bTB without causing unnecessary harm should be implemented instead. All prohibitions under the draft Badger (Control Area) (Wales) Order 2010 would represent very poor law and cannot be supported.' (David Grimsell)

- 14.6 In their response, RSPCA Cymru highlighted what they perceived to be some potential issues for them as an organisation which specialises in rescue, animal welfare and preventing animal cruelty. Should a badger cull in the IAA go ahead these are clearly issues that we would have to address:

'Taking a badger/and or possessing a badger, other than as permitted under the Protection of Badgers Act (PoBA), are already offences so the proposal in paragraph 4(a) of the draft Order would appear to duplicate existing offences.

The Order could also raise some practical issues for the Society. For example, what might be the position if a member of the public brings 'orphaned' cubs to the Society for care? We may not have details of the location in which they were found but what if they are from the IAA? What if we receive a call for an injured badger on a road in the IAA and we task an inspector to attend? The badger is not so seriously injured as to qualify for mercy killing under the PoBA so it is taken into care. What do we then do with such an animal?' (RSPCA Cymru)

- 15. As well as the seven specific questions, respondents were also given the opportunity to comment on any related issues which may not have been specifically addressed within the consultation document.**

15.1 Impact of Bovine TB

- 15.2 The consequences of bovine TB in Wales are recognised by the Welsh Assembly Government as unacceptable and unsustainable and as such the One Wales Coalition Government is committed to vigorously pursue a programme of TB eradication. In their response, some respondents expressed their agreement with this view, stating what they considered to be some of the main impacts of the disease. Others recognised the difficult decision made by

the Minister for Rural Affairs in coming to a provisional view that a cull of badgers in the IAA is needed. Comments included:

'The RCVS welcomes the Welsh Assembly Government's review of the approach to tackling Bovine Tuberculosis (bTB) and the College strongly supports comprehensive, coordinated and science-based action to reduce or eradicate this serious infectious disease.'

Bovine TB has a major economic and social impact on farmers and it places a significant and rising cost burden on the taxpayer. Aside from the economic arguments for tackling bTB, there is also an important argument for controlling the disease on animal welfare grounds, as both farmed animals and wildlife suffer from the disease. It is important to note that bTB is a zoonotic disease and failure to tackle the continually growing reservoir of this serious disease presents a potential threat to human health, both to those who work with farm animals and in situations where companion animals, that live in close proximity to humans, may have contracted the disease from infected wildlife or farmed animals. History and the actions of Governments in other countries have shown that this disease can be controlled and eradicated.' (Royal College of Veterinary Surgeons)

'Bovine Tuberculosis (TB) restrictions continue to have an impact on every aspect of the farming community, farming business and the countryside. The burden placed on farmers directly, is evident in a number of areas from increased paperwork, reduced profitability where the income streams for marketable stock are closed off and increased costs as a result of movement restrictions. These burdens are added to by the vitally important and often overlooked emotional and physical stress placed on farming families dealing with trauma following the tragic losses incurred as the disease moves through their herd.' (Holstein UK)

'Bovine TB is a debilitating disease that not only destroys thousands of cattle in Wales each year; it also has an enormous emotional impact on farmers and their families as they deal with an incident on their farm. The disease comes at major financial cost to farming business through the loss of animals in the prime of their productive life, the loss of valuable genetics and the additional costs placed on the business as a result of movement restrictions.'

Farmers throughout Wales are adhering to stringent cattle control measures and working closely with the Assembly Government and local Animal Health offices through groups like the Regional Eradication Boards to continue to investigate what more they can do to protect their animals from infection / re-infection.

Farmers within the intensive action area have for some time now faced even more stringent and costly control measures and have worked closely with their vets to tackle this disease highlighted recently by the fact that all farmers offered a visit to discuss biosecurity measures on their farm took the offer up.

These measures will however not be enough on their own to significantly reduce and eradicate bovine TB from Wales which is why a concurrent strategy to remove infection from badgers in areas where the disease is endemic in the

cattle and wildlife populations is required to eradicate the disease from Wales.'
(NFU Cymru)

'Whilst science should form the basis of any policy on bTB control, it is important to note that the scientific evidence in this field has been interpreted in different ways, not least because tackling bTB is an intensely political issue with interested and involved stakeholders approaching the issue from opposing standpoints. Consequently, therefore, Governments must be prepared to take difficult political decisions in order to implement, oversee, monitor and manage any effective policy to control and eradicate the disease, and be prepared to ensure that any policies are in place for a sufficient length of time truly to test their effectiveness.

'To have a real impact in reducing bTB it is essential that an holistic approach is taken to tackling the disease. Cattle control measures should form the basis of such an approach, but the significant reservoir of the disease in wildlife, and in particular badgers, cannot be ignored. Governments cannot avoid facing the political reality of the situation and the responsibility lies with Governments to take tough decisions that may prove to be less than palatable to some of the parties concerned.' (Royal College of Veterinary Surgeons)

'Tackling a disease where there is a known wildlife reservoir, in the absence of a proven vaccine for the target species (in this case, a vaccine against bTB for cattle), is one of the most difficult exercises that can be undertaken. Nobody wishes to see badgers being culled, but if any potential wildlife source of bTB is ignored then modelling evidence, such as the Food and Environment Research Agency's 2010 study 'Comparing badger (Meles meles) control strategies for reducing bovine TB in cattle in England', suggests that the timescale of any control strategy will be prolonged, the overall cost will be greater and, in the long-term, there will be a more negative impact on the welfare of both the reservoir and target animals. The public popularity of the badger is a major issue in this debate but it would be unwise if, in considering the control of a serious animal and zoonotic disease, sentimentality unduly influenced scientific objectivity. Furthermore, it should be noted that the badger is not an endangered species.' (Royal College of Veterinary Surgeons)

15.3 The Consultation Process

A number of respondents considered the consultation questions to be biased in favour of those who agreed with the Minister's views. These comments were mainly restricted to two types of pro-forma received, in which the respondents also expressed their disagreement with badger culling in the control of bovine TB. Comments included:

'The questions in this consultation are skewed so that those respondents who agree with the actions as proposed by the Minister are only required to answer yes or no, whilst those who do not agree are required to explain why. This sets a much higher threshold for respondents who do not agree and may bar those who do not have sufficient time or background information from equal participation.' (Anonymous)

'It is not appropriate that only those respondents who disagree with the proposed course of action are invited to elaborate on their answers. This consultation should seek to gain maximum information to inform the decision. Asking only one group of respondents to explain creates a bias and prevents a full range of evidence being collected.' (Anonymous)

15.4 The Evidence Presented to the Minister for Rural Affairs

15.5 Some respondents did not believe that the Welsh Assembly Government 'has made a sufficient case for the culling of badgers in the IAA' :

'It is clear that badgers contribute to the overall levels of bovine TB in cattle. However, we do not believe that the WAG has clearly demonstrated that badger vaccination is not a satisfactory alternative to badger culling. We consider that, coupled with the cattle and biosecurity measures being trialled in the IAA, badger vaccination would be a more sustainable means of reducing the incidence of TB in cattle.' (RSPB Cymru)

15.6 The Draft Badger (Control Area) (Wales) Order 2010

15.7 Article 3 of the draft Badger (Control Area) (Wales) Order 2010 states that badgers must be trapped in a cage and either shot; or given lethal injection; or shot without being trapped in a cage. A number of respondents expressed their concerns over the increased presence of firearms within the IAA and the 'free-range' shooting of badgers:

'The possibility of shooting of badgers in the wild (not in a cage) is included. This is not acceptable due to both the risk this would present to all countryside users and the nature of attempting to shoot an animal that would not present an easy target allowing huge opportunity for injury and also shooting of non target animals.' (Anonymous)

'We object to the inclusion of free-shooting because it is difficult to regulate and carries a high risk. It doesn't allow for concentrated and coordinated effort, which is one factor shown by the RBCT to be essential in an effective control strategy.' (Anonymous)

'Whilst free-shooting is a widely used method of controlling a large variety of wildlife, it has not been scientifically tested as a method of killing badgers in a control programme. It is unclear therefore whether free-shooting is appropriate and humane for badgers or whether it may result in the unnecessary suffering of animals as a result of wounding or maiming, exacerbated at night by not being able to follow this up with euthanasia. In addition, it should be questioned whether free-shooting could be as effective as cage-trapping and shooting, in terms of the killing of whole setts of badgers, or whether it carries the risk of increased perturbation of the animals. Notwithstanding that night shooting of wild animals is commonly practised, and that following codes of practice such as The British Association for Shooting and Conservation's 'Code of Practice - Lamping (Night Shooting)' can significantly reduce risks, the College has concerns regarding the potential for injury to members of the public, made

worse by the fact that badger culling has significant potential to attract protestors who could put themselves at considerable risk.’ (Royal College of Veterinary Surgeons)

‘The propose[d] order makes it possible for firearms to be carried and used on land where individuals and families would normally expect to be able to live free from such activities. This is a serious civil liberty issue for many. Access to all Rights of Way in the IAA will not be free of risk.’ (Anonymous)

‘I would just add that the consultation does not give assurances to individuals and families who live on farms in the IAA concerning their safety.’ (Lorraine Barrett AM)

15.8 Some other issues relating to the Order were raised by respondents. Examples of these are provided below:

‘It is also suggested that unoccupied land will be accessed without attempting to contact the owners. This is likewise not acceptable and consent should be sought from all landowners within the IAA before attempting to access land.

Whilst TB breakdowns are distressing for farmers whose herds are under restriction the few this affects are only a very small percentage of a more diverse countryside population within any one area. This raises questions about why this element is receiving such uncompromising support at the expense of others rights and lifestyles.

The balancing exercise must address the impact of a decision to cull with the excessive powers regarding access and prohibitions on other elements of the community it will affect for many years. This action will deprive people of their privacy and basic right to use their land without interference. The proposed order makes it possible for firearms to be carried and used on land where individuals and families would normally expect to be able to live free from such activities. This is a serious civil liberty issue for many. Access to all Rights of Way in the IAA will not be free of risk.

There are many hidden costs not already detailed in the £9 million price tag including policing costs, and the losses to tourism.

With a cattle vaccine so close now (2012) there is no mention of the need to expedite the necessary permissions and licences to bring this into the toolbox for dealing with bTB in cattle.’ (Anonymous)

‘We also believe landowners should have the right to refuse access.’ (Anonymous)

‘This consultation seeks to gather opinion on a time-limited cull whereas the Order has no time limit. This is not acceptable.’ (Anonymous)

15.9 Cattle Controls

- 15.10 While some respondents commented on what they saw as the need to focus more on cattle controls in their answers to the specific questions, others added their thoughts at the end of their response. Comments included the following:

'More could be done with regard to cattle measures, such as introducing a system similar to the Accredited Herd Scheme, risk-assessing herds and controlling their trade accordingly. This has been shown to have been effective in the past, until control of trading of cattle was relaxed. No equivalently rigorous system has yet been applied.' (Anonymous)

'There is still more that could be done in terms of cattle measures to reduce bTB in cattle.

bTB was almost eliminated under the Accredited Herd Scheme (herds to be risk-assessed and to trade only according to their risk category) and this could be replicated in west Wales. Spot checks on cattle movements would make enforcement more effective. In addition it is known that reducing TB in cattle by changes to husbandry and cattle movements results in a reduction in bTB in badgers in the following years. This could be aided with a greater emphasis on preventing cattle-badger contact which has been shown by FERA to be 100% effective when correctly undertaken.' (Nigel Moss)

15.11 Cattle Vaccination

- 15.12 The subject of vaccinating cattle was a common theme throughout many responses, from those both in favour and against the proposed cull of badgers in the IAA. With an injectable cattle vaccine unlikely to be available for use until 2015 at the earliest, some respondents were of the view that ensuring its earlier availability should be of priority. Comments included the following:

'The College strongly supports the work to develop and seek authorisation for a bTB vaccine for cattle and an associated DIVA test. The latter will allow infected animals to be differentiated from those that have been vaccinated, a vital requirement if trading of animals is to be allowed under the present legislative regime.

The vaccination of cattle against bTB is likely to play a crucial role in achieving the ultimate goal of eradicating the disease. At present, however, European Directives prevent both the vaccination of cattle against bTB (EU Directive 78/52/EEC) and the trading of cattle that have not been shown to be bTB negative using the tuberculin skin test (EU Directive 64/432/EEC). The UK Government must ensure therefore that evidence is provided to European officials so that the necessary changes can be made to European legislation in order not to slow the practical usage of vaccination. Contingency plans should also be developed for tackling bTB in the event that Europe does not accept the justification or need for changing the Directives.' (Royal College of Veterinary Surgeons)

'Seeking the legal changes required to allow vaccination of cattle should have been given greater priority.' (Anonymous)

'Everything possible should be done to speed up the introduction of vaccination for cattle which surely must be the better long term measure. Seeking the legal changes necessary to allow vaccination of cattle should be prioritised as an alternative.'(Anonymous)

'With a cattle vaccine so close now (2012) there is no mention of the need to expedite the necessary permissions and licences to bring this into the toolbox for dealing with bTB in cattle.' (Anonymous)

15.13 Community Concerns

15.14 Some respondents expressed their concern for what badger culling would mean for the community living within the IAA:

'We value all our neighbours, farming and non-farming. Some of the farming ones also disagree with these proposals to cull. In rural and isolated communities such as this we rely on goodwill and mutual support to keep us all going. The proposed culling programme threatens just this, and our general sense of shared interests and cohesion. What should have happened – and could still happen – is a concerted effort by WAG to engage with, and facilitate discussion amongst all sections of the community about the issues towards finding constructive, proportionate, equitable measures that will have the widest support and acceptability. Instead, you are creating social divisions and inequity. This is not responsible or good government.' (Anonymous)

'No consideration is given to the impact of these proposals on Wales in general, or of the local communities who would be most affected in particular. The proposals show no consideration of the wider ecological principles which we have fervently tried to promote within the Assembly, and instead simply focus on the ways in which bovine TB affects a particular economic group, with a particular opinion on the solution to the problem.' (Christine Chapman AM)

15.15 Additional Costs

15.16 Some respondents were of the view that the costs provided to the Minister, prior to making her provisional decision, did not truly represent the costs of the IAA. Comments included:

'There are many hidden costs not already detailed in the £9 million price tag including policing costs, and the losses to tourism.' (Anonymous)

'I also did not see any mention of costs in terms of policing and losses to tourism. This is a big consideration that needs to be taken into account.'

I would also add that the cost of the proposed badger cull outlined in the consultation is incorrect. Paragraph 178 states that the 'cost of culling badgers is £4250 per km sq. per year'. Paragraph 179 states that the 'cost of delivering a badger cull for 5 years in the IAA is £4,590,000 based on an area of 288kmsqr'.

However £4250 x 288 x 5= £6,120,000 and not £4,590,000 as stated in the consultation document. This means that the cost of culling far outweighs the cost of preventing the 83 breakdowns anticipated i.e. £4,463,503.' (Lorraine Barrett AM)

15.17 Conservation Status of the Badger

15.18 A number of respondents questioned the conservation status of badgers and were of the opinion that farmers should be allowed to control badger numbers. Comments included:

'I think there is something being missed from this whole situation and that is the level of badger population in the country as a whole. Since the Protection Order came into force badgers numbers have increased to such an extent that there is now a serious imbalance in the countryside. For centuries farmers have maintained a balance in our wildlife so that sensible numbers of all species can thrive. True some have been eradicated : wolves bears and so on where their presense interfered too greatly with the human population.

Badgers are and never were at risk, the Protection Order was intended to prevent badger baiting and as a result we now have an unwieldy population which seems to be changing its habits and its feeding.' (Sue Ward)

The real issue is whether it is possible to relax the current protection by law of the Badger population. Whilst licences can be granted by CCW in certain circumstances it is far too restrictive in its criteria to make a meaningful difference to the spread of bTB. It is with this in mind I fully endorse your efforts as captured in the order as a livestock farmer within the known bTB hotspot of North Pembrokeshire.

I also believe that the need to provide such an order goes beyond the needs of the livestock industry, there is growing concern regarding the health status of our exploding badger population. It is too often a common scene within our countryside of dead, dying and suffering badgers. If the continued growth in the badger population is allowed to continue unabated, it naturally follows that by virtue of over populated countryside of badgers that an epidemic of disease will plaque the badger population with extensive suffering, similar to what was witnessed in the rabbit population in the past. It could be argued that man should not interfere and allow nature to take its cruel course. I would argue that man has interfered in the early nineties by introducing a protected species status on badgers and by doing so not allow the nature of man to manage and alleviate the suffering that the badger population increasingly suffers by being an overpopulated species.' (John T Davies)

'The badger, a large mammal with no natural predators, is a classic example of a population out of control through lack of management. It is not an endangered species and no longer merits its protected status.' (Veterinary Association for Wildlife Management)

15.19 Responses from Cattle Keepers

15.20 Within their response, some cattle keepers provided first-hand accounts of how bovine TB has affected them and the farming industry:

'I can't imagine any farmer having great pleasure seeing dead badgers dragged off his or her land, but if there is any scientific evidence that they carry TB then sadly they must be taken out. When we first "went down" we had a visit from a retired vet for advice, His only comment was that we should open the farm as a wild life park for the public to see badgers in their natural habitat. If the badger were an endangered species we perhaps would look at the argument differently but there are hundreds if not thousands in our area. Having listened to Professor Krebs on Radio 4 yesterday I was astounded that his advice was to keep the badger away from the cows. Maybe when they are inside this could be done but I'm still waiting for him to explain how we keep them apart in the fields. Bovine TB has changed our lives, It has exhausted us. I find this e-mail difficult to write as I have talked about TB, written about it non stop for two years. In December 2008 our farm was hit by the largest outbreak of TB in the UK. In the first week of January 850 cows were taken away for slaughter. It was devastating. We have just restocked, which was not a straight forward exercise, and have been milking again for the last two months. We took this time to restart on the Animal Health Department's advice. We were all hoping the cull would have taken place in this area by now. It was not to be. I feel strongly that everything possible should be tried to rid the countryside of this disease so that all the animals around us are healthy. What happened to us should never happen again.' (Eira Harris)

'Having experienced a lot of TB testing on my farm I have first hand knowledge of the stress that TB causes to the animals. Nobody seems to worry about the welfare of my cattle. I am therefore heartened to see that the Government is at last taking steps to combat this terrible disease and I am fully supportive of the proposals.' (Anonymous)

'I have a herd of pedigree Hereford cattle, we have not had any cases yet of confirmed TB on the farm although it is rife within Gower. Last year my pedigree stock bull was tested and classed inconclusive and then passed the second test 60 days later. People need to know the stress I was under for those 60 days. People who are actively campaigning for the cull to be stopped should go through what I did, only then would they appreciate the situation! Action needs to be holistic.' (David Jones)

15.21 Prevalence of bovine TB in badgers

Within their response, some provided concerns regarding the estimated prevalence of TB in badgers within the IAA.

'Annex 5 contains a Table showing the prevalence in the RBCT areas (selected as endemic areas with high levels of cattle TB) at the start of culling – the overall average level of infection is 11.44%, with a range from 1.6% to 37.6% across the 10 sites sampled. This is the biggest body of data specifically sought to establish TB levels. Over 3,000 badgers were sampled.

Annex 22 presents the Welsh Badger Found Dead Survey from 2005-2006 in which, from rather small samples (457 badgers across all Wales), levels of 16% were found in Carmarthenshire (sample size 56 animals), 3% in Ceredigion (31 animals) and 15% in Pembrokeshire (62 animals) – the three counties that contribute to the IAA.

Annex 19 para 27 introduces the Crawshaw et al 2008 correction factor. This is taken as justification for doubling the TB prevalence levels cited in various studies, particularly those from the RBCT publications. It is then argued that this increases the prevalence in the RBCT to 33%. However, the correct arithmetic would suggest that multiplying 11.44% by 2 produces a figure of nearly 23% not 33%.

If the Crawshaw correction is applied to the Pembrokeshire Badger Found Dead Survey figure, then a figure of 30% is arrived at. However, even this is not data from the IAA, as is required in order to meet the threshold tests set by the Court of Appeal

Annex 6 is identical to Annex 8 of the previous consultation in 2009 except that the last 10 pages have been removed. These two Annexes present several maps depicting the location of badgers analysed in the Found Dead Survey and in the Defra Road kill survey of 2003 -2008. Collectively these maps provide coverage of over 95% of the IAA. The TB status of badgers is clearly identified and show that, within the IAA boundary, 3 out of 60 badgers tested positive i.e an infection level of 5%. Even applying the Crawshaw correction this figure cannot be raised above 10%.

In addition to the data plotted for the N Pembrokeshire region Annex 6 presents similar data for four other, deliberately selected endemic areas in Wales. These show TB prevalence in badgers of 12.7% in Gwent (sample size 251), 7.6% in S. Powys (n=132), 7.1% in S Pembrokeshire (n=155), and 4.4% in Carmarthenshire (n=91).

Overall these Welsh data suggest an average TB level for badgers in Wales of about 8% with a level specifically in the IAA of only 5%. These figures are much lower than encountered in the RBCT and indicate that lower benefits would accrue from a cull of badgers.’ (Dr Mike Snow)

How the consultation responses were analysed

Consultation responses have been read and entered into a spreadsheet. Many comments have been entered verbatim into a spreadsheet, but where very detailed responses were provided with recurring themes, the comments have been summarised. Where pro forma responses were received, not all were entered onto a spreadsheet, but instead have been counted. For those pro forma responses that were entered into a spreadsheet, the comments have also been summarised.

Dealing with points that came under other consultation questions

'Yes/No' responses have been entered into a spreadsheet. This is to help with recording and analysis.

'N/A' has been recorded against some questions, as a number of written responses did not follow the question order but were in the form of executive summaries. These comments have been analysed and entered against the appropriate consultation question.

Where a respondent did not answer a question this has been recorded as 'N/A'.

Dealing with points that did not specifically answer consultation questions

When responses did not refer to a specific consultation question but covered issues raised by specific questions they have been entered under that question.

General comments

Where responses have referred to related issues which we have not specifically addressed in the consultation document or asked by the consultation questions, but nonetheless related to the consultation, these have been summarised and entered into a spreadsheet under 'additional comments'.

Comments not relating to the consultation exercise were noted but excluded from the analysis.

Counting consultation responses

Each consultation response form and formal written response, whether received in hard copy or electronic media have been counted as a single response.

Many responses were received from organisations, groups and associations. Although these may represent the views of multiple members, these have only been counted as one response.

When individuals have provided an individual name and address or stated that this is a personal response or 'in my personal view' we have considered this to be an individual response. When someone has provided a work title or entered their organisation and has then referred to their organisation's view or used 'we'; we have taken that to mean that they are responding for their organisation.

Three Petitions were also received and were recorded separately. Two were submitted by individuals and had a total of 338 signatures. In both these petitions signatories expressed their opposition to badger culling. A third, submitted by the Wildlife Trust of South and West Wales had 2707 signatures. This petition was in response to the now annulled Tuberculosis Eradication (Wales) Order 2009 and not the draft Badger (Control Area) (Wales) Order 2010. As well as urging the Welsh Assembly Government to cease implementation of a badger cull, the Wildlife Trust petition also called for the application of improved farm biosecurity in conjunction with the vaccination of badgers.

Information in relation to the consultation process distributed externally is listed below. This information has previously been released under a Freedom of Information request which can be accessed online via the Assembly Government's Disclosure Log at: www.information.wales.gov.uk

Document Description

- 1 Communication plan – Word document.
- 2 Evidence presented to the Minister. Published on Welsh Assembly Government website on 14 September 2010 – available online at: <http://wales.gov.uk/topics/environmentcountryside/ahw/disease/bovinetuberculosis/intensiveactionpilotarea/evidence/?lang=en>
- 3 Covering letter issued with the consultation document and response form.
- 4 Consultation response form (hard copy).
- 5 Online response form.
- 6 Diary marker issued to the media on 17 September 2010.
- 7 Written statement by Elin Jones, Minister for Rural Affairs on 20 September 2010 - available online at: <http://wales.gov.uk/about/cabinet/cabinetstatements/2010/10/0920bovinetb/?lang=en>
- 8 Press release “New bovine TB Eradication proposals announced by Welsh Rural Affairs Minister” issued to the media on 20 September 2010 - available online at: <http://wales.gov.uk/newsroom/?lang=en&view=Search+results&sessionId=20641871&pageNum=1&f=currentissues&v=Bovine%20TB>
- 9 Media Q and A issued to the media with the press release and available on the Welsh Assembly Government website.
- 10 Facts and figures document issued to the media with the press release.
- 11 Script for the Welsh Assembly Government switchboard.
- 12 Stakeholder/ team bulletin issued 20 September 2010.
- 13 Article provided to partners/ stakeholders on request for more information.
- 14 Relevant slides from 3 presentations given by members of OCVO in September, October and November 2010.
- 15 Farming connect bulletin issued on 4 October 2010 to Farming Connect organisations.

- 16 Press release, "*Vets and farmers work together to tackle bovine TB*" issued to the media on 14 October 2010. Available on the Welsh Assembly Government news pages (link previously provided).
- 17 Gwlad article – Gwlad 100 (October 2010) page 5 - available online at:
<http://wales.gov.uk/topics/environmentcountryside/ecnewsevents/gwlad/gwlad2010/?lang=en>
- 18 Leaflet issued to homes in the region of the Intensive Action Area from the week beginning 18 October 2010.
Press release, "*Counting the human cost of Bovine TB*" issued to the media on 22 October 2010. Available on the Welsh Assembly Government news pages.
- 19 Stakeholder bulletin issued on 25 October 2010.
- 20 Letter to editors of Western Telegraph, Tivyside Advertiser and the Carmarthen Journal for publication issued on 4 November 2010.
- 21 Farming connect bulletin issued on 1 November to Farming Connect organisations.
- 22 Gwlad article – Gwlad 101 (November 2010) page 12- available online at:
<http://wales.gov.uk/topics/environmentcountryside/ecnewsevents/gwlad/gwlad2010/?lang=en>
- 23 Relevant slides given in a presentation by the Chief Veterinary Officer for Wales - 27 September 2010, 19 October 2010, 25 October 2010, 2 November 2010, and 17 November 2010.
- 24 Postcard issued to homes in the region of the Intensive Action Area from the week beginning of 22 November 2010.
- 25 Press release "*Bovine TB consultation: Ten days left to respond*" issued on 7 December. Available on the Welsh Assembly Government news pages (link previously provided).

Screening Assessment Template

Annex D

Proposed Policy, Practice or Function: **the Badger (Control Area) (Wales) Order 2011**

Equality Strand	Summary of evidence Identified and gathered	Weighting [Credibility of evidence] Tick appropriate box			Relevance of evidence [Equality issues raised by evidence]	Policy or practice relevance to equality strand Tick appropriate box			
		Unsatisfactory	Satisfactory	Strong		No relevance	Low	Medium	High
	This legislation relates to the culling of wild animals and therefore would seem to have, on balance, only slight impact on humans								
Disability	There is no evidence to suggest that this piece of legislation will impact negatively or adversely on the disability equality strand	X			N/A	X			
Race	There is no evidence to suggest that this piece of legislation will impact negatively or adversely on the race equality strand	X			N/A	X			
Gender and Gender Reassignment	There is no evidence to suggest that this piece of legislation will impact negatively or adversely on this equality strand	X			N/A	X			
Age	There is no evidence to suggest that this piece of legislation will impact negatively or adversely on this equality strand	X			N/A	X			
Religion and Belief and Non-Belief	There is no evidence to suggest that this piece of legislation will impact negatively or adversely on issues of Religion, Belief and Non-Belief	X			N/A	X			
Sexual Orientation	There is no evidence to suggest that this piece of legislation will impact negatively or adversely on the sexual orientation equality strand	X			N/A	X			

Human Rights (see Annex A for more information)	Concerns were raised during the consultation that the prohibitions enacted by the Order will impact on landowner's right to peaceful enjoyment of their private property.	X			N/A		X		
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The Badger (Control Area) (Wales) Order 2011

Following the consultation exercise on the Badger (Control Area) (Wales) Order 2011 a few responses suggested that the prohibitions enacted by the Order will impact on landowner's right to peaceful enjoyment of their private property. However following close consultation with individuals we know that the majority of landowners in the IAA are content for action to take place on their land. It is the Welsh Assembly Government's contention that, on balance, these measures are in the public interest and that this outweighs the specific concerns raised in the consultation.

Officials have considered the likely impact of this legislation on the equality strands and believe there to be no evidence to suggest that this piece of legislation is likely to cause any detrimental effects on issues of inclusion, equalities or Human Rights for the people living in (or outside) the Intensive Action Area. There is:

- No credible evidence that people from different equality strands or communities are (or could be) adversely or negatively affected by the policy or practice;
- The policy does not appear to make a contribution to meeting the statutory duty to promote equality for all people mindful of the strands of age, disability, gender and gender reassignment, race, religion and belief and non-belief and sexual orientation and promoting human rights, or to meeting one or more of the specific or general duties set out at Annex A;

It is also felt that the gathering of further evidence to support this conclusion is not necessary at this time, however in line with good practice this decision will be reviewed in March 2012.

The Competition Assessment for farming

The competition filter test	
Question	Answer yes or no
Q1: In the market(s) affected by the new regulation, does any firm have more than 10% market share?	No
Q2: In the market(s) affected by the new regulation, does any firm have more than 20% market share?	No
Q3: In the market(s) affected by the new regulation, do the largest three firms together have at least 50% market share?	No
Q4: Would the costs of the regulation affect some firms substantially more than others?	No
Q5: Is the regulation likely to affect the market structure, changing the number or size of businesses/organisation?	No
Q6: Would the regulation lead to higher set-up costs for new or potential suppliers that existing suppliers do not have to meet?	No
Q7: Would the regulation lead to higher ongoing costs for new or potential suppliers that existing suppliers do not have to meet?	No
Q8: Is the sector characterised by rapid technological change?	No
Q9: Would the regulation restrict the ability of suppliers to choose the price, quality, range or location of their products?	No

This piece of legislation is unlikely to cause any detrimental effects on competition in the farming industry, in fact the farming industry is demonstrably behind the policy (see response to the consultation at Annex C) and believes that it is in the industry's best interest.

For Tourism

The competition filter test	
Question	Answer yes or no
Q1: In the market(s) affected by the new regulation, does any firm have more than 10% market share?	No
Q2: In the market(s) affected by the new regulation, does any firm have more than 20% market share?	No
Q3: In the market(s) affected by the new regulation, do the largest three firms together have at least 50% market share?	No
Q4: Would the costs of the regulation affect some firms substantially more than others?	No
Q5: Is the regulation likely to affect the market structure, changing the number or size of businesses/organisation?	No
Q6: Would the regulation lead to higher set-up costs for new or potential suppliers that existing suppliers do not have to meet?	No
Q7: Would the regulation lead to higher ongoing costs for new or potential suppliers that existing suppliers do not have to meet?	No
Q8: Is the sector characterised by rapid technological change?	No
Q9: Would the regulation restrict the ability of suppliers to choose the price, quality, range or location of their products?	No

This piece of legislation is unlikely to cause any detrimental effects on competition in the Tourism industry in south west Wales, however, opponents of the policy have said that any action to cull badgers would have a detrimental impact on aspects of the industry:

- Responses to the consultation from the tourism industry highlighted that they are currently witnessing a growth in conservation and green tourism, either as the main reason for visiting or as part of the reason to visit Wales and other destinations. Their responses have asked that the Welsh Assembly Government ensure that it "allows for mitigation measures" for any negative fallout for the tourism industry that may occur.
- The Standard Operating Procedures for a cull would detail what activities take place when. For example they will specify what trapping can and cannot take place around any public rights of way and will prescribe the timing of when traps will be laid, baited and checked. The majority of all activities will be undertaken in the late evening or the early morning. The Standard Operating Procedures will be

designed to minimise the visibility of the work such that most people will be unaware of it happening. These steps should help ensure that detrimental effects on visitor numbers or the visitor experience from the badger culling operation are minimised.

- We are not aware of any specific evidence that assesses the impact of a badger culling operation on tourism or the local community from the RBCT or other badger culling operations such as in the Republic of Ireland. It is however clear from the consultation responses that any decision to cull badgers will receive some public opposition. The extent of this opposition is difficult to predict. It is even less clear how far this would lead to action by animal rights activists and other that are opposed to culling in attempts to disrupt any culling operation either by legal or non legal methods. The RBCT did face some disruption by activists, but the ISG argued that this was not significant enough to impact on the efficiency of their culling operations.
- Protests could lead to additional burden on police resources during any culling activity; however if there was an attempt to disrupt legitimate culling activity this would need to be balanced against the Welsh Assembly Government stance on domestic extremism. The involvement of the police to enforce legitimate culling activity would lead to an increased profile in the news media, which would continue to publicise the culling operation and possibly extend it to a wider audience.