The natural capital benefits of shooting

BASC

The British Association for Shooting & Conservation

basc.org.uk

What is natural capital?

Natural capital can be defined as the sum of financial and social benefits we derive from our natural environment. For example, the extent and condition of woodland habitat determines how much timber, biodiversity, carbon capture, clean air and clean water it delivers. Additionally, our countryside provides recreation, health and wellbeing benefits. Understanding the range and value of these benefits enables balanced land management choices.

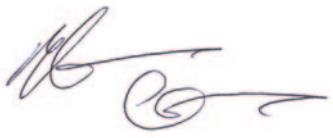
The Natural Capital Committee sat between 2012 and 2020 to advise government on such matters. It established metrics to measure natural capital and assisted government in the creation of a 25 Year Environment Plan for England. This has developed into the Environmental Improvement Plan, supported by legally binding environmental targets under the 2021 Environment Act. Natural capital approaches are interwoven into each home country's policy and delivery frameworks. Wales' Environment Act of 2016 legally embedded the sustainable use of natural resources into their operations, Scotland is developing its own environmental improvement plan and the natural capital approach also underpins Northern Ireland's draft Environment Strategy.

Natural capital has impacted on land managers in a material way. Payments are available for farmers under agri-environment schemes to deliver public goods like biodiversity, recreation, clean air and water. Private natural capital markets pay for benefits like carbon capture and biodiversity offsetting.

Shooting across the UK is diverse and provides recreation for hundreds of thousands of people – an important natural capital benefit. However, what are the other benefits that come from its influence on the landscape and how can the policy maker, landowner and farmer work those benefits into the wider land management choices they make?

This report sets out BASC's inaugural natural capital account for shooting. It provides a new insight to the scale of benefits shooting provides. We have developed it using the best data available to BASC and our partners at eftec and Strutt & Parker's research team.

The report demonstrates that the natural capital benefits of shooting and shooting-related activities equate to over a billion pounds a year. It is therefore with great pride that I present this report and its findings to the wider public.



Eoghan Cameron
BASC Chairman

Executive summary

We estimate the natural capital benefits attributable to shooting are more than £1.1 billion a year in 2023 prices. This figure is divided between four main categories.

- Carbon storage and capture
- Public health cost savings
- Recreational value for shooters and the public
- Food value and savings to farmers and foresters

For comparison, national statistics estimate the total income from farming in the UK was £7.9 billion in 2022. The benefits from shooting that we are currently able to value fall into the following areas.

Carbon

The capture, removal and storage of atmospheric carbon is critical to mitigating the impacts of climate change. The carbon sequestration value of shooting's management of land and species across woodland, wetland and saltmarsh have never been assessed before. We estimate it at £382 million, comprised of sequestration from habitat creation and management for shooting (£178 million) and the avoided carbon losses because of deer and grey squirrel management in woodlands specifically (£204 million).

Public health

We have valued the public health savings from avoided NHS and local authority budgets at £64.3 million. It is comprised of physical health benefits (£20m) and mental health benefits (£6.7m) for those involved in shooting. There is an additional benefit to everyone's health (£37.6m) from air pollutants removed by woodland created by and managed for shooting.

Recreation

The largest benefit in monetary terms is the recreational value generated by those who shoot or support shooting, such as beaters and pickers-up. This is £572 million, generated from over three million days of activity spread across rural parts of the UK. Additionally, the public benefit from an enhanced recreational experience from accessing more diverse and rich habitats as a result of shooting, which we valued at £35.9 million.

Food, farming and forestry

We have valued the benefits for food production and forestry productivity that come from shooting at approximately £100 million. Shooting harvests high quality animal protein and we estimate that is worth more than £44 million. The management of species to minimise crop losses for farmers is worth £43 million a year. Similarly, the management of deer and grey squirrels avoids foresters losing over £12 million in timber output.

Other benefits

There are two benefits it is not currently possible to value. Firstly there is water storage from woodland managed for shooting, which improves water quality and reduces flood risk, and is estimated at 18.9 million cubic metres. The second is that land used for game and waterfowl shooting has a much higher level of overlap with priority habitats than average, at 20-28 per cent of the land coverage.

Shooting can often be considered too narrowly. However, this report clearly indicates its value across much wider policy priorities for governments. It provides us with compelling reasons why it is in the public's interest to have sustainable shooting contributing towards these public benefits.

The overarching approach

The approach we took was to study the benefits that come from lowland game shooting, upland game shooting, waterfowl shooting and from the regulation of certain species.

These benefits include: the carbon value of key habitats affected by management for shooting; air pollution and water storage impacts from woodland; an indication of the biodiversity value on land used for shooting; the recreational value for both the general public and participants; the value of the food harvested; and the physical and mental wellbeing impacts. The impact of the management of species that cause environmental issues was assessed by estimating the avoided damage to natural assets such as crops and timber.

To develop a robust account, we used several complimentary approaches to establish the environmental assets of the land that shooting operates over and to estimate the gross value of the benefits generated. We then determined how much of that value was attributable to shooting, as little land is influenced solely by one activity.

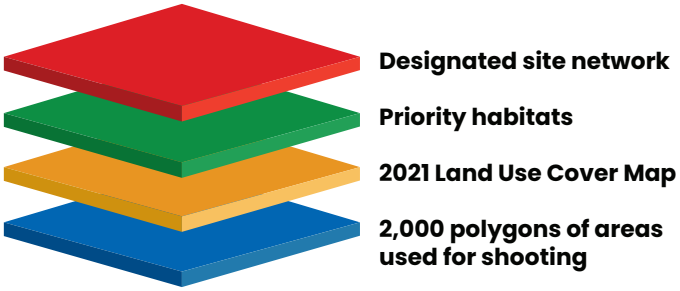
We used the best available evidence to inform both parts of the process, be that peer reviewed data, published documents or expert knowledge. We used expert opinion to determine a conservative mid-point attribution rate, to avoid the risk of overestimating the benefits.

Data we used to generate the account

Lowland game shooting and waterfowl shooting

To determine the spatial extent for lowland gamebird shooting and for waterfowl shooting, we compared the spatial overlap of over 2,000 shooting areas provided by BASC members with broad habitat types from the 2021 Land Use Cover map and priority habitats for each home country that fall within these types of shooting. We did the same exercise for the designated site network (ASSI, SSSI, Ramsar, SPA and SAC).

We then followed the approach pioneered by Exeter University that estimated how many shoots of what size are in each home country to translate the sample to the country scale.



Upland game shooting

For upland gamebird shooting (principally grouse), we benefitted from detailed data held by the Moorland Association from their members for England. In Scotland we used data estimates commissioned as part of the Werritty Review. Estimates for Northern Ireland came from the Irish Red Grouse Conservation Trust. Estimates for Wales were from expert opinion.

Regulation of certain species

For the impact of wildlife management on the environment, especially deer, squirrel, rabbit, woodpigeon and goose, we took estimates from bag data, their overall populations and the current level of damage experienced to estimate the damage avoided by their control.

Number of days people spend on shooting

The number of days people spent shooting or supporting shooting were taken from surveys run by countryside organisations. For grouse shooting a bespoke calculation based on the potential productivity of moorland used for shooting was moderated by long-term bag indices produced by the Game and Wildlife Conservation Trust.

Valuing the benefits

To value the benefits, we favoured methods established through the Enabling a Natural Capital Approach programme and those used by the Office of National Statistics. We used 2023 market price values in this account.

We found the data availability for Northern Ireland was extremely limited, both for estimating the extent of shooting and scaling it up to a national level. Consequently it is likely to be an extreme under-estimate of the true picture.

The results in detail

Carbon - £382 million

UK Carbon sequestration value from habitat creation, management and species management from shooting (£ million)

	Upland game	Lowland Game	Wildfowl	Deer management	Grey squirrel management	Total
Woodland	11.5	158.5	2.7	171.4	32.6	376.8
Saltmarsh			3.3			3.3
Inland wetlands			2.3			2.3
						382.4

See appendix for home country contributions to UK values

Habitat creation and management for woodland, wetland and saltmarsh

We found that shooting operates over a very large extent of wooded landscape. Most notably, lowland game shooting encompasses over 310,000ha of woodland.

From the peer-reviewed evidence base we determined that 35 per cent of the carbon value of the woodland could be attributed to lowland game shooting from the enhanced planting and management that occurs compared with land without lowland game shooting. We reduced this to 25 per cent for woodlands on upland game shooting areas to reflect that pheasant shooting often occurs in woodlands on the moorland fringe but not on shelter belts high above the moorland line. We also allocated a nominal two per cent for woodlands where waterfowl shooting takes place to reflect the management around woodland ponds used for duck flighting. The lower calculated value than woodland is due to lower carbon sequestration rates and different market value for wetland carbon units. The combination of these is substantial at £172.7 million.

We found that shooting areas that undertook waterfowl shooting had higher freshwater, coastal and marine habitats than the national average. Peer-reviewed evidence on shooting's impact on wetland is limited so we undertook a rapid assessment of the wetland ponds and scrapes present on the Ouse Washes in Cambridgeshire. We found 93 per cent of wetland features on shooting land were created and or maintained for waterfowl shooting only. To allow for the fact that only wetland features in optimal condition sequester carbon we considered only one third was in such condition in this study.

For saltmarsh some wildfowling clubs have active programmes to improve its condition, such as targeted grazing or mowing and creation of scrapes. However, for much of a saltmarsh the appropriate conservation choice is non-intervention. Therefore, we allocated a conservative five per cent of the carbon value to management for shooting.

Deer and grey squirrel management

The carbon value of new and established woodlands can be significantly reduced by herbivore damage. We looked at deer and grey squirrel numbers culled across the UK and estimated the corresponding amount of damage. We estimated that the loss of seven per cent of the UK's woodland area was avoided and that three and a half per cent of tree biomass was saved when deer management is in place. For grey squirrel management, a similar approach resulted in ten per cent of woodland damage and biomass reduction avoided. The benefit to saved carbon is substantial at £171.4 million from deer management and £32.6 million from grey squirrel management.

Public health benefits – £64 million

UK health benefits for general public and members of the shooting community (£ million)

	Upland game	Lowland Game	Wildfowl	Deer and pest management	Total
Healthcare benefits from air pollution removal by woodland	0.9	36.2	0.5		37.6
Physical health benefits – shooting community	0.2	16.5	0.9	2.5	20
Mental health benefits - shooting community (figure for all shooting types combined)					6.7
					64.3

See appendix for home country contributions to UK values

Healthcare benefits from air pollution removal

Vegetation removes pollutants from the air, which leads to human health benefits. Modelling work on the particulate matter smaller than 2.5 micrometres (PM2.5) removed by woodlands and the associated savings in local authority healthcare costs is well established. This has enabled us to translate the benefit rates established for the carbon valuation above into public healthcare savings from PM2.5 removal at £37.6 million.

Physical health benefits for the shooting community

Active recreational visits have a measurable physical health benefit in terms of avoided healthcare costs due to improved quality of life. Live quarry shooting involves substantial physical activity and many of those activities are for the whole day, not just the required 30 minute duration to qualify. However, being conservative, we assumed that a shooting visit equated to one 30 minute slot to estimate the avoided health care costs. Although this is certainly lower than the true value, it is still a substantial saving to NHS costs across the UK of £20 million.

Mental health benefits for the shooting community

There is growing empirical evidence that engagement in the natural environment lowers depression, anxiety and stress. This is the basis of NHS green social prescribing. Studies of the shooting community already provide evidence of lower rates of loneliness and higher mental clarity and sociability than the average citizen. Using established models, the avoided mental health costs from being involved in shooting is worth £6.7 million.

Recreation – £608 million

UK value of recreation for those who shoot or support shooting (£ million)

	Upland game	Lowland Game	Wildfowl	Deer management	Pest management	Total
Recreational value for those involved with shooting	24.2	501	12.8	22.4	11.3	571.7
Public recreation in landscapes managed for shooting	3.5	22.1	10.3			35.9
						607.6

See appendix for home country contributions to UK values

Recreational value for those involved in shooting

This assessment is based on the monetary value for both the people accessing shooting as well as those supporting them, such as guides, beaters and pickers-up. This valuation does not include a wider assessment of economic benefits such as supporting local hotels, food businesses and suppliers of equipment.

We split our data into shooting at commercial rates from 2023 market values (i.e. buying shooting from a provider) and non-commercial rates from costs of a syndicate running their own shooting or gaining permission from a landowner by the number of days shooting taken. Non-shooting participants like guides and beaters were assumed to have a value of £50 a day.

Lowland game shooting is clearly the highest contributor from the table above and this is mainly driven by the number of participants. The overall recreation value to the UK is high at £571.7 million in 2023 prices.

Public recreation in landscapes managed for shooting.

The public gain a welfare benefit from visits to accessible open space, especially where it is more diverse. We used the welfare benefits figures generated for rural areas from the Defra-funded ORVal recreational valuation tool. In line with similar studies, we considered a five per cent attribution of this benefit appropriate because of the higher than the national average of coverage of native woodland and wetlands on land used for shooting. Therefore, the benefit to the public from accessing landscapes managed for shooting is £35.9 million.

Food, farming and forestry - £100 million

UK value of food harvest from shooting alongside crop and timber losses avoided through wildlife management (£ million)

	Upland game	Lowland Game	Wildfowl	Deer management	Pest management	Total
Food harvested	1.2	11.3	1.5	29.2	1.3	44.5
Crop damage avoided				17.3	25.7	43.0
Timber damage avoided				11.1	1.4	12.6
						100.1

See appendix for home country contributions to UK values

Food harvested from shooting

We took UK bag stats from a number of organisational surveys to estimate the number of birds and mammals harvested in each home country. We looked at the market rates for deer (venison) and grouse or substitutes for other species when either they cannot be sold or when the farm gate price provides an unrealistically low value. The results revealed an overall value of £44.5 million, with venison the largest contributor at nearly £30 million across the UK. Lowland game was second at £11.3 million.

Food is not all about its financial value. The high quality and low-fat properties of game meat, which is often produced alongside conventional farming, make a significant contribution towards providing quality animal protein for society.

Avoided crop damage for farmers

To estimate the value of avoided crop damage, we referred to evidence of the costs of current crop losses to farmers from pests and deer. Then we calculated the additional damage expected from the proportion of the population harvested each year from those species. We estimated values for deer (£17 million), woodpigeon (£19.8 million), rabbits (£1.5 million) and geese (£4.4 million) management and combined them to give the overall value of £43 million.

Avoided timber and wood fuel damage

To estimate timber and wood fuel damage avoided, we referred to the Office of National Statistics Woodland Natural Accounts figures for the volume harvested and market value. We used estimates from England and Scotland of timber crop lost from deer browsing to arrive at a three per cent reduction in damage that would have been caused without current levels of deer management (£11.1 million). For grey squirrels we looked at evidence of damage from the National Forest Index and reports from the Royal Forestry Society to arrive at ten per cent avoided damage due to grey squirrel control (£1.4 million). The difference in estimated values is because the gross impacts of deer are substantially higher than grey squirrels.

Final thoughts

This inaugural natural capital report has helped identify where data is either weak, missing, uncertain and contested, i.e. the effect of peatland management practices of prescribed burning, cutting and non-intervention for carbon sequestration/emissions, risk of wildfire, flooding and water resources (flow and quality), and upland biodiversity. As improvements in the evidence base and methodologies for ecosystem service valuation are available, we will refine our existing assessments and add in other factors to provide a more comprehensive set of benefit accounts.

This report has revealed the widespread natural capital benefits provided by shooting for society. The £1.1 billion of benefits across the UK is pushing back against the nature and climate emergencies we all face. Shooting is providing carbon benefits through habitat creation, management and protection. It is improving health and wellbeing for the public and participants in shooting. It is providing a recreational benefit for both those in society that shoot and those that do not. It is providing food and materials by supporting farm and forestry efficiency, as well putting low fat high protein meat onto dinner tables from shot food. What is striking is how balanced the public benefits from shooting are. Many forms of recreation will give you recreational, health and wellbeing benefits but how many also give society a substantial carbon benefit, result in a sustainable food supply and help our farms and foresters produce food and materials? In this respect shooting is unique.

At BASC, we are focused on enhancing those benefits so that sustainable shooting will provide more for current and future generations.

Appendix - UK - Summary table of benefits from shooting and its associated habitat creation and management in 2023 (£ million)

	Upland game	Lowland Game	Wildfowl	Deer management	Pest	Totals (allowing for rounding)
Carbon sequestration **£382.4 million**. A regulating ecosystem service						
Woodland	11.5	158.5	2.7	171.4	32.6	376.8
Saltmarsh			3.3			3.3
Wetland			2.3			2.3
Public health benefits **£64.3 million**. A cultural ecosystem service						
Healthcare benefits from air pollution removal by woodland	0.9	36.2	0.5			37.6
Physical health benefits – shooting community	0.2	16.5	0.9	1.2	1.3	20
Mental health benefits - shooting community (figure for all shooting types combined)						6.7
Recreational value **£607.6 million**. A cultural ecosystem service						
Recreation value to those involved in shooting	24.2	501.0	12.8	22.4	11.3	571.7
Public recreation in landscapes managed for shooting	3.5	22.1	10.3			35.9
Food, farming and forestry value **£100.1 million**. A provisioning ecosystem service						
Food harvested	1.2	11.3	1.5	29.2	1.3	44.5
Crop damage avoided				17.3	25.7	43.0
Timber damage avoided				11.1	1.4	12.6
Total (allowing for rounding)						**1,154.4**
Non-monetary measures						
Water storage by woodland (million m3)	1.3	17.3	0.3			**18.9**
Priority habitat cover (%)	28.1	20.1	2.02			

ENGLAND – Summary table of benefits from shooting and its associated habitat creation and management in 2023 (£ million)

	Upland game	Lowland Game	Wildfowl	Deer management	Pest	Totals (allowing for rounding)
Carbon sequestration **£226.8 million**. A regulating ecosystem service						
Woodland	7.3	123.0	1.8	70.0	22.0	224.1
Saltmarsh			2.2			2.2
Wetland			0.5			0.5
Public health benefits **£57.7 million**. A cultural ecosystem service						
Healthcare benefits from air pollution removal by woodland	0.8	34.9	0.5			36.2
Physical health benefits – shooting community	0.2	13.5	0.7	0.9	1.1	16.4
Mental health benefits - shooting community (figure for all shooting types combined)						5.1
Recreational value **£495.1 million**. A cultural ecosystem service						
Recreation value to those involved in shooting	14.8	411.9	10.4	16.5	9.6	463.2
Public recreation in landscapes managed for shooting	2.2	20.8	8.9			31.9
Food and forestry value **£65.1 million**. A provisioning ecosystem service						
Food harvested	0.7	9.3	1.2	12.5	1.1	24.8
Crop damage avoided				13.9	22.7	36.6
Timber damage avoided				2.7	1.0	3.7
Total (allowing for rounding)						**844.9**

SCOTLAND – Summary table of benefits from shooting and its associated habitat creation and management in 2023 (£ million)

	Upland game	Lowland Game	Wildfowl	Deer management	Pest	Totals (allowing for rounding)
Carbon sequestration **£120.5 million**. A regulating ecosystem service						
Woodland	4.2	28.7	0.7	78.7	6.7	119.1
Saltmarsh			0.4			0.4
Wetland			1.0			1.0
Public health benefits **£4.6 million**. A cultural ecosystem service						
Healthcare benefits from air pollution removal by woodland	0.1	0.7	0.0			0.8
Physical health benefits – shooting community	0.0	2.4	0.1	0.3	0.2	3.0
Mental health benefits - shooting community (figure for all shooting types combined)						0.8
Recreational value **£92.4 million**. A cultural ecosystem service						
Recreation value to those involved in shooting	9.2	72.0	2.0	5.6	1.4	90.1
Public recreation in landscapes managed for shooting	1.2	0.6	0.5			2.3
Food, farming and forestry value **£29.3 million**. A provisioning ecosystem service						
Food harvested	0.5	1.7	0.2	16.0	0.2	18.6
Crop damage avoided				1.7	2.3	4
Timber damage avoided				6.7	0.0	6.7
Total (allowing for rounding)						**246.8**

WALES – Summary table of benefits from shooting and its associated habitat creation and management in 2023 (£ million)

	Upland game	Lowland Game	Wildfowl	Deer management	Pest	Totals (allowing for rounding)
Carbon sequestration **£26.8 million**. A regulating ecosystem service						
Woodland	-	6.0	0.1	16.5	2.8	25.4
Saltmarsh			0.6			0.6
Wetland			0.8			0.8
Public health benefits **£1.2 million**. A cultural ecosystem service						
Healthcare benefits from air pollution removal by woodland		0.5	0.0			0.5
Physical health benefits – shooting community	0.0	0.4	0.0	0.0	0.0	0.5
Mental health benefits - shooting community (figure for all shooting types combined)						0.2
Recreational value **£15.1 million**. A cultural ecosystem service						
Recreation value to those involved in shooting	0.1	12.6	0.4	0.4	0.3	13.7
Public recreation in landscapes managed for shooting	0.0	0.7	0.8			1.4
Food, farming and forestry value **£4.2 million**. A provisioning ecosystem service						
Food harvested	0.0	0.3	0.1	0.4	0.0	0.8
Crop damage avoided				1.5	0.4	1.9
Timber damage avoided				1.2	0.2	1.5
Total (allowing for rounding)						**47.4**

NORTHERN IRELAND – Summary table of benefits from shooting and its associated habitat creation and management in 2023 (£ million)

We found that the data availability for Northern Ireland was extremely limited both for estimating the extent of shooting and scaling it up to a national scale. Therefore, these figures are an extreme under-estimate of the true picture.

	Upland game	Lowland Game	Wildfowl	Deer management	Pest	Totals (allowing for rounding)
Carbon sequestration **£8.3 million**. A regulating ecosystem service						
Woodland		0.8	0.1	6.2	1.1	8.2
Saltmarsh			0.0			0.0
Wetland			0.1			0.1
Public health benefits **£0.8 million**. A cultural ecosystem service						
Healthcare benefits from air pollution removal by woodland	0.0	0.1	0.0			0.1
Physical health benefits – shooting community	0.0	0.1	0.0	0.0	0.0	0.1
Mental health benefits - shooting community (figure for all shooting types combined)						0.6
Recreational value **£5 million**. A cultural ecosystem service						
Recreation value to those involved in shooting	0.1	4.6				4.7
Public recreation in landscapes managed for shooting	0.0	0.0	0.2	-	-	0.3
Food and Forestry value **£1.5 million**. A provisioning ecosystem service						
Food harvested	0.0	0.1	0.0	0.2		0.4
Crop damage avoided				0.2	0.3	0.5
Timber damage avoided				0.5	0.1	0.6
Total (allowing for rounding)						**15.4**

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