EXPLANATORY MEMORANDUM TO

THE MUTILATIONS (PERMITTED PROCEDURES) (ENGLAND) (AMENDMENT) REGULATIONS 2008

2008 No. 1426

1. This explanatory memorandum has been prepared by the Department for Environment, Food and Rural Affairs and is laid before Parliament by Command of Her Majesty.

2. Description

2.1 These Regulations amend the Mutilations (Permitted Procedures) (England) Regulations 2007 (the 2007 Regulations) by inserting new permitted procedures and the requirements that apply to them. The new permitted procedures are:
For sheep and goats:

- Embryo collection or transfer by a surgical method
- Laparoscopic insemination (only allowed as part of a breed improvement programme)
- Ovum transplantation (including ovum collection) by a surgical method

For wild birds and farmed birds:

- Wing tagging and web tagging

For farmed ducks:

- Neck tagging and web notching

2.2 The Regulations substitute a new regulation 5 in respect of who may perform the permitted procedures.

3. Matters of special interest to the Joint Committee on Statutory Instruments

The Regulations amend regulation 4 of the 2007 Regulations in order to correct a minor drafting error and regulation 5 in the interests of clarifying the drafting. In accordance with paragraph 3.4.13 of Statutory Instrument Practice, the Department has agreed with the SI Registrar that the free issue procedure does not need to apply to this instrument on the basis that the primary purpose of the Regulations is to introduce new provisions.

4. Legislative Background

4.1 Mutilations are referred to in the parent Act, the Animal Welfare Act 2006, as 'prohibited procedures'. A prohibited procedure is defined in section 5(3) as one 'which involves interference with the sensitive tissues or bone structure of the animal, otherwise than for the purpose of its medical treatment'.

4.2 The 2007 Regulations set out the exceptions to the prohibition on mutilations (as outlined by the Secretary of State in the House of Commons) "to permit procedures that are considered necessary for the overall welfare or good management of an animal..." (Hansard: vol. 441. Part No. 89 col. 165). The regulations came into force on 6 April 2007.

4.3 The amending Regulations insert new exceptions to the prohibition on mutilations.

4.4 The amending Regulations are intended to come into force on 1 June 2008.

5. Territorial Extent and Application

This instrument applies in England.

6. European Convention on Human Rights

The Minister for Sustainable Food and Farming and Animal Health (Lord Rooker) has made the following statement regarding Human Rights:

In my view the provisions of the Mutilations (Permitted Procedures) (England) (Amendment) Regulations 2008 are compatible with the Convention rights.

7. Policy background

7.1 The Animal Welfare Act 2006 banned the mutilation of animals.

7.2 There are some procedures which, though technically mutilations, are performed in the animal's long-term welfare interest or are accepted methods of animal management. Such mutilations are exempted from the ban under the 2007 Regulations.

7.3 The 2007 Regulations have been in place since April 2007. After the 2007 Regulations came in to force, officials were made aware of certain procedures that were not highlighted by the relevant industries during the original consultation but are in fact commonly used animal management practices. The amending Regulations insert these procedures into the list of permitted procedures (as set out in paragraph 2).

7.4 The parent Act applies to all vertebrate animals other than man. The permitted procedures inserted by the amending Regulations relate to farmed animals and wild animals that are under the control of man.

7.5 Regulation 5 has been amended in the interests of clarity and to ensure that it is an effective implementation of the provision in relation to castration and tail docking of pigs in Council Directive 91/630/EEC laying down minimum standards for the protection of pigs (OJ No L 340, 11.2.1991, p. 33).

7.6 The amending Regulations insert in Schedule 4 conditions in relation to laying hens in order to implement paragraph 8 of the Annex to Council Directive 1999/74/EC laying down minimum standards for the protection of laying hens (OJ No L 203, 3.8.1999, p. 53).

Public Consultation

7.7 These Regulations were consulted on widely. There were 29 responses in total. Responses came from sheep and goat industry bodies, poultry rearing industry groups, veterinary surgeons and their representative bodies, welfare organisations, other interest groups and individual members of the public.

7.8 As a result of the consultation, some minor amendments were made to the Regulations. These were the addition of wing-tagging for some farming purposes and web-tagging. The issues of neck-tagging and web-notching emerged during the consultation but were not consulted upon. Following advice from Defra veterinarians it was decided to include the procedures in the amending Regulations.

7.9 The amendments to regulation 5 and the amendment to Schedule 4 in relation to laying hens were not consulted upon as they do not represent any change to policy or current farming practice. Industry has been informed of these amendments.

Guidance

7.10 The purpose of the 2007 Regulations was largely to consolidate existing legal provision. The purpose of the amending Regulations is to further this aim by amending the 2007 Regulations to recognise certain common management and conservation practices that were not known about when the 2007 Regulations came into force. The status quo for farming and conservation practices will remain unchanged. Therefore, guidance will not be necessary.

8. Impact

Two Impact Assessments are attached to this memorandum.

9. Contact

Charlotte Coles at Defra (Tel: 0207 238 5980 or e-mail: charlotte.coles@defra.gsi.gov.uk) will answer any queries regarding the instrument.

Summary: Intervention & Options

Department /Agency:	Title:	
Defra	Impact Assessment of Amending the Mutilations (Permitted Procedures) (England) Regulations 2007	
Stage: Final IA	**Version: 2**	**Date: March 2008**
Related Publications: Impact Assessment on the proposal to permit the tagging of birds.		

Available to view or download at:

http://www.http://www.defra.gov.uk/corporate/consult/mutilation-reg08/index.htm

Contact for enquiries: Charlotte.Coles@defra.gsi.gov.uk **Telephone:** 0207 238 5980

What is the problem under consideration? Why is government intervention necessary?

The Mutilations (Permitted Procedures) (England) Regulations 2007 currently prevent sheep and goat breeders from carrying out certain artificial breeding procedures (detailed below). These techniques are important for the sustained genetic improvement of the English sheep and goat stock. No viable alternatives to these techniques currently exist that can be used on a large scale. Some of these procedures are already exempted for cattle under the regulations.

What are the policy objectives and the intended effects?

To permit for sheep and goats: (i) embryo collection or transfer by a surgical method; (ii) ovum transplantation, including ovum collection, by a surgical method; (iii) laparoscopic insemination of sheep and goats. The intended effect will be to allow sheep and goat breeders to access artificial breeding techniques that lead to sustained genetic improvements in the English sheep and goat stock and thereby improve its productivity, breeding potential, resistance to disease etc.

What policy options have been considered? Please justify any preferred option.

The policy options considered were:

(i) Leave the Mutilations Regulations unamended

(ii) Amend the Regulations to permit the procedures list above and to re-draft the provisions above.

Strong preference for option (ii). Failure to permit these procedures would be damaging to the sheep and goat breeding industries and would impinge on their ability to bring about genetic improvement in the sheep and goat stock.

When will the policy be reviewed to establish the actual costs and benefits and the achievement of the desired effects?

In five years time from the Regulations coming into force.

Ministerial Sign-off For Final Impact Assessments:

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible Minister:

Jeff Rooker

.....Date: 1st April 2008

Summary: Analysis & Evidence

Policy Option: Amendment of mutilation regulations	Description: Proposal to add certain artificial breeding procedures for sheep and goats to the list of exempted procedures under the mutilation regulations.

COSTS

ANNUAL COSTS		Description and scale of **key monetised costs** by 'main affected groups'
One-off (Transition)	**Yrs**	Cost of carrying out artificial breeding procedures, over and above baseline cost (see evidence base for details)
£0		
Average Annual Cost (excluding one-off)		
£0.4 million	5	**Total Cost** (PV) **£2 million**

Other **key non-monetised costs** by 'main affected groups'

Animal welfare impact of artificial breeding procedures expected to be minimal in practice with correct handling and appropriate use of anaesthesia and analgesia.

BENEFITS

ANNUAL BENEFITS		Description and scale of **key monetised benefits** by 'main affected groups'
One-off	**Yrs**	Benefit to commercial sheep producers from genetic improvements of slaughter lambs produced.
£0		
Average Annual Benefit (excluding one-off)		
£1.1-2.3 million	5	**Total Benefit** (PV) **£5-10.1 million**

Other **key non-monetised benefits** by 'main affected groups'

The country benefits from export earnings from export of sheep and goat live genetic material (embryos and semen), although the volume of these exports is likely to be small in relation to cattle. Data on the volume and value of these exports have not been obtained.

Key Assumptions/Sensitivities/Risks

1. Value to goat industry not included as artificial breeding techniques are not used extensively.

2. Rate of genetic improvement in commercial sheep sector assumed to be in the range of 1-2% pa.

Price Base Year 2007	Time Period Years 5	**Net Benefit Range** (NPV) **£2.9-8.1 million**	**NET BENEFIT** (NPV Best estimate) **£2.9 m (most conservative)**

What is the geographic coverage of the policy/option?				England	
On what date will the policy be implemented?				1 June 2008	
Which organisation(s) will enforce the policy?				Common Enforcers	
What is the total annual cost of enforcement for these organisations?				£0	
Does enforcement comply with Hampton principles?				Yes	
Will implementation go beyond minimum EU requirements?				No	
What is the value of the proposed offsetting measure per year?				£0	
What is the value of changes in greenhouse gas emissions?				£0	
Will the proposal have a significant impact on competition?				See evidence base	
Annual cost (£-£) per organisation (excluding one-off)	Micro	Small	Medium	Large	
Are any of these organisations exempt?	No	No	N/A	N/A	

Impact on Admin Burdens Baseline (2005 Prices) (Increase - Decrease)

Increase of £0 Decrease of £0 **Net Impact** **£0**

Key: **Annual costs and benefits: Constant Prices** **(Net) Present Value**

Evidence Base (for summary sheets)

[Use this space (with a recommended maximum of 30 pages) to set out the evidence, analysis and detailed narrative from which you have generated your policy options or proposal. Ensure that the information is organised in such a way as to explain clearly the summary information on the preceding pages of this form.]

1. Introduction

The following artificial breeding procedures relating to sheep and goats are at present banned under the 2007 Mutilations Regulations for England:

- Ovum transplantation, including ovum collection, by a surgical method
- Embryo collection or transfer by a surgical method
- Laparoscopic insemination for the purpose of breed improvement programmes

The 2007 Regulations were designed to put a general prohibition on all animal mutilations but to exempt mutilations carried out routinely in current farming practice in order to preserve the status quo for the farming industry. During the consultation on the 2007 Mutilations Regulations, we were not made aware that the procedures listed above were used in the sheep and goat breeding industry and therefore they were not added to the original list of permitted procedures. Now that the industry has made us aware of the need to use these procedures, we are amending the regulations to add them to the list in order to reinstate the status quo.

Embryo and ovum collection and transfer

Embryo and ovum collection and transfer require invasive surgery under general anaesthesia. They entail exposing and incising the uterus of both the donor animal, to obtain the embryos, and also of the recipient animals to which the embryos are transferred. Post operative pain relief would be routine, although animals tend to recover well and relatively rapidly from such procedures. The general procedure is the same for ovum collection and transfer. As the donor animals are of high value, and the recipients are carrying high value embryos/eggs, their welfare is, inevitably, well taken care of. Although there will be some post operative discomfort from such surgery, it is considered that there are significant overall welfare benefits in relation to disease prevention (scrapie) and in improvements in flock and herd standards. These are clearly aimed at a better final product in relation to food production, animal conformation etc.

The techniques also assist in ensuring the survival of rare breeds of sheep and goats. Where numbers of a breed fall dangerously low the procedures allow for a significant number of offspring to be produced so allowing a relatively rapid increase in numbers. They also ensure that animals with good traits in relation to conformation, milk production (for offspring), ease of giving birth, can be selected for.

Laparoscopic insemination

The shape of a sheep's, and to lesser extent a goat's, cervix does not allow for non-invasive artificial insemination, unlike cattle. The procedure requires a small incision into the abdomen and uterus of a ewe or goat to allow deposition of sperm from selected rams. Done under local anaesthetic with post-operative care, studies have suggested that using veterinarians and appropriate anaesthesia, stress responses arising from these techniques can be successfully minimised[1].

2. Options

Two options were identified:

[1] Reference from articles supplied by innovis

I. Leave the ban on these procedures in place
II. Amend the regulations to include these procedures on the exempted list

The costs and benefits of the two options are analysed in the following sections. A five-year time horizon was used for estimation of costs and benefits. The main reason for using a five year horizon was that a policy review of the regulations is planned in five years' time.

Due to lack of data on the use of artificial breeding techniques in the goat industry, costs and benefits were estimated for the sheep industry only. It is expected that the resulting under-estimation of social benefit is not significant, because (i) artificial breeding techniques are not at present extensively used in the goat industry; and (ii) goat production is a lower value activity than sheep production.

3. Use of artificial breeding procedures in sheep industry

The sheep breeding industry has a pyramid structure, with elite sheep breeders at the top of the pyramid and commercial sheep flocks at the bottom. The primary role of the elite breeders is to create superior breeding stock which can be used in the following tiers. Therefore, elite sheep flocks are the main focus for genetic improvement (Simm, Amer and Pryce, 1997), and artificial breeding techniques such as the ones considered here are only likely to be used in these flocks. It was therefore assumed in the analysis that the purpose of using the artificial breeding techniques is to produce lambs for breeding purposes.

Seven sheep breeding companies currently deliver specialist artificial breeding techniques to the sheep and goat industries in the UK. At present, they are used only on a limited scale within the elite flocks at the apex of the breeding pyramid. Their use is, however, becoming more prevalent over time, and has been increasing at the rate of 1-2% per annum in recent years. Use of artificial breeding procedures in the sheep breeding industry started in the late 1980s.

Industry sources reported that, prior to the ban, about 25,000 laparoscopic artificial insemination (lap AI) procedures and 800 multiple ovulation embryo transfer (MOET) procedures were being undertaken annually in England and Wales. The ratio of English breeding ewe population to breeding ewe population in England and Wales was used to estimate how many of these procedures may have been undertaken in England alone. Since breeding ewe populations in England and Wales in 2006 were 7.19 million and 4.7 million respectively, this ratio is 60%. It was therefore assumed that 15,000 lap AI procedures and 480 MOET procedures were being undertaken in England prior to the ban.

4. Lamb production using artificial breeding

Annual lamb production with the lap AI technique was calculated using a conception rate of 75% and 1.4 as the natural reproductive capacity of ewes, and annual lamb production using the MOET technique was calculated using a 70% rate of embryo survival and a rate of 6 live lambs to each ewe. Accordingly, it was assumed that nearly 18,000 lambs would be produced every year over the five year time horizon in the elite breeding sector if the artificial breeding techniques were exempted from the ban.

5. Baseline scenario

The baseline scenario in this case is that artificial breeding procedures continue to be banned in future. In that case, elite breeders would switch to the next best alternative. This is likely to be natural breeding, because of the lack of comparable artificial breeding alternatives to lap AI and MOET in sheep.

Lap AI is the only technique that enables the successful exploitation of frozen thawed semen in sheep. Conception rates using cervical AI with frozen semen are in the range of 10-30% and therefore commercially unacceptable at the present time. The closest alternative to lap AI and MOET is cervical AI with fresh semen. Conception rates using this technique are in the range of 60-70%. Sperm dose requirements, however, are very high, in the region of 350 million sperm/dose, which limits the mating capacity of the ram to no more than 20-30 ewes/day. Flexibility is also greatly limited as a result of the requirement to use fresh sperm, as the procedure must be carried out within six hours. Therefore, there is limited scope to extend the use of cervical AI.

Baseline lamb production was therefore calculated by assuming that ewes that would have been subject to lap AI and MOET procedures prior to the ban would now be serviced through natural breeding. As before, a conception rate of 75% and a natural reproductive capacity of 1.4 was used.

6. Baseline cost

Because lap AI allows the use of frozen semen, breeders using this technique can avoid buying a ram. If these breeders switched to natural breeding, they would have to incur the costs of purchasing a ram and maintaining it for the duration of its lifetime.

The recommended ewe to ram ratio for sheep farms is about 40 ewes to one ram. With this ratio, nearly 390 rams would be required for the ewes on which artificial breeding techniques would otherwise have been used. This is a very conservative estimate, as many elite breeding flocks tend to be very small, so that in practice more rams would be needed for the same number of ewes

The fixed cost of purchasing rams was estimated using a market price of £500 per ram and a reproductive lifetime of four years. Variable costs of maintaining rams include the cost of feed, bought-in fodder, concentrates, veterinary and medical costs, etc. An estimate of £25/ram/year was used for variable cost. The value of the ram at the end of its reproductive lifetime was deducted from the cost of baseline lamb production using a value of £23 for a cull ram.

7. Cost of artificial breeding

According to an industry source, the cost of a lap AI procedure is about £10-15/ewe. An estimate of £12.5 was therefore used as the cost of a lap AI procedure.

The cost of a MOET procedure is £300-380 for a donor flush, and £40-60 for each embryo transferred. Using the mid-points of both ranges, and noting that 6 embryos can be transferred to each ewe, the price of each MOET procedure was assumed to be £640.

These prices were used to calculate the cost of the artificial breeding procedures.

8. Use of lambs within elite breeding sector

The UK sheep breeding industry is geared towards the production of breeding males. Simm, Amer and Pryce (1997) state that *"…the role of elite breeders is to produce breeding stock, particularly males…"*, while Amer et al. (2007) report *"Genetic improvement on commercial sheep and beef farms is largely realised through the purchase of breeding males (Simm et al., 1994). These come from specialised flocks and herds where specific efforts are made to achieve genetic improvement of traits which maximise the saleability of breeding males to commercial farmers and, commonly, to other specialised breeders"*.

It was therefore assumed in the analysis that all female lambs produced through natural/artificial breeding in the elite breeding sector (half of all lambs produced) would be used internally in that sector for the further production of breeding males, while the majority of male lambs produced would be used for breeding in the commercial sector. This is consistent with the nature of the UK sheep breeding industry as described by Amer et al: *"The large number of specialised male breeding units for the sheep and beef industries arise for several reasons…relatively low reproductive rates relative to pigs and poultry mean that there are a large number of elite females required to generate breeding rams"*. It was also assumed that all the progeny produced by breeding males in the commercial sector would be destined for the slaughter market, as commercial flocks are primarily concerned with meat production and do not usually sell stock for further breeding.

It was assumed that 70% of the male lambs produced would be used as breeding males in the commercial sector. Although this estimate is on the conservative side, it is consistent with the assumption made by Amer et al. in their model of genetic progress that each breeding ewe generates a maximum of 0.4 breeding males suitable for sale every year.

9. Benefit of artificial breeding

The primary benefit of artificial breeding, that would be lost if the artificial breeding procedures were not exempted from the ban, is that it enables continued genetic improvement to take place. Genetic improvement at the top of the breeding chain (in elite breeding stocks) is disseminated through commercial breeders to sheep producers and results in profitable productivity increases.

In principle, genetic improvement programmes can target different sets of genetic traits for slaughter animals and breeding animals. For slaughter animals, growth and carcass traits such as faster growth, carcass weight, muscle depth, fat depth, and carcass conformation are important. Faster growing lambs can be sold to slaughter at an earlier age. Higher carcass weight obviously implies a higher return for the farmer. Higher muscle depth and lower fat depth result in greater lean meat content of the carcass, which commands a higher price. Carcass conformation describes carcass shape in terms of convex/concave profiles and the amount of flesh (muscle and fat) in relation to the size of bones. A carcass classification system is used throughout the EU to classify sheep carcasses by fatness and conformation. The average fat class for sheep is class 3L, with classes 1 and 2 representing better performance. The average conformation class for sheep is class R, with classes E and U representing better performance.

For breeding ewes, female traits such as litter size and maternal ability (i.e. higher milking ability) are important. Higher litter size has obvious benefits for the farmer in terms of more lambs for the market. Higher milking ability of ewes is typically measured indirectly through the weight of lambs weaned, as ewes with higher milking ability will produce heavier lambs at weaning.

In practice, the main focus of sheep genetic improvement programmes in the UK has been to produce heavier lambs at slaughter in a shorter time period. Therefore, the key trait considered for the economic evaluation of artificial breeding in the sheep industry was the carcass weight of slaughter lambs. Although ongoing research suggests that potential gains could be made from genetic improvement programmes targeting breeding animals, they have not yet been realised. According to Amer et al., *"the inherent problems of selecting for sex-limited traits with low heritability and expressed quite late in life appear to have precluded quantifiable genetic improvements in maternal traits, at least until very recently. Instead, recent genetic progress appears to have come from improvement in terminal sire traits, such as growth rate, and to a lesser extent, carcass composition"*.

10. Benefit estimation

According to industry sources, the use of artificial breeding techniques has resulted in annual rates of improvement of up to 4% in the key genetic traits of breeding animals. One respondent to the consultation noted that *"the use of these procedures is understood to have generated around a 4% per annum increase in index scores among flocks involved in sire reference schemes"*. When superior breeding animals are used for mating in the commercial sector, 50% of the genes of the slaughter lambs produced would come from these parents. An annual rate of 2% was therefore used to forecast the increase in carcass weight of slaughter lambs produced in the artificial breeding scenario.

The average carcass weight of slaughter lambs is about 19.5 kg, and the unit price is about £2.7/kg. It was assumed that carcass weight would stay constant at this level over the five year time horizon in the baseline scenario. In the artificial breeding scenario, it would continue to increase at the rate of 2% pa[2]. The benefit of genetic improvement was therefore estimated as the monetary value of increased meat production in the slaughter lambs produced by the breeding rams that were created through artificial breeding techniques.

Since 2% represents the maximum possible rate of genetic improvement that is consistent with recent experience, lower rates of 1% and 1.5% were also used in order to generate a range of benefit estimates.

11. Net present value

[2] The assumption that all further increases in carcass weight would stop as soon as artificial breeding techniques were banned was made primarily for ease of calculation. In reality, the benefits of genetic improvement take time to filter down, so that the impact of genetic improvement programmes from previous years would still be felt. Moreover, some genetic progress would continue via natural breeding.

In a cost benefit analysis of any policy, the net present value (NPV) represents the net benefit that would accrue to society over the time horizon, if the proposed policy were to be implemented. In this case, the NPV is the net benefit that would be achievable over the next five years if the artificial breeding procedures were exempted from the mutilations ban. It is a 'net' value both because the additional cost of artificial breeding has been deducted from the benefit of artificial breeding, and because both the cost and the benefit of artificial breeding have been calculated over and above baseline cost/benefit. Since both costs and benefits accrue in the future, their present value is calculated through a process of discounting. In accordance with Green Book guidance, a 3.5% discount rate was used.

It was estimated that, if the artificial breeding procedures led to a 2% rate of annual genetic progress in slaughter lambs produced in the commercial sector, exempting them from the mutilations ban could result in a NPV of £8.1 m. Using more conservative rates of genetic improvement of 1% and 1.5%, the NPV of the proposed policy was estimated to be £2.9 m and £5.5 m, respectively.

The scale of the estimated benefits are roughly consistent with published estimates. Simm, Amer and Pryce (1997) estimated the combined value of genetic improvement in sheep and beef cattle in Britain to be about £4.8 m per year. Amer et al. (2007) estimated that the benefit over twenty years from ten years of genetic progress in the entire UK sheep population is about £17.8 m. These studies did not deal specifically with the impact of artificial breeding, but instead evaluated the overall benefit of genetic progress, whether it was achieved via natural or artificial breeding.

12. Impact Tests

Competition Assessment

The amendments will have no new implications in terms of competition. However, a failure to carry out the proposal may have consequences in terms of competition between the devolved regions.

Not going ahead with the amendments is likely to disadvantage English companies. Scotland and Wales are currently reviewing their Regulations relating to controlling reproduction in sheep and goats. If they were to decide to lift the prohibition on certain artificial insemination procedures, but England maintained the ban, there would be significant negative consequences for the English sheep breeding industry. It is likely that companies would move to Scotland or Wales where they could continue their business within the law and English sheep farmers would be disadvantaged by being unable to take advantage of these techniques for breed improvement programmes. During the consultation process sheep breeding companies also expressed fears that if the ban were to continue, Britain's export market in sheep and goat genetics would be greatly disadvantaged.

Small Firms Impact Test

We do not envisage the amended Regulations to have any significant cost implications. We have consulted the British Veterinary Association and they did not raise any points with regard to how the Regulations may affect veterinary practices. In fact, by allowing previously prohibited procedures to take place, veterinary surgeons would benefit from the amendments. Veterinary income from these procedures is estimated at £13million a year (26,000 procedures as above, each involving 2.5 fee hours at £200 an hour), this income would be lost if the procedure remained prohibited.

13. Conclusion

Exempting artificial breeding procedures such as laparoscopic artificial insemination and embryo transfer for sheep from the mutilations ban could lead to a net social benefit of up to £5.6 million over the next five years. While these procedures are not used as extensively for goats, the 'true' value of the exemption for the sheep and goat industries combined would be somewhat larger. Data on the export of sheep and goat genetic material such as embryos and semen have not been found, but this is another benefit of the amendments.

The balance of costs and benefits is based on the assumption that the welfare cost of conducting artificial breeding procedures on sheep and goats will be negligible in practice, due to the use of good practice.

References

Amer, P R, Nieuwhof, G J, Pollott, G E, Roughsedge, T, Conington, J and Simm, G (2007) 'Industry benefits from recent genetic progress in sheep and beef populations'. Animal 1(10), pp. 1414-26.

Pollott, G E and Stone, D G (2003) The breeding structure of the British breeding sheep industry 2003. Produced for Defra.

Simm, G, Amer, P R and Pryce, J E (1997) 'Returns from genetic improvement of sheep and beef cattle in Britain'. SAC Animal Science Research Report, Scottish Agricultural College, Edinburgh, pp. 12-16.

Simm, G, Conington, J, and Bishop, S C (1994) 'Opportunities for genetic improvement of sheep and cattle in the hills and uplands'. In T L J Lawrence, D S Parker and P Rowlinson (ed.) Livestock production and land use in hills and uplands, BSAP occasional publication 18, BSAP, Edinburgh, pp. 51-66.

Specific Impact Tests: Checklist

Use the table below to demonstrate how broadly you have considered the potential impacts of your policy options.

Ensure that the results of any tests that impact on the cost-benefit analysis are contained within the main evidence base; other results may be annexed.

Type of testing undertaken	*Results in Evidence Base?*	*Results annexed?*
Competition Assessment	Yes	No
Small Firms Impact Test	Yes	No
Legal Aid	No	Yes
Sustainable Development	No	Yes
Carbon Assessment	No	Yes
Other Environment	No	Yes
Health Impact Assessment	No	Yes
Race Equality	No	Yes
Disability Equality	No	Yes
Gender Equality	No	Yes
Human Rights	No	Yes
Rural Proofing	No	Yes

Annexes

Legal Aid

The Proposal does not create new criminal sanctions or civil penalties.

Sustainable Development

This proposal will have very little impact on sustainable development.

Carbon Impact Assessment

The Proposal will have no significant effect on carbon emissions.

Other Environmental Issues

The proposal has few implications in relation to climate change, waste management, landscapes, water and floods, habitat and wildlife or noise pollution.

Health Impact Assessment

The Proposal will not directly impact on health or well being and will not result in health inequalities.

Race /Disability/Gender

There are no limitations on meeting the requirements of the Proposal on the grounds of race, disability or gender. The Proposal does not impose any restriction or involve any requirement which a person of a particular racial background, disability or gender would find difficult to comply with. Conditions apply equally to all individuals and businesses involved in the activities covered by the Proposal.

Human Rights

The Proposal is consistent with the Human Rights Act 1998.

Rural Proofing

This proposal will not have a significant impact on rural life and rural communities.

Summary: Intervention & Options

Department /Agency:	Title:	
Defra	Impact Assessment of amending the Mutilations (Permitted Procedures) (England) Regulations 2007	
Stage: Final IA	**Version:** 2	**Date:** March 2008
Related Publications: Impact assessment of proposal to permit artificial insemination techniques in sheep and goat.		

Available to view or download at:

http://www.http://www.defra.gov.uk/corporate/consult/mutilation-reg08/index.htm

Contact for enquiries: Charlotte.Coles@defra.gsi.gov.uk **Telephone:** 0207 238 5980

What is the problem under consideration? Why is government intervention necessary?

The Mutilations (Permitted Procedures) (England) Regulations 2007 currently prevent the use of some of the most effective forms of identification for certain birds in conservation and the farming industry. These identification techniques are used in breeding programmes for farmed birds and enable commercial producers to benefit from continued genetic improvement. They are also the most effective means of marking wild birds in conservation and reintroduction programmes, and enable conservation agencies to evaluate the success of their programmes. They are also used for research purposes and for identification purposes when sampling for the presence of disease.

What are the policy objectives and the intended effects?

We are amending the 2007 Regulations to permit:- i) the wing-tagging and web-tagging of non-farmed birds for conservation puposes and for research ii) the wing and web-tagging of farmed birds for breed improvement programmes and for for testing for disease iii) the neck-tagging and web-notching of farmed ducks for breed improvement programmes

The intended effect of these amendments is to allow conservationists and certain poultry farmers to use the most efficient and effective methods of identification.

What policy options have been considered? Please justify any preferred option.

Option I - Leave 2007 Regulations unamended

Option II - Amend 2007 Regulations

Strong preference for option II. Failure to amend the 2007 Regulations would be damaging to bird conservation efforts, particularly reintroduction programmes, and to certain sectors of the farmed

When will the policy be reviewed to establish the actual costs and benefits and the achievement of the desired effects?

Five years from the amending Regulations coming into force.

Ministerial Sign-off For Final Impact Assessments:

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible Minister:

Jeff Rooker

.....Date: 1st April 2008

Summary: Analysis & Evidence

Policy Option: 2	Description: **Proposal to add wing, web and neck tagging and web-notching of birds for conservation purposes and for commercial breed improvement programmes to the list of exempted procedures**

COSTS

ANNUAL COSTS	
One-off (Transition) **Yrs**	Description and scale of **key monetised costs** by 'main affected groups' No monetised costs (see evidence base for details)
£ 0	
Average Annual Cost (excluding one-off)	
£ 0	**Total Cost** (PV) **£ 0**

Other **key non-monetised costs** by 'main affected groups'

BENEFITS

ANNUAL BENEFITS	
One-off **Yrs**	Description and scale of **key monetised benefits** by 'main affected groups'
£0	(i) Value of genetic improvement in commercial farmed bird sector: £6.7 m over 5 years
Average Annual Benefit (excluding one-off)	(ii) Economic value of increase in population of wild birds: £1.2-3.5 m over 5 years
£1.7-2.2 m 5	**Total Benefit** (PV) **£7.9-10.2 m**

Other **key non-monetised benefits** by 'main affected groups'

Key Assumptions/Sensitivities/Risks

Ban on wing/web/neck tagging and web notching assumed to lead to 5% loss in value of genetic improvement in farmed bird sector pa, and 0.1% reduction in future populations of affected wild bird species (conservative assumptions)

Price Base Year 2008	Time Period Years	**Net Benefit Range** (NPV) **£7.9-10.2 m**	**NET BENEFIT** (NPV Best estimate) **£7.9 m**

What is the geographic coverage of the policy/option?			England only	
On what date will the policy be implemented?			1 June 2008	
Which organisation(s) will enforce the policy?			Common Enforcers	
What is the total annual cost of enforcement for these organisations?			£0	
Does enforcement comply with Hampton principles?			Yes	
Will implementation go beyond minimum EU requirements?			No	
What is the value of the proposed offsetting measure per year?			£ 0	
What is the value of changes in greenhouse gas emissions?			£ 0	
Will the proposal have a significant impact on competition?			No	
Annual cost (£-£) per organisation (excluding one-off)	Micro	Small	Medium	Large
Are any of these organisations exempt?	No	No	N/A	N/A

Impact on Admin Burdens Baseline (2005 Prices) (Increase - Decrease)

Increase of £0 Decrease of £0 **Net Impact** **£ 0**

Key: **Annual costs and benefits: Constant Prices** **(Net) Present Value**

Evidence Base (for summary sheets)

[Use this space (with a recommended maximum of 30 pages) to set out the evidence, analysis and detailed narrative from which you have generated your policy options or proposal. Ensure that the information is organised in such a way as to explain clearly the summary information on the preceding pages of this form.]

1. Introduction

The Mutilations (Permitted Procedures) (England) Regulations 2007 created a list of exemptions from the ban on mutilations contained in section 5 of the Animal Welfare Act 2006. Omitted from the list of permitted procedures were the wing, web and neck-tagging and web-notching of birds. During the consultation on the 2007 Regulations, industry bodies did not tell us of the need for these procedures to be added to the list.

Since the Regulations have come into force however, we have been told that the wing-tagging and web-tagging of birds for conservation purposes is an essential procedure in reintroduction and conservation programmes for certain species. Leg rings cannot be used in birds of prey, for example, as their relatively short legs render the rings insufficiently visible. Tagging is essential to allow conservationists to monitor the number of a certain species in a specific area, especially if they have recently been reintroduced. Also included under the heading of 'conservation purposes' are education and captive breeding programmes. As tagging for monitoring purposes is the primary reason for wing-tagging this impact assessment will focus on this element of the broader term 'conservation purposes'.

We have also been made aware of the use of wing, web and neck-tagging and web-notching in farmed birds. Wing and web-tagging is used in breed improvement programmes in order to identify from a very young age the pedigree of the birds. During the consultation process, officials were provided with information to show that the welfare of the bird was not put at risk by either procedure. It was also argued that alternatives such as micro-chipping and leg rings could be potentially more damaging to welfare. Neck-tagging and web-notching are used by pedigree duck breeders as they are the most welfare-friendly forms of identification for day old ducklings. Ducklings have a loose scruff at the back of their neck which can be tagged without major welfare concerns. At this age their wings are not developed enough to tag and due to the speed of growth of their legs, leg rings would have to be replaced every few days which would cause stress for the birds due to the amount of handling this would involve. Web-notching involves a nick to the membrane of the web in either a 'V' shape or a small hole. The method is used to identify ducklings intended for line breeding programmes to improve the quality of the birds.

We are inserting a provision to permit the wing and web-tagging of non-farmed birds for the purposes of research, and farmed birds for identification when sampling for disease. The proposal to allow these procedures for research purposes came about following consultation with conservation groups. We were informed that tagging was sometimes carried out in order to monitor birds involved in research programmes. It was considered to be important that all scenarios where birds are tagged were covered in the regulations. Similarly, we were informed that tagging is used to identify birds tested as part of notifiable disease outbreak control programmes. It was decided to allow wing and web tagging for these purposes as to disallow them would cause difficulties for conservation programmes and disease control programmes.
These purposes are not considered further in this impact assessment. This is because it is felt that the purposes, being specific to certain (and generally infrequent) circumstances, would have no impact on industry or administrative burdens.

We have included a provision to prohibit tagging, micro-chipping, de-toeing, dubbing and laparoscopy on laying hens in establishments of more than 350 laying hens, thereby bringing the 2007 Regulations into line with the European Union Laying Hens Directive (OJ No L 203, 3.8.99, p 53) which bans these actions on establishments of more than 350 birds. The industry has informed us that these procedures are

not carried out on laying hens that fall under the remit of the Directive and will not place a burden or restriction on the industry. As result it is not considered further in this assessment.

1.1 Options

We have considered two options in formulating policy:

I. Leaving the Regulations as they are and maintaining the prohibition on wing, web and neck-tagging and web-notching.

II. Amending the Regulations to allow wing-tagging and web-tagging for conservation and farming purposes and neck-tagging and web-notching in ducks for farming purposes.

Below are two analyses of the economic costs and benefits of option II set against the base line of option I. The first deals with farmed birds and the second with wild birds.

2. Costs and benefits – Farmed birds

2.1 Introduction

The economic impact of exempting tagging of farmed birds from the mutilations ban was examined. Farmed bird species included in the analysis were chickens, turkeys and ducks. Together, these three species account for more than half of the primary meat market in the UK. Although geese are also produced for domestic consumption, production volumes are very small and it was therefore excluded from the analysis.

A five year time horizon was used in the analysis of costs and benefits. The main reason for using a five year time horizon was that a policy review of the regulations is planned in five years' time.

2.2 Tagging in farmed birds

Wing tagging, web tagging, neck tagging and web notching are extensively used for identification purposes in the farmed bird breeding sector. Breed improvement has a triangular structure. At the top of the triangle are the pedigree or elite flocks, where selective breeding for genetic improvements is carried out. These flocks produce the great-grandparent and grandparent flocks, which in turn produce the parent flocks. In the chicken industry, the parent flock comprises two types of chickens: laying hens for egg production, and chickens for broiler production.

Birds in the top tiers (pedigree, great-grandparent and grandparent flocks) are tagged. Breed improvement programmes select for both production traits such as feed conversion, breast meat yield, and egg production, and non-production welfare traits such as skeletal development, cardiovascular fitness, and disease resistance.

Industry experts strongly support tagging as the only effective means of identifying individual birds, which is clearly essential for carrying out breed improvement programmes. One consultation response noted that *"The use of wing tagging is essential in pedigree breeding operations and at present no other practical alternative has been identified which provides a better method of identification of individual birds from day old onwards"*.

Other marking options for birds are the use of leg rings, elastic bands on wings or legs, or microchips. However, there are considerable problems with all of these alternatives. Both leg rings and elastic bands pose an increased risk of constricting blood supply, which can result in injury, lameness, or death due to necrosis. Leg rings are also frequently outgrown, which means that they must be replaced frequently. An industry expert has indicated that leg rings would probably have to be replaced 3-5 times for chickens between 0-8 weeks. In ducks, they would have to be changed at least four times at approximately 1, 2, 3 and 10 weeks, and possibly once more in the teens. Repeated handling results in increased stress levels for the birds, which is likely to lead to reduced growth and productivity. Micro chipping is a less effective

procedure because microchips sometimes migrate under the skin. Also, the birds have to be handled in order to read the microchip.

Wing tagging, on the other hand, is believed to cause minor and temporary discomfort, and tags are readily accepted by the birds[3].

2.3 Baseline scenario

If wing tagging is not exempted from the mutilations ban, poultry breeders would probably switch to using alternative marking techniques such as leg ringing. However, it is clear from the above that alternatives to wing tagging are unsuitable for a number of reasons.

2.4 Cost of exempting wing tagging

The animal welfare cost of leg ringing is likely to be higher than the cost of wing tagging (from stress induced by repeated handling). Avoiding higher animal welfare costs would therefore be one of the benefits of exempting wing tagging from the mutilation regulations. However, estimating the monetary value of this was not possible.

2.5 Benefit of exempting wing tagging

Because wing tagging is the most common, efficacious and welfare friendly method of marking farmed birds, a continued ban on wing tagging is likely to have a significant impact on breeding programmes. One respondent to the public consultation went to the extent of stating that *"the effect of banning these procedures would be to ban the whole of the UK poultry primary breeding sector"*. Breeding programmes would be affected both due to increased welfare culling as a result of increased risk of injury to birds from leg rings, and due to fewer progeny produced in the breeding bird sector as a result of increased stress from increased handling. An adverse impact on breeding programmes, in turn, would result in loss of economic value from genetic improvement in the farmed bird industry. The avoided loss, therefore, represents the benefit of exempting wing tagging from the mutilation regulations.

Establishing a precise relationship between leg ringing and the loss of economic benefits was, however, impossible. Because leg ringing is not used on a large scale in the farmed bird breeding sector, industry sources indicated that there was a lack of data on the number of birds destroyed specifically for leg ringing related reasons. The approach taken was therefore to estimate the economic value of genetic improvement in the farmed bird sector, and assume that a certain proportion of the total value would be lost if wing tagging was not exempted from the mutilations ban. Although industry sources indicated that the impact of the ban would be considerable, it was assumed that only 5% of the total value would be lost, in order to generate a very conservative benefit estimate. Even with such a conservative assumption, the loss of value was found to be considerable.

2.6 Benefit estimation

Two main areas for genetic improvement were considered: increase in egg production by laying hens, and decrease in feed conversion of broiler chickens, turkeys and ducks. These are explained in the following sections.

2.6.1 Egg production by laying hens

Egg production is one of the primary reasons for the genetic improvement of laying hens. Other important breeding objectives include low mortality, conformation, bone strength, aggression, high adaptability to different environments, low feed cost per egg, and optimum internal and external egg quality. Preisinger and Flock (2000) report the results of econometric analysis to isolate the impact of genetic improvement

[3] Since wing tagging is the most important and widely used marking technique of the ones considered here, the text makes reference to wing tagging. However, economic values refer to all the marking techniques.

on egg production of laying hens over time. Using data from their report, the rate of genetic improvement was estimated to be 0.4% per annum. In order to estimate the value of genetic improvement in the laying hen sector, it was assumed that this rate would persist over the next five years.

The UK laying hen population in 2003 was 29.3 m, while the English population was between 20.78-25.64 m (Russell et al, 2005). Using a mid-point estimate for the English population, it was estimated that England accounts for 79% of the UK population. Using this proportion, and given that the current population of laying hens in the UK is 31 m (Defra, 2005), the English laying hen population was estimated to be 24.5 m. It was assumed that this population would stay constant over the five year time horizon.

Average yield per layer was 307 in 2005 (Defra, 2005). From this level, an annual increase of 0.4% pa results in an increase of about one egg/hen/year. While egg production obviously cannot be increased indefinitely (the biological limit is one egg per day), it seems reasonable to assume that genetic progress can be sustained over the relatively short time horizon considered here. Egg production in the absence of any further genetic improvement was calculated by using the 2007 level of egg yield/hen for future years.

2.6.2 Feed conversion in broiler chickens

The feed conversion ratio (FCR) is defined as the quantity of feed required to produce a kg of liveweight output. Therefore, a decrease in the FCR implies a reduction in the quantity of feed required to produce a bird to typical slaughter weight. Genetic progress has resulted in a decrease in the FCR over time. Other genetic progress has occurred in areas such as cardio vascular fitness, skeletal integrity, liveability, leg condition and skin lesions.

Mean FCR in the English broiler chicken industry in 2002 was 1.9 (Sheppard, 2004). The rate of genetic improvement in FCR in the broiler chicken industry is -1.2% per annum (McKay et al, 2000). This rate was used to derive an estimate for current FCR, as well as predicted FCR over the next five years if genetic improvement continued. As before, baseline FCR (if no further genetic improvement took place) was calculated by assuming that FCR in future years would stay constant at the 2007 level.

England accounted for 75% of the total UK production of broiler chickens in 2002 (Sheppard, 2004). Assuming that this proportion still holds, and given that current broiler chicken production in the UK is about 860 m, current broiler production in England was estimated to be 645 m. Average liveweight at sale of broilers is about 2.4 kg (Sheppard, 2004). Feed cost was assumed to be about £0.2 per kg in present terms, based on feed cost estimates from Sheppard (2004).

2.6.3 Feed conversion in turkeys

Annual turkey production in England is about 11.3 m (Defra, 2007). The average liveweight is 13.8 kg (Defra, 2008). Average feed cost is about £0.2/kg. FCR in turkey production in 2000 was 2.63, and the rate of genetic progress was estimated to be about 2% per annum (McKay et al, 2000).

2.6.4 Feed conversion in ducks

Annual duck production in England is about 16.2 m. Average liveweight is 3.4 kg. Average feed cost was assumed to be £0.2/kg. FCR in duck production in 2000 was 2.2, and the rate of genetic progress was estimated to be about 2% per annum (McKay et al, 2000).

2.7 Results

If no further genetic progress took place in egg production in the laying hen sector and in the efficiency of feed conversion in the farmed bird sector, the potential loss of value would be more than £130 m over the next five years. Although a ban on wing tagging and other similar marking techniques would lead to some loss of value, it was not possible to estimate precisely what the extent of this loss would be. To err on the conservative side, it was assumed that a continued ban on these marking techniques would only lead to a

5% reduction in the value of genetic progress in the farmed bird industry, although industry sources have suggested a much greater impact. It was found that a 5% reduction would still represent a significant loss of nearly £7 m over the next five years. This is likely to be an under-estimate, not only for the reason stated above, but also because breeding programmes target several marketable attributes, of which only a few have been valued here, and because certain smaller market sectors such as duck eggs and goose meat were ignored in the analysis.

3. Costs and Benefits – Wild birds

3.1 Wing tagging of wild birds

Bird conservation agencies have indicated that about forty conservation and reintroduction projects every year involve the wing tagging of wild birds. On average, about 500 birds are tagged each year.

According to bird conservationists, wing tagging is an essential procedure in reintroduction and conservation programmes for certain bird species. The next best alternative – leg ringing – is particularly unsatisfactory for birds of prey, as their relatively short legs render the rings insufficiently visible. Marking birds through wing tagging provides information on the habitat use of birds, movements, survival rates and causes of death (through reports of wing tagged birds found dead), which is used to inform the future development of projects.

Conservation agencies reported that they used wing tagging on several birds of prey in the UK, including the red kite, hen harrier, white-tailed eagle, golden eagle, and kestrel. Grey herons and some ducks are also wing-tagged. The white-tailed eagle and golden eagle are either extinct or nearly extinct in England, but English reintroduction projects exist for the red kite, hen harrier and kestrel.

3.2 Baseline scenario

If wing tagging is not exempted from the mutilations regulations in future, it was assumed that conservation agencies would switch to using leg rings on all ‘new’ entrants to conservation and reintroduction programmes. Birds that have already been wing tagged would continue to wear wing tags.

3.3 Cost of exempting wing tagging

There is not likely to be any appreciable difference in the financial cost to conservation agencies of using wing tagging versus leg ringing on birds. In terms of the animal welfare cost, leg ringing may be less invasive in comparison to wing tagging, as the latter involves piercing the bird’s wing. However, conservation groups have stressed that the overall impact of wing tagging on bird welfare is negligible. According to Natural England, the wing tagging procedure normally induces no reaction at all from the bird being tagged. Occasionally a bird may twitch slightly as the attachment is pushed through the wing membrane but the reaction is momentary and has no lasting effects. A review of the use and effects of marks and devices on birds (Calvo and Furness, 1992) also found that the use of wing tags in raptors did not seem to cause any adverse physical or behavioural impacts.

On the basis of the available evidence, it was therefore concluded that there are no additional costs of exempting wing tagging (over and above baseline costs).

3.4 Benefit of exempting wing tagging

Conservation agencies stated that, because leg ringing is a less efficacious marking technique than wing tagging for wild birds, the wing tagging ban would make it more difficult for them to evaluate the success of their programmes. This would create the risk of misdirecting conservation activity and investment, in which case future wild bird populations in England would be lower under the ban, than if wing tagging were exempted from the ban. This represents the benefit of exempting wing tagging.

Although this is a plausible scenario, conservation agencies were unable to provide any predictions or even best guesses regarding the actual impact that a continued ban on wing tagging might have on future population growth rates of wild birds. The approach taken was therefore to value a range of potential impacts, ranging from 0.1% to 1% decrease in wild bird populations under baseline conditions, compared to the scenario in which wing tagging was exempted from the ban. In order to estimate the actual number of birds affected, future population levels that would prevail with and without the wing tagging ban were forecast for each affected species. The future population growth rate that would prevail if the ban was lifted was estimated in some detail for the red kite (see appendix 1), both because this species was particularly highlighted in the responses to the public consultation, and because there was adequate data in the public domain about the population growth rates observed in the course of reintroduction projects since 1989. Because such data was not available for the other species, it was assumed that the current population levels would be maintained if the ban on wing tagging was lifted, while retaining the ban would lead to a fall in population.[4]

Using the population estimates, it was apparent that the 0.1% population reduction scenario represented minimal impact on wild bird populations, as it was associated with the potential loss of only a few red kites and hen harriers and about fifty kestrels.

3.5 Benefit estimation

The total economic value (TEV) of environmental 'goods' such as wild birds includes both use and non-use values. Use value, as the name suggests, is the value attached to actual or potential use of the resource. It includes the direct use value (e.g. bird-watching for recreation), indirect use value (the value of the species in maintaining healthy and resilient ecosystems), and option value (the value attached to possible use of the resource in the future). The non-use value stems from the fact that people often value the continued existence of an environmental resource, not because they use it, but due to purely altruistic motives, ethical considerations, or for the benefit of future generations.

The monetary value of any good or service is measured by the concept of willingness to pay (WTP), which is dictated by individuals' underlying preferences. For commodities that are partly or wholly traded in the marketplace, the market price provides at least a lower bound estimate of the WTP (since consumers would not pay the market price unless the commodity was worth at least as much to them). In the present context, for instance, the cost of visits by bird-watchers to wild bird reserves could provide a lower bound estimate. These costs are often substantial. The Kite Country centres in mid Wales, for instance, received 148,000 visits in 1995/96. The visitors were estimated to have spent £5.4 m in the mid Wales economy, of which £2.9 m was directly attributed to the Kite Country project (RSPB, 2006). More generally, the value of the bird-watching industry in the UK has been estimated to exceed £200 m (Murray and Simcox, 2003).

Using bird-watching expenditure to estimate the economic value of the wild bird species considered here was difficult, because of lack of information on the value attributable to specific species. Moreover, bird-watching represents only one component – direct use value – of the TEV. Because non-use values for environmental goods are often significant, using an economic value estimate that ignored this component altogether could result in a considerable under-estimation of benefit. Because non-use value, by definition, is not associated with consumption of the good in any form, it cannot be estimated by using actual market transactions to 'reveal' peoples' underlying preferences. Instead, it has to be elicited by asking individuals to state their preferences. These are called stated preference methods, and include techniques such as contingent valuation (CV), which is the most commonly used stated preference technique, and contingent ranking.

[4] In spite of repeated probing, conservation agencies could not provide current population estimates of the bird species concerned, so estimates were generated using publicly available data, mainly from the RSPB and BTO websites and reports. It was thereby estimated that there are currently about 500 pairs of red kites, 30 pairs of hen harriers, and 25,000 pairs of kestrels in England (see appendix 1 for details).

Ideally, the economic value of exempting wing tagging of wild birds from the mutilations ban would be estimated by multiplying the unit WTP for each affected species by the increase in population of that species that could be expected to occur as a result of the continued use of wing tagging. In practice, this was impossible, because (i) as stated above, it was impossible to establish a quantitative relationship between wing tagging use and future population increases, and (ii) WTP estimates for all the particular bird species considered here were not found. As a result, the search was widened to include WTP estimates for bird species in general. The results are reported in Table 1. The reported estimates were used to derive WTP for a 1% change in the population of one species of wild bird.

Table 1. Willingness to pay for bird species

No.	Study	Environmental good valued	WTP for environmental good (2007 £/household/year)	Derived WTP for 1% change in population of one species (2007 £/household/year)
1	Foster and Mourato (2000)	Loss of one species of farmland bird in the UK	15.2	0.15
2	Macmillan et al. (2002)	10% increase in population of four wild goose species in Scotland	4.9	0.12
3	MacMillan, Hanley and Lienhoop (2006)	Expansion of red kite reintroduction programme in Scotland	10.5	0.04
4	Christie (2007)	Conservation of red kites in Wales	8.7	0.09

Table 1 shows that there is considerable variation in the WTP estimates. One of the problems commonly mentioned in the context of CV surveys is that, because of the hypothetical nature of the questions, the stated values are likely to be much higher than what people would actually pay in practice. There was evidence to suggest that this could be the case with the estimates produced by study 1, as the authors stated that *"…the results could be unrealistically high when compared with what people actually pay in practice. This result suggests that the monetary values obtained in this study would probably need to be adjusted before being applied to answer policy questions"*. It was therefore not used in benefit estimation. Study 4 was also eliminated because the format used to elicit WTP in this study was not consistent with the use of best practice in CV surveys[5].

Studies 2 and 3 were therefore used to produce a range of benefit estimates. These studies represent the cutting edge in CV research, as they use a market stall approach to elicit WTP rather than the conventional interview-based approach. The market stall approach allows participants to discuss the valuation issue in small groups, exchange information with each other, and form their opinion over a period of time. It has been suggested that, particularly for relatively unfamiliar goods (such as rare wild birds), this approach is likely to provide much more reliable WTP estimates than one-shot interviews.

3.6 Results

Willingness to pay estimates as reported above were used to value the potential benefit that would occur if wing tagging and other similar marking techniques were exempted from the mutilation regulations. Since it was not possible to predict precisely the impact that the ban would have on future populations of wild bird species, a conservative range of impacts ranging from 0.1% to 1% was considered. Using the WTP estimates from the previous section, the potential loss of economic value associated with a 1%

[5] This does not represent a shortcoming of the study, as its aim was to explore a different issue and not to produce a reliable estimate of the WTP for red kites.

change in the population of three wild bird species – the red kite, hen harrier and kestrel - was estimated to be in the range of £12-35 m over the next five years. For a 0.5% reduction in population levels, the possible loss of economic value was estimated to be in the range of £5.8-17.5 m. For a minimal impact of 0.1% reduction in population levels, the potential loss of economic value over the next five years was estimated to be £1.1-3.5 m.

3.7 Appendix 1

Red kite

The red kite had become extinct in England by the early 1900s. Reintroduction efforts were initiated by English Nature and the RSPB in 1989. Four waves of reintroduction have so far taken place: Chilterns from 1989-1994; Midlands from 1995-1998; Yorkshire from 1999-the present; and Gateshead from 2004-2008. Baseline projections of future red kite populations were made using population data obtained from reports of the reintroduction projects.

It was estimated that there are about 970 red kites in England at the present time**.**

Forecasts of red kite populations with and without the ban for the next five years were made in the following way:

1) The 'Return of the red kite' publication by English Nature/RSPB provide red kite population data for England in 2000/2001. There were 242 birds in the Chilterns, 32 in the Midlands and 16 in Yorkshire, making a total population of 290 (the Gateshead project did not start till 2004).

2) There are currently 700 red kites in the Chilterns.

3) From the above, the annual growth rate of red kite population in the Chilterns is estimated to be about 19%. It is assumed that this growth rate would prevail if wing tagging were exempted from the mutilations regulations.

4) This growth rate is used to forecast population levels in the Chilterns over the next five years. It is also used to calculate present-day population levels in the Midlands and Yorkshire, and to forecast population levels in these areas over the next five years.

5) In Gateshead, 20 kites were released in 2004, 41 in 2005, and 33 in 2006. Although the programme will continue till 2008, releases for 2007 and 2008 have not been included because of lack of data. As for the other regions, a growth rate of about 19% is used in order to calculate current population level, and to forecast population levels over the next five years.

Hen harrier

Within England, hen harriers are mainly found in the north. Currently, there are about 749 pairs in the UK, with another 57 pairs on the Isle of Man. A survey carried out in 1998 estimated the total hen harrier population at the time of 570 pairs, of which 436 were in Scotland, 19 in England, 28 in Wales, 38 in Northern Ireland, and 49 in the Isle of Man (Sim et al, 2001). Assuming that a similar distribution still holds, the current population of hen harriers in England was estimated to be 27 pairs.

Kestrel

There are currently 36,800 breeding pairs of kestrels in the UK. According to BTO estimates, England accounted for about 68.5% of the total UK population in 1991. Assuming that the same percentage still holds, the current kestrel population in England was estimated to be 25,208 pairs.

3.8 Appendix 2

References

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4. Impact Tests

Assessments of particular relevance are summarised below. Further Impact tests are attached in Annex I.

Other Environment
The amendments have minor implications for environmental issues, namely habitat and wildlife. By following option II we would be supporting the conservation of wildlife and biodiversity. Bird conservationists have used this method of identification of birds, particularly in reintroduction programmes, routinely before the 2007 Regulations came into force. See cost-benefit analysis above for data on the benefits to conservation efforts.

Rural Proofing
The amendments, by lifting a prohibition on a procedure commonly used by conservationists particularly in rural areas, is likely to have a positive impact in these areas. Feedback from conservationists during the consultation, although it did not include precise figures, did state that lifting the ban would significantly aid them in monitoring their conservation efforts. As has been demonstrated in the cost-benefit analysis, an increase in wild birds provides economic benefits for elements of the rural community, such as bird watching visitor centres.

Competition Assessment
The amendment which lifts the prohibition on wing, web and neck-tagging for farmed birds will not have a detrimental effect on competition. Indeed, if the ban was to remain, as the cost-benefit analysis states, the industry could face major financial losses. In the face of a continued ban, it is unlikely that pedigree bird breeders would continue their business in England. Scotland and Wales are currently reviewing their 2007 Mutilations Regulations in order to implement similar changes as are proposed in England. If they were to go ahead with a repeal of the ban on wing, web and neck-tagging, it is likely much of the business in England would move over the border. Therefore, the effect of lifting the prohibition will be to maintain a level playing field across the bird rearing sector Great Britain.

Small Firms Impact Test
The small firms upon which these proposals will impact are:

- Vets
- Pedigree bird breeders

We have consulted the BVA, which represents veterinary surgeons and their practices. They expressed their approval of the amendments and did not highlight any significant impact they would have on vets financially. We also consulted poultry breeders and their industry representatives. They highlighted the importance of lifting the ban on these procedures which they saw as vital to the survival of their businesses. Therefore, the amendments are likely to have a positive impact on firms which routinely used the procedures before the 2007 Mutilations Regulations came into force.

Specific Impact Tests: Checklist

Use the table below to demonstrate how broadly you have considered the potential impacts of your policy options.

Ensure that the results of any tests that impact on the cost-benefit analysis are contained within the main evidence base; other results may be annexed.

Type of testing undertaken	***Results in Evidence Base?***	***Results annexed?***
Competition Assessment	Yes	No
Small Firms Impact Test	Yes	No
Legal Aid	No	Yes
Sustainable Development	No	Yes
Carbon Assessment	No	Yes
Other Environment	Yes	No
Health Impact Assessment	No	Yes
Race Equality	No	Yes
Disability Equality	No	Yes
Gender Equality	No	Yes
Human Rights	No	Yes
Rural Proofing	Yes	No

Annexes

Annex I: Outcome of Impact Tests not referred to in the Evidence Base

Legal Aid

The Proposal does not create new criminal sanctions or civil penalties.

Sustainable Development

This proposal will have very little impact on sustainable development as it reinstates the status quo.

Carbon Impact Assessment

The Proposal will have no significant effect on carbon emissions.

Health Impact Assessment

The Proposal will not directly impact on health or well being and will not result in health inequalities.

Race /Disability/Gender

There are no limitations on meeting the requirements of the Proposal on the grounds of race, disability or gender. The Proposal does not impose any restriction or involve any requirement which a person of a particular racial background, disability or gender would find difficult to comply with. Conditions apply equally to all individuals and businesses involved in the activities covered by the Proposal.

Human Rights

The Proposal is consistent with the Human Rights Act 1998.