



# The role of shooting in landscape scale land management

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Bird species in this report are shown in bold and colour-coded according to their conservation status, as defined by Birds of Conservation Concern 3 (2009).

# 1. EXECUTIVE SUMMARY

## Recommendations

- **Recognition for the benefits of wildlife management and pest control.** Shooters carry out wildlife management and vital pest control around the UK, invariably at no cost to the farmer. This enhances UK food security, helps to increase farm productivity and provides an important regulating ecosystem service. In the case of deer, rabbits and **woodpigeons** it also provides a valuable food resource. It is therefore vital that government and local authorities understand the need for, and recognise the benefits of, legitimate pest control.
- **Development funding to help farmers create shoots.** Shooting benefits the environment and farmers, and through the conservation based ecosystem services it provides, society as a whole. Funding for farmers to create more shoots would result in significant conservation benefits in terms of greater habitat creation and enhanced biodiversity. Furthermore it will increase the uptake of rural training delivered as a consequence of farm diversification.
- **Development of the supply chain for game as food.** Game meat is a healthy alternative to farmed meat with an estimated annual value of £61 million, but it is currently undervalued and underutilised.
- **Simplification of the general licences.** A reduction in the administrative burden surrounding general licences would facilitate best practice and allow shooters to concentrate on delivering their much needed and valued conservation work.

## Shooting and agriculture

- Farmers provide a significant proportion of the land, shooters shoot over.
- Farmland managed in a way that is beneficial for wildlife is beneficial for shooting.
- Shooters can provide important wildlife and habitat management and pest control services for farmers.
- Shooters are important for food security
- Shooters can help farmers achieve their agri-environment objectives.

## Shooting and landscape scale land management

- Shooters are well placed to manage off-set land to maximise the potential for biodiversity and shooting.
- Shooters have a proven track record of working with other land users and managers to achieve landscape scale management objectives.

## Payment for Ecosystem Services (PES)

- Shooting takes place over two thirds of the rural land mass of the UK, therefore shooters are well placed to take part in PES schemes.
- Shooters can add value by acting as buyers, sellers and knowledge providers for PES schemes.
- As PES schemes begin to gain acceptance there should be greater engagement between land managers and shooters to achieve landscape scale gains.

## Farm diversification

- Shooting offers a number of diversification options for farmers including clay pigeon shooting and leasing of shooting rights.
- Diversification into shooting allows farmers to upskill, through on the job and formal education. It offers the opportunity to add additional income

## 2. WHY IS LANDSCAPE SCALE MANAGEMENT IMPORTANT

Landscape scale management is “characterised by the pursuit of multiple benefits across a defined area (e.g. water quality, biodiversity, access). The best examples also make links to wider economic and social priorities, where enhancing nature can provide benefits to the local economy and quality of life” (HM Government, 2011). Traditional conservation efforts have focused on species, typically because they were commercially valuable, or threatened (Knight, 1998). Landscape scale management moves away from this species-centric approach to conservation and focuses on the habitat as a whole, seeking to enhance the ecosystem services that support important species, as well as those services which are beneficial to us (Brussard *et al.*, 1998).

In the UK this move was embraced by the Natural Environment White Paper (HM Government, 2011) which set out a new vision for nature which sought to put natural capital at the heart of a green economy and work with business to capture the value of nature. This is important as increased development, population growth and climate change are all beginning to exert pressure on the UK's natural environment. For example, some bird species are predicted to have to migrate an additional 250 miles within the next 50 years in order to reach suitable habitat (Doswald *et al.*, 2009). Given the level of the predicted impact of climate change on the UK environment it is important to build resilience and permeability in the UK's natural network of greenspace in order to allow wildlife to move in response to shifting temperatures. Clearly this must be achieved at the landscape scale.

Notwithstanding the need for landscape scale management to increase resilience, it also has an important role to play in the management of overabundant species such as deer (Wäber *et al.*, 2013), rabbits (Petrovan & Barrio, 2011) and foxes (Newsome *et al.*, 2014). Repeated studies have shown that uncoordinated attempts to manage these species on local (field-by-field or farm-by-farm) scale are ineffective, and can be counter-productive, for example leading to greater rates of emigration which simply exports the problem (Coulson *et al.*, 2003).

Getting the most for nature at such a large scale is not cheap, with, for example an estimated cost to farmers of £412m per year outside of agri-environment schemes (CPRE & NFU, 2006) and a more recent estimate of a total cost of £624.4m per annum to conduct all landscape scale management activities currently conducted by farmers and land managers in England alone (Cao *et al.*, 2009). However, when done properly, landscape scale management can deliver significant ecosystem services, such as £1.5 billion annually of “free” coastal defences (UK National Ecosystem Assessment, 2011) and £440 million per year of “free” pollination for UK crops (HM Government, 2011).

The UK government is currently trying to enhance the national effort for landscape scale management through schemes such as Nature Improvement Areas (NIAs), updated agri-environment schemes, trials for Payments for Ecosystem Services (PES) and biodiversity offsetting. Although farmers are able to deliver much that these schemes aim to achieve, shooters are well placed to facilitate this work and help move the UK towards a more extensive, rich and resilient natural network. Involvement of a broader range of stakeholders, including the shooting community, would provide an opportunity to enhance the value for money delivered by schemes such as these.



## **2.1. Landscape scale management and farming**

Environmental stewardship schemes<sup>1</sup> play an important role in modern farming systems and have contributed to a general greening of the landscape of the UK. These schemes have evolved from the Environmentally Sensitive Areas (ESAs) introduced in 1987 and today there are independent schemes either running, or soon to run in each of the home nations. The newer schemes have a strong emphasis on maintaining or enhancing landscape scale biodiversity gains, combating and building resilience against climate change and maximising ecosystem services (A. J. McKenzie *et al.*, 2013). Entry in to these schemes is voluntary; however there is a move away from the “broad and shallow” schemes of recent times (Curry, 2002) to competitive schemes that aim to deliver deeper, targeted benefits across a diverse range of habitat types. The Common Agricultural Policy (CAP) reforms have led to an overhaul of Rural Development Policy schemes, including agri-environment schemes. Policy makers should ensure they consider the shooting community whilst drafting the new schemes as we remain convinced that shooting can play an enhanced role in conservation through these schemes.

Research has identified that poor communication, lack of collaboration and high entry costs (Espinosa-Goded *et al.*, 2013) are restricting take up of agri-environment schemes in the UK (Emery & Franks, 2012). However, collaborative (with other farmers and land managers) landscape scale projects with clearly defined aims have been suggested by farmers as likely to increase entry (Franks & Emery, 2013; van Dijk *et al.*, 2015). Other factors likely to induce participation include the compatibility of the scheme with existing farming methods, and financial rewards (Lobley & Potter, 1998; Wilson & Hart, 2001).

Nature Improvement Areas (NIAs) in England are a good example of collaborative efforts to create joined-up and resilient ecological networks at the landscape scale. The first twelve NIA's started in April 2012 and will run for three years. Given the large scale of shooting activity and associated conservation work already conducted in the UK there is clearly potential for shooters to work with farmers and conservation-minded land managers to create or enhance ecological networks through NIA's, or other schemes.

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<sup>1</sup><https://www.gov.uk/government/collections/common-agricultural-policy-reform>  
<http://wales.gov.uk/topics/environmentcountryside/farmingandcountryside/farming/schemes/?lang=en>  
<http://www.scotland.gov.uk/Topics/farmingrural/Agriculture/Environment/Agrienvironment>  
<http://www.dardni.gov.uk/agri-environment-schemes>

## 2.2. Payment for ecosystem services

The term Payments for Ecosystem Services (PES) is used “to describe schemes in which the beneficiaries, or users, of ecosystem services provide payments to the stewards, or providers, of ecosystem services” (Smith *et al.*, 2013). An example of this is The Pumplumon Project in Wales where Biffaward and Waterloo makes payments to landowners to work with the local wildlife trust to secure a range of beneficial ecosystem services (Figure 1).



**Figure 1:** Pumplumon Project 5 year plan

PES schemes typically involve four groups (From Smith *et al.*, 2013):

- ‘**buyers**’: beneficiaries of ecosystem services who are willing to pay for them to be safeguarded, enhanced or restored;
- ‘**sellers**’: land and resource managers whose actions can potentially secure supply of the beneficial service;
- ‘**intermediaries**’: who can serve as agents linking buyers and sellers and can help with scheme design and implementation; and
- ‘**knowledge providers**’: these include resource management experts, valuation specialists, land use planners, regulators and business and legal advisors who can provide knowledge essential to scheme development.

### Shooters as **Buyers**

- Benefitting from game-friendly ecosystem services such as conservation headlands, cover crops and well managed woodlands.

### Shooters as **Sellers**

- Providing woodland management options for flood mitigation to councils (slowing down the flow by re-wetting woodlands)
- Providing crop and livestock protection (shooting pigeons, corvids and foxes)
- Providing the removal or control of non-native invasive species (for example air gunners controlling grey squirrels in woodland)
- Providing services to aid land managers meet cross-compliance and agri-environment scheme requirements.
- Providing services to aid land managers meet conservation objectives

### Shooters as **Intermediaries**

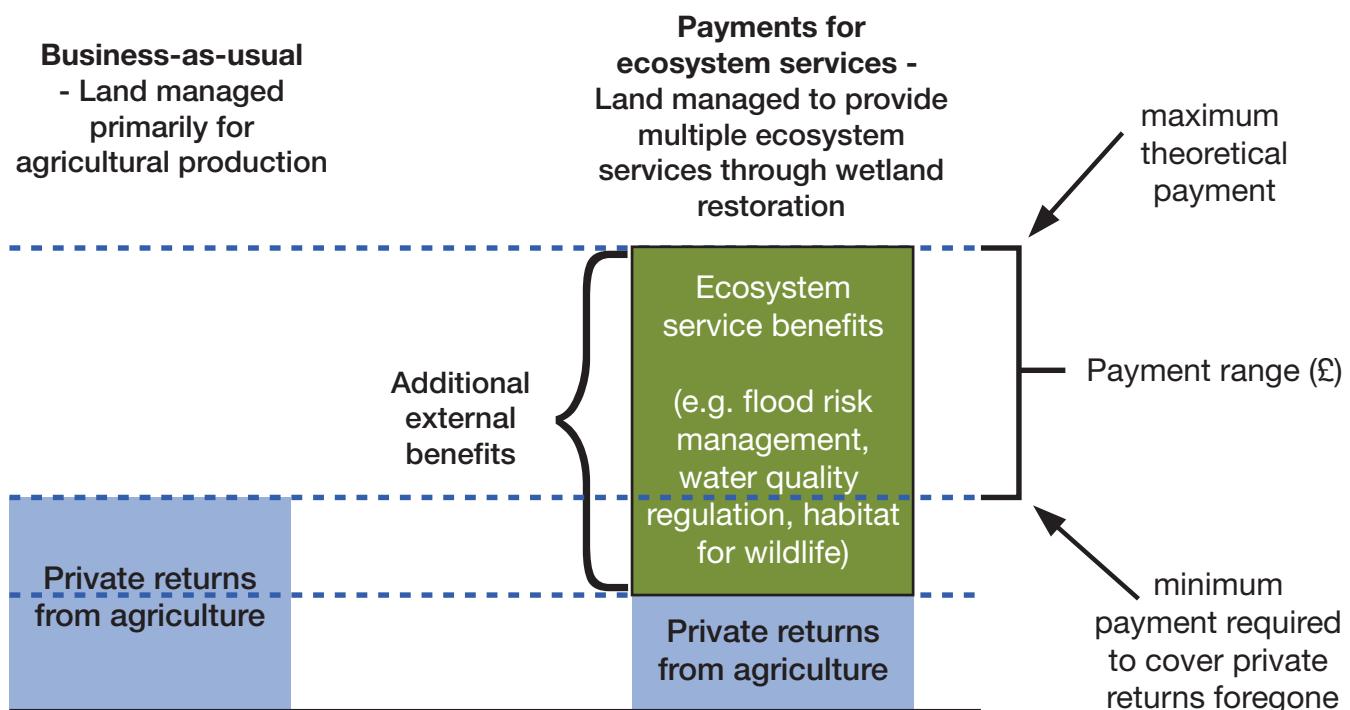
- Providing a link between land managers and conservation workers (for example through BASC's Green Shoots project)
- Assisting landowners with diversification to take advantage of shooting opportunities and the social, economic and environmental benefits that these opportunities can provide

### Shooters as **Knowledge Providers**

- Providing information from Greenshoots to help target other schemes (for example distribution data or fine scale habitat data)
- Providing knowledge on conservation and shooting in all its forms, including game and deer shooting and wildfowling

In order for PES schemes to work it is essential that everyone involved benefits. This is relatively simple to assess for the buyers who will likely be satisfied if they obtain the ecosystem services they've agreed. However, clearly there are likely to be costs for the supplier involved in any change in management. For example, there is a direct financial cost to farmers planting cover crops (time taken to prepare the ground and sow the seeds), as well as indirect costs such as land lost to grazing or cultivation. In order for PES schemes to be viable for sellers, it is essential that the benefits at least equal the return foregone. In this instance the value of the ecosystem services provided by planting cover crops, such as agri-environment payments, more insect pollinators and greater pest control provided by the bird and insect population supported by the cover crop should cover the financial loss to the farmer. Any shortfall would be expected to be accounted for by the PES buyer, which in this instance would be the shoot.

**Figure 2:** Land managed primarily for agricultural production vs land managed to provide multiple ecosystem services under a PES scheme (From Smith *et al.*, 2013)



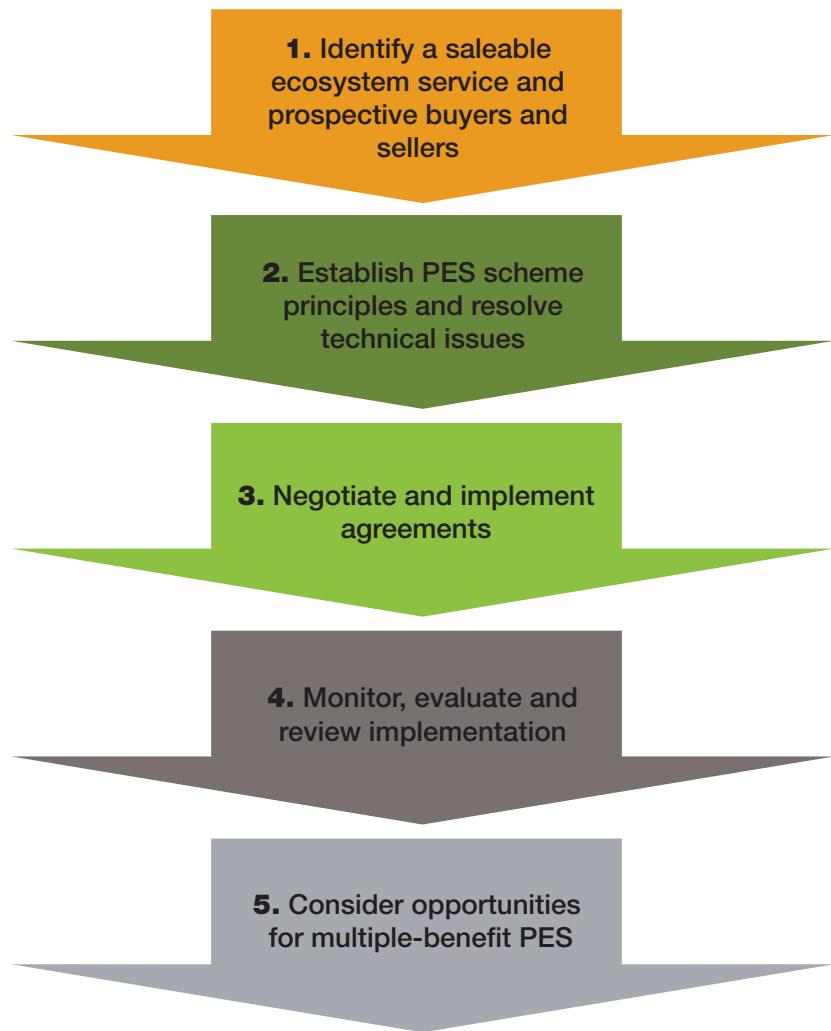
Best practice guidance on the delivery of PES schemes has identified five steps for successful delivery (Figure 3). The first step, identifying a saleable ecosystem service, depends on being able to answer “yes” to three questions:

- 1.** Are there specific land or resource management actions that have the potential to secure an increase in supply of the service?
- 2.** Is there a clear demand for the service in question and is its provision financially valuable to one or more potential buyers?
- 3.** Is it clear whose actions have the capacity to increase supply of the service in question?

Much shooting takes place over designated sites, and as such there will be conservation objectives that land managers on those sites must achieve. Obviously these objectives will vary from site to site (for example the conservation objectives for chalk grasslands will differ from those on estuaries), but where shooters are directly responsible for the management of the site it is very likely that they will be able to answer yes to each of the above questions.

Shooting takes place over two thirds of the rural land mass of the UK, and although many PES schemes would likely focus on local issues, such as helping farmers to meet agri-environment scheme requirements, BASC has already demonstrated the potential for landscape scale working through the various *Green Shoots* programmes.

Shooters are well placed to work with farmers, conservation charities and regulators to deliver paid for ecosystem services at both a local and landscape scale. Many of these relationships will see shooters act as buyers or sellers, but BASC’s *Green Shoots* programme also allows shooters to act as knowledge providers at local and national scales. At a national scale BASC members have provided detailed habitat information on almost 500,000 hectares of land, and survey data at a local scale (for example, Dorset) can account for up to 43% of the total land area of a county.



**Figure 3:** Five broad phases for designing and implementing a PES scheme (From Smith *et al.*, 2013)

### 3. WHAT CAN SHOOTING DELIVER?

Shooting influences the management of 14 million hectares of land, which is equivalent to two thirds of the rural land mass of the UK (PACEC, 2014). Just under 30% of all land influenced by shooting has conservation designations. Furthermore, 1.8 million hectares are managed specifically for shooting, which includes 850,000 hectares of heather moorland and 500,000 hectares of woodland. These areas have an essential role to play in connecting the UK's many fragmented and dispersed Sites of Special Scientific Interest (SSSIs), 77% of which are smaller than 100ha (England Biodiversity Group, 2011).

Shooting and farming form a natural synergy, with farmers providing access to a large proportion of shot-over land in the UK. Shooters can act as volunteer conservators and custodians for farmers, helping with food security, pest control and habitat management, and farmers can work with shooters to provide the best habitat for game. In this role shooters have helped farmers to embrace the habitat management schemes initiated by Common Agricultural Policy (CAP) reform, which have resulted in modern day stewardship schemes.

Working together farmers and shooters can increase farm effectiveness (through wildlife management and pest control and other regulating services), maximise the shooting opportunities, and provide biodiversity gains all round. By acting as unpaid labourers shooters have the potential to help farmers overcome some of the financial barriers to entry to agri-environment schemes. There is already a strong tradition of shoots creating or maintaining habitats in ways commensurate with agri-environment schemes, with recent data (PACEC, 2014) showing:

- 48% of shoots planting cover crops
- 41% of shoots creating or maintaining hedgerows
- 33% of shoots creating or maintaining grass strips around fields
- 26% of shoots creating or maintaining conservation headlands
- 18% of shoots creating or maintaining beetle banks

#### 3.1. Habitat management and conservation

Shoot providers on lowland shoots work with land owners and managers to achieve the best landscape for game, with knock-on benefits for many other species. Recent data (PACEC, 2014) show that this includes 500,000ha of managed woodland, 140,000ha of retained overwinter stubbles and 25,000ha of cover crops planted by shooting providers.

Many bird species are dependent on the food provided by overwinter stubbles, which have been found to support higher numbers of overwintering granivorous passerines such as **linnet**, **yellowhammer** and **chaffinch** as well as breeding **lapwing**, **starling** and **greenfinches** (Bradbury & Allen, 2003). For some species the effect of overwinter stubbles can be large. For example, **Cirl buntings** are almost entirely reliant on weedy overwinter stubble fields<sup>2</sup>, and in areas with high uptake of over winter stubbles the population has been shown to increase by 83%, compared with a 2% increase on farms managed otherwise (Peach *et al.*, 2001).

<sup>2</sup> <http://www.rspb.org.uk/whatwedo/projects/details.aspx?id=222509>



However, the area of overwinter stubbles has decreased, and changing management practices have led to reductions in the density of seeds in arable soils (Robinson & Sutherland, 2002). Shooting however, continues to manage roughly a quarter of all over winter stubble in the UK (140,000ha), and the area where shooting exerts an influence has increased by 20,000ha since 2006.

Hedgerows are an important feature of lowland farms, forming boundaries, natural seedbanks and shelter for the many natural predators of farmland pests. They are also invaluable for shooting, providing feeding and nesting sites for game, natural highways for gamebirds and cover for guns. It is no surprise then that 41% of shoot providers create or maintain hedgerows. The creation and management of hedgerows by shooters and farmers provides an important resource for farmland birds (Hinsley & Bellamy, 2000), especially when combined with other habitats common to land managed for game, including cover crops, stubble fields and conservation headlands. When further combined with other typical game management practices, such as predator control, this has been found to locally reverse the declines seen in farmland bird species (Stoate & Szczur, 2001) for species such as **song thrush**, **whitethroat**, **dunnock** and **blackbird**. Predator control has also been found to help ground nesting upland birds (Fletcher *et al.*, 2010) including **skylark** (Tryjanowski *et al.*, 2002), **lapwing**, **golden plover**, **curlew**, **red grouse** and **meadow pipit**, especially where predator numbers are high (Bolton *et al.*, 2007). Clearly there is potential for shooters and farmers to work together to achieve similar gains at the landscape scale.

Over half of all shoot providers carry out wildlife management and pest control to protect game and habitats. This is a complicated area as it has been found to increase populations at the end of the breeding season, but not to affect the numbers surviving the winter (Côté & Sutherland, 1997). Predator control is therefore beneficial for quarry populations, but of limited use to most other bird species (perhaps with the exception of ground nesting birds and waders).

Corvids are one of the most important groups of avian nest predators (Andren, 1992; Anglestam, 1986), and management for shooting, which includes the removal of corvids can lead to significant increases in passerine breeding success (Stoate & Szczur, 2001). Furthermore, jays can be responsible for up to 40% of all nest predation in blackcaps (Weidinger, 2009). Research has found that the most effective control is where mammalian and avian predators are both removed (Bodey *et al.*, 2011; Madden *et al.*, 2015; Parker, 1984), and data from the Value of Shooting shows that on average shoots report annual bags of 74 small mammalian predators per estate; so clearly this is already happening.

BASC has been working at the landscape scale in a targeted way since the turn of the millennium through its Green Shoots programme. This seeks to “recognise, build upon, and co-ordinate the shooting community’s considerable contribution to wildlife and biodiversity conservation”. To date this programme has achieved significant biodiversity gains at the landscape scale, with, for example, twenty one local landowners in Cheshire working together to plant or restore 48km of hedgerow and 87 hectares of woodland with the aim of allowing dormice to recolonise the county, expand their range and move in response to climate change. Furthermore, BASC has co-ordinated volunteers, farmers, conservation charities and statutory agencies across the Somerset Levels, South Somerset, West Dorset and certain rivers in Devon to help restore water vole populations through targeted habitat management and mink eradication. To date over 600 mink have been removed from the Somerset Levels alone and 3 independent reports chart the significant recovery of water vole.



## 3.2. Food security

Shooters can play an important role in protecting crops and livestock. Over half (37,800) of all shoot providers carry out wildlife management and pest control, either to protect game or habitat. Furthermore, there are an estimated 220,000 individuals carrying out control of avian pests and 140,000 individuals controlling mammalian pests and predators in the UK. This results in an estimated annual take of at least 1.1 million **woodpigeons**, 300,000 corvids, 520,000 rabbits, 150,000 grey squirrels and 66,000 foxes. Due to methodological constraints, this does not include those birds and animals controlled as part of a job, so for example the number killed by the estimated 21,000 full-time equivalent game keepers and shoot managers in the UK are not included.

Agri-environment schemes, which act at the landscape-scale, can lead to overabundance of dominant species (such as **woodpigeon**) which can act to exclude and outcompete target species (Baker *et al.*, 2012). Although much of the research is old (see Parrott *et al.*, 2014 for a brief review), rabbits and pigeons can cause significant damage to crops. For example, rabbits have been estimated to cause £115m of damage to British agriculture (Petrovan & Barrio, 2011). Furthermore, there is approximately 737,000ha of oil seed rape grown in the UK with a total yield of 2.2m tonnes (HGCA & AHDB, 2014), worth approximately £531m. However, rabbits (Boag *et al.*, 1990) and **woodpigeons** can cause significant reductions in yield, with **woodpigeons** alone capable of causing up to a 9% reduction in oil seed rape yields (Inglis *et al.*, 1989). This could be equivalent to up to £50m annually worth of damage to oil seed rape by **woodpigeons** alone. Shooters can play an important role in acting as a lethal deterrent over these crops, especially during March (Murton & Jones, 1973) when most damage is caused by woodpigeons. This can help to reduce local damage as well as providing an important provisioning service in the form of **woodpigeon** and rabbit meat.



It has been estimated that foxes cause £12m worth of damage to UK agriculture, including £9.4m to the sheep sector and £1m to pig producers (Harris & Yalden, 2008). There are roughly 250,000 foxes in the UK, of which 33,000 live in urban areas (Battersby & Tracking Mammals Partnership, 2005), meaning that 66,000 foxes shot each year by shooters represents roughly one third of the rural population. This is an important pest-control service for farmers which can have significant benefits for ground nesting birds.

In Scotland, many goose populations have recovered to the point that they are beginning to cause conflicts with agriculture. The nature of the conflict varies with species and location, but the two principle species are Greenland **barnacle geese** on Islay and native **greylag geese** on Orkney. Greenland **barnacle geese** on Islay have increased from around 7,000 in

the early 1960's to over 40,000 which has led to damage of £1.6 million (R. McKenzie, 2014) due to heavy grazing pressure on spring grass, resulting in an increased winter feed costs for farmers, delayed tupping and a move away from dairy to beef cattle. On Orkney, resident **greylag geese** have increased from 110 in 2000 to over 20,000 by 2013 (Brides *et al.*, 2013; Crabtree *et al.*, 2010) which has led to damage to grass leys and barley crops. Both of these populations are now subject to adaptive harvest management schemes which aim to reduce the damage caused by these populations to acceptable levels through culling and scaring of the geese. On Islay, shooters are involved in the culling of these geese under licence from the Scottish government, ensuring food security and reducing the cost to the public through reduced compensation payments. Furthermore, the geese shot as part of the Orkney scheme are sold on the island, providing a healthy and nutritious meat as well as bringing in employment and income for the local economy.

Shooting not only protects agriculture, it is also a source of food. In the case of woodpigeon and rabbits, this is predominantly a by-product of pest control operations, but for other bird species the provision of wild, healthy meat is an important part of the process. Deer will be shot as part of wildlife management operations, for welfare reasons and also for sporting purposes. Table 1 estimates the edible portion weight of all game meat (approximately 9,000T), and the value of the provisioning service provided by game meat (£61 million). Although this is small compared with the total UK spend on food of £96 billion in 2013 (Defra, 2014) it is nevertheless a valuable service.

SPECIES	NUMBER SHOT	TOTAL EDIBLE PORTION WEIGHT (T)	VALUE OF PROVISIONING SERVICE
<b>Pheasant</b>	13,000,000	2600.0	£13,000,000
<b>Partridge</b>	4,400,000	396.0	£1,980,000
<b>Woodpigeon</b>	1,100,000	99.00	£495,000
<b>Duck</b>	1,000,000	100.0	£500,000
<b>Grouse</b>	700,000	98.0	£490,000
<b>Woodcock/snipe</b>	270,000	13.5	£67,500
<b>Goose</b>	110,000	74.3	£371,250
<b>Rabbit</b>	520,000	260.0	£2,080,000
<b>All deer</b>	184,000	5225.6	£41,804,800

**Table 1:** The estimated value of the provisioning service provided by shooting, assuming a chicken equivalent value of £5/kg for bird species and a beef equivalent value of £8/kg for mammal species.)

### 3.3. Cross-compliance

Shooters have an important role to play in ensuring they do not breach the cross compliance rules that farmers are bound by. These rules are requirements that farmers must comply with in order to be eligible for single farm payments and agri-environment scheme funds from the Common Agricultural Policy. They fall in to Good Agricultural and Environmental Condition (GAEC) and Statutory Management Requirements (SMRs), and although they vary across the home nations there are many similarities. For example, there are GAEC requirements for heather and grass burning, protecting public rights of way, and protecting landscape features, trees and SSSIs. Most SMRs refer to specific husbandry actions, but there are also SMRs for the protection of SSSI's, wild birds and the conservation of habitats which are relevant to shooters. Shooters need to be aware of these rules and abide by these requirements in order to avoid fines for farmers

### 3.4. Biodiversity off-setting

Development, as a result of increasing urbanisation, is one of the main cause of worldwide habitat loss (McKinney, 2006). However, the concept of biodiversity offsetting, where developers pay to restore equivalent greenspace for any habitat damaged or destroyed, has split all involved in land management, including farmers and conservationists. The disagreement has mainly focused on the potential for off-setting to allow developers to destroy irreplaceable biodiversity (for example ancient oak woodland) in exchange for lower value habitats. One of the reasons for this is that it is difficult to assess how much biodiversity will be lost, and therefore the size of the required offset (Moilanen *et al.*, 2009; Quétier & Lavorel, 2011). For example, due to the processes involved, a hectare of scrub grassland is likely to be easier to off-set than a hectare of established salt marsh.

Off-setting is not a new concept, with options for wetland habitat mitigation dating back to the 1970's in America, but the evidence that biodiversity off-setting could work in the UK and won't result in a net loss of biodiversity is unclear (Maron *et al.*, 2012; Walker *et al.*, 2009). Currently the government is still considering the findings of the original biodiversity off-setting pilots trialled in 2013/14 and was due to report in late 2014. However, clearly there are potential opportunities for shooters to benefit where they are willing to act as land managers. For example, new wetlands created through managed realignment are likely to be attractive to wildfowling clubs.

Biodiversity off-setting is inextricably linked with ecosystem services (Mace *et al.*, 2012), although not always in obvious ways. For example, the conversion of agriculturally-improved grassland to a traditional hay meadow would have substantial positive effects on native species richness, and a small increase in the carbon sequestration ability of the land. However, planting the same grassland with non-native trees would increase the provisioning services of the land (by providing timber) and greatly increase the carbon sequestration potential, but at the same time reducing native species richness (Bullock *et al.*, 2011).

### 3.5. Diversification for small farms

Farm diversification has been found to provide an average of £10,400 extra revenue for the roughly 50% of UK farms with some form of diversification. Some of the more common forms of diversification include alternative agricultural products such as fish farming, alternative livestock (such as llamas) or non-food crops (such as short rotation coppice). However, shooting can also provide several avenues for diversification, including clay pigeon shooting and the leasing of shooting rights.

Clay shooting is a popular sport in its own right, with 15 Olympic disciplines, as well as 25,000 members of the Clay Pigeon Shooting Association and 66% of all shooters reporting shooting clays at least once a year. Clay target shooting requires space, but if it is taking place for fewer than 28 days per year, and no permanent structures are erected, no planning permission is needed. One final restriction is that clay pigeon shooting should not take place over crops (especially oilseed rape) after 31st March or yellow bud stage, whichever is later. Typically clay target shooting participants will pay £20-£40 to shoot 100 clays at a cost of £0.005-£0.09 per target and one off costs of £150-£1,200 per target thrower (trap). Aside from the restriction over rape crops clay shooting can take place over pasture and arable land without interfering with farming operations. As such it can be an attractive diversification option for farms in areas with strong shooting communities.

Much of lowland Britain has the potential to host small game shoots, and farmers are best placed to provide access to this land. Recent data shows that shooters are paying on average £3.20/ha to rent shooting rights. Often this involves little participation from the farmer, but where shoots request additional services, such as creation of woodland rides, or cover crops, this can generate additional income for farmers. As well as the direct financial benefits to farmers there are additional ecosystem services that shooters can provide, including wildlife management and pest control (woodpigeons, foxes and rabbits), winter food provision (which can benefit farmland passerines) and habitat management such as brush clearing.

Including shooting in diversification portfolios also enables farmers to benefit from upskilling opportunities through both formal and on the job qualifications. For example, BASC manages a network of highly qualified shotgun coaches who are all required to reaccredit every 3 years, all of whom achieve an Edexcel accredited level 3 award in coaching. Furthermore, many colleges offer land-based courses that would benefit farmers looking to diversify into shooting with qualifications from diplomas and BTECs up to BSc (hons) level. Some funding is already there to support farmers in diversification skills development eg Farming Connect.

## 4. CONCLUSIONS AND RECOMMENDATIONS

Landscape scale management is a sea-change in the UK's approach to conservation, and with it will come a great deal of challenges for those land managers that want to take part. Shooting can facilitate many aspects of landscape scale management, as well as helping farmers to break down the barriers to entry to agri-environment schemes. However, more can be done to help shooters work collectively with conservation organisations and land managers to maximise the biodiversity gains and enhance the resilience of the network.

- Recognition for the benefits of wildlife management and pest control. Shooters carry out wildlife management and vital pest control around the UK, invariably at no cost to the farmer. This enhances UK food security, helps to increase farm productivity and provides an important regulating ecosystem service. In the case of deer, rabbits and **woodpigeons** it also provides a valuable food resource. It is therefore vital that government and local authorities understand the need for, and recognise the benefits of, legitimate pest control.
- Development funding to help farmers create shoots. Shooting benefits the environment and farmers, and through the conservation based ecosystem services it provides, society as a whole. Funding for farmers to create more shoots would result in significant conservation benefits in terms of greater habitat creation and enhanced biodiversity. Furthermore it will increase the uptake of rural training delivered as a consequence of farm diversification.
- Development of the supply chain for game as food. Game meat is a healthy alternative to farmed meat with an estimated annual value of £61 million, but it is currently undervalued and underutilised.
- Simplification of the general licences. A reduction in the administrative burden surrounding general licences would facilitate best practice and allow shooters to concentrate on delivering their much needed and valued conservation work.



## 5. REFERENCES

- Andren, H. (1992). Corvid Density and Nest Predation in Relation to Forest Fragmentation: A Landscape Perspective. *Ecology*, 73(3), 794.
- Anglestam, P. (1986). Predation on Ground-Nesting Birds' Nests in Relation to Predator Densities and Habitat Edge. *Oikos*, 47(3), 365–373.
- Baker, D. J., Freeman, S. N., Grice, P. V., & Siriwardena, G. M. (2012). Landscape-scale responses of birds to agri-environment management: a test of the English Environmental Stewardship scheme. *Journal of Applied Ecology*, 49(4), 871–882.
- Battersby, J., & Tracking Mammals Partnership. (2005). *UK Mammals: Species Status and Population Trends. Population (English Edition)*. JNCC/Tracking Mammals Partnership 2005.
- Boag, B., MacFarlane Smith, W. H., & Griffiths, D. W. (1990). Effects of grazing by wild rabbits (*Oryctolagus cuniculus*) on the growth and yield of oilseed and fodder rape (*Brassica napus* sub. sp. *oleifera*). *Crop Protection*, 9(2), 155–159.
- Bodey, T. W., McDonald, R. A., Sheldon, R. D., & Bearhop, S. (2011). Absence of effects of predator control on nesting success of northern lapwings *Vanellus vanellus*: implications for conservation. *Ibis*, 153(3), 543–555.
- Bolton, M., Tyler, G., Smith, K. E. N., & Bamford, R. O. Y. (2007). The impact of predator control on lapwing *Vanellus vanellus* breeding success on wet grassland nature reserves. *Journal of Applied Ecology*, 44(3), 534–544(11).
- Bradbury, R. B., & Allen, D. S. (2003). Evaluation of the impact of the pilot UK Arable Stewardship Scheme on breeding and wintering birds. *Bird Study*, 50, 131–141.
- Brides, K., Leitch, A., & Meek, E. (2013). *The abundance and distribution of British Greylag Geese on Orkney, August 2013*. Slimbridge.
- Brussard, P. F., Reed, J. M., & Tracy, C. R. (1998). Ecosystem management: what is it really? *Landscape and Urban Planning*, 40(1-3), 9–20.
- Bullock, J. M., Aronson, J., Newton, A. C., Pywell, R. F., & Rey-Benayas, J. M. (2011). Restoration of ecosystem services and biodiversity: conflicts and opportunities. *Trends in Ecology & Evolution*, 26(10), 541–9.
- Cao, Y., Elliott, J., McCracken, D., Rowe, K., Whitehead, J., & Wilson, L. (2009). *Estimating the Scale of Future Environmental Land Management Requirements for the UK*.
- Côté, I. M., & Sutherland, W. J. (1997). The Effectiveness of Removing Predators to Protect Bird Populations. *Conservation Biology*, 11(2), 395–405.
- Coulson, T., Guinness, F., Pemberton, J., & Clutton-Brock, T. (2003). The demographic consequences of releasing a population of Red Deer from culling. *Ecology*, 85(2), 411–422.

CPRE, & NFU. (2006). *Living landscapes: hidden costs of managing the countryside.*

Crabtree, C., Humphreys, L., Moxey, A., & Wernham, C. (2010). *2010 review of goose management policy in Scotland.* Stirling, Scotland.

Curry, D. (2002). *Farming and Food, a Sustainable Future. Report of the Policy Commission on the Future of Farming and Food.* London.

Defra. (2014). *Food statistics pocketbook 2013: In year update.*

Doswald, N., Willis, S. G., Collingham, Y. C., Pain, D. J., Green, R. E., & Huntley, B. (2009). Potential impacts of climatic change on the breeding and non-breeding ranges and migration distance of European *Sylvia* warblers. *Journal of Biogeography*, 36(6), 1194–1208.

Emery, S., & Franks, J. (2012). The potential for collaborative agri-environment schemes in England: Can a well-designed collaborative approach address farmers' concerns with current schemes? *Journal of Rural Studies*, 28(3), 218–231.

England Biodiversity Group. (2011). *Think BIG: How and why landscape-scale conservation benefits wildlife, people and the wider economy.*

Espinosa-Goded, M., Barreiro-Hurlé, J., & Dupraz, P. (2013). Identifying additional barriers in the adoption of agri-environmental schemes: *The role of fixed costs.* *Land Use Policy*, 31, 526–535.

Fletcher, K., Aebischer, N. J., Baines, D., Foster, R., & Hoodless, A. N. (2010). Changes in breeding success and abundance of ground-nesting moorland birds in relation to the experimental deployment of legal predator control. *Journal of Applied Ecology*, 47(2), 263–272(10).

Franks, J., & Emery, S. (2013). Incentivising collaborative conservation: Lessons from existing environmental Stewardship Scheme options. *Land Use Policy*, 30(1), 847–862.

Harris, S., & Yalden, D. W. (2008). *Mammals of the British Isles: Handbook, 4th edition.*

HGCA, & AHDB. (2014). *HGCA oilseed rape guide.*

Hinsley, S. A., & Bellamy, P. E. (2000). The Influence of hedge structure, management and landscape context on the value of hedgerows to birds. *Journal of Environmental Management*, 60(1), 33–49.

HM Government. (2011). *The Natural Choice: securing the value of nature.*

Inglis, I. R., Thearle, R. J. P., & Isaacson, A. J. (1989). Woodpigeon (*Columba palumbus*) damage to oilseed rape. *Crop Protection*, 8(5), 299–309.

Knight, R. L. (1998). Ecosystem management and conservation biology. *Landscape and Urban Planning*, 40(1-3), 41–45.

Lobley, M., & Potter, C. (1998). Environmental Stewardship in UK agriculture: A comparison of the environmentally sensitive area programme and the Countryside Stewardship Scheme in South East England. *Geoforum*, 29(4), 413–432.

Mace, G. M., Norris, K., & Fitter, A. H. (2012). Biodiversity and ecosystem services: a multilayered relationship. *Trends in Ecology & Evolution*, 27(1), 19–26.

Madden, C. F., Arroyo, B., & Amar, A. (2015). A review of the impacts of corvids on bird productivity and abundance. *Ibis*, 157(1), 1–16.

Maron, M., Hobbs, R. J., Moilanen, A., Matthews, J. W., Christie, K., Gardner, T. A., McAlpine, C. A. (2012). Faustian bargains? Restoration realities in the context of biodiversity offset policies. *Biological Conservation*, 155, 141–148.

McKenzie, A. J., Emery, S. B., Franks, J. R., & Whittingham, M. J. (2013). Landscape-scale conservation: collaborative agri-environment schemes could benefit both biodiversity and ecosystem services, but will farmers be willing to participate? *Journal of Applied Ecology*.

McKenzie, R. (2014). *Islay sustainable goose management strategy: October 2014 - April 2024*.

McKinney, M. L. (2006). Urbanization as a major cause of biotic homogenization. *Biological Conservation*, 127(3), 247–260.

Moilanen, A., van Teeffelen, A. J. a., Ben-Haim, Y., & Ferrier, S. (2009). How Much Compensation is Enough? A Framework for Incorporating Uncertainty and Time Discounting When Calculating Offset Ratios for Impacted Habitat. *Restoration Ecology*, 17(4), 470–478.

Murton, R. K., & Jones, B. E. (1973). The ecology and economics of damage to Brassicaceae by wood-pigeons *Columba palumbus*. *Annals of Applied Biology*, 75(1), 107–122.

Newsome, T. M., Crowther, M. S., & Dickman, C. R. (2014). Rapid recolonisation by the European red fox: how effective are uncoordinated and isolated control programs? *European Journal of Wildlife Research*, 60(5), 749–757.

PACEC. (2014). *The Value of Shooting: The economic, environmental, and social benefits of shooting sports in the UK*. Cambridge, UK.

Parker, H. (1984). Effect of Corvid Removal. on Reproduction of Willow Ptarmigan and Black Grouse. *The Journal of Wildlife Management*, 48(4), 1197.

Parrott, D., Roy, S., Bellamy, F., & Daniel, B. (2014). A review of the woodpigeon costs to Brassicas, salad crops and oilseed rape and the effectiveness of management activities.

Peach, W. J., Lovett, L. J., Wotton, S. R., & Jeffs, C. (2001). Countryside stewardship delivers cirl buntings (*Emberiza cirlus*) in Devon, UK. *Biological Conservation*, 101(3), 361–373.

Petrovan, S., & Barrio, I. (2011). Farming for pests? Local and landscape-scale effects of grassland management on rabbit densities. *European Journal of Wildlife Research*, 57(1), 27–34.

Quétier, F., & Lavorel, S. (2011). Assessing ecological equivalence in biodiversity offset schemes: Key issues and solutions. *Biological Conservation*, 144(12), 2991–2999.

Robinson, R. a., & Sutherland, W. J. (2002). Post-war changes in arable farming and biodiversity in Great Britain. *Journal of Applied Ecology*, 39(1), 157–176.

Smith, S., Rowcroft, P., Everard, M., Couldrick, L., Reed, M., Rogers, H., White, C. (2013). Payments for Ecosystem Services: A Best Practice Guide. London.

Stoate, C., & Szczur, J. (2001). Could game management have a role in the conservation of farmland passerines? A case study from a Leicestershire farm. *Bird Study*, 48(3), 279–292.

Tryjanowski, P., Goldyn, B., & Surmacki, A. (2002). Influence of the red fox (*Vulpes vulpes*, Linnaeus 1758) on the distribution and number of breeding birds in an intensively used farmland. *Ecological Research*, 17(3), 395–399.

UK National Ecosystem Assessment. (2011). *The UK National Ecosystem Assessment Technical Report*. Cambridge.

Van Dijk, W. F. A., Lokhorst, A. M., Berendse, F., & de Snoo, G. R. (2015). Collective agri-environment schemes: How can regional environmental cooperatives enhance farmers' intentions for agri-environment schemes? *Land Use Policy*, 42, 759–766.

Wäber, K., Spencer, J., Dolman, P. M., & Waber, K. (2013). Achieving landscape-scale deer management for biodiversity conservation: The need to consider sources and sinks. *The Journal of Wildlife Management*, 77(4), 726–736.

Walker, S., Brower, A. L., Stephens, R. T. T., & Lee, W. G. (2009). Why bartering biodiversity fails. *Conservation Letters*, 2(4), 149–157.

Weidinger, K. (2009). Nest predators of woodland open-nesting songbirds in central Europe. *Ibis*, 151(2), 352–360.

Wilson, G. A., & Hart, K. (2001). Farmer Participation in Agri-Environmental Schemes: Towards Conservation-Oriented Thinking? *Sociologia Ruralis*, 41(2), 254–274.



The British Association for Shooting and Conservation  
Marford Mill, Rossett, Wrexham LL12 0HL

Tel: 01244 573 000

Fax: 01244 573 001

Email: [enq@basc.org.uk](mailto:enq@basc.org.uk)

[www.basc.org.uk](http://www.basc.org.uk)

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